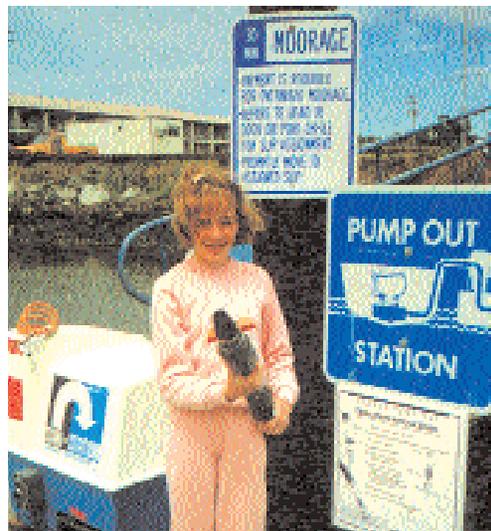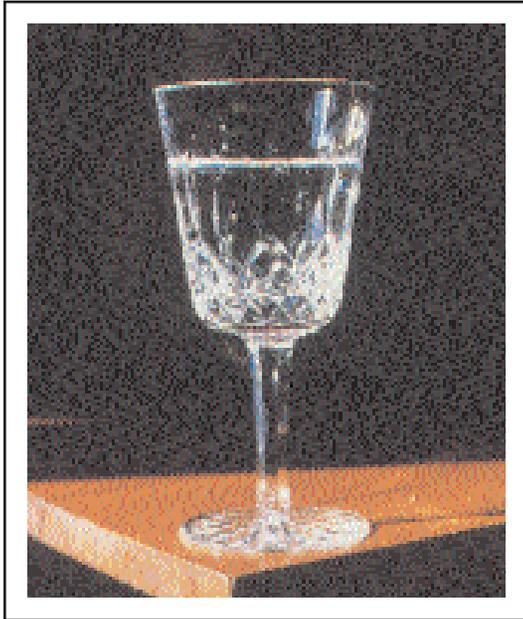# Taking Action

To Reduce Nonpoint Water Pollution in Washington

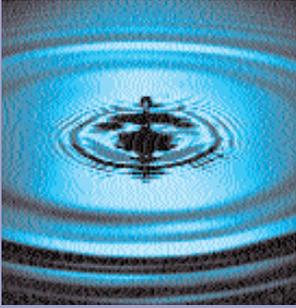**Text:** Annie Phillips
Editor: David Roberts
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Taking Action

To Reduce Nonpoint Water Pollution in Washington

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Washington Land Covers from Space
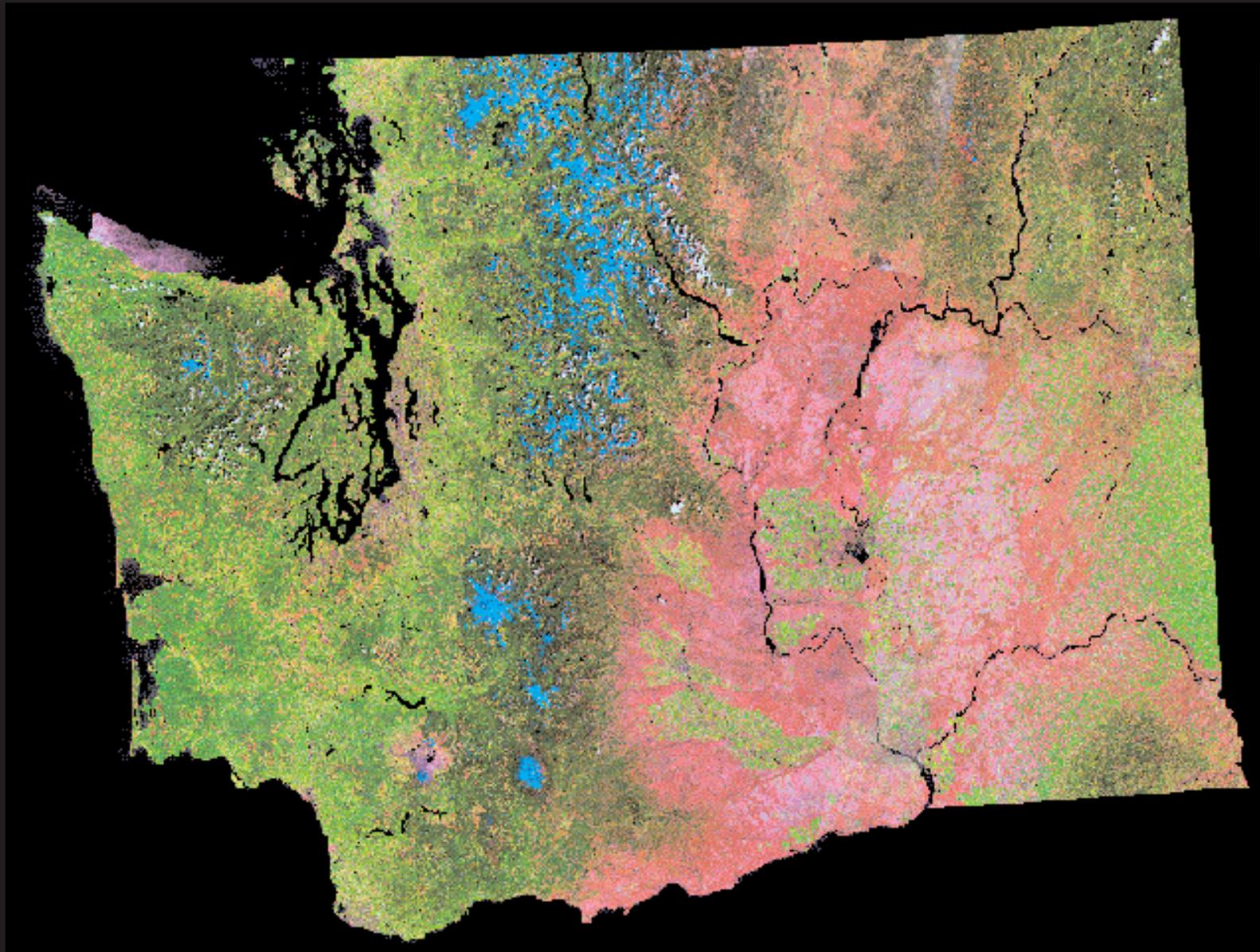
Legend:
- Land without trees
- Land covered with trees
- Land covered with water
- Land covered with snow

Summary

Nonpoint pollution is complicated and elusive. Sometimes it can be traced to several sources; sometimes it cannot be traced at all. Nonpoint water pollution is a growing threat to the environment and public health.

Nonpoint water pollution is the accumulation of sediment, chemicals, toxics, nutrients, debris, and pathogens that get washed into the nearest body of water by runoff from rainstorms, snow melt, or human practices. It comes from water-based and land-use activities; surface water runoff from agricultural lands, urban areas, and forest lands; subsurface or underground sources; and discharges from marine vessels.

Washington State has been a leader in addressing nonpoint source pollution for many years. Many tools already exist to achieve cleaner water. Some programs are regulatory and required, but most are voluntary. We have numerous examples of innovative approaches to management and funding of these programs.

In spite of all the work accomplished to date, salmon recovery and water quality protection require more urgent efforts to control nonpoint source pollution. Calling for rigorous management of nonpoint pollution, the President's Clean Water Action Plan required each state to update its nonpoint plan in 1999. The idea was to encourage states to take a fresh look at ways to improve and focus efforts to address nonpoint pollution.

The development of this plan is timely for our state. Washington's Strategy for Salmon Recovery identifies nonpoint source pollution as a primary target for recovering salmon. Most of the more than 600 water bodies currently on Washington's list of impaired and threatened waters (the 303(d) list) have nonpoint pollution problems. These listed water bodies are scheduled for Total Maximum Daily Load (TMDL or Water Cleanup Plan) development by 2013.

Washington has developed a statewide plan for protecting our natural resources from nonpoint pollution.

This is a collaborative effort of a wide range of entities. It identifies gaps in existing programs, sets a strategy for improving those programs, recommends timelines, and outlines methods for evaluating our progress.

"Taking Action" is a compilation from the official document "Washington's Water Quality Management Plan to Control Nonpoint Source Pollution," approved and published in the year 2000. It reflects current efforts and creative, practical new ideas from all interested partners.

