

CHAPTER 4

CONSERVATION PROGRAM AND SOURCE OF SUPPLY ANALYSIS

The focus of water system planning is to develop a system capable of delivering adequate quantities of high quality water supply to its customers. One key element of the planning process is the development of an effective and realistic conservation program. The Town of Friday Harbor must be able to reliably supply water to a growing population. A water conservation program consisting of both demand and supply strategies can reduce the effects of increased demands on water supply resources, and thus extend their usable capacity. Demand strategies include conservation devices such as shower flow restrictors, low flush toilets, and reductions in irrigation. Supply strategies reduce water system demands through improved system efficiency, reduced distribution system leakage, meter calibration, and rates adjustments.

Required Conservation Plan Elements

The Department of Health (DOH) requirements for a Conservation Plan are listed in Table 4-1. In addition to the requirements for water use data collection and water demand forecasts, the DOH requires the implementation of conservation measures to include source meter installation and program promotion at a minimum.

The Conservation Planning Requirements were published by the DOH in March 1994. These requirements present guidelines for public water systems regarding water use reporting, demand forecasting methodology, and conservation programs. This document establishes varying conservation implementation requirements based on the number of connections served by the water system. All public water systems, regardless of size, are required to conform to the following format for their conservation plan:

1. Water Use Data Collection Requirements
2. Water Demand Forecast
3. Conservation Program
 - Conservation objectives
 - Evaluation of conservation measures
 - Identification of selected conservation activities

Table 4-1. Required Conservation Plan Elements for All Systems

Measure	Recommendation/Definition
Water Use Data	Systems must report the best currently available data on water use.
Water Demand Forecast	Systems must develop a complete forecast, including an estimate of reduction of water use from implementation of water conservation measures.
<p>Conservation</p> <p><u>Conservation Objectives</u></p> <p>Required Conservation Measures</p> <p>Program Promotion</p> <p>Source Meters</p> <p><u>Selected Conservation Activities</u></p> <p>Description</p> <p>Schedule</p> <p>Budget</p> <p>Monitoring Requirements</p> <p>Target Water Savings Projections</p>	<p>Goals and objectives designed to meet the needs of the water system must be identified.</p> <p>Publicize the need for water conservation through television and radio public service announcements, news articles, water utility bill inserts, or other means.</p> <p>Install source master meters for all sources and maintain a periodic meter testing and repair program.</p> <p>Provide a description of conservation measures being implemented including required measures.</p> <p>Provide a schedule of when the conservation measures will be implemented, with emphasis on the six-year implementation schedule.</p> <p>Provide a projected budget for each selected conservation measure.</p> <p>Provide a description of how the system will monitor the results of its conservation measures.</p> <p>Provide a percentage savings goal based on the measures chosen for implementation.</p>

Water Use Data Collection Requirements

The water use data collection requirements established in the Conservation Planning Requirements are summarized in Table 4-2.

Table 4-2. Water Use Data Collection Requirements

Water Use Data	Requirement	Town of Friday Harbor
Source of Supply Meter Readings	Read daily, Report Monthly and Annual Totals	Read and Record Daily
Emergency Interties-Amount Imported/Exported	Collect Monthly Total	N/A
Peak Day/Peak Month	Collect Each Year's Peak Day and Month Totals	Calculate from Source of Supply Meter Readings
Lost and Unaccounted for Water	Annual	Generate Monthly Reports
Accounted for Water	Annual	Generate Monthly Reports
Service Meter Readings	Collect Monthly Total	Monthly Collection of Service Meter Readings
Population Served	Annual	Document estimates Based on Existing Data
Economic Data	Existing Water Rates	Available from Existing Data/Ordinances
Conservation Data	Annual	Document type of measure, level of implementation, duration, and date begun

CONSERVATION PROGRAM

In August of 2001, the Town of Friday Harbor finalized its Water Conservation Plan (WCP). The following information is taken from this report's Executive Summary. Further details of the Town's Water Conservation Plan, source of supply analysis, and recommended water conservation program measures can be found in the 2001 WCP.

Background

In 1912, Town officials believed that economic development and growth would outpace available water supplies and declared, “the future of Friday Harbor depends on good water and sewage systems.” This quote is as true today as it was then. However, during portions of the year, there is a limited supply of this precious resource due to two seasonal influences.

San Juan Island is situated in the rain shadow of the Olympic Mountain Range. Because it is an island, there are no rivers bringing in water from melting snow packs and other upstream sources. Therefore, Trout Lake Reservoir depends solely upon precipitation for recharge.

