

Clean Water Herald

A Newsletter, to inform and update you about your Clean Water District



To: Watershed Resident

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CLALLAM COUNTY
ENVIRONMENTAL HEALTH/NATURAL RESOURCES
CLEAN WATER HERALD



CALENDAR OF EVENTS

Event	Date/Time	Location
Forage Fish of the Nearshore Strait of Juan de Fuca <i>by Anne Schaffer</i>	January 7 PM	Dungeness River Audubon Center
Septics 101 <i>by Clallam Co. Environmental Health Division</i>	January 22 6 - 8 PM	Call: 417-2258 to register
Field trip to Sequim & Dungeness Bays Concentrating on mid-winter waterbirds <i>by the Olympic Peninsula Audubon Society</i>	January 25 9 AM - 1 PM	North parking lot at John Wayne Marina
Septics 101 <i>by Clallam Co. Environmental Health Division</i>	February 12 6 - 8 PM	Call: 417-2258 to register
Olympic Coast National Marine Sanctuary <i>by Mary Sue Brancato</i>	February 19 7 PM	Dungeness River Audubon Center

Look for: Upcoming presentations on Shellfish in our Area & Salmon of the Dungeness AND a chance to get your feet wet conducting a stream study.

Call: the River Center for more information @ 681-4076

A special thanks to Ann Soule, our groundwater specialist.

CLEAN WATER HERALD

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Questions? Comments? Confused?

Call Val Streeter for the straight scoop and we'll include questions and answers in future updates.

Funded through a grant from WA Department of Ecology

WATER

Groundwater Guardian Designation



It's official! In October the Clean Water District Outreach Team received notification that we've been officially designated as the "Sequim-Dungeness Groundwater Guardian Community" by the Groundwater Foundation. We are one of 150 communities in 34 states to receive the national award, in recognition of our groundwater protection and education efforts. The Groundwater Guardian program supports, recognizes, and connects communities working to protect groundwater.

"Groundwater is vital to both the environmental and economic health of this community," says Steve Tharinger, Clallam County Commissioner, District 3. It's true - groundwater recharges our wetlands, streams, and bays, in addition to drinking water wells for all residents. As more people move to the area, there is more pressure on natural resources such as clean groundwater.

The Clean Water District is committed to promoting community understanding about groundwater. Recently we conducted water quality workshops, produced a display poster on protecting drinking water from contamination, and organized National Water Monitoring Day.



Students locating their watershed address on National Water Monitoring Day, October 18th, at the Dungeness River Audubon Center.

USGS, County, Tribe, and volunteer field monitors presented methods and monitoring objectives for surface and ground water to around 200 students from Sequim High School

WATER

Tests for your Well Water

It is recommended that well owners test their tap water for bacteria at least once per year, and nitrates at least every three years. The County lab located behind the Environmental Health desk is open for bacterial tests; however, for the time being, nitrate testing is not available. Several chemical labs located in the Puget Sound area are listed in the yellow pages under "laboratories." National-level services can be located using the internet. Check whether the lab runs the test you need, and whether it offers sample collection services for this area.



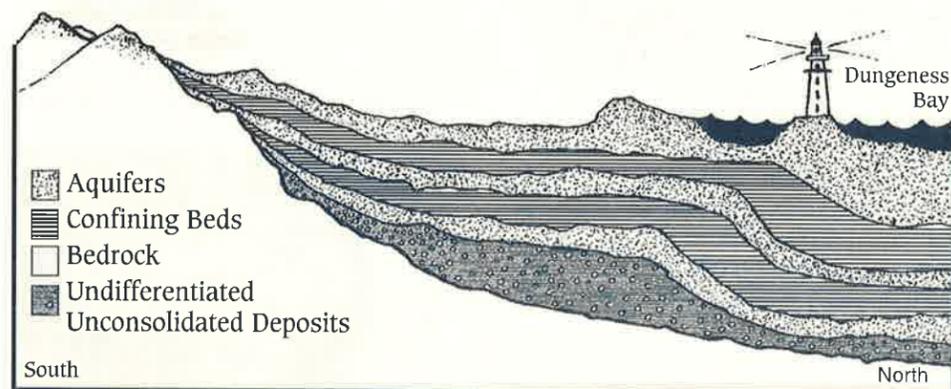
The Clean Water Workgroup has been discussing the issue of siting wells and the proximity of septic systems with Department of Ecology. Clallam County Environmental Health Division has authority over where a septic system is installed, ensuring that it is setback from buildings and wells. However, the Department of Ecology has authority over the siting of a well, and well, they trust the good judgement of the well driller and property owner.

SO, be informed. Know where your septic is and where YOUR NEIGHBORS' systems are. Be aware that long thin parcels (like bluff view property) are particularly vulnerable to problems with well and septic system siting. A neighbor's septic may make up to 100 feet of your property unsuitable for siting a well. Contact the Clallam County Environmental Health Division for any available information about drilling a well.

