

EXHIBIT "C"

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT'S LOWER EAST COAST
WATER SUPPLY PLAN**



2023-2024 LOWER EAST COAST

WATER SUPPLY PLAN UPDATE

PLANNING DOCUMENT

Cover Photos

Front Top: Sugarcane

Front Bottom: Miami Beach, Biscayne Bay

Back: Miami Beach, Biscayne Bay

Acknowledgments

The South Florida Water Management District (SFWMD) recognizes and thanks the regional water supply workshop participants for their contributions, comments, advice, information, and assistance throughout the development of this *2023–2024 Lower East Coast Water Supply Plan Update*.

Furthermore, the SFWMD expresses appreciation to all staff who contributed to the development and production of this plan update.

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The logo for the South Florida Water Management District (SFWMD) features the text "sfwmd.gov" in a bold, lowercase, sans-serif font. Below the text is a stylized, wavy horizontal line that resembles a water surface or a decorative underline.

Executive Summary

The South Florida Water Management District's (SFWMD or District) strategic goal for its water supply plans is to identify sufficient water supply sources and projects to meet existing and future reasonable-beneficial uses during 1-in-10-year drought conditions while sustaining water resources and related natural systems. This *2023–2024 Lower East Coast Water Supply Plan Update* (2023–2024 LEC Plan Update) is the fourth update to the *2000 Lower East Coast Regional Water Supply Plan* (2000 LEC Plan), which previously was updated in 2006, 2013, and 2018. This plan update is consistent with the water supply planning requirements of Chapter 373, Florida Statutes (F.S.), and presents population and water demand projections through 2045, a review of water supply issues and evaluations, and a list of water source options. It also examines local and regional water supply efforts and describes water resource and water supply development projects completed since the 2018 update.

This 2023–2024 LEC Plan Update was developed in an open, public forum (**Chapter 1**). Meetings and workshops were held with water users, local and tribal governments, and utilities as well as agricultural industry and environmental representatives to solicit input, provide information about planning results, and receive comments on draft sections of the plan update. The SFWMD held three virtual public workshops for this water supply plan update.

The LEC Planning Area covers more than 6,500 square miles of southeastern Florida, including all of Palm Beach, Broward, and Miami-Dade counties, most of Monroe County, and the eastern portions of Hendry and Collier counties. The LEC Planning Area includes unique and critical ecosystems, such as the Everglades, Lake Okeechobee, Florida Bay, Biscayne Bay, Florida Keys, Loxahatchee River, and Lake Worth Lagoon. These ecosystems coexist with large agricultural areas around Lake Okeechobee and in southern Miami-Dade County, and with expansive urban areas that comprises 30% of the state's population.

Typically, the LEC Planning Area receives abundant rainfall seasonally, with volumes exceeding human and natural system needs during wet periods. Annual precipitation averages 57 inches, with three-quarters of rainfall occurring between May and October. Water availability varies annually with periodic drought years. There is an extensive network of canals and waterworks used for water supply and flood control in the LEC Planning Area. The regional water management system plays a critical role in capturing wet season stormwater for use during dry times, moving water between natural systems, delivering water to agricultural areas and urban coastal communities, and moving excess water to tide to provide flood protection. Fresh groundwater from the surficial aquifer system (SAS) and surface water from Lake Okeechobee are the primary water sources for urban, agricultural, and industrial uses in the LEC Planning Area.

Climate change and sea level rise are issues of concern, especially in coastal regions. South Florida is particularly vulnerable to potential changes in climate and sea level because of its location, regional variability in climate, hydrology, geology, low topography, natural resources, and dense population in coastal areas. To plan and prepare for regional climate change and sea level rise, the SFWMD is conducting research and computer modeling to

better predict and reduce uncertainties, analyzing vulnerabilities in the current water management system, and developing effective adaptation strategies for the future. Coordination with other resource management entities and governments is vital to ensuring a common approach and shared information moving forward.

DEMAND ESTIMATES AND PROJECTIONS

As described in **Chapter 2** and **Appendix A**, the LEC Planning Area has one of the fastest growing populations in the country. The region is home to approximately 6.2 million people and supports a large seasonal population, tourism and golf, and a substantial agricultural industry. The permanent population is projected to reach approximately 7.3 million people by 2045, a 17% increase from the 2021 base year estimate for this plan update. Details about Public Supply (PS) utilities, including the populations within their service areas, are provided in **Appendix B**.

Current and future water demands are heavily influenced by the existing and projected population. Population growth will lead to increases in water demands for public supply, landscape irrigation, power generation, and mining operations in the region. Irrigated agricultural acres are projected to remain relatively stable, declining 2% over the planning horizon.

Total water demands under average rainfall conditions for all water use categories are projected to increase 11%, from a total water use of 1,854.63 million gallons per day (mgd) in 2021 to 2,063.56 mgd in 2045 (**Table ES-1**). Projected demands under 1-in-10-year drought conditions are 348 mgd (17%) higher than the average demands in 2045.

The PS water use category is projected to remain the largest in the LEC Planning Area accounting for approximately 51% of the total 2045 projected demand. Agriculture (AG) is the second largest water use category, representing 31% of the total 2045 projected demand. Landscape/Recreational (L/R) is the third largest water use category representing approximately 10% of the total 2045 projected demand. Domestic Self-Supply (DSS), Commercial/Industrial/Institutional (CII), and Power Generation (PG) collectively account for approximately 9% of the total 2045 projected demand.

Table ES-1. Estimated (2021) and projected (2045) gross water demands under average rainfall conditions in the LEC Planning Area.

Water Use Category	2021 Estimated Use (mgd)	2045 Projected Demand (mgd)	Percent Change	Percent of Projected 2045 Total*
Public Supply	890.67	1,047.37	18%	51%
Domestic Self-Supply	10.56	14.45	37%	<1%
Agriculture	645.20	637.66	-1%	31%
Commercial/Industrial/Institutional	87.35	102.57	17%	5%
Landscape/Recreational	178.65	199.18	11%	10%
Power Generation	42.20	62.33	48%	3%
LEC Planning Area Total	1,854.63	2,063.56	11%	100%

LEC = Lower East Coast; mgd = million gallons per day.

*May not equal 100% due to rounding.

DEMAND MANAGEMENT: WATER CONSERVATION

Water conservation by all water use categories continues to be a priority to help meet future water needs. Conservation programs often are among the lowest-cost solutions to meet future demands and can reduce costs over the long term if properly planned and implemented (**Chapter 3**). Conservation efforts in the LEC Planning Area have effectively lowered the net (finished) water per capita use rate for PS over the past two decades, from 176 gallons per capita per day (gpcd) in 2000 to approximately 131 gpcd per day in 2021. Analyses suggest that Palm Beach, Broward, Miami-Dade, Hendry, and Monroe counties collectively can save an additional 62.13 mgd by 2045 if various urban and agricultural conservation options are implemented.

NATURAL SYSTEMS AND RESOURCE PROTECTION

The LEC Planning Area encompasses extensive natural systems, including the Everglades, Lake Okeechobee, Florida Bay, Biscayne Bay, Florida Keys, Loxahatchee River, and Lake Worth Lagoon (**Chapter 5**). The region has two national parks and five national wildlife refuges. Natural systems are protected and addressed through regulatory mechanisms, restoration efforts, and water resource development projects.

