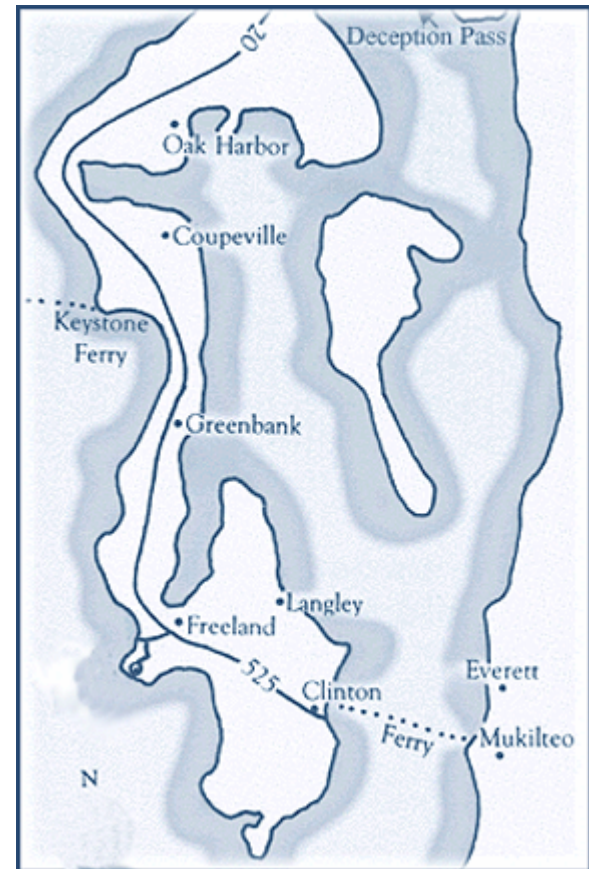


# Water Resources on Whidbey Island



Oak Harbor Planning Department, Eric Johnston, Steve Powers, Rich Tyhius, and Kathy Rosen, February, 2003.  
WSDOE, Geoff Tallent and Rod Sakrison phone consultations and correspondence, February and March, 2003.

Farmers Ron Muzzall and Don Sherman, and Don Meehan of WSU Extension, February, 2003.

WRAC, Don Lee, and Bob Deering (not currently on committee), September, 2002.

#### Public Meetings Attended

Board of IC Commissioners, December, 2002 and January 2003.

WRAC, Jennifer Kropac, WSDOH, October, 2002, and January, 2003.

Sound Waters, Washington State University Cooperative Extension of IC Beach Watchers, 2003.

WRAC Groundwater Subcommittee, November, December, 2002, and January 2003.

#### Publications

City of Langley Comprehensive Water System Plan, 2003.  
Comprehensive Water System Plan, Freeland Water District, 1994.

Early Action Recommendations – Watershed Management, August 2001, ICWRAC, ID Planning Unit.

Gleick, Peter H., Safeguarding Our Water: Making Every Drop Count, Scientific American, February, 2001.

IC Groundwater Management Program, 1992.

IC Groundwater Nitrate Study, 1997.

Kruckeberg, A.R., Gardening with Native Plants of the Pacific Northwest, University of Washington Press, Seattle, 1982.

Low Impact Development, Sound Waves, Fall, 2000, p. 5.  
North Whidbey Watershed Nonpoint Pollution Prevention Plan, 1997.

Options for Success, WSDOH, Division of Drinking Water, April, 2001.

### **What Individuals Can Do?**

It is apparent that water issues on WI are complex. You may wonder how you fit in and what you can do to about them. Becoming informed is a place to start. You may want to consult one of the resources below, attend your local water association meetings, attend the monthly Water Resources Advisory Committee (WRAC) meetings, or other educational forums so you can be a knowledgeable participant in government decisions that so directly affect you. If you are one of those with an unregistered well, consider making it known and metered. If you have an on-site septic system, know how to maintain it properly and have it pumped at recommended intervals. Improve your water use efficiency by adopting practices that are known to be effective. Consider LID if you are building a home or business and encourage this type of development in your community.