These actions focus on how to improve existing efforts through stronger implementation, increasing funding, or making fundamental changes to programs.
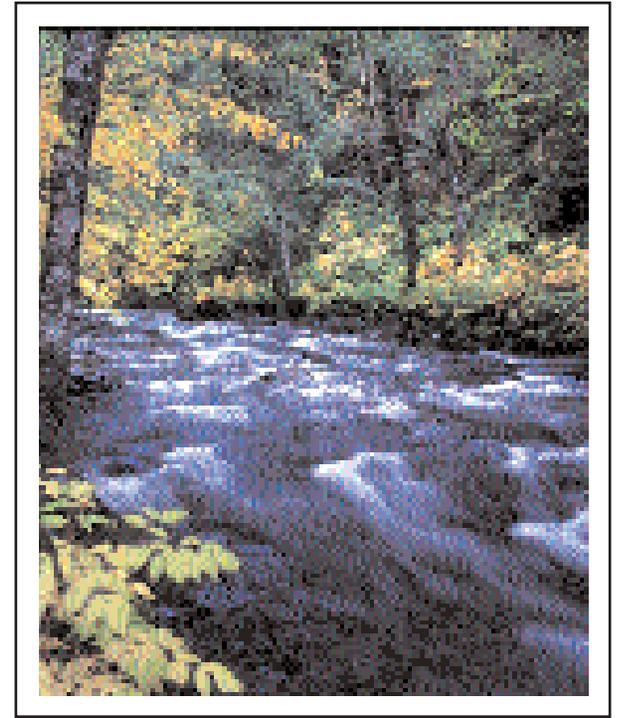
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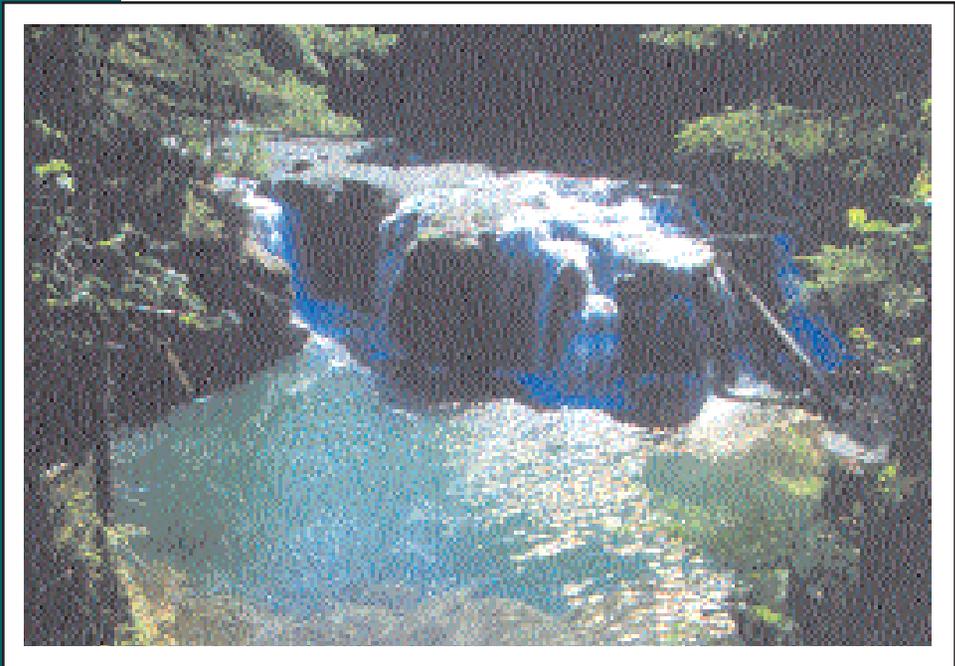
Nonpoint Concerns

Statewide, more than half the streams have fair to poor water quality and do not support the complete range of uses. This condition results mostly from surface or stormwater runoff, flow alteration, loss of riparian cover, and animal access. Most of these are nonpoint source problems.

River and Streams

More than 70,400 miles of streams flow through Washington's complex landscapes. By far, most are small streams, many with only seasonal flows. Their condition is highly variable, directly dependent on the surrounding land uses. Statewide, more than half the streams have fair to poor water quality and do not support the complete range of uses. This condition results mostly from surface or stormwater runoff, flow alteration, loss of riparian cover, and animal access. Most of these are nonpoint source problems.

Condition of Washington's Streams

41% — Poor
41% — Good
18% — Fair
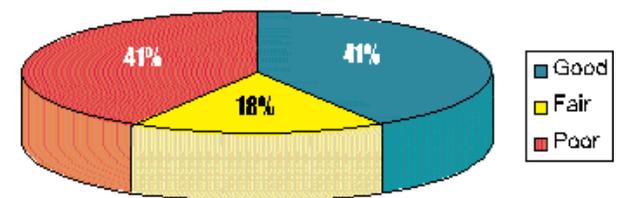
Good | Fair | Poor

Good, fair, and poor refer to the overall condition of streams in Washington as measured by a variety of factors.

The primary causes of water quality problems in rivers and streams are fecal contamination, metals, temperature, pH, dissolved oxygen, and toxic chemicals. Siltation and other habitat modifications are significant issues as well. With the exception of metals pollution, these are all indicators of nonpoint source pollution. These problems affect the use of rivers and streams for swimming, support of aquatic life, and wildlife habitat.

Impacts from various land uses are slowly decreasing, but cumulative impacts are still a problem. In the forested

environment, forest practices rules focusing on preventing water quality problems have been in place since the early 1980s. These rules have been modified over time to provide what is generally recognized as the most restrictive protection found in any state in the country.   Forested areas have been the site of many restoration efforts, but change occurs slowly in the forest.

In agricultural areas, practices are also improving. Educational efforts by the Natural Resources Conservation Service (NRCS), conservation districts, and WSU Cooperative Extension (CE) have raised awareness of producers and increased the number of acres managed under best management practices (BMPs).   Nutrient management on dairy farms continues to be a tough issue, along with soil erosion from dryland and irrigated crops. But progress is happening, and in many areas we expect to see the fruits of this work showing up as cleaner water.
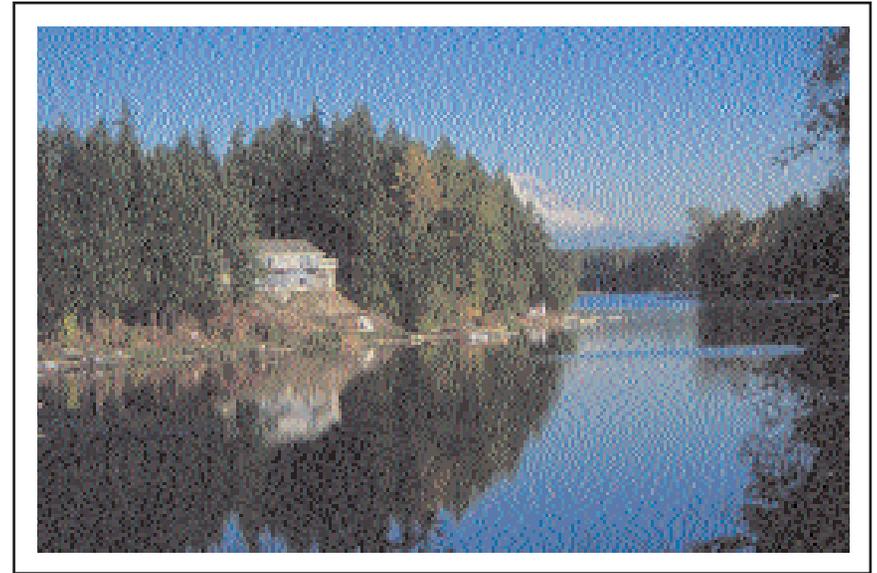
The difficult places in the state are on the urban fringes.   The greatest impacts from urban development are increased peak flows in the winter, reduced base flows in the summer, and loss of riparian habitat.   Runoff from impervious surfaces delivers nutrients, sediment, fecal contamination, and toxic chemicals to stream systems.

The public's understanding of the value of river systems in Washington continues to increase. Issues related to salmon survival highlight water quality, flow, and habitat problems. Population growth and conflicting uses have resulted in a need for more comprehensive planning that considers a wide range of interests.   New information about ground water-surface water interaction has opened a whole new dimension to management.

Lakes

One of the most sought-after housing sites in Washington is on the shoreline of a beautiful, clear lake. Those lakes with poor water quality may be due to natural conditions, but generally the culprit has been man's own activities in the watershed.

Runoff from roofs, streets, sidewalks, and lawns is the main source of nutrients which eventually end up in lakes, causing the summer algae blooms that indicate poor water quality.

Excessive loading of phosphorus, both external and internal, almost always causes the algal concentrations. As sediments accumulate, in-lake phosphorus recycling exacerbates the problem. In extreme cases, cyanobacteria (blue-green algae)

Condition of Washington's Lakes

65% Good
29% Fair
6% Poor

Good, fair, and poor refer to the overall condition of lakes in Washington as measured by a variety of factors.

can severely degrade the water quality. Heavy blooms of blue-green algae can cause noxious odors, surface scums and mats, low dissolved oxygen and high pH. Also, some blue-greens can become toxic, killing small animals that drink the water and causing gastric problems and skin irritations in humans.

Development of lake-watersheds is an ever-increasing threat to lakes' health as our population grows. This figure shows that 35 percent of monitored lakes are in less than good condition. Many are in high-density housing areas.

Another infamous lake problem intensified by excess nutrients is aquatic plants, both native and introduced. Most healthy lakes host an abundant and diverse population of aquatic plants. In other lakes, non-native aquatic plants like Eurasian milfoil grow rampantly, unlimited by natural controls.

Estuaries

The nearshore environment includes the beach, intertidal and shallow subtidal areas that hold saltwater or brackish water. These habitats are critical to the health of estuaries and marine life. They provide shelter for fish, shellfish, birds, and marine mammals. They are used as spawning, rearing, and feeding grounds for species that live in and around the shoreline.

The nearshore is a collage of habitats, from mudflats to eelgrass beds and salt marshes.

It is also home to an abundance of small marine invertebrates. Surf smelt spawn directly in gravel on the beach near the high water mark. Herring lay their eggs on eelgrass and raise their young there. Eelgrass beds occur in shallow and generally calm marine waters and are sensitive to human disturbance.

Most salmon leave streams when they are very small, entering estuaries and other nearshore environments. They use the nearshore as their travel corridor to the ocean and food source, eating large quantities of smaller forage fish such as sand lance, surf smelt, herring and other small marine animals until they get big enough to move into deeper waters.

Residential and commercial development at the shoreline has a tremendous effect on the nearshore. Clearing vegetation from the shoreline and immediate upland areas causes erosion and increases the amount of surface water runoff. Upland development can easily pollute the nearshore with bacteria, excess nutrients and toxics, making shellfish unsafe for eating and water unsafe for swimming.

