

# Chapter 1A: Introduction to the *2007 South Florida Environmental Report – Volume I*

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This introductory chapter highlights the governmental, scientific, and legal context behind the *2007 South Florida Environmental Report* (SFER). The SFER – a sweeping consolidation of agency reporting – is essential to support sound, long-term environmental management decisions by the South Florida Water Management District (District or SFWMD) and Florida Department of Environmental Protection (FDEP), and other agencies. The 2007 SFER efficiently unifies more than 50 individual reports into a single document, pursuant to Chapter 2005-36, Laws of Florida ([http://election.dos.state.fl.us/laws/05laws/ch\\_2005-036.pdf](http://election.dos.state.fl.us/laws/05laws/ch_2005-036.pdf)). Notably, a new initiative was also launched in 2006 to further streamline the sizable SFER. While continuing to provide efficient communication and production, the annual SFER now focuses on the past year's major results and findings, with a more comprehensive update to be completed every five years. This year's report also continues to provide current and projected financial information for those chapters that have specific reporting requirements. Overall, the information presented in the report aids in the implementation of Everglades restoration activities and supports restoration, management, and protection activities associated with Lake Okeechobee, the Kissimmee Basin, and South Florida's coastal ecosystems.

The 2007 SFER includes the two-volume main report and the Executive Summary. In 13 chapters, *Volume I, The South Florida Environment*, provides data summaries for all major ecosystems in South Florida during Water Year 2006 (WY2006) (May 1, 2005–April 30, 2006) and highlights the District's financial resources management during Fiscal Year 2006 (FY2006) (October 1, 2005–September 30, 2006). Similar to the 2006 SFER, this volume continues the overall objective to summarize available data and findings associated with South Florida restoration activities. Volume I chapters are also supported and enhanced by appended documentation that provides data summaries and detailed analyses for the special-interest reader and complies with various permit requirements.

*Volume II, District Annual Plans and Reports*, summarizes the planning and project status for eight annual reports required under various mandates. Required by all five water management districts in Florida, these reports include the Annual Work Plan Report; Minimum Flows and Levels Priority List and Schedule; Five-Year Capital Improvements Plan; Five-Year Water Resource Development Work Program; Alternative Water Supply Annual Report; Florida Forever Work Plan Annual Update; and Mitigation Donation Annual Report. The Land Stewardship Annual Report is also now covered along with the Florida Forever Work Plan to more comprehensively report on District-wide land management efforts.

The 2007 SFER Executive Summary is written for a diverse readership and provides an abstract of the report's key facts and supporting information presented in both volumes. It has been developed to highlight findings of relevance to environmental decision makers, particularly regarding decisions on projects across the District. The complete 2007 SFER is available on the District's website at [www.sfwmd.gov/sfer](http://www.sfwmd.gov/sfer).

The first part of this chapter (1A) highlights the Volume I content. An overview of geographical features of the entire South Florida environmental resource, along with related District's programs and comprehensive restoration efforts throughout South Florida, is detailed in the 2006 SFER – Volume I, Chapter 1A. Key aspects of this overview are also summarized in **Tables 1A-1** and **1A-2**. Major features of the South Florida environment within the District's boundaries are depicted in **Figure 1A-1**, with brief highlights below. The 2007 report objectives, including a summary of the numerous legal and reporting requirements and the processes used to create the report and to provide peer and public review, are also presented. The second part of this chapter (1B) focuses on the integrative theme of water quality in the South Florida region. An introductory chapter to the report's second volume is also provided in Volume II, Chapter 1.

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## MAJOR FEATURES OF THE SOUTH FLORIDA ENVIRONMENT

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**Tables 1A-1** and **1A-2** provide key facts on important geographic features and District programs associated with various geographic areas. Major features of South Florida are shown on **Figure 1A-1**. A common theme between geography and programs is regional interconnectedness — water moves north to south by gravity and water management structures in a tightly coupled and systematic manner. Development of the region over the past century with its associated water management system has altered the local movement and balance of water, but development has not removed the interdependence of sub-regions and the overall north-south movement of water.

As water moves from the Upper Basin and other parts of the Lake Okeechobee watershed at the northern edge of the Kissimmee Okeechobee Everglades (KOE) ecosystem through the Kissimmee River (Chapter 11) and other tributaries to the lake (**Figure 1A-1**), water comes to reflect surrounding land uses and changes quality before entering Lake Okeechobee (Chapter 10). As with all lakes, the chemistry of Lake Okeechobee is a reservoir of the lake's history and tributary waters are altered greatly as they mix with ambient water in the lake, losing their identity in the process. Water levels in the lake reflect the balance between inflows, outflows, and evaporation (Chapter 2) and are controlled largely by man as a central water repository of the regional ecosystem. High water levels produce high outflows with significant impact on the Caloosahatchee and St. Lucie rivers downstream of the lake (Chapter 12).

From the liquid heart of the system, some water moves southward through the Everglades Agricultural Area (EAA) (Chapter 4) and through the Stormwater Treatment Areas (STAs) (Chapter 5). Outflows from the STAs and other tributary basins move into the Everglades Protection Area (EPA), which contains remnant Everglades marshes providing vital surface water to sustain the natural and human elements of the southern part of the regional ecosystem (Chapter 6). The interconnectedness of this massive system is most obvious during climatic extremes, particularly droughts and floods, when water management must actively control the water balance in various parts of the system. Regional-scale models used widely in the Comprehensive Everglades Restoration Plan (CERP) planning process (Chapter 7) are able to quantify the cascading influences of water management across the region and demonstrate the system-wide effects of CERP components.

**Table 1A-1.** Major features of the South Florida environment within the boundaries of the South Florida Water Management District (District or SFWMD).