In the LEC Planning Area, minimum flows and minimum water levels (MFLs) with their associated recovery strategies have been previously adopted for Lake Okeechobee, the Everglades, and the Northwest Fork of the Loxahatchee River. The Lake Okeechobee MFL recovery strategy has been revised as part of this plan with consideration of the Herbert Hoover Dike repairs, a new lake regulation schedule, and additional storage projects (**Appendix C**). MFLs with prevention strategies have been adopted for Florida Bay, the Biscayne aquifer, and the Lower West Coast aquifers. A re-evaluation of the adopted MFL criteria for Florida Bay was completed in 2014. A water reservation, another resource protection regulatory mechanism, was established for Nearshore Central Biscayne Bay in 2013 and for the proposed Everglades Agricultural Area (EAA) Reservoir in 2021. Restricted allocation areas (RAAs), another resource protection regulatory mechanism, were established for the L-1, L-2, and L-3 canal system in 1981; the North Palm Beach County/Loxahatchee River Watershed Waterbodies and LEC Everglades Waterbodies in 2007 (amended in 2022); the Lake Okeechobee Service Area (LOSA) in 2008; and the water stored via aquifer storage and recovery (ASR) wells at the C-18W Reservoir site in 2022.

There are numerous large ecosystem restoration projects under way in the LEC Planning Area (**Table ES-2, Chapter 7**) that are vital to improving and maintaining the viability of the region's natural systems and water resources, including elements identified in MFL recovery and prevention strategies. The Comprehensive Everglades Restoration Plan (CERP), a partnership between the United States Army Corps of Engineers (USACE) and the SFWMD, is a critical component of ecosystem restoration and water supply. CERP includes numerous capital projects needed to protect and restore natural systems and increase water availability. An Integrated Delivery Schedule organizes the implementation of capital projects and is updated every year.

Table ES-2. Water resource development projects within the LEC Planning Area by region.

Region	Project	Status
Lake Okeechobee	CERP Lake Okeechobee Watershed Restoration Project (LOWRP)	Planning/Construction
	USACE Herbert Hoover Dike Major Rehabilitation	Construction Complete
	Lake Okeechobee Component A Storage Reservoir (LOCAR)	Planning
	Central Everglades Planning Project (CEPP) A-2 Reservoir and Stormwater Treatment Area (STA)	Planning/Construction
Everglades	Restoration Strategies Regional Water Quality Plan	Construction
	Modified Water Deliveries to Everglades National Park	Operational
	CERP Water Conservation Area 3A Decompartmentalization Physical Model	Operational
	CERP Central Everglades Planning Project (CEPP)	Construction
	C-111 South Dade Project	Construction
	CERP C-111 Spreader Canal Western Project	Planning
Western Basins	CERP Western Everglades Restoration Project	Planning
	C-139 Annex Restoration	Construction
LEC Service Areas	Restoration Plan for the Northwest Fork of the Loxahatchee River	Planning
	CERP Loxahatchee River Watershed Restoration Project	Planning/Design
	CERP Environmental Preserve at the Marjorie Stoneman Douglas Everglades Habitat	Operational
	CERP Fran Reich Preserve Reservoir Levee	Operational
	CERP Broward County Water Preserve Areas	Planning/Design
	CERP Biscayne Bay Coastal Wetlands Project	Planning/Construction
	CERP Biscayne Bay and Southern Everglades Ecosystem Restoration	Planning

WATER SOURCE OPTIONS

Water users in the LEC Planning Area rely on surface water, groundwater (fresh and brackish), and reclaimed water (**Chapter 5**) to meet urban and agricultural demands. Surface water from canals and lakes, and fresh groundwater from the SAS are considered traditional water sources. Alternative water supply sources include brackish groundwater from the Floridan aquifer system (FAS), reclaimed water, seawater, and excess surface water and groundwater captured and stored in ASR wells, reservoirs, and other storage features. Use of alternative water supplies is an integral part of the current and future water supply strategy.

PS utilities within the LEC Planning Area primarily rely on fresh groundwater from the SAS, with limited use of the FAS, and one utility uses surface water. Groundwater sources can meet 2045 PS demands; however, increases in fresh groundwater allocations are limited to comply with resource protection criteria. Of the 54 PS utilities in the LEC Planning Area, 11 will need to construct new projects to meet their projected 2045 demands. These new projects include expanded use of the FAS and use of the C-51 Reservoir, both of which are alternative water sources; SAS aquifer recharge offsets; and interconnections with nearby utilities for bulk water purchases.

Fresh groundwater from the SAS supplies 100% of the estimated demand for DSS in the LEC Planning Area. Although DSS demand is expected to increase by 37% over the planning horizon, groundwater from the SAS can continue to meet the 2045 DSS demands in most areas.

Approximately three-quarters of the total agricultural acreage in the LEC Planning Area is in the EAA, which relies exclusively on surface water. There are two other agricultural areas in the LEC Planning Area that rely on fresh groundwater: southern Miami-Dade County and the eastern portion of Hendry County. In those areas, groundwater sources can meet 2045 AG demands; however, increases in fresh groundwater allocations are limited by resource protection criteria.

L/R irrigation users, including golf courses, rely primarily on surface water, fresh groundwater, and reclaimed water in nearly equal amounts. In addition, eight L/R users meet their demands with treated brackish groundwater from the FAS for golf course irrigation. Increases in L/R demands are expected to be met primarily through the expansion of reclaimed water systems in Palm Beach and Broward counties and with fresh groundwater in Miami-Dade County.

For CII users, the 2021 demands for the LEC Planning Area were distributed evenly with half between surface water and reclaimed water and the other half fresh groundwater. Increases in the CII category through 2045 are expected to be met by fresh groundwater and surface water. There are 12 major power generation facilities within the LEC Planning area, and 7 of them have demands met from groundwater or reclaimed water. No new power generation facilities requiring water supply are planned for construction or operation through 2045. **Table ES-3** summarizes the variety of water source options that typically are used by each water use category.

Table ES-3. Typical water source options for the water use categories in the LEC Planning Area.

Water Use Category	Fresh Surface Water	Fresh Groundwater	Brackish Groundwater	Reclaimed Water
Public Supply	✓	✓	✓	
Domestic Self-Supply		✓		
Agriculture	✓	✓		
Commercial/Industrial/Institutional	✓	✓		✓
Landscape/Recreational	✓	✓	✓	✓
Power Generation		✓	✓	✓

Surface Water

Surface water supply sources for the LEC Planning Area include Lake Okeechobee, water conservation areas, Central and Southern Florida (C&SF) Project canals, county and water control district canals, reservoirs, and on-site ponds. Water availability from Lake Okeechobee and connected surface water bodies is limited due to concerns regarding protection of existing legal users, limited storage, and environmental needs. Specific surface water volumes in eastern Hendry County are identified for the Seminole Tribe of Florida Big Cypress Reservation in addition to a secondary irrigation supply from Lake Okeechobee. As discussed earlier, use of several surface water bodies is limited by RAA rules and MFLs. The City of West Palm Beach is the only PS utility using surface water as its primary water supply; however, application has been made to the SFWMD for authorization to withdraw groundwater from the FAS, reducing the utility’s reliance on surface water. Future surface water demands are expected to decrease slightly for AG and remain relatively static for PS, CII, L/R, and PG. Additional water storage features and tailwater recovery systems could enhance water availability.

