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NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
GROUND WATER AND ECOSYSTEMS RESTORATION RESEARCH

Characterization of Ground Water Contamination by Nitrates, Bacteria, and Other Contaminants in Yakima River Basin

Project Type

This is an EPA Region 10 Regional Applied Research Effort (RARE) project established between EPA's Ground Water and Ecosystem Restoration Division (Steve Hutchins, Project Officer) and EPA Region 10 (Theogene Mbabaliye, Project Officer). It provides research and analytical support to an ongoing EPA Region 10 project (Curt Black, Project Coordinator).

Project Period

January 1, 2010 to present

Project Summary

Ground water sampling data from 1990 through 2008 in the Lower Yakima Valley of Washington State has shown as many as 12 percent of area wells to be contaminated above the drinking water standard for nitrate (10 milligrams per liter) and about 20 percent to demonstrate bacterial contamination. These wells tend to be shallow and in many cases are primarily used by tribal members of the Yakima Nation or Spanish-speaking families participating in the local agricultural economy. While no systematic testing of private drinking water wells is done by any level of government, sampling for nitrate has been conducted in the lower valley for decades. Despite this testing, today Yakima residents still have no way to link land uses to observed adverse effects in the quality of their ground water. Potential sources of nitrate include rural residential septic systems, low-density animal husbandry, application of chemical fertilizers and manure to agricultural crops, spray-field application of nutrient-rich wastewaters, and concentrated animal feeding operations.

EPA Region 10 is working to assess which activities on the land are contributing excess nitrate to the shallow ground water. This RARE effort will contribute to this assessment by providing supplemental analyses of multiple trace organic compounds which potentially can be used for source tracking of ground water nitrate. The EPA Region 10 project is organized into three phases. Phase 1 includes the development of a geographical information system (GIS) tool to organize the large amount of historical information and to allow the examination of the landscape for spatial patterns in that data. Phase 2 will be to locate current drinking water wells with nitrate levels over the Maximum Contaminant Level downgradient from potential nitrate contaminant sources. Phase 3, the focus of this RARE effort, will involve selection and sampling of the highest nitrate concentration wells identified in Phase 2 (along with other control wells and source waters) for a wide range of potential tracing or linking compounds that may be traveling with the nitrate. These compounds include estrogens, androgens, veterinary and human antibiotics, agricultural

chemicals, personal care products, human medications, and compounds (such as caffeine), along with selected degradation byproducts. These compounds could potentially identify, or link back to, the land use from which the nitrate came. This may help determine which practices or activities are protective of continuing ground water quality and which activities are threats to the ground water resource.

Products

An EPA report is planned.

Contact

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