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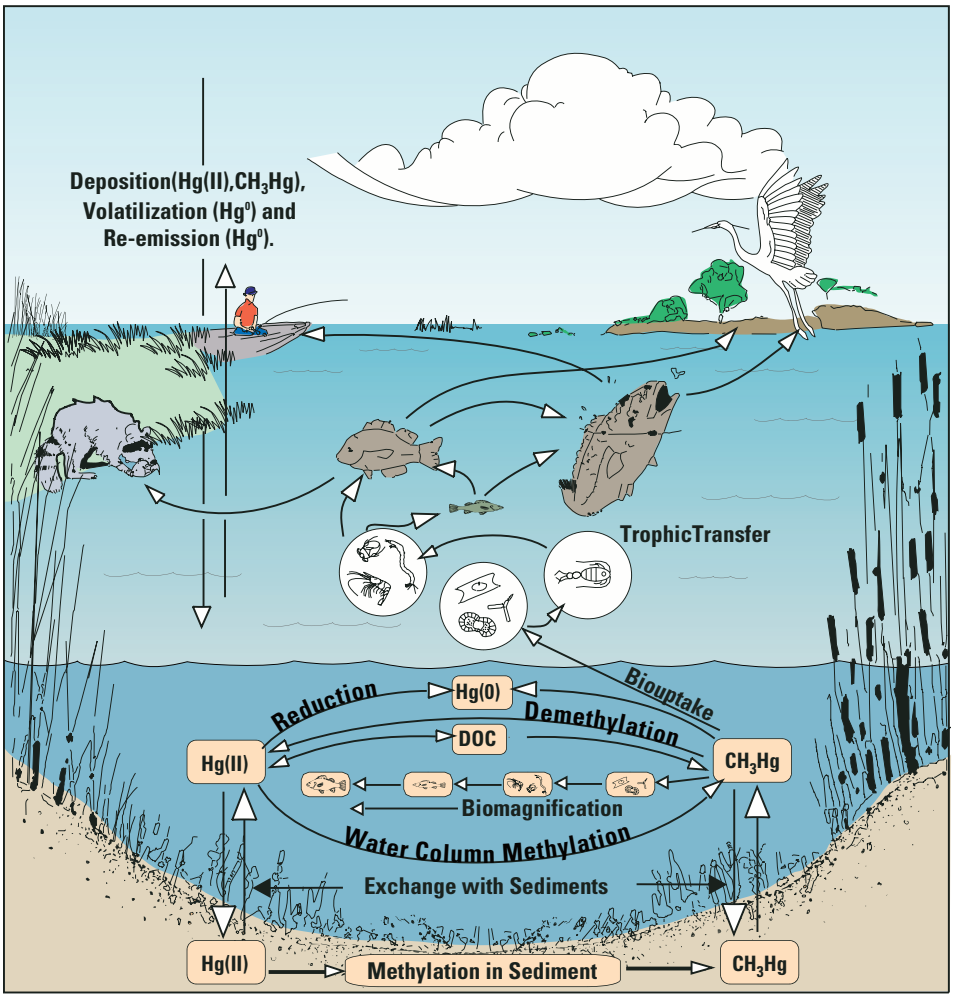
Summary of Greater Everglades Ecosystem Restoration Workshop: 5. Contaminants and Biogeochemistry, May 29, 2002

The Workshops

During April and May 2002, the United States Geological Survey's (USGS) Greater Everglades Place Based Studies (PBS) held five information workshops in south Florida to discuss the status of greater Everglades ecosystem research, and to solicit suggestions for additional studies from greater Everglades restoration partners. The Contaminants and Biogeochemistry Workshop was held at NOVA Southeastern University in Fort Lauderdale on May 29, 2002.

Background

The greater Everglades restoration program is prescribing ecosystem-wide changes to some of the physical, hydrological, and chemical components of this ecosystem. The ability to accurately understand the complex interactions between contaminants, nutrients, hydrology, and other related process within the present-day and the unaltered (prior to significant human alteration) greater Everglades ecosystem is crucial for the success of greater Everglades ecosystem restoration and successful implementation of the Comprehensive Everglades Restoration Plan (CERP). Information on contaminants and biogeochemistry of the system allows restoration planners to establish realistic baseline conditions, restoration goals, and performance measures; create predictive models; and monitor the success of restoration efforts.



Theoretical mercury cycle within the Everglades

Many organizations and programs are dependent on scientific knowledge and more accurate models for restoring the greater Everglades ecosystem. These include federal, state, and local agencies, Native American tribal governments, as well as private organizations.

