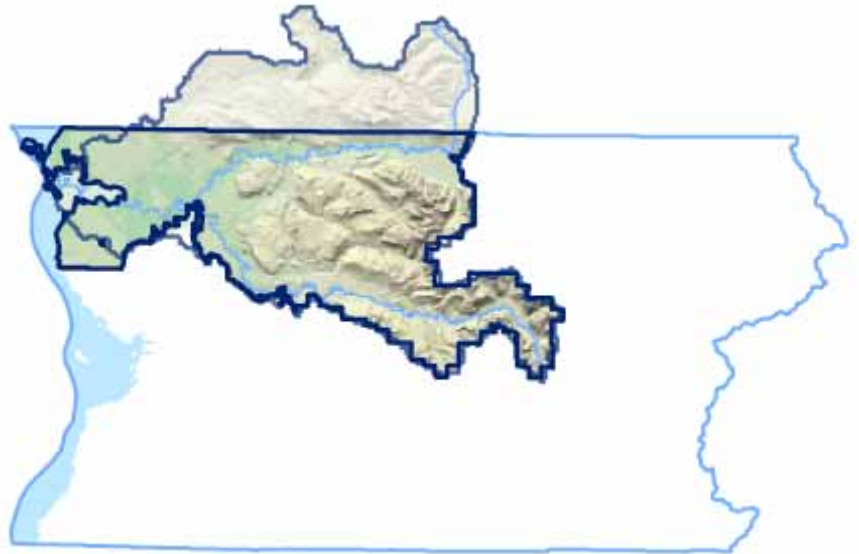


Part 1

State of the Stilly

Executive Summary



Executive Summary

Introduction

The Stillaguamish Clean Water District was formed in 1993 to provide a comprehensive program for managing and regulating surface water including water quality, stream flow, fisheries benefits as well as salt water quality needed to maintain harvestable shellfish beds. The District was reauthorized in 2004 and sunsets at the end of 2007. This report has been prepared by the Snohomish County Public Works Department, Surface Water Management Division to provide a snapshot view of the current “state of the Stilly” to the Stillaguamish Clean Water District Advisory Board. This report provides a review of the current conditions and trends in the watershed and a summary of the activities and accomplishments of Surface Water Management in the Stillaguamish Watershed and the Clean Water District in the last five years. The report was designed to provide a foundation for setting the future direction of the District and the needs in the Stillaguamish Watershed.

The Stillaguamish Watershed

The Stillaguamish River is the fifth largest tributary to Puget Sound. The Stillaguamish watershed extends across northern Snohomish County, and southern Skagit County, draining approximately 694 square miles and includes more than 3,112 miles of river, stream, and marine shore habitat (ES-1). Most of the Stillaguamish Watershed lies within the jurisdictional boundaries of the Clean Water District (CWD), with the remainder in Skagit County. Elevations in the watershed range from sea level to about 6,854 feet on Three Fingers Mountain. The Stillaguamish Watershed can be separated into three distinct basins: North Fork, South Fork, and Mainstem. The two forks join in Arlington, about 18 river miles from the mouth. Pilchuck, Deer, Boulder, and Canyon creeks are the four largest tributaries. The watershed drains into Port Susan and Skagit Bay. It is also part of the Whidbey Basin, which includes Skagit Bay, Saratoga Passage, Port Susan, and Deception Pass.

The Stillaguamish Watershed is significant to Puget Sound. It is still largely forested and undeveloped, yet near urban development and growth areas. The watershed supports a variety of vegetation and wildlife, and its waters are used by all eight salmonid species. Chinook salmon and bull trout were listed as “threatened” under the federal Endangered Species Act in 1999. In 2005, the recovery plan for Chinook salmon in the Stillaguamish Watershed was completed, setting goals for habitat restoration and other objectives to restore the Stilly to healthy population levels. Chinook salmon runs have been greatly reduced from historical levels, yet optimism remains that the watershed can be restored to functioning conditions.

Summary of Watershed Conditions

Section 2.3 of the report presents a synopsis of the Stillaguamish Watershed conditions, organized around the following resource areas:

- Lakes (2.3.1)
- Streams (2.3.2)
- Groundwater (2.3.3)
- Aquatic Habitat/ Riparian Corridors (2.3.4)
- Drainage (2.3.5)
- Floodplains (2.3.6)
- Marine Shoreline and Shellfish (2.3.7)

A summary of the findings for each of these resources is presented here.

Lakes

Lakes are valuable resources within the Stillaguamish CWD. They range in size from large lakes, such as Lake Goodwin, to small lakes, such as Lake Loma. Lakes provide recreation, fish and wildlife habitat, and desirable residential sites.

Although algae and aquatic plants are natural elements of a healthy lake, nuisance levels of algae (algal blooms), excess aquatic plants, and invasive aquatic plants are problems in a number of the CWD lakes. Too many nutrients (mainly phosphorus) flowing into lakes from the surrounding land is the primary cause of these problems. Excess nutrients come from fertilizers, soil erosion, road runoff, poorly maintained septic systems, and pet and animal wastes.

Since 1992, SWM has worked with citizen volunteers and homeowners' associations to monitor and protect the water quality of lakes in the CWD. Currently, monitoring is ongoing at 14 lowland lakes, 12 of which have public access. Volunteers and SWM monitor water clarity, phosphorus levels, and chlorophyll *a* (algae). Monitoring assesses the current health of lakes, detects specific problems in individual lakes, and identifies long-term trends in water quality. Table ES-1 summarizes the overall condition of monitored lakes in the CWD.