<u>Geographic Area</u>	<u>Area</u>		<u>Description</u>
	(square kilometers)	(square miles)	
<b><u>Everglades Region</u></b>			
<b>Everglades Protection Area (EPA)</b>	9,000	3,474	Comprised of Water Conservation Areas 1, 2A, 2B, 3A, and 3B; Arthur R. Marshall Loxahatchee National Wildlife Refuge; and Everglades National Park
<b>Water Conservation Area 1 (WCA-1)</b>	566	218	Within the Refuge; managed by District with U.S. Fish and Wildlife Service (USFWS) and U.S. Army Corps of Engineers (USACE); sawgrass wetland with many tree islands; receives water primarily from STA-1W, STA-1E, and EAA region
<b>Water Conservation Area 2 (WCA-2)</b>	537	207	Managed by District with USACE and Florida Fish and Wildlife Conservation Commission (FWC); smallest WCA divided into WCA-2A and 2B; sawgrass wetland with tree islands; receives water primarily from STA-2, STA-3/4, WCA-1, and EAA region
<b>Water Conservation Area 3 (WCA-3)</b>	2,339	903	Managed by District with USACE and FWC; largest WCA divided into WCA-3A and 3B; sawgrass marsh with tree islands, wet prairies and sloughs; receives water primarily from STA-5, STA-6, WCA-2, Big Cypress National Preserve and EAA region
<b>Everglades National Park (ENP)</b>	5,569	2,150	Second largest national park and one of the nation's 10 most endangered parks; established in 1934 to preserve the unique Everglades ecology; managed by USFWS and NPS with USACE and SFWMD; freshwater sloughs, marl-forming marshes, and mangroves
<b>Everglades Agricultural Area (EAA)</b>	2,872	1,109	Highly productive agricultural land containing rich, organic peat or muck soils; 77 percent is in agricultural production; recognized as a major contributor to nutrient enrichment of the region; basin is the subject of a water quality monitoring program and a regulatory Best Management Practices program
<b>Holey Land Wildlife Management Area</b>	140	54	Managed by FWC; lies within the EAA boundaries; heavily used for deer and hog hunting; important for game management, water resource protection, and providing habitat corridors adjacent to the EPA
<b>Rotenberger Wildlife Management Area</b>	96	37	Managed by FWC; lies within the EAA boundaries; heavily used for deer and hog hunting; important for game management, water resource protection, and providing habitat corridors adjacent to the EPA
<b>C-139 Basin</b>	686	265	Agriculture is the dominant land use; discharges into WCA-3A via structures; basin is the subject of a water quality monitoring program and a regulatory Best Management Practices program
<b>Big Cypress National Preserve</b>	2,280	880	Established in 1974 to protect natural and recreational values of the Big Cypress Watershed; land supports hunting, fishing, and oil and gas production; provides an ecological buffer zone and water supply for Everglades National Park
<b><u>Lake Okeechobee</u></b>	1,730	668	Large, shallow eutrophic lake and largest body of fresh water in the southeastern U.S.; managed by District with USACE and FWC; watershed covers about 3.5 million acres, or 10,400 square kilometers; provides water supply, flood protection, sport and commercial fishery, and wetland habitat; functions as the central part of a large interconnected aquatic ecosystem in South Florida and is the major surface water body of the Central and Southern Florida Flood Control Project

Table 1A-1. Continued.

