"Water is a precious Islands' resource, please use it wisely."

Water Conservation Plan

Volume 2 of the
Town of Friday Harbor
Comprehensive Water System Plan Update

Final
August 2001

Water Conservation Plan

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Map of the Town's Water System by Warren Jones.

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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, yet during portions of the year, we have a limited supply of this precious resource due to two seasonal influences.

San Juan Island is situated in the rain shadow of the Olympics. 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 outlined in this plan will effectively target this period of low supply and peak demand.

In calendar year 2000, the Town used 67.2% of its capacity to provide water. When 85% 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 this plan will achieve a 10-20% savings in water use which translate into a significant deferral of capital investments, allowing more time to effectively plan and save for needed infrastructure improvements.

The 2000 population of the Town of Friday Harbor was estimated at 1,989 as per WA State's Office of Financial Management . 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 in this plan help keep rates affordable, while saving water for future development within the Town limits.

Part 1 of this Plan provides further background detail, including a description of the Town's water sources and system, the hydrological and demographic factors influencing the water supply, and pertinent legislation and planning guidelines.

Summary of Recommended Water Conservation Plan

Part 2 of this plan outlines specific water conservation and demand management programs and measures. **<Funding Potential>** indicates the possibility of obtaining funding through grant applications.

- Recommended Programs or Measures have been prioritized as important.

- Potential Programs or Measures provide ideas for future implementation.

- Current Programs or Measures are presently being implemented.

- Information Required identifies weak links in the necessary data chain.

- Recommended Town Council Action refers to upcoming State legislation.

This 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 after 2001 (refer to Chapter 11, Data Collection and Demand Management). Meanwhile, an industry rule of thumb is:

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

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 WA 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
- Rate payer impacts
- Legal issues or constraints
- Regulatory approvals
- Public acceptance
- Staff resources and capability
- Environmental impacts

In 1999, DOH approved the Town's *Compreh* *te* with the condition that current levels of water conser xpand. The next scheduled update of the water syste d must contain a Water Conservation Plan, that must th ent will be revised and updated as necessary to satisfy

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 plus 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 ratepayer base and its visitor shoulder seasons. Typically, the cost of construction increases at a rate similar to inflation, thus no true savings are incurred by building sooner rather than later.

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 this plan will benefit not only the Town of Friday Harbor, but more importantly, the citizens that the Town serves.

Introduction

As the Town's population grows and visitor shoulder seasons expand, our water resources are going to have to go further in order to meet increasing demands. The dollars lost in revenue to the Town due to conservation are but drops in the bucket when compared to the cost of raising the dam. Conservation represents the least costly source of water for current and future needs.

According to Maddaus, 1987, there is no universally accepted definition of water conservation. The US Water Resources Council defines water conservation as "activities designed to:

1) reduce the demand for water,
2) improve efficiency in use and reduce losses and waste of water,
3) and improve land management practices to conserve water."

The importance of water conservation and demand management have long been acknowledged by Town of Friday Harbor elected officials and the citizens they serve, as well as by Washington State legislators and state agencies. Water conservation has become an increasingly important part of overall Town planning, and dovetails with many County and State level efforts. Refer to Appendix A for a description of these relationships.

This plan is divided into three parts:

Part 1 gives pertinent background information by briefly describing the Town of Friday Harbor's water system, listing the hydrological and demographic factors that influence the Town's water supply, and summarizing state legislation requiring and/or supporting water conservation.

Part 2 describes ongoing and proposed water conservation and demand management programs and measures.

Part 3 provides a list of acronyms and definitions, a list of references, a bibliography, and appendices.

The following goals, policies and objectives are taken from Town of Friday Harbor planning documents and provide a basis for Part 2 of this plan, Water Conservation Programs and Measures.

Goals

The following goals and policies relating to water conservation are taken from pages 6-70, 71 and 73 of the Town's *1999 Comprehensive Plan, Capitol Facilities Element.*

CFE-34 To develop and maintain a safe, efficient, and cost-effective water supply treatment and distribution for Friday Harbor.

CFE-35 To promote water conservation as a means to ensure protection and availability of Friday Harbor's water supply.

CFE-37 To encourage the research and use of water conservation technology.

CFE-38 To exhaust potential cost effective conservation measures before seeking new resources.

Policies

CFE-39 Friday Harbor should establish water conservation measures that apply to both water supply development and water use.

CFE-40 Friday Harbor should consider and support the best available options for water sources and supply to ensure that its citizens have adequate and reliable supplies of drinking water.

CFE-42 Friday Harbor should review and implement all viable methods of conservation, including but not limited to –

- water efficient devices.

CFE-43 Friday Harbor should establish a Conservation Program Manager to –

- collect, maintain and distribute conservation information;
- educate the public on new conservation technology;
- evaluate conservation systems;
- encourage the public to adopt conservation measures.

CFE-44 Friday Harbor should explore utility rate structures that encourage conservation.

CFE-45 Friday Harbor should encourage the voluntary adoption of conservation measures and purchase of conservation devices through education and incentive programs.

CFE-47 Friday Harbor should revise its land use, development and building regulations to encourage water conservation. Measures should include, but not be limited to –

- point-of-use demand management and water meters,
- water-efficient landscaping.

CFE-52 Friday Harbor should favor conservation measures over the acquisition of new resources.

Water Conservation Program Objectives

The objectives listed below and following quotes are taken from the Town of Friday Harbor's current *Comprehensive Water System Plan Update.* The objectives appear as amended by the Planning Commission during the 1999 Water Demand Management Work Session.

- Attain maximum efficient utilization of current water supplies resulting in financial savings achieved through the deferral of capital investments.

- Develop a program to inform all water customers, including visitors, how to use water efficiently.

- Reduce peak monthly and total annual consumption.

- Establish a means of incentive to conserve water.

- Promote long term efficiency with accelerated conservation on a short term basis.

"The Town of Friday Harbor is committed to implementing stringent conservation measures over the next 20 years to minimize costs associated with developing additional sources of water supply and treatment capacity."

"In the immediate future it is unlikely that additional sources of supply will be incorporated into the water system to meet anticipated increased demand. Friday Harbor must therefore rely on existing sources."

"Expansion of the source capacity can be delayed if conservation measures show a long-term reduction in water use or if the Town can accept more frequent periods when water conservation measures must be enforced."

"The Town's conservation efforts will also focus on limiting peak-day demands. The Town's goals are to reduce peak flows by 10 percent over the 20 year planning period."

In conclusion, past elected officials and appointed members of the Town's Planning Commission have long considered water conservation to be imperative, thus the maxim:

"Water is a precious Islands' resource, please use it wisely."

Chapter 1 Town of Friday Harbor's Water System

1.1 Description of Sources

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 about five miles west of Friday Harbor in an isolated, undeveloped pocket fed by a steep drainage basin. The Town owns 600 acres of the surrounding watershed that totals approximately 860 acres.

In 1979, Augmentation (AUG) 1 was constructed to supplement the reservoir with additional surface water runoff. 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 (with certain limitations) from October 1 to April 15.

Augmentation (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 (with certain limitations).

Refer to Figure 1.1, a map of Trout Lake, AUG 1 and AUG 2 watersheds, and to Appendix B for a more detailed history of the Town's water system.

1.2 Capacity of Trout Lake Reservoir

Four studies have been done over a nineteen-year period determining the capacity of Trout Lake Reservoir. The results are summarized in Table 1.1 below.

Table 1.1 Capacity Studies of Trout Lake Reservoir

Date	Organization	Total Volume	Usable Volume
1975	Ecology	469 MG	Not computed
1979	Island Surveying	Not computed	318 MG
1983	KCM	520 MG	385 MG
1994	KCM	468 MG	370 MG

The most recent study, the *Town of Friday Harbor Trout Lake Capacity Analysis,* done in 1994 by KCM, determines the total volume of the reservoir to be 468 MG based on bathometric studies. The usable volume is less because the outlet pipe elevation is 288.2 inches below the spillway. The volume below the pipe is termed 'dead storage'

because it is not readily available, and is estimated to be 98 MG, leaving a usable volume of 370 MG.

During 1995, the year following a severe winter-long drought, the "dead storage" volume was accessed by a siphoning system that remains in place. The high sediment and organic content of this water puts a strain on the water treatment facility's filters, thereby limiting its use. The amount reasonably accessible by siphoning that will not put too great a strain on the treatment plant filters is estimated at 30 MG.

Usable volume of 379 MG + 30 MG siphoning = 400 MG total capacity of Trout Lake Reservoir.

However, the elements listed below that contribute to sustainable yield must be factored into the equation, as the total capacity is a very simplistic and unrealistic representation of the amount of water actually available for use.

1.3 Sustainable Yield of Combined Water Sources

Sustainable yield is calculated using recharge projections and average annual conditions including fire suppression needs, historical consumption, precipitation, drought occurrences, reservoir levels, and watershed characteristics. The figures in Table 1.2 determine the amount of water that the reservoir and augmentation watersheds can safely and sustainably yield during a one-year period.

Table 1.2 Sustainable Yields of Water Sources Available to the Town
Calculated by KCM in the 1994 *Trout Lake Capacity Analysis*

Source	Sustainable Yield (MG, million gallons)
Trout Lake Reservoir	106 MG
Trout Lake + AUG 1	146 MG
Trout Lake + AUG 1 + AUG 2	168 MG
Trout Lake + AUG 1 + AUG 2 + Dead Storage	193 MG

Use of dead storage would only be condoned during drought conditions, therefore the effective total sustainable yield amount of 168 MG is the basis for the Town's monthly *Water and Sewer Utilities Summary Reports.*

1.4 Capacity of Treatment, Distribution and Storage Systems

The Town's *Comprehensive Water System Plan Update* provides an in depth description of the following elements which are briefly summarized below.

a. Treatment

Three gravity filters are located at the Town's Water Treatment Facility, two of which can be operated simultaneously, leaving one as a backup in case of failure. Usually operated at a conservative 4 gpm/sf, the filters have been pilot tested at higher rates within the hydraulic capacity of the systems pumps and piping. At a surface loading rate

of 5 gpm/sf, each of the three filters would have a capacity of 845 gpm. During peak season, two filters operating jointly increase potential production to 1,690 gpm.

b. Distribution System

Consisting of both transmission lines and pumps, the distribution system has the hydraulic capacity to operate at the above 1,690 gpm rates, but is not designed to carry a greater volume. During peak season and depending upon fire suppression needs, daily consumption may exceed this amount, in which case the 1.5 million-gallon storage capacity summarized below is critical.

c. Storage

Water is held in the Town's two tanks for three reasons – standby, equalization and fire storage. The standpipe, or storage tank, by the Town shop holds .5 MG, and the tank up on hill at the intersection of Harborview and Salmonberry holds 1 MG. Additional components of the transmission system store smaller amounts of water.

During peak season, the storage tanks are replenished during evenings and nights, corresponding to periods of lower demand.

1.5 Cost Comparison of Increased Capacity

The cost of acquiring 'new water' has increased by a factor of 10, from hundreds of thousands to millions of dollars. Refer to the Table 1.3 below.

Table 1.3 Cost Comparison of Additions to Town's Water System
KCM, *Comprehensive Water System Plan Update,* February 1997
KCM, *Town of Friday Harbor Trout Lake Dam Improvement Feasibility Study,* October 1997

Date	Description	Yield in MG	Total Cost	Cost per MG
1914	Addition to natural dam	?	$600	?
1914	Construction of wooden pipeline	NA	$7,251	NA
1979	AUG 1 system	78 MG	$256,000	$3,282
1988	AUG 2 system	240 MG	$556,000	$2,316
2000	New Dam raising total reservoir storage level by 7 feet	100 MG MG=million gallons	$3,000,000	$30,000

"The days of cheap water are over" is a quote heard at local, state and federal levels. Unfortunately, it is the Town's ratepayers that must bear this burden. According to WA State legislation RCW 35.92, it is the responsibility of Town elected officials and staff to minimize the financial impact to their customers, while continuing to provide a safe and reliable supply of potable water.

Chapter 2 Hydrological Factors Influencing the Water Supply

Rainfall patterns, drought occurrences, water supply recharge rates, and watershed health all influence the amount of water available in Trout Lake, AUG 1 and AUG 2 watersheds. Each of these elements is part of the larger 'hydrological cycle' and all are interdependent.

