Final Report for:

City of Anacortes

Public Utility District #1
Of Skagit County

Skagit River
Watershed Control Plan

November 2004

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City of Anacortes/PUD #1 of Skagit County
Skagit River Watershed Control Plan

Certification

This Skagit River Watershed Control Plan has been prepared under the direction of the Registered Professional Engineer indicated below.

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Contents

3 – Watershed Control Program

Appendices

List of Tables

List of Exhibits

Executive Summary

Under the Public Water System Coordination Act of 1977, purveyors of public drinking water systems that utilize surface water sources are required to develop and implement a Watershed Control Program. This document represents a cooperative effort by the City of Anacortes and the Public Utility District #1 of Skagit County to create a Watershed Control Program in accordance with state law to minimize the risk of contamination of the Skagit River affecting drinking water supplies and public health.

The purpose of a Watershed Control Program is to control sources of potential contamination to the supply source of a public drinking water system. In the case of the Skagit River Watershed, obtaining or maintaining complete control of all potential contaminant sources is impossible due to the wide variety of land owners and uses present. The goal of the Skagit River Watershed Control Program, therefore, is not to control all potential contaminant sources, but to minimize the risk of potential contamination and the impact on the public drinking water supply if contamination does occur.

A Watershed Control Program Area is defined in this document for the purpose of development and implementation of the Skagit River Watershed Control Program. The Watershed Control Program Area consists of 80.6 square miles within the Skagit River Watershed located in western Skagit County, including the 43-mile length of the Skagit River between River Miles 13.2 and 56, as well as 750 feet of riverbank on either side of the Skagit River and the corresponding portion of the 100-year flood zone. The Watershed Control Program Area is intended to provide an adequate and manageable buffer to protect the quality of water being withdrawn from the Skagit River to supply public drinking water.

An inventory of land use in the Watershed Control Program Area identified parcels and other landmarks where land use or other factors pose a potential threat to water quality of the Skagit River. These Potential Contaminant Sources include parcels with agricultural, commercial/industrial or transportation land use designations; sites regulated by the Washington Department of Ecology due to potential environmental impact; stormwater outfalls, bridges and pipelines that cross or are located adjacent to the Skagit River.

A review of existing conditions in the Skagit River Watershed revealed two particular types of events that pose a threat to the water quality of the Skagit River, and subsequently to public drinking water supplies: 1) human-produced pollutant loading from accidents or treatment plant failures, and 2) surface runoff during peak flow events and/or over-bank flood waters carrying pollutants into the river. In an effort to define and measure these potential threats, a hydrologic study was completed determine travel times of pollutants that may enter the Skagit River within the program area, due to accident or flood, at various times of year and rates of streamflow. This information may be utilized by emergency management personnel and water treatment plant operators to minimize the risk of potential contamination and determine the appropriate response to an event.

Several strategies may be used to minimize the risk of potential contamination of the Skagit River, including public education, improved communication and emergency notification procedures, and cooperation among state and local agencies, governments, and others. This document provides recommendations and a schedule for the development and implementation of the Skagit River Watershed Control Plan and highlights the proactive steps being taken by the City of Anacortes and the Public Utility District #1 of Skagit County to protect the quality of drinking water supplies and public health.

Section 1
Introduction

1.1 Introduction and Background

Diminishing water availability and quality, and increased water demand due to population growth, are key issues facing the State of Washington. Our State depends on reliable sources of safe drinking water to protect the health and well being of current and future water consumers.

The Washington Department of Health (DOH) is responsible for the regulation and protection of our State's drinking water sources. Compliance with DOH regulatory standards is achieved using a variety of methods, depending on the type of water source involved and the current and projected demand on the water system. In systems where the primary source is surface water, such as a river, the source may be susceptible to contamination from a variety of sources throughout the watershed. In an effort to address this issue, DOH requires a Watershed Control Program (WCP) to be implemented to minimize the risk posed by these potential sources of contamination.

The purpose of this document is to provide a framework for implementation of a WCP in the Skagit River Watershed. The City of Anacortes (City) currently utilizes the Skagit River as its sole source of supply for its public drinking water system. The Public Utility District #1 of Skagit County (PUD) proposes to construct a water diversion to draw water from the Skagit River to supplement existing supplies. As purveyors of public water systems, the City and the PUD have cooperated to create this document in accordance with DOH regulations to minimize the risk of contamination of the Skagit River affecting drinking water supplies and public health.

1.2 Legal Basis for the Watershed Control Program

The Safe Drinking Water Act of 1974 and its amendments provide a framework for management and regulation of public water systems[1]. The Act places primary enforcement responsibility with the States. DOH is tasked with regulation of our State's public drinking water supplies[2].

Under the Public Water System Coordination Act of 1977, purveyors, or public water system operators, are required to submit a Water System Plan to DOH that demonstrates a system's capability to comply with minimum quality standards set by DOH, and meet present and future demand[3]. Purveyors of water systems using surface water sources are required to develop and implement a WCP as part of the Water System Plan[4].

[1] U.S.C. Title 42 Chapter 6A Subchapter XII Part B
[2] Chapter 43.20 RCW; Chapter 246-290 WAC
[3] Chapter 70.116 RCW; Chapter 246-290 Section 100 WAC
[4] Chapter 246-290 Section 135 WAC

The WCP must contain, at a minimum, of the following[5]:

- A general description of the watershed, including location, hydrology, land ownership and activities that may adversely affect source water quality
- Documentation of current source water quality trends
- An inventory of potential sources of contamination within the watershed
- A description of the treatment operation, including emergency provisions
- Control measures to minimize risk of contamination and monitor source water quality, including relevant written agreements and monitoring activities

As owner and operator of a regional public water supply system utilizing the Skagit River as a supply source, the City is required to submit a WCP to DOH for approval and implement the WCP upon approval. If the PUD utilizes the Skagit River as a water source in the future, it would also be required to submit and implement a WCP; the PUD has therefore cooperated in the development of this document in a proactive effort to address this requirement. DOH requires that the WCP be updated every six years.

1.3 The Watershed Control Program Area

The following section describes the area within which the WCP will be implemented. The Watershed Control Program Area (program area) was designed in an effort to achieve regulatory compliance and create a practical area for local and interlocal cooperation, monitoring and administration of the WCP.

1.3.1 General Description and Location of the Program Area

The term "watershed" can be defined in a variety of ways depending on the application and context. The Washington Administrative Code defines the term, in relation to the regulation of drinking water, as "… the region or area that ultimately drains into a surface water source that is diverted for drinking water supply; and affects the physical, chemical, microbiological, and radiological quality of the source[6]." In the case of the Skagit River Watershed, this definition encompasses an extensive area and involves multiple jurisdictions. For the purpose of regulation at the local level, this definition creates an impractical implementation area that covers thousands of square miles and extends into Canada; it was therefore necessary to more narrowly define the area to be considered in the WCP and in this document.

The Skagit River Watershed is defined for the purposes of the WCP as shown in Exhibit 1-1. The watershed was defined using computer-based watershed delineation tools and elevation data from the U.S. Geological Survey. No data were available for the portion of the watershed that

[5] Chapter 246-290 Section 135 WAC
[6] Chapter 246-290 Section 010 WAC

extends into Canada, and since this area is outside of state and local jurisdiction, it was not included. The Skagit River Watershed is comprised of Water Resource Inventory Areas 3 and 4, as defined by the Washington Departments of Ecology (DOE), Natural Resources, and Fish and Wildlife in 1970[7].