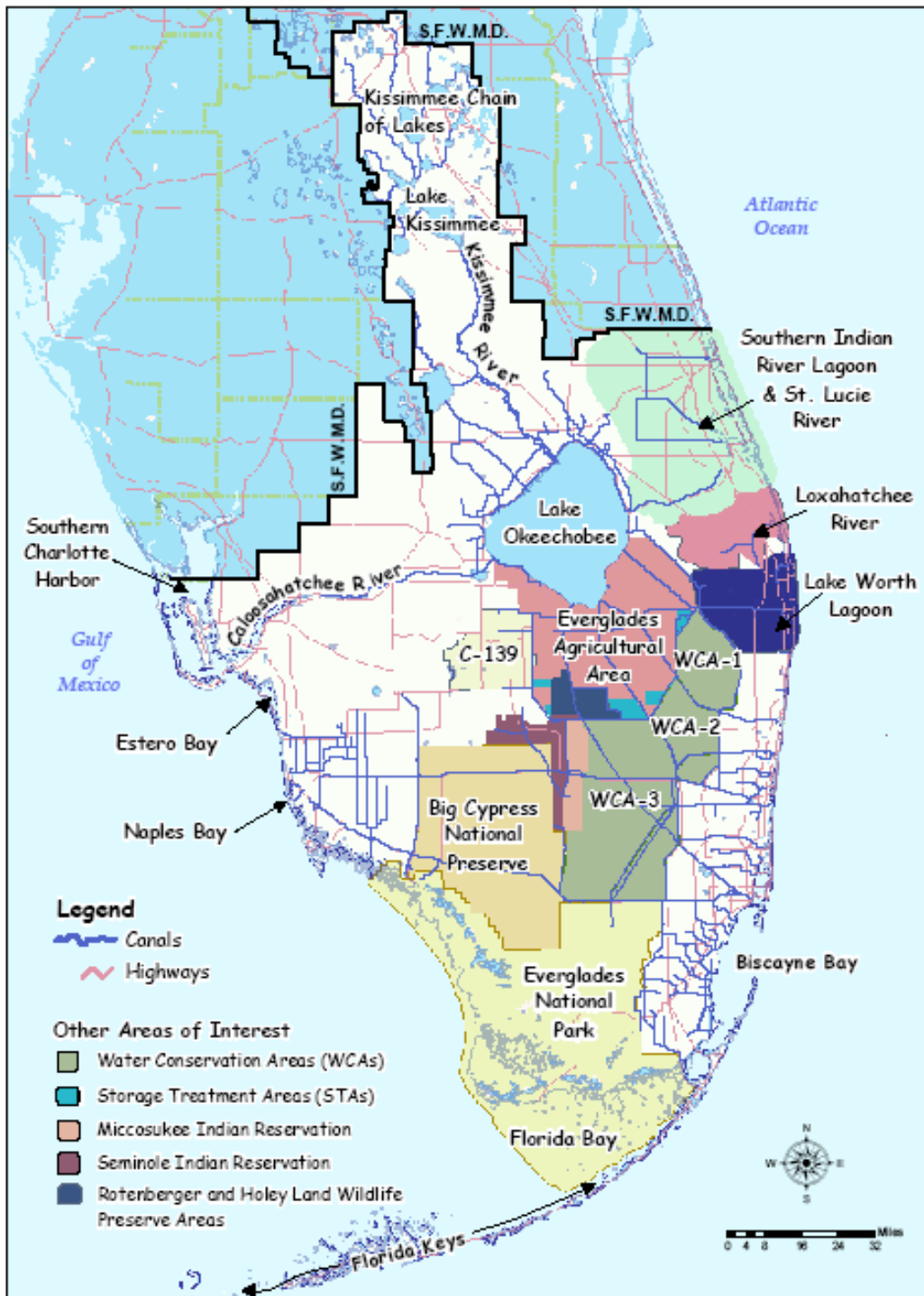
<u>Geographic Area</u>	<u>Area</u>		<u>Description</u>
	(square kilometers)	(square miles)	
<b>Kissimmee Basin</b>	6,200	2,393	Managed by District with USACE and FWC; watershed forms the headwaters to the greater Kissimmee-Okeechobee-Everglades ecosystem and includes the drainage area of Lake Istokpoga, the Kissimmee River and the Upper Basin; the Upper Basin is an important regional water source and diverse natural resource that transitions between warm, temperate and subtropical areas; the Lower Basin includes the historic Kissimmee River and its tributary watersheds between Lake Kissimmee, Lake Okeechobee, and the C-38 flood control canal; Kissimmee Chain of Lakes consists of 28 prominent lakes that function hydrologically and ecologically as a regional-scale resource, resides within 14 sub-watersheds and is fed by more than 30 tributaries throughout the region
<b>Upper Basin</b>	4,200	1,621	
<b>Lower Basin</b>	2,000	772	
<b><u>Coastal Ecosystems</u></b>			
<b>Southern Indian River Lagoon</b>	860	332	Designated for special study, protection, and restoration as part of the regional National Estuary Programs; characterized by the greatest species diversity of any estuary in North America; supports fishing, clamming, ecotourism, agriculture and recreation
<b>St. Lucie River and Estuary</b>	24	9	Part of the Indian River Lagoon estuary system and drained by several creeks and canals that flow into the North or South Fork of the St. Lucie River before entering the lagoon near the St. Lucie Inlet; provides habitat for thousands of plant and animal species and supports commercial, recreational, and educational activities
<b>Loxahatchee River and Estuary</b>	518	200	First federally designated National Wild and Scenic River; watershed includes the communities of Hobe Sound, Tequesta, Jupiter, Jupiter Inlet Colony, Jupiter Farms, Juno Beach, and Palm Beach Garden; watershed contains large tracts of undisturbed land, protected parcels, and agricultural land; very diverse habitat includes coastal sand pine scrub, pinelands, xeric oak scrub, hardwood hammock, freshwater marsh, wet prairie, cypress swamps, mangrove swamps, seagrass beds, tidal flats, oyster beds and coastal dunes
<b>Lake Worth Lagoon</b>	450	174	Watershed is highly urbanized; lagoon was historically a freshwater lake with occasional brackish conditions and converted to a marine environment since the early 1900s
<b>Biscayne Bay</b>	1,100	428	Subtropical estuary designated as an aquatic preserve and Outstanding Florida Water; bay is comprised of north, central, and south regions; contains a coral reef system, which is the world's third longest and the only one in the world located in close proximity to a large highly urbanized coastal area; reef is home to more than 200 marine species of fish and is important for fisheries
<b>Florida Bay and Florida Keys</b>	2,200	849	About 80 percent of the bay lies within Everglades National Park; a broad, shallow expanse of brackish-to-salty water that contains numerous small islands, extensive sandbars and grass flats; mangroves and seagrasses provide valuable habitat for many species; keys watershed consists of a limestone island archipelago of about 800 islands extending southwest for over 320 kilometers, or 200 miles
<b>Estero Bay</b>	39	15	Long, narrow, and very shallow water body; several barrier islands separate the bay from the Gulf of Mexico; the bay has five rookery and roosting islands utilized by thousands of native birds
<b>Caloosahatchee River and Estuary</b>	82	32	Large estuary where the Gulf of Mexico mixes with freshwater inflows from the river, sloughs, and overland sheetflows in the basin; lower reaches of the estuary are characterized by a shallow bay, extensive seagrass beds, and sand flat; extensive mangrove forests dominate undeveloped shoreline areas
<b>Southern Charlotte Harbor</b>	805	311	Florida's second-largest open water estuary and one of the state's major environmental features; designated for special study, protection and restoration as part of the regional National Estuary Programs; area contains three national wildlife refuges and four aquatic preserves

