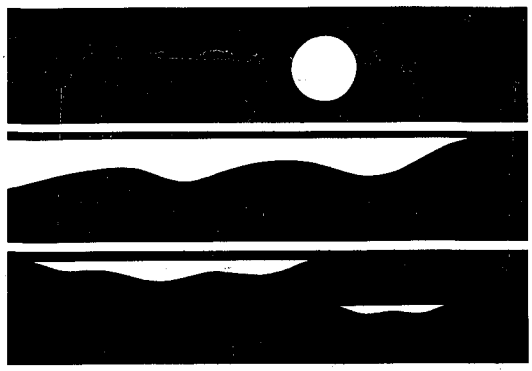


WASHINGTON STATE DEPARTMENT OF ECOLOGY

WATER AND SHORELANDS DIVISION WATER QUALITY PROGRAM

1994 WASHINGTON STATE WATER QUALITY ASSESSMENT [305 (b)] Report

September 1995

Ecology Publication # WQ-95-65a

1994
Washington State Water Quality Assessment
[305 (b)] Report

Prepared by the Washington State Department of Ecology
Water and Shorelands Division
Water Quality Program

Michael T. Llewelyn, Program Manager

Document Coordinators:
Steve Butkus
Sue Patnude

September 1995

Publication # WQ-95-65a

(Companion documents are also available:
WQ-95-65b: Assessment Data and References
WQ-95-65c: Assessment Maps)

Publication # WQ-95-65a

Companion documents are also available.

WQ-95-65b contains Water Quality Assessment Data and References

WQ-95-65c contains 11 x 17 Assessment Maps of each Water Quality Management Area and Water Resource Inventory Area

WQ-95-311 contains the 1994 Statewide Water Quality Assessment Lakes Chapter

For additional copies of these documents, contact:
Department of Ecology
Publications Distribution Center
P.O. Box 47600
Olympia, WA 98504-7600
Phone (360) 407-7472

(A charge may be applied to offset printing costs)

ACKNOWLEDGEMENTS

MANY PEOPLE CONTRIBUTED TO THIS DOCUMENT...

MYRA BARKER

STEVE BUTKUS

AMY CHOMOWICZ

STAN CIUBA

KIRK COOK

KEN DZINBAL

BOB DUFFY

KITTY GILLESPIE

FRED GRIEF

KATHY HAMEL

TIM HILLIARD

MIKE HEROLD

PHIL KAUZLORIC

JAIMI KOOSER

FOROOZAN LABIB

MICHAEL T. LLEWELYN

PERRY LUND

TOM LUSTER

SUE PATNUDE

RON MCBRIDE

ALLEN MOORE

JULIE RECTOR

DAVE ROBERTS

STEVE SAUNDERS

DICK WALLACE

DAN WRYE

THANK YOU!

Information About This Document

Washington's 1994 State Water Quality Assessment [305 (b)] Report to Congress details the results of water quality assessments conducted by the state. Descriptions of state programs that manage and clean up troubled waters and prevent pollution are also included. This report is intended to partially satisfy biennial reporting requirements under Section 305 (b) of the federal Clean Water Act and Washington state's need for a comprehensive state reference. A companion document to the 305(b) report was published in February 1995 and is titled 1994 Statewide Water Quality Assessment Lakes Chapter, Ecology Publication # 95-311.

Overall assessment information is divided into three documents. The first is a narrative overview of state programs that manage water quality and statewide assessments. The second document contains individual water body information organized by the water quality management areas currently used by Ecology's Water Quality Program as geographic planning tools, along with references and background information. The third package contains maps for 23 water quality management areas and 62 water resource inventory areas - covering the whole state.

Statewide Geographic Information System covers in ARC-INFO format for support of uses, causes of impairment and sources of impairment are available upon request. Send an 8mm tape and/or an internet address for File Transfer Protocol (FTP) to Steve Butkus, P.O. Box 47600, Olympia, WA 98504-7600 or call Steve at (360) 407-6482.

If you have questions about the general content of this report, please call Steve Butkus at (360) 407-6482 (voice) or (360) 407-6006 (TDD). Contacts for information on specific issues in the report are listed inside.

Copies of this publication and its companion publications, or other publications listed inside the report are available through Ecology's Publication Distribution Office, (360) 407-7472. Ask for Publication # WQ-95-65a, #WQ-95-65b, and/or #WQ-95-65c.

Table of Contents

List of Tables

Companion Documents Available:

Ecology Publication # WQ-95-65b: Assessment Data and References

Ecology Publication # WQ-95-65c: Assessment Maps

Ecology Publication # WQ-95-311: Lakes Chapter

THE QUALITY OF WASHINGTON STATE WATERS

EXECUTIVE SUMMARY

Washington State is blessed with abundant rivers, streams, lakes, wetlands and marine waters. These surface water supplies provide irrigation water, electricity, drinking water, habitat for birds, shellfish and other aquatic life, support recreational activities like fishing, swimming and boating, and bring tourists to Washington from all over the world, boosting the state economy.

Washington's economy depends on a healthy environment. Fishing, forestry, agriculture, and mining are examples of resource based industries that depend upon the availability of natural resources to survive. These industries can also be a threat to the quality of water. Since the state's population has grown, more demands have been placed on these industries, as well as our cities and towns. As a result, the volume of waste has increased and water pollution in Washington state is becoming more widespread.

Ground water supplies, once plentiful in the state, are now being challenged as never before. Population growth and accompanying demands for water use, pesticides and nitrates in tested wells, and lower than average rainfall over the years are testing the state's ability to sustain high quality water supplies.

Every two years, the Washington State Department of Ecology gathers all available information on water quality in the state and reports on how our waters are doing. This most current water quality assessment represents a snapshot in time of Washington's water quality. Ongoing changes in the process used to assess our waters makes it impossible at this time to determine water quality trends. However, with technology improving and partnerships for protecting our state's water quality developing, we anticipate an increase in capabilities and shared resources.

Surface Water Quality

In 1994, complete individual assessments were made for 1,516 rivers, stream, lake and estuary segments. These assessments represent

about 10% of all rivers and streams, 51% of lakes, and 20% of estuaries in the state. Data was collected for these waters because of known or suspected water quaity problems.

Approximately 70% of the river and stream lengths assessed are not supporting their beneficial uses (e.g., swimming, fishing) as set by state water quality standards. The primary causes of these water quality problems are high temperature and fecal coliform bacteria. The greatest pollution sources for impairment to Washington state rivers and streams are agricultural activities and modification of stream habitat.

About 30% of the lake areas assessed are not supporting their beneficial uses, primarily due to aesthetic impacts from too much algal and aquatic plant growth. The primary cause of these problems is excessive nutrients. Nonpoint source pollution and natural conditions are the greatest pollution sources of water quality impairment to lakes in Washington state.

Nearly 40% of estuary areas assessed are not supporting their beneficial uses. The primary causes of the impairment to estuaries are fecal coliform bacteria and low dissolved oxygen. Nonpoint source pollution and natural conditions are the greatest pollution sources of beneficial use impairment to Washington state estuaries.

Ground Water Quality

In the State of Washington, ground water is the source of drinking water for between 60 and 70% of its citizens. In large areas east of the Cascade Mountain Range, 80 to 100 % of the the available drinking water is obtained from ground water sources. As a whole, over 95% of Washington's public drinking water systems use ground water as their primary water supply.

As the state approaches full allocation of its surface water resources and the population continues to increase, pressure to develop the state's ground water reserves will intensify. Increased use of ground water for drinking water, agriculture, and industrial development will result in degraded water quality if adequate protection measures are not put into place. Key to the protection of Washington's ground water sources is determining current ground water quality coupled with understanding the vulnerability of its productive aquifers.

The State of Washington has detected contamination in ground water across the state that can be classed in the following five categories:

1. Metals and trace elements resulting from industrial, mining, or agricultural activities;

2. Nitrates resulting from overuse of fertilizers, density of on-site sewage systems, applications of municipal and industrial wastewaters, and storm water infiltration;

3. Pesticides resulting from both large and small scale agricultural activities, and from residential use;

4. Petroleum leakage resulting from industrial spills and leaking underground storage tanks, and;

5. Synthetic organic chemical releases from industrial operations.

To some degree, each county within Washington has detected one or more of these contaminant classes in ground water. The distribution of these contaminant detections are directly related to the way land is currently being used. The highly agricultural areas within eastern Washington, the irrigated areas within the Columbia Basin and those areas within western Washington where concentrated agricultural activities take place, historically have a higher incidence of ground water contamination due to pesticide and nutrient use. The urbanized areas of the state, specifically the metropolitan areas of Seattle, Tacoma, and Spokane have concentrated areas of industrial and petroleum contamination of the ground water resource. Urbanized areas within the state also contain a higher incidence of ground water contamination traced to storm water run-off and use of injection wells for storm water management.

Management of Washington State's Water Quality

Water quality is being degraded in Washington State by the cumulative effects of human actions. What is Washington State doing to meet the water quality challenges it faces? What role does the Department of Ecology play in controlling water pollution in the state?

In 1993, the Washington State Department of Ecology started managing wastewater discharge permits and other point and nonpoint discharges of pollutants to ground and surface waters on a watershed basis. This watershed approach to water quality management is designed to synchronize water quality monitoring, inspections, permitting, nonpoint activities and funding. The approach links science, permitting, and

prevention activities to maintain water quality standards.
Managing water quality by water quality management area allows a closer examination of water quality concerns and makes it easier to link wastewater discharge permit requirements and nonpoint source controls to the overall condition and quality of local waters. It also provides an organized way to bring Ecology together with interest groups, conservation districts, tribes, federal agencies, local governments, citizens, and other state agencies to take a comprehensive look at the watershed.

Ecology's management approach consists of a five-step process: identification of problems (also called scoping); monitoring and data collecting; studying problem areas; preparing technical reports and implementing solutions to water quality problems. The anticipated outcome of this approach is improved water quality.

Water Quality Improvements: *Success through Education, Technical Assistance and Financing*

Education, site visits, building partnerships and providing financial resources are the most effective tools Ecology uses to reduce widespread sources of pollution.

In general, businesses and individuals in Washington State are concerned about the quality of water and willing to do their part, even if it means investing in new technology and pollution prevention improvements, as long as they understand what they have to do and why.

As a help to the business community, Ecology develops manuals that explain "Best Management Practices" to potential polluters of water.

× *One such manual, the Best Management Practice Manual for Vehicle Recycler Facilities is being widely used by vehicle recycling shops in Washington state and also in British Columbia. The manual has been readily accepted by the industry as an easily understandable tool that provides cost-effective options to help solve pollution problems.*

Technical assistance provided to the agricultural community and financing to upgrade sewage treatment facilities have resulted in shellfish beaches in the state being reclassified from prohibited to conditionally approved. One example is Penn Cove Park.

× *Water quality in Penn Cove Park in northeastern Puget Sound was improved through upgrades of the Coupeville and Penn Cove Park sewage treatment plants, improvements in agricultural practices, and correction of an on-site sewage treatment and disposal system. Through use of Ecology's technical assistance and financial resources, people can once again harvest shellfish.*

Financial resources managed by Ecology and passed through to local governments, tribes and other state agencies have resulted in the water quality assessments throughout Washington's many watersheds. As a result, projects have started that improve both surface and ground water quality. Projects include: public education and involvement; watershed planning; establishment of shellfish protection districts; stream rehabilitation; stormwater management; salmon spawning habitat creation; changes in agricultural practices; and water quality monitoring.

× *With help from Ecology managed Centennial Clean Water Funds, the City of Tacoma and local businesses became partners to monitor water quality in Hybelos Creek. Comprehensive monitoring was conducted in the creek to detect heavy metals, solvents, and other toxicants, and to locate the point of discharge of each. The monitoring enabled businesses to develop solutions to control or prevent pollution from their businesses, and implement them in order of priority.*

It is up to each and every one of us to protect, preserve, and enhance the quality of water in Washington state for future generations. Water is one of Washington's greatest natural assets and at its most critical point in state history. There is a growing demand for water and this demand is putting both water quality and availability at serious risk.

For more detailed information:

Besides providing water quality assessment data, this report is intended to give the reader a general overview of programs and initiatives that Ecology is currently working on to protect and improve the state's water. Contact names and numbers are listed below to give you direct access to more detailed information on each topic.

