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Introduction

The *2011 Lower West Coast Water Supply Plan Update* (2011 LWC Plan Update) presents current population, water demands, water resource and water supply projects, and other key information since publication of the *2005–2006 Lower West Coast Plan Update* (2005–2006 LWC Plan Update). In preparing the 2005–2006 LWC Plan Update, 2000 baseline data were used to make estimates and projections for the 20-year planning horizon of 2005 to 2025. For the 2011 LWC Plan Update, new 2005 baseline data were established to determine estimates and projections for the planning horizon of 2010 to 2030.

In the 2011 LWC Plan Update, the population of the Lower West Coast (LWC) Planning Area is projected to increase by 51 percent from an estimated 994,777 in 2010 to 1.5 million by 2030. Although population growth in the 2005–2006 LWC Plan Update was projected to reach 1.5 million by 2025, the region has seen significant fluctuations over the past five years in the economy, residential and commercial development, agricultural commodity markets, and hydrologic conditions. As a result, the population growth trend for this plan update is projected to be much slower than the region experienced in the mid-2000s. Moreover, Agriculture Self-Supply is expected to remain the region's largest consumer of water, accounting for 54 percent of the region's gross demands by 2030.

The 2011 LWC Plan Update reflects the impact of these factors on water users and the projected water needs of the LWC Planning Area (**Figure 1**) by estimating and projecting the gross and net water demands by water use category (**Chapter 2**); discussing the water resources available and issues facing the region (**Chapter 3**); evaluating the various water source options (**Chapter 4**); identifying Water Resource Development projects (**Chapter 5**); and Water Supply Development Projects (**Chapter 6**).

The legal authority and requirements for water supply planning are included in Chapters 373, 403, and 187 of the Florida Statutes. In accordance with Florida's Water Protection and Sustainability Program, regional water supply plans and local government comprehensive plans must ensure that adequate potable water facilities are constructed and concurrently

NAVIGATE

The 2011 LWC Plan Update consists of this Planning Document and Appendices. In addition, the accompanying CD contains electronic versions of this update package, as well as the *Water Supply Plan Support Document*. This material is also available from the District's Water Supply Plan Web site: http://www.sfwmd.gov/watersupply.

available with new development. The alternative water supply portion of this program is meant to reduce competition between users and natural systems for available water by encouraging the development of alternative water supplies.

LAW / CODE

Section 373.0361(1), Florida Statutes (F.S.) provides:

The governing board of each water management district shall conduct water supply planning for any water supply planning region within the district identified in the appropriate district water supply plan under Section 373.036, F.S. where it determines that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period.

The District's Consumptive Use Permitting Program also minimizes contention for water resources and plays an important role in resource protection. Consumptive use permitting protects the supply and quality of groundwater and surface water resources by ensuring that water use is reasonable, beneficial and consistent with the public interest, and that it does not interfere with existing legal uses. (Chapter 40E-2, F.A.C., and Section 373.223, F.S.)

In October 2008, the District adopted the Restricted Allocation Area rule for the Lake Okeechobee Service Area (SFWMD 2010). Called the Lake Okeechobee Service Area Water Availability Rule, this rule protects the rights of existing legal users as well as the water resources by limiting the availability of water for consumptive use allocations. This rule's scope addresses requests for surface water withdrawals from Lake Okeechobee or hydraulically connected systems including the C-43 (Caloosahatchee River) Canal, the C-44 (St. Lucie River) Canal, and their integrated conveyance systems.

In July 2009, the Water Reservation rule for the Picayune Strand and Fakahatchee Estuary (Chapter 40E-10, F.A.C.) became effective to reserve water for the protection of fish and wildlife by preventing its allocation for consumptive use. The rule affects the availability of surface water and water in the surficial aquifer system (SAS) in the Picayune Strand area as described in the *Basis of Review for Water Use Permit Applications* (SFWMD 2010).

The result of these changes, previously established resource protection criteria limiting water resources for consumptive use, and existing and projected demands on freshwater resources reinforce the need for water users to develop alternative sources for part or all of their future water supply. As discussed in the previous plan update, traditional fresh groundwater and surface water supplies are expected to be inadequate to meet much of the projected new water demands for the region. Meeting the updated water supply demand projections over the next 20 years will require a continued focus on conservation and nontraditional water supply solutions, as reflected in water supply plan updates.