Of the state's 3700 miles of shoreline, human development has modified more than 800 miles in Puget Sound, causing a decline in the acreage of the nearshore and its overall health. Direct physical alteration of the nearshore occurs with the construction of bulkheads, riprap, docks, piers, and other waterfront features. These can affect the character of the beach and shallow water areas and cause the loss of some habitats including baitfish spawning areas and eelgrass beds.
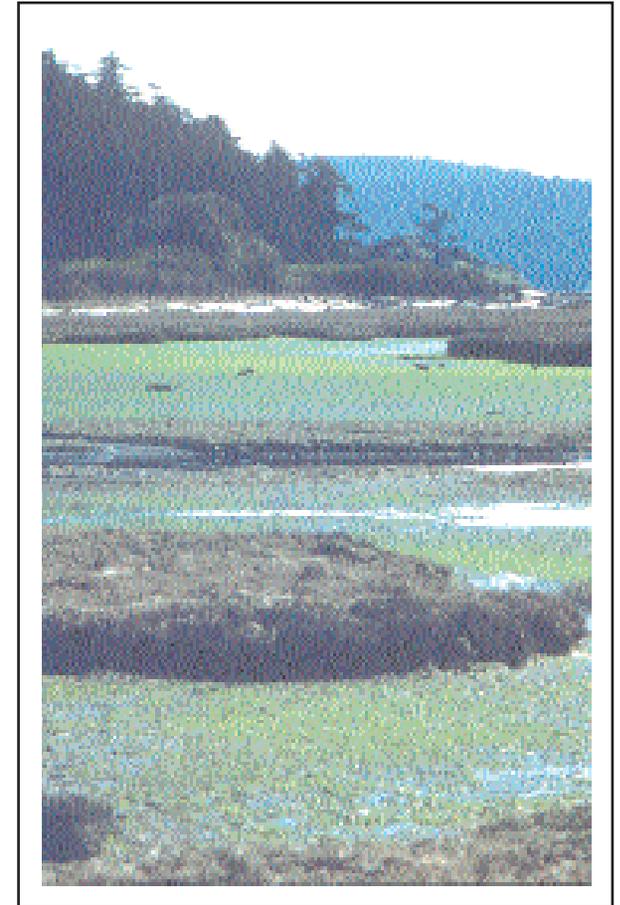
Condition of Washington's Estuaries

- Good 35%
- Fair 43%
- Poor 22%
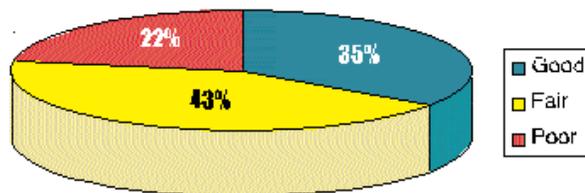
Good, fair, and poor refer to the overall condition of estuaries in Washington as measured by a variety of factors.

Of the state's 3700 miles of shoreline, human development has modified more than 800 miles in Puget Sound, causing a decline in the acreage of the nearshore and its overall health.

Ground Water

In Washington, ground water provides approximately 60 percent of the drinking water consumed by the state's 5.8 million residents. Approximately 16,000 public drinking water systems send ground water to most of our population, while more than 400,000 private wells pump water for another 1,000,000 residences.

Ground water is very important in maintaining in-stream flows and water quality during summer months. A major concern is the expected increased demand on ground water as the population grows from current levels to an estimated 11 million by 2045.

Washington contains some of the most productive aquifers in the nation. The largest is the Columbia River Basalt Aquifer System located in the central portion of the state. Two smaller but vital systems, the Spokane-Rathdrum Prairie aquifer and the Puget Sound aquifer system, serve those areas.

Generally, ground water quality in Washington is good. Contamination due to nonpoint sources appears to be the most significant widespread threat. Nitrate contamination is the most widespread problem. Statewide, exceedances of the 10 milligrams per liter nitrate-nitrogen drinking water standard in private/domestic wells are estimated at 10-15 percent, with a few areas as high as 20-25 percent. Nitrate in ground water is of special concern to infants and pregnant women. Low levels of pesticides have also been detected in a small percentage of wells.

Specific problem areas include elevated nitrate within the Columbia Basin, elevated nitrate and the pesticide ethylene dibromide (EDB) in Whatcom County, and the solvent trichloroethylene (TCE) and metals in areas of Clark County. Currently the state has identified 22 "Superfund" sites, 10 Resource Conservation and Recovery Act (RCRA) corrective action sites, and more than 100 sites currently being managed and cleaned up under the Model Toxics Control Act. The cost of cleaning contaminated ground water can be staggering.
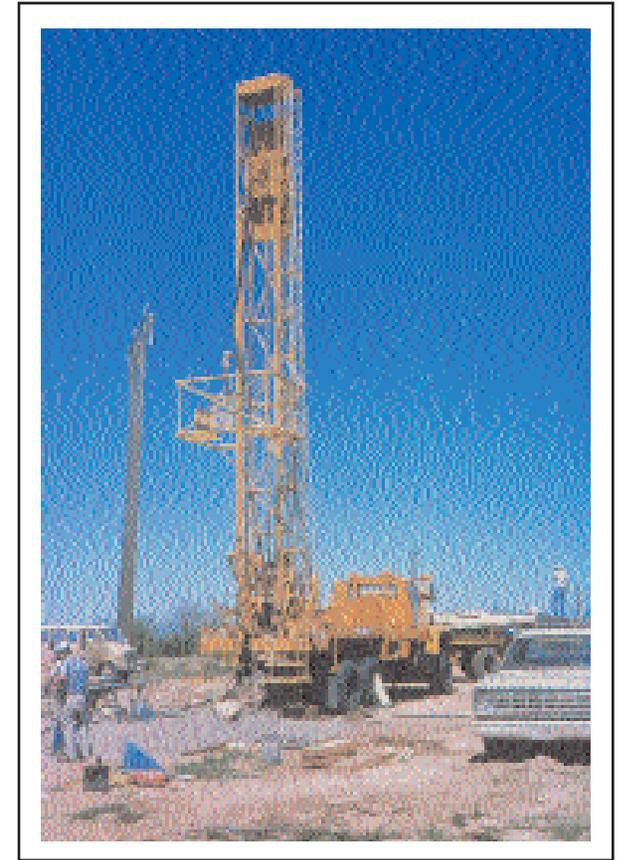
Ground Water Use in Washington
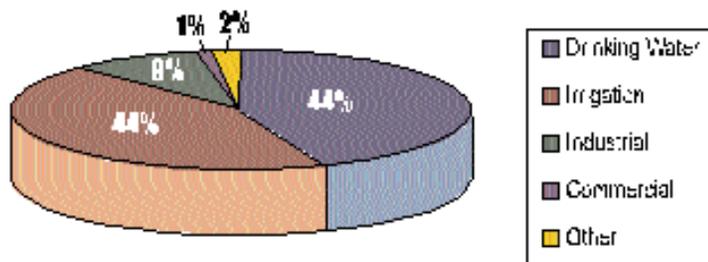
- Drinking Water
- Irrigation
- Industrial
- Commercial
- Other

A major concern is the expected increased demand on ground water as the population grows from current levels to an estimated 11 million by 2045.

Threatened Resources

The shellfish industry generates 70 million dollars per year in this state, with considerable potential for expansion, particularly for income-poor rural coastal counties.

Fish

Many stocks of wild salmon, steelhead and trout have declined in Washington. These declines are the result of many factors. Some are natural and beyond our control. Others have resulted directly from human activities. Economic development and rapid population growth have exacerbated conditions unfavorable to salmon production.

The Salmon and Steelhead Inventory report, published in 1992 by the Washington Department of Fish and Wildlife, shows the condition of 435 fisheries stocks.

	Healthy	Depressed	Critical	Unknown	Extinct
435 Total Stocks	187	122	12	113	1
Percent of Total	43%	28%	3%	26%	0

Problem	Sources
Removal of riparian shade, causing high stream temperatures	Agriculture, forestry, urban development
Animal access causing bank erosion	Agriculture
Introduction of nutrients resulting in low dissolved oxygen	Agriculture and urban development
Landslides causing coarse sediment in streams	Forestry and development
Road and surface erosion causing fine sediment in streams	Agriculture, forestry, recreation, urban development
Lack of large organic debris from removal of riparian vegetation	Forestry, agriculture, urban development
Reduced flow from over-allocation and impervious surfaces	Urban development and water use practices
Loss of habitat (wetlands, in-stream and off-stream areas)	Diking, stream modification, filling wetlands

Shellfish

Shellfish production in Washington ranks among the highest in the country. Washington is first in oyster production. Clam beds in Skookum Inlet (south Puget Sound) are the nation's most productive. In 1999, commercial growers in Washington harvested shellfish from 246,000 acres of tidelands. The industry generates 70 million dollars per year in this state, with considerable potential for expansion, particularly for income-poor rural coastal counties.

Since 1981, the state Department of Health has closed or restricted for harvesting more than 46,000 acres of key shellfish growing areas in Washington due to contamination. Local governments, tribes and state agencies have worked together to correct pollution problems in several areas, and the department has reopened about 13,000 of those acres.

Recreational shellfish beaches are classified by Health, based on a survey to evaluate shoreline pollution sources and nearshore water quality. Beaches are assigned one of three classifications:

- **Open** - these beaches always meet state public health standards
- **Conditional** - these sometimes meet standards, but often must be closed due to bacteria and other nonpoint contaminants that wash down during significant rainstorms or that come from malfunctioning sewage treatment facilities or on-site systems along the shore
- **Closed** - always unsafe for recreational shellfish harvest.

Not all beaches have been classified.
For the latest safety information, go to
http://www.doh.wa.gov/ehp/sf/recshell.htm

Problem	Sources
Animal access in tributaries and lack of proper manure management contributing fecal coliform and pathogens	Agriculture
Spraying of toxic insecticides	Agriculture and gardening
Failing on-site sewage systems leaching fecal coliform	Suburban development
Bulkheads and other shoreline construction and habitat alteration	Shoreline development

Since 1981, the state Department of Health has closed or restricted for harvesting more than 46,000 acres of key shellfish growing areas in Washington due to contamination.