Watershed Approach to Water Quality Management:
Ron McBride at (360) 407-6469
Sue Patnude at (360) 407-6432

TMDLs and the CWA [303 (d)] Listing Process:
Steve Butkus at (360) 407-6482

Point Source Initiatives:
Bill Moore at (360) 407-6444

Wastewater Treatment Plant Operator Certification:
Myra Barker at (360) 407-6449

Nonpoint Source Initiatives:
David Roberts at (360) 407-6414

Puget Sound Plans:
Dave Roberts (360) 407-6414

Dairy Waste Management:
Phil KauzLoric at (360) 407-6413

Monitoring:
Ken Dzinbal at (360) 407-6672

Financing:
Steve Carley at (360) 407-6572

Ground Water:
Kirk Cook at (360) 407-6415

Wetlands:
Jaime Kooser at (206) 649-7000 (Northwest Regional Office)

Lakes Restoration:
Allen Moore at (360) 407-6563

WATER QUALITY ASSESSMENT AND PROGRAM INFORMATION

Watershed Approach to Water Quality Management

In 1993, the Washington State Department of Ecology started managing wastewater discharge permits and other point and nonpoint discharges of pollutants to ground and surface waters on a watershed basis. The watershed approach to water quality management is designed to synchronize water quality monitoring, inspections and permitting. The approach links science, permitting, and prevention activities to maintain water quality standards.

Managing water quality on a watershed basis allows a closer examination of water quality concerns and makes it easier to link wastewater discharge permit requirements and nonpoint source controls to the overall condition and quality of local waters. It also provides an organized way to bring Ecology together with interest groups, conservation districts, tribes, federal agencies, local government, citizens, and other state agencies to take a comprehensive look at the watershed.

Ecology's water quality technicians and research staff work in 23 watersheds across the state. Wastewater discharge permits for municipal and industrial facilities within specific watersheds are issued during the same time frame to ensure consistency. Watershed councils are formed and local nonpoint action plans are developed through local watershed partners with Ecology's financial and technical assistance.

Each of Washington's 23 water quality management areas will progress through a five-step process as indicated below:

Step 1 - Identify known and suspected water quality problems within the watershed.

Step 2 - Monitor water quality and collect data

Step 3 - Continue to monitor water quality, collect data and perform special studies.

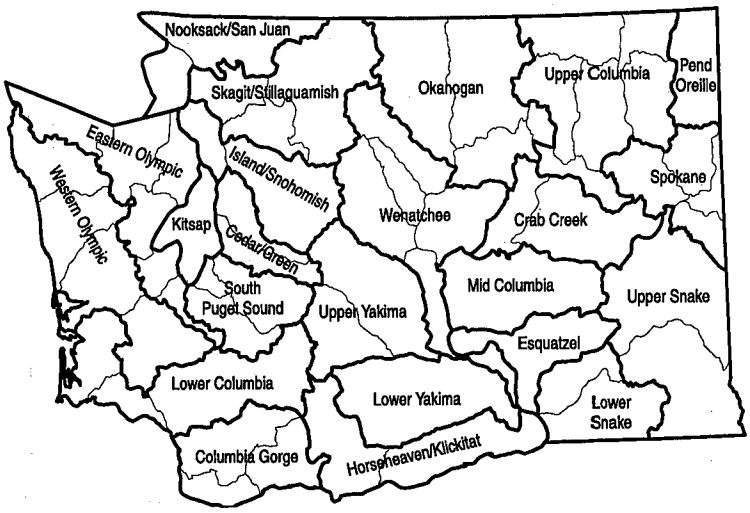
Step 4 - Develop technical reports that summarize areas of concern and strategies to respond to these concerns; and

Step 5 - Issue wastewater discharge permits and implement other activities to help meet quality standards.

This process is repeated on a five-year rotating cycle. By focusing on smaller geographical areas, Ecology is able to more closely examine the sources and effects of pollution within each watershed and take positive action that could dramatically improve water quality.

In July 1993 Ecology began its five-year, five step process by scoping the Skagit/Stillaguamish, Horseheaven/Klickitat, Pend Oreille, Upper Columbia, and Columbia Gorge watersheds. In July 1994, scoping was initiated in the Island/Snohomish, South Puget Sound, Okanogan, Crab Creek, and Esquatzel watersheds.

The map below shows the 23 water quality management areas in Washington used to manage water quality program resources. Copies of documents assessing the above mentioned watersheds are available through Ecology's publications office or by contacting Ron McBride at (360) 407-6469.



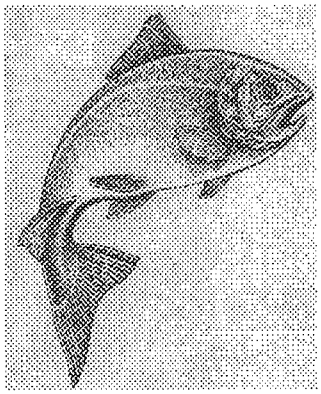
Total Maximum Daily Loads - TMDLs

Water bodies selected for further studies within Ecology's water quality management areas are first assessed through the "303 (d)" listing process. Section 303(d) of the federal Clean Water Act requires that Ecology develop this list every two years. The list describes those rivers, coastal waters, estuaries, and lakes that need additional water quality controls in order to meet standards. The listing of these "troubled waters" is used by the state to set environmental priorities for action.

Waters on the list exceed standards for bacteria, temperature, oxygen levels, nutrients, and toxic compounds or heavy metals. The list helps Ecology determine if there are human health concerns, dangers to fish and wildlife, and what kinds of uses the water body will support or impair.

Ecology conducts intensive studies on specific water bodies on the 303 (d) list in conjunction with the watershed approach to water quality management discussed earlier. These studies are referred to as Total Maximum Daily Load (TMDL) determinations.

TMDLs are used to control the discharge of pollutants to surface waters and still maintain water quality. When a technology-based pollution control, such as secondary treatment of a wastewater discharge, does not protect water quality, the federal Clean Water Act requires states to set limits on the amounts of pollutants that the water body can receive from all pollution sources...point source and nonpoint source...and still remain fishable and swimmable.



For an example of recommendations to improve water quality that are a result of a TMDL study, take the Upper Chehalis River Basin.

A TMDL study completed in 1994 that was conducted in the Upper Chehalis River Basin discovered low dissolved oxygen, high water temperatures, and bacterial contamination caused by pollution and natural conditions. These contaminants threaten water supplies, fish and wildlife habitat and recreational opportunities.

Recommendations made as a result of the study were:

- ***eliminate or move the current summer river discharges for the City of Chehalis and Darigold wastewater treament plants to reduce problems of low oxygen and the resulting threats to fish; and***

- ***reduce sources of bacterial contamination and nutrients in Black and Chehalis Rivers by activating watershed management plans.***

The results of a TMDL study, such as the Upper Chehalis, can have widespread effects on human and wildlife inhabitants of a watershed. Local government, industry and residents of the Chehalis watershed are working with Ecology to address the pollution issues in the river and come up with workable solutions.

Another example of a recently completed TMDL study in Washington state was done for the Puyallup River.

* *The Puyallup was selected as a priority from the troubled waters list because the continuous impacts of numerous permitted discharges on the river was unknown. In addition, the Puyallup watershed is undergoing rapid growth that promises to bring more pollution pressure and increasing requests to "load" the river with discharges from municipal and industrial facilities.*

* *Pollutants that threaten the beneficial uses (e.g., fishing and swimming) of the Puyallup river come from both point and nonpoint sources. There are wastewater discharge permits for 10 point sources on the river and nonpoint concerns include urban stormwater and runoff from forestry and agricultural practices.*

* *Due to limited resources, Ecology's study of the Puyallup was restricted to those pollutants that appeared most likely to cause significant water quality problems: ammonia; chlorine and oxygen demanding substances.*

The TMDL study recommended that specific amounts of each of these pollutants be allocated to the river. The study also set aside capacity for future dischargesor increases in the amount of discharges, should they occur. These limits on how much pollution from different sources can be discharged to the river are called Waste Load Allocations.

Facts about TMDLs:

≈ *Surface waters can digest pollutants to some extent through a natural process of self-purification. The amount of a pollution a waterway can absorb without violating water quality standards is called its loading capacity. TMDLs are usually set equal to a water's loading capacity.*

≈ *Loading capacities and TMDLs are based on water quality monitoring data. Ecology uses historical and current data from various sources to develop loading capacities and TMDLs. Mathematical modeling to simulate critical conditions of streamflow and pollutant loading are frequently used to establish a TMDL.*

≈ *The area included in a TMDL varies. A TMDL can be developed for part of a waterway, such as one section of a river, or for a basin that includes several rivers.*

≈ *The number of pollutants covered by a TMDL varies.*

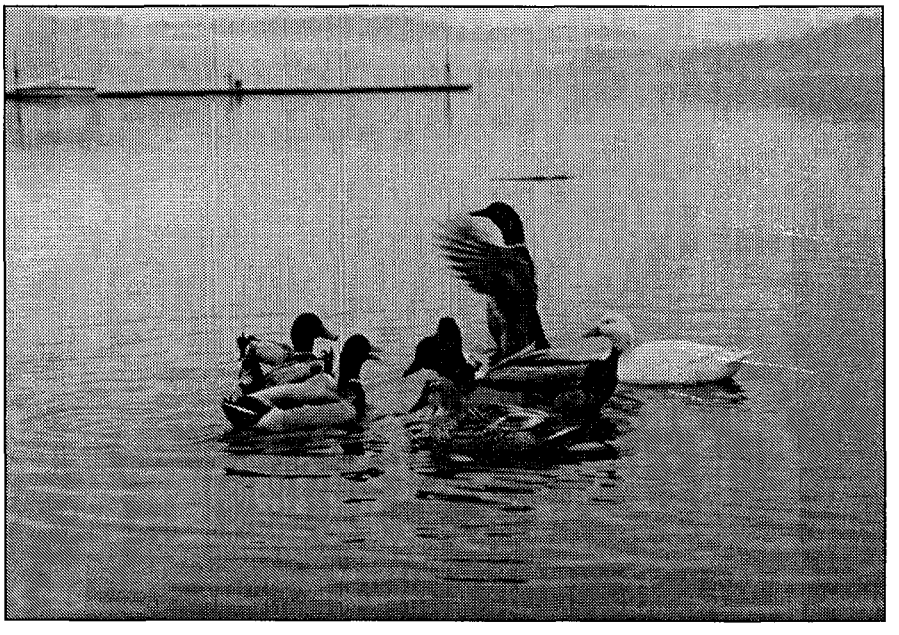


photo by Tom Hyde

TMDL Activities Update as of June 1, 1995

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
01	Sumas River	Ammonia-N BOD-5 Chlorine	Analysis completed 10/92. Water quality-based permit issued for the City of Sumas 5/95. Awaiting public process for TMDL notification before submittal to EPA for approval.	Water quality-based permit issued for the City of Sumas 5/95.	Not yet begun.
01	Fishtrap Creek	Fecal Coliform	Draft report completed 2/95	Not yet begun	Not yet begun
03	Lower Skagit	BOD (5-day) Fecal Coliform	Quality Assurance Project Plan prepared and sampling nearly completed. Report expected 7/96.	Not yet begun	Not yet begun
07	Lower Snohomish	Dioxin	TMDL approved 9/92.	Water quality-based permit for Weyerhaeuser Everett Kraft Mill issued 10/91, amended 2/92. Facility is currently not discharging.	Permit requires monitoring of 4 species for dioxin bioaccumulation before 5/96.
		Ammonia	Draft report on water quality model calibaration prepared 5/95	Not yet begun	Not yet begun
07	Snohomish River Tributaries	BOD (5-day) Fecal Coliform	Scoping started 5/95	Not yet begun	Not yet begun
07	Snoqualmie River	Ammonia-N BOD (5-day) Fecal Coliform	Submitted 12/94 and awaiting EPA approval.	Permits issued for Cities of North Bend and Snoqualmie in 1994, and Duvall in 1992. 2 year nonpoint action plan begun.	Ecology committed to monitoring during 1995 and 1996.