In preparing the 2005–2006 LWC Plan Update, local governments and water suppliers in the LWC Planning Area worked closely with the South Florida Water Management District (SFWMD or District) to identify and develop potable water supply projects to meet the expected need. These proposed projects were subsequently included in each local government's comprehensive plan. The 2011 LWC Plan Update continues to build on these projects with its list of projects in **Chapter 6**.

PURPOSE

The 2011 LWC Plan Update addresses the anticipated water supply needs of the LWC Planning Area for the next 20 years and describes how these needs will be met. The plan describes and meets current statutory requirements, including listings of proposed alternative water supply projects and regional project implementation strategies for planners, policy makers, and utility directors. The majority of new water needs are planned to be met through the development of alternative water supplies. This 2011 LWC Plan Update contains a list of water supply projects for Fiscal Years (FY) 2010–2030. Providing that funding is available, the alternative water supply projects listed in this plan update are eligible for cost-sharing consideration through a separate annual funding process established by the District's Governing Board, consistent with statutory requirements.

DISTRICT

Role of the South Florida Water Management District

The South Florida Water Management District performs water supply planning for each region within its jurisdiction. The District's mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems, and water supply. The agency serves local governments by supporting efforts to safeguard existing natural resources and meet future water demands.

Some traditional supply development may be possible where appropriate local hydrologic conditions are present and regulatory requirements are met.

Regional Water Supply Plans

The SFWMD prepares water supply plans for each of its four planning areas to effectively support planning initiatives and address local issues. The regional water supply plans encompass a 20-year future planning horizon and are updated every five years. All local governments within each planning area are required to update their 10-Year Water Supply Facilities Work Plans, which identify water supply projects, and adopt revisions to their comprehensive plans within 18 months following the approval of this water supply plan update.

Each regional water supply plan update provides:

- Revised water demand estimates and projections.
- An evaluation of existing regional water resources.
- Identification of water supply-related issues.
- A discussion of present water source options.
- Water resource and water supply development components including funding strategies.
- Recommendations for meeting projected demands for the region.

The 2011 LWC Plan Update also includes a discussion of Minimum Flows and Levels (MFLs) established within the planning area, MFL recovery and prevention strategies where appropriate, Water Reservations adopted by rule, technical data, and support information.

PLAN GOAL

The District's strategic goal for all of its water supply planning efforts is to ensure an adequate supply of water to protect natural systems and to meet all existing and projected reasonable-beneficial uses, while sustaining water resources for future generations. Additionally, the goal of the 2011 LWC Plan Update is to identify sufficient sources of water to meet the needs of all reasonable-beneficial uses within the LWC Planning Area for 2030 during a 1-in-10 year drought event, while sustaining the region's water resources and related natural systems.

Public Participation

The SFWMD established the Water Resources Advisory Commission (WRAC) to serve as an advisory body to the Governing Board. The WRAC is used as the primary forum for conducting workshops, presenting information, and receiving public input on water resource issues affecting south Florida. Commission members represent environmental, urban, and agricultural interests from all four of the District's water supply planning areas.

The SFWMD held WRAC Issue Workshops throughout the water supply planning process. Stakeholders representing a cross-section of interests in the region—agricultural, industrial, environmental, utilities, local government planning departments, and state and federal agencies—were invited to attend the workshops. During the workshops, participants reviewed and provided comments regarding projected demands compiled by SFWMD staff. Individual meetings were held with local government planning departments and utilities, as well as agricultural industry representatives to discuss water demand projections and coordinate planning processes.

2011 Lower West Coast Plan Objectives

The following six objectives for this plan update were developed. The objectives, which provide an overall framework for the planning process, were modified from those developed for the 2005–2006 LWC Plan Update.

WATER SUPPLY / Identify sufficient sources of water to meet reasonable-beneficial consumptive uses projected through 2030 under a 1-in-10 year drought event, without causing harm to the natural resources.

NATURAL SYSTEMS / Protect and enhance wetland systems and the water resources from harm due to water use, including drawdowns and harmful movement of saline water.