The program area includes 80.6 square miles within the Skagit River Watershed located in western Skagit County (Exhibit 1-1). The program area is mostly contained within Water Resource Inventory Area 3, the Lower Skagit-Samish Basin[8]. Rolling foothills and floodplains characterize the terrain. Natural vegetation includes species such as western hemlock, western red cedar, red alder, and Douglas fir. Land use is dominated by forestry and agriculture. The municipalities of Burlington, Concrete, Hamilton, Lyman, Mount Vernon, and Sedro-Woolley are located in the program area. The primary population centers are Burlington, Mount Vernon and Sedro-Woolley.

1.3.2 Criteria Used to Define the Program Area

Based on discussions between the City and the PUD and consultations with DOH, it was determined that the program area should encompass the 43-mile length of the Skagit River between River Miles 13.2 and 56.6 and include the water withdrawal point for the City and the proposed withdrawal point for the PUD. The program area includes 750 feet of riverbank on either side of the Skagit River and the corresponding portion of the 100-year flood zone. Major tributaries within the program area such as Hansen Creek and Nookachamps Creek are considered as part of the flood zone. The westernmost portion of the 100-year flood zone was excluded due to its location downstream from water withdrawal points.

The program area begins downstream of the City's raw water intake structure and ends at the point of confluence with the Baker River east of the Town of Concrete. In 1978, the segment of the Skagit River from the pipeline crossing at Sedro-Woolley upstream to and including the mouth of Bacon Creek was designated as a Wild and Scenic River[9]. The Wild and Scenic designation indicates that human-induced contamination is minimal. However, the program area includes the segment from Sedro-Woolley upstream to Concrete due to the wastewater treatment facility and corresponding outfall to the Baker River located in Concrete. Several municipalities are located upstream from Concrete; however, these communities utilize septic systems and were assumed to pose no significant threat to water quality in the Skagit River.

[7] Washington Department of Ecology, 2003, Water Resource Inventory Maps, http://www.ecy.wa.gov/services/gis/maps/wria/wria.htm
[8] Washington Department of Ecology, 2003, Watershed Conditions, http://www.ecy.wa.gov/programs/eap/wrias/index.html
[9] National Park Service, 2003, Skagit Wild and Scenic River, Washington, http://www.nps.gov/rivers/wsr-skagit.html

Insert Exhibit 1-1 Watershed Control Program Area and Vicinity

1.4 Organization of Document

The remainder of this document is organized as follows:

- Section 2.1 provides a description of watershed characteristics in the Skagit River Watershed and the program area
- Section 2.2 summarizes recent water quality trends in the Lower Skagit River Watershed and the program area
- Section 2.3 describes land use and ownership in the program area and defines Potential Contaminant Sources
- Section 2.4 describes existing water treatment operations and emergency provisions that have been implemented by the City and the PUD to protect public drinking water supplies
- Section 2.5 describes existing mechanisms for monitoring water quality in the Skagit River Watershed
- Section 3.1 discusses threats to water quality in the program area
- Finally, Section 3.2 provides recommended strategies for further development and implementation of the Skagit River WCP.

Section 2
Existing Conditions

2.1 Watershed Characteristics

This section provides a detailed description of the physical characteristics found in the Skagit River Watershed and the program area. This information provides a framework for consideration of the potential threats to water quality and alternatives for management of those threats in the program area.

2.1.1 Physical Setting

The Skagit River Basin originates in Canada, encompasses a portion of the northern Cascade Mountains including Mt. Baker, and extends down to the lowland broad outwash plain from Sedro-Woolley west. The program area is located within the Skagit River Basin and includes a portion of the low gradient outwash, with elevations ranging from near sea level at the western boundary near the Anacortes water supply intake, to 130 feet at Concrete just below the eastern boundary. Foothills along the Skagit River's banks near its confluence with the Baker River provide the only significant elevation in the program area, rising to 225 feet.

A significant portion of the Skagit River Basin has been diked and drained for agricultural use since the late 19th Century. Dikes extend along the river on either side from the beginning of the program area upstream for three miles, and on the north side for an additional three miles, ending east of Burlington. The dikes protect municipalities and populations from seasonal flooding, and prevent floodwaters from returning to the river. In addition, drainage of the low elevation outwash plain has transformed the landscape from wetlands and estuaries into productive agricultural areas.

2.1.2 Climate

The climate in the program area is temperate, with mean monthly temperatures ranging from 41°F in winter to 62°F in summer. Precipitation varies widely, both geographically and seasonally. Annual snowfall within the program area is minimal; however, snowfall upstream from the program area is significant such that snow and glacial melt constitute a large portion of the Skagit River streamflow in the spring and summer/early fall. Tables 2-1 and 2-2 summarize data collected at climate stations located in Mount Vernon and Concrete[10].

[10] Western Regional Climate Center, Desert Research Institute, 2003, Washington Climate Summaries, http://www.wrcc.dri.edu/summary/climsmwa.html

Table 2-1
Monthly Climate Summary for Mount Vernon, WA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec.	Annual
Avg. Max Temp (F)	45.5	49.1	52.7	57.5	63.9	68.5	73.1	73.7	68.6	59.4	50.7	45.8	59.1
Avg. Min Temp (F)	33.6	35.1	37.0	39.9	44.6	48.8	50.5	50.8	46.9	41.7	37.8	34.5	41.8
Avg. Total Precip(in.)	4.04	2.87	2.72	2.48	2.18	1.83	1.18	1.39	1.85	3.18	4.40	4.10	32.22

Period of Record: 1/1/1956 to 6/30/2003
Data compiled by Western Regional Climate Center

Table 2-2
Monthly Climate Summary for Concrete, WA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Avg. Max Temp (F)	42.3	47.3	52.9	60.1	66.9	70.9	76.4	76.7	71.3	61.0	49.3	43.1	59.9
Avg. Min Temp (F)	31.6	33.0	35.3	39.6	44.8	49.7	52.4	52.8	49.3	43.5	37.3	33.3	41.9
Avg. Total Precip(in.)	9.46	7.05	6.85	4.58	3.28	2.76	1.52	1.66	3.43	6.71	10.10	10.71	68.13

Period of Record: 1/1/1931 to 7/31/2003
Data compiled by Western Regional Climate Center

2.1.3 Hydrology

Streamflows in the Skagit Basin have been heavily regulated since the early 20th Century by a series of hydroelectric dams. Table 2-3 shows average streamflows calculated from stream gage data collected in Mount Vernon and Concrete.

Table 2-3
Average Streamflows in the Program Area

	Skagit River near Mount Vernon, WA* (USGS 12200500) (cfs)	Skagit River near Concrete, WA** (USGS 12194000) (cfs)
September (low flow during dry season)	9,369	8,478
June (peak flow due to snowmelt)	24,750	24,590
Winter	14,000 – 19,000	12,000 – 16,000

* 62 years of record
** 78 years of record
Data compiled by HydroLogic Services Company

Despite regulation upstream, seasonal flooding does occur in the Skagit River Basin and the program area. Flooding is largely contained by dikes from Burlington west; current

flood protection is designed to control a 50 year flood event. Table 2-4 shows estimated streamflows near Mount Vernon during peak flow events.