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
08	Ballinger lake	Total Phosphorus	TMDL approved 4/93	Phase II Clean Lakes Project completed in 1982 and Phase III completed in 1987	Routine monitoring began in 1987 by the city of Mountlake Terrace.
08	Pipers Creek	Fecal Coliform	TMDL approved 4/93	Puget Sound Watershed Action Plan under WAC 400-12 was completed in 1990.	Routine monthly and storm event monitoring being conducted by METRO.
09	Lake Fenwick	Total Phosphorus	TMDL approved 1/93	Phase I Clean Lakes Project completed in 1991. Phase IIa is expected to be completed in 1/96	The Phase IIb project is to montor the effectiveness of the restoration conducted in Phase IIa. Funds have not yet been granted for this project.
09	Lake Sawyer	Total Phosphorus	TMDL approved 2/93	Removal of Black Diamond discharge by interceptor to METRO in 1992.	METRO conducts routine monitoring of nutrients and water clarity
09	Duwamish River Lower Green River	Ammonia-N	TMDL approved 1/93	Removal of METRO's REnton discharge by diversion to Puget Sound in 1987	Biweekly monitoring by METRO at 4 locations on the segment
10	Commencement Bay	Dioxin	TMDL approved 6/92	Water quality-based permit for Simpson-Tacoma Kraft Mill issued 6/91	Permit requires monitoring of 4 species for dioxin bioaccumulation before 1/96
10	Puyallup River Basin	Ammonia-N BOD (5-day) Fecal Coliform	TMDL approved 11/94 Scoping started 5/95	Water quality-based permits for multiple discharges in 1994 Not yet begun	Ecology committed to monitoring during 1996 and 1997 Not yet begun

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
10	Wapato Creek	BOD	Scoping started 5/95	Not yet begun	Not yet begun
10	White River	Nutrients pH Instream Flow Temperature Chinook Habitat	Scoping started 5/95	Not yet begun	Not yet begun
11	Nisqually River	Fecal Coliform	Scoping started 5/95	Not yet begun	Not yet begun
12	Wapato Lake	Total Phosphorus	TMDL approved 4/93	Phase II Clean Lakes Project completed in 1987	Phase III monitoring was conducted from 1992 to 1994. A final report is expected by 7/95
12	Chambers Creek Clover Creek	Fecal Coliform	Scoping started 5/95	Not yet begun	Not yet begun
12	Clear Lake American Lake Snake Lake Steilacoom lake	Total Phosphorus	Scoping started 5/95	Not yet begun	Not yet begun
18	Strait of Juan de Fuca	Dioxin	TMDL approved 7/92	Water quality-based permit for ITT rayonier at Port Angeles issued 7/91	Permit requires monitoring of 4 species for dioxin bioaccumulation before 6/96
22	Inner Grays Harbor	Dioxin	TMDL approved 7/92	Water quality-based permits for Weyerhaeuser at Cosmopolis issued 5/91 and ITT Rayonier at Hoquiam issued 6/91	Both permits require monitoring of 4 species for dioxin bioaccumulation before 6/96

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
22	Wildcat Creek	Chlorine Ammonia-N Fecal Coliform BOD (5-day)	TMDL approved 2/93	Water quality-based permit for City of McCleary issued 4/80 and expired 4/85. New permit issuance expect by 7/95	Post-upgrade survey in 1986 found none of the previous wate quality problems. Currently, there is no ambient monitoring being conducted or planned.
23	Upper Chehalis River	Ammonia-N BOD (5-day)	Analysis completed 7/94. Public process, draft permits and nonpoint source aciton plans developed 5/95. Expect TMDL submittal to EPA for approval 7/95	Not yet begun	Not yet begun
23	Black River	BOD (5-day) Total Phosphorus Fecal Coliform	Analysis completed 6/94. Public proces, draft permits and nonpoint source aciton plans developed 5/95. Expect TMDL submittal to EPA for approval 7/95.	Not yet begun	Not yet begun
28	Weaver Creek	Ammonia-N BOD (5-day)	TMDL approved 3/93	Water quality-based permit for Town of Battleground issued 3/81 and expired 3/86. New permit issuance expected by 7/98.	Monthly ambient monitoring being conducted by Clark County at 3 locations on the segment
28	Gibbons Creek	Fecal Colliform Priority Pollutants	Quality Assurance Project Plan prepared and sampling completed. Report expected 11/95.	Not yet begun	Not yet begun
28	Lacamas Creek Lacamas Lake	Total Phosphorus	Project report expected 11/95	Not yet begun	Not yet begun
28	Salmon Creek	Fecal Coliform Turbidity	Quality Assurance Project Plan prepared. Report expected by 11/95.	Not yet begun	Not yet begun

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
30	Little Klickitat River	Chlorine BOD (5-day)	TMDL approved 8/93	Water quality-based permit for City of Goldendale issued 6/89 and expired 7/94. New permit issuance expected by 7/98.	No ambient montoring being conducted or planned
32	Mill Creek	Ammonia-N	TMDL approved 2/93	Water quality-based permit with seasonal discharge prohibition for City of Walla Walla issued 6/93	No ambient water quality monitoring being conducted or planned.
34	S.F. Palouse River	Ammonia-N	TMDL approved 9/94	Water quality-based permits will be issued for cities of pullman by 7/95 and Albion by 1/96 based ont he new analysis	Ecology committee to monitoring during 1997 and 1998
35	Pataha Creek	BOD (5-day) Ammonia-N	TMDL approved 9/94	Water quality-based permit for City of Pomeroy will be issued in March 2000. Compliance schedule has been issued with current permit to allow an upgrade to required effluent limits	Ecology committee to monitoring during 1997 and 1998
37	Lower Yakima River	Suspended Sediment	Quality Assurance Project Plan prepared and 1 year sampling completed	Not yet begun	Not yet begun
39	Crystal Creek	Chlorine Ammonia-N BOD (5-day) Fecal Coliform	TMDL approved 2/93	Water quality-based permit for City of Roslyn was recommended by EILS study. Permit is expected to be issued by 7/96	No ambient monitoirng being conducted or planned
41	Bureau of Reclamation Wasteways (DW237, W645W, and W645)	BOD (5-day)	Analysis completed 1/94. Awaiting public process of TMDL notification and completion of draft perrmit for the City of Quincy.	Not yet begun	Not yet begun

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
42	Sun Lakes /Chain Lakes	Nutrients	Scoping started 5/95	Not yet begun	Not yet begun
47	Lake Chelan	Total Phosphorus	TMDL approved 1/93	Water quality management plan with interlocal approval on 2/92	Monitoring is expected to begin sometime in 1995
54	Spokane River	Cadmium Lead Zinc	Analysis completed 6/94. Awaiting public process and permit development for NPDES dischargers	Not yet begun	Not yet begun
54	Long Lake	Total Phosphorus	TMDL approved 11/92	Memorandum of Agreement in 1989 for the Spokane River Phosphorus Management Plan resulted in water quality based-permits for City of Spokane, Liberty Lake Sewer District, Inland Empire, Kaiser Aluminum, and Spokane Industrial Park	No ambient monitoring being conducted or planned
55	Dragoon Creek	Chlorine Ammonia-N BOD (5-day) Total Phosphorus	TMDL approved 12/93	Removal of Deer Park discharge to spray irrigation in 1985	No ambient monitoring being conducted or planned
57	Spokane River	Cadmium Lead Zinc	Analysis completed 6/94. Awaiting public process and permit development for NPDES dischargers	Not yet begun	Not yet begun
57	Liberty Lake	Total Phosphorus Total Nitrogen	TMDL approved 4/93	Lake Restoration Project completed in 1983	Sampling in 1984 and 1985 showed loads were will below the TMDL goal. WSU continues to conduct monitoring at two locations.

Water Resource Inventory Area (WRIA)	Waterbody Name	Parameters	Development Status	Implementation Status	Followup Ambient Monitoring
59	Colville River	Ammonia-N BOD (5-day) Fecal Coliform Temperature	Quality Assurance Project Plan prepared and sampling completed. Project report expected by 7/96	Not yet begun	Not yet begun
NA	Columbia River	Dioxin	EPA established TMDL 2/91.	Water quality-based permit for eight pulp mills in Washington, Idaho and Oregon	A draft sampling and analysis plan for fish tissue has been developed by EPA. No date has been scheduled for monitoring to begin.

Statewide Assessment Information *(for more specific assessment data and reference information see companion document WQ-95-65b)*

Surface Waters

Washington State Department of Ecology is required by the federal Clean Water Act to assess the water quality of state surface waters (rivers, streams, estuaries and lakes) every two years. This assessment tells us:

- what the causes and sources of a water body impairment are;
- if there are excessive nutrients in the water that degrade aesthetic enjoyment;
- what toxic pollutants are present; and
- how state waters support beneficial uses such as swimming and fishing that are designated for protection in the State Water Quality Standards.

Statewide assessment information in this report is available for 20% of the total statewide area for estuaries, 51% of the total statewide area for lakes, and 10% of the total statewide length of rivers and streams. Also, due to a lack of available data, a large percentage of surface waters in the state were not assessed.

The assessment includes a look into how state waters support beneficial uses designated for protection under a classification scheme described in the state's Water Quality Standards (Chapter 173-201 WAC). The standards identify specific beneficial uses such as domestic water supply, recreation, navigation and fish habitat. (see Classifications for Designated Uses Table on page 30)

Assessments were prepared for surface water bodies by combining information available from a variety of sources (see WQ-95-65b). Use of the summary statistics shown in these tables and figures should be qualified with an understanding of the inherent bias resulting from the design of the assessment process.

Surface water quality data is not collected randomly, but is often collected from known problem areas. In addition, a water body may be listed as not supporting beneficial uses even if only one beneficial use is not supported and all others are.

In the next table, a description of the overall size of statewide surface waters is available, as well as, the size of waters assessed for this report period.

Statewide Surface Waters: Overall Size and Assessed Size

Surface Water Atlas Information	Size
Statewide Rivers and Streams Totals [1]	**73,886 miles**
Perennial Streams [1]	39,483 miles
Intermittent Streams [1]	31,592 miles
Ditches and Canals [1]	2,811 miles
Length of Streams Assessed	7,435 miles
Statewide Lake Area Totals [1]	**466,296 acres**
Number of Lakes Statewide [1]	4,174 acres
Area of Lakes Assessed	227,233 acres
Number of Lakes Assessed	700
Statewide Estuary Area Totals [2]	**2,943 square miles**
Area of Estuaries Assessed	577 square miles
Length of Ocean Coasts [2]	163 miles
Length of Ocean Coasts Assessed	0 miles
Statewide Wetland Area Totals [3]	**907,709 acres**
Freshwater Wetland Areas [3]	696,820 acres
Estuarine Wetland Areas [3]	210,889 acres

1 USEPA Total State Waters Report (December 1991)
2 Digital Planimetry from NOAA Navigation Charts
3 National Wetland Inventory 1984 maps converted to ARCInfo using Cowardin et al., 1992

Surface Water Classification

As seen in the following table, Washington's water quality standards place all surface waters into the following classifications:

- ***Class AA - Extraordinary Freshwater and Marine water***
- ***Class A - Excellent Freshwater and Marine water***
- ***Class B - Good Freshwater and Marine water***
- ***Class C - Fair Marine Water***
- ***Lake Class - Freshwater***

Specific classifications for 166 segments are provided within the state's Surface Water Quality Standards. General classifications apply to surface water bodies not specifically classified as follows:

- All surface waters lying within National Parks, National Forests, and/or wilderness areas are classified Class AA of Lake Class
- All lakes and their feeder streams are classified Lake Class and Class AA, respectively
- All unclassified surface waters that are tributaries to Class AA waters are classified Class AA
- All other unclassified surface waters are classified Class A

Classifications for Designated Uses of Surface Waters in Washington State

Designated Uses	Classification
WATER SUPPLY	
Domestic	Freshwater AA; Freshwater A; LAKE
Industrial	Freshwater AA; Freshwater A; Freshwater B; LAKE; Marine AA; Marine A; Marine B; Marine C
Agricultural	Freshwater AA; Freshwater A; Freshwater B; LAKE
STOCK WATERING	Freshwater AA; Freshwater A; Freshwater B; LAKE
FISH AND SHELLFISH	
Salmonid spawning	Freshwater AA; Freshwater A; LAKE
Rearing, harvesting, and other fish spawning	Freshwater AA; Freshwater A; Freshwater B; LAKE, Marine AA; Marine A; Marine B
Salmonid and other fish migration	ALL CLASSES
Clam, oyster, and mussel harvesting	Marine AA; Marine A
Clam, oyster, and mussel rearing and spawning	Marine AA; Marine A; Marine B
Crab, shrimp, etc, rearing, spawning, and harvesting	Marine AA; Marine A; Marine B
WILDLIFE HABITAT	ALL CLASSES
RECREATION	
Primary Contact (swimming, etc)	Freshwater AA; Freshwater A; LAKE; Marine AA; Marine A
Secondary Contact (fishing, etc)	ALL CLASSES
NAVIGATION	ALL CLASSES

Assessment Methods and Assumptions

Past statewide water quality assessment reports were generated based primarily on guidance documents from EPA. This guidance simply did not address many of the issues that came up during assessment analysis. In previous assessments, for issues not addressed in EPA guidance subjective decisions were made based on the interpretation of the intent of the federal Clean Water Act.

Concern was raised about the continuity of these assessment decisions between biennial reports. Two advisory panels were formed to review these issues. One panel consisted of about 40 Ecology staff from a wide range of disciplines. The second panel consisted of 10 non-Ecology professionals representing a balance of local government, academia, industry, and environmental interests. Expert opinion was solicited from both panels. Recommendations made by the panels were adopted as policy guidelines by Ecology's Water Quality Program to resolve these assessment issues. The policy appears in the companion report #95-65b.

Assessment Data Sources

Ecology attempts to gather as much information as possible on the state's water quality in order to conduct water quality assessments. Data sources are actively solicited through request letters, personal contacts, and by announcements in newsletters. Only data considered to be of acceptable quality based on professional judgement are used in the assessment.

Factors considered when evaluating data for acceptance include whether or not the data collector used a Quality Assurance/Quality Control plan, routine calibration of field instrumentation, and standard sampling techniques. In addition, some data is retrieved from central data bases and is assumed to be acceptable. For example, data collected by federal agencies and retrieved from EPA's STORET database were considered to have acceptable quality for assessments. Ecology welcomes information from new data sources for use in future assessment reports.