### **Resources**

Interviews for the Water Study

ICHHD, Virginia DeLong, Keith Higman, Donna Keeler, Doug Kelly, Kathleen Parvin (phone consultation) and Jeff Tasoff, November, 2002 –March, 2003.

Coupeville Planning Department, Larry Cort, phone consultation, March, 2003.

Freeland Water District, Sandy Duncan, March, 2003.

## **League of Women Voters of Whidbey Island League of Women Voters of South Whidbey**

### **Water Resources Committee**

Gena DiLabio, Chair Elizabeth Davis, Teresa Dix,  
Mary Fiddler, and Elizabeth Turpin

#### **Editor:**

Gena DiLabio

#### **Publications Design**

Ivy Behrns

#### **Reading Committee**

Dot Deering, Joan Gerteis, Andrea LeBosquet  
Joan Metheny and Rolf Seitle

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Department Hydrogeologist.

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League of Women Voters of Washington  
4710 University Way NE, #214  
Seattle, WA 98105-4428  
206-622-8691

- 4 Maximizing retention of native vegetation cover to intercept, evaporate and transpire precipitation
- 5 Using pervious surfaces where possible
- 6 Minimizing building footprints, and road widths to reduce impervious surface coverage

increased withdrawals from the groundwater aquifers. This has diminished available supplies of freshwater and increased the potential for contamination of ground water by seawater intrusion. Efficient use of groundwater is a widely recognized element of a complete water resource management program, as yet no comprehensive conservation program exists in IC to reduce aquifer withdrawal rates, extend the life of the resource, reduce the potential for seawater intrusion, and decrease the stress on septic and wastewater-disposal systems.” Although no comprehensive plan is yet in place, important but limited progress has been made. The County hired a hydrogeologist who has been and is conducting field research which furnishes the scientific data upon which to base decisions. There is a greater recognition of what is needed and a new Watershed Management Plan is in the works. It should be completed by 2005.

Low Impact Development (LID) is a set of strategies that shows promise for protecting water quality and aquatic habitat. When used in conjunction with sound watershed and regional planning, LID deserves consideration for implementation in IC. Central to this strategy is maintaining, as closely as possible, the natural hydrology and reducing groundwater flow from the site receiving precipitation. LID goals are attained by site planning and development practices which include for example:

- 1 Assessing a site’s soils, current and native vegetation cover, wetland areas, streams, and other critical areas
- 2 Locating buildings and roads away from critical areas and soils that can infiltrate stormwater
- 3 Preserving permeable native soils and amending disturbed soils

## **Water Resources on Whidbey Island**

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Waste can be considered a preventable threat to our water supplies. Poor maintenance of private systems may account for a large proportion of wasted water, but the greatest loss is from inefficient use of water in our homes and gardens. Water left running, leaks, large capacity toilets, watering of lawns, inefficient watering of gardens, watering during times of high evaporation, etc. are behaviors which can be readily changed if we are motivated to use our water resources more efficiently.

### **Other Threats**

Desalination of seawater is often touted as a solution to water shortages. However, present systems require large amounts of energy and produce many gallons of concentrated brine for every gallon of fresh water produced. Direct return of concentrated brine to the Sound may be toxic to sea and shore life, and on land it may need to be treated as hazardous waste. Desalination does not appear to be a viable solution to WI's water needs until more energy efficient and safe methods of desalination are developed.

A further threat to the quality and quantity of water resources is the limiting effect of budget cuts on government agencies. Much research must be funded before accurate prediction of water supplies can be made. To improve water quality and quantity, effective management of present water resources requires continuing government support at adequate levels. Recent cuts in funding for the USEPA, WSDOE and the ICHD for example may greatly diminish our ability to properly manage and protect our water from hazardous waste and other substances that pollute groundwater.

### **What IC Has Done and Is Doing about All This?**

The IC Groundwater Management Program of 1992 stated: "Population growth in Island County has significantly

saltwater into a freshwater aquifer) is the major ground water quality problem we face. A delicate balance exists between the water stored in an aquifer, the amount of recharge from precipitation, and the amount of natural discharge. As the pressure in an aquifer is lowered by pumping of water for surface use, it becomes more susceptible to seawater intrusion.