Factors determining the amount of water available to the Town of Friday Harbor fall into two general categories, hydrological and demographic. Hydrological factors, such as rainfall, often influence demographic factors, such as consumption rates. To a certain extent, we can control the human factors, but we must adapt to and plan for the effects of the natural factors.

All of these factors must be taken into account during local planning efforts and when tailoring water conservation programs to meet local needs.

2.1 Rainfall Patterns

The Olympic Mountain massif partially shields the San Juan Islands from moisture laden clouds blowing in from the Pacific. This is termed a rain shadow effect, whereby less precipitation falls here than in mainland Puget Sound. San Juan Island and Lopez are closest to the Olympics and are more strongly influenced by the rain shadow effect than Shaw, Orcas and the more northerly islands of the San Juan Archipelago.

Precipitation is the sole source of recharge to the watersheds comprising the San Juan Islands. There are no rivers bringing in snowmelt or accessing other stored water sources upstream. As well, the bedrock geology is too convoluted to provide pathways of groundwater movement from the mainland. (Brandon, 1988.) Therefore, both surface and groundwater systems are resupplied or recharged by precipitation.

The Town of Friday Harbor has kept rainfall data since the early 1900s at the Trout Lake station. This data is accessible in digital form for the years since 1979, and when mined, produces information that can be used both in planning and in tailoring water conservation programs.

The average yearly rainfall for the Trout Lake station was 27.64 for 1980-1999 and 29.18 for 1990-1999. Refer to Figure 2.1, Rainfall – Trout Lake Water Treatment Facility.

According to the US Geological Survey (USGS), precipitation in the Pacific Northwest has decreased since 1977. *"The water supply, though under greater demand, is not being renewed as fast as it was two to four decades ago because of the Pacific Northwest's currently drier and warmer climate. In the long term, managing the region's water resources will require better understanding of the role of climate."* (USGS, 1999.)

Figure 2.2, 100 Year Rainfall Averaged by Decade, illustrates that this general trend is also present at Trout Lake.

2.2 Drought Occurrences

Due to conditions summarized above, the Town's water supply is particularly vulnerable to cyclical droughts. During the last 20 years, the Town of Friday Harbor 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 1979, 1988 and 1993/94 the last of which was declared a State level emergency.

As stated on page 3-8 of the Town's *Comprehensive Water System Plan Update*:

> "*On May 1, 1993, the water level [of Trout Lake Reservoir] was 89 inches below the spillway, triggering a moderate emergency. On May 1, 1994, the water level was 141 inches below the spillway, triggering a severe drought emergency."*

The Town of Friday was required to develop a *Water Shortage Response Plan*, which defines levels of emergencies and measures to be taken. To implement this plan, the Town passed Ordinance 1083, *Emergency Water Restrictions,* revised in 1998, and codified in Chapter 13.16 FHMC.

2.3 Water Supply Recharge Rates

The type of bedrock underlying a reservoir influences its hydrologic connection to the surrounding watershed. Trout Lake Reservoir is located in the Constitution Formation, "a clastic sequence containing massive volcaniclastic sandstone, with interbedded mudstone, ribbon chert, pillow lava, and green tuff." (Brandon, 1988.) The reservoir also lies along a fault valley. Both of these factors indicate that there is a degree of connectivity between the reservoir and the surrounding groundwater system. Further research is needed to determine the specifics of this connection.

The influence of rainfall on reservoir levels is shown in Figure 2.3, Rainfall and Max/Min Trout Lake Reservoir Levels. Note that a three-year, 20-inch decline in rainfall produces a sharp 195-inch decrease in reservoir level during the fourth year. At the beginning of a drought, surrounding groundwater is still adding to the reservoir level. Thus the reservoir level does not drop as quickly as one might think when precipitation is less than normal.

Depending on the duration and severity of the drought, the reservoir may actually loose water to the connected groundwater system through faults in the bedrock. And, as rainfall begins to increase following the drought, the surrounding watershed's hydrologic system is still recharging, and there is less flow into the reservoir itself, causing a "delayed recharge effect."

According to KCM's *Town of Friday Harbor Trout Lake Capacity Analysis,* there is no effective recharge from runoff to the reservoir until 18.5 inches of rain have fallen for any given year. For each inch of rain over 18.5 annual inches, there is a net recharge of approximately 35 million gallons to the reservoir. Refer to Appendix C, Trout Lake Reservoir Level, for data covering 1993 to 2000.

The same analysis determined that no water is available from AUG 1 until 17.5 inches of rainfall occurs in the watershed. Once this threshold is reached, each additional inch yields 42.4 million gallons.

For the purpose of the *Trout Lake Capacity Analysis*, KCM engineers estimated that AUG 2 requires 18 inches of rainfall to recharge the watershed, and that after this amount of rain has fallen, each additional inch yields 30 million gallons.

A comparison of rainfall data with reservoir levels shows that precipitation occurring after April *does not* increase the level of Trout Lake Reservoir. Not until October or later does the reservoir level begin increasing, no matter how much rain falls in May, June or September. In effect, consumption, evaporation, and watershed absorption negates rainfall during this period. Refer to Figure 2.4, Rainfall and Trout Lake Reservoir Levels.

For this reason, a customized local weather forecasting program would be extremely useful in determining the levels of demand management needed to ensure adequate water supply through dryer periods. Accurate weather forecasting would also determine the potential for precipitation and thus recharge during the coming winter months. If this potential were predicted to be low, increased levels of water conservation methods would be justifiable even after the end of the usual dry season.

2.4 Watershed Health

Though all vegetation uses a certain percentage of water during transpiration, most species of plants and trees trap precipitation and gradually release far more than they use into the watershed. Vegetation coverage also insures that the ground temperature is cooler than incoming precipitation. Rainwater can only infiltrate under this “positive temperature gradient,” or when it is warmer than the surface it falls upon.

Therefore, the amount of healthy vegetative surface area in a watershed is directly proportional to the amount of precipitation that is trapped and slowed for infiltration into that water system. In a healthy forested area, “the retention of runoff is in the order of 85%, about 15% being absorbed by the vegetation and humus and about 70% going towards groundwater recharge.” (Coats, 1998.)

A healthy watershed also prevents erosion and filters out many of the contaminants found in today’s precipitation. Sediments from erosion put an increased burden on the water treatment facility’s filters. Those that settle out in the reservoir bottom decrease the overall holding capacity of the reservoir, reducing the volume of water held for use.

In the long run, healthy watersheds provide a cleaner more abundant supply of relatively pristine water to the community of Friday Harbor.

Chapter 3 Demographic Factors Influencing the Water Supply

Actual population, estimates of population increases (both resident and seasonal), consumption, peak use, projected demand, and regulatory requirements are demographic or human factors that influence the Town's water supply.

3.1 Actual Population

According to the State Office of Financial Management (OFM) data, the population of the Town of Friday Harbor's incorporated area (inside town limits), was 1,957 as of April 1st 2000. Refer to Appendix D, Town Population Estimate Worksheet for April 1, 2000.

The total residential population (not including business or industrial accounts) of the area obtaining water from the Town system (both in-town and out-of-town connections) during 2000 can be estimated using OFM factors and Town water account data as follows:

472 SFR units (InTown accounts) x .9270 (OFM occupancy rate) x 2.3236 (OFM persons/unit) = 1,017
342 SFR units (OutofTown accts) x .6245 (OFM occupancy rate) x 2.2181 (OFM persons/unit) = 474
485 MFR units (InTown accounts) x .8194 (OFM occupancy rate) x 1.6984 (OFM persons/unit) = 675
Number of MFR InTown units obtained from Town CCR distribution list for 2000
57 MFR units (OutofTown accts) x .6245 (OFM occupancy rate) x 2.2181 (OFM persons/unit) = 79
Total number of residential individuals provided Town water in 2000 = 2,245

Figure 3.1, April 1 Population per OFM, tracks population for both Friday Harbor and unincorporated San Juan Island. The degree to which non-rate-paying individuals use "Town" water is difficult to determine, as is accurately tracking the total number of people who depend upon the Town's water system.

The above paragraphs illustrate that this most basic of factors, population, is difficult to pin down. Yet it plays an integral role in determining all of the following factors. The value of accurate population data cannot be overstated.

3.2 Population Growth

Increases in the population supplied by the Town of Friday Harbor fall into two categories – resident and seasonal. More accurate data is available on the resident population of both in-town and out-of-town water accounts, yet even this data is an estimate. Seasonal population increases are estimated by cobbling together data from a range of sources. As with baseline population, this is an area that warrants further refining. Refer to Appendix E, Estimated and Projected Water Area Served Population, for estimates up to the year 2015.

a. Increases in Resident Population

The projected growth rate for the Town of Friday Harbor was estimated to be 2.78% in 1995 by KCM in the Town's *Comprehensive Water System Update*. The growth rate for 1991 – 1994 shows an average 4.66% increase (refer to Figure 3.1, April 1 Population per OFM), yet in actuality, the growth rate for 1995 – 2000 shows an average 1.78% increase. During the Town of Friday Harbor's Comprehensive Plan update for 2001, an analysis was done that lead to a recommendation of a new growth rate of 1.4%. The

document's projections are based on this new number of 1.4%, pending final approval later this year.

Projected growth rates are invariably difficult to estimate as they are affected by unpredictable economic and geopolitical factors.

b. Seasonal Population Increases

People visit San Juan Island for a variety of reasons. Some come here only once, some come to visit family or friends, some stay part of the year in summer homes, and some come again and again because they enjoy it here. Most of these people access San Juan Island through Friday Harbor, using the municipality's infrastructure, and impacting the Town's water supply. The livelihood of many Friday Harbor businesses, and indeed Islanders in general, depends to an extent upon this seasonal population bulge.

Following are statistics drawn from various sources that illustrate dramatic seasonal increases in population:

- 58% increase in the day population of San Juan Island from April to September 1995, *Town of Friday Harbor Comprehensive Water System Plan Update*
- 87% increase in day population of San Juan Island during the peak month of August 1995, *Town of Friday Harbor Comprehensive Water System Plan Update*
- 450% increase in ferry traffic, both vehicular and walk-on, between January and August WA State Ferry data, TFH *Capitol Facilities Concurrency, Planning Commission Report,* 4-22-1999
- 5,274% increase from January to August in boat nights/month, two person occupancy Port of Friday Harbor data, TFH *Capitol Facilities Concurrency, Planning Commission Report,* 4-22-1999

This seasonal population bulge must be taken into account when estimating water use per capita, planning for future water supply, and tailoring effective water conservation programs. However, there is no one source of accurate data.

- Information Required – Establish a shared reporting framework including the Port of Friday Harbor, WA State Ferries, the lodging industry, and the San Juan Island Chamber of Commerce that will provide more accurate seasonal population information.

3.3 Town Water Accounts

The Town of Friday Harbor divides water customers into the following general classes. Further subdivision, for instance into type of commercial use, is complicated by many instances of communal metering.

a. Classes

SFR = Single Family Residential, also includes
SFR-RUR = low income elderly/disabled (must qualify through TFH)
MFR = Multi Family Residential

COM = Commercial
IND = Industrial
PA = Public Authority
Special (refer to Appendix F)

For a list of Industrial, PA and Special accounts, refer to Appendix F

b. Total Connections

As of December 2000, the Town of Friday Harbor water system has a total of 1201 connections, up from 992 accounts in 1990. The average rate of increase has been 21.5 per year since 1990. WA State DOH is requiring that connections be translated to equivalent residential units (ERUs), a unit of measure that is specific to the water system, and that reflects the amount of capacity needed to serve a typical full time single family residence.

3.4 Yearly Consumption of Water Resources

The Town of Friday Harbor meters customer service connections to measure water consumption. The Town's Water Department also meters the flow of water produced by the Water Treatment Facility. The difference between production and consumption equals unaccounted water, which must also be factored into yearly use figures and is present to some degree in all water systems. Refer to Chapter 5, System Measures Implementing Water Efficiency, Section 5.3 for a complete discussion of unaccounted water.

A *Draft Water Conservation Analysis,* modeled after Tacoma Public Utilities *Water Consumption Analysis,* was performed by the Town's System Administration Department and Water Conservation Program Coordinator in 1998, parts of which were used as baseline data for sections 3.4 to 3.6 of this chapter.