Individual Water Body Designated Use Support

For the purpose of this assessment, support of beneficial designated uses has been determined by comparing available water quality information to the state's water quality standards. These determinations consider criteria for chemical, biological or physical parameters which have been established to provide a level of water quality that supports designated uses. The following tables represent specific water body types, their designated uses and how much support is available for those uses.

ESTUARY (square miles)				
Designated Uses	Fully Supporting	Partially Supporting	Not Supporting	Not Assessed
Rearing, harvesting, and other fish spawning	45.1	34.4	63.2	2800.3
Salmonid and other fish migration	130.9	2.3	8.5	2801.3
Clam, oyster, and mussel harvesting	265.6	82.2	220.6	2374.6
Clam, oyster, and mussel rearing and spawning	43.6	34.1	65.9	2799.4
Crab, shrimp, etc, rearing, spawning, and harvesting	43.6	34.1	65.0	2800.3
Fish consumption	—	—	6.6	2936.4
Primary contact recreation (swimming)	117.3	4.4	18.0	2803.3
Secondary contact recreation (fishing)	138.7	0.4	1.0	2802.9
Wildlife habitat	—	—	5.5	2937.5

RIVERS AND STREAMS (reported in miles)				
Designated Uses	**Fully Supporting**	**Partially Supporting**	**Not Supporting**	**Not Assessed**
Salmonid spawning	1,273	1,527	4,221	66,865
Rearing, harvesting, and other fish spawning	2,142	624	2,602	68,518
Salmonid and other fish migration	2,554	589	2,146	68,597
Fish consumption	—	210	341	73,335
Primary contact recreation (swimming)	1,307	485	2,675	69,419
Secondary contact recreation (fishing)	2,117	273	1,351	70,145
Wildlife habitat	—	—	370	73,516

LAKES (reported in acres)				
Designated Use	**Fully Supporting**	**Partially Supporting**	**Not Supporting**	**Not Assessed**
Salmonid spawning	22,130	66	41,141	402,959
Rearing, harvesting, and other fish spawning	22,236	31	41,071	402,958
Salmonid and other fish migration	22,347	—	40,990	402,959
Fish consumption	—	—	18,472	447,824
Primary contact recreation	34,004	1,352	1,564	429,376
Secondary contact recreation	—	—	—	466,296
Aesthetic enjoyment	124,023	92,494	179	249,600
Wildlife habitat	—	—	22,890	443,406

Degree of Designated Use Support by Water Body Type

SIZE ASSESSED BY WATERBODY			
Degree of Designated Use Support	**Rivers and Streams (miles)**	**Lakes (acres)**	**Estuaries (square miles)**
Fully Supported	784	89,314	264.9
Partially Supported	1,396	69,756	82.0
Not Supported	5,255	79,993	229.7
Total Size Assessed	7,435	239,063	576.6
Total Size Not Assessed	66,451	227,233	2,366.4
Percent Assessed	10%	51%	20%

Overall Designated Use Support

The table above shows how many miles, square miles and acres of surface waters assessed for this report are supporting designated uses. Keep in mind that a waterbody may have several designated uses and be categorized at different levels of support, but overall will have only one use support determination. The overall use support determination will usually present the worst case situation.

If a waterbody is listed as overall ***Fully Supported*** it means that at least one individual designated use is assessed as fully supported and no other uses are assessed as partially or not supported.

If a waterbody is listed as overall ***Partially Supported*** it means that one or more individual designated use is assessed as partially supported.

If a waterbody is listed as overall ***Not Supported*** it means that one or more use is assessed as not supported.

Causes and Sources of Designated Use Impairment

During the 1994 assessment, causes and pollution sources for assessed water bodies that did not fully support their designated uses were categorized according to EPA definitions. Summary information on the causes and sources affecting impaired water bodies are presented in the next series of tables. Since a single water body may be impaired from multiple causes or sources, the total of the sizes reported for each water body type are greater than the total size assessed. There is no data that shows impairment of designated uses to Washington's coastal waters.

	Size Assessed by Water Body Type		
Causes of Use Impairment	**Rivers and Streams (Miles)**	**Lakes (acres)**	**Estuaries (square miles)**
*Unknown Toxicity	370	22,889	<0.1
Pesticides	388	52,709	1.4
Organics	379	33,863	15.6
Metals	255		6.9
Ammonia	3,224	857	
Chlorine	30		
Nutrients	10	111,717	
pH	3,664	59,169	163.5
Siltation	91		
Low Dissolved Oxygen	3,747		145.9
Temperature	5,694		163.5
Flow Alterations	4,703		
Habitat Alterations	1,642		
Pathogen Indicators	4,374	28,088	286.7
Turbidity	42		

**Mortality was caused to organisms used to test the toxicity in the water and the source of the toxicity remains unknown*

Size Assessed by Water Body Type			
Possible Sources of Use Impairment	**Rivers and Streams (miles)**	**Lakes (acres)**	**Estuaries (square miles)**
Industrial Point Sources	556		16.8
Municipal Point Sources	546		73.0
Combined Sewer Overflows	45		
Unspecified Nonpoint Sources	683	37,377	318.3
Stormwater Runoff	685	40,253	1.1
Agriculture - Overall	6,239	101,238	21.1
Nonirrigated Crop Production	157		
Irrigated Crop Production	1,412		
Specialty Crop Production	141		
Pasture Land	1,115		
Feedlots	209		
Aquaculture	65		
Animal Management Areas	523		20.3
Manure Lagoon	113		
Unspecified Agriculture	3,337	101,238	0.9
Silviculture - Overall	2,970		
Harvest Management	290		
Forest Management	395		
Logging Road Maintenance	437		
Unspecified Silviculture	2,251		

	Size Assessed by Water Body Type		
Possible Source of Use Impairment	**Rivers and Streams (miles)**	**Lakes (acres)**	**Estuaries (square miles)**
Construction - Overall	**392**	**6,006**	
Road/Bridge Construction	67	4,863	
Land Development	325	5,927	
Resource Extraction - Overall	**228**		
Surface Mining	34		
Mine Tailing	21		
Unspecified Resource Extraction	194		
Land Disposal - Overall	**164**		**80.2**
Wastewater	71		
Onsite Septic System	113		78.4
Hazardous Waste	30		1.8
Unspecified Land Disposal			
Hydromodification - Overall	**5,381**	**1,625**	
Channelization	197		
Dredging	105		
Dam Construction	19		
Flow Modification	1,074		
Riparian Vegetation Removal	1,882		
Streambank Modification	150		
Drainage/Filling of Wetlands	10		
Unspecified Hydromodification	2,560	1,625	

Size Assessed By Water Body			
Possible Sources of Use Impairment	**Rivers and Streams (miles)**	**Lakes (acres)**	**Estuaries (square miles)**
Other Sources - Overall	**2,124**	**11,539**	**259.4**
Waste Storage Tank Leaks	23		
Highway Maintenance	77		
Spills	28		
In-Place Contaminants	130	6,534	
Natural Sources	1,413	131,147	247.7
Recreational Activities	95	675	12.2
Upstream Impoundments	574		
Unspecified Other Sources	72	10,352	

Point Source Initiatives

Washington's Wastewater Discharge Permit Program

Washington state has been issuing permits to wastewater dischargers since 1973. The U.S. Environmental Protection Agency delegated this authority to the state through the administration of the National Pollution Discharge Elimination System (NPDES) program. NPDES permits are required for anyone who discharges wastewater to, or has a significant potential to impact, surface waters of the state. State wastewater discharge permits are required of anyone who discharges waste materials from a commercial, industrial or municipal operation to the ground or to a publicly-owned treatment plant.

Through the issuance of permits, Washington's goal is to maintain the highest purity of public waters by limiting pollutant discharges to the greatest extent possible. Four principles drive the Washington wastewater discharge permit program toward this goal:

- The discharge of pollutants is not a right. A permit is required to use the waters of the state, a public resource, for purposes of wastewater discharge.
- Permits limit the amount of pollutants to be discharged.
- Wastewater must be treated with all known available and reasonable technology before it is discharged - regardless of the quality of water into which it is discharged.
- Discharge limits are set using technology-based and water quality based-standards. The more stringent of the two limits is always applied.

Washington's Department of Ecology issues wastewater discharge permits. There are two different types of permits: individual and general. Individual permits cover single, specific facilities or activities like factories. One general permit covers a category of similar dischargers.

Individual and general permits may be issued either as a state permit or an NPDES permit. When discharges are to surface waters, to the ground or to a treatment plant, the discharges are covered by a combined state/NPDES permit.

There are currently more than 4,000 facilities and operations with wastewater discharge permits in Washington state.

Permit Management

Ecology has developed and maintained a number of tools to improve permit managment and to increase permit writing efficiency and consistency. These tools include a variety of NPDES and state permit shells, fact sheet shells, permit applications, and spreadsheets for doing the calculations for water quality-based permitting.

Ecology has engaged in two specific "total quality management" (TQM) efforts that relate to the wastewater permit management processes. Two permit management areas which have improved from the efforts of TQM workgroups are permit preparation efficiency and discharge monitoring database quality.

The permit preparation group identified that permits could not be issued in a timely manner because permit applications were being filled out incorrectly or inadequately. As a result, Ecology adopted improvements to the state wastewater discharge permit application forms and process.

The discharge monitoring database group identified errors made in filling out discharge monitoring reports (DMRs) that in turn caused errors in database reports. As a result, Ecology converted to computer-generated pre-printed reporting forms and developed training for DMR preparers.

Water Quality Permit Life Cycle System (WPLCS)

WPLCS is a computerized information system for wastewater discharge permits. It is designed to hold information on all aspects of the permit program. Data is entered monthly into the system by Ecology's regional permit managers and coordinators. Data in WPLCS includes:

- facility ownership and location, type of discharge and location of discharge;
- permit application status, permit manager and other contacts;
- permit limits and requirements;
- fee information;
- monitoring results;
- compliance analysis;
- inspection results; and

- other information necessary to obtain a history of the permitted discharge.

WPLCS is successfully being used to manage the permit system and produce useful reports on all aspects of the permit program.

Wastewater Discharge General Permits

Until 1993, wastewater discharge permits were issued on a case-by-case basis to individual dischargers. Issuing individual permits to each of the many dischargers in the state presented an administrative challenge that exceeded Ecology's resources. In order to tackle the permitting of dischargers not covered by existing individual permits, Ecology began issuing a single general permit that covered many similar dischargers.

General wastewater discharge permits cover multiple facilities within a defined category. A general permit category is made up of dischargers that:

- have similar operations and wastewater streams,

- are regulated by similar legal requirements, and

- are able to apply similar technology to control the types of pollution they generate.

Using general permits allows Ecology to more efficiently design and issue effective permits for a greater number of dischargers. Since 1993, well over 2,500 previously unpermitted wastewater dischargers have been given coverage under general permits. In the spring of 1995 there were 3,162 facilities (some of which previously had individual coverage) covered under the six existing general permits. These include:

Upland fin fish rearing facilities (hatcheries)	89
Boatyards	115
Sand and gravel (aggregate)	761
Dairy	2
Fruit packers	244
Stormwater	1,951

Since the development of general permits, the number of individual permits has been reduced from about 1,100 to less that 850 through conversion of individual coverage to general coverage.

Fresh Fruit Packers General Permit

In 1994, Ecology issued a wastewater discharge general permit for the fresh fruit packing industry. The permit covers hard or soft fruit packing plants or storage facilities statewide. Any fresh fruit packing or storage facility is eligible to apply. There are currently 244 facilities covered under the general permit.

Fungicides are commonly used by packing facilities and are potential pollutants typical of the industry. Other water quality problems commonly associated with the fruit packing industry include increased biological oxygen demand, increased total suspended solids and contamination with various pesticides.

Implementation of specific wastewater treatment or disposal methods (TDMs) are a major requirement of the permit. The TDMs are designed to ensure that discharges from the industry protect existing water quality and human health.

The TDMs must be used by the industry when designing and constructing new discharge facilities, or when expanding existing facilities. The TDMs were selected based on availability to the industry, reasonableness of installation and operation costs, and effectiveness to bring discharges into compliance with water quality standards.

Advances in process water treatment technology or changes in water quality standards might cause the permit to be modified at some point. Fresh fruit packer permittees have a two-year grace period for implementation of TDMs.

Sand and Gravel General Permit

Another general permit developed in 1994 by Ecology covers sand and gravel mines, rock quarries, clay mines, silica mines, diatomite mines, olivine mines, dolomite mines and associated operations. Asphalt batch and concrete batch plant facilities are also covered, whether or not they are located at the mine site. Process water and storm water discharges to both ground and surface waters are covered by the general permit. Other types of facilities may require a permit for storm water only, including sites that stockpile mined materials. Since coverage under the sand and gravel permit began, 761 operations have been permitted.