**Table 1A-2.** Key District programs addressing management and restoration efforts in South Florida.

Regional Programs	Key Components	Strategic Plan Connections <small>(from <a href="http://www.sfwmd.gov/images/pdfs/stratplan_2006.pdf">http://www.sfwmd.gov/images/pdfs/stratplan_2006.pdf</a> )</small>
<b><u>Everglades Program</u></b>		
<p><i>2007 SFER Coverage:</i> <b>Volume I - Chapters 1–9</b></p> <p>[Everglades Forever Act (EFA), Chapter 373.4592, Florida Statutes]</p> <p><i>Key Objective:</i> To restore and protect the Everglades system as a result of adverse changes in water quality and the quantity, distribution and timing of flows</p>	<p>Everglades Construction Project</p> <p>Stormwater Treatment Areas</p> <p>Phosphorus Source Control Programs</p> <p>Long-Term Plan for Achieving Everglades Water Quality Goals</p> <p>Comprehensive Everglades Restoration Plan</p>	<p><i>Water Supply:</i> To restore more natural flows and levels in the Everglades, and to increase available quantity and restore the timing and distribution of water to the Everglades</p> <p><i>Flood Control:</i> To operate the District's flood control infrastructure including STAs, and to maintain flood protection levels across the Everglades region</p> <p><i>Water Quality:</i> To protect and improve the quality of water delivered to the Everglades through STA construction and operation and CERP and Long-Term Plan implementation</p> <p><i>Natural Systems:</i> To restore the ecology and natural function of the greater Everglades system</p>
<b><u>Lake Okeechobee Protection Program (LOPP)</u></b>		
<p><i>2007 SFER Coverage:</i> <b>Volume I - Chapters 9 &amp; 10</b></p> <p>[LOPP, Chapter 373.4595, Florida Statutes]</p> <p><i>Key Objective:</i> To rehabilitate the lake and enhance its ecosystem while maintaining other project purposes, such as water supply and flood control</p>	<p>Comprehensive Everglades Restoration Plan</p> <p>Lake Okeechobee and Estuary Recovery Plan</p> <p>Lake Okeechobee Protection Plan</p> <p>Lake Okeechobee Construction Project</p> <p>Lake Okeechobee Watershed Phosphorus Control Program</p> <p>Lake Okeechobee Research &amp; Water Quality Monitoring Program</p> <p>Lake Okeechobee Exotic Species Control Program</p> <p>Lake Okeechobee Internal Phosphorus Management Program</p>	<p><i>Water Supply:</i> To maintain current water supplies to South Florida by making regional water deliveries from Lake Okeechobee</p> <p><i>Flood Control:</i> To ensure flood protection levels are maintained in evaluating Lake Okeechobee regulation schedule modifications</p> <p><i>Water Quality:</i> To improve the quality of water entering Lake Okeechobee through development and implementation of regional projects</p> <p><i>Natural Systems:</i> To improve ecosystem health through water quality improvements of isolated wetlands, hydrology management, and exotic species control</p>

**Table 1A-2.** Continued.

Regional Programs	Key Components	Strategic Plan Connections (from <a href="http://www.sfwmd.gov/images/pdfs/stratplan_2006.pdf">http://www.sfwmd.gov/images/pdfs/stratplan_2006.pdf</a> )
<b><u>Kissimmee River Restoration Program</u></b>		
<p><i>2007 SFER Coverage:</i> <b>Volume I - Chapters 9 &amp; 11</b></p> <p>[1992 Water Resources Development Act (WRDA)]</p> <p><i>Key Objective:</i> To restore over 40 square miles of river/floodplain ecosystem including 43 miles of meandering river channel and 27,000 acres of wetlands</p>	<p>Kissimmee River Restoration Project</p> <p>Kissimmee River Restoration Evaluation Program</p> <p>Kissimmee River Headwaters Revitalization Project</p> <p>Kissimmee Chain of Lakes – Long-Term Management Plan</p>	<p><i>Water Supply:</i> To protect water supply sources through developing technical criteria for Minimum Flows and Levels and initial water reservations</p> <p><i>Flood Control:</i> To maintain flood protection capacity through flood mitigation construction</p> <p><i>Water Quality:</i> To improve downstream water quality through the Kissimmee Upper Basin Restoration Initiative</p> <p><i>Natural Systems:</i> To improve Kissimmee River natural function through restoration of the Kissimmee watershed</p>
<b><u>Coastal Watersheds Program</u></b>		
<p><i>2007 SFER Coverage:</i> <b>Volume I - Chapters 9 &amp; 12</b></p> <p><i>Key Objective:</i> To manage freshwater discharge to South Florida’s estuaries in a way that preserves, protects, and where possible, restores essential estuarine resources</p>	<p>Various projects and plans for the following areas:</p> <p>Southern Indian River Lagoon and St. Lucie River and Estuary</p> <p>Loxahatchee River and Estuary</p> <p>Lake Worth Lagoon</p> <p>Biscayne Bay</p> <p>Florida Bay and Florida Keys</p> <p>Naples Bay</p> <p>Estero Bay</p> <p>Caloosahatchee River and Estuary</p> <p>Southern Charlotte Harbor</p>	<p><i>Water Supply:</i> To protect water supply sources through developing technical criteria for Minimum Flows and Levels and initial water reservations</p> <p><i>Flood Control:</i> To increase flood protection capability through stormwater projects and partnerships with FEMA</p> <p><i>Water Quality:</i> To improve water quality in various water bodies through development of water quality targets</p> <p><i>Natural Systems:</i> To improve environmental systems through development and implementation of restoration plans</p>



**Figure 1A-1.** Major features of the South Florida environment within the District's boundaries. [See also Figure 2-2 of this volume for major hydrological features in South Florida.]

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## CONTENT OF THE 2007 SOUTH FLORIDA ENVIRONMENTAL REPORT – VOLUME I

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### REPORT OBJECTIVES AND CONTENT

The primary objective of the *2007 South Florida Environmental Report* – Volume I is to summarize annual data and findings relating to the District's programs, specifically the Kissimmee-Okeechobee-Everglades and coastal ecosystems restoration efforts. In addition to building on and updating information from earlier consolidated reports, this year's report also satisfies many reporting requirements of multiple federal and state permits. Stemming from the 2005 expert panel's recommendations, the District has launched a new initiative to further streamline and improve the SFER. While continuing to provide efficient communication and production, this annual report now focuses on the past year's major results and findings, and more routine and background information from earlier consolidated reports is cross-referenced, as appropriate. It is also anticipated that a more comprehensive update will be completed every five years.

