
News Release

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

Release
January 22, 2001

Contact
Carl R. Goodwin
USGS State Representative, Florida

Address
U.S. Geological Survey, Florida District
227 N. Bronough St., Suite 3015
Tallahassee, Florida

Phone (850) 942-9500, ext. 3011
Fax (850) 942-9521

Website <http://fl.water.usgs.gov>

USGS: Nutrients, Mercury, and Pesticides are Implicated in Water-Quality Degradation in the Everglades and Other Southern Florida Basins



Photograph of USGS fish sampling in Big Cypress Swamp as part of the southern Florida NAWQA study.

(Photograph and news release are available for download at <http://fl.water.usgs.gov/News/SFLNAWQApr.html>.)

The U.S. Geological Survey (USGS) announced today that agricultural practices and urban development have greatly reduced the diversity of native plant and animal life in the Everglades because of drainage, alteration of water flows, degradation of water quality and the continuing invasion of exotic species. The USGS National Water Quality Assessment (NAWQA) in southern Florida documented conditions in surface and ground waters of the region during 1996-98. Federal and State agencies and environmental groups have recently reached a consensus that parts of southern Florida should be restored to predevelopment conditions. Restoration will require massive changes in the water-management system to restore predevelopment drainage patterns, improve water quality, and protect native biota. The USGS report will be used by decision-makers in an effort to make informed management decisions to restore and protect the Everglades.

Major findings on surface water and biology from the USGS southern Florida NAWQA assessment

—Phosphorus concentrations in parts of the northern Everglades are above background levels and above the U.S. Environmental Protection Agency (USEPA) Everglades water-quality standard of 0.01 milligrams per liter. The Everglades ecosystem, which is adapted to water that has extremely low phosphorus concentrations, is being altered. Too much phosphorus from fertilizers used in agriculture and pesticides can cause algal blooms and decreased oxygen in the aquatic habitats - oxygen that is necessary for fish and other aquatic life to survive.

—Pesticides are detected in most water samples, but concentrations are usually below aquatic-life criteria. However, the criteria does not address potential effects of mixtures of pesticides and their degradation products, which are common in the water samples. Organochlorine pesticides, such as DDT and its degradation products, are still prevalent in bottom sediment and fish tissue in the Everglades and other basins, even though most uses of these pesticides have been discontinued in recent decades. The mobilization of these pesticides by reflooding of the Everglades farm lands, planned for restoration, could lead to food-web contamination.

—The USGS assessment indicates that mercury has accumulated in game fish and other parts of the food web because human influences and natural conditions enhance methylation of mercury to its organic form, methylmercury. The enrichment of methylmercury enhances mercury uptake by fish and other biota. As a result, the Everglades ecosystem has one of the highest ratios of methylmercury to total mercury in bottom sediment of 21 NAWQA basins studied nationwide.

—The frequency of external anomalies (lesion, ulcer, and tumors) on fish are common at some Everglades agricultural canal sites. These anomalies can indicate that fish are stressed by contamination.

Major findings on ground water from the USGS southern Florida NAWQA assessment

The USGS reports that ground water in the surficial aquifers, such as the Biscayne aquifer, is of good quality and usually meets Federal and State drinking water quality standards. Contaminants are usually in low concentrations presumably because of rapid flushing and recharge as a result of high annual rainfall (about 55 inches) and shallow aquifers of porous limestone that allow easy interchange between surface and ground water.

—Most nitrate concentrations are below drinking water standards (10 milligrams per liter).

—Pesticides were detected in 85 percent of the shallow ground water samples and beneath every type of land use studied. Pesticides detected were associated with specific land uses.

—Radon-222 radioactivity exceeded the proposed USEPA maximum contaminant level of 300 picocuries per liter in the majority of samples from the Biscayne aquifer, including untreated water from the public-supply wells.

—Volatile organic carbon compounds were detected in water from shallow and deep wells in the Biscayne aquifer. Concentrations of one industrial compound, vinyl chloride, exceeded the USEPA maximum contaminant level for drinking water.

The USGS report, “Water Quality in Southern Florida, Florida, 1996-98” by Benjamin F. McPherson, Ronald L. Miller, Kim H. Haag, and Anne Bradner, published as USGS Circular 1207 is available free of charge from the USGS Branch of Information Services, Box 25286, Denver Federal Center, Denver, CO 80225, (303) 202-4700 (fax request to (303) 202-4693). The Circular may be viewed on the World Wide Web as downloadable portable document files (PDF) at <http://water.usgs.gov/nawqa>.

The USGS assessment is part of a national program, currently releasing results on surface and ground water in 15 additional major river basins. Check the status and availability of the individual basin reports on the NAWQA website.

As the nation’s largest water, earth, and biological science and civilian mapping agency, the USGS works in cooperation with more than 2,000 organizations across the country to provide reliable, impartial, scientific information to resource managers, planners, and other customers. This information is gathered in every state by USGS scientists to minimize the loss of life and property from natural disasters, contribute to the sound conservation, economic and physical development of the nation’s natural resources; and enhance the quality of life by monitoring water, biological, energy, and mineral resources.

For additional information contact:

Benjamin F. McPherson, Project Manager, Southern Florida (SOFL) National Water Quality Assessment
(813) 884-9336, extension 126 (bmcphers@usgs.gov).