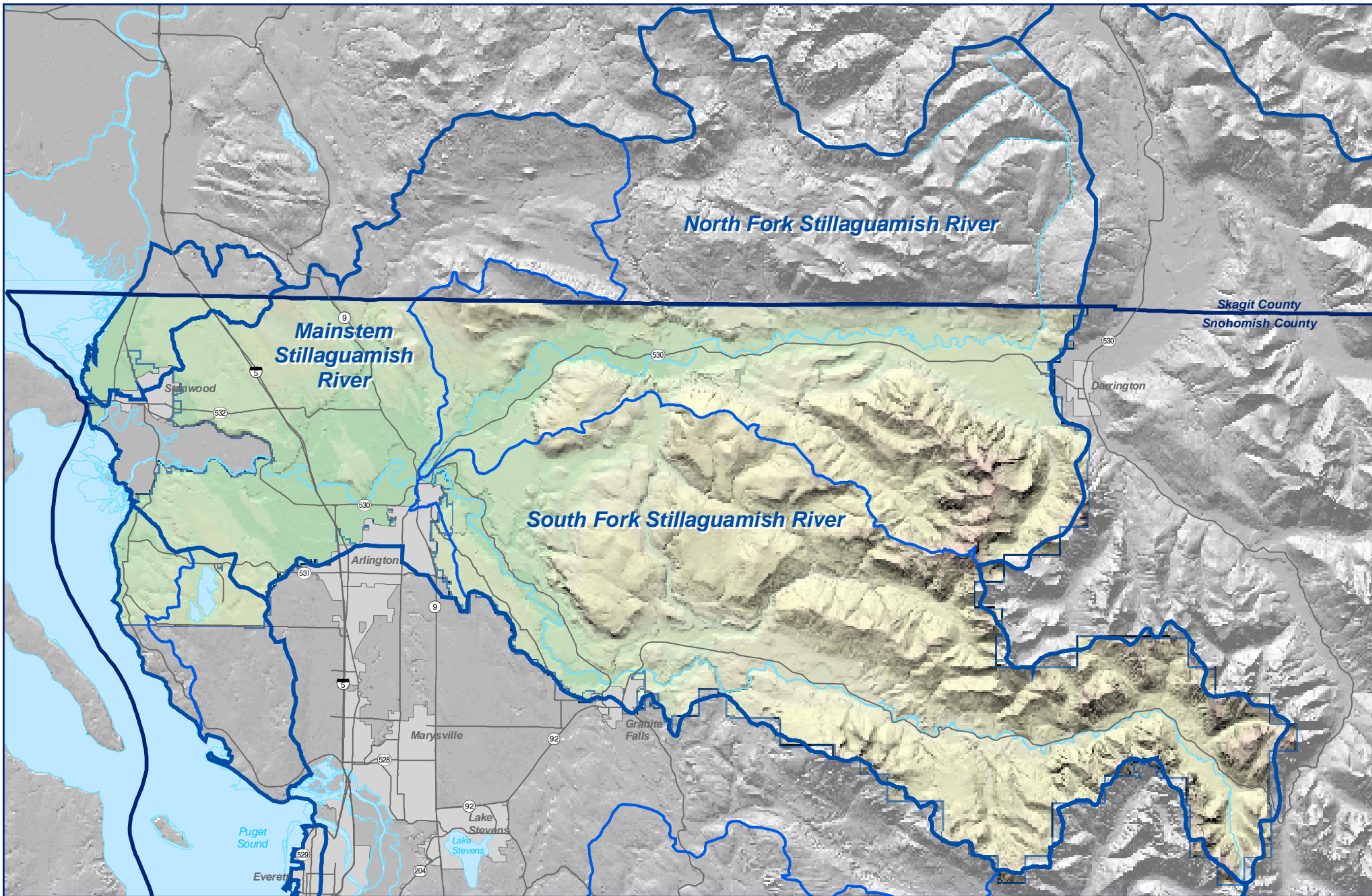


Figure ES-1 Stillaguamish CWD & Stillaguamish Basin Relief Map

- Basins
- Watersheds
- Cities
- Major Roads
- Rivers & Streams
- Lakes & Bays
- Stillaguamish CWD (Colored Relief)




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Table ES-1 Lake Status and Trends in the CWD

Healthy	
These lakes have stable or improving water quality. Lake conditions fully support recreation and other uses. Continued protection is needed to maintain good conditions.	
• Bryant	-- stable water quality; naturally dark-colored water
• Crabapple	-- low nutrients; occasional algal blooms, but acceptable conditions
• Goodwin	-- clear water; improving nutrient levels; overall good conditions
• Ki	-- clear water; good conditions but slight trend of increasing nutrients
• Riley	-- improving water clarity, but trend toward increasing nutrients
• Spring	-- moderate water clarity; shallow lake with few algae problems
At Risk	
These lakes show some signs of declining water quality. Public and private efforts are needed to prevent any further declines.	
• Armstrong	-- frequent algal blooms; trend toward increasing nutrients in bottom waters
• Howard	-- some algal blooms; trend toward increasing nutrients in upper waters
• Martha	-- regular algal blooms; trend toward increasing nutrients in bottom waters
• Rowland	-- shallow lake; dense algae and plants; increasing nutrient levels
• Shoecraft	-- clear water, but trends toward increasing nutrient levels and algae
Impaired	
These lakes need restoration to address significant problems that affect their use and enjoyment. The State has designated these lakes as having “impaired” water quality.	
• Ketchum	-- poor clarity; high nutrients; frequent algal blooms; some toxic algae
• Loma	-- poor clarity; high nutrients; frequent algal blooms; some toxic algae
• Sunday	-- nuisance levels of aquatic plants and algae; increasing nutrients

Streams

The Stillaguamish is the primary river system in the CWD. The Mainstem, North Fork and South Fork have approximately 104 miles of combined length within the CWD, and approximately 122 miles of combined length within the entire Stillaguamish Watershed. The upper reaches of the North and South Forks are under the direct jurisdiction of the U.S. Forest Service and State Department of Natural Resources. The Forest Service manages 236 square miles (about 35 percent) of the Stillaguamish Watershed’s 684-square miles; the Department of Natural Resources manages about 123 square miles (about 18 percent). Therefore more than half of the watershed, and the stream and river system contained within, is under direct federal or state government control.

