SECTION V

WATER USE EFFICIENCY

1. WATER CONSERVATION AS A SUPPLY ALTERNATIVE

In Section VII, a discussion of supply alternatives for regional development is presented. These alternatives represent major undertakings in most cases and will require substantial planning and investment before they are implemented to provide significant new water resources to Island County. Based on engineering considerations, extension of the Oak Harbor pipeline to additional areas of north, and possibly central, Whidbey Island, and also extending supply from Stanwood to north Camano Island, appear to be feasible. In either case, there appears to be a viable source of supply which could be used.

However, the most desirable and cost-effective resource alternative is the efficient development of local groundwater if good quality supply can be found. The essentials of maintaining, developing, and conserving this resource are being identified and formulated into policy under the Ground Water Management Program, funded by the Department of Ecology (Ecology), for Island County.

Appendix K provides a regional groundwater resource analysis by Hart-Crowser & Associates, Inc. which draws the conclusion that, in some areas, replenishment of groundwater from natural sources is greater than probable future demand. This conclusion is based on water balance methods and is not equivalent to concluding that a sufficient and sustained yield of groundwater can be expected from wells developed in those areas. However, with proper management and design of well construction and use, together with monitoring, there is a greater confidence that water supply is developable where there is adequate replenishment. Subject to confirmation, the results of the groundwater resource investigation indicate that groundwaters are physically available on a County-wide basis to satisfy future demand through the year 2040.

The waters, however, may not be available where demands occur. At present very few water systems employ interties for transfer of water. Long distance transmission may be the only alternative to deliver adequate groundwater to where it is needed.

The indications of limits to groundwater supplies are strong enough in most areas of the County that it should be a priority of all groundwater users to employ conservation as a primary alternative to additional well construction.

The Washington 1988 Legislature, through Substitute House Bill (SHB) 1594, established a Water Use Efficiency Study Committee to examine water use efficiency and conservation in the State. The findings and recommendations of this committee were published in draft form in December, 1988. The recommendations address a broad range of municipal, industrial, agricultural, and public education issues, but also include some specific measures and concepts which can be implemented in any conservation program.

The effectiveness of conservation is dependent on the circumstances in which it is applied. Reported reduction of water demand on the order of 10 percent is not unusual. In Island County there already is a heightened awareness of water supply limitation. Because of this awareness, conservation is probably in effect to a certain degree. If a reduction, due to conservation, of 10 percent of domestic demand is accomplished in Island County, the potential "resource" to be gained is approximately 0.6 MGD of the current demand and as much as 1.2 MGD of the projected additional demand in Island County through 2040 (see Section III). A total potential resource saving of 1.8 MGD might be available.

Each public water system in Island County should at least prepare plans to implement conservation measures in times of water shortages. In areas experiencing salt water intrusion, there should also be active ongoing conservation measures in all public water systems. Conservation and reduction of withdrawal from a particular well may have important long-term benefits in preserving more groundwater storage for future use.

2. RECOMMENDATIONS AND REQUIREMENTS FOR LONG-TERM WATER CONSERVATION

Island County must develop a comprehensive water conservation program as a method for managing water resources on a long- term basis.

Elements of a conservation program are outlined in this chapter along with requirements for new and expanding water systems and overall conservation program recommendations. It is recommended that the comprehensive conservation program be developed and implemented as part of the Ground Water Management Plan (GWMP).

This Section addresses the following topics in water use efficiency:

- Public education
- Metering
- Water pressure reduction
- Water rates
- Leak detection and repair
- Water saving devices
- Building and plumbing codes

- o Water use restrictions
- o Landscaping
- o Water reuse
- o Irrigation
- o Infiltration/recharge
- o Retention systems

A. Public Education

Public awareness is essential to the success of a water conservation program. Citizens need to understand what conservation practices are intended to accomplish, what the costs of delivering water are, what the water resource situation is, and why the resource in Island County needs to be used conservatively now and protected for future generations. If water rate incentives are to be implemented, citizens need to know what they can do to reduce their own water use.

Voluntary commitment by consumers is critical in achieving reductions in water use. The installation of water-saving devices, restrictions on water use, and leak detection and repair all require the cooperation of the homeowner. A voluntary approach can result in decreased enforcement to achieve the desired changes in water use.

Public education can be achieved in any number of ways including: billing inserts, announcements in the news media, workshops, booklets, and distribution of water saving devices. The County should research grant funding opportunities to further public education efforts.

B. Metering

Water meters, which record the amount of water delivered to each residence or business, have been demonstrated to be effective in reducing water demands because users pay according to the amount of water they use.

