

CHAPTER 5

WATERSHED CONTROL PROGRAM

The Town of Friday Harbor relies on surface water for its water supply. The Town has three water sources. To protect water supplies, the Department of Health (DOH) requires public water utilities to develop and implement a watershed control program as a component of their water system comprehensive plans (WAC Chapter 246-290-135).

The purpose of a watershed control program is to provide the Town of Friday Harbor with a proactive program for preventing source water contamination. A successful watershed control program consists of a number of components, which must be developed before the plan can be fully implemented. The major components of the plan are described below and form the basis of this chapter:

- A *delineated source water protection area* defined by the entire watershed up-gradient of the intake point. This includes the initial watershed plus any open conveyance mechanism and/or any storage reservoirs.
- An *inventory* within each source water protection area of potential sources of contamination.
- *Watershed control measures* to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.
- A description of *emergency provisions*.
- Documentation of *water quality trends*.

Friday Harbor monitors activities in watersheds that may affect source water quality. The watershed control program will be reevaluated at least once every 6 years. Changes that may affect the source water quality will be documented and recommendations made for improved watershed control.

WATERSHED DESCRIPTION AND INVENTORY

The watershed description and inventory provides site-specific information including location, hydrology, land ownership and activities that may adversely affect source water quality.

Location

The Town of Friday Harbor diverts surface water from watersheds in San Juan County, approximately 5 miles west of the Town. Friday Harbor has three surface water sources: Trout Lake, overflow from Lake 310 pumped into the Trout Lake watershed (AUG 1), and a seasonal diversion of water from a creek in Section 17 east of Trout Lake (AUG 2). Figure 5-1 presents the three watersheds.

Trout Lake. The Town's primary source of water is Trout Lake. A concrete dam that was originally constructed in 1928 forms the lake. The dam was raised to its present height of 37 feet in the 1950's and the lake has a surface area of approximately 60 acres when full. The Trout Lake watershed is located west of Town in an isolated, sparsely developed pocket and is surrounded by a steep drainage basin of approximately 840 acres. The Town owns approximately 570 acres in the Trout Lake watershed and prohibits development in the watershed.

Augmentation No. 1 (AUG 1). In 1979, the Lake 310 augmentation project (AUG 1) was constructed to supplement Trout Lake with additional surface water runoff. The project entailed construction of a small impoundment and pump station near the south end of Lake 310. The Lake 310 overflow is captured in the impoundment and pumped over a hill into Trout Lake Creek that drains into Trout Lake. The Lake 310 watershed includes approximately 190 acres of privately owned land. The watershed is in the remote mountainous interior of the island and is somewhat protected from significant development.

Augmentation No. 2 (AUG 2). In 1988, the Town constructed a second augmentation project (AUG 2), consisting of a stream diversion, a pump station and a force main. The diversion and pump station are located approximately a quarter mile northeast of the Town's Water Treatment Plant. Originally runoff water was pumped directly to the treatment plant. In 1994, the pump station was improved and a force main was constructed to allow the pumping of the runoff water back to the Trout Lake reservoir. The AUG 2 watershed includes approximately 3,850 acres of which the Town owns very little.

Hydrology

Trout Lake, AUG 1, and AUG 2 are highly dependent on rainfall for recharging the reservoir annually. The Town has experienced periods of drought in the past that have severely tested the capacity of the water supply system. Average monthly rainfall ranges from approximately 0.75 to 5 inches with an annual average of 27 inches (period of record: 1985 – 2001). Surface elevations range from 100 feet to 1,036 feet at Mt. Dallas, which is the highest point on San Juan Island.

Runoff throughout the county is low for Western Washington due to limited rainfall; small catchment areas; and coarse, porous glacial sediment over bedrock. However, runoff is high

Insert Fig 5-1.

proportionally due to the presence of bedrock and impervious soil layers. Runoff occurs primarily from December through March when soils are saturated and rainfall is heaviest. Runoff estimates indicate that 28 percent of average annual precipitation is not captured and becomes runoff. The Town's watershed is within the San Juan Island's False Bay watershed, which has the greatest volume of runoff for any basin in the county with over 3,154 acre-feet per year.