Problem	Sources
Inappropriate use of animal waste and fertilizers, resulting in elevated nitrates	Agriculture
Inappropriate use of pesticides	Agriculture, urban development
Disposal of stormwater to dry wells and other infiltration devices used to dispose of stormwater (18,000 in the state)	Underground injection wells
Unlined dumps leaching and seeping toxics and pathogens	Landfills
Failing septic systems introducing nutrients and fecal coliform	Suburban development
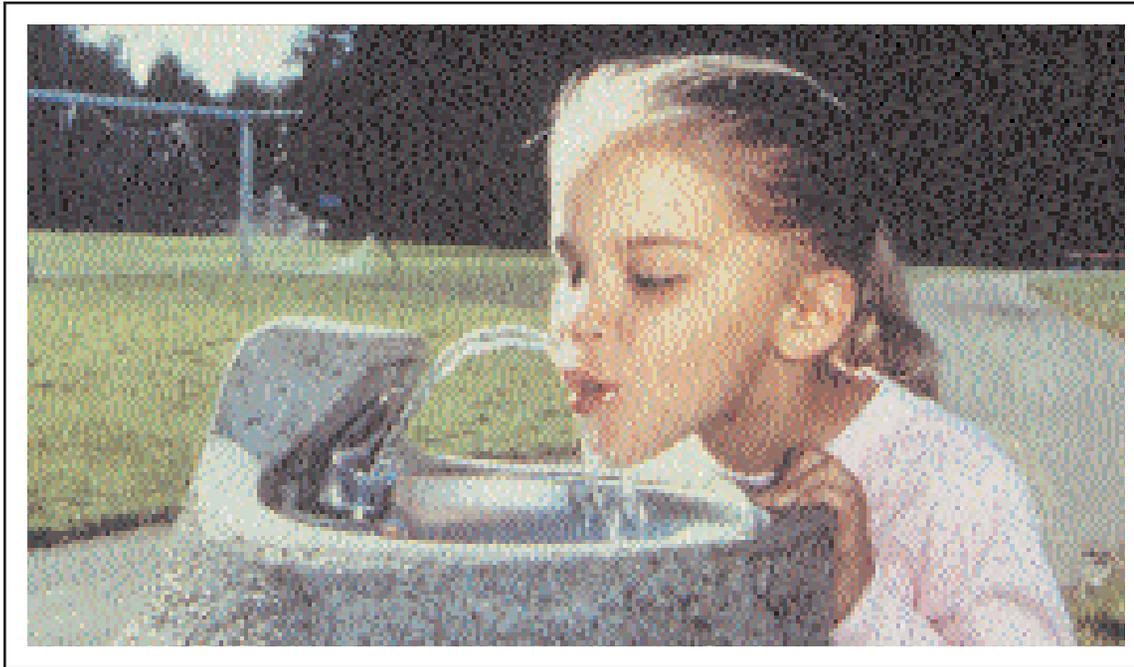
Drinking Water

Americans tend to take safe drinking water for granted. While more than a billion people in developing countries cannot access safe drinking water, we enjoy the luxury of simply turning on a tap.

But our drinking water is threatened by increasing urbanization, environmental degradation, inadequate protection of drinking water sources, contaminated water supplies, and deteriorating drinking water infrastructure. These health risks can impact communities' economy and sustainability.

About 5 million Washington citizens are served by more than 16,000 public water systems. Nearly a million more get their water from private wells.   All but 242 of the public water systems deliver ground water to approximately 60 percent of the population.

Seattle, Tacoma, and Everett and their surrounding areas are largely served by surface water systems. It is fortunate that these cities can control activities in their upper watershed areas to protect their water supplies.

In uncontrolled areas, nonpoint pollutants eventually run off into surface water or leach into ground water. Exposed surface water sources like lakes, streams, and rivers pose significantly higher risks from non-point pollution threats than protected aquifers. The future use of these sources as drinking water supplies will depend upon how well potential sources of contamination are managed and controlled.

Our drinking water is threatened by increasing urbanization, environmental degradation, inadequate source protection, contaminated supplies, and aging systems.

Wetlands and Riparian Areas

Wetlands and riparian areas provide critical resources to entire ecosystems. Wetlands store water, reduce flooding, and provide rich habitat for a variety of life forms. Riparian areas also provide unique habitat and help keep streams cool.

Historically, wetlands and riparian areas have been altered or destroyed to encourage development across the state. Approximately 70 percent of the state's original wetlands have been filled. In the Puget Sound area, only ten percent of all wetlands remain. Riparian areas also have suffered through destruction of vegetation, streambank erosion, and alterations to stream channels.

Wetlands protection continues to be complex, as new issues of water quality and quantity in wetlands arise. Local governments restore and protect wetlands through a variety of mechanisms, including land use controls, acquisition and preservation programs, and restoration projects. The State Environmental Protection Act (SEPA), the Growth Management Act (GMA), the Shoreline Management Act, the Puget Sound Water Quality Plan, and the Coastal Zone Management Act also control impacts to wetlands.

To enhance wetland management in the state, Ecology and Department of Community Trade and Economic Development prepared the State Wetlands Integration Strategy. SWIS contains 47 recommendations for Ecology and other agencies, most of which are currently being implemented.

The Joint Select Committee on Lake Health was created by the Legislature in 1996 to address the growing conflicts between shoreline property owners and agencies over the use and treatment of lakes. Key issues include noxious weed control, funding for local lake improvements, aquatic pesticides, and the need for public education about nonpoint pollution of lakes and boating impacts.
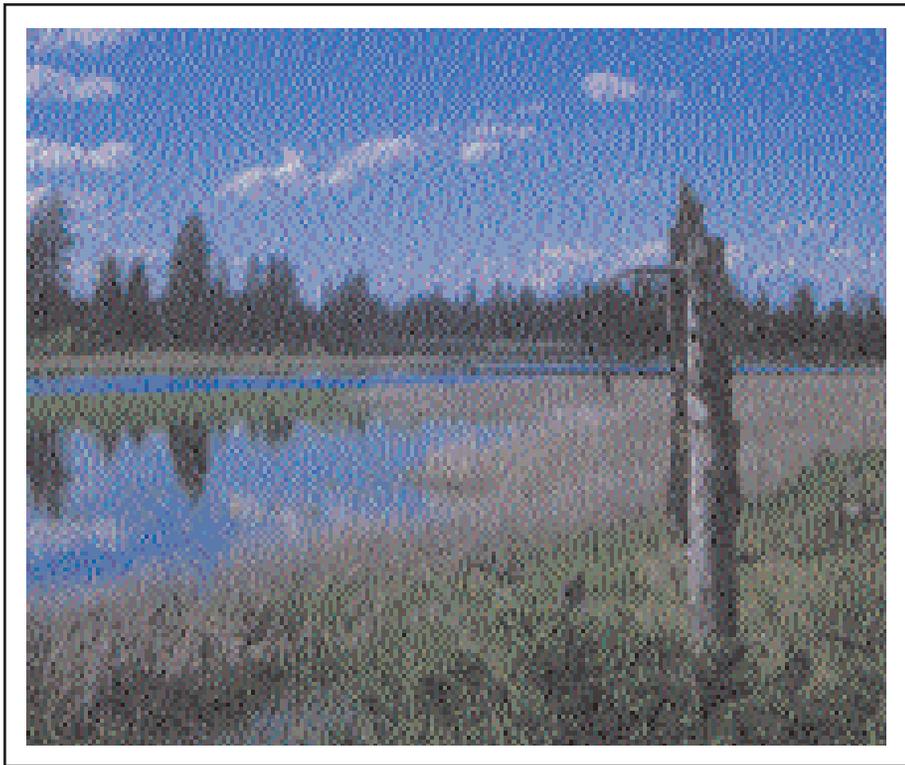
Problem	Sources
Degradation of water quality in wetlands affecting biological community structure	Upstream pollution, runoff from agriculture and suburban development
Changes in wetland flooding patterns	Stormwater discharges and development-related flooding
Fragmentation of large, intact wetland systems	Transportation and other linear infrastructure development
Interruption of wetland and riparian sediment processes	Shoreline modification - i.e., riprap or dikes
Changes in wetland plants and animals	Introduced, non-native species

Riparian areas have suffered through destruction of vegetation, streambank erosion, and alterations to stream channels.

Managing Nonpoint

These days, with most easily-traceable pollution sources controlled through permits and enforcement, nonpoint pollutants account for most of the remaining water pollution in the United States. They are introduced into water through runoff. How the land is used (or not used) determines the amount of runoff and what it will carry. The US Environmental Protection Agency (EPA) estimates that more than 60 percent of our water pollution problems come from nonpoint sources.

In all major watersheds in Washington, nonpoint source water pollution occurs to some degree. The sources are related to the various land uses. Watershed-based programs generally identify and address nonpoint problems related to land use. Forest practices and dairy waste management have laws that require specific actions to protect water quality. Local governments play an extremely important role by passing ordinances that control land use and development.   All other programs are voluntary.

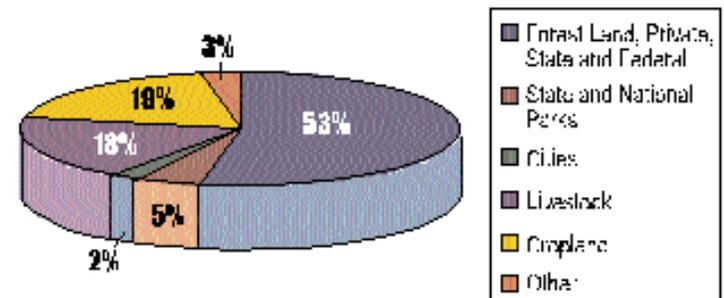In Washington, federal and privately-owned forests and agriculture occupy some 90 percent of land area in the state. This is in addition to five percent occupied by state and national parks.   Both logging and farming are major contributors to nonpoint pollution. Urban areas are the third significant contributor, despite their relatively small share, two percent of land coverage. In fact, state and private forest and farms were developed at the average rate of 70,000 acres per year in Washington from 1992 to 1997. This was the 17th fastest rate in the country, according to figures from the United States Department of Agriculture.

A wide range of programs in Washington address nonpoint source problems.   Local governments carry out many activities, particularly as they relate to development. Conservation districts are the key players addressing agricultural issues. Tribes play an important role in managing nonpoint source problems, especially by identifying issues on the ground. State and federal agencies provide guidance, technical assistance, and funding for a large number of efforts.

This part of the plan looks at the primary categories of nonpoint source pollution and provides an overview of local, state, federal, and tribal programs addressing the problems. In addition to describing the programs, you will find actions designed to improve program performance. Many of the actions are linked to the state's salmon strategy.