A reasonable assessment of how many wells have been affected by seawater intrusion can be obtained by looking at chloride vs. conductivity ratios in wells, and evaluating intrusion based on that data. This approach indicates 7.4 percent of the wells for which these data are available (2872 to date) have at least one sample that appears to be intruded.

### **Land Uses That Reduce Aquifer Recharge**

Clearing vegetation from the land for development also adversely affects our water supply. For example, through their roots many plants take in and break down unnatural chemicals preventing these impurities from moving into our groundwater. Trees and other vegetation intercept rainfall reducing soil erosion and flooding. Trees also provide shade which slows the process of evaporation from underlying soils and nearby surfaces of lakes and streams. Through transpiration (evaporation of water from leaves during photosynthesis) trees release moisture back into the environment.

Changes made to the surface of the land can alter the quality and quantity of our water. Filling of wetlands severely impacts the land's ability to filter polluted water and reduce runoff thereby reducing recharge to aquifers. Increased areas of impermeable surfaces such as roads, parking lots and rooftops, reduce the potential for rainfall to soak into the ground.

### **Waste**

## **Water Resources on Whidbey Island**

### **Introduction**

Imagine what you would do if you found a buried treasure in your backyard. No doubt most of us would take great care in protecting such a find. In reality those of us who live in Western Washington have in our backyards something more precious than diamonds and more valuable than gold. *The treasure we have is water.* Water seems to be everywhere; it is the flowing force that connects human communities and natural ecosystems. From mountain glaciers to the salty depths of Puget Sound, water is the resource that allows life to spring forth from every forest stream, river, mudflat and marsh.

Living in a place with so much water seems to confirm those images from space which revealed Earth as a blue planet wealthy with water. On the other hand, a close up view from the perspective of scientific analysis gives a very different picture of how much water is actually available for human use. The following numbers compiled by the University of New Hampshire' Water Systems Analysis Group indicate the true nature of what's on tap for a thirsty world population of 6.2 billion people.

**Oceans cover 71 percent** of the Earth's surface and contain 96.5 percent of Earth's water. Saline or brackish groundwater and saltwater lakes make up another 1 percent. If all this water evaporated, the Earth would be covered with more than 40 feet of salt.

Only **2.5 percent** of Earth's water is **fresh water**, but not all of even this water is available for human use.

Nearly **70 percent** of the world's fresh water is frozen in **glaciers**.

**30 percent** of all fresh water is underground; much of this water is in **aquifers** that are too deep to access.

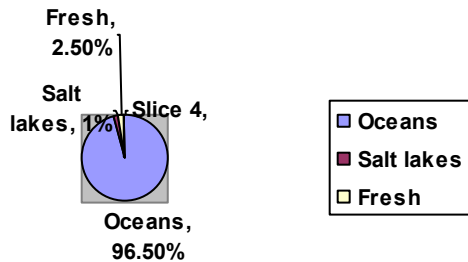
**Atmospheric water vapor** holds **0.04 percent** of the fresh water.

**Lakes and rivers** contain a little more than **0.25 percent** of the Earth's fresh water.

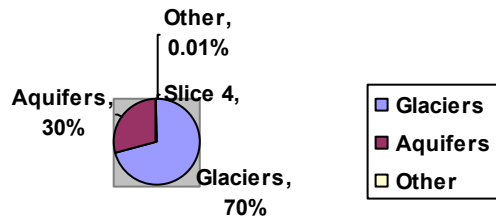
**Dirt, mud, swamps, plants and animals** contain just under **0.1 percent** of the fresh water.