For surface water users in LOSA, additional water can be stored in Lake Okeechobee resulting from the completion of the dike repairs and the revised regulation schedule, known as the Lake Okeechobee System Operating Manual (LOSOM). The USACE made available the Final Draft LOSOM Water Control Plan in 2023, and the final Record of Decision was signed on August 12, 2024. The USACE's water control plan for LOSOM includes operational flexibility reflecting the multiple objectives of managing Lake Okeechobee water levels. The Environmental Impact Statement (EIS) upon which LOSOM is based showed water supply performance improvements over the Lake Okeechobee Regulation Schedule 2008 (LORS08). The SFWMD will provide operational guidance to the USACE on a weekly basis and use available storage and conveyance capacity to achieve water supply performance consistent with the state's water supply authority.

The revised LOSOM will result in improvements to water supply, but it does not result in a sufficient increase in storage volumes to allow the lake to return to an MFL prevention strategy at this time. As such, the Lake Okeechobee MFL recovery strategy has been revised as part of this 2023–2024 LEC Plan Update. The environmental enhancement, regulatory criteria, and water shortage components of the MFL recovery strategy will not change. The SFWMD will continue to allocate water for existing and future reasonable-beneficial uses pursuant to its regulatory rules and criteria. The capital projects component has been revised. Additional details about the MFL and updated recovery strategy are provided in **Appendix C**. For increases in surface water use other than within LOSA, water availability would have to be determined based on local conditions.

Fresh Groundwater

The SAS, including the Biscayne and Lower Tamiami aquifers, is the primary source of fresh groundwater in the LEC Planning Area and is used by all water use categories. Further development of the SAS is limited by potential impacts on the regional system, wetlands, and existing legal users as well as proximity to contamination sources and the potential for saltwater intrusion or upconing of relict seawater. Specifically, use of the SAS in coastal areas is restricted 1) by the Biscayne Aquifer MFL prevention strategy, which specifies no further inland movement of salt water, and 2) near C&SF Project canals by the LEC Regional Water Availability criteria, which prohibits increased allocations that induce increased seepage from the canals.

Available water supplies for allocation in eastern Hendry County from the Lower Tamiami aquifer are constrained by the presence of isolated wetlands and the Lower West Coast Aquifers MFL. AG water demands in the portion of Hendry County within the LEC Planning Area are expected to increase by 5% over the planning horizon; water levels will require close monitoring where they are approaching the maximum developable limit. Water availability from the SAS will be determined locally in these areas, considering the quantities required, local resource conditions, existing legal users, and viability of other supply options.

In 2021, the SAS accounted for approximately 90% of PS use and 100% of DSS use in the LEC Planning Area. SAS use for PS is projected to increase from 824.41 mgd in 2021 to 939.33 mgd by 2045, as utilities maximize their permitted allocations from this source. The utilization of surface water from the C-51 Reservoir as an alternative source will allow certain PS utilities to increase withdrawals from the SAS by up to 35 mgd as an offset specified in those permits. Most PS utilities in the LEC Planning Area have been proactive in permitting

and constructing water supply systems that anticipate demand increases and have proposed projects to meet future growth (**Chapter 8**).

The SFWMD is currently developing a density-dependent groundwater model for the SAS (i.e., East Coast Surficial Model [ECSM]) to evaluate the ability of this resource to sustainably meet future demands. Results of the model simulations will provide guidance for developing water management strategies, support periodic updates to the regional water supply plans, evaluate resiliency, and be used in regulatory applications. The current version of the model is being calibrated to water level and water quality (total dissolved solids observations for transient conditions). Following completion of model calibration and verification as well as incorporation of peer review comments, the ECSM will be applied through the development of the planning demands for 2021 and 2045 model scenarios. Model results should be available in 2025, and the effects of these future demands on the SAS will be evaluated in support of this 2023–2024 LEC Plan Update.

For SAS water users, the most recent mapping of saltwater intrusion in Palm Beach, Broward, and Miami-Dade counties indicates the saltwater interface has remained relatively stable, but some inland movement has occurred. These maps are being updated based on 2024 dry season data and are scheduled to be published in fall 2024. Surface water canals and salinity control structures are operated to maintain water levels that minimize inland saltwater movement, and no regional declines in water levels have been observed. However, sea level rise is likely to accelerate the inland movement of the saltwater interface.

Brackish Groundwater

Brackish groundwater from the FAS is utilized by 24 PS utilities, 8 golf courses, and 3 power generation facilities. Additionally, seven utilities are proposing wellfield and reverse osmosis (RO) water treatment plant (WTP) projects to begin treating brackish water from the FAS to meet a portion of their 2045 projected demands. The 15 operating RO WTPs have a combined capacity of approximately 79.50 mgd. In 2021, the FAS and associated RO WTPs supplied water to meet 6% of PS demand and are expected to meet the same by 2045. Current and future FAS demands were previously simulated using the East Coast Floridan Model (ECFM), which is a peer-reviewed, calibrated regional FAS groundwater model. ECFM was used to assess the potential impacts of withdrawals on water quality and the viability of the source through the planning horizon in support of the 2018 LEC Plan Update. Since the 2045 projected FAS water demands are of a similar magnitude to the 2040 FAS water demands simulated and presented in the 2018 LEC Plan Update, it was determined that the results are still representative for 2045 in this 2023–2024 LEC Plan Update, and additional ECFM simulations were not needed. Review of historical chloride data and model results indicates properly managed FAS wellfields can meet projected demands through 2045.

Current groundwater level and quality data for the FAS are discussed in **Chapter 6** and **Appendix D**. Review and analyses of FAS water level and quality data indicate there have not been substantial regional changes; however, some local changes in water quality have been observed, which may be the result of localized pumping stresses or hydrologic conditions. FAS users may need to spread out withdrawal facilities or reduce individual well pumping rates to mitigate water quality changes. These areas should continue to be monitored through a coordinated effort with utilities and other FAS stakeholders.

Reclaimed Water

Use of reclaimed water is an important component of managing water supplies in the LEC Planning Area. In 2021, 28 of the 45 wastewater treatment facilities provided at least a portion of the treated wastewater for reuse in other areas. Including supplemental water sources, 14% (97.47 mgd) of the region's treated wastewater was reused for golf course and landscape irrigation, industrial uses, power generation facility cooling purposes, wetland hydration, and groundwater recharge. However, 601.90 mgd of potentially reusable wastewater was disposed, mainly through deep well injection and ocean outfall. Wastewater flows are projected to increase to 849.62 mgd by 2045. Many utilities have constructed the required treatment facilities to produce reclaimed water for public access irrigation in anticipation of increased reclaimed water demand in the future. The volume of reclaimed water used for irrigation is projected to more than double by 2045 as a result of population growth and compliance with the Ocean Outfall Law pursuant to Section 403.086, F.S., requirements.

Water Storage

Capturing surface water and groundwater during wet conditions for use during dry conditions increases the amount of available water. In the LEC Planning Area, water storage options include ASR and reservoirs, which are considered alternative water supplies. As of 2021, there are two active ASR wells, three idle and available for operation, and one abandoned. Several others were repurposed as FAS supply wells.

Regional reservoirs (e.g., flow equalization basins and EAA A-2, C-51, and C-18W reservoirs) will attenuate stormwater, provide water quality treatment in conjunction with stormwater treatment areas, and store seasonally available water. Local agricultural reservoirs can store recycled irrigation water or collect stormwater runoff.