Because the island lies in a rain shadow, precipitation is historically limited during the dry season, which varies in length, and can occur anywhere from April through October. This corresponds to the period that Augmentation 1 and 2 watersheds *cannot* be tapped due to restrictions on water rights. An analysis of precipitation and reservoir level data illustrates that rain falling during April through October does not increase the reservoir level. Increased human consumption, evaporation, and watershed absorption effectively offset rainfall during this period.

A second seasonal factor is the economically important visitor population bulge that dramatically impacts the Town’s infrastructure and nearly doubles daily consumption of water. This seasonal population increase occurs during the same months that San Juan Island historically experiences little rainfall. Thus, periods of high demand correspond to periods of low water supply.

Water conservation methods as outlined in the Town’s Water Conservation Plan effectively target this period of low supply and peak demand.

In calendar year 2000, the Town used 67.2 percent of its capacity to provide water. When 85 percent is reached, the Town’s *1999 Comprehensive Plan, Capitol Facilities Element* CFE-50 recommends decreasing demand and/or increasing supply. A dam raising the level of Trout Lake Reservoir has been considered. However, the cost of this project was estimated at over 3 million dollars (KCM, 1997.)

Focused water conservation programs outlined in the 2001 Water Conservation Plan will achieve a 10-20 percent savings in water use, which will translate into a significant deferral of capital investments, allowing more time to effectively plan and save for needed infrastructure improvements. Water consumption has already seen a declining trend since 1998, and will hopefully continue to decline on a per capita basis.

The 2000 population of the Town of Friday Harbor was estimated at 1,957 (as of April 1st) as per Washington State’s Office of Financial Management (OFM). These individuals, plus out-of-town customers, must bear the burden of rate increases to cover the rising costs of system operation, maintenance, and improvements. By capitalizing on water in effect ‘purchased’ by water conservation programs, ratepayers may be protected from immediate, extreme rate increases otherwise needed to fund infrastructure improvements.

Legally, the Town of Friday Harbor must plan for and provide adequate water to supply basic customer and fire suppression needs during periods of peak use. Therefore, enough water must be

available to supply all hookups and to prevent potential fires during the busiest and driest season, regardless of how much water is running over the spillway during the wettest of winters.

According to RCW 35.92.010 "*Municipal Utilities-Authority to Acquire and Operate Waterworks,*" the Town is obligated to provide a safe and reliable supply of water as efficiently as possible. These responsibilities extend to current customers, as well as to undeveloped lots within town boundaries. Effective water conservation programs outlined below and discussed in the 2001 Water Conservation Plan help keep rates affordable, while saving water for future development within the limits.

Summary of Recommended Water Conservation Plan

The 2001 Water Conservation Plan takes a long-term approach to water conservation and targets all classes of water users. Industry cost-benefit analyses of commonly used water conservation programs, combined with local data, will be used to prioritize each year's expenditures.

A minimum of five years of data is necessary to analyze the actual effectiveness of programs. The Town will be able to begin this type of analysis in 2003. Meanwhile, an industry rule of thumb is:

- Up to 10 percent conservation is achieved by voluntary methods,
- Up to 20 percent conservation is achieved by regulatory or mandatory methods
Examples - Plumbing and Building Code Amendments
Landscaping Ordinance,
- Up to 30 percent conservation is achieved by severe mandatory restrictions, Example
- Instituting the Town's current *Water Shortage Response Plan* (see section below).

Currently, the Town has implemented the following water conservation measures:

- Short-term emergency conservation planning ordinances have been passed by the Town Council,
- Distribution of promotional conservation items, including letters indicating immediate measures to be taken during drought conditions,
- Education of conservation measures through the Town's technical assistance program,
- Distribution of billing history to show increase/decrease in water usage from year-to-year,
- Installation of meters on all of the Town's water sources and individual service meters,
- Promotion and distribution of efficient showerheads and toilet tank flow restrictors to single family residences and high use commercial customers,
- Enacted seasonal rate water conservation pricing.

Certain programs, such as fixture replacement, when combined with Plumbing and Building Codes requiring the installation of low flow fixtures for all remodels and new construction, can reasonably be phased out as the majority of older toilets, for example, are replaced with ultra low flush models.

Other programs, such as leak detection, weather forecasting, and assessing improvements in water conservation technologies, can reasonably be seen as ongoing, with funds allocated per year as for weather forecasting and technology assessment, and averaging every three years, as for leak detection.