*Less than 0.5 percent of the total water on the planet is available fresh water.*

**Water Distribution on Earth**



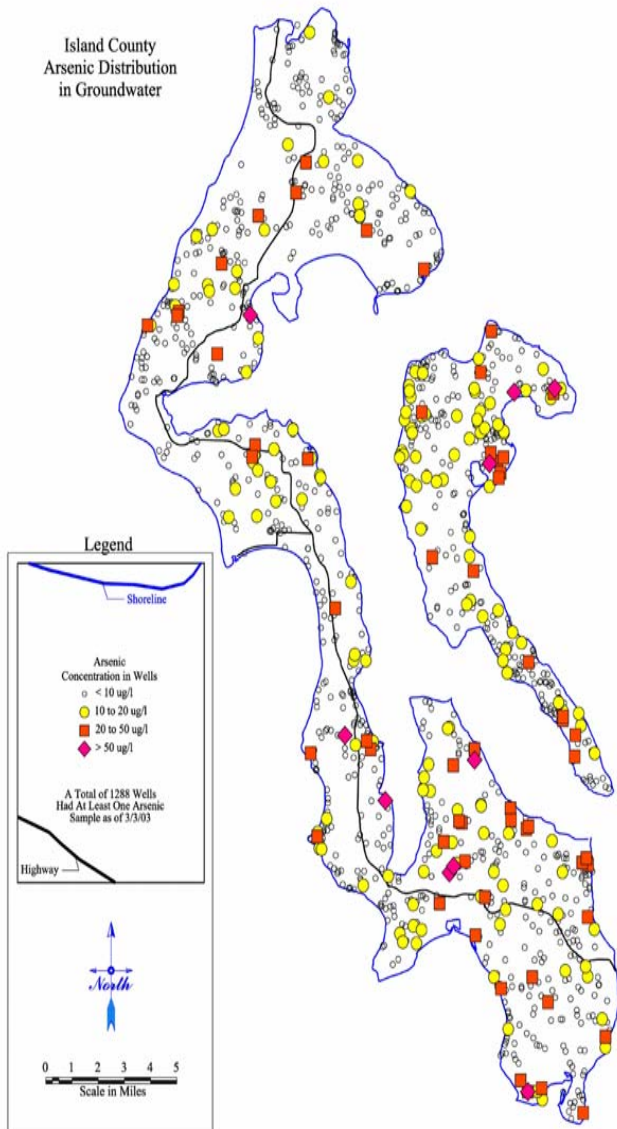
**Distribution of Fresh Water on Earth**



Treatment technologies to reduce arsenic in drinking water are available at point of entry (well) or point of use (drinking water tap) systems. Current cost estimates for Group B systems equate to an amortized annual cost (10 years at 7 percent) of \$150-\$400 per connection. The cost for those on Type A systems could range from \$175-\$350/year per household.

**Seawater Intrusion**

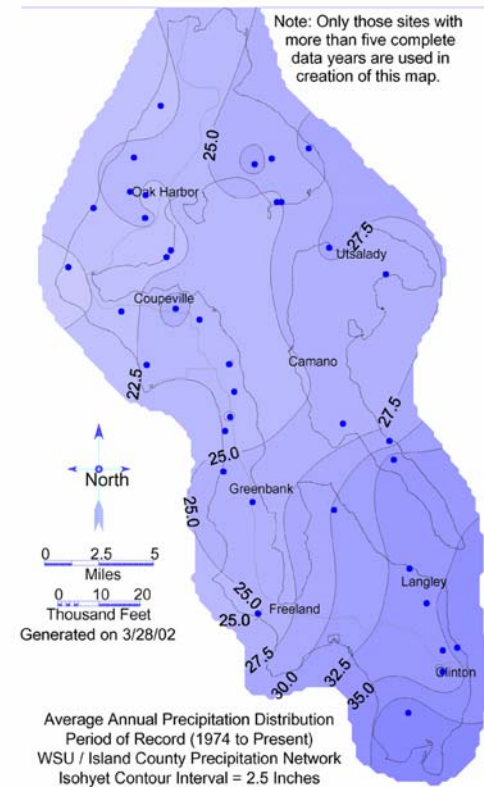
On Whidbey Island, seawater intrusion (the movement of