Seawater

There are two RO seawater desalination treatment plants in the LEC Planning Area. Both plants are in the lower Florida Keys and operated for emergencies by the Florida Keys Aqueduct Authority. The Stock Island plant—the first desalination plant built in Florida—can produce up to 2 mgd of potable water, and the Marathon plant can produce another 1 mgd. In addition, there is one proposed desalination plant in Crawl Key, which will be able to produce up to 4 mgd of potable water, and there are plans to expand and rehabilitate the existing Stock Island plant. Also, three power generation facilities in the LEC Planning Area use seawater for cooling purposes.

FUTURE DIRECTION

Chapter 9 contains guidance to help focus future efforts in the region to meet projected water needs. Some of the key suggestions to regional stakeholders, including the SFWMD, utilities, other government agencies, agricultural interests, and environmental groups, are as follows:

- ◆ Continue implementation of water conservation programs throughout the LEC Planning Area to increase water use efficiency and reduce the amount of water needed to meet future demands.
- ◆ Continue implementation of MFL prevention and recovery strategies, and review and update these strategies, as appropriate, in conjunction with future water supply plan updates.
- ◆ Evaluate future versions of LOSOM with consideration of capital projects being designed and constructed, such as ASR systems and aboveground storage reservoirs to increase storage capacity.
- ◆ Continue development of alternative water supplies, including maximizing the use of reclaimed water.
- ◆ Design new FAS wellfields to maximize withdrawals while minimizing water level and quality changes. This likely will require a combination of additional wells with greater spacing between wells, lower-capacity wells, and continued refinement of wellfield operational plans.
- ◆ Develop regional and local reservoirs and other storage systems (e.g., ASR systems), where possible, to increase surface water availability for environmental, agricultural, and urban water supply needs.
- ◆ Continue supporting ecosystem restoration efforts, including the Restoration Strategies Regional Water Quality Plan and CERP.
- ◆ Identify wells critical to long-term monitoring and modeling to ensure they are constructed, maintained, or replaced, as necessary.
- ◆ Continue mapping the saltwater interface and identify areas of concern that might require enhanced monitoring or changes in wellfield operations.
- ◆ Continue characterizing, monitoring, and designing adaptation solutions in response to climate change and sea level rise and their impacts to water supply and continue participating in the Southeast Florida Regional Climate Change Compact.

CONCLUSIONS

Building on the findings and conclusions of previous LEC water supply plan updates, this 2023–2024 LEC Plan Update assesses water supply demand and available sources through 2045. This plan update concludes that future water needs of the region during average and 1-in-10-year drought conditions can be met through the 2045 planning horizon with appropriate management, conservation, and implementation of projects identified herein.

Meeting future water needs through 2045 in the LEC Planning Area depends on the following:

- ◆ Construction of potable water supply development projects by PS utilities.
- ◆ Implementation of CERP Restoration Strategies and other water resource development projects to provide additional storage.
- ◆ Implementation of LOSOM and construction of CERP capital projects identified in MFL prevention and recovery strategies.

Successful implementation of this 2023–2024 LEC Plan Update requires close collaboration with agricultural interests, local and tribal governments, utilities, and other stakeholders. Coordination efforts should ensure that water resources in the LEC Planning Area continue to be prudently managed and available to meet future demands while also protecting natural systems.

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- Appendix A: Water Demand Projections
- Appendix B: Public Supply Utility Summaries
- Appendix C: MFLs and Prevention and Recovery Strategies
- Appendix D: Groundwater Monitoring, Saltwater Intrusion, Groundwater Modeling, and Climate Change
- Appendix E: Wastewater Treatment Facilities

Acronyms and Abbreviations

AFSIRS	Agricultural Field Scale Irrigation Requirements Simulation
AG	Agriculture
APPZ	Avon Park permeable zone
ASR	aquifer storage and recovery
AWE	Alliance for Water Efficiency
AWS	alternative water supply
BBCW	Biscayne Bay Coastal Wetlands
BBSEER	Biscayne Bay and Southeastern Everglades Ecosystem Restoration
BCWPA	Broward County Water Preserve Areas
BEBR	Bureau of Economic and Business Research
bls	below land surface
BMP	best management practice
C&SF Project	Central and Southern Florida Project
CCS	cooling canal system
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
CFP	Cooperative Funding Program
cfs	cubic feet per second
CII	Commercial/Industrial/Institutional
Compact	Southeast Florida Regional Climate Change Compact
District	South Florida Water Management District
DSS	Domestic Self-Supply
EAA	Everglades Agricultural Area
ECFM	East Coast Floridan Model
ECSM	East Coast Surficial Model
EQIP	Environmental Quality Incentives Program
F.A.C.	Florida Administrative Code
F.S.	Florida Statutes
FAS	Floridan aquifer system
FAWN	Florida Automated Weather Network
FDACS	Florida Department of Agriculture and Consumer Services

FDEP	Florida Department of Environmental Protection
FEB	flow equalization basin
FKAA	Florida Keys Aqueduct Authority
FPL	Florida Power & Light
FSAID	Florida Statewide Agricultural Irrigation Demand
FY	Fiscal Year
gpcd	gallons per capita per day
gpm	gallons per minute
IAS	intermediate aquifer system
L/R	Landscape/Recreational
LEC	Lower East Coast
LFA	Lower Floridan aquifer
LOCAR	Lake Okeechobee Component A Storage Reservoir
LORS08	Lake Okeechobee Regulation Schedule 2008
LOSA	Lake Okeechobee Service Area
LOSOM	Lake Okeechobee System Operating Manual
LOWPP	Lake Okeechobee Watershed Protection Plan
LOWRP	Lake Okeechobee Watershed Restoration Project
LTA	Lower Tamiami aquifer
LWCSIM	Lower West Coast Surficial and Intermediate Aquifer Systems Model
MDL	maximum developable limit
MDWASD	Miami-Dade Water and Sewer Department
MFL	minimum flow and minimum water level
mg/L	milligrams per liter
mgd	million gallons per day
MIL	mobile irrigation lab
ModWaters	Modified Water Deliveries to Everglades National Park
MRZ	mandatory reuse zone
NGVD29	National Geodetic Vertical Datum of 1929
OOL	Ocean Outfall Law
PCUR	per capita use rate
PG	Power Generation
PS	Public Supply
RAA	restricted allocation area

RO	reverse osmosis
SAS	surficial aquifer system
SFER	South Florida Environmental Report
SFWMD	South Florida Water Management District
STA	stormwater treatment area
TDS	total dissolved solids
UF/IFAS	University of Florida Institute of Food and Agricultural Sciences
UFA	Upper Floridan aquifer
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WCA	water conservation area
WERP	Western Everglades Restoration Project
Work Plan	Water Supply Facilities Work Plan
WPP	watershed protection plan
WRDA	Water Resources Development Act
WSVA	Water Supply Vulnerability Assessment
WTP	water treatment plant
WWTF	wastewater treatment facility

Introduction

The South Florida Water Management District (SFWMD or District) develops and updates regional water supply plans to assess current and future water needs while protecting central and southern Florida’s water resources. This *2023–2024 Lower East Coast Water Supply Plan Update* (2023–2024 LEC Plan Update) assesses existing and projected water demands as well as water sources to meet those demands through 2045 in the LEC Planning Area.