The Water Beneath our Feet

A 4-year U.S. Geological Survey (USGS) study published in 1999 describes the Sequim-Dungeness groundwater system in detail. Similar to a layered sponge cake with fudge frosting, our groundwater system contains three aquifers separated by "confining layers" (see diagram). Like the fudge frosting between the cake layers, the confining layers are clay soil, separating the aquifers (i.e. groundwater). In the Sequim-Dungeness groundwater system, the top aquifer is

"unconfined," which means that water infiltrating from the surface does not usually encounter a clay layer before it reaches the water table. The top aquifer is typically around 100 ft. thick, and provides water to about 75% of wells. There are two more aquifers below this top aquifer, each separated by a confining layer. The two lower aquifers are considered "confined" aquifers, because the clay confining layer separates them from the water above.



The Groundwater in Our Area

Are you concerned?

- > "I'm concerned that my well will go dry if they pipe all the irrigation ditches."
- > "The farm near here is polluting my well."
- > "With so many new houses going up we're ALL going to run out of water."

"I would love to have simple solutions to these concerns," says Ann Soule, water resources planner with the Clallam County Natural Resources Division, "but they are difficult issues. In general, groundwater issues are complex and very difficult to resolve – largely because the evidence is buried underground!"

Soule reports that the Sequim-Dungeness area naturally has a good groundwater supply. However, she notes that in past years the groundwater level was artificially high, due to decades of flood irrigation and a leaking irrigation ditch system, which raised the water table by several feet across the region. Since then, the shallow groundwater table has dropped as much as 10 feet in some areas of the Sequim-Dungeness Valley, because hundreds of domestic wells have been installed each year, and over the past 30+ years commercial irrigation has become more efficient. As a result, many residents who drilled their wells in the 1970s, when the water table was probably at its highest, have since had to deepen their wells.

Groundwater contamination found in the Sequim-Dungeness area is mostly due to nitrate or bacterial pollutants which come from a variety of sources. Bacterial contamination in a well results from human or animal waste entering the well from the ground because of a poor seal. Since this a local problem, bacterial contamination in a well can usually be easily remedied. A more difficult issue to remedy is nitrate contamination. Decades of fertilization and releases of animal and human waste has reached the groundwater, which has caused widespread nitrate

Pressure determines the direction of groundwater flow. Groundwater moves away from areas of high pressure to areas with lower pressure. The 1999 USGS Study found that groundwater in our region generally flows from south to north. About 35% of the water "recharging" the groundwater system (all three aquifers) came from leakage from the Dungeness River and irrigation system.

What is an aquifer?

Underground areas where groundwater exists in sufficient quantities to supply wells or springs are called **aquifers**, a term that literally means "water bearing." Aquifers store water between particles of sand, gravel, soil, and clay, as well as cracks and fractures in hard rock. There are confined and unconfined aquifers. If the aquifer is sandwiched between layers of clay or other relatively impermeable material, it is a confined aquifer. In contrast, an unconfined aquifer has no confining layer above it, and is generally closer to the land surface. Therefore an unconfined aquifer is more susceptible to surface contamination.

(source: EPA's "Citizen's Guide to Groundwater Protection," 1990.)

contamination in the upper Sequim-area aquifer. While nitrate concentrations in groundwater are much lower than health standards in most areas – this is

not true everywhere (see related article about Agnew).

Recent research, compiled and collected by the US

Geological Survey (USGS), has shown that in our area in general nitrate levels are on the rise.

To further understand groundwater in our area, consultants are now constructing a computer model of the aquifer system that will simulate groundwater flow and the annual cycle of recharge (adding water) and discharge (removing water) in the aquifer.

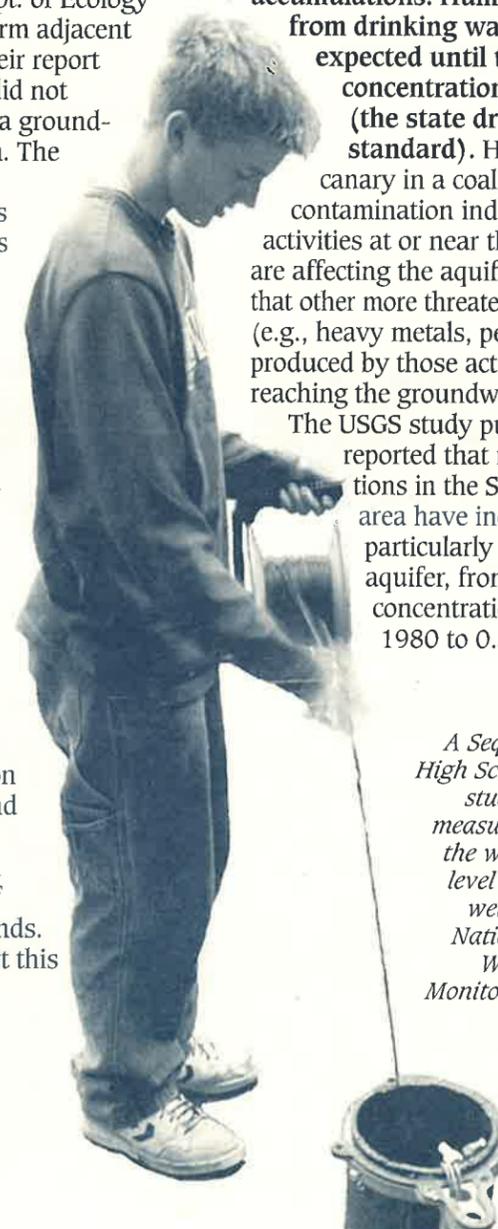
"This groundwater model will allow us to ask 'What if...?' questions, which is exactly what we need for effective water resource management in this area," said Soule, a licensed hydrogeologist. Expected to be completed next year, other questions for the model will examine the impacts from residential growth and urbanization on the aquifers.