Table 2-4
Peak Flow Events on Skagit River near Mount Vernon (USGS stream gage 12200500)

Flood Event	Flood Magnitude (cfs)*
2 year flood	65,000
10 year flood	113,000
25 year flood	140,000
100 year flood	153,000

* Post-regulated record 1941-2001 approximate values
Data compiled by HydroLogic Services Company

2.2 Water Quality

This section describes recent water quality trends in the Lower Skagit River Watershed and the program area. DOE is tasked with setting surface water quality standards to comply with the federal Clean Water Act[11]. Within the program area, the portion of the watershed from the beginning of the program area boundary upstream to the north end of Skiyou Slough near Sedro-Woolley is classified as a Class A fresh water body; the portion upstream from this point to the end of the program area boundary is classified as a Class AA water body. Water quality standards for these classes are described in Table 2-5.

Table 2-5
Washington State Water Quality Standards for Surface Fresh Water Bodies

Parameter	Class A Quality Standard	Class AA Quality Standard
Fecal Coliform	≤ 100 colonies/100mL (geometric mean)	≤ 50 colonies/100mL (geometric mean)
Dissolved Oxygen	≥ 8.0 mg/L	≥ 9.5 mg/L
Temperature	≤ 18°C	≤ 16.0°C
pH	6.5 to 8.5	6.5 to 8.5
Turbidity	Not to exceed 5 NTU over background	Not to exceed 5 NTU over background
Toxics	Below levels specified by WAC 173-201A-240	Below levels specified by WAC 173-201A-240

DOH requires public water system operators to test raw water and treated water to ensure compliance with drinking water standards established by the U.S. Environmental Protection Agency. Standards are enforced for the following categories of contaminants[12]:

[11] Chapter 173-201A WAC
[12] U.S. Environmental Protection Agency, 2003, Potential Sources of Drinking Water Contamination Index, http://www.epa.gov/ogwdw/swp/sources1.html

- **Organic contaminants**, such as pesticides and herbicides, petroleum products, solvents cleaners and degreasers, which may come from a variety of sources such as agriculture, stormwater runoff, wastewater treatment facilities and residential areas, gas stations and maintenance facilities.

- **Inorganic contaminants**, such as salts and metals, which may come from stormwater runoff, industrial or domestic wastewater discharges, or agriculture

- **Disinfection by-products**, such as trihalomethanes, which may come from agricultural and stormwater runoff or drinking and wastewater treatment discharges

- **Microbial contaminants**, such as fecal coliform, *Giardia, Cryptosporidium* and *E.coli,* which may come from sewage treatment plants, septic systems, and agricultural livestock operations

- **Radionuclides**, such as radium and uranium, which may occur naturally or result from oil and gas production or mining activities

As discussed in detail below, several water bodies in the Lower Skagit River Watershed have experienced water quality problems in recent years, such as high temperature, low dissolved oxygen and presence of fecal coliform. These data are presented to describe general water quality trends in the watershed, and do not necessarily indicate a problem that will affect drinking water quality. For example, high temperature and dissolved oxygen are stream habitat issues, not indicators of poor quality drinking water. Further, the contribution of these tributaries is relatively small compared to the volume of the Skagit River, and water treatment processes such as disinfection are used by treatment plants to remove contaminants that may enter the river.

2.2.1 DOE Water Quality Studies

DOE completed its first major study of water quality in the Lower Skagit River in 1997[13]. The study area included the North and South Forks and the mainstem of the Skagit River from its mouth upstream to the north end of Skiyou Slough near Sedro-Woolley. The study evaluated water quality and proposed Total Maximum Daily Loads for fecal coliform in Nookachamps Creek and dissolved oxygen in the Lower Skagit River near Conway (downstream from the program area). The fecal coliform Total Maximum Daily Load was approved in 2000. DOE is currently completing a reassessment of Total Maximum Daily Loads in the Lower Skagit River Watershed.

The DOE water quality survey demonstrated that fecal coliform levels regularly exceeded Class A fresh water quality standards in many tributaries in the Lower Skagit; bacteria levels upstream from Sedro-Woolley exceeded the more stringent Class AA standards which apply to that area[14]. The following water bodies in the program area were listed in 1996 as quality-limited under the federal Clean Water Act for exceeding fecal coliform standards: Lower Skagit River, Gages

[13] Washington Department of Ecology, July 1997, Lower Skagit River Total Maximum Daily Load Water Quality Study, http://www.ecy.wa.gov/pubs/97326a.pdf
[14] Washington Department of Ecology, July 1997, Lower Skagit River TMDL Water Quality Study, Page 2

Slough, Nookachamps Creek, Hart Slough/ Brickyard Creek, and Hansen Creek[15]. High bacteria levels have historically been attributed to dairy farms and other agricultural practices, urban stormwater runoff, and failing septic systems. DOE is currently working to establish a Total Maximum Daily Load for fecal coliform in the Lower Skagit River to address impairments to contact recreation and protect shellfish harvesting in Skagit Bay[16].

In addition, DOE has identified the following areas as high temperature problem areas under the federal Clean Water Act: Carpenter creek, Coal Creek, Cumberland Creek, Day Creek, Fisher Creek, Hansen Creek, Indian Slough, Jones Creek, and Nookachamps Creek. Hansen Creek, Parker Creek and Sorenson Creek have also been identified as problem areas with regard to fish habitat.

2.2.2 Skagit County Baseline Monitoring Project

The Skagit County Public Works Department developed and implemented a baseline water quality monitoring project in 2001[17]. The project was intended to identify trends in watershed health in the Samish and Skagit River Basins, and to provide baseline water quality data in Skagit County's agricultural areas as a standard for future comparisons. Data were collected biweekly at 27 monitoring stations between July 2001 and June 2002. Parameters monitored included dissolved oxygen, temperature, conductivity, salinity, pH, turbidity, plant nutrient levels, and fecal coliform.

The relatively short period of record in this study is limiting in terms of analysis; however, the data collected demonstrated significant deviations from water quality standards in several parameters. Only eight of the 27 locations tested met the dissolved oxygen standard in all samples taken, and readings from five stations failed to meet the standard in more than 50% of samples. Maximum temperatures exceeded the high temperature standard at 15 locations. Temperatures over 20°C were recorded in samples from Colony Creek and Nookachamps Creek. Samples taken at each of the stations failed to meet fecal coliform standards at some point during the year, and the geometric mean exceeded maximum contaminant levels in samples from Thomas Creek, Samish River, College Way Creek, and most significantly at Nookachamps Creek, where a geometric mean of 169 colonies/100mL was recorded.

[15] Washington Department of Ecology, July 1997, Lower Skagit River TMDL Water Quality Study, Page 4
[16] Washington Department of Ecology, June 2000, Lower Skagit River Fecal Coliform TMDL Submittal Report, Page 3, http://www.ecy.wa.gov/pubs/0010010.pdf
[17] Skagit County Public Works Department, September 2002, Baseline Monitoring Project Annual Report for the Monitoring Period July 2001-June 2002

2.2.3 Anacortes Public Works Department

The City has tested raw water quality to ensure compliance with federal drinking water quality standards since the water treatment plant became operational in 1971. Testing has been established for the following contaminants: inorganics, chlorinated hydrocarbons, volatile organics, and radionuclides. Trihalomethanes and micro-organisms are also monitored in compliance with federal drinking water standards. The data collected indicates that all parameters are in compliance. Recent water quality testing results are provided in Appendix A of this document.

2.2.4 PUD Water Quality Analysis

The Cultus Mountain Watershed has been the PUD's principal source of drinking water since the construction of Judy Reservoir in 1947[18]. The Watershed is located southeast of Sedro-Woolley on the south side of the Skagit River, and ultimately drains into the Skagit River and the program area. Raw water is diverted from four creeks (Salmon, Gilligan, Turner and Mundt) and collected in Judy Reservoir. The PUD completed a WCP for the Cultus Mountain Watershed in 1960, with subsequent revisions in 1979 and 1991.

