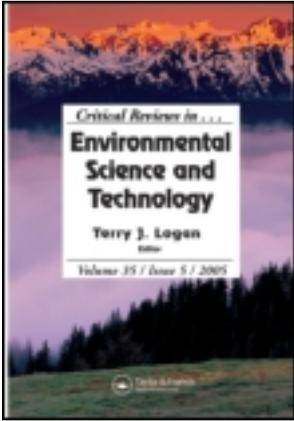


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Biogeochemistry and Water Quality of the Everglades: Symposium Overview

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Biogeochemistry and Water Quality of the Everglades: Symposium Overview

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The Greater Everglades comprises more than one and a half million acres of natural landscape—or roughly 10,800 square miles spanning the southern third of Florida. It is a complex ecosystem, and moving into the next decade, it is more critical than ever that we reinforce the significant linkage between Planning, Policy, and Science toward implementing sustainable development of the South Florida Ecosystem and ecosystem restoration of Florida's Greater Everglades. As we more closely examine Florida's ever-changing Greater Everglades landscape, we see a model living laboratory for assessing the predicted change. Lessons learned from research and management of this complex ecosystem can serve as a model for other ecosystems in the world. The Greater Everglades is an interlinked chain of natural and human ecosystems, from the Kissimmee River at the top through Lake Okeechobee; the Loxahatchee and St. Lucie estuaries to the east; the Caloosahatchee Estuary to the west; southward to the Everglades and Florida Bay, with the Keys and Dry Tortugas at the bottom; and, from Biscayne Bay and other coastal systems on the east to Big Cypress, Ten Thousand Islands and other coastal systems on the west. The Everglades restoration can be framed into four interrelated hydrologic factors: water quantity, timing, distribution, and water quality. During the past two decades, lawsuits, mandates, and a push to implement the Comprehensive Everglades Restoration Plan (CERP) has generated a large amount of scientific information on the hydrological, biogeochemical, ecological, and social factors influencing the Everglades restoration. Some of this information has been accumulated in the literature, and several volumes of synthesis articles have been published (Davis and Ogden, 1994; National Research Council, 2007, 2008; Porter and Porter, 2001; Reddy et al., 1999; Richardson, 2008; Sklar and van der Valk, 2002), but much of the biogeochemical data has never been vetted to a large audience. Excess nutrients and other contaminant inputs from various sources including agricultural and urban land use activities, atmospheric deposition,

and weathering of natural minerals can significantly impact nutrient cycling, plant growth, trophic conditions, and succession in the Greater Everglades ecosystem. Many biogeochemical processes functioning in Everglades soil, water, periphyton, and vegetation components influence the fate and transport of nutrients and other contaminants, which in turn influence the large scale ridge and slough patterns that make the Everglades so distinctive. The scales at which these biogeochemical processes operate and are studied vary and range from very small (particle, microbial, and laboratory), to meso (field plots, sloughs, and tree islands) to macro (impoundments, mangrove forests, and Water Conservation Areas). Unfortunately, conclusions derived from studies conducted at a specific scale are difficult to extrapolate to another scale, and disciplinary biases and experimental designs are often difficult to interpret by another scientist. Although the research conducted by scientists working in the Everglades has regional and disciplinary significance, it lacks the linkage or common targeted goal to solve ecosystem and restoration problems. That is why a series of conferences, under the name of Greater Everglades Ecosystem Restoration (GEER) and organized by the University of Florida in collaboration with federal and state agencies, were designed to provide an effective mechanism to establish the linkage between scientists and users of the scientific information. Linkage across scales and disciplines, and among resource managers and scientists provided an opportunity to exchange technical information and aided in solving more practical problems related to the Everglades restoration.

This special issue includes select papers presented at GEER 2008 with special topical area of Biogeochemistry and Water Quality of the Everglades. Technical papers were organized in the following topical areas: (a) sources and types of nutrients and contaminants; (b) landscape patterns of nutrients and contaminants, periphyton, and vegetation; (c) biogeochemical transformations of nutrients and contaminants; (d) biogeochemical responses of microbes, periphyton, and vegetation to nutrients and contaminants; (e) transport processes of nutrients and contaminants; (f) synthesis and modeling; and (g) case studies related to various hydrologic units.

In this special issue we present papers that provide synthesis and interpretation of most research findings related to water quality and implications to the Everglades restoration. The specific focus of these papers is to review the present understanding of the role of biogeochemical cycles in regulating the fate and transport of nutrients and other contaminants as related to ecosystem restoration and recovery. In addition, new approaches and techniques that link community structure at the micro and macro scales, to better understand the mechanisms that control the fate of chemicals at ecosystem scale, were also presented in these papers. In addition, the review also included present management strategies to abate the impact of nutrients and other contaminants and identify key water quality indicators to assess the recovery.

All papers were extensively peer reviewed by approximately 60 reviewers. The editors of this special issue sincerely thank all reviewers for their effort in improving the quality of all papers. Funding to publish this special issue was provided by the South Florida Water Management District and the U.S. Geological Survey. Additional information on GEER conferences can be found at <http://conference.ifas.ufl.edu/>.

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