There are only seasonal streams in the Trout Lake watershed. The AUG 1 and AUG 2 catchment areas are seasonal streams that flow from west to east. Small dams at the catchment areas provide pools for the augmentation project pump stations. The AUG 1 Pump Station pipeline terminates just past the crest of the Trout Lake watershed. Water from the pump station flows down a seasonal creek channel (Trout Lake Creek) to the reservoir. The AUG 2 pipeline also terminates just over the crest of the Trout Lake watershed and once discharged the water flows down a ditch into the reservoir.

Land Ownership

The Town owns only a portion of the lands within its source water protection areas and the following description summarizes the land ownership within these areas (see Figure 5-2).

Trout Lake. The Town owns approximately 570 acres (70 percent) of the Trout Lake watershed adjacent to Trout Lake. The remaining area, approximately 270 acres, is privately owned and sparsely developed. The Town does not have the resources to purchase additional land within the watershed at this time. If future development presents a threat to water quality in Trout Lake, the Town may consider purchasing additional land. The San Juan County designated land uses in the Trout Lake watershed include Natural, Forest Resource, and Rural Farm Forest (San Juan County Planning Department, 2000 – Official Maps).

- Natural – Protects, conserves, and manages existing natural conditions and preserves the ecosystem in a natural state for the benefit of future generations without precluding compatible human uses.
- Forest Resource – Recognizes and protects the physical condition of forest resource lands that are conducive to the use of such lands for long-term commercial production. Residential density is limited to 1 unit per 20 acres.
- Rural Farm-Forest – Provides for rural living opportunity with parcel sizes generally 5 to 10 acres. Commercial and industrial uses are not allowed.

Augmentation No. 1 (AUG 1). The Town does not own any land in the AUG 1 watershed. This watershed is privately owned and designated land use includes a combination of Forest Resource and Rural Farm-Forest.

Augmentation No. 2 (AUG 2). The Town does not own any land in the AUG 2 watershed except for 10 acres around the diversion area. This watershed is privately owned and

Insert Fig 5-2.

designated land use includes a combination of Forest Resource, Agricultural Resource, and Natural and Rural Farm Forest with limits of 1 unit per 5 acres and 1 unit per 10 acres.

- Agricultural Resource – Designated and protected lands that are determined locally to be of long-term commercial significance for resource production. This land-use class recognizes and protects the physical conditions and characteristics of agricultural lands that are conducive to the use of such lands for long-term commercial production.

WATERSHED INVENTORY OF POTENTIAL CONTAMINANT SOURCES

An essential element of the watershed control program is an inventory of past, present and proposed activities that may pose a threat to water quality in the watershed protection areas. The contaminant source inventory considers existing and potential sources of contamination related to watershed activities and land use. This includes both point and nonpoint pollution sources. Within a watershed protection area, there are many diverse activities that may impact a water supply. It is important that these activities are properly inventoried and, if necessary, regulated to prevent degradation of the water supply. These activities may include land use and zoning practices, solid waste, wastewater and stormwater discharges, agriculture, underground storage tanks, septic tanks, and other types of contamination. A discussion of these practices and their potential impact on Friday Harbor's water supply are included in the following sections. More detailed information related to the watershed inventory is presented in the San Juan County Watershed Management Action Plan and Characterization Report completed in 2000 (see <http://www.co.san-juan.wa.us/health/wtrshdpln/>).

Friday Harbor's watersheds are relatively isolated and sparsely developed. Based on land ownership and zoned uses, the primary potential contaminant concerns relate to agricultural land use, residential development and associated septic systems. Due to its nature, the DOH designates all surface water supplies as Highly Susceptible. Figure 5-2 presents land ownership and uses.

Recreation

The Town restricts access to Trout Lake. There is a locked gate on the road to the lake. There are no sanctioned recreational opportunities allowed in the Trout Lake watershed.