SWM began monthly sampling at eight sites in the Clean Water District in 1994 to determine status and trends in water quality. These sites are located on the Mainstem, Pilchuck Creek, Church Creek, Portage Creek, Fish Creek, and Glade Bekken. The Department of Ecology has sampled sites on the North and South forks and the

Mainstem. The Stillaguamish Tribe has additional data from numerous sites. The monitoring results have been used to guide restoration and protection efforts throughout the watershed. In addition, SWM operates a network of river gages in the basin, primarily for flood warning. SWM also shares costs with the USGS in the operation of two additional gages. The Department of Ecology installed a new network of gages in 2003 that significantly improved the gage density in the basin.

Monitoring of stream flows is done for long term trend analysis, river management and design purposes. High flow measurement data is also used for flood warning and flood protection. Low flow monitoring allows data collection for habitat, biological, water quality and water quantity analysis.

The gage records show that peak flows on the river have increased sharply over the period of record. On the North Fork, only one flood exceeded 30,000 cfs in the 51 years prior to 1980. Since then, flows have exceeded 30,000 cfs in 15 of the 27 years. There is no clear trend towards lower flows in the river. However, it is expected that climate change and continued development will result in higher peak flows, less snow pack and consequent spring runoff and lower summer flows.

Water quality is improving in many locations in the watershed according to a trend analysis conducted by SWM (Table ES-2). Bacteria, a standard for human recreational use, and oxygen, critical for aquatic life, show either improvements or no change at all the sites. Temperature, a key factor for salmon, is improving in the Mainstem and tributaries, but may be worsening in the North and South forks. Sediment levels, which can be detrimental to fish rearing, are decreasing at many sites. However, sediment in the South Fork has increased. In many cases, sites with improvements or no change in a parameter still do not meet water quality standards and will require continued or focused efforts to improve conditions.

Table ES-2 Water quality trends at Stillaguamish sampling sites.

Stream Name	Bacteria	Temperature	Oxygen	Sediment
Mainstem – Arlington	None*	Improving*	Improving	Improving
Mainstem – Silvana	Improving*	None*	Improving	None
Mainstem – Hatt Slough	None*	Improving*	Improving*	Improving
North Fork – Cicero	Improving	None*	None	None
North Fork – Darrington	None	Worsening*	None	None
South Fork - Arlington	Improving	Worsening*	None	Worsening
South Fork – Granite Falls	Improving	None*	None	Worsening
Pilchuck Creek	None	Improving	Improving	Improving
Church Creek	Improving*	Improving	Improving	Improving
Portage Creek	Improving*	Improving	None*	Improving
Fish Creek	None*	Improving	Improving	Improving
Glade Bekken	Improving*	Improving	Improving	Improving

Trends highlighted by shading are statistically significant. Asterisks indicate continuing violations of water quality standards at these sites.

Groundwater

Groundwater is present in large quantities in the glacially-derived sediment layers and underlying bedrock. Groundwater and surface water exchange freely in many areas of the watershed. Significant amounts of groundwater are withdrawn by thousands of wells, primarily for domestic water supply and agricultural uses.

The SWM groundwater program develops and maintains the County's groundwater database and performs area-specific groundwater studies, such as the Getchell Plateau Groundwater Investigation. The groundwater program is 100% funded by the County's General Fund. Other SWM programs that affect groundwater include the water pollution investigation program and various projects that promote groundwater recharge. These programs are paid for in part by CWD fees.

Groundwater quality is generally good, with no significant widespread groundwater contamination. Most problems are from natural causes. Arsenic is found throughout the glacial sediment layers in the watershed and in the underlying bedrock. Arsenic in well water poses the most significant human health threat related to groundwater. Arsenic concentrations above federal drinking water standards have been found in many wells, with the highest concentrations along the Cascade foothills north of Granite Falls.

Although groundwater exists in large quantities, the Department of Ecology determined that salmonid habitat is impaired due to surface and groundwater withdrawals. In response, the department issued the Stillaguamish instream flow rule, which established minimum flows in the river as water rights. The rule also suspends issuance of new water rights in the watershed. Further analysis of water rights versus actual water use is necessary to determine whether new water rights can be issued, and, if so, whether geographic or other restrictions are needed.

Aquatic Habitat/ Riparian Corridors

Aquatic habitat and riparian zones that inhabit the floodplains, canyons and valleys of the Clean Water District are used by all fish and most wildlife species. The two work together, each rejuvenating the other, when possible. Pre-development, riparian zones fed aquatic habitat with large wood, roots, nutrients, and food sources for aquatic life. Likewise, aquatic habitat moved across and through floodplain riparian areas feeding them organic detritus, sediment, and nutrients that favored the growth of local ecosystems. Post-development, aquatic habitat has suffered a loss of large wood from both upstream and riparian sources, and a surfeit of sediment, nutrients, and solar energy; and has in many places been confined by humans and disconnected from its riparian zone.