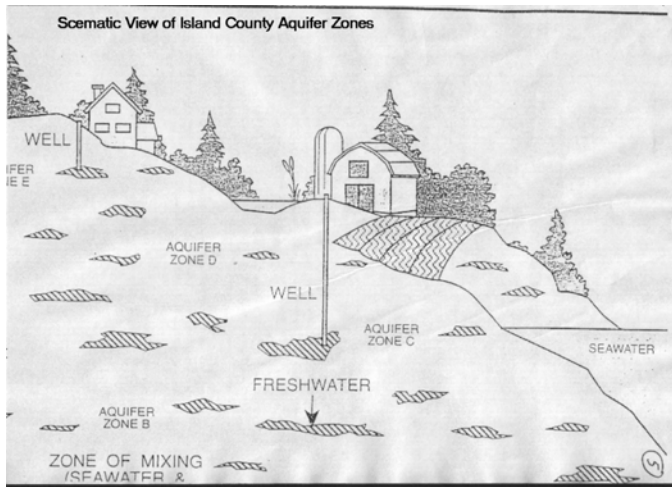
## Where Does Whidbey Island Get Its Water?

*Contrary to popular myth, there is no underground river that supplies water to the island.*

Current annual water use on Whidbey Island (WI) is about 1.5 billion gallons. Sixty to seventy-five percent of the Island's drinking (potable) water comes from wells drilled into underground aquifers. The remaining twenty-five to forty percent is obtained from the Skagit River, via pipeline from the City of Anacortes, and serves Oak Harbor and NAS Whidbey.



Precipitation is the sole source of the water we pump from our wells; in other words Whidbey Island is served by sole source aquifers. Annual rainfall on the island varies from about 20 inches near Coupeville to nearly 40 inches in the Possession Point area. Rainwater percolates through the soil to reach aquifers; a significant percentage of that water must remain in the aquifer after pumping to maintain water pressure sufficient to prevent seawater intrusion.



The exact number of aquifers on the island is not known. They are numerous, of varying sizes, and are located at many different depths. These differences account for the varying depths to which wells must be drilled to reach potable water.

and as pure. But today, when over 60 percent of the world's population does not have clean water to drink, we can't help but wonder about our own water here on WI. Will the Skagit River and our underground aquifers continue to supply us with the water we need? Will there be enough for future generations? To answer these questions, we need to consider the following factors which threaten our water supply in addition to the variables already mentioned.

### Pollution and Contamination

Our groundwater supplies may become contaminated from a number of sources. Pathogens and nitrates from our numerous on-site septic systems, pesticides and herbicides used in home gardens, and runoff of petroleum products from roads and paved areas may reach the water in our aquifers and wells. Runoff from industrial or military facilities can also be a problem.

Contamination of groundwater and rural drinking water by pathogens and nitrates is recognized as a potential public health hazard worldwide. Common sources of these include sewage-disposal systems, fertilizers, animal waste and decaying vegetation. Because of public health concerns, the USEPA set the maximum contaminant level (MCL) for nitrates in drinking water at 10 mg/L. The Island County Groundwater Nitrate Study in 1997 recommended source protection, monitoring and education to prevent exposure to nitrate levels above the MCL and prevention of further degradation of groundwater quality. Of all sources that contribute to contamination, residential use was ranked first in the North Whidbey Watershed Nonpoint Pollution Prevention Plan adopted in 1997. Since about two thirds of Whidbey Islanders rely on on-site septic systems, it is critical that these are properly sited and well-maintained.

Medicines and chemicals used in the home increasingly are the cause of contamination of groundwater. Pharmaceuticals and personal-care products (PPCPs), including aspirin, antibiotics, nicotine, caffeine, antibacterial agents and

reducing Coupeville's unaccounted water loss to about 8 percent (Washington State average is about 20 percent). Oak Harbor and Langley have also been successful in their respective programs to improve water use efficiency.