The LEC Planning Area includes all of Palm Beach, Broward, and Miami-Dade counties, most of Monroe County, and the eastern portions of Hendry and Collier counties. In addition, it includes the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida reservations (**Figure 1-1**). The 2023–2024 LEC Plan Update presents population estimates and associated water demands and projections (**Chapter 2**), water resource and water supply development projects (**Chapters 7 and 8**, respectively), and related water supply planning information for the 2021 to 2045 planning horizon. Designed to be a planning guide for local and tribal governments, utilities, agricultural operations, and other water users, the 2023–2024 LEC Plan Update provides a framework for local and regional water supply planning and management decisions in the LEC Planning Area.

The boundaries of the LEC Planning Area follow the north-to-south sheetflow pattern of the historical Everglades, draining into Florida Bay at the southern tip of the peninsula, and encompassing the Florida Keys island chain. As shown in **Figure 1-2**, the LEC Planning Area encompasses the LEC Service Areas and a large part of the Lake Okeechobee Service Area (LOSA). Lake Okeechobee borders four water supply planning areas and is formally included in this plan. The LEC Service Areas include major metropolitan areas from West Palm Beach to Miami. Portions of Palm Beach, Broward, and Miami-Dade counties as well as the Seminole Tribe of Florida’s Brighton and Big Cypress reservations depend on surface water from Lake Okeechobee and its connected conveyance canals for supplemental water supply and aquifer recharge. The Everglades Agricultural Area (EAA), which comprises a large portion of LOSA, is located within the LEC Planning Area and also relies on surface water from Lake Okeechobee for irrigation water supply. Surface water from Lake Okeechobee is conveyed south through stormwater treatment areas (STAs) and water conservation areas (WCAs), which comprise the Everglades Protection Area, for storage and water quality treatment before going into Everglades National Park.

TOPICS

- ◆ 2023–2024 LEC Plan Update
- ◆ Goal and Objectives
- ◆ Legal Authority and Requirements
- ◆ Tribal Governments
- ◆ Regional and Local Planning Linkage
- ◆ Plan Development Process
- ◆ Progress Since the 2018 LEC Plan Update

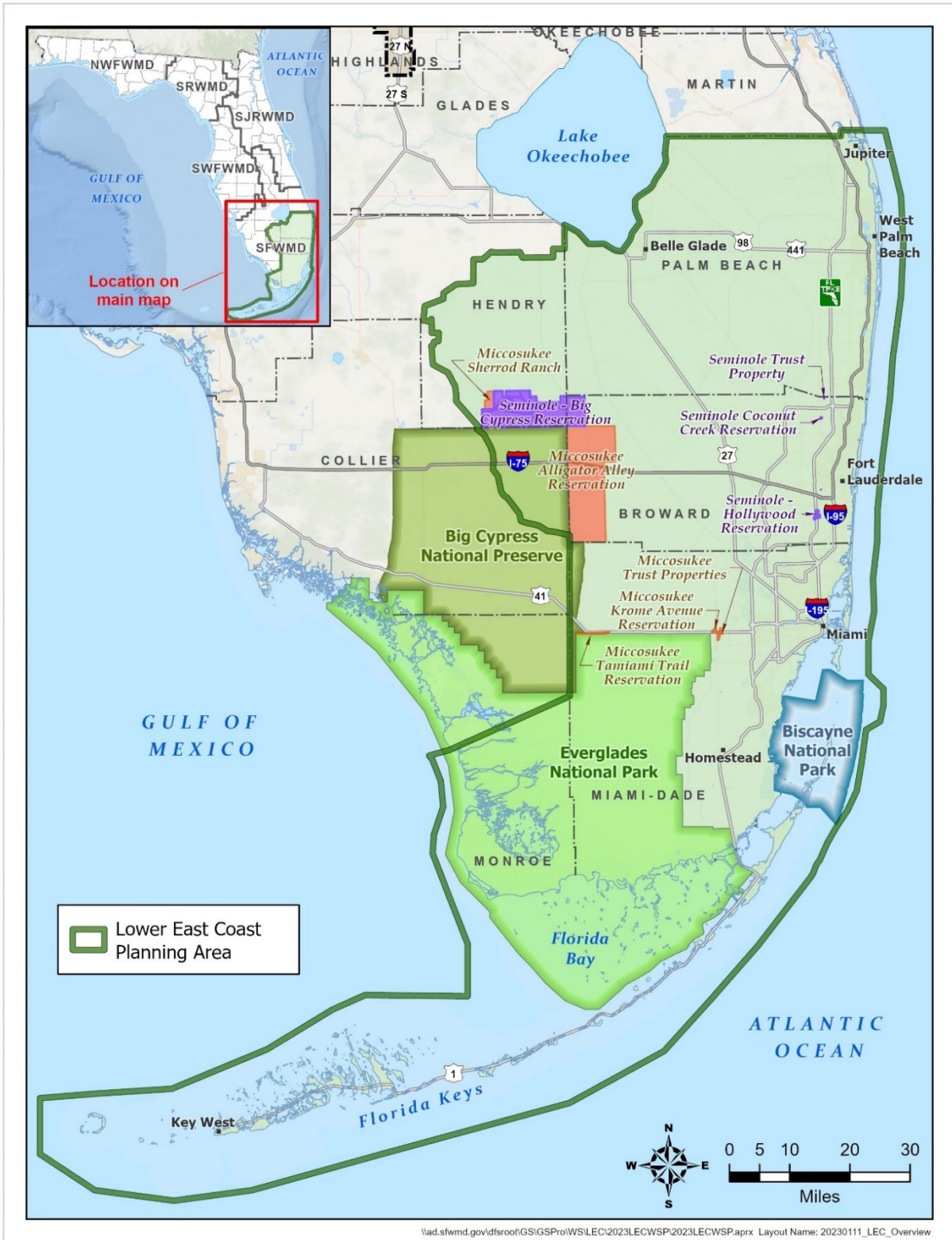


Figure 1-1. LEC Water Supply Planning Area.