Snohomish County SWM undertakes riverine and riparian habitat surveys to assess the conditions of these critical areas, and for developing site-specific habitat restoration

projects. SWM designs and implements salmon recovery projects such as side channel reconnections and riparian revegetation to help improve aquatic and riparian habitat. Current conditions are generally poor to fair in Clean Water District aquatic habitat and riparian areas, though there is some variation (See Table ES-3). Forested basins in Forest Service jurisdiction are generally in the best condition. Tributaries have a wide range of conditions, but in general large wood in aquatic habitat is largely missing, pool area is greatly reduced, forest cover is moderate to good. In the floodplains (i.e., aquatic habitat and riparian areas) of the North Fork, South Fork (below Granite Falls), and mainstem Stillaguamish Rivers, there is much development, banks are hardened (provides less, poor habitat), large wood is severely reduced, fine sediments are thought to be dramatically affecting survival-to-emergence of Endangered Species Act-listed Chinook salmon, and riparian areas are so decimated that even in our marine-influenced climate, aquatic organisms are suffering from high stream temperatures.

Table ES-3 Summary of Current Conditions and Trend for Aquatic Habitat and Riparian Areas

Resource	Condition	Trend
Wadeable aquatic habitat	Variable	Unknown (need more survey)
Large river aquatic habitat	Poor (large wood is at about 3% of regional criteria)	Neither improving nor degrading (need more survey)
Riparian impervious area	Variable (about 1/3 is poor)	Increasing impervious area adjacent to UGA's and along coast
Riparian forest cover	Variable (about 1/3 is good)	Forest cover is being reduced in private forestry and suburbanizing subbasins

Drainage

Different varieties of drainage systems exist throughout the CWD, which are grouped into several categories below.

- **Conveyance systems** – The main purpose of these systems is to convey stormwater to larger receiving waters. Roadside ditches and culverts are predominant throughout the CWD, though enclosed drainage pipes are also common in areas.
- **Detention facilities** – The main purpose of these facilities is to detain stormwater and gradually release flows downstream. While open detention ponds are more common, other types include underground detention pipes and vaults.
- **Treatment facilities** – The main purpose of these facilities is to remove pollutants from stormwater. Examples include biofiltration swales and wetponds.

Snohomish County has drainage programs that perform a variety of services within the CWD as well as the rest of the unincorporated county. Each of these programs is briefly summarized below.

- **Drainage Planning** – The Master Drainage Planning program performs detailed analyses of drainage systems in order to identify the need for drainage projects.
- **Capital Drainage Program** – The Drainage Infrastructure Construction Program designs and constructs drainage and water quality infrastructure improvements.
- **Drainage Inventory & Mapping** – The Drainage Inventory and Mapping program inventories and creates maps of the existing drainage systems.
- **Drainage Maintenance** – The Drainage Facility Maintenance Program performs inspections and maintenance of stormwater detention and water quality facilities. In addition, the County maintains drainage systems within the road right-of-way.
- **Drainage Technical Assistance** – The Drainage Complaint Response Program investigates drainage complaints and questions received from county residents, provides technical assistance, and coordinates solutions.
- **Water Quality Complaints** – The Water Quality Complaint Investigation Program responds to complaints regarding the quality of surface waters and coordinates solutions.

Several trends related to drainage have either been observed or are expected to occur in the future, as briefly summarized below.

- **Aging Drainage Infrastructure** – As many of the older drainage systems are nearing their natural lifespan, these systems will begin to fail and will need to be replaced. Replacement is often difficult and costly.
- **NPDES** – It is anticipated that more stringent NPDES regulations will result in drainage facilities being inspected and maintained more frequently. The investigation of illicit discharges that degrade water quality will also likely be increased by the NPDES requirements.
- **Stormwater Runoff Increase** – Although the County’s drainage standards have helped to reduce the impacts of development, the total amount of stormwater runoff will likely continue to increase as development continues within the CWD.
- **Drainage Complaints** – While the number of drainage complaints from residents within the CWD have been somewhat cyclical, there has been an upsurge in complaints in the last two years. County staff have also observed some general changes in the types of complaints being reported. One trend is that there has been a general increase in the number of complaints made by longstanding rural property owners about stormwater from adjacent or uphill property owners and new development. Another general trend is that there has been an increase in the number of complaints from rural residents, likely many of whom moved from urban areas, about the way in which existing drainage systems function.

Floodplains

The floodplains of the Stillaguamish River represent a natural feature that is a tremendous resource to the farming community as well as the natural functions of the river system. These low-lying areas adjacent to the river are formed as a result of river sediment deposition during flood events. This natural process resulted in soils that are highly desirable for farming. In fact, almost 58 percent of the Stillaguamish floodplain is in agricultural use. While desirable for farming, use of the floodplain is not without its

risks. In addition to periodic flooding, the river may cause bank erosion, whereby the river and stream banks are scoured or undermined by high velocity erosive flow. Ongoing bank erosion can result in movement or shifting of the channel, called channel migration. Both flooding and channel migration are natural processes that exacerbate the risk of damage to developed properties. At the same time, these processes are important for creating and maintaining healthy aquatic and riparian habitats.

The benefits of a naturally functioning floodplain include the storage and conveyance of flood waters, the recharging of groundwater, the maintenance of surface water quality, and the provision of habitats for fish and wildlife. Off-channel habitats in the floodplains of larger rivers are important refuge and rearing habitats for salmonids. Floodplains are also a source of nutrients and organic matter for the food web. These areas filter floodwaters and provide depositional areas for fine sediment. Along the Stillaguamish River, floodplains have been modified and disconnected in places from their rivers due to human activities and development.

