

Introduction: Overview of Conditions

The State of the County's Waters – Historical and Current

Snohomish County is rich in its network of natural streams, wetlands, lakes, and rivers. For the most part, our waters have not yet become severely degraded. But with few exceptions, the surface waters of Snohomish County consistently fail to meet water quality standards established by the State of Washington. At least 37 rivers, streams, and lakes in the County fail to meet the goals of the Federal Clean Water Act, which are that our waters should support fish and be healthy for swimming. There are widespread violations of water quality standards in rivers, lakes and streams and a range of pollutants in ditches carrying stormwater runoff. Parts of Port Susan and Possession Sound have serious water quality problems, and shellfish harvesting in Port Susan has been restricted. Many lakes in the County have problems such as excessive plant growth, and some lakes violate water quality standards.

Since the 1960's, substantial progress has been made toward controlling point source pollution from sewage treatment plants, pulp mills, and large industrial facilities. However, pollution associated with dispersed urban and rural land uses, known as nonpoint source pollution, continues to have significant cumulative impacts on the quality of water resources. Continued growth is expected to increase these impacts. Therefore, control of nonpoint source pollution from urban runoff, septic systems, fertilizers and pesticides, and agricultural runoff is a major challenge within Snohomish County and Puget Sound for the foreseeable future.

Snohomish County has grown by 25 percent since 1990. Urban and rural land uses are increasing, and many pollutants are associated with these land uses. SWM's water quality investigations show problems that follow patterns of population concentration and land use. In the most populated area in the southern part of the County, the main types of pollutants are petroleum products, toxic chemicals, soaps, industrial wastewaters, and failing sewer and septic systems. In the Snohomish basin, which comprises a mixture of rural and urban development, the main problems are petroleum products and manure from farms. Failing septic systems, toxic chemicals and industrial wastewaters are reported at a much lower frequency in the Snohomish basin than in the south county. The few problems reported from the rural Stillaguamish watershed are related to runoff from manure with some reports of petroleum products.

Many pollutants are present in County waters. Copper, lead, zinc, cadmium, and mercury have been found in streams in urban, commercial, and industrial areas. High levels of fecal coliform bacteria are a problem in many streams. Bacteria can come from failing septic systems, manure, and pet waste. Many streams and lakes show high nutrient levels, and excessive nutrient enrichment is often a problem in lakes. Nutrients can come from fertilizers, detergents, septic systems, and manure. High sediment loads from development, tree harvesting, and erosion are a problem in many County streams and rivers. Low dissolved oxygen levels and high temperatures found in many County streams can be a barrier to fish.

Water Quality Trends

Information on long-term water quality trends is limited, but rapid changes in land use patterns continue to pose challenges for maintaining water quality. SWM began monitoring programs from 1992-1994 in many watersheds in the County. We are learning more about the current condition of our streams, but six to eight years of data are insufficient for most long-term trend analyses. Results of biological monitoring from 1997-2000 indicate that the aquatic life in our lowland streams and rivers is in fair or poor condition.

Chemical monitoring data show no major deterioration in the quality of our waters since the early 1990's, but most streams and rivers are still not meeting state water quality standards. We are seeing a slight decline in levels of lead in streams in the more urban areas in the Snohomish and South County watersheds. This decrease in lead is a result of the use of unleaded fuels. However, baseline monitoring in the Stillaguamish mainstem and tributaries has shown an increase in conductivity from 1994 through 1999. Conductivity is an indicator of contaminants in streams from road runoff. This increase is likely a result of increased population in the watershed and the resulting increase in traffic on roads.

Although an increase in conductivity in the Stillaguamish is a cause for concern, we are seeing decreases in bacteria concentrations in that watershed. The Department of Ecology found improving trends in bacteria in both the North and South Forks as well as a significant decrease in bacteria and ammonia in the lower mainstem. This decrease in the mainstem may be a result of recent upgrades at the Arlington Sewage Treatment Plant. SWM data also show an overall decrease in bacteria and an increase in dissolved oxygen at all sites in the lower watershed since 1994. However, SWM monitoring data indicate that temperature, bacteria, nutrient, and sediment concentrations increase going downstream from the upper mainstem at Arlington to the lower mainstem at Marine Drive. In addition, bacteria concentrations still violate state standards on both the mainstem Stillaguamish and many of the tributaries. While overall bacteria levels in the Stillaguamish are declining, we still need continuing improvements to meet state standards in both the mainstem and the tributaries.