The topics of this 13-chapter volume are primarily the same as those in the 2006 SFER, as well as a synthesis chapter providing a more integrative view of South Florida water quality (Chapter 1B). The hydrology of South Florida, the subject of Chapter 2, now follows the introduction and provides supporting hydrologic information for subsequent chapters. Water quality status and trends for standard Class III parameters in the Everglades Protection Area (EPA) are presented in Chapters 3A through 3C. Chapter 3B specifically covers issues concerning mercury, including an update on research and monitoring in support of risk analysis for mercury contamination in South Florida, the role of sulfur as regards the mercury risk, and other risks of sulfur contamination. An update on the activities under the phosphorus source control programs implementing Best Management Practices (BMPs) and the monitoring results are provided in Chapter 4. Chapter 5 highlights the status of STA compliance, performance, and optimization research. The status of ecological research in South Florida is provided in Chapter 6. Chapter 7 is divided into a two-part update on Comprehensive Everglades Restoration Plan (CERP) and Restoration Coordination and Verification (RECOVER) activities. Chapter 7A documents CERP financial information and the progress of CERP implementation in FY2006. Chapter 7B summarizes the ongoing RECOVER activities associated with CERP implementation. Chapter 8 updates the strategy for achieving long-term water quality goals in the EPA. Chapter 9 summarizes the current status of plant and animal invasive exotic species in the South Florida environment. Chapter 10 updates the status of water quality and habitat conditions in the lake and its watershed and lake-related project implementation activities. Chapter 11 summarizes the accomplishments of the Kissimmee River restoration and Upper Basin initiatives, including the design and implementation of its restoration program. Chapter 12 provides an update on management and restoration activities of South Florida's coastal resources, with an emphasis on the Loxahatchee River and Estuary. Detailed financial information on Everglades restoration during FY2006 is included in Chapter 13.



## LEGAL AND REPORTING REQUIREMENTS

The *2007 South Florida Environmental Report* is the product of a major consolidation process authorized by the Florida legislature in Chapter 2005-36, Laws of Florida ([http://election.dos.state.fl.us/laws/05laws/ch\\_2005-036.pdf](http://election.dos.state.fl.us/laws/05laws/ch_2005-036.pdf)). This legislation directs the South Florida Water Management District to consolidate statutorily mandated plans and reports to the Florida legislature and governor. Other plans and reports are also addressed in order to improve coordination, efficiency, and effectiveness as part of this consolidation effort. The annual March 1 deadline has been implemented in lieu of statutory deadlines for the submission of certain District plans and reports including the Everglades Consolidated Report, the Lake Okeechobee Protection Program Annual Progress Report, and the Comprehensive Everglades Restoration Plan Annual Report.

The District's restoration efforts under the Everglades, Lake Okeechobee, and CERP programs entail numerous reporting mandates covered in the 2007 SFER – Volume I:

- An Everglades Forever Act Annual Report, required by Subsection 373.4592(13), F.S., submitted to the FDEP, the Florida governor's office, and the leaders of the Florida legislature. This report must summarize water conditions in the EPA and the status of the impacted areas, STA construction, BMP implementation, and actions taken to monitor and control exotic species.
- An annual peer-reviewed report, required by Subparagraph 373.4592(4)(d)5, F.S., also submitted to the FDEP, the Florida governor, and legislative leaders regarding the research and monitoring program that summarizes all data and findings as an update on most topics included in the 1999 Everglades Interim Report, required by Subparagraph 373.4592(4)(d)5, F.S.
- An annual financial report, required by Sections 373.4592 and 373.45926, F.S., accounting for all monies used to fund the 1994 Everglades Construction Project and the 2003 Long-Term Plan for Achieving Water Quality Goals for EPA Tributary Basins and providing a comparison annually of actual versus projected revenues and a projection of costs and revenues over the successive five-year period.
- A Non-Everglades Construction Project permit annual report, required by Paragraphs 373.4592(9)(k) and (l), F.S., and by FDEP Permit No. 06, 502590709, to be submitted to the FDEP and to address water quality at structures associated with the EPA that are not included in the Everglades Construction Project. This report also addresses schedules and strategies to improve that water quality.
- A 404 permit report(s), required by Permit No. 199404532, submitted to the USACE and addressing the District's strategy for achieving water quality standards and updating the USACE on the activities authorized or otherwise regulated by the permit.
- A series of reports on the STAs from National Pollutant Discharge Elimination System (NPDES) permits and Everglades Forever Act permits and to be submitted to the FDEP and the USACE. These permits require information on the quality of water discharged from the treatment systems as well as on the progress of the treatment systems at improving water quality.

- A Lake Okeechobee Protection Program Annual Report, required by Paragraph 373.4595(3)(g), F.S., and submitted to the FDEP, the Florida governor's office, and the leaders of the Florida legislature. This report must include a summary of the water quality and habitat conditions in Lake Okeechobee and its watershed and the status of implementation activities, including the Lake Okeechobee Construction Project.
- A Lake Okeechobee Operating Permit report, required by Permit No. 50-0679349 and issued under the provisions of Chapter 403, F.S., and Rule 17-4, 17-25, F.A.C. This permit requires information on the quality of water discharged at structures that flow or pump into Lake Okeechobee and to Water Conservation Area 3A.
- A Comprehensive Everglades Restoration Plan Annual Report, required by Section 373.036(7), F.S., and submitted to the FDEP, the Florida governor's office, and the leaders of the Florida legislature. This report provides enhanced oversight and accountability for the financial commitments established under the Everglades restoration section and the progress made in the implementation of CERP, Section 373.470(7), F.S., as amended in 2005.