### **What Can Homeowners Do to Save Water?**

- Consider Xeroscape. Select plants, trees, and shrubs that need minimal water. Remember that 50 percent of household water (according to national data) is used for landscape watering and the remainder for drinking, bathing, etc.
- Consider drip irrigation for your plants, trees and shrubs.
- Mulch planted areas to reduce evaporation.
- Let your lawn go golden for the summer months. It will come back when the rains do.
- Reduce the size of your lawn; use drought-resistant groundcovers for much of the area.
- If your home is older, convert to water efficient toilets, faucets and showerheads.
- Take shorter showers.
- Don't let the water run when you are brushing your teeth, shaving, or hand- washing dishes.
- Don't use faucets at full pressure.
- Make sure you have a full load before running your washing machine or dishwasher.
- Buy the most water efficient appliances you can afford--e.g. front-loading washers use half as much water.
- Use a rain barrel or cistern to catch water from your roof for garden use

### **What Are the Threats to Whidbey Island's Water Quantity and Quality?**

We once believed that water was as free as the air we breathe

### **Washington Water Law**

Washington law states that water is a public resource held in trust for the people of the state. Individuals do not own water, they merely have a right to its use, and the state retains control over that use. Recognizing that water is a limited resource, the state legislature established a system of rights or permits to use water that sets forth the importance of water being put to a beneficial use. Washington's water code prohibits the non-beneficial use of water, which is defined as the waste of water and is a misdemeanor subject to penalties. Beneficial uses are defined by law. They include domestic, stock watering, industrial, commercial, agricultural, irrigation, fish and wildlife maintenance and enhancement, recreational, preservation of environmental and aesthetic values, etc.

In order to obtain a water right four criteria must be met:

- 1 Water must be put to beneficial use; i.e., not wasted
- 2 Water is available for appropriation
- 3 Water can be extracted without impacting senior or existing rights
- 4 Issuance of the requested right will not be detrimental to the public's welfare

### **Prior Appropriation Doctrine**

The requirement that water be put to a beneficial use is a fundamental part of the "prior appropriation doctrine." This doctrine essentially means "first in time is first in right;" i.e., the first person to use water has a superior right to those who use it at a later date. Each user has a date of priority determined by the date of his/her continuous and beneficial use of water. Some would argue that this discourages water conservation in that not using any or all of the water may lead to a reduction in or loss of one's right. It is estimated, with a great margin of error, that the rights issued over the

years exceed the amount of water available. This is a complex problem not easily resolved.

### **How Is Whidbey Island's Water Managed?**

The Washington State Department of Ecology (WSDOE) is responsible for issuing and managing water rights. It is also responsible for managing Washington's quantity and quality of surface and groundwater resources. Several agencies are involved in the regulation of public water systems. Among them are the United States Environmental Protection Agency (USEPA), the Washington State Department of Health (WSDOH), the Island County Health Department (ICHD) and the Island County Public Works (ICPW). Wells are regulated by WSDOE which issues permits to well drillers. To obtain a building permit from the Island County Planning Department (ICPD) the applicant must obtain Water Availability Verification from the ICHD which shows the applicant has a potable water source or is connecting to an existing water system. This is to comply with the Growth Management Act (GMA) which requires demonstrating that water is available before allowing growth.

State Water Code provides for three types of water systems:

- 1 Individual wells
- 2 Group B public systems (2 - 14 connections)
- 3 Group A public systems (15 and over connections including municipal)

and farms should be required to use water more efficiently to help keep streams from drying up.

Efficient water use will also save consumers money. By using less water, not only can water bills be lowered, additional savings may be realized from reductions and/or delays in capital spending to expand systems and through lower operation and maintenance expenses such as treatment plants, pumping and energy costs. A further benefit is that less water going into on-site septic systems makes these systems last longer.

When people pay very little for water, there is a greater tendency to waste it. The USEPA estimates that the average water bill takes 0.7 percent of US household median income while Americans spend three times that amount on bottled water and filters. Water rates generally are inadequate to cover long-range costs of pipes, plants, etc., let alone protect the resource. If water users paid a rate reflecting those extended costs and the cost of protecting the resource, water use efficiency would increase. One of several examples of this follows.