Shaping attitudes toward water and the use of this resource has proven to be one of the most effective methods of conservation. Target audiences, such as local 5th grade classes, high school biology classes, new homeowners, and seasonal ‘visitors’ are constantly changing. Therefore, education programs, including audits, can also be thought of as ongoing.

This plan follows the *Conservation Planning Requirements* published by the Washington State Department of Health (DOH). The following criteria from the Environmental Protection Agency’s *Water Conservation Guidelines* were also used in the development of this plan:

- Cost Effectiveness
- Program costs
- Ease of implementation
- Consistency with other programs
- Ratepayer impacts
- Legal issues or constraints
- Regulatory approvals
- Public acceptance
- Staff resources and capability
- Environmental impacts

In summary, water conservation is a viable method of purchasing additional water, a finite resource that is in seasonal short supply. The Town’s investment in effective water conservation programming will pay off because the cost is magnitudes less than the \$3,000,000 needed for a dam improvement project.

However, a future balloon payment for infrastructure improvements is likely inevitable, especially if the Town is to continue to expand its customer base and its visitor shoulder seasons.

Implementation of water conservation programs and resource demand management will delay costly capital improvement projects, allowing more time for funding sources to be negotiated, and in return shielding constituents from dramatic and immediate rate increases. Funding the programs outlined in the Water Conservation Plan will benefit not only the Town of Friday Harbor but also, more importantly, the citizens that the Town serves.

WATER RIGHTS EVALUATION

Surface water is the sole source for the water supply accessed by the Town of Friday Harbor. Trout Lake Reservoir, the initial and primary source, is approximately five miles west of the Town in an isolated, undeveloped pocket fed by a steep drainage basin. The Town owns approximately 570 acres of the surrounding watershed that totals approximately 840 acres, and has a water right for 497 acre-feet per year from Trout Lake.

In 1979 Augmentation 1 (AUG 1) was constructed to supplement the reservoir with additional surface run-off. A dam was built near the southeast end of Lake 310 to collect water from a 190-acre watershed. Water captured is then pumped over a hill and into Trout Lake Creek, which drains into the northwest end of Trout Lake. The Town does not own the watershed, but has primary water rights for a 440-gpm instantaneous withdrawal and an annual withdrawal of 78 MG (240 acre-feet) from October 1 to April 15.

Augmentation 2 (AUG 2) was built in 1988 and consists of a stream diversion, pumping station, and force main. Water from a 3,850-acre watershed is funneled through a weir and pumped to the reservoir just above the dam. The Town owns secondary water rights and may withdraw 1,350 gpm instantaneously from November 1 to April 15 for a total annual withdrawal of 240 MG (736.5 acre-feet).

The sustainable yield of these combined sources (including dead storage) is 193 MG, and 168 MG without dead storage. As discussed in Chapter 3, this sustainable yield should be sufficient until the year 2046 for the Town's consumption, and 2038 for the Town's production. 85 percent of the sustainable yield from the above mentioned water rights will be reached in 2022 (see 2001 WCP for more details). Certificates for the water rights mentioned are included in Appendix B.

SOURCE OF SUPPLY ANALYSIS

This information is discussed briefly in the above section, and included in detail in the 2001 Water Conservation Plan.

WATER SUPPLY RELIABILITY ANALYSIS WITH WATER SHORTAGE RESPONSE PLAN

Due to the hydrologic conditions discussed above, the Town's water supply is particularly vulnerable to cyclical droughts. During the last 20 years, the Town experienced three 50-year droughts. A 50-year drought is expected by the USGS to occur only once every 50 years. Local droughts of this magnitude occurred in 1978, 1988, and 1993-94, the last of which was declared a State level emergency.

The Town was required to develop a Water Shortage Response Plan (WSRP), which defines levels of emergencies and measures to be taken. The Town adopted its Water Shortage Response Plan in

1988. The WSRP is included in Appendix E, and defines the official level of water shortages, the steps the Town must take to inform the public, and outlines limited and/or prohibited public water uses as well as fines and enforcement procedures.

To implement the WSRP, the Town enacted Ordinance 1083, which has now been codified. Chapter 13.16 of the Friday Harbor Municipal Code, *Emergency Water Restrictions*, accompanies the above plan in Appendix E and was revised in 1998.

The Town's water supply reliability in terms of source, (i.e. water quality and quantity) and facility reliability is discussed in detail in Chapter 3.

INTERTIES

No interties exist for the Town of Friday Harbor.