We have divided this discussion into six source categories: agriculture, forestry, urban (which includes stormwater, onsite sewage systems, pollution prevention, and transportation), recreation, hydromodification (meaning ditching, diking, dredging, stream channelization, and dams), and loss of aquatic ecosystems.

Land Use in Washington

- Forest Land, Private, State and Federal — 53%
- State and National Parks — 5%
- Cities — 2%
- Livestock — 18%
- Cropland — 19%
- Other — 3%

Agriculture

Farming is a productive use of land, yet it can be a threat to water quality. Direct discharges and runoff from farms carry nonpoint pollution. Soil erosion, use of pesticides and other chemicals, animal waste, and loss of riparian zones next to water bodies are common concerns. Ground water is at risk of contamination from some farming practices.

Shellfish beds are especially vulnerable to bacteria, and sometimes the Department of Health must close them because of runoff from upland farms. Removing natural riparian vegetation and allowing animals to access streams destroys fish habitat.

Primary technical assistance to farmers is provided by conservation districts, CE, and NRCS. Education programs by CE cover a wide array of topics. NRCS and conservation districts help farmers with farm plans and local watershed planning activities. There is often financial assistance as well, through cost share from the local conservation district or NRCS, or through a low-interest State Revolving Fund loan from Ecology.

Agriculture's effect on salmon is now a primary issue facing the public. Negotiations are underway involving agricultural interests, state and federal agencies, tribes and environmental organizations, in hopes of developing some new agreements regarding water use and water quality protection for agricultural areas of the state. The process is known as Agriculture, Fish and Water or "AFW" for short.

All agricultural practices are under voluntary control except dairy operations and fish farms, which Ecology regulates, and pesticides, which WSDA and EPA regulate. Activities which kill fish or cause other acute environmental impacts are also subject to enforcement by Ecology. Community-based watershed activities have been instrumental in restoring and protecting the waters of the state.

Taking Action

▸ Through education and financial support, agencies will encourage the development and use of farming methods that will lead to more sustainable farming.

▸ Commodity groups will develop appropriate practices for their own growers.

▸ Farmers will receive help to write water-friendly farm plans.

▸ The Farm*A*Syst program will be used to protect wells on farms by reducing risks of ground water contamination.

▸ Conservation districts will seek more stable funding to increase the effectiveness of their outreach and education work.

Forest Management

Sedimentation and increased water temperature are the worst problems associated with logging, particularly as they relate to fish. These mostly come from improper road construction and maintenance — there are almost 61,000 miles of state and private logging roads in Washington — and from careless timber harvesting next to streams.

Any logging activity on state or private land in Washington involving more than 5,000 board feet (about one truckload) requires a forest practices permit from the Washington State Department of Natural Resources (DNR). The Forest Practices Rules specify procedures to protect water quality and Wildlife.

Already regarded as the state with the strictest rules for logging, Washington will soon adopt even tighter forest practice rules. The state Legislature passed the Forests and Fish Report in 1999 after almost two years of negotiation between forest landowners, tribes, local governments, and federal and state agencies. It calls for the Forest Practices Board to adopt new rules by June 30, 200l, to help protect salmon.

The new rules will preserve more trees in streamside areas to provide the shade that helps keep streams cool and the woody debris that builds in-stream salmon habitat. They will also require better road construction and maintenance to help prevent siltation of streams, provide more protection for wetlands, and set more restrictions on pesticide use. Landowners will be offered incentives designed to slow the conversion of forestland to other uses. The forest practices rules apply to all state and private forestlands in Washington. The US Forest Service has pledged to meet or exceed the provisions of the Forests and Fish Report on its lands in Washington through an agreement with the Department of Ecology.

Taking Action

▸ The state will implement the actions in the Forests and Fish Report and House Bill 2091.

▸ DNR will review and approve road maintenance plans to make sure old logging roads don't contribute to stream sedimentation.

▸ The state will seek sustainable support to educate small private forest landowners on water quality and ESA issues through DNR's Forest Stewardship Program.
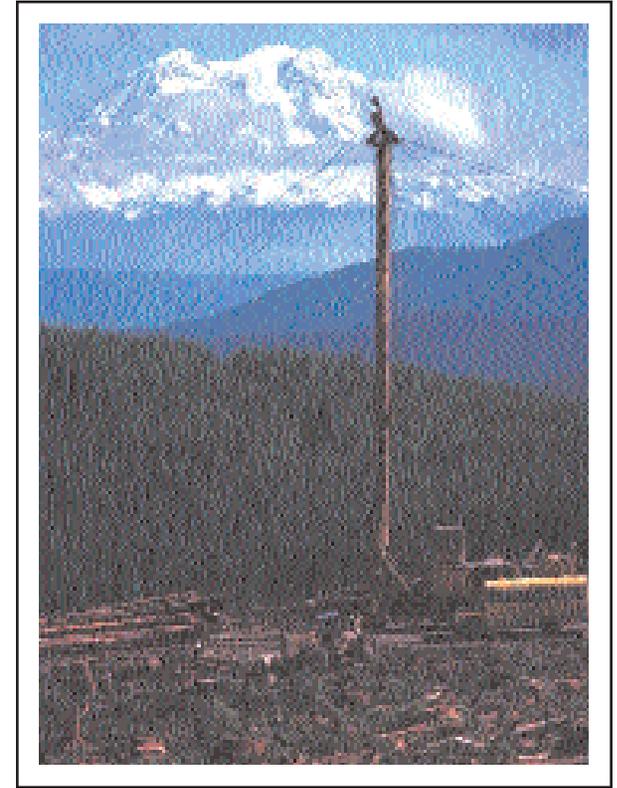
The new rules will preserve more trees in streamside areas to provide the shade that helps keep streams cool and the woody debris that builds in-stream salmon habitat.

Stormwater Control

Clearing for buildings, parking lots, and landscaped areas is now occurring at a rapid rate in Washington. Drainage patterns are forever changed. Rainfall runs quickly and directly into the streams, dramatically increasing their volume and peak flows, and reducing summer flows.

Runoff may contain high concentrations of heavy metals, lawn and garden chemicals, bacteria, silt, petroleum products, and nutrients. More stubborn problems are associated with impacts to habitat due to destructive flows in the winter and low summertime flows.

In the short term, these pollutants can harm aquatic organisms, damage shellfish beds, and restrict water recreation. In the long run, they can create serious problems such as excessive algae growth, ground water contamination, loss of fish habitat, and contaminated sediments.

Local governments control stormwater impacts from development by following the requirements of the SEPA, the GMA, and, where appropriate, the Shoreline Management Act. Many counties and cities accomplish these requirements with the help of stormwater manuals and ordinances.

Growing trees and maintaining forest lands in urban areas is one of the best ways to absorb and filter stormwater runoff. The DNR Urban and Community Forestry (U&CF) program works with many developing communities to form ordinances that deal with natural resource preservation and management. Currently, the U&CF program is federally funded. With state support, we could increase education and outreach efforts to help more communities.

Septic Systems

Septic systems serve approximately 1.4 million Washingtonians, a number that is growing each year. The exact number of failing systems is not known. Common problems include poor soils, obsolete design, improper siting, poor construction, poor operation and maintenance, and limited knowledge on the part of local professionals and owner/operators. The recently revised state on-site system regulations deal with most of these factors.

Failing systems pose a health hazard because domestic wastewater can contain bacteria, viruses, protozoa, and helminths (worms) harmful to people. Typhoid fever, gastrointestinal infections, and infectious hepatitis have been linked to failing on-site systems around the country. Nitrates that find their way into well water are also a problem, especially for pregnant women and infants.

Local health districts issue permits for installing on-site systems. Across the state, there are not enough field staff to adequately monitor systems for failure. The statewide average is approximately one inspector for every 7,500 on-site systems.

Watershed plans are a good way to address on-site septic system problems. Strategies include voluntary, educational and regulatory programs. Solutions may entail education about maintenance to prevent failure, requiring alternative designs where necessary, and limiting housing density. The State Revolving Fund offers counties no- or low-interest loans for deserving homeowners to repair, replace or upgrade their onsite sewage systems.

Taking Action

▸ The state will encourage the use of innovative technologies and seek additional funding for repairing failing septic systems.

▸ The state will find funding to hire more septic system inspectors and expand local health departments' inspection programs.

Strategies include voluntary, educational and regulatory programs. Solutions may entail education about maintenance to prevent failure, requiring alternative designs where necessary, and limiting housing density.

Hazardous Materials

In densely populated areas, our random everyday acts of negligence and disregard add up to a powerful cumulative dose of contamination. Use of household pesticides continues to be a significant issue in many urban watersheds. Their residues appear in many streams, impacting stream health in ways that are only recently being observed.

Another issue of growing concern is pet waste. Increasingly, fecal coliform linked to cats and dogs is making its way to urban streams. Education is needed to show animal owners the importance of controlling waste in urban areas.

Many industries discharge specific pollutants into surface and ground water - for instance, construction, auto wrecking, boat and auto repair shops, golf courses, concrete and gravel mining. Creative local programs like Bellevue's "Business Partners," the "Whatcom Watershed Pledge," and King County's "EnviroStars" enlighten unwitting polluters, giving technical advice on targeted BMPs to protect water quality.

Other programs aimed at pollution prevention generally come under the state's waste management acts. Local governments carry the main responsibility for solid waste, as well as household and small-business hazardous waste. Responsibility for industrial hazardous waste lies with Ecology. The 1997 figures for Washington are impressive:

- 4600 tons of hazardous waste from households were collected at the state's 45 permanent facilities in 90 collection events.
- About 80 percent of this was recycled or used for energy recovery.
- 4000 tons of used oil were collected in 521 facilities across the state, and either recycled or used for energy recovery.
- 198 tons of hazardous waste were collected from small businesses.
- 33 percent of all solid waste in the state was recycled, including 210 tons of grass clippings and other yard waste.
- More than one-third of Washington cities offered curbside recycling to their residents.

Taking Action

- State and local governments and CE will educate home gardeners about reducing runoff and the use of chemicals in their landscaping.

- State and local governments will explore ways to increase the rate of residential and industrial recycling.