A water quality analysis was completed as part of the Water System Plan the PUD completed in September 2001[19]. The analysis compiled and evaluated historical water quality data collected by the PUD. Levels of micro-organisms, trihalomethanes, inorganic chemicals, volatile organics, and radionuclides were found to be consistently well below maximum levels allowed by federal drinking water quality standards[20]. A similar water quality analysis will be implemented for the proposed Skagit River intake.

2.3 Land Use Inventory

This section describes the types of land use and activities that occur in the program area. Special attention is paid to land uses that are considered a potential threat to water quality in the Skagit River. This information is essential to the process of developing watershed control measures.

2.3.1 General Description, Land Ownership and Activities

Land use in the program area is dominated by agriculture. The majority of land is privately owned; public lands are located primarily within the city limits of municipalities.

Skagit County is required to plan land use and zoning under the State's Growth Management Act[21]. Land located within the program area and outside the city limits of municipalities is subject to regulation under the Skagit County Comprehensive Plan, land use and zoning

[18] Public Utility District No. 1 of Skagit County, September 2001, Water System Plan, 2-4
[19] Public Utility District No. 1 of Skagit County, September 2001, Water System Plan, 4-41
[20] See PUD Water System Plan, Appendix E for further detail
[21] Chapter 36.70A RCW

regulations. Incorporated cities within the program area have individual comprehensive plans to regulate land use and zoning within city limits.

2.3.2 Potential Contaminant Sources

Sources of potential water supply source contamination within the program area are of paramount concern in the development and implementation of the WCP. To that end, a list of Potential Contaminant Sources (PCSs) was developed for use in the WCP. The PCS list is comprised of parcels within the program area where the current land use designation is one considered to pose a threat to water quality in the Skagit River.

Three aggregate groups of PCSs were created for use in the WCP:

- **Agriculture**, including cropland, pasture, and orchards
- **Commercial/Industrial**, including manufacturing, retail, construction, mining and other resource production
- **Transportation**, including associated parking and maintenance facilities

These PCS groups were developed by grouping activities associated with land use designations from the Skagit County Comprehensive Plan, which are assigned to individual parcels by the Skagit County Assessor's Office. Table 2-6 describes the types of contaminants associated with these activity groups[22]. The Skagit County Assessor's land use categories that constitute the PCS groups and the number of parcels identified within each group are listed in Table 2-7. Exhibit 2-1 shows the location and type of PCSs found within the program area.

Table 2-6
Activities and Contaminants Associated with PCS Groups

PCS Group	Activities	Contaminants
Agriculture	Fertilizers/herbicides/pesticides Contained animal feeding operations Lagoons and liquid waste Irrigation/erosion of natural deposits	Organic Inorganic Trihalomethanes Microbial
Commercial/Industrial	Fabrication/manufacturing Synthetics/plastic production Chemical/petroleum processing Wastewater discharge	Organic Inorganic Trihalomethanes Microbial Radionuclides
Transportation	Maintenance/fueling areas Stormwater runoff Hazardous materials transport	Organic Inorganic Trihalomethanes

[22] Adapted from U.S. Environmental Protection Agency, 2003, Potential Drinking Water Contaminant Index, http://www.epa.gov/safewater/swp/vcontam3.html

Insert Exhibit 2-1 Watershed Control Program Area and Potential Contaminant Sources

Table 2-7
PCS Parcels in the Program Area

PCS GROUP	PARCELS
Agriculture	
Agriculture Related Activities	33
Agriculture, Non-classified	325
Open Space Farm and Agriculture	1,551
Commercial / Industrial	
Chemicals	1
Contract Construction Services	7
Fabricated Metal Products	1
Land Zoned Industrial with Residence	42
Mining Activities & Related Services	13
Miscellaneous Services	434
Other Resource Production	4
Scientific, Photo & Optical	1
Repair Services	42
Retail Trade/Building Materials/Hardware/Farm Equipment	16
Rubber & Misc. Plastic Products	7
Stone, Clay and Glass Products	17
Wholesale Trade	18
Transportation	
Aircraft Transportation	3
Automobile Parking	36
Highway & Street Right of Way	10
Marine Craft Transportation	1
Motor Vehicle Transportation	14
Other Transport/Communications/Utilities	28
Railroad Transportation	50
Total Number of Parcels	**2,654**

Data source: Skagit County Assessor's Office http://www.skagitcounty.net/
Data compiled by HydroLogic Services Company

In addition to Assessor's parcels, facilities regulated by DOE were considered potential sources of contamination. DOE is tasked with administration and enforcement of the National Pollution Discharge Elimination System (NPDES) in our State. Authorized by the federal Clean Water Act, the NPDES permit program regulates point sources that discharge pollutants into waters of the United States[23]. DOE regulates these and other types of sites that pose a potential threat to the environment. Categories of DOE regulated sites and the number of sites within each category is listed in Table 2-8. Exhibit 2-1 shows the location and type of DOE regulated sites. Exhibits 2-2 and 2-3 identify individual sites in the program area with identification numbers. These numbers correspond to Appendix B, which provides information about ownership, activities and the types of contaminants found at each site.

[23] U.S. Environmental Protection Agency, 2003, National Pollutant Discharge Elimination System, Overview, http://www.epa.gov/npdes/

Table 2-8
DOE Regulated Sites in the Program Area

FACILITY TYPE	SITES
Dairy	9
Emergency/Hazardous Chemical Inventory TIER2	21
General Permit Industrial	7
General Permit Municipal	1
General Permit Storm Water Industrial	3
Hazardous Waste Generator	43
Landfill	1
Minor Municipal	2
State Cleanup Site	3
Voluntary Cleanup Sites	2
Underground Storage Tank (Burlington STP)	1
Total DOE Regulated Sites	**93**

Data source: Washington Department of Ecology http://www.ecy.wa.gov/
Data compiled by HydroLogic Services Company

Other PCSs considered in this WCP include landmarks such stormwater outfalls, bridges and pipelines that cross the Skagit River in the program area. These landmarks are shown in Exhibits 2-1, 2-2 and 2-3. The pipeline crossing shown in the Exhibits represents two natural gas pipelines operated by Williams Northwest Pipline Company.

Insert Exhibit 2-2 DOE Regulated Sites in the Program Area

Insert Exhibit 2-3 Enlarged View of DOE Regulated Sites

2.4 System Operations

This section describes existing water treatment operations and emergency provisions that have been implemented by the City and the PUD, which are detailed in their most recent WCPs submitted to DOH in September 2000 and 2001, respectively[24]. The PUD does not currently draw water from the Skagit River; however, PUD system operations that are already in place will be expanded to accommodate the proposed Skagit River raw water intake. Any changes in operations that result from the additional intake will be included in WCP updates.

2.4.1 Water Treatment Operations - Anacortes

The City owns and operates a regional water treatment plant located near Mount Vernon on the east bank of the Skagit River. The plant was constructed and placed in operation in 1971. The City's water system serves Anacortes, La Conner, Oak Harbor, the Tesoro and Shell Oil Refineries, the Swinomish Indian Reservation, portions of the PUD service area, and numerous other industrial customers[25].

The City's water treatment system consists of raw water intake, flocculation, sedimentation, filtration, chlorination, and finished water pumping[26]. Water is pumped from the intake structure located on the west bank of the Skagit River across the river to the flocculation and sedimentation basins. Alum, lime and other chemicals can be mixed with the raw water to aid in removal of particles and other contaminants. Solids settling out in the sedimentation basin are continuously removed to settling lagoons.