Process wastewater discharges from the diverse mining facilities covered by the permit have a similar potential to adversely affect ground and surface water quality. Pollution can result from the processing of mined materials, storm water runoff, or from any connected operations. Pollution associated with sand and gravel mining or related industrial activities include elevated pH, dissolved solids, oil and grease, nitrate concentration, and excessive turbidity.

The permit defines limits for the discharge of pollutants to surface water and ground water, and requires the permittee to put controls, like best management practices, in place to meet those limits. Best management practices include the preparation and implementation of a Storm Water Pollution Prevention Plan, an Erosion and Sediment Control Plan, and a Monitoring Plan.

Industrial Baseline Storm Water General Permit

In December 1992, Ecology issued an industrial storm water general permit. The permit regulates discharges of storm water from industrial facilities and from construction sites that disturb five or more acres. The permit was issued to meet requirements of the federal Clean Water Act and regulations adopted by the U.S. Environmental Protection Agency.

Storm water is runoff from rainfall or snowmelt. Eleven categories of industries and construction site operations must obtain permits if they discharge storm water either directly to surface waters, or indirectly, through a storm sewer. Most of those industries were identified using their Standard Industrial Classification (SIC) code numbers. Among those categories listed are:

- Heavy and light manufacturing
- Mining, oil and gas extraction
- Hazardous waste treatment, storage, and disposal facilities
- Landfills
- Recycling operations
- Steam electric power plants
- Transportation industry facilities with vehicle maintenance equipment maintenance or cleaning, or airport deicing facilities
- Sewage treatment plants
- Construction sites that disturb five or more acres

Since the storm water general permit was issued, more than 1,900 dischargers have acquired permits. All permittees are required to develop a Storm Water Pollution Prevention Plan and keep it at the facility at all times. Best management practices that are developed in the plans work to keep storm water pollution from entering the surface waters of the state.

Best Management Practices for Storm Water

The Industrial Baseline Storm Water General Permit requires those covered to develop a storm water pollution prevention plan to control runoff that might

pollute surface waters of the state. Best management practices (BMPs) are methods for controlling or preventing pollution and are an integral part of a storm water pollution prevention plan. BMPs may include:

- a schedule of activities;
- structural modifications to prevent release of pollutants;
- a reporting system for spills, leaks, runoff;
- materials handling practices;
- requirements for "good housekeeping" practices - maintenance of clean orderly work areas; and
- preventive maintenance to avoid spills, overflows, and runoff.

The storm water permit further categorizes BMPs into four groups: operational, source control, erosion and sediment control, and treatment.

Logyard Best Management Practices

Log storage and handling facilities have been identified as a potentially significant source of storm water pollution. Oil and grease, pH, biological oxygen demand, chemical oxygen demand, and total suspended solids pollution have been linked to log storage yards. Ecology has developed guidelines to help reduce storm water pollution at such facilities including areas where chipping, debarking and stockpiling of these wood products occurs.

Logyards with a discharge to a surface water or storm sewer must obtain coverage under the Industrial Baseline Storm Water General Permit, unless they already have an individual discharge permit that addresses storm water. Best management practices are included in the storm water pollution prevention plans required under permit coverage. Permit implementation deadlines for logyards depend on the complexity of the best management practices selected as part of the planning process.

Best management practice guidelines for logyards were developed by Ecology and an advisory committee with representatives from the industry, industry consultants, cities, counties, environmental groups, and the general public.

Vehicle Recycler Best Management Practices

Facilities that dismantle vehicles for parts or scrap and have a storm water discharge to a surface water of the state are required tobe covered under the Industrial Baseline Storm Water Permit. Best management practices for vehicle recyclers are outlined in a guidance manual prepared by Ecology.

Those activities that generate pollutants for which BMPs have been selected include vehicle dismantling and crushing, fluid removal, and the cleaning of vehicles, parts, and equipment. BMPs have also been selected for storage activities including the storage of fluids, parts for resale, scrap parts and metal, solid wastes, and vehicles. Two or more BMP options are given for some pollutant sources.

An example of BMPs in the guidance manual is the use of covered concrete containment for vehicle dismantling, fluid removal, and fluid and parts storage. Activities or operations that may need oil/water separators are also covered in the guidance manual. Other acceptable BMP options are based on source control and good housekeeping, such as removing all the vehicle fluids prior to storage.

Vehicle and Equipment Washer Best Management Practices

Washwater from vehicle/equipment cleaning activities may contain significant quantities of oil and grease, suspended solids, heavy metals, and organics, as well as pollutants from detergents.

Best management practices have been developed to prevent pollution for the following operations:

- small dischargers (1 to 2 pieces of equipment and/or vehicles per day and no more that 8 per week);
- charity car washes;
- washing vehicle exteriors at new and used auto dealerships;
- at-site rinsing of farm and construction vehicle/equipment to prevent tracking of dirt, sediment and floatable materials onto streets and roadways;
- mobile washers; and
- large commercial vehicle washing operations.

Wastewater Treatment Plant Operator Certification

The Wastewater Operator Certification Program assists in protecting public

health and the waters of the state by certifying the people who operate domestic wastewater treatment plants. The wastewater operator must meet minimum qualifications and pass an examination in order to be certified.

Washington state has 1950 certified domestic wastewater treatment plant operators. At least three times a year, Ecology administers statewide certification tests. Each year, approximately 600 people apply for the examination to become a qualified operator.

Financing Water Quality Improvements

The Water Quality Account

The Washington State Legislature established the Water Quality Account in 1986. The purpose of the account is to provide local governments, Indian Tribes and state agencies with technical and financial assistance to protect and improve the quality of water in the state. (Chapter 70.146 RCW, Water Pollution Control Facilities Financing)

The enabling statute directs that $45 million a year should be deposited into the Water Quality Account. Approximately $35 million comes from the tax on tobacco products each year. The remaining balance comes from the state's general fund, although in recent years, these monies have not been appropriated.

Most of the funds are passed to local government through the Centennial Clean Water Fund grant and loan program. Some other uses of the funds are:

- $1.3 million for the administration of grants and loans by Ecology and to provide technical assistance to grant and loan recipients;
- $1.2 million to the State Conservation Commission to support water quality improvement activities;
- $.05 million annually to the Puget Sound Water Quality Authority for Public Information and Education (PIE) grants;
- $31 million, since 1986, for the state to match federal revolving loan program funds that get passed on to local government;
- $2.9 million to the Department of Health to operate the Drinking Water Program that regulates public water supply systems.

All remaining funds are earmarked for the Centennial Clean Water Fund, and used for water quality improvement projects by local government agencies. Approximately $309 million in grants and loans have been offered to local governments for water quality improvement and protection since establishment of the account.

The Legislature directed that from 1987 to 1995 not more than 50% of Centennial Clean Water Fund should be used for facilities that discharge directly into marine waters, not more than 20% for facilities and activities that prevent or mitigate ground water pollution (with at least two-thirds for the Spokane-Rathdrum Prairie Aquifer), not more that 10% for nonpoint sources of pollution, and not more than 10 % for activities that protect freshwater lakes and rivers. Remaining funds are spent for water quality projects at the discretion of Ecology.

Wastewater Discharge Permit Fees

Ecology has charged fees to cover the administration of wastewater discharge permits since 1989. However, this was not always the case. Historically, the administration of wastewater discharge permits was funded from the state general fund and federal grants.

In 1988, the state Legislature passed a bill requiring Ecology to establish a fee system to partially fund permits. The bill was written to decrease pressure on the general fund and to strengthen water quality protection in the state.

Shortly after the bill passed, citizens's Initiative 97 was passed by voters requiring full funding of permit administration through annual fees. Each biennium the legislature establishs a fee appropriation level, and Ecology adopts a corresponding fee schedule by rule to recover expenses for permit activities. Ecology then collects the fees from permitted dischargers.

Activities that are funded with permit fees include administration of permit applications, permit issuance and appeals, inspections, engineering and other report review, data and information management, pretreatment and more. Enforcement activities are not paid for with permit fees. They are funded from the state general fund.

The appropriation level established by the Legislature to pay for permit administration was $20.7 million dollars for the 1993-1995 biennium.

DAIRY WASTE MANAGEMENT

The Agriculture Compliance Memorandum of Agreement

In September 1988, Ecology and the Washington Conservation Commission signed the Agriculture Compliance Memorandum of Agreement. The purpose of the agreement is to:

1) recognize the relationship between Conservation Districts, the Conservation Commission, and Ecology in protecting the quality of Washington state waters, and

2) outline a process by which water quality complaints stemming from agricultural practices will be initially handled by conservation districts.

The agreement applies to all types of commercial agriculture. Forty-seven of Washington's forty-eight districts have formally entered into the agreement at a specific level of participation.

Dairy Waste General Discharge Permit

Following a comprehensive four-year development process, Ecology issued a statewide National Pollutant Discharge Elimination System/State Dairy Waste General Discharge Permit on August 10, 1994. The permit satisfies requirements of the federal Clean Water Act, the Washington State Water Pollution Control Act (Chapter 90.48 RCW), and the 1993 Washington State Dairy Waste Management Act (Chapter 90.64 RCW).

Developing the dairy permit involved extensive outreach to commercial dairy farmers through direct mailings and numerous informational meetings and public workshops. As a result of this effort, water quality and the need for proper dairy waste management moved to the forefront of many farmer's management considerations.

The permit applies statewide to all dairy farms meeting the federal definition of a Concentrated Animal Feeding Operation. A permit is required for those farms causing pollution by discharging manure or contaminated wastewater directly to surface water. Discharges to ground water are also regulated through the Washington State Water Pollution Control Act.

When responding to a water quality complaint Ecology evaluates individual farms to determine the need for a discharge permit. Permit determination may also be made if a farm is identified through watershed studies as a possible source of water quality degradation.

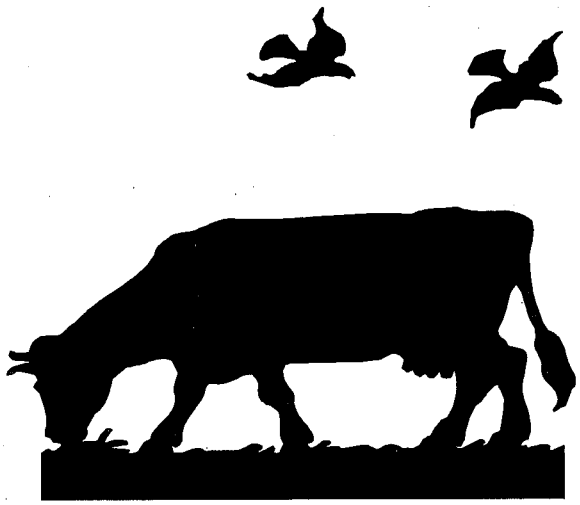
When a farm is issued a permit, an animal waste management plan is developed within six months. An additional eighteen months is set aside for plan implementation. Permitted farms that fully implement their animal waste management plan for 36 months may request a written exemption from the permit.

Dairy Waste Management Act

In 1993, the Washington State Legislature enacted the State Dairy Waste Management Act (Chapter 90.64 RCW). The purpose of the act is to:

- establish a clear process for the management of dairy waste that affects surface and ground water;
- provide a stable and predictable business climate for dairy farms;
- affirm federal regulations requiring a waste discharge permit for dairies; and
- codify the existing Agricultural Compliance Memorandum of Agreement as it applies to dairy farms.

This legislation combines federal requirements for waste discharge permits with the technical assistance capabilities of conservation districts. This statute largely directs the site-specific management of dairy waste.



Nonpoint Source Initiatives

Section 319 of the Federal Clean Water Act calls for each state to develop a nonpoint source pollution preventions and control program. Washington state's "319" plan was approved in 1990 by the U.S. Environmental Protection Agency. It describes existing local, state, and federal programs that address nonpoint sources of pollution.

The overall goal of Washington state's nonpoint source management program is to ensure that state surface and ground waters meet existing water quality standards. A combination of education, technical assistance, financial assistance, and enforcement is used to reach this goal.

Funding to implement the Washington nonpoint source management plan has been available through the Washington State Centennial Clean Water Fund (CCWF) as well as the U. S. Environmental Protection Agency and other sources. Many different types of projects have been supported with these funds, including:

- watershed management and implementation of plans;
- technical assistance to farmers and landowners;
- development of new approaches for preventing and controlling nonpoint pollution;
- restoration of fish habitat in disturbed streams; and
- outreach to involve diverse communities in nonpoint source prevention and control.

Current priorities for nonpoint funding include:

- implementation of comprehensive, watershed-based efforts that protect ecosystem resources;
- projects that protect ground and surface water quality;
- building the capacity to continue projects and programs after funding ends; and
- creating a strong environmental stewardship ethic through active public involvement in resource protection.

The state nonpoint source management plan is revised when the need becomes apparent. Changes in state laws, refinement of exisitng state and local programs, and federal mandates can all cause the state to re-evaluate the contents of its program.

Federal Clean Water Act Section 208 - Water Quality Management Plans

State nonpoint pollution control programs are guided by the water quality management plans developed pursuant to Section 208 of the federal Clean Water Act. Under Ecology's leadership, 208 plans have been developed for forest practices, dairy waste, irrigated agriculture, dryland agriculture, urban stormwater, and included four regional nonpoint source plans.

