WASHINGTON GROUND WATER CONDITIONS

Ground Water Importance:

About **61%** (3,702,000) of the 6 million plus people in Washington obtain their drinking water from ground water sources. Slightly more than half (51%) of the state's public water supply customers (2,756,000) depend solely on groundwater from nearly 16,500 groundwater-based public water supply systems. About 10% (600,000) are served by private individual wells in mostly rural areas.

Salmon and other fish depend on ground water inflow to streams during the summer. As much as 69% to 87% of baseflow in some streams is dependent on groundwater in late summer.

Where Is It?

Principal aquifers of Washington occur in glacial unconsolidated deposits, terrace/valley fill, and at the tops of flood lava flows of the Columbia River Basalt. Fractures in hardrock provide locally important but minor groundwater sources (USGS 1984).

Washington shares large important common aquifers with Oregon, Idaho, and Canada.

Yields of 1,000 to 3,000 gpm are common in the Columbia River Flood Basalts. In the Spokane Aquifer, coarse sand and gravel yields from 500 to 2,000 gpm. Yields vary greatly in the Puget Lowland glacial deposits from only enough for a domestic supply, to 10,000 gpm (USGS 1980).

How good is the water?

Groundwater is generally of good quality. Contamination concerns include nitrates, chlorides, total dissolved solids, organic contaminants, pesticides, pathogens, and arsenic.

There are several areas of the state where nitrates have been found above the MCL. Locally, where there are high nitrates in groundwater, the percentage can rise to levels on the order of 20 to 25% of the wells in some areas (including private wells). Statewide, less than 1.4% of public water supply systems reported nitrate values in excess of the MCL of 10 mg/L during 2002.

Washington State has identified nearly 9,000 toxic cleanup sites. Roughly 6,000 of these are the result of an underground storage tank leaking into the environment and contaminating the soil and/or ground water. Out of 3,352 cleanup sites, 580 are pending investigation, 1,483 require no further action, and 1,289 cleanups are in progress.

Several studies of pesticides in groundwater have been conducted by the state and the USGS over the past years. In general, pesticides above the MCL have been from banned products, such as EDB. Almost all other detections were below the MCL in these studies. However, detections of pesticides in wells below the MCL occurred, often with multiple pesticides in the same well. In a study by the state Dept. of Health and the USGS, pesticides were detected near or below the MCL in 6% of 1103 randomly selected public water supply wells.

A state Dept. of Health survey (1996, 1998) indicates that roughly 76% to 83% of private well owners had their well tested at least once, and that 6% of those tested reported contaminated well water. With respect to public water supply systems, The Health of Washington State Report (July 2002) states:

"In 2001 an estimated 84% of the population receive water from a public water supply regulated by the State. While nitrate and microbiological contamination are the most commonly occurring contaminants in these systems, fewer than 1% of the larger "Group A" water systems exceed the public health water quality standards in any one year. However, only 75% of these systems had completed the required microbial monitoring , and just over half had completed the required monitoring for nitrate."

Naturally high levels of arsenic have been found in groundwater in some areas of the state. Recent revision to the Safe Drinking Water Act standards for arsenic from 50 ppb to 10 ppb raises public health concerns for over 400 public drinking water systems in the state.

Costs of Contamination:

Costs of contamination are well-known to be immense, with individual sites costing in the millions of dollars. Specific total costs for sites are not easy to compile. The US EPA has estimated that an average cost of remediation of a CERCLA or RCRA site is in the range of 1 - 3 million dollars per site. Two specific Washington state examples are the City of Tumwater Palermo Well Field and the Boomsnub site:

Palermo Well Field:

- TCE, and PCE contaminated city wells
- Cost $3.9 million dollars
- Cleanup took more than six years

- Three of six city wells were closed for five years
- Two replacement wells were installed elsewhere

US EPA Fact Sheet Excerpt, 1995, on the Boomsnub site:

"An estimated $10 million will be spent in an attempt to save the city of Vancouver's water supply from contamination with hexavalent chrome."

Efforts to Protect Ground Water:

The statutory basis for groundwater protection in Washington are the Ground Water Standards. Other protection mechanisms include the Implementation Guidance for the Ground Water Quality Standards; the State Waste Discharge to Ground Permit program, General Permit requirements for facilities such as dairies, sand and gravel operations, and fruit packers; land application guidance; the Underground Injection Control program; water re-use regulations and guidance; on-site septic systems rule and proposed revisions; hazardous waste laws and regulations; pollution prevention; toxic cleanup laws and regulations; underground storage tank requirements; water rights laws and rules; well construction requirements; Ground Water Management Areas; watershed planning; source water protection (well head protection); and state-mandated growth management requirements that include aquifer protection; and the EPA Sole Source Aquifer program.

In the Mid-Columbia Basin, a Ground Water Management Area has been formed by three counties to address nitrate contamination of groundwater. Several other counties have formed GWMAs that include ground water monitoring and work with citizens on ground water issues.

The state legislature instituted and provided some funding for watershed planning by local entities, with cooperation from the state. Watershed planning includes mandatory ground water quantity planning, and optional ground water quality planning.

The State Dept. of Health administers the Source Water Protection Program. Under this program, all public water supply wells in the state have delineated (or will delineate) wellhead protection zones. These zones are mapped in GIS so that potential sources of contamination locations can be compared with well head protection zone locations via a website.

The state Growth Management Act mandates that Critical Aquifer Recharge Areas be protected by counties through planning, ordinances, permit decisions, and other mechanisms. The purpose of this requirement is to protect the community's drinking water supply in areas that are at higher risk of contamination. Local ordinances and programs have resulted from this requirement. In addition, local government has generated hydrogeologic information important for the protection of aquifers.

What Else Is Needed:

All of the following areas need more work and attention, especially in terms of technical assistance and funding.

Contamination issues: Prevention of toxic cleanup sites, arsenic, saltwater intrusion, nitrate, total dissolved solids, pesticides, pathogens and emerging contaminants (such as pharmaceuticals).

Water resource management issues: Climate change (less snowmelt), floods, drought, population growth and growing water needs, water law reform, water banking, water re-use, instream flows for endangered salmon.

Tools: More cohesive and comprehensive knowledge of hydrogeologic framework; local tools for ground water protection; support from federal government for funding, technology transfer, and technical assistance; better data and information management (especially use guidance, quality control and access); continued development of use of published scientific information; compilation on statewide/regional basis of information developed by local scale studies; far better public education and outreach.

Regulatory issues:

Improvement of fragmentation of laws, regulations, strategies, and plans for groundwater quality and quantity management; reconciliation of the Clean Water Act with groundwater protection needs (especially in terms of funding, mandates, and reporting);

Coordination between water areas: Flood, drought, groundwater mining, instream flows, stormwater, Underground Injection Control, ground water protection, surface water protection/cleanup, and meteorology/climate.