The Town's System Administrator receives data from the Water Department, performs analyses and produces monthly Utilities Summary Reports, as required by WA State DOH. This data can be framed in various helpful formats, some of which are listed below.

a. Average Annual Overall Consumption

Annual use of water has risen more slowly than anticipated during the six years since the last drought, reaching 112.8 MG in 2000. Refer to Figure 3.2, Water Consumption and Production. This is mainly due to the following reasons:

1) Following the drought of 1994, residents continued with many water conservation methods implemented by the Town's *Water Shortage Response Plan.* In addition, the Town's water conservation program was established in 1996, and has been operating since, reinforcing the importance of water conservation.

2) Some water customers have drilled wells for outdoor use.

3) Population growth has been less than expected, as discussed in Section 2.6a above.

4) The gravel pit, an industrial account that was the largest annual consumer of Town water significantly reduced consumption during the mid 90's and ceased operations shortly thereafter.

Refer to Appendix G, Water Consumption and Production, for more detailed information for the years 1994 to 2000.

b. Percentage of Total Water Use by Class

Table 3.1 below shows percentage by class of total annual water use for 2000. This comparison is instructive to a point. At first glance, the SFR class presents the greatest potential for water conservation savings. However, if most residents of the Town have already embraced the "water is a precious resource, please use it wisely" ethic, then there may be less potential for savings in this class than initially apparent.

Table 3.1 Percentage of Total Water Use of Class for 2000
Town of Friday Harbor Monthly Utilities Report, December 2000

Customer Class		% of Total Annual Water Use, 2000
SFR	Single Family Residential Includes SFR-RUR	37.7
COM	Commercial	25.7
MFR	Multifamily Residential	18.8
PA	Public Authority	14.4
IND	Industrial	1.5

The Town's System Administration Department has been tracking consumption by customer class since 1991. Refer to Appendix H, Water Consumption by Customer Class, for more detailed information for the years 1996 to 2000. A wealth of information is contained within this data. Refer to the figures below during the following sections on residential, commercial, public authority, and industrial annual use:

Figure 3.3, Water Connections by Customer Class, 1990 & 2000
Figure 3.4, Annual Water Use by Customer Class, 1990 & 2000
Figure 3.5, Separate graphs for COM, MFR, SFR, PA & IND Annual Water Consumption 1990-2000
Figure 3.6, Comparison by Customer Class, 1990 – 2000

c. Residential Annual Use

The number of Single Family Residential accounts has gone from 728 in 1990 to 806 in December of 2000, increasing by 10%. However, SFR annual usage in 2000 was 39.2 MG, actually below the maximum annual use of 46.5 MG that occurred in 1992. Multi-Family Residential (MFR) comparisons are problematic because a single account may represent a few to many living units. In 1990 there were 438 Multi-Family

Residential units (not accounts) and in 1997 there were 666, an increase of 34% over seven years. Annual MFR consumption was 15.6 MG in 1990 and 19.6 MG in 2000.

d. Average Daily Use per Residential Occupant

This calculation is problematic due to the difficulty in obtaining accurate occupancy rates, both number of people per household and fulltime versus seasonal occupancy. OFM occupancy rates were used for both In Town and Out of Town accounts. Refer to Appendix I, 2000 Average Daily Water Use per Occupant – In and Out of Town, and Appendix J, Estimated Average Daily Use per Occupant for SFR MFR Accounts - 2000, for complete information used in this calculation.

Table 3.2 Average Daily Use in 2000 Per Occupant for SFR and MFR

Customer Class	Location	Average Daily Use Per Occupant
Single Family Residential (SFR)	In Town	55.8 gallons
	Out of Town	99.9 gallons
Multifamily Residential (MFR)	In Town	63.6 gallons
	Out of Town	97.9 gallons

Note: MFR Out of Town includes 44 single family units on Friday Island, 39 of which are occupied seasonally. An attempt was made to adjust for this by using a four month occupancy for 39 units, and fulltime for 5 units.

In town water use by both single and multi family homes is below national averages, figured at 72.6 gcd (gallons per capita per day). Refer to Chapter 7, Figure 7.1, Typical Single Family Home Water Use Without Conservation.

e. Commercial Annual Use

The total number of commercial accounts has steadily increased from 146 in 1990 to 188 in 2000. Much of the downtown core has multiple uses on one meter, making it difficult to calculate consumption by business type.

f. Industrial and Public Authority Annual Use

Industrial accounts stabilized in 1992 at 15, remaining so through 1999, and increased to 18 as of end 2000. Primarily due to the closure of the gravel pit, industrial annual use has declined from a peak of 34.5 MG in 1993 to 1.7 MG in 2000.

Public Authority accounts increased from 38 in 1995 to 53 as of end 2000, while use increased from 10.8 to 15 MG.

3.5 High End Water Users

Certain factors make this comparison difficult. The UW Labs, for instance, has an entire complex on one meter, while the County, Town, school district, and some businesses and apartment complexes each have multiple meters. Most newer buildings are individually metered, whereas the downtown core has many instances of communal buildings where multiple businesses plus an occasional residential unit share a single meter.

Therefore a simple arrangement by individual account is often misleading. Appendix K, 1999 Top 40 Annual and Peak Month Water Users, was therefore compiled by combining multiple accounts into classes of users.

The Town was singled out because it is currently the top single annual water user on the system primarily due to the amount of water used by the Wastewater Treatment Facility. Refer to Chapter 5, System Measures Implementing Water Efficiency, for ways in which the Town could reduce use.

3.6 Peak Use

The Town must provide water supply (including fire suppression needs) and infrastructure capacity for periods of peak use. Monthly peak use historically falls in August and occasionally in July, and as of 2000 was 14,000,000 gallons per month, 3 MG below the highest pre-drought level of 17,026,910. Refer to Appendix L, Water Consumption – Peak Month. This decrease is due to a combination of leveling of population growth, added groundwater usage, and increased implementation of water conservation methods by Town customers. Refer to Figure 3.7, Water Consumption - February and August 2000, for a breakdown of peak monthly use by class.

The Town's peak use periods are historically synonymous with seasonal population increases and with decreased rainfall, necessitating irrigation. Therefore, peak use can be divided into two main categories, outdoor irrigation and visitor services.

a. Outdoor Irrigation

Most of this type of peak seasonal use occurs in areas outside the Town limits. As outdoor use is rarely separately metered, it is difficult to quantify. Chapter 8, Outdoor Water Conservation Methods, targets this type of peak use.

b. Visitor Services

Most of this type of peak seasonal use occurs within the Town limits, although 'visitors' more appropriately refers not only to tourists, but also to friends and families of residents, as well as to individuals living in the county who come to town. Because of their relatively large impact on water use, the visitor population can in essence be considered another class of resource user, and is targeted as such in Part 2 of this plan.

No method is currently in place to quantify the specific effects of this added class of user.

3.7 Projected Demand for Water Resources

Projected demand for water resources is based on population rates, historical per connection water production, and estimated per capita reductions due to conservation.

According to the Town's *Comprehensive Water System Plan Update,* the projected water use of those supplied by the Town's system was to exceed existing sources'

sustainable yield in the year 2000 with no water conservation, and in the year 2001 with 10% water conservation. Refer to Figure 3.8, Projected Source Requirements, (KCM, 1995).

In actuality, water use has leveled off. Population has not grown as rapidly as projected in 1995, thus the revision of the growth rate mentioned above. Conservation measures have taken effect, groundwater use has increased, and industrial use decreased, all of which have reduced the per capita use of water.

Based on current data, projected water source requirements were recalculated by the Town's System Administrator (refer to Appendix M, Projected Water Source Requirements, for the actual calculations and data used in Figure 3.9). Refer to Figure 3.9, Projected Source Requirements, Revised, and note that the maximization of the Town's water supply has shifted to:

- 2046 for sustainable yield, based on consumption, without tapping into dead storage (volume below outlet pipe), with ongoing water conservation. 85% of sustainable yield will be reached in 2030.

- 2038 for sustainable yield, based on production. 85% of sustainable yield will be reached in 2022.

- Information Required – Include projected land use designations and related densities, as well as refined projections of commercial, industrial and public authority annual and peak uses to determine projected water demand for inclusion in the Town's next Comprehensive Water System Plan Update.

3.8 Regulatory Requirements

The Town of Friday Harbor is classified as a medium system by WA State Department of Health (DOH), and is required to have an approved Water Conservation Plan meeting the specifications for systems with 1,000 to 10,000 hookups.

In order to remain in compliance, DOH requires the Town to maintain infrastructure for periods of peak use and to maintain an adequate water supply for fire suppression and potential periods of drought.

Therefore, one cannot realistically divide the total capacity by yearly consumption averages to obtain the total available water. Periods of peak use, which historically correspond to lower reservoir levels, and the amount of water needed for fire protection during typically dry months, must be factored in.

Chapter 4 State Legislation and Planning Guidelines

4.1 State Legislation Requiring and/or Supporting Water Conservation

A growing recognition that water conservation and demand management are important resource management tools has spurred Washington State legislators to pass statutes directing the State Departments of Ecology and Health to encourage and in some cases require water use efficiency. Refer to Appendix N, WA State Legislative Actions and Statutes, for a detailed list of legislation. Five are particularly worth mentioning in the body of this plan.

- Note that RCW 90.14.130 - 180 concerning water rights is currently being reevaluated with the intention of eliminating or reducing the "use it or lose it" disincentive to conservation and providing certainty relating to inchoate water rights, e.g. that portion of water right certificates not yet put to an end use. (WA State DOH, 1998.) Specifically, "there is a concern among some systems that if they use less water, water rights may be reduced by a similar volume. In practice, this is not Ecology's approach." (WA State DOH, June 2000.)

- Note that the Town Attorney interprets the RCWs relevant to the Town of Friday Harbor's powers and duties as indicating that the Town has the responsibility to provide water to both developed and *undeveloped* lots within the Town limits.

a. RCW 90.03.400 (Water Rights)

"Crimes against water code – Unauthorized use of water. The unauthorized use of water to which another person is entitled or the willful or negligent waste of water to the detriment of another, shall be a misdemeanor."

b. RCW 35.92.017 (Cities and Towns)

"**Intent – Water Conservation encouraged – 1989 c 421:** The conservation and efficient use of water is found and declared to be a public purpose of highest priority. The legislature further finds and declares that all municipal corporations, public utility districts, water districts, and other political subdivisions of the state that are engaged in the sale or distribution of water should be granted the authority to develop and carry out programs that will conserve resources, reduce waste, and encourage more efficient use of water by consumers."

c. RCW 90.54.180 (Water Use Efficiency and Conservation Programs and Practices)

"In determining cost-effectiveness of alternative water sources, consideration should be given to the benefits of conservation and wastewater recycling." "Entities receiving state financial assistance for construction of water source expansion or acquisition of new sources shall develop and implement a water use efficiency and conservation element of a water system plan."

d. RCW 43.20.230 (Water Resource Planning) and subsequent WAC 246-290-100 Water System Plans

WA State Department of Health (DOH) requires systems with over 1,000 service connections to submit a Comprehensive Water System Plan update every six years. In

order to be approved, these plans must contain a Water Conservation Plan in compliance with the department's *Conservation Planning Requirements*. Specifically stated,

- WAC 246-290-100(4) - "In order to demonstrate system capacity, the water system plan shall address the following elements, as a minimum, for a period of at least twenty years into the future:

    - (4)(i) "Development and implementation of a cost-effective conservation program, which includes evaluation of conservation-oriented water rate structures.

WAC 246-290-480 states "For systems with 1000 or more service connections, water use data will be collected and submitted for each individual customer class."

e. State Salmon Recovery Strategy

DOH has recently been mandated by the state legislature to lead progressive efforts to promote water conservation. "Specifically, the Legislature has appropriated special funding for the Department to help water systems develop water conservation programs that will maintain or reduce the impact of human development on water tables and stream levels." (WA State DOH, June 2000.)