ESTUARINE AND RIVERINE SYSTEMS / Protect and enhance the estuarine and riverine systems through effective water deliveries and management of the water resources.

CONSERVATION AND ALTERNATIVE SOURCE DEVELOPMENT / Encourage conservation measures to improve the efficiency of water use and support and promote the development of alternatives sources.

LINKAGE WITH LOCAL GOVERNMENTS / Provide linkage between the LWC Plan Update and local government water-supply related elements.

COMPATIBILITY AND LINKAGE WITH OTHER PLANNING EFFORTS / Achieve compatibility with other related planning activities within the region and with adjacent water management districts.

Figure 1. Lower West Coast Water Supply Planning Area.

Characteristics of the Lower West Coast Planning Area

- LWC Planning Area covers 5,129 square miles.
- Includes all of Lee County, most of Collier County, and portions of Hendry, Glades, Charlotte, and mainland Monroe counties.
- Also includes the Big Cypress Basin, one of two administrative units in the SFWMD with its own board of directors. The Big Cypress Basin encompasses all of Collier County and part of Monroe County.
- The LWC Planning Area generally reflects the drainage patterns of the Caloosahatchee, Imperial, Estero, and Cocohatchee River basins, and the Big Cypress Swamp.
- Population is projected to increase from an estimated 995,000 in 2010 to about 1.5 million by 2030, a 51 percent gain. Most of the population is clustered in coastal Lee and Collier counties.
- Agricultural acreage totaling 306,000 acres in 2010 is expected to increase to 332,000 acres by 2030. Agricultural acreage is predominantly located inland in north-central Collier, western and northern Hendry County, and southern Glades County.
- Freshwater sources include: fresh groundwater from the surficial aquifer system (SAS), intermediate aquifer system (IAS), and surface water from the Caloosahatchee River and Big Cypress Basin canals and man-made ponds.
- Additional water sources include: reclaimed water, surface water captured during wet-weather flows, aquifer storage and recovery (ASR) wells, surface reservoirs, and brackish surface water and groundwater.
- The LWC Planning Area is a leader in developing brackish and reclaimed water sources projects. Currently, brackish water sources provide about 48 percent of the area's public potable water supply, and over 90 percent of the wastewater flow in the area is currently reused.
- The Caloosahatchee River Estuary is a large estuarine ecosystem where salt water from the Gulf of Mexico mixes with fresh water from the Caloosahatchee River and other sources.
- Estero Bay (Estero Bay Aquatic Preserve) and adjacent barrier islands comprise the Estero Bay Watershed. Estero Bay makes up the southernmost portion of Charlotte Harbor, which has been identified as a significant estuary by the National Estuary Program.
- Naples Bay and its watershed, located in western Collier County, were formed by the confluence of the Gordon River and other small tributaries that empty into the Gulf of Mexico through Gordon Pass.
- The Picayune Strand and Fakahatchee Estuary Water Reservation supports the Picayune Strand (Southern Golden Gate Estates) Restoration Project. When completed, this project will improve aquifer recharge to protect water supplies and impede saltwater intrusion, restore hydrologic seasonality, restore and enhance habitat for fish and wildlife, and maintain the existing level of flood protection.

- The major wetlands in Collier, Hendry, and Lee counties are: the Fakahatchee Strand, Picayune Strand State Forest, Florida Panther National Wildlife Preserve, Okaloacoochee Slough, Big Cypress National Preserve, and Corkscrew Regional Ecosystem Watershed. The major wetlands in Glades and Charlotte counties are associated with Fisheating Creek, the only free-flowing tributary to Lake Okeechobee, Fred C. Babcock–Cecil M. Webb Wildlife Management Area, and Telegraph Swamp.

PLANNING PROCESS

1

Planning and Assessment

The process for development of the 2011 LWC Plan Update incorporated extensive public participation, including five public workshops, as well as coordination with local governments, adjoining water management districts, and other state and federal agencies. A review of previous planning efforts in the region and documentation of activities since the approval of the 2005–2006 LWC Plan Update was a key starting point of this process. Planning efforts integrated development of 2030 demand projections, assessment of existing and projected resource conditions, and formulation of strategies to meet urban, agricultural, and environmental water needs.