Snohomish County has a number of programs that address the risks associated with flooding. These range from capital improvement projects and maintenance of flood control structures, to floodplain regulations designed to reduce the risk of damage to floodplain property owners and work within the framework of the National Flood Insurance Program. Snohomish County is a Cooperating Technical Partner with FEMA to upgrade the accuracy of the County's floodplain maps. In 2006, the County became a member of the Community Rating System, accepted at a level resulting in a 25% reduction in flood insurance rates for County residents. Snohomish County also operates a number of river and stream gages that are part of the flood warning system for the County.

Marine Shoreline and Shellfish

The CWD area includes the marine shoreline and tidelands in north Port Susan and southeast Skagit Bay. Most of the freshwater from the Stillaguamish River flows into Port Susan through Hat Slough, which connects to Puget Sound just north of Warm Beach. Tidal influence extends up the river to approximately Silvana. The mixing of freshwater and saltwater in this area produces highly productive estuary habitat, which is important for a wide variety of local and migratory wildlife, including salmon, waterfowl, and shorebirds. Nearshore habitat, water quality, and fish and wildlife are the primary marine resource concerns in the CWD.

Most of the marine shoreline is privately owned. Rural residential use is the primary land use south of Warm Beach. Riverway commercial agriculture is the primary land use north of Warm Beach. Kayak Point County Park, 780 acres of the Skagit Wildlife Area, and the 4,000-acre property owned by The Nature Conservancy are managed primarily for open space and conservation.

Existing SWM programs that contribute to improving CWD habitat, fish and wildlife, and water resource conditions include the following:

- Salmon recovery – planning, habitat project implementation, stewardship education and outreach, and monitoring and adaptive management.
- Snohomish County Marine Resources Advisory Committee (MRC) – Dungeness crab stewardship, nearshore habitat restoration, public involvement and education, and marine water quality.
- Water quality – monitoring, inspection, and complaint investigation

Nearshore habitat is degraded compared to historical conditions, primarily due to conversion of intertidal salt marsh habitat to commercial agriculture and clearing and bank hardening of marine shoreline areas for residential building. Recent efforts by Snohomish County, the Stillaguamish Tribe, the Tulalip Tribes, and the Skagit River System Cooperative, and The Nature Conservancy have defined existing baseline conditions for nearshore habitat. However, follow-up studies have not yet been conducted to detect change in key indicators of nearshore habitat condition, such as eelgrass, marine riparian vegetation, and bank armoring. Therefore nearshore habitat trends are not well known at this time.

Salmon, forage fish, Dungeness crab, bivalve shellfish, birds, and whales all utilize marine and nearshore habitat within the CWD. Nearshore habitat is critical for Chinook salmon and bull trout, which are both listed as Threatened species. The Southern Resident orcas are listed as Endangered and they depend on salmon as prey. Forage fish are a primary food source for salmon. Clams are a primary food source of Dungeness crab. The Stillaguamish estuary is identified by the Washington Audubon Society as an Important Bird Area because it is one of four areas in the state that regularly supports more than 20,000 shorebirds in a season. The Stillaguamish Tribe monitoring indicates that the two Stillaguamish Chinook salmon populations have stabilized, but are not yet increasing. The South Fork Chinook is of particular concern because it is probably less than 200 returning adult spawners. Little is known about the population trends of forage fish, Dungeness crab, and bivalve shellfish, and birds.

Water quality impairment is a prominent issue for the marine area of the CWD. Commercial shellfish harvest in this area was closed by the Washington Department of Health in the late 1980s because of high levels of fecal contamination. Since the creation of the CWD in 1993, Snohomish County Public Works, the Stillaguamish Tribe, and the Washington State Departments of Health and Ecology have been monitoring water quality and working with other public and private organizations and residents to clean up point and non-point sources of fecal pollution. Examples of progress include:

- Local commercial dairies and the wastewater treatment plants at Stanwood and Warm Beach have made significant improvements in cleaning up their operations.
- The Snohomish Health District has improved its onsite septic system management program.
- The Stillaguamish River Flood Control District has installed a flow enhancement structure at the head of the Old Stillaguamish Channel, which has improved flushing and water quality.

Water quality monitoring indicates that freshwater and marine water quality has improved in some areas, but marine water quality conditions have still not reached the Washington Department of Health standards to recertify the area for commercial shellfish harvest. To address this shortcoming, SWM has contracted with the Pacific Shellfish Institute, based in Olympia, to provide an independent analysis of what it will take to recertify the shellfish beds.

Surface Water Management Programs

The mission of the Surface Water Management Division (SWM) of the Snohomish County Public Works Department is to work in partnership with citizens of Snohomish County to protect and enhance water quality and aquatic habitats, to minimize damage from flooding and erosion, and to preserve a water resource legacy for future generations. SWM is organized into several major program areas to achieve this mission:

- Drainage and Water Quality Infrastructure CIP
- Habitat & River CIP
- Stewardship, Planning & Analysis (SPA)
- Water & Habitat Sciences
- Administration

The Drainage and Water Quality Infrastructure CIP functions include planning, design, and implementation of construction projects for drainage infrastructure, including update of the County's drainage inventory, and work priorities from the Drainage Needs Report. The Habitat & River CIP functions include habitat and river improvements, and also the County's flood hazard management program. The Stewardship, Planning & Analysis functions include the salmon recovery and marine resources programs, watershed plans, public information and education, community partners, GIS and data management. The Water & Habitat Sciences functions include lake management, pollution investigations, groundwater management, NPDES permit administration, habitat mitigation support, and habitat and ambient monitoring. Administration includes SWM fee billing, and other activities such as development of Interlocal agreements.