In 1999, DOH's Division of Drinking Water created three water conservation specialist positions to provide technical and other assistance to water systems through the Division's regional offices. An interim Water Conservation Program is being developed based on budget proviso language per the WA State Legislature, the State Salmon Recovery Strategy, the Joint Natural Resources Cabinet and the Governor's Office. (WA State DOH, June 15, 2000.) The following documents have recently been made available:

- *Water Conservation: survey of small and medium water systems*
- *Water Conservation Communications Plan*

4.2 Planning Guidelines

Water conservation and demand management programs have been in place for well over a decade in many parts of the nation, and longer in areas that have historical water deficits. Water conservation is increasingly acknowledged as a relatively inexpensive source of water compared to construction projects. In turn, dramatic rate increases can be prevented, benefiting the customers that municipalities are in the business to serve.

The following organizations, both private and governmental, have distilled years worth of experience in the area of water conservation/demand management and have published guidelines that are helpful in tailoring programs that fit local needs. These guidelines were used in the design of this plan.

a. American Water Works Association (AWWA)

Providing peer education, research and support since 1881, AWWA is a professional organization which has an active water conservation/demand management branch that has published a helpful *Water Conservation Plan Outline*.

The *Water Conservation Guidebook for Small and Medium Sized Utilities,* published by AWWA's Pacific Northwest Section Water Conservation Committee and revised in 1999 is also considered a leading reference.

b. WA State Departments of Health (DOH) and Ecology
As stated above in section 4.1d, WA State DOH requires the inclusion of a Water Conservation Plan in a municipality's Comprehensive Water System Plan. A seven page checklist provided by the department, *Conservation Planning Requirements for Public Water Systems with 1,000 – 10,000 Service Connections* acts as the regulatory guideline.

In 1994, WA State DOH also published *Conservation Planning Requirements: guidelines and requirements for public water systems regarding water use reporting, demand forecasting methodology, and conservation programs*. These guidelines emphasize flexibility and recognize regional differences in water supply and demand conditions. Municipalities are encouraged to tailor programs to fit local needs.

More stringent conservation measures than those defined herein may be required by DOH

1) where regional water resource plans, pursuant to RCW 90.54.045 have been, or are being developed and include more rigorous conservation standards;

2) for areas designated as critical water resource situations, pursuant to WAC 173-500-080 (Critical Water Resource Situation Response Process);

3) if legislation is passed mandating additional conservation efforts.

c. US Environmental Protection Agency (EPA)
In 1998, the US Environmental Protection Agency published *Water Conservation Plan Guidelines.* A helpful summary appears in the Winter 1998 Special Water Conservation Issue of "On Tap," a quarterly publication of the National Drinking Water Clearinghouse, sponsored by the Rural Utilities Service.

Chapter 5 System Measures Implementing Water Efficiency

This chapter lists water conservation measures that a utility undertakes and that target the water system itself. All numbered subheadings below are required by WA State DOH.

5.1 Approve a *Water Conservation Plan* and Fund its Implementation

The Town's water system currently has 1,201 connections. WA State DOH requires public water systems with 1,000 or more hookups to have an approved *Water*

Conservation Plan as part of their *Comprehensive Water System Plan Update*, and to fund its implementation. The Town's next update is due October 2001.

According to DOH, water conservation plans must contain the following three elements, listed with reference chapter numbers from this plan:

- Data collection and reporting – Chapter 11
- Demand forecasting for future water needs – Chapter 11
- Conservation program development and implementation – Chapters 5 to 10

This Water Conservation Plan is designed to meet as many criteria as possible, and will be updated and revised as needed.

The Town has funded a Water Conservation Program and part time Program Coordinator since 1996. Refer to Appendix N, History of Town Water Conservation Programs, for details.

5.2 Metering

a. Source

Town Water Department staff take daily manual readings of reservoir levels. The amount of water entering the water treatment facility from Trout Lake is automatically metered.
The US Geological Survey (USGS) has installed a data station that includes flow monitoring where the creek enters the reservoir at the northern end of Trout Lake.

- Information Required – Any data relating to the capacity of Trout Lake Reservoir, and AUG 1 and AUG 2 watersheds will assist the Town in determining source availability.

- Potential Measure - Install an automatic reservoir level monitoring system at the spillway using telephone telemetry connecting to the Water Treatment Facility.
  <Funding Potential>

b. Production

In order to calculate consumption and forecast demand, the amount of water entering the distribution system must be known. In 1955, the Town installed meters monitoring the amount of water the Water Treatment Facility produces.

c. Service Meters and Sub-metering

Friday Harbor Municipal Code (FHMC) Title 13, Water Line Specifications, currently requires the water service meter to be installed at the edge of the public right-of-way, and a shut-off valve for each building on the parcel. Requirement of a separate meter for each building was considered, however the following concerns were raised:

- Cost of connection charges doubling or tripling depending upon the number of planned buildings per parcel.

- Who is responsible for reading the meters? Invasion of privacy issues may be raised if Town meter readers proceed beyond the public right-of-way in order to read sub-meters.

- Who is responsible for repair and maintenance of transmission lines running from the public right-of-way to the dwelling?

Many 'communal' buildings in the older downtown core contain multiple uses. To retrofit with sub-meters for each use would be a complicated process, raising all of the above mentioned concerns. To date, the Town has elected not to require sub-metering for either separate uses or structures, but has instead left that option open to individual property owners.

Outdoor use can also be sub-metered. To date, the Town has left this option up to the customer as well.

5.3 Unaccounted Water/Leak Detection

The Town tracks the amount of water produced by the Water Treatment Facility and the amount of water used by all metered water accounts.

Production – Consumption = Unaccounted for Water

The following are the three main categories of unaccounted for water.

a. Flushing of Transmission Lines

In order to clean out accumulated sediment and organic buildup, the Town Water Department must regularly flush the transmission mains.

- Recommended Measure – Flush mains on a regular basis but not during periods of high demand.

b. Fire Suppression and Training

When a Town water system fire hydrant is tapped to either put out a fire or for training exercises, the amount of water used is not recorded accurately.

- Potential Measure – Require all Fire Departments to accurately estimate and report water usage.

c. Leaks in Transmission Lines

Leaks are particularly wasteful as the lost water is not benefiting anyone, is depleting the water supply, costs money to produce, and is not bringing in revenue. The Town of Friday Harbor has taken proactive steps to detect and fix leaks. Town Water Department staff has been trained to spot evidence of leaks and is on 24-hour call to respond to leak reports, especially during dryer months.

Water System Utility Reports produced monthly by the Town's System Administration Department list the amount of unaccounted water. 10 to 15% of total production is acceptable by State standards. Since 1994, the Town's policy has been to contract a

leak detection firm to test the main distribution lines when unaccounted water exceeds 10%. Refer to Figure 5.1, Unaccounted for Water as Percent of Water Produced.

- Current Program – Continue monitoring the percentage of unaccounted water and contract a leak detection firm as necessary. **<Funding Potential>**

- Recommended Program – Include major subsidiary lines in leak detection schedules.

Occasionally leaks occur during phases of construction. The Town does not currently charge the individual or company responsible for the costs of lost water or repairs.

- Potential Program – Institute a miscellaneous billing process to charge the cost of lost water and a repair assessment to the individual or company responsible for line breaks.

d. Customer Leaks

During the course of recording monthly use, Town meter readers have been trained to assess individual meters for evidence of leaks that are the customer's responsibility. Customers are contacted immediately when their meter indicates such a leak.

- Potential Program – Newer meter models have a built in leak detection arrow and are much easier to read than older meters. Develop a program partnering with customers to replace older meters. This program will peak and then be phased out.

5.4 Pressure Reduction

When water pressure in transmission lines is too high, above 40 psi, water waste can occur. During the 1970s, the Town installed flow reducers in low lying areas of high pressure, primarily the Port of Friday Harbor and the waterfront area.

5.5 Analysis of Improved Technologies

As the cost of water continues to rise, utilities are searching for ways to increase efficiency, and technological advances continue to bring what were once cost prohibitive measures into the range of consideration.

For instance, former U.S. Senator Paul Simon, author of *Tapped Out: the coming world crisis in water and what we can do about it,* suggests channeling funding and research into desalination.

- Recommended Program – Monitor improvements in water conservation technology. When warranted, conduct specific cost benefit analyses for:

  a. **Desalination Plant** to provide water for the Town's Wastewater Treatment Facility. This facility is currently the largest annual consumer of Town water. Excess water could be used to irrigate the high school ball field, as this would require installation of a relatively short transmission line. **<Funding Potential, especially as a 'pilot' project>**

  b. **Water Reuse Methods** to be incorporated into the Wastewater Treatment Facility. WA State DOH's standards for water reuse are currently so stringent that reuse is cost prohibitive. (WA State DOH, 1993.) However, the department has been directed to reexamine these standards, potentially opening this avenue as a cost-effective option. **<Funding Potential>**

Chapter 6 Rate Structure Encouraging Water Conservation

6.1 Existing Town Rate Structure

Across the nation, water rates are increasing as municipalities attempt to replace aging infrastructure and comply with increasing regulatory demands. In an effort to cope with rising production, maintenance and infrastructure costs, the Town of Friday Harbor continues to adjust its water rates. The average annual increase in water rates in Washington has been 5.6%. (Association of Washington Cities, 1999.)

In 1993, the Town contracted Financial Consulting Solutions Group, Inc. to complete the *Town of Friday Harbor Utility Rate Study Final Report.* This report, finalized in 1996, recommended a 34.5% increase for water rates and a 16.9% increase for sewer rates.

Table 6.1 below compares monthly water rates per 1,000 cubic feet of water.

Table 6.1 Comparison of Monthly Water Rates in Washington State
Annual *AWC Tax and User Fee Surveys*, Part IV, published by the Association of Washington Cities
Rates are based on the use of 1,000 cf (cubic feet) of water.

Year	Number of Reporting Municipalities	Rank In WA State	Inside TFH Single Family Water Rate	Average Inside Single Family Water Rate	Highest Inside Single Family Water Rate
1996	306	3	$39.64	$18.38	$54.52
1997	255	1	$48.50	$19.17	$48.50
1998	149	68	$22.30	$19.74	$25.03
1999	265	95	$20.24	$20.29	$26.80
2000	260	2	$50.17	$22.17	$54.92

Refer to Appendix P, Monthly Utility Rates, for the 2000 rate schedule.

Increasing the amount customers pay for water is arguably the most effective water demand management tool. However, in this context, it is only fair to reward low end consumers, while encouraging high-end water users to conserve. The Town has implemented the following two rate structure changes.

a. Fourth Tier Added to Single Family Residential

In 1997, the Town shifted from a flat rate to a block rate structure for the Single Family Residential (SFR) class. Each block, or tier, charges a certain amount up to a designated number of thousands of gallons used. For example, SFR customers can use up to 3,500 gallons a month, or 117 gallons a day to qualify for the basic first tier rate of $3.80 per 1000 gallons.

The Town Council added a fourth tier to SFR water rates effective January 1999. As of 2000, any SFR account using 10,500 or more gallons a month, or an average of 350 gallons a day, falls into Block 4 and is charged $7.58 per 1,000 gallons. The revenues from this tier help fund the Town's water conservation program.

b. Seasonal Increase for All Other Classes

All other classes are subject to rate increases during 'summer,' defined as June through September. Recall that this period typically corresponds to lower reservoir levels, seasonal population increases, and proportionally higher use. This type of rate structure was instituted in 1996. In 2000, the cost per 1,000 gallons increases from $3.80 for October through May, to $4.75 for June through September.

6.2 Incentive Program

There are several examples of incentives offered by municipalities that reward customers for participating in water conservation programs. Many of these programs

can be accessed through AWWA's website, which links to member utility and municipality websites.

The Town's Water Conservation Office records the names and account numbers of customers that have, for example, acquired water saving devices, including ultra low flush toilets, efficient clothes washing machines, or rainbarrels.

- Recommended Program – Develop an ongoing system to reward those customers, of all classes, that participate in water efficiency programs offered by the Town Water Conservation Office. Consider establishing a Conservation Class for each type of water account, with membership determined by a predetermined reduction in use.

6.3 Drought Conservation Surcharge

Several municipalities institute increased charges for water during periods of official drought. The Town's *Water Shortage Response Plan* outlines the definitions of various drought stages, limitations on water use, and the steps the Town must take to notify the public. Currently, no additional rate increases go into effect during drought conditions.

- Potential Measure – Reexamine the official levels of drought defined in the *Water Shortage Response Plan* and attach a drought conservation surcharge to the highest two tiers of residential accounts, to increase as the official drought level increases. For all other classes, institute a surcharge if a specific percentage decrease in use, tied to the level of drought, is not achieved.