Use of household pesticides continues to be a significant issue in many urban watersheds. Their residues appear in many streams, impacting stream health in ways that are only recently being observed.
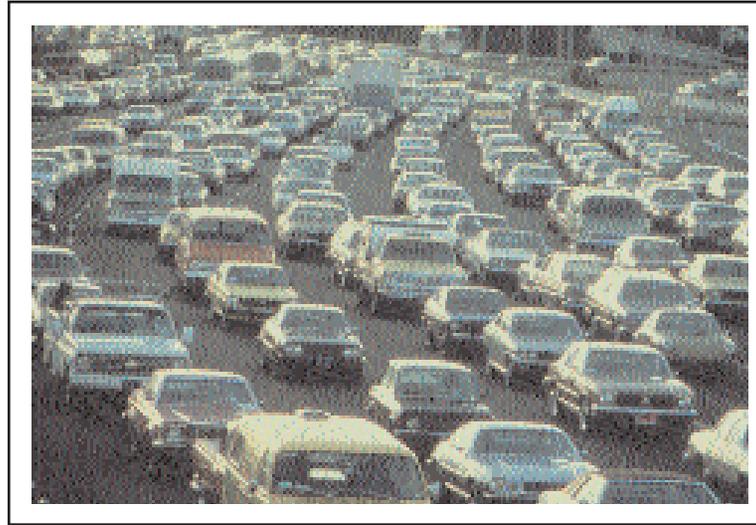
Roads

Nearly 80,000 miles of road run through the state (not including logging roads), used by 5.2 million vehicles, mostly in the Puget Sound area. Gasoline, oil and other fluids eventually wash into surface waters or seep into ground water. Airborne particulates from exhaust and tire wear wash to the ground whenever rain "clears the air." Occupants dispose of litter and contaminants along roads. Grit from the road ends up as fine sediment, clogging streams and suffocating fish spawning areas. Like all impervious surfaces, roads increase runoff.

Local governments and state agencies use a variety of permits to prevent problems associated with road and bridge construction. All bridges must have a Shoreline and Hydraulics permit before construction. All road construction and maintenance projects with potential environmental impacts must obtain Ecology's Stormwater Construction General Permit. It is used to prevent stormwater impacts to adjacent waters during construction and requires that "all pollutants…that occur on-site during construction shall be handled and disposed of in a manner that does not cause contamination of stormwater."

The permit requires an Erosion and Sediment Control Plan and Spill Prevention and Emergency Clean-up Plan. Permits may be conditioned to prevent problems. Stop work orders can be issued if conditions are violated.

Salmon have been directly harmed by roads in Washington. The Washington State Department of Transportation (WSDOT) has established a working agreement with the Washington Department of Fish and Wildlife that describes how WSDOT plans to carry out construction in the future to avoid impacts to threatened and endangered salmon species.

WSDOT also has a state of the art manual on road maintenance designed to address both water quality and fish needs. This manual is available to local governments and will likely become the standard by which all road surfaces will be managed in Washington.

Taking Action —————

▸ Department of Transportation and local governments will follow new statewide guidance on road construction and maintenance, and target methods to verify and increase use of the guidance.

▸ The state will seek new ways to provide assistance to communities addressing transportation runoff.

Local governments and state agencies use a variety of permits to prevent problems associated with road and bridge construction.

Marinas and Boats

Within Washington's coastal areas, some 450 marinas provide nearly 37,000 wet moorage slips. Sewage from boats affects water quality, especially in smaller bays with poor water circulation and at marinas. Boaters also can pollute recreational waters by discharging contaminated bilge water, petroleum products, garbage and trash, paint scraping, and toxic solvents.

Boat yards and marinas were once a source of significant contamination to Washington's waters. Through a combination of permits, advisories, and technical assistance, pollution from boat maintenance activities has been notably reduced.

Ecology led a two-year multimedia educational effort targeting boatyards and marinas. This effort was known as the "Ship Shape" campaign. The campaign provided a comprehensive environmental resource manual to marina operators. In addition, all boatyards and marinas in the state received onsite technical assistance visits.

Addressing boater sewage has been a major effort since the mid-1980s. The placement of marine sewage pump-out stations is the responsibility of State Parks. In coordination with other state natural resource agencies, grants are provided to marinas to install pumpout and other sanitation facilities. In 1999, there were more than 100 marine sewage facilities in the state.

State Parks conducts an extensive education program for boaters. Along with posters, brochures and similar media, a Boater's Guide is distributed which contains safety tips, environmental information, and a summary of disposal regulations, with a map showing locations of pumpout stations.

Fuel dock operators have expressed ongoing concerns about petroleum spills. These generally occur during the fueling process, especially when the boat owner does the fueling. Boat design issues and operator awareness seem to be the primary source of concern.

Taking Action

▸ The state will coordinate education for boaters on environment-friendly practices, especially the use of boat sewage pumpout facilities. The state will make sure there are enough of these available, that boaters know where they are, and that the facilities are in good working order.

▸ The state will examine new approaches to prevent spills from boaters overfilling their gas tanks.
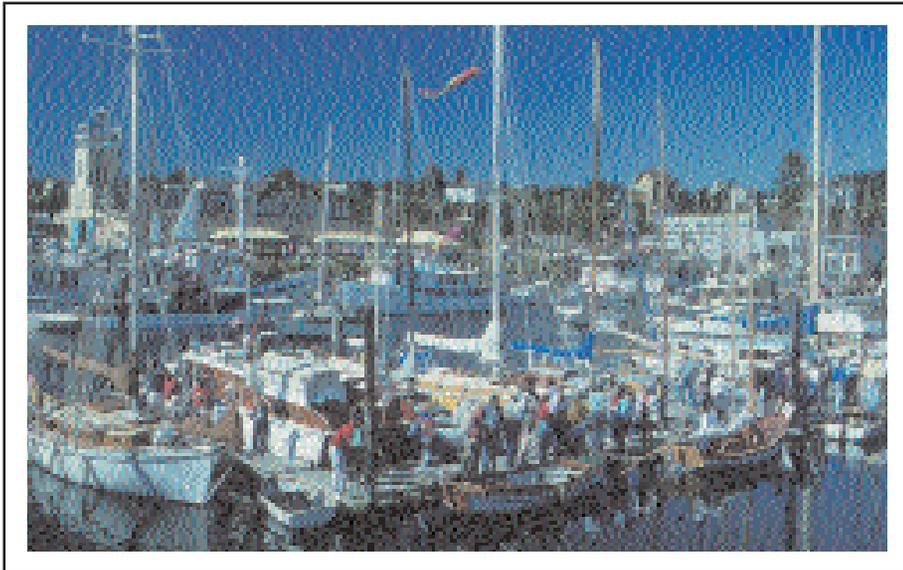
Boat yards and marinas were once a source of significant contamination to Washington's waters.

Off-Road Vehicle Use

According to the 1991 Washington State Trails Plan, 15 percent of households use a utility-size 4-wheel drive vehicle off road; 12 percent drive motorcycles off road; and 10 percent use short-base 3- or 4-wheel all-terrain vehicles.

Even with managed trails, there is strong potential for water quality degradation. Many off-road users recreate near water, disturbing stream banks and causing erosion and sedimentation.

In 1971, the Washington Legislature created the All-Terrain Vehicle Program that later became Chapter 46.09 RCW.   This law established a fund source, administered by the Interagency Committee for Outdoor Recreation, for the development and management of off-road recreation facilities. Several federal, state, and local agencies manage ORV facilities and trails. The 1993 Washington Off-Road Vehicle Guide lists 34 major ORV recreation areas.
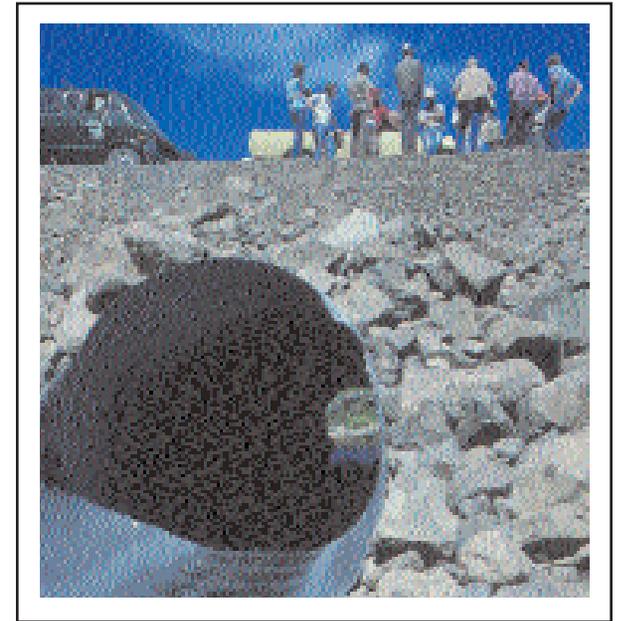
Taking Action

▸ State and local governments will work with ORV user groups to help them understand how their activities can contribute to nonpoint pollution - and how to prevent it.

Working in the Water

People have modified many stream systems in Washington, with considerable effect on the landscape. Dams, tide gates, culverts, bridges, piers, bulkheads and jetties, and the dredging and placement of fill have benefited people and the economy, but at the expense of aquatic ecosystems and fish habitat. Channelization disturbs stream beds and increases scouring and bank erosion. It may also cause changes in pH, metals concentration, dissolved oxygen, instream flow, and nutrient levels.

Some of these problems are addressed through wetlands restoration programs and fish and wildlife habitat programs. Permits for dredging or stabilizing stream banks are reviewed and conditioned by state agencies, local government and the Corps of Engineers.

New tools to examine project impacts and watershed function are currently being developed. Salmon habitat and restoration guidelines will help resource managers design projects that have the least impact to salmon. The river basin characterization process provides critical information to decision-makers about watershed processes and areas of resource sensitivity.

Taking Action

▸ The state will help local agencies identify and restore physical processes that create and maintain fish habitat, improve water quality, and prevent flooding.

Salmon habitat and restoration guidelines will help resource managers design projects that have the least impact to salmon.