Septic Tanks

Contamination from on-site septic systems in the watershed is of concern. Properties with failing septic systems located near a stream channel or natural drainage present the greatest potential for sewage contaminants (bacterial, chemical and nutrient agents) entering surface waters that will drain into the Trout Lake or one of the Augmentation project pump stations.

The San Juan County Health & Community Services Department (HCSD) regulates on-site septage activities. Overall, the drainage basin contains fairly shallow soils with high clay and rock content. Many of the older septic systems in the drainage basin are gravity systems, which are not the most suitable type of system for shallow clay soils. On-site systems installed prior to 1972 did not require permits, which makes these systems the most difficult to locate and assess. The HCSD is currently working to update septic permit records and plans to develop an on-site septage operations and maintenance program to ensure systems are properly designed, installed, and maintained in the future.

Development

Nonpoint pollutants commonly associated with residential land use include sediment, nutrients, oxygen-demanding substances, pathogens, hydrocarbons, heavy metals, and toxins. Common household pollutants include paints, solvents, lawn and garden care products, detergents and cleansers, and automotive products such as antifreeze and motor oil. The use and disposal of these products are chronic sources of pollution. The care of landscaped areas through the application of fertilizers and pesticides can be detrimental to surface waters and receiving marine waters. In addition, the proximity of sources to water bodies may result in increased loadings.

Agriculture

Agricultural uses exist in the False Bay watershed, which includes the Friday Harbor watersheds and lands south of the Friday Harbor watersheds. The Agricultural Resource lands are located in the AUG 2 watershed. However, more land is being converted to rural-residential use with farming occurring on smaller acreages. Livestock operations may include sheep, cattle, and horses. If not properly managed, agriculture operations can contaminate surface water. Contaminants can include, but are not limited to, sediment from soil erosion, nutrient loading, microbiological, and chemical. Farming activities that can cause water quality problems include poor pasture management, chemical use, poor management of animal wastes, unlimited animal access to surface waters, and over grazing in wetlands and other sensitive terrestrial habitats.

Forestry

Forestlands comprise over 70% of the land area in San Juan County and a large portion of the Town's watersheds. Local timber harvested may be used for sawlogs, pulpwood, export logs, and firewood. Without proper management, timber harvesting and subsequent site preparation activities have the potential to adversely affect water quality through increased soil erosion and sedimentation, soil compaction, and water temperature increases, as thermal cover is removed.

Erosion

Elevated erosion and increased sediment loading result from the movement of soil by water and wind. Concerns due to soil erosion are the migration and deposition of soils into surface waters,

with subsequent stream channel and substrate degradation. Sediment from nonpoint sources is the most widespread pollutant of surface water. Total suspended solids and turbidity are water quality indicators relating to sediment, but the effects of sediment on ecosystems can also be characterized. In addition, pollutants, such as bacteria, nutrients, and organic material, can adhere to suspended particles.

The erosion potential of areas within the watersheds is dependent on the local soil characteristics and underlying geology of the area. Areas in the watershed have a high potential for erosion due to local physical features of topography, altitude, slope exposure, and vegetative cover.

The San Juan County Watershed Management Action Plan identified that upland areas in the False Bay watershed, which includes the Friday Harbor watersheds, may have high erosion potential but specific areas were not identified.

Roads

Roads are potential sources of contamination to surface waters through their potential for spills, construction and maintenance activities, and general vehicular traffic that can introduce chemicals and sediments from roadways. Excessive erosion and sedimentation can introduce suspended solids, nutrients and metals into adjacent streams and lakes. County or rural roads that are unpaved or have gravel shoulders can contribute sediment, nutrient, and metal loading into tributaries and nearby streams. Normal vehicular traffic can contribute oil and grease and gasoline into the watershed.

Traffic in the watersheds is relatively low as there are no significant tourist destinations, and few major roads are located in the watersheds.