### **A Success Story**

One success story of increased water efficiency on WI is the town of Coupeville's, which has decreased per capita water consumption nearly 30 percent over a ten year period. Coupeville faced water shortages in the early 1990's, the threat of seawater intrusion and insufficient funds to make necessary improvements. In 1992 the town took action and decreased consumption the first year by 16 percent. The most effective method found to reduce demand was the use of tiered rates.

When people pay more, they use less. Continually educating consumers about water- saving practices and technology, and the summer surcharge, contributed greatly to the successful decrease in use. The town also offered a \$200 rebate to replace old toilets. In addition, a leak detection program, meter testing, and stringent accounting have resulted in

surface and groundwater. The revision of the Uniform Plumbing Code in the early 1990's greatly increased water efficiency in requiring the installation of lower water use fixtures for new or remodeled construction. New toilets and urinals are limited to 1.6 gallons per flush; showerheads, kitchen and bathroom faucets and replacement aerators are limited to a 2.5 gallons/minute flow rate.

In Washington State there is no way to account for 20 percent of the water entering the various local water distribution systems, i.e., it is not metered at the consumer (residence, business, farm, etc.) site. This amount includes unmetered consumption, leaks, flushing of water lines, meters not functioning properly, meters misread and a variety of other situations. Successful water supply management requires knowing how much water is actually being used.

As the population of Washington State and WI has grown over time, water use has increased dramatically. IC government and local citizens have been working on better water resource management since the 1970's. IC Watershed Plans are required to provide strategies for increasing water supplies in the management area through water conservation, water reuse, use of reclaimed water and voluntary water transfers. Use of these strategies is intended to supply water in sufficient quantities to ensure future supplies are available for agriculture, and population and economic growth under the GMA and to satisfy the minimum in-stream flows for fish.

Using water more efficiently is the most cost-effective way to meet competing needs for water. Conservation or efficiency is a much cheaper source of water supply than the cost of developing new water sources, storage, and supply systems. Improving water efficiency enjoys broad public support. A recent statewide poll conducted by the Washington Environmental Council revealed 65 percent of Washington voters support mandatory water conservation standards, and 79 percent agree that homeowners, businesses

Whidbey Island has:

- 1 Approximately 4500 known individual wells and an estimated total of 8000 individual wells
- 2 Approximately 169 two-party wells and 399 Group B systems
- 3 Approximately 202 Group A systems

The WSDOH oversees Group A systems. The ICHD oversees the individual wells and the Group B systems. In general, regulation of Group A systems is more stringent than B systems and requires more frequent sampling and more comprehensive testing.

### **Island County's Role in Protecting Water Resources**

Among its responsibilities the ICHD implements the Island County Code on Potable Water and Supply and complies with state and federal regulations for well site approvals, testing, and groundwater resource protection.

Because of the many miles of shoreline and ongoing concerns with seawater intrusion into aquifers, Island County (IC) is one of the few counties that employs a staff hydrogeologist and has a Sea Water Intrusion Policy (SWIP). The role of the hydrogeologist is to analyze and provide a scientific determination of whether or not a given project will have a detrimental impact upon IC's groundwater resources.

Creation of new parcels (short platting) or development of small water systems and individual wells on parcels less than 1.5 acres are subject to review under the SWIP. Proponents of such projects must prove that their withdrawals will not increase SWI or they must provide some other mitigation methods.

In 1992, IC adopted the section of the County's Waterworks Standards which specifies: any new public water system (A and B systems) will have both source and use meters; and any expanding system must be metered.

Since 1990, all new individual wells are required to be metered. Metering is critical to knowing how much water is used and to detect leaks so that less water is wasted. Meter readings are not required, however, and it is the individual well-owner's prerogative to monitor usage.

The ICHD has no ongoing program to monitor water usage by water systems or non-potable uses of water.

### **Skagit River Water**

The City of Anacortes has a water right by which substantial amounts of Skagit River water are reserved for its use in an agreement with the City of Mount Vernon and the Skagit Public Utility District. Oak Harbor's water contract with Anacortes has a 50 year history. It was last updated in March 2001 and the allotment is considered adequate for projected demand. Rates set by Anacortes are governed by the Washington State Utility Commission. Oak Harbor citizens have opportunity for input at City Council meetings when rate changes are proposed. Anacortes supplies the city of Anacortes, the Shell and Tesoro oil refineries, La Conner, and Oak Harbor. Oak Harbor in turn supplies water for NAS Whidbey, Deception Pass and Northwest Water District.