Research Needs

Research needs, including those directly related to contaminants and biogeochemistry and those relevant to other research topics, were compiled during the workshop based on discussions among the represented organizations and individuals having interests and roles within greater Everglades restoration. For the purpose of this summary, these needs have been subdivided into 1) contaminants, 2) wildlife effects, and 3) biogeochemistry.

Contaminants

Determine relative contribution of local, regional and global sources

to mercury deposition within south Florida.

Forecast mercury fate and toxicity due to structural and hydrologic changes during CERP implementation.

Determine mercury methylation / demethylation rates and factors affecting these rates.

A general predictive tool is needed to determine mercury methylation potential based on inputs of soil type, mercury, sulfur, DOC concentrations, hydroperiod, fire and drought. A tool is needed as a stopgap measure for near-term activities using existing research.

Determine if increased Everglades flows will increase mercury delivered to Florida Bay. Will increased flows scavenge mercury or methyl mercury associated with particles or sediment, and/or increase loading of dissolved mercury or mercury associated with DOC/colloids?

Determine if lower salinities within Florida Bay, which will result from increased flow within the Everglades, will enhance mercury methylation.

Determine possible impacts of aluminum, iron, and chloride on mercury methylation rates.

Determine if northern Everglades methyl mercury generation and nutrient mobilization after fire/drought also occurs within the more pristine southern Everglades.

Derive data to support a sulfur module for the Everglades Mercury Cycling Model (E-MCM).

Wildlife Effects

Expand current research on effect of ambient levels of mercury and pharmaceuticals on Everglades wildlife. Suggested species include freshwater mussels, largemouth bass, marine fish, and alligators.

Further investigate effect of food web structure and seasonal variation in structure on mercury bioaccumulation.

Determine mercury dose-response relations for wading bird, fish, and other wildlife.

Archive biological samples as a baseline for future investigations.

Biogeochemistry

Assess possible chemical reactions that may occur within the subsurface during Aquifer Storage and Recovery (ASR). Mercury methylation rates, and DOC-aquifer substrate interactions were explicitly mentioned.

Determine potential effects on the Everglades of reducing or eliminating anthropogenic sources of sulfate.

Determine the effect of increased flows and levee/canal degradation on the areal extent of sulfur contamination.

Collect additional information on sulfur/sulfite within Big Cypress Preserve.

Quantify sources of phosphorous in Florida Bay.

For Further Information

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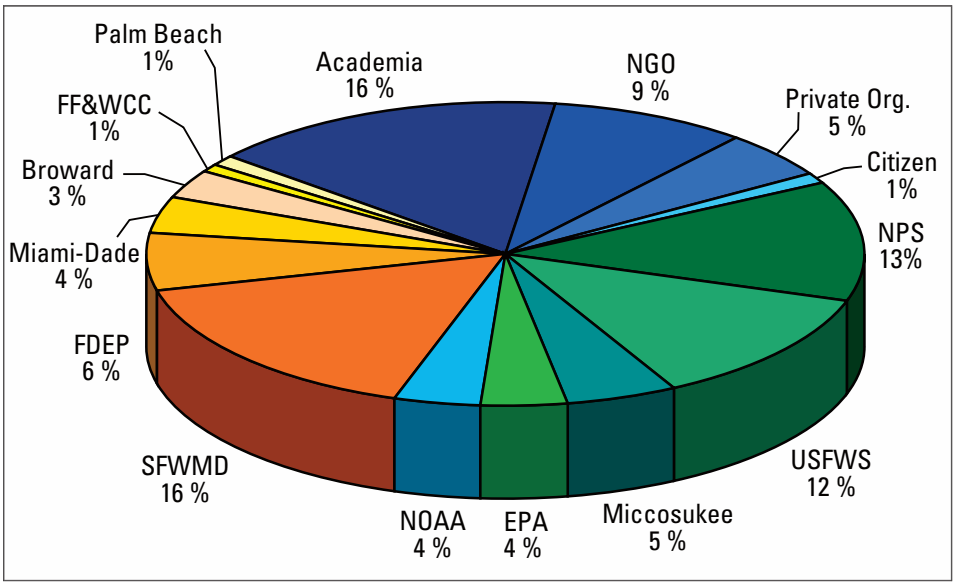

Participation by greater Everglades restoration partners during the 50-person Contaminant and Biogeochemistry Workshop (excluding USGS participants).