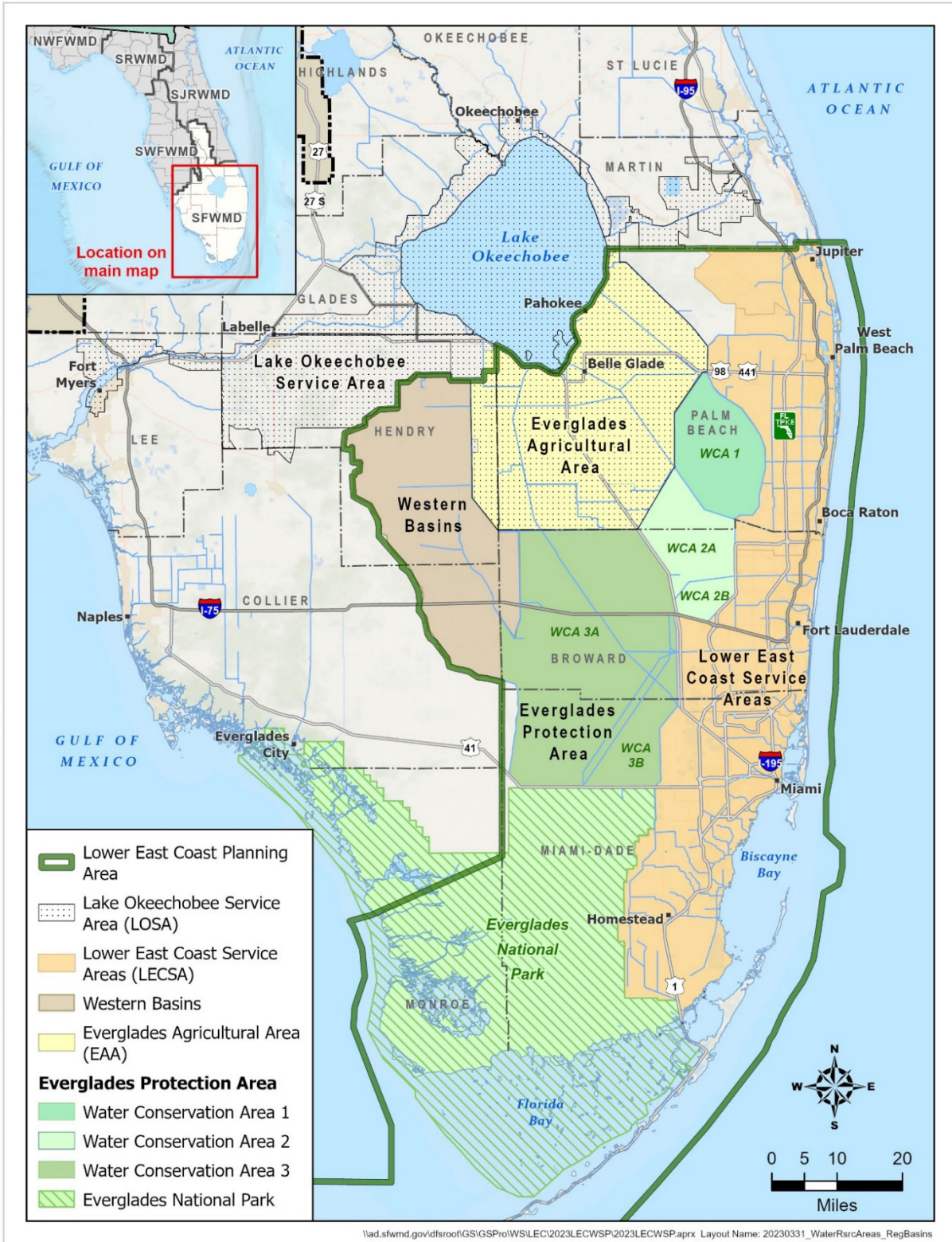


Figure 1-2. Location of major water resource areas and regulatory basins within the LEC Planning Area.

Unique and critical ecosystems, such as the Everglades, Lake Okeechobee, Florida Bay, Biscayne Bay, and the Loxahatchee River, are located in the LEC Planning Area. Two national parks (Everglades and Biscayne), a federally designated Wild and Scenic River (Northwest Fork of the Loxahatchee River), and five national wildlife refuges are also located within the LEC Planning Area boundaries. Because the LEC Planning Area depends on surface water from Lake Okeechobee and the Everglades—especially the WCAs—for a portion of its water supply, the LEC planning efforts are tightly linked with restoration efforts and management decisions concerning those water resources. Most restoration projects are part of the Comprehensive Everglades Restoration Plan (CERP), a joint effort between the SFWMD and the United States Army Corps of Engineers (USACE). In addition to important natural areas, the LEC Planning Area includes an extensive agricultural industry, several major urban communities, and the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida reservations.

The primary sources of fresh water throughout the LEC Planning Area are surface water and groundwater from shallow aquifers. To a much lesser extent, reclaimed water is also used for nonpotable uses like irrigation. Major surface water resources include Lake Okeechobee, the WCAs, and their hydraulically connected water bodies. The availability of surface water and fresh groundwater in the LEC Planning Area is limited, primarily due to water resource protection criteria (**Chapter 4**). Groundwater resources in the LEC Planning Area include the surficial and Floridan aquifer systems (SAS and FAS). Further information about water source options is provided in **Chapter 5**.

2023–2024 LEC PLAN UPDATE

The 2023–2024 LEC Plan Update reflects the changes experienced in the LEC Planning Area since 2018, describes the effects these changes have had on water use, and provides updates to projected water demands from 2040 to 2045. This update consists of three documents: 1) the planning document, 2) the appendices, and 3) the *2021–2024 Support Document for Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021b). The planning document and appendices focus on the LEC Planning Area. The 2021–2024 Support Document discusses aspects common to four of the SFWMD regional planning areas, including the legal authority and requirements for water supply planning. The Upper Kissimmee Basin is not included in the Support Document because it is part of the Central Florida Water Initiative, which has its own support documents. Additional supporting information for the District’s planning areas is available in the recent publication titled *Physical Features and Water Resources of the South Florida Water Management District* (SFWMD 2022b).

GOAL AND OBJECTIVES

The goal of the 2023–2024 LEC Plan Update is to identify sufficient water supply sources and future projects to meet existing and future reasonable-beneficial uses during 1-in-10-year drought conditions through 2045 while also sustaining the water resources and related natural systems. The objectives in the *2018 Lower East Coast Water Supply Plan Update* (2018 LEC Plan Update; SFWMD 2018) were reviewed and modified for this 2023–2024 LEC Plan Update as follows:

1. **Water Supply** – Quantify sufficient volumes of water and water supply projects to meet reasonable-beneficial consumptive uses projected through 2045 under 1-in-10-year drought conditions.
2. **Natural Systems** – Protect natural systems and water resources, including the Everglades, estuarine and riverine systems, and other federal, state, and local natural resource areas.
3. **Water Conservation and Alternative Source Development** – Encourage water conservation measures to improve water use efficiency. Continue to encourage development of the FAS as an alternative water supply (AWS) and monitor the aquifers to enhance understanding of the relationships among water use, water levels, and water quality. Develop water storage options, including aquifer storage and recovery (ASR) systems and reservoirs, and promote projects that increase use of reclaimed water.
4. **Linkage with Local and Tribal Governments** – Provide information to support local government Comprehensive Plans. Promote compatibility of the 2023–2024 LEC Plan Update with local and tribal government land use decisions.
5. **Compatibility and Linkage with Other Efforts** – Achieve compatibility and integration with the following planning-related activities within the region:
 - ◆ CERP and other environmental restoration projects
 - ◆ Other state and local water resource initiatives
 - ◆ Existing and proposed environmental projects
 - ◆ Modifications to operating schedules for the regional system, including Lake Okeechobee
 - ◆ Water use permitting process, minimum flow and minimum water level (MFL) criteria, water reservations, and restricted allocation areas (RAAs)
 - ◆ Local, District, and state resiliency efforts addressing the impacts of climate change, including rising sea levels and changing rainfall and flood patterns

LEGAL AUTHORITY AND REQUIREMENTS

The legal authority and requirements related to water supply planning are included in Chapters 163, 187, 373, and 403, Florida Statutes (F.S.) with Chapter 373, F.S. establishing the District’s legal authority. 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 available to meet the demands of new development. The water supply planning region identified in this plan shall be considered a Water Resource Caution Area under Rule 62-40.520(2), Florida Administrative Code and for purposes of Section 403.064, F.S., and affected parties may challenge the designation pursuant to Section 120.569, F.S.