Building Stewardship

Education about nonpoint pollution is a challenge. It must target both specific and general audiences. It should inform and inspire. It needs to reach youth and adults.

The Nonpoint Source Management Plan contains a list of recommended activities and projects to add to current efforts, mostly within the next five years.   These include both formal (K-12) and informal ("public") education. Additional sources of funding will be needed to implement these ideas.

Ecology works closely with the Governor's Council on Environmental Education, a partnership of 11 state natural resource agencies. The council develops programs, based on needs assessments, which enable learners of all ages to gain an understanding of personal and community responsibilities to the natural environment. The council works through existing educational organizations, which meet the needs of communities and watersheds.

Taking Action

▸ Ecology will expand formal (K-12) education through small Magic Apple grants to teachers, children's water festivals, and teacher workshops.

▸ State agencies and local governments will expand public education, targeting both specific groups and the general public.   They will develop materials for use by local governments, and promote a resource library of model materials and success stories.

▸ The Governor's Council on Environmental Education and its member agencies will help students and citizens gain their own information through local volunteer monitoring programs, becoming informed stewards of their watersheds. They will develop a full-blown Master Watershed Stewards program.

▸ Ecology will sponsor a statewide Nonpoint Conference every two years to share ideas, innovations, and inspiration.

In 1996, the council launched the Master Watershed Stewards program to mobilize volunteer leaders on behalf of community watershed issues. Ecology and the council host Watch Over Washington, the statewide network of volunteer monitors which numbers in the thousands and is growing. Beginning in 2000, an online database to hold and display volunteer data will reside at the University of Washington, a product of another partnership within the council.

Carrots and Sticks

It is important that programs show progress in cleaning up water quality so that these funding sources continue to assist with nonpoint source program implementation.

Funding available for water quality efforts

Many entities fund projects that address water quality, habitat and watershed restoration efforts in Washington. In 1999, 15 major programs spent an estimated $91.3 million in federal funds and $45.8 million in state funds on local watershed planning, salmon recovery, and nonpoint source control efforts. There is an increasing need for coordination to make sure funds are appropriately targeted to accomplish restoration and protection goals.

Though the amount of money seems significant, it may take this level of funding for many years to clean up historical nonpoint source problems. It is important that these programs show progress in cleaning up water quality so that these funding sources continue to assist with nonpoint source program implementation.

State funds are available to implement best management practices (BMPs) through grants from the Conservation Commission, DNR, WDFW, the Salmon Recovery Board, the Puget Sound Action Team, and Ecology, and through low-interest loans from the State Revolving Fund.

Federal funds for nonpoint control come from Section 319, the Federal Salmon Recovery Program, the Conservation Reserve Program (CRP), the Environmental Quality Initiative Program (EQUIP), and the SRF. In addition, the US Department of Agriculture administers the Wildlife Habitat Incentive Program (WHIP), the Wetlands Reserve Program (WRP), and the Conservation Reserve Enhancement Program (CREP). In Washington, the CREP program hopes to enroll farmers whose land totals 100,000 acres or 3-4,000 miles of riparian habitat next to salmon spawning streams. At least $200 million will be available to help Washington farmers restore salmon habitat and protect water quality through 2013.

For small timberland owners, several programs provide incentives, technical assistance, and education. The NRCS, in conjunction with locally based conservation districts, helps timberland owners write forest conservation plans. The Agricultural Conservation Program assists with forest practices and soil conservation. The Forestry Incentive Program, sponsored by DNR, helps timberland owners with forest production and habitat planning.

Other incentives for water quality improvement include the Washington Conservation Corps and other jobs programs at Ecology and DNR which provide free or low-cost BMPs including fencing, in-stream structures, and other measures to improve habitat and water quality. Marina owners may apply for federal Clean Vessel Act funding through State Parks for installation of pumpouts and other sanitation systems in marinas. Ecology also provides funding to local governments for pollution prevention and waste management through Coordinated Prevention Grants.

Enforcement

Enforcement is a key component of any nonpoint source program. Many people feel incentives have little value without the threat of appropriate enforcement. Though many programs are voluntary in nature, a regulatory backstop helps encourage those who are not complying with basic requirements of environmental protection. Enforcement gets rid of the competitive advantage enjoyed by those who disregard the law. It also provides cooperative landowners and businesses a sense of equity and a belief that their contribution is making a difference.

The primary state enforcement agencies with ties to water quality in Washington are the DNR, Fish and Wildlife, Agriculture, and Ecology. DNR primarily addresses forestry activities, Department of Agriculture focuses on pesticides, and Department of Fish and Wildlife enforces the Hydraulics Act. Ecology enforces the Water Pollution Control Act, Shoreline Management Act, and various Solid and Toxic Waste Management acts. Local governments play a key role in enforcing water quality programs. Enforcement of local ordinances and requirements by cities and counties has a significant impact on water quality.

Taking Action

‣ The state will work with funding entities to improve coordination and targeting of resources for the most efficient use.

‣ The state will establish a process to increase coordination of compliance and enforcement activities.

Though many programs are voluntary in nature, a regulatory backstop helps encourage those who are not complying with basic requirements of environmental protection.

Monitoring Change

Assessments quantify both point and nonpoint sources and frequently include studies describing the relationship between surface water and ground water quality.

Water Quality Standards

All the state's surface and ground water bodies must meet the state water quality standards. These include both numeric and narrative criteria which set acceptable levels for conditions like pH, temperature, dissolved oxygen, bacteria, metals, organic chemicals, and turbidity, in order to protect "beneficial uses" such as recreation, water supply, and habitat.

Ecology continually assesses the quality of the waters of the state, using its own data and many outside sources. This information is then reported semi-annually to EPA in the 305(b) Report, named after section 305(b) of the Clean Water Act, and the section 303(d) List of Impaired Waters.

Ambient Monitoring

The state maintains a network of sampling stations in rivers, streams, lakes, and estuaries. Ecology and the Puget Sound Water Quality Action Team use ambient monitoring programs to assess the current status of state waters, identify threatened or impaired waters, and evaluate trends in water quality over time. To maximize coverage and reduce costs, locations of sampling stations are coordinated with tribes and with other state, local, and federal agencies.

Evaluating Water Quality Change through Violation History

Ecology has amassed 22 years of data from 42 monitoring stations on certain key indicators: pH, dissolved oxygen, temperature, and fecal coliform. The figures show the percent of samples which have failed to meet standards. In the charts for pH and fecal coliform, trend lines have been drawn to show a long-term tendency toward improvement or decline.

In the future, Ecology plans to develop additional indices for flow, total suspended solids, pesticides, and nutrients.

pH Sample Failure Rates from 42 River Stations for 1978-99 (Average for 22 years=8.4%)
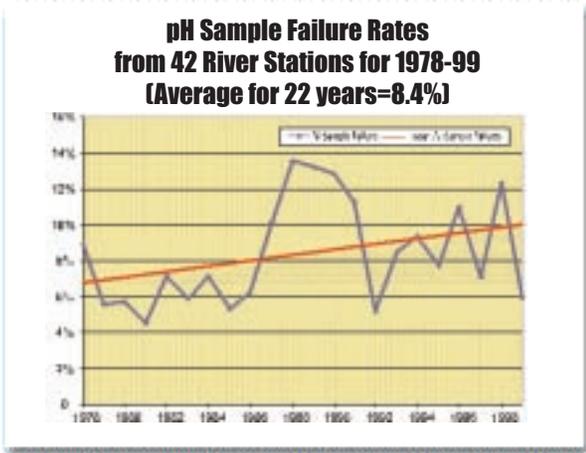
pH sample failure rates show an increase over the last 22 years at the monitoring sites. Higher pH readings may be caused by excess nutrients from municipal or industrial discharges, or from nonpoint sources like manure, garden fertilizers, leaking septic systems, and rotting organic debris.
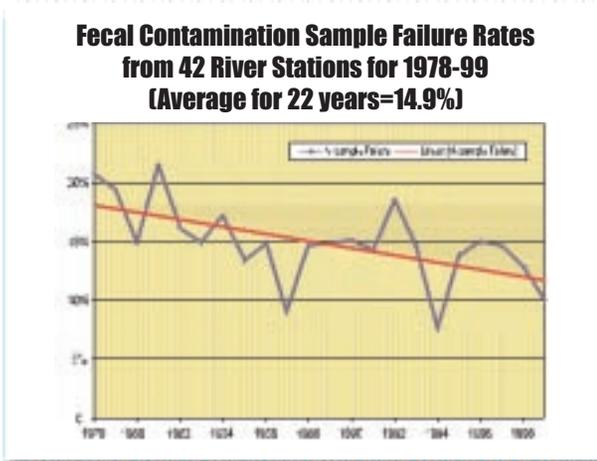

Fecal Contamination Sample Failure Rates from 42 River Stations for 1978-99 (Average for 22 years=14.9%)

Fecal contamination sample failure rates have shown an overall decline over the past 22 years. This indicates that, on the average, bacterial contamination as measured by the presence of fecal coliforms at the river monitoring sites is becoming less of a problem.

Project Monitoring

Other water quality monitoring activities include:

- Ecology assesses surface waters for Total Maximum Daily Load (TMDL) studies conducted on rivers, lakes, and marine waters which do not meet state water quality standards. Assessments quantify both point and nonpoint sources and frequently include studies describing the relationship between surface water and ground water quality. Information on TMDLs can be found at http://www.wa.gov/ecology/wq/tmdl/

- Washington State Department of Health classifies commercial shellfish beds to protect shellfish consumers from contaminated shellfish. DOH continually monitors fecal contamination levels in more than 100 restricted commercial shellfish growing areas in Puget Sound. Reports are available at http://www.doh.wa.gov/ehp/sf/default.htm

- Federal agencies such as the US Geologic Survey, and Washington State tribes regularly monitor water quality. Tribes often provide technical help for local watershed planning efforts by providing information on fish habitat and identifying water quality problems.

- Local jurisdictions including conservation districts help local watershed planning groups with monitoring. They also measure impacts from septic systems, farm practices, and local land uses.