The Agnew Area

Clallam County Environmental Health Division took samples from six wells in the Agnew area for nitrates monthly, since late 1999, because earlier well samples in the area exceeded the state drinking water standard of 10-parts per million (ppm) for nitrate. Results from these monthly tests show consistently high levels (8 to 20+ ppm) of nitrate in five of the six wells. The results have been quite steady, with no apparent increasing or decreasing trend over the 2.5-year sampling period. Unfortunately, the County sampling program was discontinued this summer, due to staff changes, and continued investigations will be limited to grant programs.

In 2000, the State Dept. of Ecology inspected the dairy farm adjacent to these wells, and their report states that the dairy did not appear to be creating a groundwater quality problem. The dairy follows best management practices (BMPs) and continues to improve the waste management system. For example, the dairy now collects drainage from silage, a potential source of nitrates identified by the Clallam Conservation District.

Ecology is finishing its own study of the water quality in eight wells in Agnew and Carlsborg over a two-year period. This research will examine the current distribution of nitrate, bacteria, and other constituents of groundwater, and will include an analysis of potential seasonal trends. We can expect a report this winter.



A Sequim High School student measuring the water level in a well on National Water Monitoring day

Nitrates in the Water

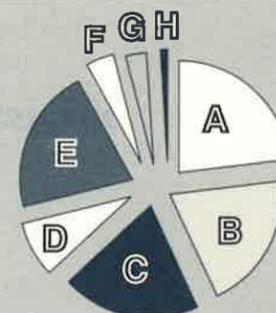
The amount of nitrates in the groundwater indicates how clean our aquifers are. Because nitrates dissolve in water, they can move quickly into the groundwater. A variety of sources, such as septic systems, animal waste, or fertilizers, introduce nitrates to the environment. Even pristine watersheds might have trace levels of nitrate in groundwater. Nitrogen compounds, when naturally introduced into the environment, are easily taken up by growing vegetation, which in turn, may contribute excess nitrates to the groundwater, when it dies.

Levels of nitrate in groundwater greater than one part per million (ppm, or 1 mg/L) indicate unnatural accumulations. Human health effects from drinking water would not be

expected until the nitrate concentration exceeds 10 ppm (the state drinking water standard). However, like a canary in a coal mine, nitrate contamination indicates that activities at or near the ground surface are affecting the aquifer, which means that other more threatening contaminants (e.g., heavy metals, pesticides, etc.) produced by those activities could be reaching the groundwater, as well.

The USGS study published in 1999 reported that nitrate concentrations in the Sequim-Dungeness area have increased over time, particularly in the shallow aquifer, from a median concentration of 0.35 ppm in 1980 to 0.53 ppm in 1996.

The amount of nitrogen (including other forms, nitrate, nitrite and ammonia) entering the groundwater system was **estimated for eight sources:**



- A = Residential Fertilizers 23%
- B = Septic Systems 20%
- C = Commercial Ag. Fert. 20%
- D = Dairy Farms 8%
- E = Soil Mineralization 21%
- F = Precipitation 4%
- G = Dry Atmos. Deposition 3%
- H = Steam/Ditch Leakage 1%

Given these numbers, it is not surprising that water quality was found to be worse under residential and agricultural areas than under natural grasslands or forests. In groundwater under residential areas, nitrate concentrations had medians of 1.3 ppm; under agricultural areas the median was 0.5 ppm of nitrate, while the groundwater under natural grasslands or forests showed only 0.1 ppm of nitrates.

Eight tips EVERYONE can do... to Protect and Conserve their Groundwater

1. Call Co. Environmental Health 417-2258 to find out how to dispose of household chemicals.
2. Take used motor oil to a recycling center.
3. Limit the amount of fertilizer on plants.
4. Bury or dispose of pet waste
5. Be sure detergent and bleach use is compatible with septic functioning.
6. Run full loads of dishes and laundry.
7. Water plants only when necessary.
8. Landscape with native vegetation.

(source: The Groundwater Foundation)

WATER