In addition to water supply planning, the SFWMD is required by statute to provide updates for a variety of resource development, restoration, and monitoring programs implemented within the District’s boundaries. Such updates are provided in the annual publication of the *South Florida Environmental Report* (<https://www.sfwmd.gov/sfer>), which is referenced as needed in this plan update.

TRIBAL GOVERNMENTS

The Seminole Tribe of Florida is a federally recognized Indian Tribe organized pursuant to Section 16 of the Indian Reorganization Act of 1934 and recognized by the State of Florida pursuant to Chapter 285, F.S. The Seminole Tribe of Florida's Big Cypress, Coconut Creek, and Hollywood reservations are located in the LEC Planning Area in Hendry and Broward counties (**Figure 1-1**). The Big Cypress reservation land use is primarily agricultural and residential. The Coconut Creek reservation land use is commercial, and much of the Hollywood reservation land use is residential and commercial.

The Miccosukee Tribe of Indians of Florida is a federally recognized Native American tribe, who was part of the Seminole Nation until they were established as a sovereign nation in 1962. The tribe is recognized by the State of Florida pursuant to Chapter 285, F.S. and has several reservations located in the LEC Planning Area in Broward, Miami-Dade, and Hendry counties (**Figure 1-1**). Much of the reservation land use is residential, commercial, and recreational.

REGIONAL AND LOCAL PLANNING LINKAGE

The SFWMD's regional water supply planning process is closely coordinated and linked to the local water supply planning of municipal/county governments and utilities. Coordination and collaboration among all water supply planning entities is needed throughout the regional water supply plan development and approval process.

While this 2023–2024 LEC Plan Update addresses regional and Districtwide water supply issues, local governments are required to plan for their water and wastewater needs (as well as other infrastructure and public service elements) through their Comprehensive Plans. These Comprehensive Plans also include Water Supply Facilities Work Plans (Work Plans), which are required by statute. Local governments are required by Chapter 163, F.S. to update their Work Plans and adopt revisions to their Comprehensive Plans within 18 months following approval of this 2023–2024 LEC Plan Update. Revisions may include population projections, established planning periods, existing and future water resource projects, intergovernmental coordination activities, conservation and reuse measures, and the capital improvements element. More information on Comprehensive Plan and Work Plan requirements is provided in the 2021–2024 Support Document (SFWMD 2021b).

To assist local governments in updating their Comprehensive Plans and Work Plans, the SFWMD has developed technical assistance tools and informational documents, which are available on the SFWMD webpage (<https://www.sfwmd.gov/doing-business-with-us/work-plans>). Additional information about developing a Work Plan is available from the Florida Department of Economic Opportunity webpage (<https://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/water-supply-planning>).

This 2023–2024 LEC Plan Update describes how anticipated water supply needs will be met in the LEC Planning Area through 2045. The planning process used to develop this plan update is outlined below.

PLAN DEVELOPMENT PROCESS

PLAN DEVELOPMENT PROCESS 			
<h1>1</h1> <p>Planning and Assessment</p> <p>The process incorporated public participation and coordination with local stakeholders, including water supply utilities, agricultural operations, nongovernmental environmental groups, local and tribal governments, the Florida Department of Environmental Protection, the Florida Department of Agriculture and Consumer Services, and other appropriate state and federal agencies. A review of previous planning efforts in the region and documentation of activities since the approval of the <i>2018 Lower East Coast Water Supply Plan Update</i> (SFWMD 2018) were key starting points.</p>	<h1>2</h1> <p>Data Collection, Analyses, and Issue Identification</p> <p>Using the <i>2018 Lower East Coast Water Supply Plan Update</i> (SFWMD 2018) as a foundation, developing this plan update involved collecting the latest information on current and projected population and water demands (Chapter 2), water conservation (Chapter 3), water resource protection (Chapter 4), water source options (Chapter 5), and water resource analyses (Chapter 6).</p>	<h1>3</h1> <p>Evaluation of Water Resources and Water Source Options</p> <p>This phase of the planning process involved reviewing existing monitoring data and updated regional modeling used for evaluation of water resources to identify issues. Where projected demands exceed available supplies, water supply project options were identified, including alternative water supplies and water conservation.</p>	<h1>4</h1> <p>Identification of Water Resource and Water Supply Development Projects</p> <p>Where resource conditions warranted, water resource development projects were identified (Chapter 7). Water supply development projects intended to meet water needs over the planning horizon were identified, compiled, and evaluated by the SFWMD with input from stakeholders, the public, and other agencies. The SFWMD also considers water supply projects in local government Work Plans, Tribal Work Plans, and adopted Sector Plans, which are required to identify needed water supplies and available water sources pursuant to Section 163.3245(3)(a)2., F.S. Additionally, the projects were screened for permitting feasibility (Chapter 8).</p>

Public Participation

Public participation is a key component of the water supply plan development process to ensure the plan addresses the issues and concerns of stakeholders and that the future direction and projects are appropriate for future water needs. The SFWMD held three virtual workshops for this water supply plan update. Stakeholders representing a variety of interests in the region, such as agriculture, industry, environment, utilities, local government planning departments, tribal representatives, and state and federal agencies as well as the general public, were invited to attend the workshops. The workshops provided participants with an opportunity to review and comment on projected demands, water supply issues, the condition of regional water resources, water source options, groundwater modeling, and other key aspects of the water supply plan update.

Individual meetings were held throughout the planning process with public supply utilities, the Seminole Tribe of Florida, other planning agencies, local government planning departments, and agricultural representatives to discuss water demand projections and coordinate planning efforts. During meetings with the region's major utilities and local governments, population and demand estimates and projections were reviewed and verified, and the condition of regional water resources and AWS development efforts were discussed. Additionally, presentations were made to the District's Governing Board, providing overviews of the plan update and soliciting comments. Following the public comment period, the final version of the plan update was brought to the District's Governing Board for consideration of approval.

PROGRESS SINCE THE 2018 LEC PLAN UPDATE

Since the *2018 Lower East Coast Water Supply Plan Update* (SFWMD 2018), the following activities have improved the understanding of and are supporting the sustainability of the region's water resources, water supply, and natural systems.

Hydrologic Studies, Monitoring, and Modeling

- ◆ **Updated Delineation of the Saltwater Interface** – The SFWMD reviewed 2019 water quality data from Broward and Palm Beach counties and prepared updated maps comparing the 2009, 2014, and 2019 extent of saltwater intrusion within the SAS (**Appendix D**). Miami-Dade County contracts with the United States Geological Survey (USGS) to maintain and update its monitoring network and its saltwater interface maps. The USGS published the 2011 interface line in 2014 (Prinos et al. 2014) and a 2018 interface map of southern Miami-Dade County in 2019 (Prinos 2019). Further information on the updated delineation of the saltwater interface efforts is provided in **Chapter 6**.
- ◆ **FAS Monitoring Network** – The SFWMD continues to maintain and update a network of more than 108 FAS monitor wells, 24 of which are within the LEC Planning Area. Water level data from the monitor wells help manage use of the FAS as a water supply source. In addition, water quality sampling and analyses are conducted periodically to observe any trends that might signal overuse of the resource.