- Washington State University and University of Washington consult with local jurisdictions and provide monitoring expertise. The Water Research Center at WSU has a long history of providing monitoring reports for local planning efforts, especially watershed planning and lake restoration planning.

- With Ecology, the Governor's Council on Environmental Education has developed a program for citizen participation in environmental monitoring. The program, Watch Over Washington, supports local groups through a website where news, tips, success stories, and (starting summer, 2000) data are posted. It is estimated that more than 12,000 citizens and students in Washington are involved in monitoring our natural resources. For further information, visit the WOW website at http://www.wa.gov/ecology/wq/wow

Taking Action

▸ The state will promote coordinated monitoring efforts that include water quality and habitat indicators. It will expand the ambient monitoring network.

▸ The state will increase water quality monitoring capacity in tribes, conservation districts, volunteers, and local governments through training and technical assistance.

▸ The state will enhance implementation and effectiveness monitoring, and improve tools for long-term decision making.

Partnerships and Roles

Coordination and cooperation among agencies can accomplish a lot, helping people take ownership and solve local problems, and leveraging local energy and resources to reduce pollution.   Ecology facilitated the development of Washington's Nonpoint Source Management Plan, a joint project of the state's natural resource agencies.   Ideas, feedback and information came from federal and state agencies, tribes, nonprofits, businesses, local governments, and community groups.

Several agencies are involved in managing nonpoint source pollution. For a complete list of the agencies and their responsibilities, please see Chapter 6 (A Cooperative Approach to Improving Water Quality) of the nonpoint source plan, at http://www.wa.gov/ecology/biblio/9926.html

Unified Watershed Assessment

In the fall of 1998, representatives of state and federal resource management agencies and tribes came together to devise a system for collaborating on the use of watershed resources. The effort quickly expanded to include a number of local government representatives, as well as a public comment opportunity. The Unified Watershed Assessment process is part of the President's Clean Water Action Plan. All states are going through a similar process. In Washington, we are working toward an ongoing system based on three elements:
• A matrix of environmental information about watersheds that will help resource managers make decisions about targeting resources,
• Regular meetings of the resource managers to identify common geographic priorities and opportunities to coordinate activities, and
• Consideration of and coordination with local efforts and priorities.

For more information, please visit http://www.wa.gov:80/ecology/wq/watershed/uwa.html

Partnerships and Roles

Several agencies are involved in managing nonpoint source pollution. In the fall of 1998, representatives of state and federal resource management agencies and tribes came together to devise a system for collaborating on the use of watershed resources.

Watershed Planning Act

One of the primary factors limiting the success of past nonpoint source efforts has been the lack of coordination among implementing entities. The primary mechanism to facilitate this is local watershed planning. The most comprehensive process currently underway is the planning process directed under the Watershed Planning Act (Chapter 90.82 RCW).

The act calls for the formation of a planning unit with representatives of a variety of interests. The planning unit must address water availability issues and may also consider water quality, in-stream flows, and fish habitat. Planning is done on a WRIA (Water Resources Inventory Area) or multi-WRIA basis often involving several counties. At this writing, 28 planning units are formed or being formed, some comprised of clusters of WRIAs.

Ecology provides grants to local governments for start-up, assessment, planning, and implementation.

Under the Watershed Planning Act, planning units must consider all existing planning processes in the planning area. These may include TMDLs, watershed plans for nonpoint source, ground water protection plans, shellfish, and, salmon recovery, efforts. Many focus on nonpoint issues.

Salmon Recovery Act

Another major planning process is the Salmon Recovery Act (SRA). The intent of this legislation is to address salmonid habitat restoration in a coordinated manner, and to develop a structure that allows for the coordinated delivery of federal, state, and local assistance to communities for habitat projects.

When the Legislature passed the Salmon Recovery Funding Act, it required the Governor to submit the strategy to the National Marine Fisheries Service and the US Fish and Wildlife Service by September 1, 1999.

In January, 1999, the Governor's Joint Natural Resources Cabinet released a complete working draft of Extinction is Not an Option: A Statewide Strategy to Recover Salmon, a guide for what needs to be done to restore healthy salmon populations. It is available on the website: http://www.governor.wa.gov/esa/reports/eap/eaptoc.htm During the past year, the Joint Cabinet has carefully listened to public comment on the strategy and has indicated recommendations that would improve our collective efforts to recover salmon.

An Early Action Plan has been developed which specifies activities related to salmon recovery that state agencies will undertake in the 1999-2001 biennium. Also included are expected outcomes from those actions and performance measures. Many of the early actions are nonpoint source control activities and have been included in the nonpoint plan.

"Limiting factors" for salmon populations are being analyzed in 41 WRIAs. These factors include fish passage barriers and degraded estuarine areas, riparian corridors, stream channels, and wetlands. The analysis should be finished in 2001. Eleven areas have already formed committees to undertake the full SRA process. More are likely to become involved if cutthroat trout are ESA listed.

Taking Action

▸ Ecology will develop water cleanup plans and promote local watershed planning and implementation that address the listing of waters with pollution (303(d) listings) and prevent further listings. Ecology will provide technical assistance as needed.

▸ The state will establish a website to serve as an information base for planning activities by local communities, describing funding sources and necessary requirements.

▸ The state will help local governments protect wetlands.

▸ The state will increase education to lakeshore owners about sources of nutrient loading, encourage stewardship and citizen monitoring, establish phosphorus standards for each eco-region, and encourage innovative funding programs for lake restoration activities.

▸ All entities will improve coordination of riparian restoration projects on a watershed basis to consider wetland restoration and increase effectiveness.

Sustaining Momentum

As we move forward in our efforts to address nonpoint issues, we must also ensure that our solutions are helping to build a sustainable future.

Developing the Plan

Ecology took the lead updating the state's Nonpoint Source Management Plan with funding from EPA and NOAA. They will track and implement activities in partnership with other state, tribal and federal agencies. EPA has doubled the funding for nonpoint source projects in states with updated management plans. Much of this funding is passed through to local governments to support their nonpoint source control efforts.

Tracking and Reporting Progress

Ecology will prepare a report each year for the Legislature, EPA, the National Oceanic and Atmospheric Administration (NOAA), and the general public, indicating how agencies and others are making progress toward improving nonpoint programs and water quality.

This report will focus on three primary areas:

Funding – The annual report will identify all funds used to implement nonpont source activities, including salmon recovery and watershed planning efforts.

Implementation Actions – Progress reports will be included from each of the implementing entities about their activities.

Success Measures – To evaluate progress toward the plan goal, data from numerous sources will be collated and included in the annual report.

Sustainability

Washington has a diverse economy, highly dependent on clean water and healthy ecosystems. Our high quality of life makes Washington a great place to live and work. The key to future livability is in our ability to work together and make difficult decisions regarding the protection of our precious natural resources, and to ensure those decisions are carried out. As we move forward in our efforts to address nonpoint issues, we must also ensure that our solutions are helping to build a sustainable future.

A sustainable future recognizes that the goals of economic vitality, social and community wellbeing and environmental health are linked and interdependent. This means we must work together to identify economic development that is beneficial both to the community and the environment, instead of perpetually dealing with the negative impacts of growth.

Sustainable solutions address the root causes of a problem. Too often, our traditional approach to environmental management focuses solely on the consequences of a problem. We are simply limiting environmental degradation, rather than reversing the trends of decline in living systems. In selecting a course of action, we need to address fundamental design problems, and take advantage of opportunities which will enhance and restore living systems on which all life depends.

Many of the actions summarized in this document reflect such a sustainable approach – educational efforts, pollution prevention programs, incentives for changes to land use practices. The actions as a whole, if adopted, will focus resources in a manner that widens program implementation, improves program effectiveness, and attends to problems not previously addressed.

These actions will require a long-term commitment of state and private resources. Through increased coordination and cooperation, we can improve the quality of the state's waters and maintain and improve our quality of life.
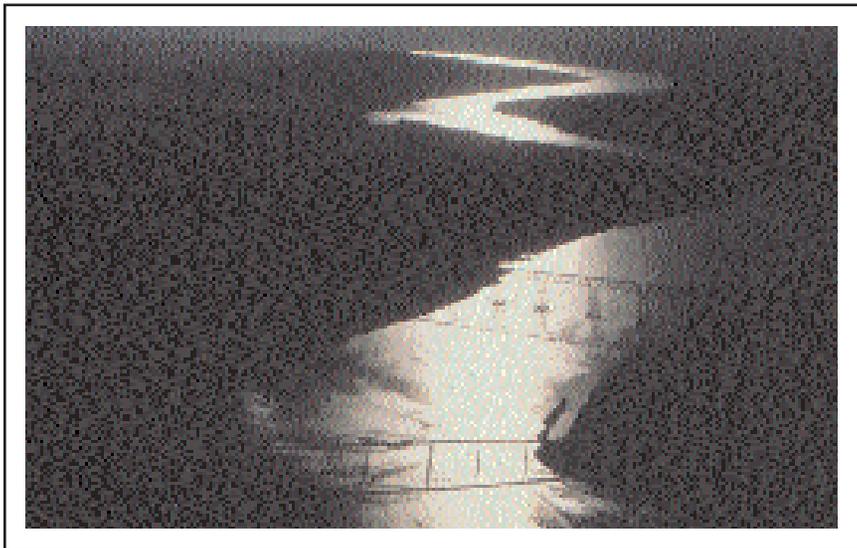
List of Acronyms:

Agencies

CE - Washington State University Cooperative Extension
DNR - (WA State) Department of Natural Resources
DOH, Health - Department of Health
EPA, US EPA - US Environmental Protection Agency
NRCS - Natural Resources Conservation Service
WSDA - Washington State Department of Agriculture
WSDOT - Washington State Department of Transportation

Programs, etc.

BMPs - best management practices
CWA - Clean Water Act
ESA - Endangered Species Act
GMA - Growth Management Act
NPS - Nonpoint Source (pollution)
SEPA - State Environmental Policy Act
SWIS- State Wetlands Integration Strategy
SRA - Salmon Recovery Act
TMDLs - Total Maximum Daily Loads

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