Chapter 7 Indoor Water Conservation Measures

It is estimated that residential indoor use of water exceeds outdoor use in most cases. Unless both uses are metered, however, an accurate accounting will not be achieved. Table 7.1 compares typical indoor and outdoor uses for both single and multi-family units in a southern California water district.

Table 7.1 Residential Indoor Versus Outdoor Use
WA State DOH, *Municipal Water Conservation Analysis and Recommendations,* December 1998
*Water use figures are based upon the average annual use for Metropolitan Water District, S. California.

Type of Water Use	**Water Use*** **(gallons per capita per day)**	
	Single Family	Multi-Family
Indoor		
Toilet Flushing	30	30
Showers and Baths	27	25
Clothes Washing	21	17

Cooking and Cleaning	13	13
Dishwashing	6	4
SUBTOTAL	**97**	**89**
Outdoor		
Landscape Irrigation and Gardening	46	18
Car Washing and Miscellaneous	7	3
SUBTOTAL	**53**	**21**
TOTAL	**150**	**110**

Refer to Figure 7.1, Typical Single Family Water Use, for an industry estimate of the same. Tables of this sort differ depending upon the year that is represented. Note that with the trend of increasing water conservation and the installation of improved efficiency fixtures, overall indoor use has been decreasing. Thus, more recent data shows lower use rates. Consumption rates also differ by region, with areas that have focused on the need for conservation showing lower use rates as well.

Estimates of residential indoor and outdoor end uses can be calculated using the average range of values found in Appendix Q, Benchmarks for Estimating Residential End Uses of Water, adapted from *Water Conservation Plan Guidelines,* US EPA, August 1998.

7.1 Plumbing Codes – WA State Water Use Standards

The Town of Friday Harbor follows the Washington State Uniform Plumbing Code, section 402 of that code deals with water conserving fixtures and fittings. Its purpose is "to implement water conservation performance standards in accordance with Chapter 19.27.170 RCW."

Beginning in July of 1993, upgraded water use efficiency standards, as illustrated in Table 7.2, went into effect in Washington. It is now prohibited to sell, distribute, import or install fixtures that do not meet the standards listed below. These standards apply to both new construction and remodeled buildings.

Table 7.2 Washington State Water Efficiency Standards
WA State DOH, *Municipal Water Conservation Analysis and Recommendations,* December 1998

Plumbing Fixture	Upgraded Standard	Pre-1993 Standard
Showerheads	2.5 gpm	3-8 gpm
Faucets	2.5 gpm	3-5 gpm
Toilets	1.6 gallons per flush	3.5, 5-7 gallons per flush

7.2 Fixture Replacement Programs

Replacing older models with more efficient fixtures gives proven investment returns and results in significant water use reduction. Due to the adoption of the above standards, the following fixture replacement programs would target only pre-July of 1993 homes.

- Information Required – Data is needed on the number of homes that still have pre-1993 standard fixtures to provide a realistic estimate of the cost of the following retrofit programs. Integration of the Town's building permit database with utility accounts would provide more information than is currently available.

After considering types of fixture replacement programs, the Town has chosen rebate programs to be the least expensive and time consuming for both the customer and Town staff. Offering a combined and ongoing rebate program will save money in printing and mailing costs, as well as in staff time.

- Recommended Program – Establish an ongoing Fixture Replacement Fund that would cover all rebate programs. This combined program will peak and then be phased out as most inefficient fixtures are replaced.

a. Toilet Rebates

In 2000 the Town initiated a Toilet Rebate Program offering $75 per toilet to water customers of all classes that replace their existing toilet/s with 1.6 gallon ultra low flush models. As suggested above, this program could be combined with clothes washers and other fixtures in a general fixture replacement fund. This rebate is currently ongoing, will peak, and then be phased out.

b. Clothes Washing Machine Rebates

$50 rebates were offered to customers upgrading to low flow models in 1998 and the program has not been funded since. Clothes washing machines typically rank second in indoor water use, falling after toilets and before showers. Were this rebate to be reinitiated as part of the Fixture Replacement Fund, it too would peak and then be phased out.

c. Showerhead and Faucet Aerator Retrofits

Showers, faucet use and baths rank in that order of indoor water use. During 1997 the Town began a partnership with Orcas Power and Light (OPALCO), the area electrical utility, to retrofit all multi-family residential (MFR) units with low flow showerheads, kitchen faucet heads, and other faucet aerators.

The Water Conservation Office has received requests for these devices, and currently has baskets of free aerators at all customer service desks for Town water accounts. However the supply is limited as the aerators are a popular item.

- Recommended Program – Reinstate above partnership with OPALCO.

Chapter 8 Outdoor Water Conservation Measures

A main factor contributing to increased water use during the low rainfall season is the need for irrigation. Gardens and landscaping often represent significant investments in both time and money that require water to survive through the dry season. There are, however, techniques that reduce the amount of water necessary without sacrificing variety, quality and aesthetics.

Additional ways in which water is often used outdoors will be addressed in the following chapter, Peak Season Programs.

8.1 Partnership with WSU Master Gardeners

Gardening and landscaping are hobbies for many, as well as sources of food and beauty. For those who don't want to do it themselves, landscaping professionals are available. There are tricks of the trade including plant selection, soil preparation, type of irrigation system, and watering schedules that reduce the amount of water needed and result in healthy, beautiful and productive gardens and landscapes.

Volunteers trained as WSU Master Gardeners are wellsprings of this sort of practical knowledge. A condition of receiving the extensive program training is to volunteer a certain number of community service hours. Therefore, an opportunity exists for a partnership between the Town of Friday Harbor and WSU Extension whereby Master Gardeners would volunteer to participate in projects as outlined in the subheadings below.

A valuable body of knowledge specific to local conditions also exists within Island landscaping and nursery professionals. Currently, there is no local professional landscaping organization, however preliminary conversations indicate a willingness to participate in a conservation partnership.

Many utilities, especially in California, hire and train in-house water conservation professionals to accomplish the following programs. The Town has the opportunity to act as facilitator, matching trained volunteers with its water customers for overall savings.

a. Landscape and Irrigation Audits

WSU Master Gardener volunteers would be available to assess Town water customers' gardens and/or landscaping, sharing their recommendations for improving water efficiency. Hours devoted to this program satisfy their community service commitments, as well as benefit participating Town water customers. The audit format could be that of a "walking tour," incorporating several customers at once and held on an annual basis.

b. Award Winning Gardens and Landscapes

Nominate and award Town water customers of all classes for outstanding examples of water efficient gardens and landscapes. Establish a committee consisting of WSU Master Gardeners and local landscaping professionals who judge entries and select winners in various categories. Winning gardens and landscapes would have the option of being open to the public during a tour, similar to the already existing "Garden Tours," organized by WSU Extension.

- Recommended Program – Partner with WSU Extension Master Gardeners and local landscaping professionals to design and implement a Landscape and Irrigation Audits Program and Award Winning Gardens and Landscapes. Target high end users *and* be open to all classes of water accounts that volunteered. Once up and running, this program would be ongoing as techniques and technologies continually improve.

  <Funding Potential>

8.2 Landscaping Ordinance, Management Policy, and BMPs

Many municipalities have enacted ordinances detailing procedures for landscaping and irrigation installation and management. Review of a new development's Landscaping Plan becomes part of the permit process. Fees are charged for professional review of the plan.

A landscaping ordinance for new or re-development helps to ensure proper soil preparation, use of water efficient species, efficient irrigation system installation, and watering schedules. Were the Town to choose this option, a review of existing landscaping ordinances and discussions with local professionals would be necessary in order to tailor an ordinance effective for local conditions.

A less regulatory approach would be to design a set of Landscaping Management Standards, or best management practices (BMPs) that would then be made available to those Town water customers who irrigate. There are examples of BMPs accessible through other utilities, or via the internet.

- Potential Measure – Tailor a Landscaping Ordinance and/or Management Policy including BMPs in conjunction with existing landscaping and screening requirements pursuant to Title 17 FHMC.

Chapter 9 Peak Season Programs

When monthly water use for December through April is compared to use during the peak month of August, consumption almost doubles. As discussed previously, this is due to two main factors – a seasonal population bulge, and the need for irrigation. Both are addressed in the sections below.

9.1 Outdoor Water Use Ordinance

Several municipalities, including Seattle, Vancouver BC, and Victoria BC, have passed ordinances that limit or prohibit outdoor water use during the 'summer' or peak season. A review of these ordinances reveals that most measures have already been incorporated into the Town's *Water Shortage Response Plan*. However, where these types of ordinances exist, they go into effect at a specific date regardless of supply levels, usually the first of June extending through the end of August. This is due to periods of seasonal low rainfall that particularly impact surface water dependent municipalities. These municipalities are simply not willing to take the risk that the much-needed rains and snows may be late, or may be far less than needed.

Water uses have been prioritized, and those viewed as wasteful are eliminated during the dry season. Permits are available for special circumstances. Uses that are prohibited and viewed as wasteful are typically:

- Using water to clean decks, sidewalks, driveways, parking lots, buildings or other outdoor structures.
- Vehicle, boat and airplane washing (unless using a recycled/enclosed system).
- Watering sidewalks or other non-vegetated surfaces.

Irrigation is usually limited to mornings or evenings, which decreases the rate of evaporation. When increased levels of conservation are in effect, the schedule may shift to one day on, one day off, and can become even more stringent as the need arises.

- Potential Measure – Using the Town's *Water Shortage Response Plan* and corresponding Chapter 13.16 FHMC, *Emergency Water Restrictions* as a basis, evaluate other such ordinances and design an Outdoor Water Use Ordinance tailored to fit local conditions.

9.2 Partnership with Chamber of Commerce

Visitor services contribute substantially to peak season water consumption. However, as with gardens and landscaping, there are 'tricks of the trade' that can be utilized without compromising customer service. In fact, incorporating the following two elements has the potential to actually increase the level of customer service:

- Combine the simple message "Water is a precious Islands' resource, please use it wisely" with a sincere "Welcome to the Islands."

- Satisfy natural curiosity by sharing 'local' information that the Islands are special, and have a limited supply of fresh water.

An ideal opportunity exists for the Town to partner with the Chamber of Commerce, benefiting both visitors and businesses that serve them by implementing the following

programs. This would also more evenly distribute the responsibility of conservation between residents and visitors.

a. Workshops for Businesses

Sharing results from audits conducted on a single business within a category such as restaurant or lodging among like-type businesses decreases the overall investment in both time and money. Managers, supervisors and/or owners trained in a workshop held in early Spring would then pass on conservation information to incoming seasonal staff.

- Recommended Program – Partner with the Chamber of Commerce to design and implement a peak season auditing, training and awards program. Include water efficiency recommendations in a simple handout to be distributed annually. Give participants a sticker or certificate denoting membership in the Wise Water Use Club, to be posted in public view. **<Funding Potential>**

b. Visitor Education

Incorporate the simple message "Water is a precious Islands' resource, please use it wisely" into all publications targeting visitors.

- Potential Program – Partner with the Port of Friday Harbor to design and distribute at the Port's fuel dock and main office a rack card with conservation methods specific to boaters plus information that the Port deems important. **<Funding Potential>**

- Potential Program – Partner with the Chamber of Commerce to design and distribute a rack card welcoming visitors to Friday Harbor, including conservation methods and information that the Chamber deems important such as the location of public restroom facilities, parks, and walking paths. **<Funding Potential>**

c. Speakers Bureau

This element is required by WA State Department of Health. Fortunately, the San Juan Stewardship Network has already organized a volunteer Speakers Bureau. Participants are trained in various areas of local natural history and must in turn perform community service. Volunteers trained in a summary of the Town's water sources, general Island hydrology, and water conservation methods would be a relatively inexpensive conduit for passing information on to visitors.
An ideal setting for this type of education would be aboard the ferries. The current WA State Ferries Outreach Coordinator has submitted a funding proposal for on board education which has not been implemented, however there is potential to revive this program.