The installation of meters makes water systems more efficient and water rates more equitable.

The minimum design standards as adopted by the Water Utility Coordinating Committee (WUCC) require individual and source meters on all new or expanding water systems. It is recommended that existing systems install meters in an effort to make the system more efficient and to promote water conservation.

Ecology has the authority to require metering as a condition of a water rights issuance. It, furthermore, has the authority to require reporting of withdrawal amounts.

C. Water Rates

Water rates are usually set to cover the cost of providing water. There are typically five cost components that must be recovered:

(1) Meter reading and account maintenance costs.
(2) Costs associated with average consumption.
(3) Cost associated with peak consumption.
(4) Fire protection costs.
(5) Costs associated with planning for an alternative or future source.

Water rates can help achieve long-term water conservation goals if the following criteria are met in designing rate structures:

- Rates must be based on the costs of development, transport, treatment, delivery, and future water supply development.
- Rates are related to the amount of water used.
- Increase rates enough to make consumers decrease their water use.
- Combine rate changes with a public education program.

Various rate structures are used to price water service. Methods that encourage conservation are:

- Inclining or increasing block rates (as the quantity of water use increases, the unit price of water increases).
- Peak demand pricing. This could be implemented seasonally as a summer surcharge for water use exceeding a baseline amount. This rate structure is effective in reducing outdoor water use.

Because conservation measures may reduce income, purveyors motivated by profit may be reluctant to install rate structures which promote water conservation. These purveyors should be encouraged, through incentives or regulation, to promote efficiency in their operations.

D. Water Pressure Reduction

Reducing excessive pressures (above 80 psi) in distribution systems decreases leakage, the amount of flow through open faucets, and leak-causing stresses on pipes and joints, ultimately saving significant quantities of water. Reducing system stress in turn decreases system deterioration, saving long-term repair costs and reducing breakage incidents.

In areas where pressure exceeds 80 psi, pressure-reducing valves should be installed in street mains or individual buildings. A 30% to 40% pressure reduction (from 90 to 100 psi down to 50 or 60 psi) would be expected to reduce overall demand by about 6%.

It should be noted, however, that minimum pressure limits are imposed by state regulations, fire-flow requirements and practical engineering aspects.

E. Leak Detection and Repair

Water leaks are responsible for a large percentage of water losses. Leak detection and repair program benefits include reduced costs for water development, treatment and distribution. As pipes are continually degrading, the detection and repair program must be ongoing.

Household water leaks are usually from leaky faucets and toilets, and from outdoor piping and fixtures. Most household leaks can be easily detected and repaired by the homeowner. New and expanding systems must develop and maintain a leak detection and repair program. It is recommended that all water systems develop and maintain a leak detection and repair program for their distribution systems and customers.

F. Water Saving Devices

The use of water-saving devices is a simple, cost-effective method to reduce water use. The following devices can reduce water use in households:

- Low flow faucets or aerators
- Pressure reducing valves
- Insulation of hot water pipes
- Toilet dams

It is recommended that water systems encourage customers to retrofit homes with water saving devices. Island County should try to obtain grant funding to provide retrofitting.

G. Building and Plumbing Codes

Revising building and plumbing codes to require water-saving fixture installation is an effective, long-term water conservation tool. It is recommended that Island County adopt local codes requiring installation of the following provisions for all new and replacement construction:

- o Low-volume toilets
- o Low flow showerheads
- o Low flow faucets
- o Insulation of hot water pipes

SHB 1397 added a new section to Chapter 19.27 RCW which provides phased-in water conservation performance standards.

H. Landscaping

Changing horticulture and irrigation practices can reduce water use significantly. Changes can occur in the following areas:

- o Plant choices
- o Landscaping practices
- o Watering methods
- o Organic material content in soils

New developments must landscape with efficient landscaping practices. It is recommended as part of a public education program that landscaping and efficient irrigation methods be promoted.

I. Water Reuse

Legislation was recently passed (SHB 1397) supporting utilization of grey water for lawns, gardens, trees, other uses consistent with the protection of public health, and water quality. It is recommended that support be given to Ecology and to the Department of Health (DOH) to prepare guidelines for improved water use efficiency and conservation.

J. Infiltration/Recharge

In much of rural Island County, rainfall is intercepted and absorbed by vegetation/soils. Additional rainfall over the retention capacity of the soil migrates towards streams, lakes, bluffs, or downward toward aquifers. Only in major storm events when rainfall exceeds the infiltration capacity does "runoff" begin. After development occurs with impervious surfaces, the runoff increases and infiltration decreases without the influence of

major storm events. This increased runoff is often diverted via ditches, culverts, and outfalls to the sound, thereby losing the benefits of recharge and also increasing the probability for non-point source pollution.