Glade Bekken, a small watershed in the Stillaguamish where SWM has monitored intensively for several years, shows decreased bacteria levels since 1994. This decrease may be a response to the numerous best management practices implemented on small farms in the watershed. However, sediment levels show only a slight decrease and nitrate concentrations have not changed. The results in Glade Bekken show that improvements in water quality require a long-term commitment from both agencies and citizens working together.

Conditions and Problems/ Issues by Watershed

Stillaguamish Watershed

The upper Stillaguamish watershed is characterized by low density residential land use and small, non-commercial farms, with extensive tree harvesting occurring in the upper reaches and along some tributaries. The Stillaguamish floodplain, west of Arlington, is characterized by traditional agriculture with increasing pressures for higher density rural development. Commercial agriculture, mainly dairy farms and croplands, occurs along the mainstem Stillaguamish and Portage Creek. Small, non-commercial farms with horses or cattle are common along the tributaries.

Bacteria and nutrients are major problems in the Stillaguamish watershed. These pollutants are probably contributed by numerous commercial and small non-commercial farms as well as by septic system failures. Erosion and sedimentation, which are significant problems in this watershed, are caused by clearing for tree harvesting, slides, unstable soils, and bank erosion from livestock. Residential and commercial development in the Stillaguamish watershed is less extensive than in the rest of the County. This is reflected in the lower number of local flooding problems and lower concentrations of typical urban runoff pollutants such as toxic metals.

Solutions to water quality problems in the Stillaguamish include livestock management programs that would reduce sediment, bacteria, and nutrients. Repairing failing septic systems could further reduce bacteria and nutrient levels. Revegetation of sensitive areas would reduce erosion as well as lower stream temperatures and increase dissolved oxygen. Continued work in federal and private forestlands to stabilize old logging roads will prevent erosion and landslides.

Snohomish Watershed

The Snohomish watershed includes three major rivers: the Skykomish, the Snoqualmie, and the Snohomish. The watershed contains land zoned for forestry, residential and commercial development, and agriculture. Agricultural land in the watershed is located mainly along the lower mainstem of the Snohomish and Snoqualmie and their tributaries with small non-commercial farms scattered throughout the residential areas. This watershed is experiencing rapid residential and commercial development. Consequently, stream problems include localized flooding, low baseflow, erosion, and sedimentation. High water temperatures, low dissolved oxygen, bacteria, and nutrients are also significant problems. Toxic contaminants, such as metals, are found in runoff from roads and commercial areas.

Solutions to water quality problems in the Snohomish watershed include livestock management programs that would reduce sediment, bacteria, and nutrients. Repairing failing septic systems and proper disposal of pet wastes can further reduce bacteria and nutrient levels. Revegetation of riparian areas reduces erosion as well as lowers stream temperatures and increases dissolved oxygen. Assessing and rehabilitating detention ponds and increasing storm sewer maintenance can reduce problems resulting from

increased storm runoff. Public outreach programs are essential because of rapid residential growth and the potential impacts related to that growth.

South County Watersheds

The Lake Washington and Puget Sound tributaries contain only land that is zoned for commercial and residential development. This is the most developed area in the County, and much of the development occurred before the requirement for stormwater detention. Consequently, extensive problems of erosion and sedimentation result from high stormflows. High temperature and low dissolved oxygen result from low summer flows. Concentrations of toxic metals and fecal coliform bacteria in the streams often exceed state water quality standards. Petroleum and detergents have been found in these streams. All of these pollutants are typically found in runoff from extensive impervious surfaces associated with urbanization.

Solutions to water quality problems in the Lake Washington and Puget Sound Tributaries include assessing and rehabilitating detention ponds and increasing storm sewer maintenance. Pollutants can be eliminated by identifying and removing illicit discharges of sewage to storm sewers. Bacteria can further be reduced by proper disposal of pet wastes. Revegetation of sensitive areas and riparian corridors reduces erosion as well as lowers stream temperatures and increases dissolved oxygen.