- Recommended Program – Partner with the San Juan Stewardship Network and WA State Ferries to fund and implement an onboard visitor education program. **<Funding Potential>**

9.3 Audits for High End Peak Water Users

The State of California has directed public utilities to assign water quotas, or allocations, to individual accounts using a formula based on type of use, past history, amount of vegetation, numbers in household or business, and other factors. When an account uses more than their allotted amount of water, they are penalized and in some cases offered assistance to bring down consumption. Washington, and certainly the Town of Friday Harbor, has not reached this point. However, as of 1998, water allotments are being considered at the state level. (WA State DOH, 1998.)

In lieu of allotments, high-end peak users could be offered audits. Rarely, if ever, would a single-family residential account appear on the list of top consumers. More typically, one sees Public Authority, Commercial and Industrial accounts topping the list. Types of audits vary depending upon account class and whether the use is indoor or outdoor.

- Recommended Program – Prioritize and target high-end peak water users in both the Landscape and Irrigation Audit Program (Chapter 8.2) and the Indoor Audit Program (Chapter 10.1). **<Funding Potential>**

Chapter 10 Information and Education Programs

Informing customers of recommended water conservation measures, and educating community members of all ages is an integral part of any water conservation program. The most effective education programs target specific audiences, as do the programs listed below.

10.1 Audit Program

Water audits are a method whereby trained individuals identify inefficient water use practices. Water use varies between classes, and audits need to be tailored to be as cost effective as possible. Training to perform audits can range from simple, for both single and multi-family accounts, to detailed for commercial accounts, to complex for some industrial and public authority accounts.

a. Residential (SFR and MFR accounts)

Develop a training program for youth service groups such as 4-H and Scouts. Trained in simple audit procedures, adults or older leaders would in turn train group members. Participation in this type of program would fulfill their community service requirements. Youth groups would be responsible for setting up the logistics of auditing certain neighborhoods, and would use a standard reporting format to convey data to the Town.

b. Commercial (COM accounts)

Develop a program whereby the results of auditing one type of commercial use, a restaurant for example, could be used to tailor a workshop for like-type business staff. Include water efficiency recommendations in a simple handout to be distributed annually. This program would be most effective in spring, targeting managers and staff

supervisors who would then train incoming seasonal staff. Refer to Chapter 9, Peak Season Programs, Section 2a, Workshops for Businesses.

c. Industrial and Public Authority (IND and PA accounts)

Hiring a professional auditing firm for this type of account is usually most cost effective. Exploring the potential of partnering with the highest water users to cover the costs is a possible funding avenue.

- Recommended Program – As the fixture replacement program phases out, build up an ongoing audit program, portions of which will also peak and then be phased out. Award participants a "Wise Water Use" sticker or certificate. Publicize accounts that demonstrate the greatest reductions as a Water Use Winner 2001. **<Funding Potential>**

Leak Detection Program

Even low flow fixtures, such as toilets and faucets, may develop leaks after extended use. Water account customers are also responsible for transmission pipes on their property. Leaks can occur anywhere in this system, and typically make up 4-10% of each account's yearly water consumption. The following program would educate customers of all account classes in simple steps to spot and repair leaks at both home and work.

- Recommended Program – Designate the second week of May as Seek Out Leaks Week, which corresponds to National Drinking Water Week. Advertise in local papers, describing how to spot leaks, and approach local hardware stores about the possibility of offering discounts on specific plumbing supplies. Ongoing program on an annual basis. **<Funding Potential>**

10.2 New Accounts

When relocating to Friday Harbor, new home and business owners may not understand the need to conserve water, nor be familiar with recommended conservation techniques. The following two programs target this information gap.

a. Welcome and Information Packet

Most people are willing to conserve once they realize that water is a precious Islands' resource. New residents and business owners/operators would most likely appreciate a 'welcome basket.' The Chamber of Commerce, Realtor's Association, civic organizations and other organizations may have information that would be helpful to include.

- Recommended Program – Develop a "Welcome to Friday Harbor" packet in conjunction with the Chamber of Commerce for business accounts and the Realtor's Association for residential accounts. Include water conservation brochures already available from WA State Departments of Ecology and Health. If deemed cost-effective, design a portion of the packet in house that is specific to Friday Harbor. Ongoing program. **<Funding Potential>**

b. Change of Ownership Ordinance

Many municipalities require a checklist as part of the change of ownership process verifying that low flow plumbing fixtures have been installed.

- Potential Measure – Research such ordinances and develop a Change of Ownership Ordinance targeting all classes that is tailored to the Town of Friday Harbor.

10.3 School Programs

Town staff members have conducted Water and Wastewater System Tours for 5th grade classes each fall since 1989. Classroom presentations are combined with tours of Trout Lake Watershed, the Water Treatment Facility, and the Wastewater Treatment Facility. This has proven to be an extremely popular program and was requested last year by the high school environmental and biology classes.

- Current Program – Continue scheduling annual Water and Wastewater System Tours to correspond to Washington Water Weeks, a statewide series of more than 150 water-related education and action activities taking place September 1 – October 15. Open these tours to the public, and advertise in local papers. Ongoing program to be expanded as staff time and funding allows.

- Potential Program – Partner with San Juan Island School District, Spring Street School, UW Labs, and SJC Conservation District to develop a Mountain to Bay curriculum focusing on False Bay Watershed (which encompasses Trout Lake Watershed), including the hydrological cycle, water conservation measures, and the Town of Friday Harbor's Water and Wastewater Systems. **<Funding Potential>**

  The UW Friday Harbor Laboratories recently established an "Outreach Program" that includes a K-12 component designed to involve school children in programs that give them the opportunity to partner with scientists in both field and lab research settings.

  The SJC Conservation District recently received Centennial Clean Water Fund grant monies for a "Watershed Restoration" project targeting four watersheds including False Bay (contains Trout Lake, AUG 1 and AUG 2 watersheds).

10.4 Community Events

a. Annual Master Gardeners Workshop

A daylong event organized by WSU Master Gardeners and held each spring. The Town Water Conservation Office has designed a display and presentation focusing on gardening and landscaping since 1999. **<Funding Potential>**

b. San Juan Farmers Market

Held every Saturday from April through October, the Town Water Conservation Office supplies the Master Gardener's table with water conservation material pertaining to gardening, landscaping, and water cachement. **<Funding Potential>**

c. San Juan County Fair

Attendance has increased to nearly 20,000 in 1999, making this the largest community based event in San Juan County. The Town's Water Conservation Office has participated in the County Fair in the following two ways:

- Sharing space with the WSU Master Gardener exhibit at the west entrance to the main building. This display focuses on gardening, landscaping and water

cachement. Free rain gauges and literature are offered to the public. **<Funding Potential>**

- A booth devoted to water conservation provides a venue for showcasing current programs, for instance the Toilet Rebate offer during 1999 and 2000. When staffed, an opportunity exists for Town staff and elected officials to interact with their customers and constituency. Water conservation handouts on a range of topics are available to the public. **<Funding Potential>**

d. Children's Festival

Sponsored by San Juan Island Parks and Recreation District, and held every September at the Fairgrounds, this festival offers a variety of activities for children and their parents. The Town Water Conservation Office could borrow, rent or purchase a different activity each year that focuses on water conservation, watersheds, or the hydrological cycle. A wide range of fun and educational activities of this type are available through various professional educational organizations. **<Funding Potential>**

- Current Program – Continue participation in community events. Ongoing program expanded to a level warranted by staff time and funding.

10.5 Water Conservation Message

a. Inclusion in Local Publications

Rather than devote funding to in-house publications, an effective and often times free approach is to contact local publications and request the inclusion of the simple message "Water is a precious Islands' resource, please use it wisely," providing more information as space allows. Examples of such publications include:

- Newspapers – press releases, guest editorials, and occasional paid advertising
- Event Schedules – SJC Fair, Jazz Festival, San Juan Theatre
- Targeting Visitors – *Springtide, Reflections, Island's Almanac, At Home*
- Real Estate – *At Home*, Caldwell Banker's *Showcase,* Windermere's *Guide*
- Guidebooks – include locally produced (e.g. *Emily's Guides,* etc.) and mainstream
- Maps of the San Juans available for visitors.

Note that the Discover Washington State series contour maps of the San Juan Islands, published by International Travel Maps, contains the following message: *"Water Conservation in the Islands – Despite the obvious fact that there seems to be water nearly everywhere you look in the San Juans, fresh, potable water is in short supply in many locales. If you are traveling in a camper or private boat, it is advisable to fill your water tanks at home or at the last mainland stop. Once in the islands, be mindful of your water consumption and* ***think conservation****. Don't let*

faucets run unnecessarily at campgrounds, don't use fresh water to wash down your boat at marinas, and don't plan to wash your car or camper in the islands."

b. Websites

The Town's Water Conservation Office works with the System Administration Department to post current water conservation programs on the website, www.fridayharbor.org and to link to other web sites that feature Friday Harbor.

When possible, these websites are asked to include at least the simple message "Water is a precious Islands' resource, please use it wisely." Further information on water conservation is provided when appropriate.

- Current Program – Continue to post aspects of the Town's water conservation program on the web. This is in essence free coverage of the Town's programs, and is accessed by a worldwide audience. Funding organizations often give credits for a web presence. Ongoing program to be implemented and expanded as staff time allows.

c. Printed Material Distribution

Handouts pertaining to water conservation are available from a number of sources, including other utilities, state and federal agencies, and professional peer organizations. Though it takes time to read newsletters and other publications listing such resources, it is well worth it in the printing costs saved. The Water Conservation Office has a supply of several such handouts and keeps records of quantity distributed and contact information for obtaining additional copies.

The Water Conservation Office maintains a distribution schedule to the following:

- Town Offices – main reception areas, and Water Conservation Office
- County Courthouse
- SJC Health and Community Services
- SJC Planning Department
- San Juan Public Library

- Current Program – Continue to accumulate and distribute water conservation handouts. Ongoing program.

For general information, the above approach works well, however there may be specific instances when locally tailored information is beneficial. The key to minimizing cost is to specify a target audience and to accurately estimate the print run needed.

- Potential Program – Redesign in-house a tent card (or other type of format) when the current supply runs low. Include information specific to the Town and a welcome to visitors. **<Funding Potential>**

The Town's Water Conservation Office has produced two pieces of tailored information, and though outdated, both are still useful:

1) *Water Conservation: good sense on an island* – describes Friday Harbor's water conservation program and gives tips for summer savings. Three brochures are recommended, all of which are out of print and no longer available.

   - Potential Program – Reprint the Town's water conservation brochure including updated information. Do so after a thorough analysis of past distribution to determine the maximum quantity necessary. **<Funding Potential>**

2) *Town of Friday Harbor Tip Sheet* – describes customers' meters and how to locate leaks, as well as the Town's leak detection program. This was intended to be the first in a series of publications and is dated Spring 1998, however, the information contained is never the less still pertinent.

   - Potential Program – Publish the Tip Sheet series on an annual basis, mailing only to owners and renters who live on the island, and designing the publication in-house.
     <Funding Potential>

Chapter 11 Data Collection and Demand Forecasting

WA State Department of Health's (DOH) *Conservation Planning Requirements* established 1991 as the initial year for a specific set of data to be collected, and for demand forecasting to be completed by municipalities and reported to DOH.

11.1 Data Collection and Reporting

According to DOH requirements, *"If the data has not been collected for any of the categories, you will be required to make a commitment in your conservation plan to begin collecting the data as required. This commitment must include a schedule for when the data will begin to be collected, and what improvements if any will be made to ensure the data is collectable. Systems which make this commitment to collect data, but do not follow through and collect the information may be unable to receive subsequent water system plan approval or approval for additional water rights, until the required data is collected."*

This data will be used by state agencies to forecast demand for future water needs, develop regional water use patterns, evaluate the success of water conservation plans, and other efforts.

a. Monthly Utilities Summary Reports

The Town's System Administration Department has been publishing most of the required daily, monthly and annual water use data in the Town of Friday Harbor Water and Sewer Utilities Summary Reports, updated monthly.

The 'mining' of this data provides information that is used by Town staff in daily operations, and in both short and long-term planning efforts. In order to maximize this resource to benefit the Town's elected decision-makers, and in order to more fully comply with State requirements the following recommendations are made.

- Recommended Program - Install a device to automatically measure reservoir levels, and transmit data to the Water Treatment Facility. **<Funding Potential>**

b. Conservation Program Data

As previously mentioned, at least five years worth of data must be accumulated to assess program success. Data is collected by the Water Conservation Office in the following formats:

- Event Summary – tracks printed material handed out, supplies needed, and general event information for each event.