Solid and Hazardous Waste

These wastes, if not managed correctly, can pollute surface and groundwater with hydrocarbons, heavy metals, toxic organic chemicals, and/or pathogens. Proper management is essential for reducing or eliminating the potential water quality pollution from these waste streams. Management includes the use, collection, storage, transportation, transfer, treatment, and disposal of the waste material. Solid waste includes garbage, rubbish, ashes, industrial wastes, demolition and construction debris, and abandoned vehicles. San Juan County currently relies on "long-hauling" all its solid waste off the islands for disposal. Transfer stations collect and store the waste until the material is transported to the mainland for disposal.

Hazardous wastes are defined as all flammable, toxic, corrosive, and reactive waste generated by residences and businesses. The county and town offer regular hazardous waste round up, allowing individuals to properly dispose of these wastes for free or at minimal cost.

Accidental Spills

Accidental spills or releases of contaminants can potentially impact water supplies. Potential sources of spills and leaks include underground storage tanks, accidents, and poor disposal practices. The watersheds do not have commercial or industrial activities, and Beaverton Valley, Westside, Egglake and Wold roads are the only major roads that pass through the watersheds. As a result, accidental spills are likely to be a minimal threat.

Confirmed and Suspected Contamination Sites

Under the Model Toxics Control Act Cleanup, WAC 173-340, The Department of Ecology is responsible for ensuring all hazardous waste sites are properly remediated. This includes confirmed and suspected sites of contamination as well as LUSTs. A separate inventory for each, which includes the status of cleanup efforts, is maintained by Ecology. There are no confirmed or suspected contamination sites located within the Friday Harbor watersheds.

The San Juan County Watershed Management Action Plan and Characterization Report summarizes land use, critical management areas, nonpoint source pollution risk, and management priorities for the False Bay watershed, which includes the Town of Friday Harbor watershed protection areas (Table 5-1).

Table 5-1. Priority Watershed Conditions Identified for the False Bay Watershed in the San Juan County Watershed Management Action Plan (2000).

Current Land Use	False Bay
Agriculture	12%
Timber Land	30%
Conservation	18%
Residential parcels	23%
Public Lands	
Critical Management Areas	
Designated Growth Areas	No
Upland Native Ecosystem	Yes
Critical Marine Habitat	Yes
Surface Water Resource Area	Yes
Research/Education Areas	Yes
Nonpoint Source Pollution Risk	
Onsite Sewage Systems	Med
Agricultural Practices	Hi
Forestry Practices	Med
Conversion of Resource Lands	Hi
Marinas and Recreational Boating	Med
Stormwater Run-off	Hi
Solid/Hazardous Waste	Med
Management Priorities	
Marine Habitat Management Area	3
Water Resource Protection Dist.	3
Riparian Restoration/Preservation	3

Wetland Restoration/Preservation	3
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Note: This information corresponds to a larger watershed that includes the Town of Friday Harbor's watershed protection areas.

Inventory Data Sources

The inventory of potential contaminant sources was compiled using the following data sources:

- *San Juan County Watershed Management Action Plan and Characterization Report.* June 2000. www.co.san-juan.wa.us/health/wtrshdpln/index.html
- Washington Department of Health, Division of Information Resource Management. Geographic Information System Data. This source maintains information from regulatory programs, including Department of Ecology databases. ww4.doh.wa.gov/gis/
- *San Juan County Comprehensive Plan, Land Use and Shoreline Master Program.* October 2000.

WATERSHED CONTROL MEASURES

This section of the watershed control program describes how the Town of Friday Harbor, in coordination with other local agencies, monitors and manages activities and land use to minimize or eliminate source water quality impacts. Friday Harbor does not own all the land within its watershed and must also rely on other local entities with land use authority.

Land Use Restrictions

- The Town of Friday Harbor restricts access to and recreation on Trout Lake.
- San Juan County currently relies on "long-hauling" all its solid waste off the islands for disposal.

Regulation of Agriculture, Timber Harvesting, and Construction Practices

- The Department of Ecology assumes the primary enforcement role to ensure that agricultural operations do not degrade water quality. Ecology's enforcement is triggered by documented water quality degradation, and usually initiated by a complaint. Generally, enforcement actions are used as a last resort only. Farm owners are encouraged to work with the Natural Resources Conservation Service (NRCS) and the local Conservation District to develop and implement farm plans and Best Management Practices (BMPs) to protect water quality.
- Under RCW 84.34, the County has the authority to regulate timber harvest under the Timber-Open Space program. The County also has land use authority in the conversion of forestland to residential and other uses.