Once sedimentation is complete, water flows through six mixed media filters that remove remaining particles before water enters the clearwell for chlorination. The filters are equipped with air wash systems to optimize water quality and filtration rates[27]. Following chlorination, the treated water is pumped through the transmission pipelines to contract customers and the distribution system.

2.4.2 Emergency Provisions - Anacortes

The City developed and implemented an emergency response plan for the water treatment plant in 1994 and the plan has been updated annually since 2000. The emergency response plan provides detailed protocols with which operators may respond to an emergency that poses a potential threat to the City's water system.

The City's water treatment plant is on the notification lists of Skagit County Department of Emergency Management and Washington State Patrol for immediate contact in the event of any hazardous material spill in the Skagit River Watershed. In addition, discharge permits held by

[24] Additional information regarding emergency provisions may be found in emergency response plans issued by the City and the PUD.
[25] City of Anacortes Public Works Department, 2003, Water System Consumer Confidence Report, http://www.cityofanacortes.org/
[26] R.W. Beck, September 2000, City of Anacortes Water System Plan, 4-1
[27] R.W. Beck, September 2000, City of Anacortes Water System Plan, 4-1

wastewater treatment plants upstream of the City's water intake, located in Burlington, Sedro-Woolley, and Concrete, require notification of DOE in the event of effluent discharge parameter violations[28]. Local officials and utilities are notified by DOE, emergency management agencies or the plants directly.

In the event of a spill or accidental discharge, the plant manager or designated supervisor will determine if the plant and intake should be shut down, based on the spill type, estimated time of arrival of the spill to the plant, and river elevation[29]. Booms are to be deployed for river elevations of 12.0 feet or less. If it is deemed necessary to shut down, all major customers will be notified and asked to cease water withdrawal. The City's primary water reservoir will be isolated, and emergency water conservation measures will be implemented. Essential personnel at the City, Skagit County and DOH will be notified, and assistance will be requested from Skagit County Emergency Services.

The plant is located within the floodplain, and existing flood protection measures provide protection from the 50-year flood[30]. The City maintains a flood fight operations plan, and holds annual staff training sessions to prepare for the flood season[31]. In the event of a flood or peak flow event, several stages of response are outlined in the emergency response plan and flood fight operations plan, to be implemented as the degree of flood threat warrants. During a flood watch, the plant manager will be immediately notified of any deviation from normal water quality parameters. The plant manager will determine if additional plant personnel are required, and will coordinate the appropriate response to weather conditions and river level with the City public works director and the Mayor.

If a flood becomes imminent, steps will be taken to secure the plant structure and obtain necessary resources to implement flood fight operations. Flood fight procedures include sandbagging, dike patrols, and coordination with emergency management agencies. If the flood fight is unsuccessful and the treatment plant must be shut down and evacuated, essential personnel at the City, Skagit County and DOH will be notified and evacuation is coordinated by emergency management agencies. The City's primary water reservoir will be isolated to secure water reserves, and emergency water conservation measures will be implemented.

2.4.3 Water Treatment Operations - PUD

The PUD is a municipal corporation of the State of Washington, established by general election in 1936[32]. Responsibilities and powers of the PUD are exercised through a board of term-elected commissioners that employs staff to oversee operations and management of the water system. The PUD operates the most expansive water system in Skagit County, serving over 19,500 metered services in the cities of Burlington, Mount Vernon, and Sedro-Woolley, the communities

[28] R.W. Beck, September 2000, City of Anacortes Water System Plan, Appendix E, Watershed Plan
[29] RH2 Engineering, P.S., May 1994, City of Anacortes Water Treatment Plant Emergency Response Plan, Emergency Response No. 9
[30] R.W. Beck, September 2000, City of Anacortes Water System Plan, 4-4
[31] RH2 Engineering, P.S., May 1994, City of Anacortes Water Treatment Plant Emergency Response Plan, Emergency Response No. 3
[32] Public Utility District No. 1 of Skagit County, September 2001, Water System Plan, 2-1

of Alger, Cedargrove, Clear Lake, Conway, Dewey, Rockport and Similk Beach, and adjacent rural and suburban areas.

The PUD established utility service by purchasing the water systems in the Cities of Mount Vernon, Burlington and Sedro-Woolley from the Peoples Water and Gas Company in 1939[33]. With these water systems, the PUD acquired water rights for the Skagit River, local springs, and five creeks in the Cultus Mountains. Subsequent acquisitions occurred and the system was integrated in 1940.

In 1947 the Judy Reservoir was completed, which became the PUD's principal source of water supply[34]. Water is diverted from four creeks in the Cultus Mountain Watershed and piped to the 1.45 billion gallon impoundment reservoir. These creeks are subject to instream flow requirements, which limit the amount of water the PUD may withdraw during periods of low flows[35]. To ensure that adequate water supplies are available to PUD customers, a Memorandum of Agreement was signed in 1996 by the PUD, the City, Ecology and other interested parties, which allows the PUD to withdraw water from the Skagit River in the same quantity as it was not authorized to withdraw from the flow-limited creeks[36]. To facilitate this withdrawal from the Skagit River, the PUD plans to construct a new pump station and pipeline from the Skagit River to Judy Reservoir[37]. Existing Skagit River water rights acquired by the PUD with city water systems in 1939 have been transferred to the proposed intake. The location of the proposed Skagit River raw water intake is noted in Exhibits 2-1, 2-2 and 2-3.

Water from Judy Reservoir is treated at the PUD's multi-media direct filtration water treatment plant[38]. The plant was constructed in 1990 and serves the cities of Burlington, Mount Vernon and Sedro-Woolley, as well as many rural communities in western Skagit County. Water is disinfected and filtered to meet federal drinking water standards, and transferred to two clearwells with a combined capacity of 2.44 million gallons. Finished water from the clearwells flows by gravity to the transmission pipelines for distribution.

2.4.4 Emergency Provisions - PUD

Due to the size of the Judy Reservoir, the PUD has the ability to shut down its proposed Skagit River water intake in the event of an accidental discharge or peak flow event. Raw water is continually monitored for turbidity and particulate levels, and if the water does not meet limits acceptable to the plant operators, the intake is shut down until water quality improves.

The Cultus Mountain Watershed is privately owned and accidental pollutant discharges are unlikely, so no emergency spill response is currently in place. If or when the Skagit River is utilized as a water supply source, the PUD will shut down the raw water intake immediately once notified of an accidental pollutant discharge upstream.

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[33] Public Utility District No. 1 of Skagit County, September 2001, Water System Plan, 2-2
[34] Public Utility District No. 1 of Skagit County, September 2001, Water System Plan, 2-4
[35] Chapter 173-505 WAC
[36] See PUD Water System Plan, Section 3 for further detail
[37] See PUD Capital Improvement Plan and PUD Water System Plan, Section 5 for further detail
[38] Public Utility District No. 1 of Skagit County, September 2001, Water System Plan, 4-4

2.5 Water Quality Monitoring Programs

This section describes water quality monitoring programs that have been or are currently implemented in the Lower Skagit River Watershed.

2.5.1 DOE Water Quality Monitoring Stations

DOE maintains one long-term water quality monitoring station in the Lower Skagit River near Mount Vernon[39]. This station has been sampled continuously since 1974, and data is available for specific years dating back to 1947. Five other DOE monitoring stations are located in the program area, but long-term sampling data is not available for these stations. Data is collected monthly at the Mount Vernon station for the following parameters: fecal coliform, oxygen, pH, suspended solids, temperature, nitrogen, phosphorus, and turbidity.