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## PEER REVIEW OF THE 2007 SOUTH FLORIDA ENVIRONMENTAL REPORT – VOLUME I

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The draft *2007 South Florida Environmental Report – Volume I* was prepared in summer 2006 and posted in September 2006 for external public review on the District's web site at <http://www.sfwmd.gov/sfer/>. In accordance with the EFA requirement for scientific peer review [373.4592(4)(d)5, F.S.], an expert panel also received this draft report. The external review was organized in accordance with (1) typical scientific review practices, (2) the independent panel review process required by Florida Statute for evaluating Minimum Flows and Levels [Section 373.042 (4), F.S.], and (3) Government in the Sunshine provisions of the Florida Statutes. The panel reviewed this report independently and then interacted with each other and the public over a WebBoard linked to the District's web site and through public hearing. As an additional reference, the District's memorandum to SFER peer-review panelists addressing general comments on last year's report is provided in Appendix 1A-1.

### THE PEER-REVIEW PROCESS

A Statement of Work (SOW) was prepared for the peer-review process and to highlight the specific roles of each panelist. The Volume I sections and chapters and their associated level of review were also defined in the panel's assignment matrix in the SOW. Through a purchase order, the 2006 panel provided the following services outlined in the SOW:

- **Read earlier reports as background.** Broad reading of previous consolidated reports was encouraged as general background for the 2007 SFER review and public hearings. These earlier reports as well as other District reports were made available through the District's web site and were read, as needed, on specific issues during the review.
- **Read assigned 2007 report chapters.** Prior to the public hearing, panelists reviewed assigned Volume I chapters or sections and prepared a preliminary written review, including questions to be addressed by District staff. Panelists also reviewed

appended material for special review topics presented in Appendices 2-3, 3B-3, 3C-1, and 12-1 of this volume.

As proposed by the 2005 panel to enhance the SFER, a tri-level review was newly incorporated into the streamlined SFER process. Based on a detailed matrix in the SOW, each panelist reviewed assigned portions of the 2007 SFER according to one of the following levels:

1. ***Progress Review: Accountability.*** This level of review is performed where annual reporting has taken on a more routine character. Updates often are shown in summary tables or graphs to readily convey the current year's performance against management goals and prior performance noted in earlier reports. A more thorough review is expected to be conducted every five years to ensure that the SFER continues to represent the most current methodology.
  2. ***Project Review: Technical.*** Where there is still a research component, the SFER continues to report on methodological detail and explanations of the new findings, which are be subject to a more traditional peer review.
  3. ***Program Review: Integrative.*** This level of review explores how the entire SFER provides information and integrates cross-cutting themes and the connections between research and water management goals.
- **Participate as a panelist in public hearings.** The panel participated in a public workshop, noticed as a public meeting in accordance with Florida's Government in the Sunshine law. They interacted with authors, interested parties, and each other during the two and one-half day public workshop from September 26 through 28, 2006 at the District's headquarters in West Palm Beach, FL. Further information on the peer review and public workshop is available on the District's web site at [http://www.sfwmd.gov/sfer/SFER\\_2007/workshop/workshop\\_07.html](http://www.sfwmd.gov/sfer/SFER_2007/workshop/workshop_07.html).
  - **Develop draft and final reports with conclusions and recommendations.** During the working session, the panel developed their initial conclusions and recommendations in a draft report, which was submitted to the District on October 10, 2006. The panel's final report provided conclusions and recommendations and included a detailed narrative to the extent the panel deemed appropriate for each chapter. Public comments contributed before and during the hearing were considered by the panel. The panel's final report was submitted on October 20, 2006.
  - **Panel Chair, additional responsibilities.** Further duties of the Chair included communicating with the panelists to ensure consistent interpretation of the Statement of Work; assisting panelists to use the web site for posting reviews and ensuring that panelists used this site for all communication; conducting organizational meetings to keep the review process well focused; chairing the workshops and working session; organizing the panel's preparation of draft and final reports to the District; and ensuring that the final report was well edited and delivered on schedule.

This intensive public and panel review resulted in extensive written comments and suggestions to the report's authors. Comments from the peer-review panel, as posted on the 2007 SFER WebBoard, are provided in Appendix 1A-2 of this volume. Public comments posted to this WebBoard are provided in Appendix 1A-3, and the authors' responses to all comments are

provided in Appendix 1A-4. Appendix 1A-5 contains the final report of the peer-review panel, reproduced verbatim. Each of the SFER authors benefited from the thorough and incisive suggestions of the expert panel. Advice from the panel and from other reviewers guided the authors through a major revision of this report from October through December 2006.

## **THE PEER-REVIEW PANELISTS**

The selection of panelists for the 2007 SFER review was primarily based on the success of preceding consolidated report reviews. Consistent with these earlier reviews and with routine practice in scientific peer review, professional expertise and experience in the major subject areas covered by this report were the primary criteria used for selecting the 2006 panelists. Knowledge of environmental management and decision making was also an important consideration. To ensure their independence, panelists continued to be free of any professional connection to interests or organizations in South Florida. All eight panelists from last year's process reviewed the 2007 report. Biographical sketches for these panelists are provided below, along with chapter assignments and specific strengths brought to the 2007 SFER process.