Projects and program areas are evaluated in Table ES-4, Goals Achievement Matrix, which shows the Clean Water District mission coverage, and the leveraging achieved for CWD projects. Cells with dots represent coverage of Clean Water District (SCC Title 25A) mission elements. The matrix shows that, although coverage varies from project to project, SWM programs cover all of the CWD mission elements. In addition to projects that benefit only the Clean Water District, CWD fees are pooled with other watershed management area fees and other funding sources for programs and activities of County-wide benefit. Many projects in the Clean Water District are funded by other sources. CWD-specific projects are leveraged at approximately 2:1, and the Clean Water District receives benefit from County-wide projects, which are also significantly leveraged.

TABLE ES-4 - BUDGET ALLOCATIONS GOALS ACHIEVEMENT MATRIX - 2007

MISSION ELEMENTS

PROGRAM NAME

PROJECTS BENEFITING CWD	CWD	WMA	Non WMA	REET	Grants	Other	TOTAL											
ADMINISTRATION	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -											
WATERSHED PLANNING/ANALYSIS	\$ 76,069	\$ -	\$ 203,948	\$ -	\$ 49,829	\$ 154,119	\$ 280,017	●	●	●	●	●	●	●	●	●	●	●
STREAM ENHANCEMENT CIP	\$ 28,423	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 28,423	●	●			●	●					
WATER QUALITY	\$ 10,938	\$ -	\$ 21,000	\$ -	\$ -	\$ 21,000	\$ 31,938	●	●	●	●	●	●	●	●	●	●	●
OTHER COMMUNITY PARTNERS	\$ 158,265	\$ -	\$ 55,705	\$ -	\$ 55,705		\$ 213,970	●	●	●	●	●	●	●	●	●	●	●
CWD DISCRETIONARY	\$ 35,000	\$ -	\$ 30,000			\$ 30,000	\$ 65,000	●	●			●	●	●				
SCD	\$ 235,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 235,000	●	●			●	●	●	●			
DRAINAGE MAINT	\$ -	\$ -	\$ -			\$ -	\$ -	●	●	●	●	●						
DRI	\$ -	\$ -					\$ -	●	●	●		●						
DRAINAGE CIP	\$ 20,000	\$ -	\$ 280,868	\$ 113,787	\$ -	\$ 167,081	\$ 300,868	●	●	●	●	●			●	●		
DNR	\$ -	\$ -	\$ -				\$ -	●	●	●								
RIVER MANAGEMENT	\$ -	\$ -	\$ 66,753	\$ 64,753		\$ 2,000	\$ 66,753	●	●			●			●			●
RIVER CIP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -											
RIVER PLANNING	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -											
SUBTOTAL	\$ 563,695	\$ -	\$ 658,274	\$ 178,540	\$ 105,534	\$ 374,200	\$ 1,221,969											

*Preserve Surface Water
 Protect & Restore Water Quality
 Manage Stormwater Runoff
 Provide for Groundwater Recharge
 Control Sediment & Stabilize Erosion
 Monitor Water Quality & Stream Flow
 Rehabilitate Stream & Riparian
 Reopen Shellfish Beds
 River Management*

WMA PROJECTS THAT BENEFIT ALL

ADMINISTRATION	\$ 75,760	\$ 388,292	\$ 556,718	\$ -	\$ -	\$ 556,718	\$ 1,020,770	●	●	●	●	●	●	●	●	●	●	●
WATERSHED PLANNING/ANALYSIS	\$ 39,495	\$ 410,361	\$ 169,573	\$ -	\$ -	\$ 169,573	\$ 619,429	●	●	●	●	●	●	●	●	●	●	●
STREAM ENHANCEMENT CIP	\$ 33,224	\$ 155,388	\$ 426,628	\$ 303,391	\$ -	\$ 123,237	\$ 615,240	●	●	●		●	●	●	●	●	●	●
WATER QUALITY	\$ 115,841	\$ 961,020	\$ 1,219,562	\$ -	\$ 169,732	\$ 1,049,830	\$ 2,296,423	●	●	●	●		●	●	●			
OTHER COMMUNITY PARTNERS	\$ 39,697	\$ 364,561	\$ 287,957		\$ 115,975	\$ 171,982	\$ 692,215	●	●	●	●	●	●	●	●	●	●	●
SCD		\$ 80,000	\$ -				\$ 80,000	●	●			●	●	●	●			
DRAINAGE MAINT	\$ 59,264	\$ 732,568	\$ 283,337			\$ 283,337	\$ 1,075,169	●	●	●	●	●	●					
DRI	\$ 74,488	\$ 378,140	\$ 1,008,734	\$ 656,977		\$ 351,757	\$ 1,461,362	●	●	●	●	●			●			
DRAINAGE CIP	\$ 44,492	\$ 373,251	\$ 826,308	\$ 620,480		\$ 205,828	\$ 1,244,051	●	●	●	●	●	●	●	●	●	●	●
DNR	\$ -	\$ -	\$ 1,158,497	\$ 1,158,497	\$ -	\$ -	\$ 1,158,497	●	●	●		●	●	●	●			
RIVER MANAGEMENT	\$ -	\$ -	\$ 42,796	\$ 7,783		\$ 35,013	\$ 42,796	●	●	●		●	●	●				●
RIVER CIP	\$ -	\$ -	\$ 129,244	\$ 111,257		\$ 17,987	\$ 129,244	●	●			●	●	●	●	●	●	●
RIVER PLANNING	\$ -	\$ -	\$ 558,073	\$ -	\$ 178,950	\$ 379,123	\$ 558,073	●	●	●		●	●	●				●
SUBTOTAL	\$ 482,261	\$ 3,843,581	\$ 6,667,427	\$ 2,858,385	\$ 464,657	\$ 3,344,385	\$10,993,269											

TOTAL

\$ 1,045,956	\$ 3,843,581	\$ 7,325,701	\$ 3,036,925	\$ 570,191	\$ 3,718,585	\$12,215,238
9%	31%	60%				100%

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This report examines resource issues, data gaps, and SWM program gaps. A summary of those are shown in Table ES-5.