2.5.2 Skagit County Public Works Department

Skagit County intends to expand upon the baseline monitoring program implemented in 2001 by adding 20 sampling sites and monitoring these sites through 2008[40]. Data will be reported to DOE and made available on the Skagit County website quarterly, and data summaries will be issued annually.

2.5.3 Anacortes Public Works Department

The City is required to monitor and report the quality of raw water entering the public water system[41]. In addition, the City prepared a Coliform Monitoring Plan in 2000[42]. Reports are submitted annually to DOH and consumer confidence reports are submitted to the public annually via mail and the City's website.

2.5.4 PUD Water Quality Monitoring Program

The PUD currently monitors the quality of raw water entering the Judy Reservoir system. This monitoring program will include testing of water withdrawn from the Skagit River once the new intake is in use. Water quality reports are submitted annually to DOH and consumer confidence reports are submitted to the public annually.

2.5.5 Skagit Conservation District

[39] Washington Department of Ecology, 2003, River and Stream Water Quality Monitoring, 03A060 – Skagit R nr Mount Vernon, http://www.ecy.wa.gov/apps/watersheds/
[40] Skagit County Public Works Department, 2003, Skagit County Monitoring Program: Public Review Draft Monitoring Plan, http://www.skagitcounty.net/PublicWorksSurfaceWaterManagement/
[41] Chapter 246-290 Section 300 WAC
[42] R.W. Beck, September 2000, City of Anacortes Water System Plan, 6-8

The Skagit Conservation District operates a citizen volunteer water quality monitoring program called the Skagit Stream Team[43]. The Stream Team program began in 1998, and the Skagit Conservation District has completed annual water quality reports since 2000. Stream Team volunteers are trained to collect and record water quality data and perform fecal coliform and turbidity tests. Data are collected on a monthly basis from stream reaches in the Nookachamps Creek, Padilla Bay and Samish Watersheds. The goal of the Stream Team program is to monitor water quality and demonstrate improvements in water quality as a result of implementation of voluntary Best Management Practices in the Watershed. The program also serves to inspire community stewardship and educate the public about water quality issues.

[43] Skagit Conservation District, 2003, Skagit Stream Team, http://www.skagitcd.org/

Section 3
Watershed Control Program

3.1 Threats to Water Quality

Two particular types of events pose a threat to the water quality of the Skagit River, and subsequently to the water supply of the City and the PUD: 1) human-produced pollutant loading from accidents or treatment plant failures, and 2) surface runoff during peak flow events and/or over-bank flood waters carrying pollutants into the river. The WCP must address both of these types of events in order to protect the public drinking water supply from potential contaminants that pose a public health risk.

This section summarizes a hydrologic study of the program area completed by HydroLogic Services Company. The goal of this study was to determine travel times of pollutants that may enter the Skagit River within the program area, due to accident or flood, at various times of year and rates of streamflow. Travel times may then be used by the City and the PUD, emergency management personnel and water treatment plant operators to determine the appropriate response to an event. For example, a decision to shut down a water intake could be based on the location, distance and estimated travel time of a spill. Similarly, an understanding of river dynamics and peak flows could help plant operators to anticipate changes in turbidity and other key water quality parameters.

As discussed in Section 2.1.3, the Skagit River is a highly regulated river with two hydroelectric utilities operating releases from a total of five reservoirs. The chronology of the reservoir completion on the Skagit River is shown in Table 3-1. Exhibit 3-1 demonstrates the difference in magnitude of peak flows since regulation.

Table 3-1
Chronology of Skagit River Regulation

Utility and Reservoir Name	Date of Completion of Dam
Puget Sound Energy	
Lake Shannon	1927
Baker Lake	1959
Seattle City Light	
Diablo	1930
Ross	1949
Gorge	1960

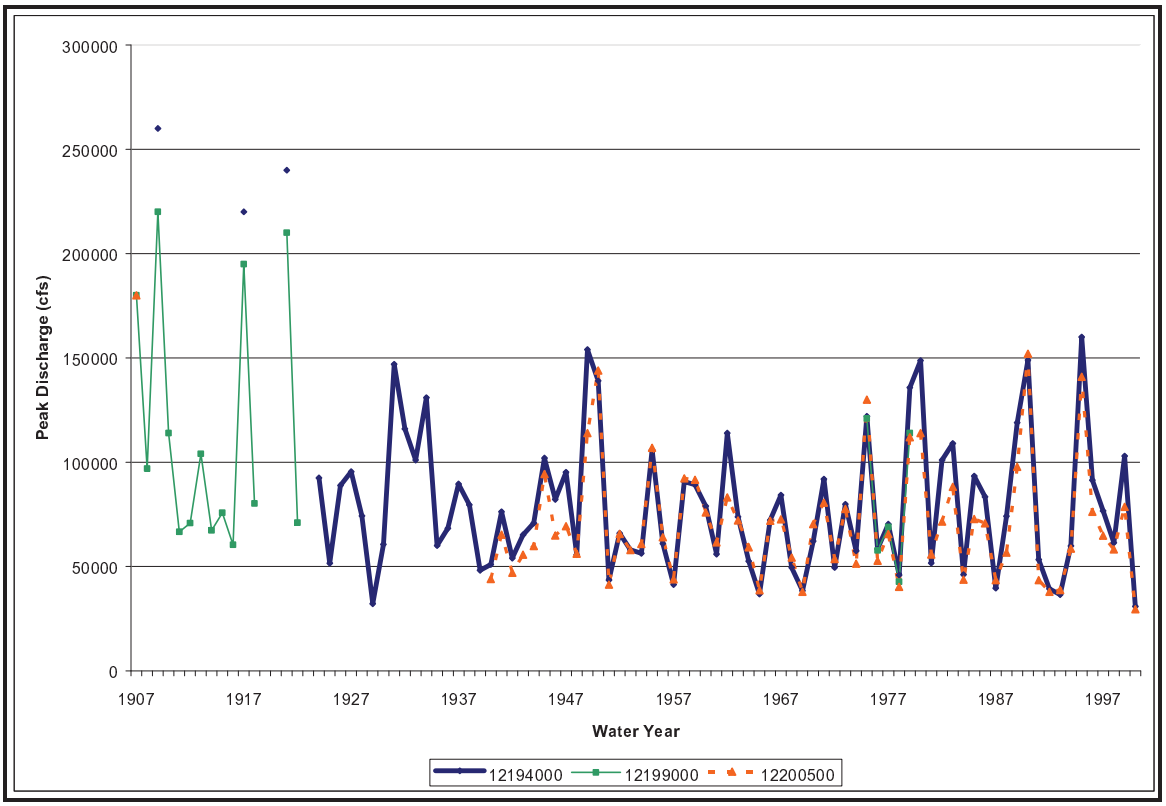

Exhibit 3-1
Skagit River Annual Peak Flows at Three Streamflow Gages

For the purposes of this study, only data from the post-regulation period was used; the potential for future contamination would likely be related to the magnitude of streamflows that occur in the post-regulated environment.

3.1.1 Accidental Discharge

Accidental discharges of pollutants to the Skagit River could occur from several sources including but not limited to oil and gas pipeline leaks, transport vehicle accidents on bridges or adjacent roads, wastewater treatment plant discharge failures, gasoline spills at service stations, etc. These events can occur at any time, during periods of high or low streamflows. Travel times vary depending on the magnitude of the flow.