- Washington State's Forest Practices Rules and Regulations are written to address logging operations statewide. However, the San Juan Islands have unique characteristics that are worth noting. First, Chapter 222-3-110 WAC, Timber Harvesting on Islands, applies to all of San Juan County. This regulation restricts clear-cut harvesting within 200 feet of a marine shoreline and limits clearcuts to a maximum of 40 acres with 200 foot between adjacent harvest units in the San Juans. Many of the streams and creeks in the San Juan Islands did not meet the Forest Practice Act protection minimums based upon stream types. According to the Forest Practices division of the Washington State Department of Natural Resources, emergency rules governing Class IV and V streams are currently in effect. These rules require that all Class IV and V waters that are two feet or wider between ordinary high water marks and have a gradient of less than sixteen percent be treated as Class III streams.

Inspection, Surveillance, and Monitoring

- Friday Harbor conducts daily water quality monitoring in the Trout Lake watershed, primarily at the raw water intakes.

Contamination Source Controls

- In 1998, the county adopted the Department of Ecology's "Stormwater Management Manual for Puget Sound Basin" (SSM) as part of the county's Unified Development Code. Under county regulations, all new development and redevelopment must conform with the SSM. Class IV General and COHP forest practices must meet the stormwater requirements of the county's Unified Development Code. "Small parcel developments" that create less than 5,000 square feet of impervious surface must develop an erosion and sediment control plan or illustration, and utilize Best Management Practices to deal with stormwater. All other regulated developments under county jurisdiction are required to prepare and submit to the county a Stormwater Site Plan that analyzes potential water quality impacts, the effectiveness of proposed Best Management Practices, and an erosion and sediment control plan.
- The Town of Friday Harbor formed a stormwater utility in 1992 and adopted a Stormwater Management Plan in 1997. This plan describes deficiencies in the existing stormwater system, recommends system improvements, and identifies Best Management Practices for new developments. The Town funds improvements to the stormwater system through an assessment of landowners with developed parcels.

Public Education

Friday Harbor leads community education programs in the Trout Lake Watershed.

- The San Juan County Extension Service implements education programs regarding information on farm and home water quality problems and management (FarmAssist, HomeAssist).
- The Stewardship Network Coalition coordinates educational, environmental groups, projects, monitoring, and data sharing.
- Town staff members have conducted Water and Wastewater System Tours for 5th grade classes each fall since 1999. Classroom presentations are combined with tours of Trout Lake Watershed, the Water Treatment Facility, and the Wastewater Treatment Facility. More information on the current and future school programs can be found in the Town's 2001 Water Conservation Plan.
- The Town Water Conservation Office provides display materials and other information and advertising at several community events throughout the year. More information on these community events can be found in the Town's 2001 Water Conservation Plan.
- Publication of a water conservation message in local newspapers, real estate publications, etc.

Watershed Control Activities

San Juan County has identified the following watershed control activities in their 1997 Watershed Control Program:

- Establish sanitary control area adjacent to the AUG 1 and AUG 2 diversions. Identify other potential high-risk areas in the watersheds that can be designated as part of a sanitary control area. Establish buffer areas (from 50 to 100 feet to protect the diversions and other vulnerable areas in the watershed.
- Establish startup procedures for the AUG 1 and AUG 2 pump stations that include water quality monitoring criteria.
- Establish communication with San Juan County to keep abreast of commercial and residential development within the watersheds.
- Contact land owners in the watershed with an informational letter identifying the Town's use of runoff water from their area and mention activities that could potentially affect the water quality of the Town's source of supply.
- Conduct a sanitary survey of the watersheds through a combination of direct inspection and questionnaires to area landowners. Establish a map of potential sources of contamination.

- Develop a public awareness program to educate landowners about activities in the watershed that could be detrimental to the water quality.