### **Expert 1: Chair: Dr. Jeffrey L. Jordan, Professor, Department of Agricultural and Applied Economics, University of Georgia, Griffin, Georgia**

With more than 15 years of post-doctoral experience in agricultural economics and water resource policy, Dr. Jeffrey Jordan is recognized for his work in modeling water demand and allocation, conservation planning, survey design, and other aspects of water resource analysis. This diverse experience in water-related economic and policy analyses is demonstrated in more than 35 peer-reviewed articles, 45 miscellaneous publications, one book, and several book chapters authored during his productive career with the University of Georgia. Dr. Jordan is well acquainted with general environmental and water quality issues that South Florida faces today. He fulfilled all contract requirements very effectively as panel Chair for the peer review of the 2000–2004 Everglades Consolidated Reports and the 2005–2006 South Florida Environmental Reports. Earlier, he served on the peer-review panel for the Lake Okeechobee Minimum Flow and Levels, the Spalding County Water Authority, and the Georgia Water Wise Council. His background and record of accomplishment proved to be invaluable for dealing effectively with the wide-ranging topics and issues associated with the 2007 SFER review. Together, these qualities made him ideally suited to continue to serve as the panel Chair. Dr. Jordan acted as the primary reviewer on the introduction (Chapters 1A and 1B), RECOVER/CERP (Chapters 7A and 7B), Everglades water quality plans (Chapter 8), and the special review topic on long-term climatic variation (Appendix 2-3). He also provided general comments on hydrological aspects of South Florida (Chapter 2), Kissimmee River restoration (Chapter 11), coastal ecosystems (Chapter 12), and the special review topic on sulfur (Appendix 3B-2).

### **Expert 2: Dr. Richard A. Meganck, Rector, United Nations University for Water Science and Education, Delft, the Netherlands**

Dr. Richard Meganck is highly experienced in planning for sustainable development and natural resource management internationally. Since receiving a doctorate in Natural Resource Management in 1975, he has authored dozens of refereed articles and papers in conference proceedings on park planning, international development, ecological restoration, and sustainable development. Dr. Meganck is very experienced in dealing with diverse audiences and interests through his work with the Organization of American States, the United Nations Environment

Program, and as a private consultant in environmental management. His resource-planning experience is exceptionally diversified and unique, particularly his extensive work on park management and sustainability. He participated in peer review of the 2000–2004 Everglades Consolidated Reports and the 2005–2006 South Florida Environmental Reports and proved to be very thoughtful and innovative in his review comments. For the 2007 SFER, Dr. Meganck acted as the primary reviewer on the introduction (Chapters 1A and 1B), RECOVER/CERP (Chapters 7A and 7B), and Everglades water quality programs (Chapter 8). He also provided general comments on BMPs (Chapter 4), exotic species (Chapter 9), management of Lake Okeechobee (Chapter 10), coastal ecosystems, (Chapter 12), and the special review topics on sulfur (Appendix 3B-2) and Loxahatchee River vegetation (Appendix 12-1).

**Expert 3: Dr. Robert C. Ward, Professor and Director, Colorado Water Resources Research Institute, Colorado State University, Fort Collins, Colorado**

Dr. Robert Ward is highly experienced in the science of water quality assessment, including the design of information systems and water quality monitoring networks, application of data to decision making, and communication of water quality information to the public. Since receiving a doctorate in Agricultural Engineering in 1970, he has authored dozens of refereed articles and two books on water quality monitoring. Dr. Ward is well acquainted with peer review, having served on many panels and review committees. He is also familiar with South Florida's technical issues and science through his participation in panels that reviewed the phosphorus control program in the Lake Okeechobee watershed, Everglades Consolidated Reports since 1999, and the 2005–2006 South Florida Environmental Reports. In addition, he is experienced in dealing with diverse audiences through his work with students, educational initiatives, and professional societies. His quantitative experience with water quality monitoring data is extensive, and his knowledge of monitoring program design is exceptional. For the 2007 SFER, Dr. Ward served as the lead reviewer for Volume I issues concerning hydrology of South Florida (Chapter 2), water quality (Chapters 3A and 3C), BMPs (Chapter 4), and the special review topic on phosphorus monitoring and compliance (Appendix 3C-2). He also provided general comments on the introduction (Chapters 1A and 1B), CERP/RECOVER (Chapters 7A and 7B), the management and restoration efforts associated with Lake Okeechobee and the Kissimmee Basin (Chapters 10 and 11, respectively), and the special review topics on long-term climatic variation (Appendix 2-3) and Loxahatchee River vegetation (Appendix 12-1).

**Expert 4: Dr. Yuch Ping Hsieh, Wetland Ecology Program, Florida A&M University, Tallahassee, Florida**

After receiving a doctorate from Rutgers University in 1976, Dr. Hsieh has held a series of academic positions as a wetland geochemist and soil scientist. From 1986 to the present, he has been Professor and Program Leader in the Wetland Ecology Program of Florida A&M University. Dr. Hsieh has been responsible for more than 40 scientific publications concerning carbon and sulfur cycling, nitrogen and phosphorus dynamics, and management practices for sustainable soils. He has served on many advisory and review teams and has attracted more than \$4.5 million in external support to Florida A&M University. Dr. Hsieh has been involved in water quality issues throughout his career and is extremely well versed in state-of-the-science methods in environmental chemistry, particularly involving isotope techniques and advanced chemical analyses of environmental samples. He has also been a valuable participant in peer review of the 2003–2004 Everglades Consolidated Reports and the 2005–2006 South Florida Environmental Reports. For the 2007 SFER, Dr. Hsieh served as the primary reviewer for Volume I issues

concerning hydrology of South Florida (Chapter 2), water quality and mercury (Chapters 3A, 3B, and 3C), constructed wetlands (Chapter 5), and Everglades ecology (Chapter 6), exotic species (Chapter 9), and the special review topics on sulfur (Appendix 3B-2) and phosphorus monitoring and compliance (Appendix 3C-2). He also commented on the introduction (Chapters 1A and 1B), BMPs (Chapter 4) and Everglades water quality programs (Chapter 8).