SWM's total budget in 2007 was \$32.7 million, including approximately \$10 million in a one-time allocation of funds from the Brightwater agreement. In 2007, \$1.05 million of SWM's annual budget is revenue from Clean Water District fees. SCC Title 25A specifies certain allocations out of Clean Water District fees. For funds collected under the authority of Chapter 90.72 RCW (Shellfish Protection), 33% is allocated to reduce water pollution within the jurisdiction of the Snohomish Conservation District (SCD). The remaining funds are allocated to other Public Works water quality restoration activities (59.1%) and to specific local water quality restoration projects recommended by the CWD Advisory Board (7.9%).

Total SWM fee revenue collected has increased over the years due to new development, and has been reduced somewhat through annexations. However, SWM still depends on yearly non-SWM fee revenues for approximately two-thirds of its annual budget. These other sources include Real Estate Excise Tax (REET), Road Fund, grants, and interlocal agreements, which do not have the same long-term stability as SWM fees. SWM programs vary yearly, depending on the amount of these other funding sources. SWM's capital program, including drainage, water quality, river, and salmon restoration projects, is heavily dependent on REET and grant funding. SCC Title 25A itself, which allows for collection of Clean Water District fees, is scheduled to sunset at the end of 2007. Unless reauthorized, fees will not be collected after 2007, resulting in significant reductions in SWM services.

As discussed in Section 2.6 Drivers, other factors or drivers affecting SWM programs include:

- National Pollutant Discharge Elimination System (NPDES).
- Critical Areas Regulations (Monitoring).
- Endangered Species
- Drainage Needs
- Flooding
- Impact of Annexation
- Value of Fees (Cost of Inflation)

Table ES-5 Resource Issues and Gaps in Data/SWM Programs

Program	Resource Issues	Data Gaps	SWM Program Gaps
Lakes	<ul style="list-style-type: none"> ▪ Nuisance algal blooms ▪ Toxic algal blooms ▪ Excess aquatic plants ▪ Invasive aquatic plants 	<ul style="list-style-type: none"> ▪ Stream flow measurements ▪ Year-round lake levels ▪ Inlet nutrient sampling ▪ Develop water and nutrient budgets ▪ Identify sources of pollution 	<ul style="list-style-type: none"> ▪ Lack of funding to restore water quality ▪ Need strategy and implementation for increased property owner and public investment for the “impaired” and “at risk” lakes
Streams	<ul style="list-style-type: none"> ▪ High fecal coliform bacteria ▪ High temperatures ▪ Low dissolved oxygen ▪ High arsenic and heavy metals ▪ Low summer streamflows ▪ Increasing volumes during storm events 	<ul style="list-style-type: none"> ▪ Imprecise flow/volume measurements ▪ Not enough river/stream gage information 	<ul style="list-style-type: none"> ▪ Need strategy and funding to implement TMDL recommendations ▪ Need increased coordination among marine and upland agencies to improve water quality ▪ Need additional stream gages
Groundwater and Surface Water	<ul style="list-style-type: none"> ▪ Arsenic contamination ▪ Chlorine, fecal coliform, and other contamination ▪ Groundwater quantity and impacts from implementation of Stillaguamish Instream Flow Rule 	<ul style="list-style-type: none"> ▪ Water rights analysis (market, uses, transfers) ▪ Determine actual water use of water rights ▪ Assess hydraulic continuity between groundwater and surface water ▪ Study effects of land use on groundwater recharge and surface streamflows 	<ul style="list-style-type: none"> ▪ Reassess method for aquifer vulnerability to contamination ▪ County-wide program to monitor well water quality and levels (note: may be done by Snohomish Health District) ▪ Funding for studies shown in “Data Gaps” ▪ Increased multi-agency coordination (2.4)
Aquatic Habitat	<ul style="list-style-type: none"> ▪ Low amounts of pools ▪ Lack of large woody debris ▪ Lack of shade ▪ High levels of fine sediment ▪ Reduced floodplain availability for salmon 	<ul style="list-style-type: none"> ▪ Survey aquatic habitat conditions ▪ Fish specific surveys (Coho, Chinook) ▪ Update inventories and maps (2.4) ▪ Determine effectiveness of protection measures, including project effectiveness monitoring 	<ul style="list-style-type: none"> ▪ Analyze existing data at reach level to find trends ▪ Increased investment in project effectiveness monitoring ▪ Increased investment in capital improvements, such as revegetation and stream restoration ▪ Increased agency collaboration on surveys and analyses
Riparian Corridors	<ul style="list-style-type: none"> ▪ Low riparian forest cover in lower basins ▪ Loss of riparian forest in areas that support ESA-listed salmon ▪ Loss of mature forest ▪ Increases in impervious surfaces, esp. in and near UGAs ▪ Lack of protective vegetation 	<ul style="list-style-type: none"> ▪ Up-to-date data ▪ Determine effectiveness of protection measures, including project effectiveness monitoring 	<ul style="list-style-type: none"> ▪ Need increasing investment in trend analysis ▪ Need increasing investment in data collection ▪ Increased investment in capital improvements, such as revegetation and stream restoration ▪ Increased agency collaboration on surveys and analyses ▪ Increased investment in project effectiveness monitoring