Snohomish County Lakes

There are about 60 lakes located in the populated portions of Snohomish County. These lakes are a valuable resource for the people of Snohomish County. However, the health of some lakes is threatened by human activities around the lakes. Available information indicates that the water quality of many Snohomish County lakes is threatened by increasing development. Human activities within a lake watershed can contribute pollutants, such as phosphorus, which accelerate the growth of plants and algae within the lake. Many lakes in the County show signs of phosphorus enrichment, undesirable plant and algae growth, and reduced water clarity. The costs of restoring a lake once the water quality has been degraded can be very high. The restoration costs at Lake Stevens, for example, have been greater than two million dollars.

Septic systems, fertilizers, detergents, pet and animal wastes, soil erosion, and excess runoff from impervious surfaces are all sources of phosphorus, which is the main nutrient responsible for undesirable plant and algal growth. When these activities contribute too much phosphorus to a lake, the result can be nuisance algal blooms, reduced water clarity, too many aquatic plants, and low dissolved oxygen. In extreme cases, there are visual and odor problems that limit the use of a lake.

Lake shorelines are desirable places to live, as evidenced by the large number of homes being built around Snohomish County lakes. As these lakes become more urbanized, there will be more sources of nutrients. Unless positive steps are taken to control nonpoint source pollution from increasing development in lake watersheds, the future condition of many lakes is likely to degrade.

Framework of County Response

Guiding Principles

Snohomish County is rich in its network of natural streams, wetlands, lakes, and rivers. Helping to sustain the quality of that water for present and future generations is a fundamental mission of Surface Water Management. Snohomish County has developed numerous programs and ordinances with long range goals for improving the quality of rivers, lakes, and streams. Current regulations seek to protect water quality, limit and control runoff, limit uses of land along fish bearing streams, and require buffers and erosion control during and after development activity. Examples of current County regulations are the Water Pollution Control Ordinance, which prohibits discharges that violate state water quality standards, and the Building and Grading Code, which regulates development and construction activities to prevent sediment from entering surface waters.

Priorities – Areas of Existing Program Emphasis

During the past decade, the County has begun a monitoring program to determine the health of our waterbodies. Currently, SWM monitors 17 streams and rivers, volunteers monitor approximately 27 lakes per year, and SWM staff conduct 25 detailed lake studies each year. While this monitoring gives us detailed information about the chemical and physical condition of the waterbody at the time of sample collection, additional biological evaluations are necessary to diagnose the cumulative effects of impacts over time. SWM has begun biological assessments of approximately 20-40 streams per year. To characterize the health of a watershed, biological and chemical data can be combined with the results of habitat surveys, which assess the condition of the riparian corridor, the stream banks and channel, and the substrate.

The County develops watershed plans to provide clear direction for enhancing water quality and habitat as well as minimizing flood and erosion damage. These plans provide recommendations that can be used to implement Water Cleanup Plans developed by the Department of Ecology to improve the water quality of our streams and rivers. Many restoration projects, such as planting streamside vegetation, fencing to prevent livestock access to streams, repairing existing drainage problems, or stabilizing creek banks have positive impacts on water quality. Conservation, in the form of land acquisition, developing regulations, or maintenance of facilities, is crucial in guaranteeing good water quality.

Surface Water Management has developed water quality focused watershed plans for the Swamp, North, Quilceda/Allen, and the Stillaguamish watersheds. A plan for the French Creek watershed is nearing completion. Reconnaissance level plans are a more rapid means of assessing watersheds. Field observations of the health of a watershed and opportunities for capital improvements, preservation, and education have been summarized in reconnaissance reports. In the Snohomish watershed, reconnaissance plans have been completed for the Bear-Evans, Little Bear, French, Lower Pilchuck River, Little Pilchuck Creek, and Fobes Hill area watersheds. In the Stillaguamish

watershed, reconnaissance plans have been written for the Portage, Church, Pilchuck Creek, Warm Beach and Tulalip, Grandview Road area, North Fork, South Fork, and Lower Mainstem watersheds.