2

Data Collection, Analysis and Issue Identification

Using the 2005–2006 LWC Plan Update as a foundation, this water supply plan update involved collecting the latest information about water resources, rainfall, natural resources, water demands, water conservation, and land use. Analyses, such as groundwater and surface water evaluations, regulatory information, mapping, wetland studies, and other related data, confirmed the validity to previously identified issues and helped identify new issues that may have emerged. In these analyses, modeling results from previous plans were used; no new modeling was conducted.

3

Evaluation of Water Source Options

The next phase of the planning process consisted of modifying existing solutions or developing new solutions to address the identified issues. In areas where projected demands exceeded available supplies, solutions included use of alternative water supplies and water conservation. Each water source option was evaluated, and local and regional responsibilities were identified.

4

Water Supply Development

Water supply projects that are intended to meet water needs for the next 20 years have been identified, compiled, and evaluated by the District with input from stakeholders. This information was used to create **Chapter 6**: Water Supply Development Projects, which evaluates existing and proposed supplies relative to projected future water demand.

PROGRESS SINCE THE 2005–2006 LWC PLAN UPDATE

The 2005-2006 LWC Plan Update addressed recommendations made in previous LWC water supply plans. These recommendations included key regional issues concerning conservation, groundwater resources, reclaimed water, the Regional Irrigation Distribution System (RIDs), seawater, storage, surface water, and related implementation strategies. The Five-Year Water Resource Development Work Program, contained in the SFWMD's *South Florida Environmental Report—Volume II* (SFWMD 2010), annually summarizes the progress of these recommendations.

In the five-year period since the 2005–2006 LWC Plan Update, activities in the LWC Planning Area have enhanced the region's water resources, water supply needs, and natural systems, as noted by the following:

- In September 2008, the SFWMD adopted a Comprehensive Water Conservation Program to establish a proactive Districtwide water conservation program.
- Year-round conservation measures adopted by rule in 2003 for the LWC Planning Area paved the way for the Districtwide year-round landscape irrigation rule that became effective in March 2010 (Rule 40E-24, F.A.C.).
- The Water Savings Incentive Program (WaterSIP) provides up to 50-50 cost-sharing funds for noncapital cost projects by utilities, municipalities, property owner associations, and large water users for purchasing and installing high-efficiency indoor plumbing fixtures, such as showerhead and toilet replacements, and outdoor irrigation retrofits, such as rain sensors and computerized central controllers. Between FY 2005 and FY 2009, the District allocated approximately $2.8 million in funding for 101 projects representing an estimated potential savings of 1,792 million gallons of water per year (MGY), including $452,861 for LWC Planning Area projects, with an estimated potential savings of 250 MGY.
- The SFWMD and U.S. Geological Survey (USGS) is cost sharing an evapotranspiration (ET) investigation to develop a water budget analysis of wetland systems. Six monitoring stations, located within differing vegetation communities in the Big Cypress Preserve, are part of a multiyear study that includes three complete years of data collection. Results from this study, expected to be published in 2011, are highly anticipated as actual ET measurements have not been reported in south Florida.
- The LWC Floridan Aquifer System Model and draft report have been peer reviewed and are undergoing revision. The model is designed to evaluate future effects of proposed use of the aquifer system and will be available for future updates to this plan.