- Material Distribution Log – tracks each water conservation publication, location of distribution points, number distributed, date of distribution, back-stocked quantities, and contact information for obtaining more copies. This information helps determine the print run quantity for publications designed by the Town's Water Conservation Office, as well as when a publication may need to be updated.

- Customer Service Log – records calls and walk-ins for both Town water customers and those not on Town water.

c. Water Conservation Customer Account Database

Records of those customers who participate in conservation measures offered by the Town of Friday Harbor are correlated with account numbers. This database is still in the design phase, and will include water efficient clothes washers, low flush toilets, and rain barrels. As proposed conservation programs are implemented, it will be expanded to include other elements, such as audits.

Two things are accomplished by this system

1) Customers that are documented as conserving can be awarded incentives.
2) Actual conservation may be more closely measured by correlation with use data.

- Recommended Program – Finalize and maintain a database that will track customer participation in Town water conservation programs, and link this database to utility accounts.

11.2 Water Demand Forecasting

WA State DOH requires that water utilities develop a complete forecast of water demand, including water use reduction resulting from implementation of water conservation measures. Demand projections for six and twenty years into the future,

for both average daily demand and peak daily demand must also be included. This information is currently included in the Town's *Comprehensive Water System Plan Update.*

a. Weather Forecasting

On a practical local level, accurate weather forecasting data is very helpful in assessing both immediate future supply and immediate demand. Weather forecasts for the 'summer' indicate levels of potential outdoor use, and predicted sunny days may be linked to potential visitor population increases, thus demand.

Weather forecasts for upcoming fall and winter predict precipitation levels, and thus the resulting recharge of the reservoir. Given the vulnerability of the Town's water sources to over-winter droughts, this type of forecasting would be very valuable.

- Recommended Program - Install an automatic weather station at the Water Treatment Facility including rain and wind gauges, thermometer and barometric pressure with telemetry capability.
- Recommended Program – Develop a series of weighted coefficients based on the most accurate sources of weather forecasting, including sources in British Columbia. Evaluate this data on a monthly basis, and on a weekly basis during periods when increased levels of water conservation may need to be implemented - for example if the proposed Outdoor Use Ordinance goes into effect or if stages of the Town's *Water Shortage Response Plan* are implemented.

- Potential Program – Assess the cost/benefit of contracting for customized, local weather forecasts on a quarterly or seasonal basis, more often when in drought conditions.

Chapter 12 Water Resources Advisory Board

"The history of humankind is the story of water – a tale of communities blooming along the banks of rivers, lakes, and edges of oceans. No civilization flourishes without water and human survival depends on good drinking water. All the water that ever has been or will ever be on Earth is here now, and with only 1 percent of all that water available for drinking, water conservation makes sense." (Emerson, Harriet 1998.)

Water conservation and demand management factor into the larger scope of "water resources." Issues such as water quality and watershed management are increasing in importance as county, state and federal agencies turn their attention in these directions.

Once the Town of Friday Harbor added the 1,001 account, WA State Department of Health classified the municipality along with all other utilities serving 1,000 to 10,000 connections. Accompanying this distinction of moving into the medium league came increased regulation and responsibilities, many of which are unfunded mandates.

In the water quality arena, testing requirements have increased, and recently a Water Quality Report, also known as a CCR (Consumer Confidence Report) has been required annually. False Bay Watershed, which contains the Town's Trout Lake Watershed, was prioritized ninth in San Juan County's Watershed Ranking process and in the recently adopted *San Juan County Watershed Management Action Plan*.

On another front, San Juan County is now in Phase II of the Water Resource Inventory Area (WRIA) planning process and is attempting to determine the quantity of water available in the San Juans, including the amount available to the Town's system. Washington State water law is undergoing an intense period of scrutiny and change. The old definitions of 'water rights' may well undergo transformation in the near future.

In summary, water resource issues are increasing in number and scope. The Town, as the largest incorporated area and largest water provider in San Juan County, is a major player. An advisory body of qualified individuals who are also water customers would benefit Town staff, elected officials, and ultimately their constituency and customers.

An immediate focus on areas of high potential in water conservation and demand management, within the larger, overall context of emerging water issues would bring much needed information to the Town's decision making table.

- Recommended Measure – Assign the duties of a Water Resources Advisory Board to the Town Planning Commission. Assess the potential of the following:

- Desalination unit and/or reuse potential for the Wastewater Treatment Facility.
  <Funding Potential>

- Partnering with SJC Health and Community Services in Phase III of WRIA planning which, according to Ecology and DOH, will focus on water conservation and reuse.
  <Funding Potential, SJC is a current funding recipient>

Chapter 13 Funding Sources

To date, the Town's Water Conservation Program has been funded through internal sources only. In effect for 1999 and thereafter, the fourth tier of SFR rates was established to fund the program and in actuality covered 91% of program costs in 1999.

The Town of Friday Harbor struggles along with other municipalities around the nation to meet unfunded state and federal mandates, and to adequately maintain and improve infrastructure. Awareness at the federal and state levels of this plight, combined with the recognition of the importance of water conservation, is slowly translating into funding opportunities.

Augmentation of the Town's investment in water conservation is possible by directing staff to explore all levels of funding opportunities. Note that credit is given for the

inclusion of water conservation elements in State funding applications for infrastructure improvements.

- Recommended Program – Research funding criteria and establish a chronology of funding deadlines. Create a prioritized list of fundable Town projects and programs. Devote the necessary staff time to communicate with funding agencies and organizations, attending workshops when necessary. Complete targeted funding applications and, when necessary, administer funded projects. Ongoing program.

13.1 State Funding for Water Utilities

Water conservation plans and the implementation of specific conservation measures may soon be required of applicants for any type of state funding. (WA State DOH, December 1998.)

a. Combined Ecology Funding Application

Applications have been modified to include Section V, which asks, *"Are there any State of Washington or Federal mandates that this proposed project addresses?"* Worth 100 points out of an application total of 1,000, the applicant must also answer the question, *"How does the project involve water conservation and/or the development of facilities to provide reclaimed water to replace potable water in non-potable applications?"*

b. State Revolving Fund

Authorizes use of funds for leak repair and main replacement, meter installation and pressure reduction valves.

c. Water Utility Tax Credits

House Bill 1821 was executive request legislation in 1996 and forwarded for consideration through 2001. If passed, it would provide a tax credit, $.50 or $1 for every $1 invested, for public water systems investing in water conservation measures. As of April 2001, water utility tax credits for municipalities with an approved water conservation plan are proposed in House bill 1832.

- Recommended Town Council Action – Support legislation that provides incentives for water conservation during upcoming legislative sessions. Your Water Conservation Office has specific details.

13.2 Federal Funding

Most of the following programs require specific project detail that is linked to an approved economic development plan and/or proof of financial hardship.

a. Bureau of Reclamation, U.S. Department of the Interior

Grants are available for a range of water conservation projects, such as planning, education, demonstrating innovative technologies, and conservation-implementation activities.

b. Economic Development Administration, U.S. Department of Commerce
Grants are provided to fund public works infrastructure and development facilities including improvements to drinking water systems. Conservation measures are eligible under the grants.

c. Rural Utilities Service (RUS), U.S. Department of Agriculture
Grants and loans are offered for drinking water and wastewater infrastructure construction for communities serving fewer than 10,000. Conservation measures are eligible.

13.3 Professional Organizations

Though much smaller in award amount, opportunities exist to fund specific projects through various professional organizations devoted to water conservation.

13.4 Partnerships at the Local Level

Today's funding climate rewards partnerships. Various public and private sources, including Puget Sound Water Quality Action Team and People for Puget Sound, maintain substantial funding programs. Single applicants are rarely, if ever, considered. Instead, partnerships between 'stakeholders' are rewarded.

The Town of Friday Harbor is a major stakeholder in several potentially fundable areas, including water conservation. An added advantage to partnering is that another organization may be designated to provide administration. Depending upon the effort required and the percentage of the overall dollar figure devoted to administration, this may be of significant benefit. Following are partnerships recommended in this plan that are potentially fundable, and are indicated by the notation **<Funding Potential >**

- Partnership with WSU Extension Master Gardeners.
- Partnership with Chamber of Commerce, San Juan Stewardship Network, and WA State Ferries.
- Partnership with San Juan Island School District, Spring Street School, UW Labs, and SJC Conservation District.

Acronyms and Definitions

AUG = Augmentation

AWWA = American Water Works Association

BMPs = Best Management Practices

CFE = Capitol Facilities Element, TFH Comprehensive Plan

DOH = Washington State Department of Health

EPA = US Federal Environmental Protection Agency

ESHB =

FHMC = Friday Harbor Municipal Code

NDWC = National Drinking Water Clearinghouse

NPDES = National Pollutant Discharge Elimination System

OFM = Washington State Office of Financial Management

OPALCO = Orcas Power and Light Company

RCW = Revised Code of Washington

SJC = San Juan County

TFH = Town of Friday Harbor

USGS = US Geological Survey

UW = University of Washington

WA = Washington State

WAC = Washington Administrative Code

WCCPS = Water Conservation Coalition of Puget Sound

WCO = Water Conservation Office, Town of Friday Harbor

WSU = Washington State University

Customer Classes

SFR = Single Family Residential, also includes
SFR-RUR = low income elderly/disabled (must qualify through TFH)
MFR = Multi Family Residential
COM = Commercial
IND = Industrial
PA = Public Authority
Special

For a list of PA, Special and Industrial accounts, refer to Appendix F

Measurements

MG = million gallons
cf = cubic feet
sf = square feet
psi = pounds per square inch

gcd = gallons per capita per day
gpd = gallons per day
gpm = gallons per minute
ERUs = equivalent residential units

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Relationship of Water Conservation Plan to Other Planning Efforts

Appendix A

Coordination and consistency with related Town and County documents are important elements of any planning effort, as are meeting state level planning requirements. This plan dovetails with the following Town, County and State efforts.

Town of Friday Harbor

Comprehensive Water System Plan Updates
The umbrella document outlining the Town's long-term strategies for water supply management. Required by WA State Department of Health (DOH) to be updated every six years. Next update required October 2001.

The *Water Conservation Plan* is Volume 2 of this overall plan.

Capitol Facilities Element of Adopted GMA Comprehensive Plans
The planning element outlining the Town's long-term strategy for infrastructure improvements, such as water system transmission lines and the Trout Lake Reservoir dam.

The *Water Conservation Plan* outlines strategies to reduce annual and peak consumption of water by 10-20%, thereby allowing more time to financially plan for needed infrastructure improvements.

Comprehensive Sewer System Plan
A planning document outlining the Town's long-term strategy for wastewater management.

The *Water Conservation Plan* outlines strategies to reduce use of water by 10 - 20% and thus decrease the effluent load on the wastewater treatment facility.

Water Shortage Response Plan
Adopted in 1988, this plan 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.

Chapter 13.16 FHMC, *Emergency Water Restrictions,* accompanies the above plan and was revised in 1998.

The *Water Conservation Plan* outlines strategies to prevent the occurrence of water shortages, weather permitting.

San Juan County

San Juan Island Critical Water Supply Service Area (CWSSA) Coordinated Water System Plan
Proposed by the San Juan Island Water Utilities Coordinating Committee and adopted October 7, 1977 by the SJC Board of Commissioners via Resolution 81-1997. Following the procedures and criteria of WAC 248-56, this plan outlines "a policy framework in which utilities, agencies, and the public can begin to focus and prioritize efforts to ensure the reliability of the island's existing water resources and prepare for future needs in an orderly and efficient manner." Update required every five years.

Appendix A, continued

Water Assessment for San Juan County
Prepared by a local volunteer Citizens' Water Advisory Committee in December, 1985, as required by WAC 248-56-300. Provides a basis for planning and management of San Juan County's water resources. Includes a preliminary analysis of San Juan Island's geography and geology, precipitation, surface and groundwater resources, and planning data, and future water supply needs.

Washington State

***Public Water System Coordination Act,* Chapter 70.116 RCW**
Established a procedure for water utilities to coordinate their planning and construction programs with those of adjacent water utilities and other local governmental activities. This Act specifies that WA State DOH or the county legislative authority may declare an area within a county as a Critical Water Supply Service Area (CWSSA).