Implementing the recommendations of these plans and educating the public in watershed issues are goals of the County. Watershed stewards for the Stillaguamish, Snohomish, and South County watersheds work directly with local residents and businesses to improve water quality and fish habitat. The countywide lake management program provides citizens with resources to implement lake protection and restoration processes on their own. SWM trains citizens to be Watershed Keepers and gives training to teachers on watershed issues. Other County programs promote watershed awareness by labeling streams, watershed boundaries, wetlands, and detention ponds.

The County provides assistance in areas where citizens' groups have special interests in watersheds. In the Quilceda/Allen watershed, Surface Water Management received a Centennial Clean Water grant from DOE to train citizens to monitor bacteria and stream flows. In Cemetery Creek, which flows to the Snohomish River, SWM is working with citizens to evaluate sources of pollution and to identify restoration projects. SWM has begun a monitoring and restoration project in the Little Bear Creek watershed in cooperation with citizens' groups and the City of Woodinville.

Cooperative efforts with other agencies can target specific problems and reach wider audiences. The County has partnerships with the Adopt-a-Stream Foundation, a private non-profit organization engaged in a wide range of education efforts aimed at protecting and restoring stream habitat. A contract with the Snohomish Conservation District provides classes and assistance to farmers in developing farm plans to reduce pollution problems. The Snohomish Health District sends educational materials and maintenance procedures to on-site sewage system owners.

Many capital improvement projects provide direct water quality benefits. Phosphorus in Lake Stevens, which causes algal blooms, has decreased since the installation of an aeration system. Bank stabilization and stream restoration projects reduce the amount of sediment in streams and rivers and maintain cool water temperatures. Wetland restoration projects increase the capacity of a watershed to provide a buffer for stormwater runoff. SWM rehabilitates detention facilities to more effectively filter pollutants and incorporates biofiltration swales into larger projects to produce cleaner runoff.

The drainage systems leading to our streams and lakes are also polluted. SWM is addressing these polluted discharges by targeting the drainage basins associated with them for comprehensive investigation intended to locate and eliminate the sources of pollution. The presence of pollutants in drainage ditches and discharge water indicates that surface runoff contributes to nonpoint water pollution.

Challenges and Opportunities

The challenges of preserving our natural resources while accommodating the needs of present and future residents are daunting. Experience to date has shown a predictable decline in resource quality. To reverse that decline will require a focus from land owners and resource managers working together. It is imperative to protect remaining high

quality habitats in addition to restoring degraded riparian habitat. Continued resource quality will require ongoing attention, enforcement of regulations, appropriate land-use decisions, stormwater management facilities, and implementation of pollution controls.

Compliance with federal laws has implications for the management of our water resources during the next decade. The County's current stormwater permit issued under the Clean Water Act is directly affected by negotiations between county governments and the National Marine Fisheries Service on requirements for recovery of Puget Sound Chinook salmon listed under the Endangered Species Act. New requirements will include more stringent conditions for development with increased protection for aquatic life and water quality.

The Environmental Protection Agency requires each state to set priorities for cleaning up polluted waters and to establish cleanup plans for each. Water Cleanup Plans, also called Total Maximum Daily Loads or TMDLs, identify the pollution problems, allocate the maximum allowable pollution from various sources, develop strategies to achieve those limits, and require a monitoring plan to assess effectiveness. The purpose of the plans is to ensure that the impaired water will meet its intended uses. The Department of Ecology has begun to develop Cleanup Plans for twelve rivers and creeks in Snohomish County. SWM will work with the Department of Ecology to identify and implement specific best management practices to control nonpoint pollution identified in these Cleanup Plans.

The 1987 reauthorization of the Federal Clean Water Act broadly defined pollution as any "manmade or man-induced alteration of the physical, chemical, biological, or radiological integrity of water." The Clean Water Act requires states to set standards for pollution and to enforce violations. Most states, including Washington, rely primarily on chemical assessments to measure the extent of surface water pollution. States that incorporate biological criteria in addition to chemical criteria typically find that the proportion of stream miles that violate standards has doubled. Therefore, our assessments of impaired water bodies in Washington are probably underestimating the extent of pollution problems.