

SWiG Update

Southern Willamette Groundwater Project

May 2003

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Possible Groundwater Management Area Declaration

Groundwater nitrate levels above natural concentrations are common in wells throughout the valley floor of the Southern Willamette Valley between Eugene and Albany. This conclusion is supported by several different groundwater studies conducted over the past ten years.

According to the **Groundwater Quality Protection Act** of 1989, the Department of Environmental Quality (DEQ) must declare a **Groundwater Management Area** (GWMA) if nitrate levels at or above 7 mg/L* are confirmed in a widespread area and suspected to originate from non-point sources.

At this time, DEQ is evaluating the data to determine if a GWMA needs to be declared in the Southern Willamette Valley, and if so what the geographic boundaries will be. It is anticipated that an announcement will be made this summer.

If a Groundwater Management Area is declared, DEQ will establish a local GWMA committee made up of affected citizens and other interested parties. The GWMA committee, in collaboration with state agencies, will develop a groundwater management plan to address the contamination issues. Some strategies for groundwater protection may include public education, demonstration projects, and development of best management practices specific to this area.

Nitrates in Groundwater Research

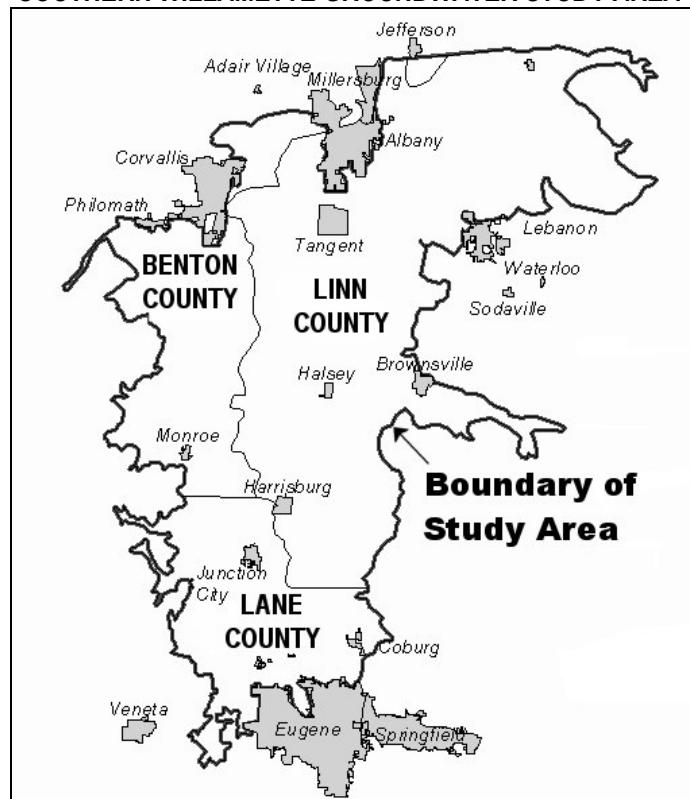
DEQ sampled 476 wells throughout the study area (see map below) in 2000 and 2001. About 100 of those wells had nitrate at or above 7 mg/L.

In 2002 DEQ resampled the wells from the 2000-2001 study that had nitrate values greater than 7 mg/L. In addition to nitrate, the 2002 study also analyzed samples for pesticides and a number of other indicators. Nitrate values were fairly consistent with previous levels. Fifteen different pesticides were detected at very low concentrations.

The successive sampling and analysis over a 1.5 year period of time (December 2000 to July 2002) provides supporting information that some portions of the shallow groundwater in the Southern Willamette Valley Study area have sustained nitrate levels above the 7 mg/L criterion.

A complete report of this research is available from DEQ and will be posted on this project's web site at <http://groundwater.oregonstate.edu/willamette>. See contact information at the end of this update.

SOUTHERN WILLAMETTE GROUNDWATER STUDY AREA



*milligrams per liter is equivalent to parts per million (ppm)

Geology, Soil Type and Nitrate Levels

While it was long believed that excess nitrate below the rooting zone would end up in groundwater, that may not always be the case. New research being conducted through Oregon State University in the Northern Willamette Valley indicates that the Willamette silt soils may actually reduce the level of nitrate reaching the groundwater. The silt layer is much thinner in the Southern Willamette Valley than further north. A research project to investigate the effects of silts on nitrate in groundwater in the Southern Willamette Valley is beginning this summer.

DEQ staff are examining geologic maps and correlating them with measured nitrate levels. Most, but not all, of the wells where nitrate levels were above 7 mg/L occur in the alluvial soils along the Willamette River. Areas with a layer of silt soil at the surface tend to have lower nitrate levels.

Groundwater Education

At a recent workshop held in Junction City attended by 65 people, including agency staff, researchers, and local residents, a variety of groundwater education strategies were suggested as a way to address the need for groundwater protection in the area. These included classroom visits, public presentations, community events, mailings and pretty much anything else that could inform the public of changes they can make to help reduce contamination to groundwater.

A SWiG Outreach Team to follow through on this recommendation is being formed. Gail Andrews of OSU Extension is spearheading this effort. She invites you to participate in one of three ways:

- **Join an informal advisory group** to map out an overall outreach strategy—one face-to-face meeting to brainstorm ideas, and the rest can probably be done with e-mail.
- **Help with outreach activities:** do presentations, write articles, or be an extra hand at events.
- **Sponsor groundwater education** activities, such as meeting speakers, fair booths, and newsletter articles.

Please contact Gail Andrews to get involved!

For more information contact:

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What IS Nitrate and Why is it a Problem for Groundwater?

Nitrate (NO_3^-) is a naturally occurring form of nitrogen. As dead plants and animals decompose, some of the nitrogen that was once proteins in these living things ends up as nitrate. Nitrate dissolves very easily in water, and because it has a negative charge, it is repelled by soil, not held by it.

Nitrate is also the form of nitrogen taken up by the roots of most plants. This explains why fertilizer with nitrogen in the NITRATE form caused grass to green up so quickly—it is ready for the grass roots to take in immediately without any conversion in the soil. The problem with nitrate in the groundwater arises when there is more nitrate in the soil than plants can use and there is water—heavy rains or irrigation—to carry it below the root zone.

High levels of nitrate in drinking water can contribute to a type of “blue-baby syndrome” called methemoglobinemia. For this reason, the public drinking water standard has been set at 10 mg/L of nitrate. This means that if a water supply had nitrate above that level, the public water system must either treat it, which is very expensive, or locate another source, which is also costly. New research suggests that there may also be some negative health effects for the general population consuming water with nitrate, even at levels below 10 mg/L. This may have implications for future drinking water standards.

Natural levels of nitrate may come from decomposition of leaves or from high levels of organic matter in soils. Nitrate in groundwater from these sources rarely exceeds 1 mg/L. When nitrate levels are measured above 1 mg/L it is usually an indication that human activities have contributed more nitrogen than the plants and soils can process. Some sources of this nitrogen include septic systems, manure storage facilities, fertilized crops, lawns, and food processing waste.



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