***Water Resource Act,* Chapter 90.54 RCW**
Set forth fundamentals of water resource policy to ensure the waters of the state will be protected and fully utilized for the greatest benefit of the people of the state. This act requires that "Procedures Relating to the Preservation of Water for Future Public Water Supply," Chapter 173-590 WAC be established. The "Preservation of Water" constitutes a shared water right, which establishes priority for public water supplies for future allocation of water resources by the Department of Ecology.

History of the Town of Friday Harbor's Water System Appendix B

Surface water is the sole source for the water supply accessed by the Town of Friday Harbor. Trout Lake, the initial and primary source, is about five miles west of town in an isolated, undeveloped pocket fed by a steep drainage basin. The Town owns 600 acres of the surrounding watershed that totals approximately 840 acres.

1912 Town officials declared that the "the future of Friday Harbor depends upon good water and sewage systems." Following the recommendations of an engineer, the Town, with approval from the voters, began construction of a dam at Trout Lake and a wooden pipeline to transport water by a gravity flow system into the Town through Beaverton Valley.

1929 Trout Lake's wooden dam replaced with a 26 foot high cement dam.

1955 Original water treatment plant constructed and put on line.

1961 Cement dam raised 11 feet, substantially increasing storage capacity. Ten inch transite transmission pipeline located through San Juan Valley to replace original wood system.

1979 AUG 1 constructed to supplement Trout Lake with additional surface water runoff. Dam built near the southeast end of Lake 310 to collect water from a 190-acre watershed. Water captured in a small storage impoundment is then pumped over a hill and into Trout Lake Creek, which drains into Trout Lake. Lake 310 is also in the remote mountainous interior of the island and is somewhat protected from significant development. The Town does not own the watershed but has water rights for withdrawal from October 1 to April 15.

1988 AUG 2, consisting of a stream diversion, pumping station and force main, built to provide additional surface water runoff. The Town owns *secondary* water rights and may withdraw water from November 1 to April 15. Water from a 3850-acre watershed is funneled through a weir and was initially pumped directly to the treatment facility. The high tannin content presented difficulties to the treatment plant's filters. The situation was remedied in 1994.

1994 AUG 2's pump station improved and a main added to pump water directly to Trout Lake prior to treatment to mitigate the above mentioned treatment difficulties.

1995 Facilities constructed to allow withdrawal from Trout Lake's "dead storage". Emergency siphoning has the potential to increase the Town's supply by up to 50 million gallons (MG).

1998 A third filter was added to the treatment system. Two filters must operate simultaneously during peak demand, the third acts as a backup in case of failure.

♦ Note: replacement of aging distribution lines is funded on an ongoing basis.

1999 Top Annual Water Users

Customer Type	# of Accounts	Use (gallons)	Avg./Acct
Town	2	5,421,720	2,710,860
Public Authority	6	11,229,080	1,871,513
Multi-family	8	12,894,120	1,611,765
Commercial	23	18,159,080	789,525
Single Family	1	302,190	302,190

1999 Top Peak Month Water Users

Customer Type	# of Accounts	Use (gallons)	Avg./Acct
Public Authority	6	2,124,660	424,932
Multi-family	4	1,307,240	326,810
Town	2	479,200	239,600
Commercial	24	2,459,260	102,469
Single Family	4	184,160	46,040

WA State Legislative Actions and Statutes Appendix N

Legislative Actions

Water Rate Study Committee – DOH, Ecology and the Washington Water Utility Council prepared a report to the legislature in December 1995 identifying economic and institutional constraints to implementing conservation oriented water rates.

Water Resources Forum – A stakeholder group representing local, state and tribal governments, and business, agriculture, fisheries, recreation and environmental interests forwarded consensus based water conservation recommendations to the Governor and legislature in October 1994.

Water Resources Data Management Task Force – The Legislature enacted Chapter 295, Laws of 1990, which provided for the development of the Water Resources Data Management Program and Task Force. Members included state agency representatives, tribal and local governments, business and recreational interest, agricultural and environmental organizations, and other interested parties.

Final Report of the WA State Water Use Efficiency Study Committee – SHB 1594 was passes by the state legislature in 1988. As part of this bill, a committee was directed to investigate and evaluate opportunities for improving water use efficiency and to report to the legislature. The committee included members of the State House and Senate, outside water interests, state agencies, and the governor. Water use efficiency was considered from a technical, legal, institutional, socio-economic and environmental perspective.

Water Efficiency: Opportunities for Action – Report to the Western Governors' Association
The Western Governors' Association (WGA) is composed of sixteen states, one commonwealth and two territories. Members of the WGA Water Efficiency Working Group, the Western States Water Council and the US Department of the Interior compiled this report in 1987 with funds from the Ford and Hewlett Foundations.

Statutes Supporting and/or Requiring Water Conservation

RCW 19.27.170 – *Water Conservation Performance Standards* – Establishes state low flow plumbing fixture requirements.

RCW 35.67.020 **– *Sewerage Systems* – Authorizes cities/towns to consider the achievement of water conservation goals and the discouragement of wasteful water use practices when setting sewer rates.**

RCW 35.92.010 – *Municipal Utilities – Authority to Acquire and Operate Waterworks* – Requires municipalities to provide a safe and reliable supply of water as efficiently as possible: *Classification of Services for Rates* – Authorizes cities/towns to consider the achievement of water conservation goals and the discouragement of wasteful water use practices when setting water rates.

RCW 43.20.230 – *Water Resources Planning – Procedures, Criteria, Technical Assistance* – Directs DOH, consistent with the water resources planning process of Ecology, to develop procedures and guidelines related to water use efficiency to be included in the development and approval of cost effective water system plans.

RCW 43.20.235 – *Water Conservation – Water Delivery Rate Structures* – Requires water purveyors who develop water system plans to evaluate the feasibility of adopting and implementing water delivery rate structures that encourage water conservation.

RCW 43.27A.090 – *Powers and Duties of Department* – Directs Ecology to adopt policies to insure water is "used, conserved and preserved" for the best interests of the state.

RCW 43.70.310 – *Cooperation with Department of Ecology* – Directs DOH, where feasible, to integrate our efforts and endorse policies in common with Ecology.

RCW 90.03.005 – *State Water Policy – Reduction of Wasteful Practices* – Instructs Ecology to reduce wasteful practices in the exercise of water rights "to the maximum extent practicable."

RCW 90.03.400 – *Crimes Against the Water Code* – The willful or negligent waste of water to the detriment of another shall be a misdemeanor.

RCW 90.44.110 – *Waste of Water Prohibited* – No public ground waters that have been withdrawn shall be wasted without economical beneficial use. Ecology shall require both flowing and non-flowing wells to be constructed and maintained as to prevent the waste of public groundwater through leaky pipes.

RCW 90.48.495 – *Water Conservation Measures to be Considered in Sewer Plans* – Ecology is to require sewer plans to include a discussion of water conservation measures considered or underway and their impact on public sewer service.

RCW 90.54.020 – *General Declaration of Fundamentals for Utilization and Management of Water of the State* – Directs Ecology to encourage federal, state, and local governments to carry out practices of conservation. Also indicates that improved water use efficiency and conservation shall be emphasized in the management of the state's water resources and in some cases will be a potential new source of water to meet future needs.

RCW 90.54.180 – *Water Use Efficiency and Conservation Programs and Practices* –

- Provides that increased water use efficiency should receive consideration as a potential source of water in state and local water resource planning processes and stipulates that water use efficiency programs should mix incentives and regulation.
- In determining cost-effectiveness of alternative water sources, consideration should be given to the benefits of conservation, wastewater recycling and impoundments.
- Entities receiving state financial assistance for construction of water source expansion or acquisition of new sources shall develop and implement a water use efficiency and conservation element of a water system plan.
- State programs to improve water use efficiency should focus on areas where water is over appropriated.
- State agencies should educate the public concerning the wise and efficient use of water.

Senate Joint Resolution 8210 – *Amendment to State Constitution to Encourage Water Use Efficiency* (passed by voters November 1989) – Permits county, city, town, quasi-municipal corporations, municipals corporations or political subdivisions of the state engaged in the sale or distribution of water to use public money to finance increased water use efficiency.

ESHB 2514 – *Regional Watershed Planning Bill (1998) Session* – Local planning units developing watershed plans are required to develop an estimate of water actually being used (water use), an estimate of water needed in the future (water demand forecast), and strategy for increasing water supplies through conservation, reuse, etc. (water conservation).

WAC 246-290 – *Group A Public Water Systems – Water System Plans* – Requires public water systems to address several elements including a "conservation program" in their water system plan. Public water systems are also required to specifically address water demand forecasting, water use data collection, and enhanced water conservation planning where water rights will be needed within 20 years.

History of Town Water Conservation Programs
Appendix O

Note that the Town Council reduced water conservation funding to one day per week for 2001. This covered the updating and adoption of the Town's *Water*

***Conservation Plan*, however no programming or other projects except for the continuation of the toilet rebate program were funded.**

MEASURES UNDERTAKEN BY UTILITY

Utility = Town of Friday Harbor Water System

Implementation Dates	Program Description
1997, 1998, 1999, 2000	Fund a Water Conservation Program Coordinator Position
1998	Draft a Water Conservation Analysis
1999, 2000, 2001	Produce an adopted and approved Water Conservation Plan

PUBLIC INFORMATION

Implementation Dates	Program Description
	Events
1997, 1998, 1999, 2000	• Master Gardener Annual Workshop
1997, 1998	• San Juan County Fair
1999, 2000	• Share booth space with OPALCO
	• Separate booth focusing on water conservation
1997,1998, 1999, 2000	• Incorporate conservation message into Master Gardener displays
1989 -1998,1999, 2000	• 5th Grade Annual Watershed Tours in September & October
1997, 1998	• Display at Library (for a 1 month period)
	Distribution of Information
1997, 1998, 1999, 2000	• Master Gardeners' table at Farmers' Market every Saturday April – Sept.
1997, 1998, 1999, 2000	• Library, Courthouse, Public Health Department, WSU Extension Office, Port of Friday Harbor
1997, 1998, 1999, 2000	• Hotels, Bed & Breakfasts, other businesses
1997	• Water Conservation Brochure produced by TFH, WCO
1998	• Tip Sheet produced by TFH, Water Conservation Office
	Articles
1997, 1998, 1999, 2000	• Newspapers
1997, 1998, 1999, 2000	• Other Publications and Programs, examples: San Juanderer, SJC Fair Premium Book, and Springtide

TFH = Town of Friday Harbor **WCO** = Water Conservation Office

MEASURES TARGETING USERS

Customer Classes: **SFR**=Single Family Residential; **MFR**=Multifamily Residential; **COM**=Commercial; **IND** = Industrial **P.A** = Public Authority

Implementation Dates	Program Description
1970's	**Monthly Billing Statement** - consumption history
1997, 1998, Ongoing	**Rate Structuring**, tiers to block rates added
Ongoing	**Plumbing Code** updates mandated by WA State
1997, 1998 2000, 2001 1997, 1998	**Fixture Retrofits & Rebates** SFR, MFR classes • Showerheads & Aerators coop with OPALCO • Low Flush Toilet Rebate • Washers (Washwise) coop with OPALCO, Conservation District, and local retailers
1998, 1999 1997, 1998, 1999, 2000	**Efficient Irrigation** SFR, MFR, COM, IND, PA classes • Rain Barrels • Rain Gauges **Landscaping Audits** SFR, MFR, COM, IND, PA classes
	Customer Surveys SFR and MFR classes • Number of visitors by month • Type of plumbing devices in use • Use patterns • Interior • Exterior
	Audits SFR, MFR, COM, IND, PA classes • Inside • Outside

MEASURES TARGETING UTILITY

Implementation Dates	Program Description
1955 1996 Upon user request	**Source Metering** • Production at Treatment Plant • Source into Trout Lake **User Metering** • Sub-metering Specific Users
Ongoing since 1970's	**Reduced PSI** primarily at Port and Waterfront
Occurs if line loss is >10% 1993, 1996, 2000 Have not been tested	**Leak Detection** • Mains • Subsidiaries

	Reclaimed Treatment Facility Water • Wastewater Treatment Plant internal use • Watering football field