The 208 plans have relied heavily on voluntary programs that provide information, education, technical assistance and incentives to promote good land management. The forest practices, dairy waste, and irrigated and dryland agriculture plans contain regulatory and enforcement components.

Identification of Best Management Practices

Best Management Practices or BMPs are methods designed to prevent water from being polluted. When BMPs are applied to potential pollution sources they minimize water quality impacts.

The state's 208 Water Quality Management Plans list BMPs for dairy waste, irrigated agriculture and dryland agriculture. Storm water and ground water BMPS have also been developed and are discussed earlier in this document. BMPs for rangeland management are currently being developed. BMPs for forest practices are established by rule and reviewed and updated through the Timber, Fish and Wildlife Agreement.

WATER QUALITY MANAGEMENT PLANS FOR SOURCES OF NONPOINT POLLUTION - Federal Clean Water Act Section 208

EMPHASIS	LEAD AGENCY	DATE ADOPTED
Dairy Waste	Ecology	March 1979
Irrigated Agriculture	Ecology	January 1979
Dryland Agriculture	Ecology	September 1979
Forest Practices	Ecology	October 1979
Storm Water	Ecology	May 1983
Agriculture/Storm Water Sewage Treatment Plant	King County & Snohomish Metro	December 1977
Agriculture/Storm Water Septic Tanks/Lakes	Clark County	January 1978
Ground Water	Spokane	April 1979
Septic, Forestry, & Mining	Colville Tribe	January 1985

Timber, Fish, And Wildlife Agreement

In an unprecedented negotiation process, government agencies, tribes, environmental groups, and forest industry representatives agreed on a major shift in the way natural resources in forested areas are managed in Washington state.

The 1987 Timber, Fish and Wildlife Agreement (TFW) provides a comprehensive series of recommendations intended to improve the conduct and regulation of forestry throughout the state. The TFW agreement covers up to 17.7 million acres of commercial forest land, including lands controlled by the state Department of Natural Resources, private individuals, the forest industry, Indian tribes and other groups.

The foundation of the TFW is a process known as "adaptive management" which allows implementation to proceed in the face of technological uncertainty. All parties agreed that rules are changeable and that as knowledge improves, they will be modified to reflect the greater level of understanding.

Features of the TFW agreement include:

- additional funding for resource agencies;
- update of forest practice rules with increased enforcement;
- on-site inspection by interdisciplinary teams;
- a more accessible data management system; and
- greater emphasis on monitoring, evaluation and research.

The 1987 update of forest practice rules provided greater protection of fish and wildlife habitat along riparian areas, tighter standards for road construction and maintenance, and forest chemical applications. After four years of implementation the issues addressed by the TFW agreement expanded to include watershed cumulative effects, wetlands, and other wildlife issues. Cooperative monitoring, evaluation, and research by TFW committees helped revise forest practice standards.

In 1992 forest practice rules were adopted for watershed analysis, woodlands protection, chemical applications, and for leaving wildlife trees and riparian shade. Evaluation of current BMPs continues with a focus on sediment issues. Washington's Department of Natural Resources has placed a high priority on completing watershed analysis using TFW methods in several mixed ownership watersheds. Linkages are also starting to be made between the watershed analysis process and total maximum daily load (TMDL) process.

Coordination with the U.S. Forest Service

The Land and Resource Management Plans for National Forests in Washington contain Best Management Practices to protect and enhance water quality. Water quality studies and comparisons of state and Forest Service Best Management Practices have been used in a recertification process provided in a Memorandum of Agreement between Ecology and the Forest Service to insure comparable water quality is attained on federal lands.

Funding for a full time Ecology/Forest Service coordinator is no longer available. However, the opportunity to share water quality research and new water quality protection ideas has expanded with new state and federal mandates for watershed analysis of cumulative effects of forest management. The federal mandates are based extensively on Washington state's TFW prototype.

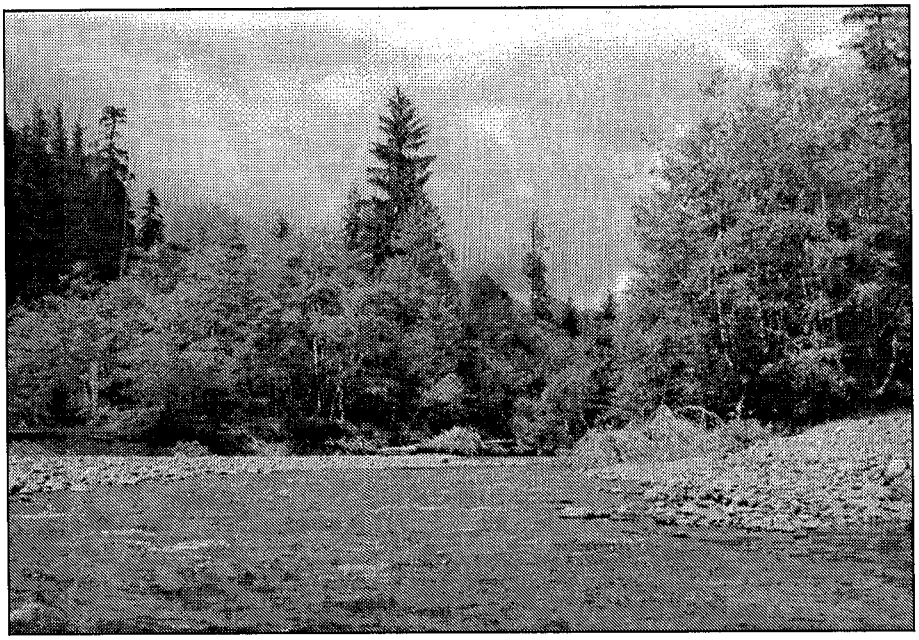


photo by Tom Hyde

Puget Sound River Basin Team

The Puget Sound River Basin Team is made up of federal employees from the U.S. Forest Service and the Natural Resources Conservation Service, and state employees from the departments of Ecology and Fish and Wildlife. The Team has been in existence since 1987.

The Team has provided characterization of watersheds to local watershed committees for use in the preparation of action plans. Since its inception, the Team has assisted Pierce and San Juan counties with ranking their watersheds

and provided planning assistance for 28 watersheds in 10 counties of the Puget Sound basin. The Team is an outstanding example of interagency government and local citizen cooperation to achieve a common goal.

Puget Sound Watershed Planning

Local watershed planning under the Puget Sound Water Quality Authority's nonpoint source rule (Ch. 400-12 WAC) is the major tool used to control nonpoint source pollution in the Puget Sound basin.

Under the Puget Sound Water Quality Management Plan, twelve watersheds were selected in 1988 for early action watershed planning. All of the early action watershed plans have been approved by Ecology. Implementation of these plans is underway. A status report for these and other watersheds can be found in the tables on the next few pages.

Puget Sound Basin Watersheds Planning Status

Watershed	Local Government Lead	CCWF Round	Status
Bainbridge	City of Bainbridge	1994	WMC started 5/94
Budd/Deschutes	Thurston County	1992	Final expected in 95
Cedar River	King County	1990	Public mtgs in spring 95
Discovery Bay	Jefferson County	1992	Final expected in 95
Drayton Harbor	Whatcom Council of Governments	1990	Awaiting concurrence draft
Dungeness River	Clallam County	1990	Implementing
Dyes Inlet/Clear Creek	Kitsap County	1989	Implementing
East Lake Sammamish	King County	1989	Approved 5/94
Eld Inlet	Thurston County	Early Action	Implementing
Green/Duwamish	King County	Early Action	Implementing
Henderson Inlet	Thurston County	Early Action	Implementing - possible update
Issaquah/Lake Sammamish	King County	1989	WMC proposed in 10/94
Kamm Creek	Whatcom Conservation District	Early Action	Implementing
Liberty/Miller Bay	Kitsap County	1993	Planning underway
Longfellow Creek	City of Seattle	Early Action	Implementing
Lower Hood Canal	Mason County	1990	Approved 10/94
Lower Puyallup	Pierce County	1989	Final submitted 4/95
Nookachamps Creek	Skagit County	1990	Final submitted 4/95

Puget Sound Basin Watersheds Planning Status...continued

Watershed	Local Government Lead	CCWF Round	Status
North Creek	Snohomish County	1990	Implementing
North Whidbey	Island County	1992	Characterization done and WMC meeting
Oakland Bay	Mason County	Early Action	Implementing
Padilla Bay/Bayview	Skagit County	1992	Review draft expected
Pipers Creek	City of Seattle	Early Action	Implementing
Port Angeles	Clallam County	1993	Final-summer 95
Port Ludlow	Jefferson County	1990	Implementing
Quilceda/Allen Creeks	Snohomish County and Tulalip Tribe	1991	WMC active
Quilcene Bay	Jefferson County	Early Action	USFS work
Samish River	Skagit County	1993	Planning underway
Sequim Bay	Clallam County	Early Action	Implementing
Silver Creek	Whatcom Council of Governments	Early Action	Approved 5/90
Sinclair Inlet	Kitsap County	1989	Approved 2/95
Stillaguamish River	Snohomish County	Early Action	Approved 10/94
Swamp Creek	Snohomish County	1989	Approved 10/94
Tacoma Cluster	Pierce County	1993	WMC meeting
Tenmile Creek	Whatcom Conservation District	Early Action	Implementing
Totten/Skookum	Thurston County	Early Action	Implementing
Upper Hood Canal	Kitsap County	1992	Planning underway

Surface Water Monitoring Program

Marine Monitoring

The goals of the marine water monitoring program are to:

- characterize ambient water quality conditions in the marine waters of Puget Sound, Grays Harbor, and Willapa Bay;
- identify significant changes in key environmental indicators throughout the marine waters of the state;
- provide water quality information to support specific Ecology programs, other agencies, and projects identified in the 1991 Puget Sound Water Quality Management Plan;
- determine the effectiveness of regulations to improve marine water quality;
- support environmental research activities through the availability of consistent, scientific and statistically valid data; and
- provide baseline water quality data to the public, local, state, and federal agencies, private institutions, and other data users.

Ecology publication # 94-210 titled Marine Water Column Ambient Monitoring Porgram: Wateryear 1993 Data Report is available through the Ecology publications distribution center (phone 360-407-7472).

Ecology monitors sediment in Puget Sound. This sediment monitoring is a major part of the multi-agency Puget Sound Ambient Monitoring Program (PSAMP).

The PSAMP was developed by an interdisciplinary committee of water quality professionals known as the Monitoring Management Committee. It is designed to be a long-term monitoring program implemented by several state agencies to provide a baseline characterization of the condition of Puget Sound. One of its tasks is to identify both natural and human caused changes in Puget Sound sediments by determining levels of contamination and the toxic effects of contaminants on communities of organisms.

Ecology publication # 92-47 titled, Puget Sound Ambient Monitoring Program Marine Sediment Monitoring Task Annual Report 1991 is available through Ecology publications distribution center (see phone number above) and fully describes the program.

Fresh Water Monitoring

Ecology has conducted an ambient freshwater quality monitoring program since 1959. The initial goals of the program were to track water quality changes through long-term sampling at selected freshwater stations. Significant changes to the program occurred and by 1978 it evolved in to the current network of monthly sampling at fixed locations. Samples are collected at roughly 77 stations across the state.

Ecology publication # 94-158 titled River and Stream Ambient Monitoring Report for Wateryear 1993 is available by calling the Ecology publications distribution center.

Fresh Water Biological Monitoring

Biological information is collected annually from rivers and streams throughout Washington State. The primary objectives for this program are to define and document baseline conditions of instream biology, and measure spatial and temporal viability of population and community attributes. Wadeable streams are surveyed for identification of degradation from characteristic land uses. Regional reference streams serve as controls for those suspected of suffering from some form of impairment. The focus of information collection involves aquatic insect surveys and characterization of instream and riparian physical features. Relationships between biological and physical characteristics of streams are intended for use in diagnosing degradation. Location of annual biological surveys are determined by the rotation of Ecology's Watershed Planning Process.

Ecology publication #95-333 titled Ambient Monitoring Instream Biological Assessment: Progress Report of 1993 Pilot Study is available through the Ecology publication distribution center.

Lake Restoration Grants

Lake restoration is the protection and enhancement of water quality of lakes. Typically, lake water quality problems are seen as a reduction in water clarity; surface scums and odors usually caused by large blooms of blue green algae; and/or reduced fish production such as fish kills caused by degraded habitat and low dissolved oxygen.

The causes of these water quality problems are nearly always excessive dissolved nutrients such as nitrogen and phosphorus. These nutrients usually come from nonpoint sources of pollution such as nearby septic systems, runoff from newly developed areas and construction sites, forest practices, farms, and natural

conditions.

Ecology manages grants that are available to restore publicly owned and accessed lakes. Recipients of funding include cities, counties and state agencies. From 1992 through 1994 approximately $ 4,856,000 was granted to improve water quality in Washington state lakes.