In order to determine appropriate responses in the event of an accidental contaminant discharge to the Skagit River, travel times from selected points of interest on the river were calculated to the City's raw water intake structure and the proposed PUD intake. Tables 3-2 and 3-3 show the distance and travel time from points of interest to the City's intake. This information is graphically depicted in Exhibit 3-2. Tables 3-4 and 3-5 and Exhibit 3-3 demonstrate these relationships between points of interest and the proposed PUD intake.

Distance upstream from the City's intake was determined for eleven points of interest (Table 3-2). These locations varied from two miles upstream to more than 39 miles upstream from the intake (Exhibit 3-2). Travel times of a spill occurring less than 2.5 miles upstream would generally take less than one hour to reach the intake and would require a quick response to mitigate effects on the water supply. Further upstream, travel times vary according to the magnitude of streamflow (Table 3-3 and Exhibit 3-2). The maximum amount of travel time occurs during a summer mean flow between the Concrete Sauk Valley Bridge crossing and the City's intake (29 hours). A flood ten times the magnitude of the mean summer flow reduces the travel time to eight hours.

Table 3-2
Distance from Points of Interest to Anacortes Intake

Points of Interest	Distance Upstream from Anacortes Intake (Miles)
Anacortes Intake	0
I-5 Bridge	2.00
SR 99 Bridge	2.27
BNSF Railroad Bridge	2.76
SR 9 Bridge	8.75
Pipeline Crossing	10.74
PUD Intake	10.85
South Skagit Hwy At River Bend near Blair Road	23.35
South Skagit Hwy Near Fox Creek Rd	26.43
South Skagit Hwy Near Lower Finney Creek Rd	32.44
SR 20 At Milepost 84.7	35.44
Concrete Sauk Valley Bridge (USGS Gauge)	39.69

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Table 3-3
Travel Times to Anacortes Intake

Event Type	Approximate Discharge (cfs)	Approximate Velocity (ft/s)	Travel Time in Hours From Point of Interest to Anacortes Intake										
			I-5 Bridge	SR 99 Bridge and Mt. Vernon gauge	BNSF RR Bridge	SR 9 Bridge	Pipeline Crossing	PUD Intake	South Skagit Hwy at Bend near Blair Rd	South Skagit Hwy nr Fox Creek Rd	South Skagit Hwy nr Lower Finney Creek Rd	SR 20 at Milepost 84.7	Concrete Sauk Valley Bridge (USGS gauge)
Late summer Mean flow	10,000	2	1.5	2	2	6	8	8	17	19	24	26	29
Early winter /late spring Mean flow	20,000	3	1	1	1	4	5	5	11	13	16	17	19
~ 1 year Flood	30,000	3.8	<1 hour	<1 hour	1	3	4	4	9	10	13	14	15
~ 2 year Flood	65,000	5	<1 hour	<1 hour	<1 hour	2.5	3	3	7	8	10	10	12
~ 10 year Flood	115,000	7	<1 hour	<1 hour	<1 hour	1.8	2	2	5	6	7	7	8
25-50 year Flood	140,000	11	<1 hour	<1 hour	<1 hour	1.2	1.4	1.5	3	3	4	5	5

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Insert Exhibit 3-2 Skagit River Travel Times to Anacortes Intake

The location of the proposed PUD intake is nearly 11 miles upstream of the City's intake. Five points of interest corresponding to those used in the City intake analysis were used to calculate travel time to the PUD intake (Table 3-4). These locations varied from 12.5 miles upstream to nearly 29 miles upstream (Exhibit 3-3). Travel times of a spill occurring closer than the first point of interest (12.5 miles upstream) would generally take four to eight hours to reach the intake and would require a prompt notification to mitigate effects on the water supply. Further upstream, the travel times vary according to the magnitude of the streamflow (Table 3-5 and Exhibit 3-3). The maximum amount of travel time occurs during a summer mean flow between the Concrete Sauk Valley Bridge crossing and the PUD intake (21 hours). A flood ten times the magnitude of the mean summer flow reduces the travel time to six hours.

Table 3-4
Distance from Points of Interest to Proposed PUD Intake

River Crossings or Points of Interest	Distance Upstream from PUD Intake (Miles)
PUD Intake	0
South Skagit Hwy At River Bend near Blair Road	12.51
South Skagit Hwy Near Fox Creek Rd	15.58
South Skagit Hwy Near Lower Finney Creek Rd	21.60
SR 20 At Milepost 84.7	24.60
Concrete Sauk Valley Bridge (USGS Gauge)	28.84

Table 3-5
Travel Times to Proposed PUD Intake

Event Type	Approximate Discharge (cfs)	Approximate Velocity (ft/s)	Travel Time in Hours from Point of Interest to PUD Intake				
			South Skagit Hwy at Bend near Blair Rd	South Skagit Hwy nr Fox Creek Rd	South Skagit Hwy nr Lower Finney Creek Rd	SR 20 at Milepost 84.7	Concrete Sauk Valley Bridge (USGS Gauge)
Late summer Mean flow	10,000	2	9	11	16	18	21
Early winter /spring Mean flow	20,000	3	6	8	11	12	14
~ 1 year Flood	30,000	3.8	5	6	8	9	11
~ 2 year Flood	65,000	5	4	5	6	7	8
~ 10 year Flood	115,000	7	3	3	5	5	6
25-50 year Flood	140,000	11	1.7	2	3	3	4

Insert Exhibit 3-3 Skagit River Travel Times to Proposed PUD Intake

3.1.2 Peak Flow Events

Overbank flooding that returns to the river can carry with it contaminants such as manure waste from dairy farms or chemical pollutants from impervious surfaces. In addition, the flood event itself can affect water quality parameters such as turbidity. To assess the threat of water supply contamination during peak flows, a comparison of peak flow events measured at Concrete and Mount Vernon was undertaken to determine travel time of flood waves downstream at different magnitudes as well as velocities expected during floods.

It is important to note that during approximately two-thirds of the overlapping flood events, the flow recorded at the downstream gauge was lower than recorded flows upstream, indicating complex river dynamics during flood events. Several factors could contribute to this situation, including the duration of the flood, the characteristics of flood wave propagation and channel storage within the travel reach, the timing of accretion flow between the gauges, the tendency for a portion of flow to go over bank just upstream of the Mount Vernon gauge site, and the intensity, duration, and spatial pattern of precipitation during the event.

Three recent flood events of different magnitude were investigated to track the timing of peaks at the two stations (Table 3-6). The velocity during higher flow events was ascertained from actual discharge measurement records from the 1996 to 2003 period. The velocity for 12 discharge measurements (flows ranging from 3,290 to 138,000 cfs) at the Concrete Station averaged 4.3 feet per second and ranged from 1.4 ft/s to 11.09 ft/s. At the Mount Vernon station, the velocities ranged from 2 to 6 ft/s and averaged 3.1 ft/sec for 15 measurements with discharges from 4,700 to 113,000 cfs. Exhibit 3-4 shows the correlation between discharge and associated velocity for the recent available measurements at both the Concrete and Mount Vernon stations.