SYSTEM OPERATION AND EMERGENCY PROVISIONS

The following section summarizes the operation, maintenance and emergency provisions for the Town's water system.

System Operation

The system operation ensures that water delivered to customers continuously meets drinking water regulations. Key system components are described in more detail in Chapter 3. Brown and Caldwell conducted a water quality and treatment audit in 2000. This audit provided recommendations for alternatives to address potential issues with disinfection by-products and seasonal taste and odor. These recommendations identified relatively simple modifications and, after implementation, the consideration of more complex studies only if they are necessary (see January 22, 2001 letter from Brown and Caldwell to Mr. Mike Wilks in Exhibit A at the end of this Chapter).

Emergency Response

In order for emergency response procedures to be effectively executed, coordination, cooperation, and communication among the responding agencies, organizations, and individuals is imperative. There are emergency response organizations at the local, state, and federal levels. Depending on the magnitude and type of the release, any of the following organizations may be involved in emergency response for a watershed protection area in Washington State.

- Department of Ecology (DOE): The Spill Response Team is responsible for determining the source and cause of the release, and responsible party. If the responsible party is unknown, DOE will investigate to determine who is responsible and ensure that containment, clean up, and disposal proceedings begin. The DOE's 24 Hour Spill Response can be contacted at (360) 753-2353.
- Department of Health (DOH): The Department of Health is developing a set of standard operating procedures in conjunction with organizations such as DOE's Spill Operations Section and the Association of Fire Chiefs that first responders can use in watershed protection areas, critical aquifer recharge areas, and other sensitive groundwater areas. DOH also provides assistance through laboratory support and services if necessary to the clean-up effort. The DOH After Hours Hotline for Water System Operators is (877) 481-4901. Other inquiries can be directed to the DOH's Northwest Drinking Water Operations Office: (253) 395-6750
- Department of Transportation (DOT): The Washington State DOT can provide spill response assistance through traffic control, equipment, and personnel for non-

hazardous clean-up activities on state and interstate highways. The WSDOT Environmental Program Office can be reached at (360) 705-7100.

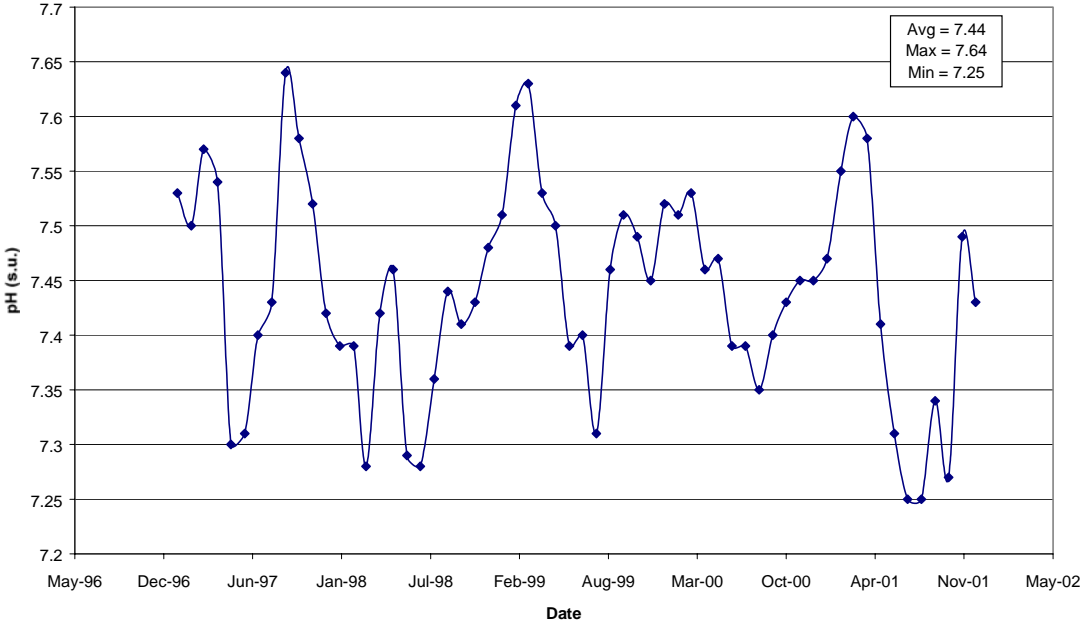
- State Patrol: The state patrol is responsible for managing spills on interstate and state highways. Response will be initiated through the local fire department.
- Local Fire Department: Initial response to a hazardous spill will be from the local fire department. The following contacts can be used for emergency situations:

Friday Harbor Fire Department: (360) 378-4183
 Fire District 3: (360) 378-5334

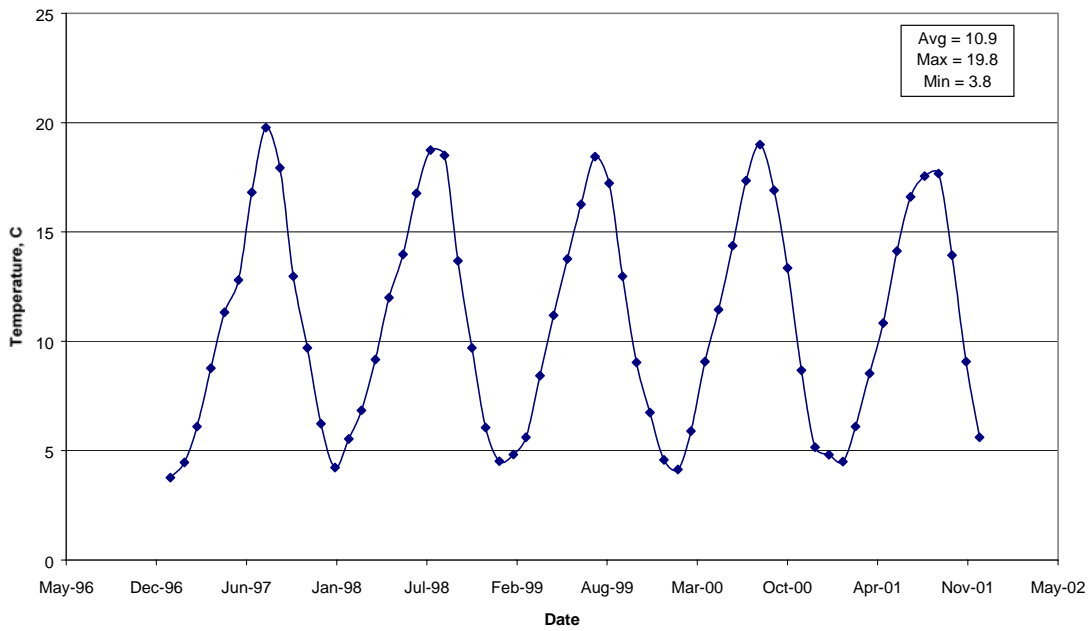
WATER QUALITY TRENDS

The Town of Friday Harbor monitors physical, inorganic and organic constituents in its source water supply. Chapter 3 presents more detail on the source water monitoring. Results of these monitoring activities are presented in Figures 5-3 through 5-7 below.

