



News Release

U.S. Department of the Interior
U.S. Geological Survey

Release	Contact	Phone	Address
May 14, 2004	Stephen Anthony	808-587-2406	677 Ala Moana Blvd
	Email santhony@usgs.gov	Fax 808-587-2401	Suite 415 Honolulu, HI 96813

Oahu Aquifers Generally OK, but Urban Streams Are Substantially Degraded, USGS Report Shows

A 3-year study by the U.S. Geological Survey (USGS) detected many chemicals in Oahu ground water, but concentrations of those chemicals were below drinking-water standards in all but a few cases. Streams were found to be more contaminated than ground water, particularly where streams pass through developed urban and agricultural lands.

Results of the USGS assessment suggest that fish may be more at risk than humans from chemical contaminants because Oahu streams are not used for drinking water, but they are home to fish and other aquatic animals, said Stephen Anthony, USGS Project Chief of the study. Besides the threat from chemicals, physical factors such as siltation, stream diversions, and high water temperatures also degrade stream habitat, particularly for native species.

More than 90 percent of the public water supply comes from aquifers in Honolulu and central Oahu that were the subject of USGS study. The USGS sampled 30 randomly selected supply wells and 15 monitor wells, including Board of Water Supply, military, institutional, and private wells. Because researchers collected raw aquifer water at the wellheads, the study results are more reflective of water quality in the aquifer than of “finished” drinking water that has been treated or blended prior to public distribution.

Several classes of chemicals were common in Oahu ground water. Of some 80 similar USGS studies, Oahu ranked first in the nation in the percentage of wells in which fumigants were detected, and third in the nation for solvents. Fumigants have long been applied to pineapple fields to combat nematodes (rootworms), and solvents are mostly used as cleaners and degreasers. Various pesticides, fertilizer nutrients, and other natural and man-made chemicals also were detected and quantified by the study.

“The good news for ground water is that concentrations of the detected chemicals were low, typically less than one part per billion,” said Anthony. Concentrations exceeded federal drinking-water standards in only two wells, one for the solvent trichloroethene, and one for the natural radioactive gas radon. Four wells exceeded more stringent state standards for the fumigants DBCP and TCP. Where standards were exceeded, the wells already had been taken out of service or were receiving treatment to remove the contaminants, Anthony noted.

125 years of science for America



1879–2004

U.S. Department of the Interior
U.S. Geological Survey

Ground-water contamination in central Oahu is a legacy of decades-old land-use and chemical-use practices, said Anthony. Fumigants, pesticides, and fertilizers were applied widely for agriculture, and chemicals not used since the 1970s and 1980s are still present in the aquifer today. Solvent contamination is thought to have originated from World War II-era aircraft and automotive shops, although exhaustive studies by the military services were unable to pinpoint exact sources.

“Honolulu ground water was surprisingly uncontaminated despite extremely high urban density there,” said Anthony. “This is due largely to a century of watershed protection by local agencies that directed chemical use and storage away from upland recharge areas of the aquifer.”

Streams on Oahu were sampled for chemicals in water, fish, and bottom sediment. Ecological surveys determined how many of each species of animal were present, and measured habitat variables such as stream depth, width, bed material, and amount of vegetation.

Few native fish such as o’opu (Hawaiian goby) were found in the sampled streams, although it is unclear whether this is due to chemical contamination, stream habitat changes that interfere with migration, or because introduced species have eaten the native fishes. Invertebrates (animals having no backbone, such as worms and fly larvae) were found to be good biological indicators of stream health, and invertebrate surveys are being continued on other Hawaiian streams by USGS and state biologists.

The study found that several chemicals in stream water and bottom sediment exceeded guidelines established to protect the health of stream animals and fish-eating wildlife. Sediment concentrations of the pesticides dieldrin, chlordane, and DDT were in the highest 5 percent of streams sampled nationally by USGS, and similarly high concentrations were present in fish tissue. “However,” said Anthony, “concentrations have decreased by factors of 7 to 200 since the 1970s.”

Dieldrin and chlordane were highest in urban areas where they were used to kill termites, and DDT was highest where it had been used for agriculture. All three chemicals are persistent in the environment, and concentrations are still high even though the chemicals haven’t been used since the 1970s and 1980s.

Fertilizer nutrients were detected in streams, both during storms and at low flow, when most of the streamflow is supplied by ground-water seepage to the stream. Nutrients entering coastal waters of Oahu may contribute to coral reef degradation by fertilizing and fostering algae growth.

Copies of the USGS report, "Water Quality on the island of Oahu, Hawaii, 1999-2001" published as USGS Circular 1239 are available free of charge by writing the USGS Branch of Information Services, Box 25286, Denver Federal Center, Denver, CO 80225 (or by calling 1-888-ask-usgs). The report also can be accessed on the World Wide Web at http://water.usgs.gov/nawqa/nawqa_sumr.html .

The USGS assessment is part of a national program currently releasing results on streams and ground water in 14 additional major river basins and aquifer systems. Findings of regional and national interest are highlighted in a separate report "Water Quality in the Nation's Streams and Aquifers--Overview of Selected Findings, 1991-2001." Check the status and availability of these reports on the NAWQA website, as well as accessibility to other publications and national data sets and maps.

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.