### **Efficiency**

The average number of gallons of water used per person per day in the United States is 170; in Washington it is also about 170. By comparison, In Beverly Hills, California, it is 500 gallons, in Europe it is 25 gallons, and in developing countries it is 5 gallons.

Since the 1970's efforts have been made on a state and local level to conserve and manage water resources efficiently. The state's 1971 Water Resources Act put water conservation at the forefront of water management and policy.

In the state many regulations and measures were implemented to promote conservation and efficient use of

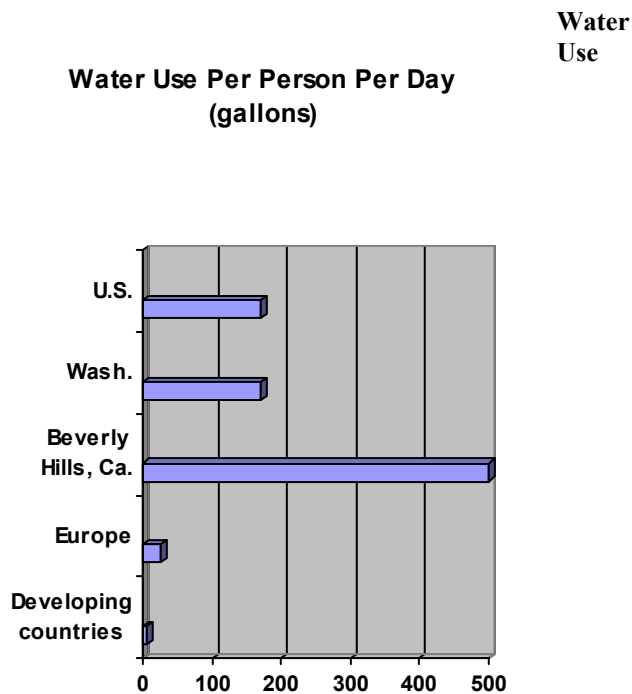
farms and equestrian activities.) Under the broad category of industrial uses are agricultural, commercial, and recreational uses. In Oak Harbor, for example, 78 percent is residential use and 22 percent commercial and industrial.

Agricultural uses include dairy farms, seed and hay crops, forestry and small commercial nurseries. Very little water is used for irrigation for farming on the island since water is not plentiful and is very expensive to pump.

Industrial uses include, for example, boat yards, cement plants, and other small commercial uses such as auto body shops, construction, car washes, golf courses, restaurants and motels.

The city has 3 wells in reserve (each with about a 0.3 million gallons/day capacity) kept ready for immediate use. The system includes 3 reservoirs.

In times of scarcity, e.g. if there were a protracted drought, water from Anacortes would not be cut off, but a stepped drought response program would go into effect. Industry and commercial use would be targeted first for reduced use; next would be voluntary residential restrictions on outdoor watering; and lastly mandatory residential restrictions on nonessential outdoor watering.



**Exempt Wells**

Due to staffing constraints at the WSDOE, a large backlog of water right applications has developed resulting in very long delays (years) between the application for a new water right and the processing of that application by the WSDOE. This delay has resulted in a proliferation of exempt wells (wells that do not require a water right) in Washington State. A well which pumps no more than 5000 gallons per day is considered exempt, which translates to six homes each using up to 800 gallons per day, or a “six pack”. Six packs have become a standard practice for the development community in dealing with the backlog of water right applications.

Island County is one of the fastest growing counties in Washington. There are now about 64,240 people on WI, 24,000 of these live in the Oak Harbor/NAS area. By 2025 it is projected that 100,000 people will be living in the county with 86-88,000 of them on WI.

**How is Water Used on Whidbey Island?**

The major water use on rural WI is for domestic purposes; i.e., homes and gardens. (Included in this category are hobby