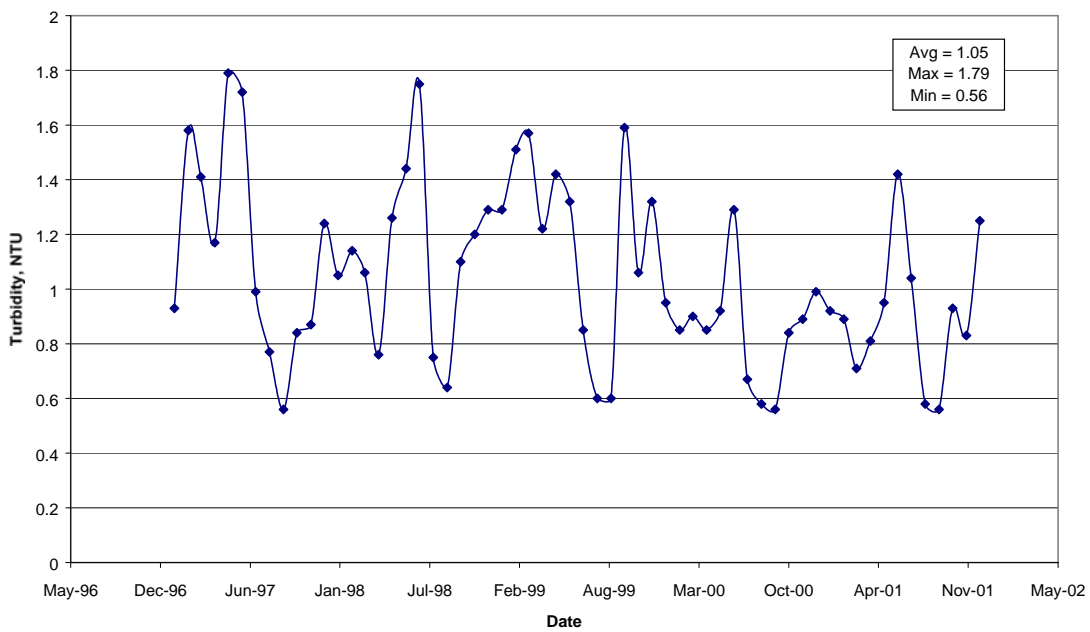
**Figure 5-3. Town of Friday Harbor
Raw Water Quality, pH**



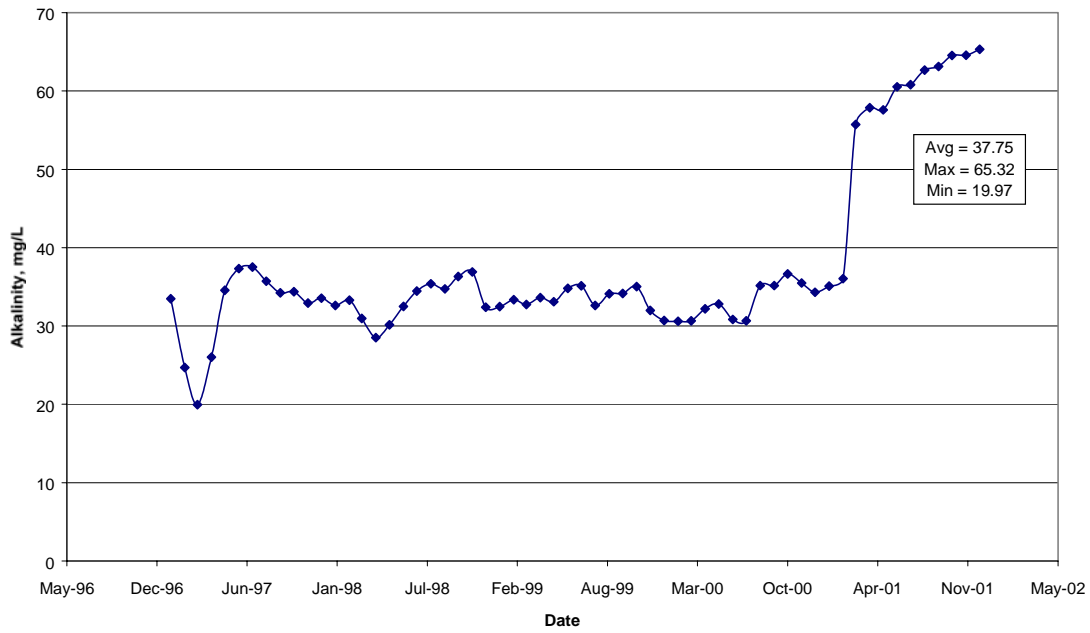
**Figure 5-4. Town of Friday Harbor
Raw Water Quality, Water Temperature**



**Figure 5-5. Town of Friday Harbor
Raw Water Quality, Turbidity**



**Figure 5-6. Town of Friday Harbor
Raw Water Quality, Alkalinity**



**Figure 5-7. Town of Friday Harbor
Raw Water Quality, Bacteriological Data**