Table 3-6
Time between Peak Flows along Skagit River

Dates of Flood Event	Skagit River near Concrete #12-194000		Skagit River near Mount Vernon #12-200500		Time between Instantaneous Peak Flows
	Peak Flow (cfs)	[Time]	Peak Flow (cfs)	[Time]	(hours)
December 13-14, 1998	61,400	[2100]	58,200	[0715]	10.25
November 12-13, 1999	103,000	[2000]	78,600	[1345]	17.75
October 20-21, 2000	30,900	[2215]	29,500	[0515]	7

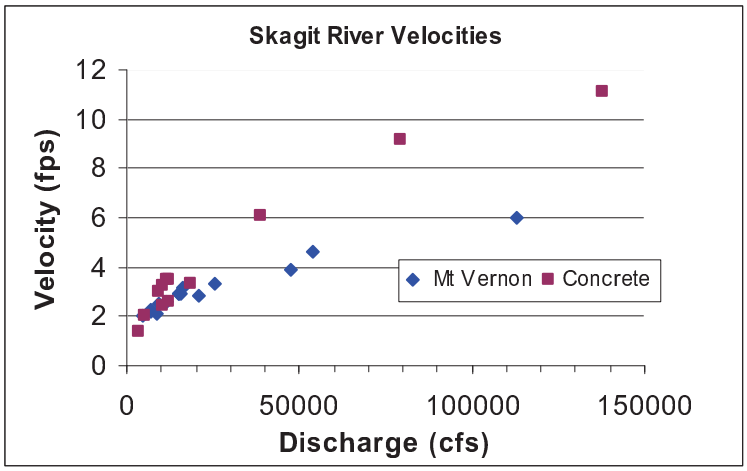

Exhibit 3-4
Streamflow Velocities as a Function of Discharge

The distance along the Skagit River between the two streamflow stations is 38.4 River Miles. At the average velocity rate of approximately three ft/s, the calculated travel time to cover the 38.4 River Miles would be nearly 19 hours. Travel time between the two stations is estimated at less than nine hours for floods with velocities of five or more ft/s. These travel times correspond in terms of order of magnitude to the range of times recorded between instantaneous peaks at the two stations for three flood events (Table 3-6). However, the time between peaks does not show a direct correlation between magnitude of event and time of travel. This can be attributed to complex river dynamics and storm patterns.

3.2 Watershed Control Program Strategies

The purpose of a WCP is to control sources of potential contamination to the supply source of a public drinking water system. In the case of the Skagit River Watershed and the program area defined in this document, obtaining or maintaining complete control of all potential contaminant sources is impossible due to the wide variety of land owners and uses present. In this situation, the goal of the WCP is not to control all potential contaminant sources, but to minimize the risk of potential contamination and the impact on the public drinking water supply if contamination does occur.

The information summarized in previous sections of this document is intended to provide a framework for the development and implementation of a WCP in the context of the Skagit River Watershed. The strategies presented in the following section are designed to provide the City and the PUD with the tools necessary to minimize the risk of contamination by flood or accident of the Skagit River within the program area, and respond appropriately to any event that could result in contamination of the public drinking water supply. A recommended schedule for implementation of these strategies is included in Appendix C.

3.2.1 Public Education

The most effective way to minimize the risk of source supply contamination in the program area is to educate the public about this risk. Land owners and users within the program area are most likely to cause an accidental spill; they are most likely to be the first point of contact with emergency management agencies by reporting a spill; and they are most able to prevent accidents through conscientious management of potential sources of contamination.

The following public education strategies are recommended for use in the WCP:

- Include a notice explaining the purpose and goals of the WCP in the annual consumer confidence reports published by the City and the PUD
- Give presentations at city and county council meetings to describe and explain the purpose of the WCP
- Coordinate public education efforts with community and non-governmental groups such as the Skagit Conservation District (see Section 2.5.5)
- Publish information about the WCP on the City and PUD websites
- Broadcast information about the WCP on public cable access channels

These public education strategies are cost-effective ways to inform water consumers about the potential risks to their drinking water supply, ways they can minimize risks, what actions should be taken in the event of a spill, etc.

Care should be taken, in explanation of the WCP and the potential risk of contamination of public drinking water, not to alarm the public. Rather, emphasis should be placed on the proactive and precautionary intent of the WCP.

3.2.2 Emergency Notification

Once an accidental spill occurs or a peak flow event becomes imminent, the focus of the WCP is to facilitate an appropriate response to protect the public drinking water supply. Timely notification of key personnel at the state and local levels is essential in this situation. As demonstrated in Section 3.1, travel times of contaminants to the City or PUD water intakes can be very short and will necessitate a prompt response to protect the public drinking water supply.

State law requires that DOE be notified when any amount of oil, regulated waste or hazardous material is released to the air, land or water[44]. If state waters are affected, both federal (National Response Center) and state (Washington Emergency Management Division and regional DOE office) spill response agencies must be notified. Notification may come from a variety of

[44] Chapter 173-303 WAC; Washington Department of Ecology, 2003, Emergency Spill Response Overview, http://www.ecy.wa.gov/programs/spills/spills.html

sources including the spiller or the person to identify a spill, local or state law enforcement or emergency personnel, or wastewater treatment plant operators. DOE determines the appropriate level of response to the spill and notifies state and local authorities as deemed necessary. As discussed in Section 2.4, DOE will notify local officials and emergency management personnel as appropriate. However, it is likely that plant operators may be notified by local officials or emergency personnel before DOE notification occurs.

In the case of a peak flow event, the National Weather Service notifies state and local emergency management agencies of potential flood conditions, and these agencies notify local jurisdictions as necessary. Obviously, local officials and plant operators may anticipate such an event prior to official notification and act accordingly.

This "top-down" approach to notification is problematic in terms of the amount of time needed to respond to an event and protect the public drinking water supply. The following strategies are recommended to address this problem:

- Inform local officials, emergency management personnel, law enforcement and others of their need to immediately inform City and PUD water treatment plant operators of accidental discharges to the Skagit River

- Create a clearly outlined notification system in cooperation with these agencies and incorporate the system into the City and PUD emergency response plans

Guidelines for the preparation of an emergency notification system and a list of potential contacts are included in Appendix D.

3.2.3 DOE Permit Holder Notification

A critical step in implementation of the WCP is to make the owners and users of PCS parcels aware of the potential risk posed by their parcel. To that end, the following strategy is recommended:

- Contact individuals listed as holders of the environmental permits issued by DOE within the program area (see Section 2.3.2, Exhibits 2-2 and 2-3) to describe and explain the WCP and explain to permit holders what they should do in the event of an accidental contaminant discharge.

A sample permit holder notification letter is shown in Appendix E.

3.2.4 Interlocal Agreements

Implementation of the WCP is dependent upon coordination among municipalities within the program area. The first step in fostering this coordination is to initiate communication with the governments of Burlington, Concrete, Hamilton, Lyman, Mount Vernon, Sedro-Woolley and Skagit County, as well as emergency management agencies, law enforcement, and other parties. The following strategy is recommended as a first step toward implementation:

- Enter into Memoranda of Agreement with municipalities, agencies and others to demonstrate the mutual understanding of the intent of the WCP and the roles each party will play in implementation of the WCP.

A sample Memorandum of Agreement is shown in Appendix F.

3.2.5 Cooperation

The key to success of this WCP is the development of cooperation among state and local agencies, municipalities in the program area, the City and the PUD. These parties must be made aware of the WCP and their active, on-going role in its implementation. The City and the PUD should be proactive in this effort.

Cooperation of the public is also important. As noted above, the public represents the first line of defense protecting the Skagit River and public drinking water supplies from accidental contamination. To ensure the success of the WCP, the City and the PUD must be take steps to help the public become informed about the WCP and involved in its implementation.

The following strategies are recommended to facilitate cooperation in the development and implementation of the WCP:

- Establish a Coordinating Committee consisting of members representing local agencies, governments and other interested parties to facilitate the on-going development and implementation of the WCP

- Utilize the knowledge, expertise and affiliations of the Coordinating Committee to find ways to facilitate the implementation of the WCP strategies provided in this document

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