- The U.S. Army Corps of Engineers (USACE) and the SFWMD completed the *Draft Southwest Florida Feasibility Study Integrated Feasibility Report and Environmental Impact Statement* (USACE and SFWMD 2009), which examines possible resource restoration projects for the entire southwest Florida area. The study provides a comprehensive watershed master plan including marine/estuary restoration and protection, environmental quality, flood protection, water supply, and other water-related purposes. Three proposed projects are recommended in the plan.
- An integrated surface water-groundwater model of southwest Florida, (SDI Environmental Services, Inc. 2008) was developed as part of the Southwest Florida Feasibility Study. The model is designed to examine the influences of proposed environmental projects on surface water hydrology and shallow groundwater systems.
- The LWC Surficial Aquifer System Model (LWCSASM), a groundwater flow model, is scheduled for peer review in 2012. The model is designed to examine the potential impacts of groundwater withdrawals from the SAS.
- The Alternative Water Supply (AWS) Funding Program provided grant money for proposed construction-ready projects in 2006, including many of the recommended reclaimed water projects developed by the *Feasibility Study for the Regional Irrigation Distribution System (RIDS) Subregional 1, 2, and 3* (Boyle Engineering Corp. 2002). RIDS Phase 3 projects have been completed using assistance from this funding.
- Through the AWS Funding Program, the District assisted water users in the development of AWS projects including reclaimed water projects, water reclamation facilities, brackish water wellfields and reverse osmosis (RO) treatment facilities, and ASR well systems. Over the past five years, the District, in cooperation with the state, has provided more than $135 million in AWS funding for 254 projects. Of these projects, more than 62 projects in the LWC Planning Area have created an estimated 33 MGD of new RO treatment capacity and 11 MGD of new reclaimed water production capacity, as well as numerous reclaimed water transmission and distribution projects. In addition, 21 MGD of surface water storage or ASR storage has been added.
- The Big Cypress Basin Board funded a program to improve control structures and management operations of its 44 control structures. The reconstructed Faka Union Canal Weir #4 has added an estimated average-annual dry-season storage volume of 3 billion gallons of water. Reconstructed weirs in the Corkscrew Canal have increased average-annual groundwater storage by approximately 424 million gallons. The retrofitted Golden Gate weirs #2 and #3 have increased groundwater levels from 0.1 feet to 1.5 feet between weirs #2 and #3, and provide an annual-average surface water storage of 1,560 million gallons.
- The C-43 (Caloosahatchee River) West Reservoir Project in Hendry County, one of the State of Florida's expedited projects, is designed to capture water from the Caloosahatchee River during high-flow times for storage and dry-season use. The siting, designing, and permitting to construct the reservoir, as well as an on-site seepage study are complete.

- The first phase of the Picayune Strand (Southern Golden Gate Estates) Restoration Project, another expedited project, is complete. The initial phase filled or plugged 7 miles of Prairie Canal and removed 65 miles of adjacent roadways, restoring 13,000 of the 55,000 acres in the project area.
- The Water Reservation Rule for the Picayune Strand and Fakahatchee Estuary (Chapter 40E-10, F.A.C.) became effective July 2, 2009, to reserve water for the protection of fish and wildlife by preventing its allocation for consumptive use.
- In October 2008, the District adopted the Lake Okeechobee Service Area Water Availability Rule (SFWMD 2010). This rule protects the rights of existing legal users as well as the water resources by limiting the availability of water for consumptive use allocations. This rule's scope addresses requests for surface water withdrawals from Lake Okeechobee or hydraulically connected systems including the C-43 (Caloosahatchee River) Canal, the C-44 (St. Lucie River) Canal, and their integrated conveyance systems.

OUTLOOK ON CLIMATE CHANGE

Climate change is occurring throughout the planet yet the impact to regions will vary and the degree of the change is unsure. Long-term data show changes in parameters, such as temperature change and sea level rise. Despite the uncertainties, climate change and the related effect on hydrogeologic conditions must be included as a consideration in water supply planning.

The anticipated rise of the sea level may increase the intrusion of salt water into groundwater. Analysis will be needed to identify the impact of the sea level rise on utility wellfields in the region at risk of saltwater intrusion. Additionally, comprehensive monitoring is required to understand and measure aquifer conditions and saltwater movement.

Other changes, such as increased evapotranspiration (ET) and changes in rainfall and tropical storms, are less predictable at this time. If the temperatures and ET increase as many expect, both Public Water Supply and Agriculture Self-Supply water demands could be expected to increase. More frequent intense rainfall events with longer dry periods in between could increase the annual rainfall but may decrease effective rainfall, and water could be lost to runoff or tide.

WATER SUPPLY PLANNING FOR THE NEXT 20 YEARS

Because of the stronger legislative link between local governments' comprehensive plans and the District's regional water supply plans, data sharing and collaborative planning have improved the planning process. Moreover, the District's consumptive use permitting is a key component of the planning process. Future updates to local governments' 10-Year Facilities Work Plans and the District's five-year update of the 2011 LWC Plan Update will

continue to influence the 20-year demand projections. **Chapter 2** presents the demand estimates and projections by water use category.

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