Aquatic Weed Management Fund

Invasive, non-native aquatic plants are a serious threat to the health of lakes, rivers, and streams throughout the state. Excessive weed growth impairs fish and wildlife habitat and restricts recreational activities. Traditionally, residents and property owners have borne the high costs of controlling these plants.

The legislature established the Freshwater Aquatic Weeds Account to provide financial and technical support that helps tackle problems on a statewide level. This account provides funding for technical assistance, public education , and grants to help control aquatic weeds. Revenue for the account comes from a $3 increase in annual license fees for boat trailers.

Grants are provided for projects that prevent and/or control freshwater, invasive, non-native aquatic plants. The types of activities funded include planning, education, monitoring, implementation, pilot/demonstration projects, surveillance and mapping projects. From 1992 to 1994 approximately $1,000,000 was granted to control aquatic weeds in Washington's lakes.

Ecology publication # 95-331 titled Aquatic Plant Technical Assistance 1994 Activity Report is available through Ecology's publication distribution center.

Milfoil Prevention and Management Grants

Eurasian watermilfoil (milfoil) is an invasive, noxious aquatic weed that is impairing the beneficial uses in many of Washington's lakes. Ecology administers a milfoil prevention and control program supported by funds from the U.S. Army Corps of Engineers. Funded projects address prevention and/or control of milfoil in public high-use recreational areas and/or navigation lanes. Projects include milfoil management activities such as harvesting, rotovation, installation of bottom barriers, and aquatic herbicide application; educational programs; and evaluation of the efficiency of control activities.

Grants are given to cities, counties, towns, state agencies, conservation districts, Tribes, special districts, and municipal organizations. Lakes groups or other

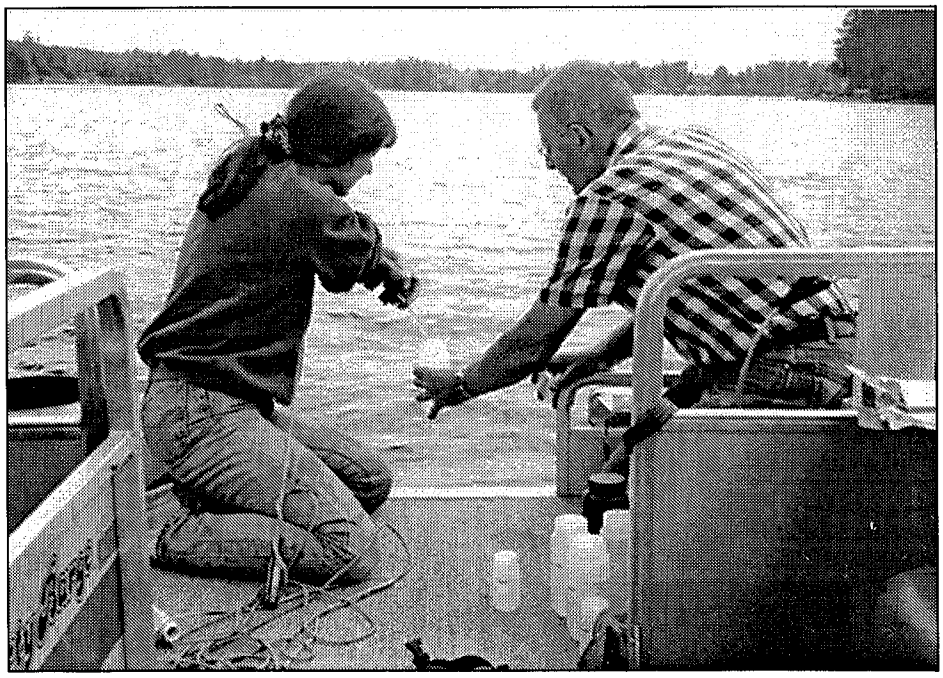
private organizations on navigable waters must work in conjunction with their local governments to receive funding for projects.

Projects that are ongoing, rather that new projects, receive the highest funding priority. Continued funding ensures that local sponsors have the means to effectively manage ongoing milfoil control activities.

Factors considered when evaluating new projects include: environmental and economic impacts of milfoil on the ecosystem, the degree that the project will benefit the public, the likelihood that milfoil will spread to other water bodies, and the statewide significance of the project.

Citizens Lake Monitoring

In Washington State, lakes are primarily monitored by a team of citizen volunteers, supplemented with data collection by Ecology staff. These volunteers measure water clarity and water temperature and record general observations every two weeks from mid-May to mid-October.



Jerry Brown, citizen monitoring program volunteer, helps Ecology staff Julie Rector monitor water quality in Mason Lake in southwest Washington .

Once in the spring and once in the fall, Ecology staff visit lakes to train the volunteers that collect chemistry samples and profile data. These data are

summarized annually by Ecology and reports are sent to each volunteer about their lake. Every second year a more detailed and technical analysis is performed on the data. The goals of the citizens monitoring program are to:

- rank lakes that have water quality problems;
- assess the productivity of monitored lakes; and
- promote public awareness of lake processes and lake protection.

Ecology publication # 95-311 titled 1994 Statewide Water Quality Assessment Lakes Chapter is available through Ecology's publication distribution center.

Ground Water Quality Management Efforts

In the State of Washington, ground water is the source of drinking water for over 60% of it's citizens. In large areas east of the Cascade Mountain Range, 80 to 100 % of the the available drinking water is obtained from ground water sources . As a whole, over 95% of Washington's public drinking water systems use ground water as their primary water supply. As the state approaches full allocation of its surface water resources and the population continues to increase, pressure to develop the state's ground water reserves will intensify. Increased use of ground water for drinking water, agriculture, and industrial development will result in degraded water quality if adequate protection measures are not put into place. Key to the protection of Washington's ground water sources is determining current ground water quality coupled with understanding the vulnerability of it's productive aquifers.

Identified Sources of Ground Water Contamination

The State of Washington has detected contamination in ground water across the state that can be classed in the following five categories:

1 . Metals and trace elements resulting from industrial, mining, or agricultural activities;

2 . Nitrates resulting from overuse of fertilizers, density of on-site sewage systems, applications of municipal and industrial wastewaters, and storm water infiltration;

3 . Pesticides resulting from both large and small scale agricultural activities, and from residential use;

4 . Petroleum leakage resulting from industrial spills and leaking underground storage tanks, and;

5 . Synthetic organic chemical releases from industrial operations.

To some degree, each county within Washington has detected one or more of

these contaminant classes in ground water. The distribution of these contaminant detections are directly related to the way land is currently being used. The highly agricultural areas within eastern Washington, the irrigated areas within the Columbia Basin, and those areas within western Washington where concentrated agricultural activities take place, historically have a higher incidence of ground water contamination due to pesticide and nutrient use. The urbanized areas of the state, specifically the metropolitan areas of Seattle, Tacoma, and Spokane have concentrated areas of industrial and petroleum contamination of the ground water resource. Urbanized areas within the state also contain a higher incidence of ground water contamination traced to storm water run-off and use of injection wells for storm water management.

Available Data

Currently there are several initiatives and studies being conducted by state and federal agencies to determine ground water quality. The results of these efforts indicated that ground water quality is relatively good in most areas. However, areas of high industrial or agricultural activity do have degraded ground water quality. Only in isolated areas is the water quality degraded to the point of violating drinking water standards as set in the federal Safe Drinking Water Act of 1977.

As part of the Wellhead Protection Program, an assessment of 1,329 Class A public water supply wells indicated that in only 10.9% of these wells were any of the five contaminant groups detected. The percentage of these wells violating drinking water standards for any one contaminant group is significantly lower.

The results of this 1994 study verify earlier statewide surveys of public ground water supply and environmental monitoring systems conducted between 1988 and 1993. During this period less than .1% of the 4,540 public water supply wells sampled exceed a Maximum Contaminant Level (MCL) for synthetic organic contamination. In 1993, less than .1% of the 5,470 public water supply wells sampled exceeded the MCL for nitrate. The percentage climbs to approximately 10% for environmental monitoring wells sampled during the same period. The state has not yet completed its analysis of pesticide sampling in public water supply systems; however, results of sampling conducted in 525 monitoring wells indicated that pesticide contamination is present in levels exceeding a MCL is approximately 4% of samples, a majority of that being contamination by EDB in isolated areas of Grant, Thurston and Whatcom counties.

Current Efforts to Protect Ground Water

Comprehensive State Ground Water Protection Program

In July 1991, a new Ground Water Protection Strategy was outlined in the final report of U.S. EPA's Ground Water Task Force. The task force was established in 1990 by EPA to develop a comprehensive, national approach to addressing ground water protection concerns. The strategy centers around the development of Comprehensive State Ground Protection Programs. Washington has agreed that such a strategy is needed and has elected to participate. Formal submittal of the state's core program document has been submitted.

Wellhead Protection Program

Washington's Wellhead Protection Program was adopted in July 1994. Currently, water supply systems are in the process of delineating wellhead protection areas. This process has been completed for several of Washington State's larger municipal systems. The Washington State Department of Health has required that all systems be delineated no later that July 1996. As part of the delineations, public water supply systems must conduct an assessment of how susceptible wells are to contaminants, and carry out a contaminant source inventory.

The Wellhead Protection Program requires that public water systems share contaminant source inventories with all agencies charged with the protection of ground water quality. These agencies in turn, are to use these inventories to prioritize regulatory activities. This method combined with the Pollution Prevention Strategy, gives the state confidence that it will achieve source control for at least 50% of the public water supply systems in the state by the year 2001.

Ground Water Pesticide and Nutrient Strategy

In 1992, Ecology in conjunction with the state departments of Agriculture, Health, and Natural Resources, the Washington Conservation Commission, the Cooperative Extension Service and the Water Research Center developed a strategy document designed to protect the state's ground water resource from pesticide and nutrient contamination. The strategy provides for a goal to achieve ground water protection as well as a process for implementation and enforcement of ground water pollution statutes, rules and policies. Under this strategy, numerous ground water protection initiatives have emerged such as the pesticide containment rules and the statewide aquifer vulnerability project.

Washington State Pesticide Management Plan

Washington's Department of Agriculture is developing a State Pesticide Mananagement Plan in order to address the pending requirements of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The management plan will describe how the state will manage the use of specific pesticides to ensure protection of the ground water resource. The plan must be approved by EPA or specific pesticides cannot be sold or used in the state.

Strategy for Public Education and Information

Washington has in place a Strategy for Public Education and Information, August 1992 for ground water related activities. This document lays out a general plan based on Ecology providing problem awareness and technical assistance on ground water pollution causes, solutions and related regulations to the public. The strategy, in combination with the Nonpoint Source Pollution Assessment and Man agement Program (October 1989), provides for an integrated approach to ground water quality protection through education and awareness.

Implementation and success of the agricultural elements of the plan rely heavily on the cooperation of numerous state agencies and the involvement of Washington State University (WSU) and Cooperative Extension Service. WSU and Ecology continue to be involved in the production of outreach materials covering topics such as overview of ground water soils, concerns for agriculture (animal keeping, fertilizer use, and pesticide application), health effects, and septic system maintenance. WSU and Ecology have designed and placed educational materials related to ground water protection in libraries and schools; with environmental and community groups; with local, state and federal agencies; and with agricultural/commodity organizations.

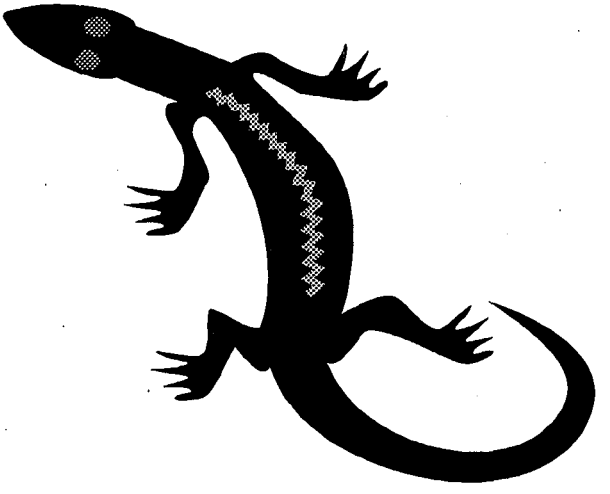
Washington's Wetland Resources

Washington state is divided by the Cascade Mountains into two distinct regions, with a wide range of climatic conditions, geology, soils, vegetation and water bodies. This diverse geography produces a tremendous variety of wetland types in Washington.

In western Washington, many of the freshwater wetlands are associated with ponds, lakes, rivers, and other shorelines, but many more are isolated from surface water and owe their existence to ground water discharge through springs and seeps, and precipitation.

The climate in eastern Washington gives rise to a variety of permanent and intermittent streams and wetlands. These wetlands are more localized in their distribution but are even more varied than their western counterparts in terms of seasonality, chemistry, and plant species composition.