Program	Resource Problems	Data Gaps	SWM Program Gaps
Drainage	<ul style="list-style-type: none"> ▪ Aging drainage infrastructure ▪ NPDES requirements for water quality inspections and increased maintenance ▪ Expectations for higher (i.e., urban) drainage and water quality services in a largely rural watershed 	<ul style="list-style-type: none"> ▪ Locations and extent of failing infrastructure ▪ Drainage system information, especially east of I-5 ▪ Analysis of total impacts to drainage of development on specific areas 	<ul style="list-style-type: none"> ▪ Increased drainage system inventory efforts, especially east of I-5 and in newly-developed areas ▪ Lack of stable funding for drainage and water quality capital projects and drainage planning programs ▪ Need strategy and funding for failing infrastructure replacements ▪ Need for increased maintenance, per NPDES ▪ Need for increased inspection and illicit discharge elimination program, per NPDES
Floodplains	<ul style="list-style-type: none"> ▪ Modifications of floodplains and disconnection from rivers ▪ Homes continuing to be built in floodplains due to previous land use codes ▪ Future flood risk increasing 	<ul style="list-style-type: none"> ▪ Flood maps are outdated ▪ Analyze-analyze and map tsunami risks 	<ul style="list-style-type: none"> ▪ Channel migration regulations (PDS) ▪ Evaluation of flood control structures for their habitat values/functions ▪ Increased flood gaging/flood hazard management (2.4)
Marine Shorelines And Shellfish	<ul style="list-style-type: none"> ▪ Shellfish beds closed to harvesting due to pollution ▪ Threat of invasive plants ▪ Increasing shoreline development ▪ Increasing water quality problems ▪ Derelict crab fishing gear 	<ul style="list-style-type: none"> ▪ Enlarge areas of marine water quality studies ▪ Nearshore habitat data on feeder bluffs, eelgrass beds, etc. ▪ Salmonid, forage fish and crab surveys ▪ Identify specific target areas for fecal coliform clean up ▪ Impacts of potential outfall discharges ▪ DNA source investigations for birds and pets in Warm Beach area ▪ Shellfish restoration studies in Port Susan and Skagit Bay (2.4) ▪ Update nearshore habitat and species inventories and maps (2.4) 	<ul style="list-style-type: none"> ▪ Long-term monitoring of habitats and species ▪ Technical assistance for shoreline property owners ▪ Better development permit coordination and effectiveness among agencies ▪ Consistent classification of shellfish harvest areas among agencies ▪ Clarify and prioritize local fecal coliform clean-up commitments ▪ Analyze intertidal salt marsh trends ▪ Analyze marine riparian functions ▪ Analyze effects of manmade structures on the shoreline ▪ Increasing federal/state requirements (2.4) ▪ Multi-agency coordination (2.4) ▪ Support Snohomish Health District's septic program (2.4)

These drivers arise from regulatory requirements, natural disasters, urbanization, and the regional economy. All have potentially significant impacts to SWM's work program and budget. NPDES is expected to cost SWM fee payers up to \$7 to \$8 million annually (approximately \$1 million in the CWD). In 2006 alone, annexations resulted in a projected loss of more than \$330,000 in SWM fees for 2007. The SWM fee of \$22 in place in 1993 has approximately the same value as the current SWM fee of \$33.01, although significant new SWM programs and services, such as ESA and NPDES response, have been added. These drivers present challenges for funding and program management as SWM carries out its mission in managing the County's surface water resources.

Conclusions and the Future

The Stillaguamish Watershed is a dynamic place to live, work and play. The watershed is a natural resource not just for Snohomish County but the Puget Sound region. It represents the best of who we are as a people who live off the land, the fish and wildlife, timber resources and other natural resources.

Efforts to protect and restore the natural functions of the Stillaguamish Watershed have been the collective endeavor of the citizens, the Stillaguamish Tribe, and many agencies and other groups for many years. Through the Clean Water District Advisory Board and the Stillaguamish Implementation Review Committee, these efforts are bearing fruit in ways that are compatible with the farming community and property owners in the Watershed. Projects are underway to restore habitat for salmon, improve water quality, address flooding and drainage problems, and progress is being made towards opening shellfish beds for harvest. In light of expected future growth in the watershed these activities will continue to be doubly important.

In 2005 the Chinook Salmon Recovery Plan was adopted for the Stillaguamish Watershed. This plan received high marks from the federal agency responsible for managing Chinook as a threatened species. The Plan and its implementation are a collaborative effort of the Stillaguamish Implementation Review Committee, the Stillaguamish Tribe, the Snohomish Conservation District, and all the stakeholders in the Watershed. Agricultural use of the floodplain will continue to be an important part of the economy of Snohomish County. Finding ways to restore habitat and natural functions of the watershed while working with farmers and other landowners will continue to be important.

Funding from the Clean Water District has been an essential component of these conservation efforts. It provides a foundation upon which partnerships can be built, grants obtained or leveraged with volunteer activities. Progress has been substantial, yet gaps remain. Future progress is desired to reach the following goals:

- Open Shellfish beds to harvest
- Meet State water quality standards in the streams and lakes of the watershed
- Restore habitat to bring Chinook and other salmon species back to sustainable levels

- Address floodplain and drainage needs that support sustainable agriculture and provide adequate infrastructure for development
- Provide healthy groundwater for future generations

A healthy water resource legacy of the Stillaguamish Watershed is our desire for future generations. How we get there will depend on continued efforts of the stakeholders in this watershed and funding from the Clean Water District.