Infiltration systems can be designed to control increased development-related runoff by imitating pre-development hydrology. The result can be recharge of groundwater, improving water quality and, in certain cases, decreasing the need for expensive detention systems.

A danger with infiltration systems is over-simplifications of the concept without regard for the problems inherent in the approach. A major problem is the absolute necessity for specific and timely maintenance of the infiltration bed itself, as well as associated pollution control devices (oil/water separators, etc.). Other design problems include potential for groundwater pollution, contribution to failure potential for unstable slopes, possible impacts on down- gradient structures including saturation of sewage disposal systems (drainfields) and potential contamination of wells.

To avoid these problems, systems must be designed based upon specific soils identification, set back away from steep and/or unstable slopes, and away from drainfields and wells. Infiltration systems must also be designed with overflows and contingencies provided in case of failure or clogging. Some of these problems can be avoided by using open infiltration ponds as opposed to closed trench systems. Infiltration systems are not presently permitted in industrial areas in Island County.

In general, with recognition of the limits of the approach, infiltration can be a positive and long run insurance against depletion of groundwater aquifers by directing water to a recharge area.

It is recommended that research be conducted on existing drainage and surface water regulations to encourage safe and effective infiltration/ recharge systems and development of a local surface water manual with basic controls/standards for such systems.

K. Agricultural Irrigation

Agricultural irrigation is a major groundwater use and irrigators need to build in irrigation practices which maximize efficiency and resource conservation. Certain practices which could be instituted by agricultural irrigators include:

(1) Developing alternate sources of irrigation water by the construction of impoundments and catchment basins to prevent water

runoff into Puget Sound. Water recovered in such systems may be pumped to higher altitude retention ponds and used later for crop irrigation.

(2) Determining crop water needs in inches and utilizing pan evaporation data collection to determine weekly application rates.

(3) Annually inspecting irrigation system for pressure losses, nozzle size variations, leaks, and application uniformity.

(4) Applying irrigation water at rates which avoid field runoff.

(5) Developing soil moisture budgeting as a management tool in crop irrigation.

(6) Planting crops which require less irrigation.

(7) Upgrading efficiency of existing irrigation systems.

Best Management Practices for agriculture, as established by the Soil Conservation Service, should be followed as closely as possible.

L. Retention Systems

An additional category in water conservation encompasses catchment basins, cisterns, and other structures designed to trap and reserve storm runoff for future use. In agricultural regions, cost-sharing could reduce the individual capital costs of large pond construction. Such ponds could conceivably be used to supply several users with irrigation for much of a growing season. Cisterns which catch runoff from rooftops could easily accumulate enough clean water over the winter to supply a year's irrigation for a lawn or small garden. For new developments planning extensive landscaping, retention basins should be built right into the site plan.

As with infiltration systems, there is danger in oversimplification of retention systems, and they are limited by local factors. However, when properly installed and maintained, retention systems can significantly reduce demand on groundwater resources.

Irrigation Districts (as outlined in Chapter 87.03 RCW) may be organized to construct, operate, and maintain a system of diverting conduits from runoff water to the point of individual distribution for irrigation purposes.

3. SUMMARY OF WATER CONSERVATION REQUIREMENTS FOR NEW AND EXPANDING WATER SYSTEMS

The following comprise the requirements for new and expanding water systems. These are also recommendations for existing water systems:

A. Installation of individual and source meters.

*B. Implement rate structures that encourage water conservation.

*C. Develop and implement a leak detection and repair program.

D. Outline water use restrictions for drought periods in Operation and Maintenance Agreement.

* To be included in water plan

4. RECOMMENDATIONS

Island County should develop a comprehensive conservation program requiring the following:

A. A County-wide ongoing public education program.

B. Incentives to install source and individual service meters on existing water systems (County will research grant funding to make meters available).

C. Support water rate structures that encourage conservation.

D. Require all water systems to develop and maintain a leak detection and repair program.

E. Provide (if grant funding available) water saving devices for retrofitting.

F. Revise local building and plumbing code to require water saving fixture installation for new and replacement construction.

G. Develop guidelines for efficient landscaping practices and irrigating methods.

H. Revise the land development standards (ICC 11.01) to require new housing developments or commercial developments to use low water use landscaping.

I. Support and request the DOH and Ecology to develop guidelines for water reuse as outlined in SHB 1397.

J. Develop a local surface water manual containing basic standards and controls for infiltration/recharge systems.

K. Research and recommend agricultural practices which use water efficiently.