Washington's wetlands total 908,000 acres and deep water habitats total 1,441,000 acres. Combined, all wetlands and deep water habitats comprise about 5% of the land surface of the state; wetlands account for 2 % and deepwater habitats make up 3% of this area.



Wetland Type and Acreage in Washington

Wetland Type	*Acreage in 1992**
Forested Wetlands	163,944
Scrub-Shrub Wetlands	145,068
Emergent Wetlands	387,809
Estuarine Wetlands	210,889
Total Wetland Acreage	907,709

**National Wetland Inventory maps were digitized and converted to ARCInfo, using Cowardin, et.al., 1992.*

The following generalizations were made to obtain the information in the table above:

1) Marine systems were not considered;
2) In the Estuarine system, only classes within the Intertidal subsystem were considered, and these are given as one figure;
3) In the Riverine system, only Emergent classes were considered and listed as emergent wetlands within ecoregions (there were none found);
4) In the Lacustrine system, the Forested, Scrub-Shrub, and Emergent classes were listed by ecoregion; and
5) In the Palustrine system, all classes are considered. Those classes not identified as Forested or Scrub-Shrub are considered Emergent class, these are also listed by ecoregion.

Current Status of Washington's Wetlands

The total historical wetland acreage in Washington is estimated to have ranged from 1.17 to 1.53 million acres. Current estimates (see table above) show Washington has approximately 908,000 acres of wetland remaining. This is a 33 % reduction from pre-settlement levels. Current estimates indicate Washington state is losing between 700 to 2,000 wetland acres per year. Seventy percent of the tidally influenced wetlands in Puget Sound have been lost due to diking, dredging and filling activities. Urbanized wetlands in the same region have suffered losses ranging from 90% to 98%. Freshwater wetland loss estimates include Thurston county at 55%; Pierce County at 82%, and King County at 70%.

Impacts to Wetlands

Ecology studied State Environmental Policy Act documents for rural and suburban wetland losses throughout Washington and found that well over twice the number of acres of wetlands were drained as were filled. Over 74% of the wetlands observed as impacted were between one-half and five acres in size.

Approximately 10% of the current losses fell under the Section 404 permitting program managed by the U.S. Army Corps of Engineers. These figures point out significant shortfalls in the Clean Water Act Section 404 permitting program. Draining and impacts to small, isolated wetlands are not covered by Section 404 permits or Section 401 certification.

Many of the remaining wetlands in Washington have experienced some degree of degradation to vegetation, soils, or hydrology. All areas inventoried have been degraded to some extent; it is difficult to determine the condition of the land prior to European settlement.

Some major factors responsible for wetland degradation are: urban growth; dikes and other barriers; erosion and siltation caused by increased storm water and construction activities; invasion of exotic plants and animals that reduce habitat valued for native species; and forest and agricultural practices.

Marine, estuarine, and tidally influenced freshwater rivers and streams are associated with the Pacific Ocean, Grays Harbor, Willapa Bay, and Puget Sound. It is these highly productive, wetlands that have been most impacted by human activities. More than 80% of the state's estuaries have been lost. Of those remaining, all have a road associated with them and there is some degree of degradation. A Department of Natural Resources study of Puget Trough coastal wetlands found no pristine coastal wetland systems still exist in the region. Those remnants which are located in Washington's coastal wetlands continue to be threatened by human-related alteration and destruction and by the spread of introduced species.

Many existing wetlands in eastern Washington, particularly in the Columbia Basin, are being rearranged by human activities. Hydro-electric projects in the Columbia River produce large expanses of open water habitat which in turn changes hundreds of miles of habitat adjacent to rivers. Irrigation projects create wetlands by redistributing water and elevating ground water tables. Many valuable wetlands are being eliminated by water reallocation through irrigation projects, agricultural conversion, and livestock grazing.

Monitoring Wetlands

Washington does not have an established monitoring program for wetlands as with other water bodies. Ecology has funded other monitoring programs. These were not, however, designed to determine if wetlands were able to support characteristic uses, but did study the general ecological condition of wetlands including plant and animal habitat diversity, as well as chemical and physical water quality parameters.

The sources of wetland monitoring data and inventory information that Ecology does have indicate that all wetlands that have been studied show some sign (chemical, biological, or physical) of human degradation. An Ecology funded King County storm water research program showed that the state's water quality criterion for lead was exceeded in all wetlands, including control sites located in undeveloped watersheds.

This study also showed that no single wetland contained more than 65% of the total bird and mammal species found in all the wetlands studied. In all cases, the number of native species found decreased during the study period and the only increase in diversity was in the number of exotic species. This study clearly indicates how important individual wetlands are for maintaining species diversity in a watershed, and how sensitive wetlands are to ecological disturbances.

Wetland Inventory and Geographic Information System Coordination

Two of the key issues identified as necessary to improve management and protection of wetlands are a better information base or inventory, and a tracking system to monitor the goal of no net loss of wetlands in the state. Although Washington has a state-wide inventory (through the National Wetlands Inventory), it is informational only and cannot portray the regulatory boundaries of wetlands. That definitive boundary is what regulatory agencies and local governments need to provide a solid base for permit decisions and comprehensive planning.

Many local governments and Tribes have compiled or are in the process of preparing wetlands inventories. One intent of the Washington State Growth Management Act passed in 1990 is to promote regional planning, with multiple jurisdictions coordinating to designate critical areas, (wetlands being one of those) and prepare comprehensive plans. With each local government independently preparing wetland inventories, there is little consistency in types of information collected, level of detail involved and how the information is stored (maps, GIS, etc.) Additionally, there is little consistency among those tribal and

local entities that are tracking permits, violations, mitigation or other wetland alterations.

In response to these problems, the Puget Sound Water Quality Authority developed five goals for wetland inventory issues:

- establish standards for wetland inventories;
- training for local governments on new standard approaches;
- compile inventory information from local governments;
- identify restoration and preservation sites; and
- prepare a tracking system for no net loss.

Currently, an assessment of wetland inventory and GIS needs is being done. Representative federal, state and local government, tribes and consultants that do inventory work are being contacted to identify the highest priority needs. A technical work group will be formed to develop collaborative solutions to those priority issues.

Setting Water Quality Standards for Wetlands

The first step in getting wetlands into the water quality standards is to place the word "wetlands" in the definition of surface waters. This makes it clear that wetlands are covered by the standards. In addition, it makes it clear that wetlands are to be treated as waters of the state for the purpose of compliance with the water quality standards; not just for how they relate to other surface waters.

Defining wetlands as waters of the state ensures that wetlands will be subject to the same level of analysis or certification as are lakes, rivers, and streams. It also means activities will be analyzed for their impacts to the wetlands as a separate water body.

Due to the great, natural variation of chemical and biological parameters found in wetland systems across the state it is difficult to establish numeric water quality criteria that could be considered effective for all wetland types. The physical and geographic characteristics of Washington's wetland systems include alpine and subalpine meadows in the Cascade and Olympic mountain ranges, salt marshes and river mouth estuaries along the Pacific Coast and within Puget Sound; and vast areas of fresh water marshes in the Columbia River Basin. Parameters used to measure water quality, such as pH and fecal coliform organisms, can very widely, due to natural causes in these different systems. It is Ecology's intentions that

the wetlands criteria establish a measure to allow consistent decisions until more information can be gathered to determine whether specific numeric criteria are appropriate.

Narrative criteria are designed to protect some of the unique, ecological characteristics of wetlands. They address solids that settle, nutrient accumulation, and the maintenance and protection of the physical and biological characteristics of wetlands. By using narrative criteria, standards are applied on a site-specific basis, allowing permits to be written for the unique and variable characteristics of individual wetlands.

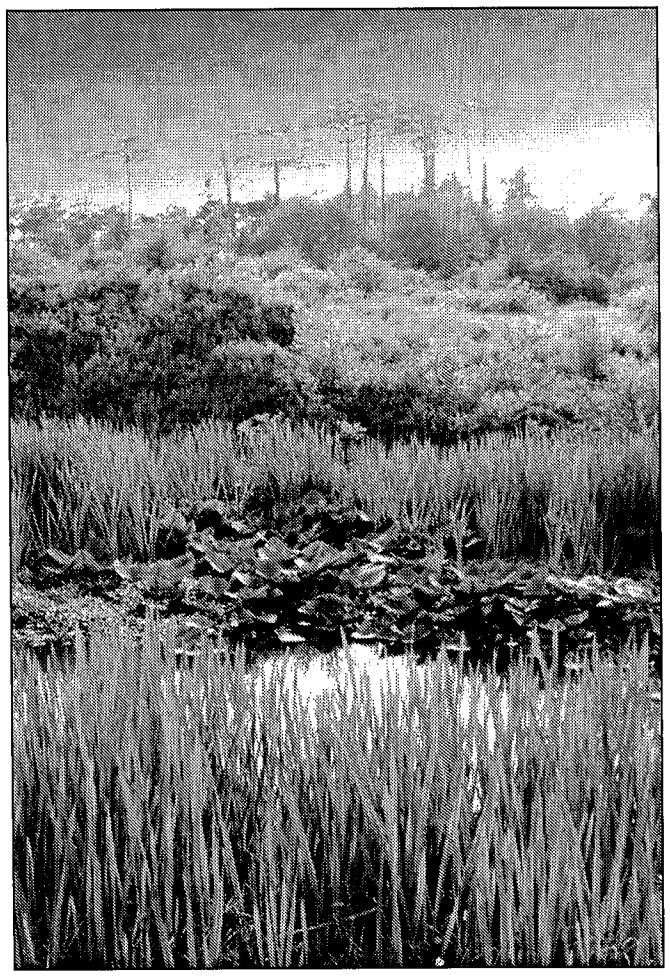


photo by Tom Hyde

Wetland Protection Activities

Section 401 Certification

Washington applies Section 401 certification to all appropriate federal permits and licenses. Washington does not have a 401 certification regulation. Guidelines and best professional judgement are used to set condition requirements.

For wetlands, the primary permit for which Ecology applies 401 certification is the Section 404 permit administered by the U.S. Army Corps of Engineers. Approximately 600 acres of wetlands in Washington state were permitted during the 1992-1994 period. Permits were issued for utility lines; road crossings; headwaters and isolated waters discharge; wetland restoration and creation; temporary construction; cranberry bog expansion; and cleanup of toxic waste.

Stormwater Control and Treatment

Ecology's publication Storm Water Management Manual for the Puget Sound Basin contains considerable information on preventing and treating stormwater runoff, including a section on using natural wetlands.

The manual includes a process for determining if it is appropriate to include a wetland in a storm water treatment system. Users of the manual are reminded that for any discharge of storm water to a wetland, the discharge must meet state water quality standards.

Previous amendments to the water quality standards include specific provisions for storm water (Ch. 173 201A-160 WAC). These amendments have greatly improved the ability to ensure storm water is treated and discharged in an appropriate fashion.

In the Puget Sound region, many local governments are in the process of developing or constructing regional storm water facilities. These facilities are critical because of increasing population densities and heavy rainfall in the region. Ecology staff works closely with local governments to provide technical assistance as they develop regional storm water facilities.

State Wetlands Integration Strategy

Ecology has completed a process to develop a state wetlands conservation program called "State Wetlands Integration Strategy" (SWIS). SWIS began in mid-1993 with six workgroups focusing on:

- regulatory reform,
- non-regulatory methods,
- planning and public process,
- education and training,
- technical aspects of wetlands protection, and
- economics of wetlands protection.

The intent of the SWIS was to find methods to make our existing state and local wetland protection programs work better. A framework was developed in cooperation with other federal and state agencies, local governments, interest groups, and the public to identify conflicts and to find solutions to existing wetland protection problems.

Wetland Restoration

Ecology's wetland restoration initiative is a new, voluntary, non-regulatory program that focuses on a coordinated approach to watershed planning and assessment for wetland restoration. Using public input and existing technical information, the program identifies wetland restoration sites which will contribute to solving identified problems within individual watersheds. Technical assistance and training is provided to all individuals, organizations, local jurisdictions, and tribes interested in restoring wetlands.

Wetland Preservation

Ecology, the U. S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service have been working in concert with Snohomish County and the Washington State Department of Fish and Wildlife, since 1992 to develop and implement the Spencer Island intertidal wetlands restoration project.

The Spencer Island project site is located in the lower Snohomish River and is owned jointly by state Fish and Wildlife and Snohomish County Parks. Project goals include:

- reestablishment of tidal conditions on approximately 50 acres of freshwater diked wetland;

- the replacement of reed canarygrass with native tidal wetland plants;

- the provision of increased habitat diversity to the island;

- the provision of increased food resources and rearing areas for juvenile salmonids and other estuarine fish species; and

- the export of products of primary production for the island to downstream systems.

Early efforts consisted of conducting feasibility assessments, baseline studies, hydrological modeling for the cross levee, project planning and design and construction of the cross levee separating the southern 50 acre portion of the island. The completion phase of the project, yet to come, will prepare the island for inundation and monitor changes.