**Expert 5: Dr. Joanna Burger, Professor, Division of Life Sciences, Rutgers University, Piscataway, New Jersey**

Dr. Joanna Burger has a distinguished research and teaching career that spans three decades. She has contributed greatly to our understanding of water-bird ecology and behavior and the effects of metals and other toxic substances on animals. Her research and scholarly activities have been extremely diverse and numerous and have recently included aspects of ecological risk assessment, a subject of emerging importance in South Florida. She is a highly productive research scientist with more than 70 books and book chapters and about 400 refereed publications. Similar to Dr. Burger's participation in peer review of the 2000–2004 Everglades Consolidated Reports and the 2005–2006 South Florida Environmental Report, the unusual depth and breadth of her experience as a biologist, ecologist, and toxicologist have allowed her to contribute greatly to the review of the 2007 SFER. Her unique understanding of wading bird ecology has also been a valuable asset to this review. Dr. Burger acted as the primary reviewer on the Volume I chapters on mercury in South Florida (Chapter 3B), Everglades ecological studies (Chapter 6), exotic species (Chapter 9), the Kissimmee Basin (Chapter 11), and the special review topic on sulfur (Appendix 3B-2). She also commented on the introduction (Chapters 1A and 1B), hydrology (Chapter 2), wetland science (Chapter 5), and the special review topics on long-term climatic variation (Appendix 2-3) and phosphorus monitoring and compliance (Appendix 3C-2).

**Expert 6: Dr. Ellen van Donk, Professor and Department Head for Food Web Studies, NIOO Centre for Limnology, Netherlands Institute of Ecology, the Netherlands**

Dr. Ellen van Donk has more than 20 years of experience as an aquatic researcher and Department Head at the Netherlands Institute of Ecology. She has served on a diverse array of editorial boards and peer review panels, including providing review comments on the Lake Okeechobee Minimum Flow and Level determination in 1998 and the 2005–2006 South Florida Environmental Reports. Dr. van Donk has worked with scientists in Europe and the United States on studies concerning basic limnology, planktonic food webs, lake restoration and management, wetland ecology, and ecotoxicology. Her experience with complex interactions involving food webs, nutrients, and plant community structure has been gained through publication of more than 90 papers in the peer-reviewed literature and has been extremely valuable for the 2007 SFER review panel. She is also well versed in the management and restoration of shallow lakes. Dr. van Donk acted as the primary reviewer for the Volume I chapters on exotic species (Chapter 9), Lake Okeechobee (Chapter 10), the Kissimmee Basin (Chapter 11), and the special review topic on Loxahatchee River vegetation (Appendix 12-1). She also provided general comments on the introduction (Chapters 1A and 1B), water quality (Chapters 3A and 3C), STAs (Chapter 5), Everglades ecological studies (Chapter 6), and the special review topic on phosphorus monitoring and compliance (Appendix 3C-2).

**Expert 7: Dr. Neal E. Armstrong, Vice Provost for Faculty Affairs and Zarrow Centennial Professor in Engineering, University of Texas at Austin, Austin, Texas**

Through an engineering career spanning more than three decades, Dr. Neal Armstrong has held a suite of positions with increasing responsibility and authority in engineering and science. His experience base is extremely diverse and includes numerous academic committees, many assignments from professional societies, many consultancies often related to water quality, and dozens of research projects involving water pollution ecology, eutrophication, and water quality modeling and analysis. His expertise is well suited for dealing with the array of challenges facing South Florida regarding water quality. Dr. Armstrong is also highly experienced in peer review for applied science and engineering, serving on the Florida Bay Oversight Panel from 1994–1999, on the panel to review phosphorus control strategies for Lake Okeechobee in 1995, and on the peer-review panel for the 2005–2006 South Florida Environmental Reports. For the 2007 SFER, Dr. Armstrong acted as the lead reviewer for Volume I chapter on BMPs (Chapter 4) and the primary reviewer for the introduction (Chapters 1A and 1B), STAs (Chapter 5), the restoration and management of coastal ecosystems (Chapter 12), and the special review topic on long-term climatic variation (Appendix 2-3). Additionally, he provided general comments on water quality (Chapter 3), Everglades long-term water quality plans (Chapter 8), Lake Okeechobee (Chapter 10), and the special review topics on sulfur (Appendix 3B-2) and Loxahatchee River vegetation (Appendix 12-1).

**Expert 8: Dr. JoAnn M. Burkholder, Professor and Director, Center for Applied Aquatic Ecology, North Carolina State University, Raleigh, North Carolina**

Since 1999, Dr. Burkholder has served as the Director and Professor at the Center for Applied Aquatic Ecology at the North Carolina State University. In a career spanning three decades, Dr. Burkholder has proven to be a highly productive researcher on eutrophication of freshwater and estuarine ecosystems; assessment of nutrient and associated pollutant loadings; the biology, ecology, and impacts of harmful algae; and the physiological ecology of seagrasses. With many distinguished honors, she has authored more than 150 technical reports and publications in the peer-reviewed literature as well as numerous scientific presentations and workshops. She participated in peer review of the 2006 SFER and provided very constructive and thoughtful review comments. For the 2007 SFER, Dr. Burkholder acted as the primary reviewer for the Volume I chapters on Lake Okeechobee (Chapter 10), the Kissimmee Basin (Chapter 11), coastal ecosystems (Chapter 12), and the special review topic on the Loxahatchee River vegetation (Appendix 12-1). Additionally, she provided general comments on the introduction (Chapters 1A and 1B), Everglades ecological studies (Chapter 6), exotic species (Chapter 9), and the special review topics on sulfur (Appendix 3B-2) and phosphorus monitoring and compliance (Appendix 3C-2).