- ◆ **Hydrogeologic Studies** – Between 2018 and 2023, the SFWMD and its partners completed the following hydrogeologic investigations in the LEC Planning Area:
 - ◆ Saltwater interface monitoring and mapping program (Shaw and Zamorano 2020)
 - ◆ Groundwater chemistry of the Lower Floridan aquifer – upper permeable zone in Central and South Florida (Geddes et al. 2020)
 - ◆ Hydrogeology and groundwater salinity of Water Conservation Area 2A (Janzen and Baker 2020)
 - ◆ Hydrogeologic investigation and aquifer performance testing at Morikami Park, southeastern Palm Beach County, Florida (Lindstrom 2020)
 - ◆ Cycle testing summary report Hillsboro Canal aquifer recharge, storage, and recovery system (Verrastro 2018)
 - ◆ Geochemistry of the Upper Floridan aquifer and Avon Park permeable zone within the South Florida Water Management District (Geddes et al. 2018)
 - ◆ Installation of a monitoring well cluster at the S-356 Pump Station (Smith 2018a)
 - ◆ Installation of monitor wells at three sites in Miami-Dade County (Smith 2018b)

- ◆ **USGS/SFWMD Cooperative Monitoring** – Water level and water quality monitoring at existing monitor wells provides critical information to develop groundwater models, assess groundwater conditions, and manage groundwater resources. The SFWMD maintains extensive groundwater monitoring networks and partners with the USGS to provide additional support and funding for ongoing monitoring. Well details and monitoring data are provided in various SFWMD technical publications and in the District’s corporate environmental database, DBHYDRO. Data from sites monitored by the USGS are archived in a USGS database and published annually.

- ◆ **Lower West Coast Surficial and Intermediate Aquifer Systems Model** – The Lower West Coast Surficial and Intermediate Aquifer Systems Model (LWCSIM) was designed and constructed to evaluate changes in water levels in the SAS and intermediate aquifer system (IAS) for the 2014 and 2040 withdrawal scenarios. The model was completed and simulations were conducted during 2020. Information about this modeling effort, including model results, are provided in the *2022 Lower West Coast Water Supply Plan Update* (SFWMD 2022a). The LWCSIM model boundary incorporates western portions of the LEC Planning Area.

- ◆ **East Coast Floridan Model** – The East Coast Floridan Model (Giddings et al. 2014) was updated and used for the *2021 Upper East Coast Water Supply Plan Update* (SFWMD 2021a) to identify potential changes in water quality, flows, and water levels in the FAS for the 2019 and 2045 withdrawal scenarios (Billah et al. 2021).

- ◆ **East Coast Surficial Model** – The East Coast Surficial Model, a density dependent groundwater model under development by the District, will have the ability to evaluate changes in water levels and water quality in the SAS for the 2021 and 2045 withdrawal scenarios. The model is under development and is expected to be completed in 2025 (**Chapter 6**).

- ◆ **Monitor Well Installations in Broward County** – The SFWMD installed Biscayne aquifer monitor wells (BS-2 and BS-3) in southeastern and northeastern Broward County to evaluate the movement of salt water in 2021 and 2023, respectively.

Water Supply Studies

- ◆ **Annual Estimated Water Use Reports** – The SFWMD prepared annual reports that summarize estimated use (based on reported withdrawals) for the water use categories: Public Supply, Domestic Self-Supply, Agriculture, Commercial/Industrial/Institutional, Landscape/Recreational, and Power Generation. The annual reports can be found at <https://www.sfwmd.gov/our-work/water-supply>.
- ◆ **2023 Water Supply Cost Estimation Study** – The SFWMD funded an engineering evaluation of the capital and operational costs of various water supply facilities including groundwater wellfields, surface facilities, water treatment processes, storage, piping and distribution facilities, and other ancillary components that was completed in 2023. The report can be found at <https://www.sfwmd.gov/our-work/water-supply>.

Regulations and Operations

- ◆ **Aquifer Storage and Recovery Storage Horizon Restricted Allocation Area Near the C-18W Reservoir** – The SFWMD established water use permitting criteria for an RAA in 2022 for the underground storage horizon of the ASR wells associated with the CERP Loxahatchee River Watershed Restoration Project.
- ◆ **Lake Okeechobee System Operating Manual (LOSOM)** – A re-evaluation of the lake regulation schedule by the USACE began in 2019 to coincide with the Herbert Hoover Dike repairs which were completed in 2023. The water control plan was completed, and the final Record of Decision was signed in August of 2024.

Water Storage, Construction, and Restoration Projects

- ◆ **C-51 Reservoir Phase 1** – In January 2017, the SFWMD designated the C-51 Reservoir Phase 1 as a pilot alternative water supply development project, pursuant to Section 373.037, F.S. The reservoir and connection to the L-8 flow equalization basin was completed in 2023 and is expected to provide up to 35 million gallons per day (mgd) for Public Supply (**Chapter 5**).
- ◆ **Herbert Hoover Dike/Lake Okeechobee** – In 2006, the USACE designated the Herbert Hoover Dike as a Level 1 risk, the highest risk for dam failure. Twenty-eight water control structures were replaced with new structures, one culvert was removed, and three were filled in. Construction of all works are completed, and the Dam Safety Action Classification rating improved from a Level 1 to a Level 4 (lowest risk of dam failure).



- ◆ **Lake Okeechobee Watershed Restoration Project** – Part of CERP, the purpose of the Lake Okeechobee Watershed Restoration Project (LOWRP) is to improve the ecology of Lake Okeechobee, decrease regulatory releases to the St. Lucie and Caloosahatchee estuaries, restore freshwater wetlands in the watershed, and improve water supply for existing legal users. Although this project and its components are located outside of the LEC Planning Area, improvements to water supply of Lake Okeechobee are critical to the region. The LOWRP Final Integrated Project Implementation Report and Environmental Impact Statement was released for public and agency review in 2020. The recommended plan included aboveground storage, underground storage with 80 ASR wells, and two wetland restoration sites. Concerns related to the acceptability and cost of the plan received during state, agency, and tribal review resulted in direction to refine the recommended plan by removing the aboveground storage component and its 25 associated ASR wells. The LOWRP Final Report of the USACE Chief of Engineers is pending and is anticipated to be received in 2026 for the wetland restoration and 55 ASR well components. Planning, design, and test/exploratory wells for the ASR well program have been initiated, and the design of a 10 mgd Demonstration Facility at the C-38S location is under way. A feasibility study for Lake Okeechobee Component A Reservoir (LOCAR) has been initiated for other reservoir locations in the watershed that may add up to 200,000 acre-feet of additional storage.
- ◆ **Central Everglades Planning Project Everglades Agricultural Area (CEPP EAA)** – Designed to reduce damaging discharges from Lake Okeechobee to the northern estuaries, the CEPP EAA project consists of a combination of canals, a 6,500-acre STA (A-2 STA), and a 10,500-acre reservoir (A-2 Reservoir) to reduce harmful discharges from Lake Okeechobee to the northern estuaries and to send more water south to the Everglades. The A-2 STA and the A-2 Reservoir construction has commenced and is anticipated to be completed by December of 2024 and September of 2034, respectively. North New River Conveyance and Miami Canal Improvements are currently in design and scheduled to be completed in November of 2025 and May of 2027, respectively. All aspects of the A-2 Reservoir are anticipated to be completed in 2034 with a 240,000-acre-foot storage capacity.
- ◆ **Modified Water Deliveries to Everglades National Park** – Modifications to the Central and Southern Florida (C&SF) Project have been completed and are operational to improve natural water flows to Shark River Slough in Everglades National Park.
- ◆ **C-111 South Dade Project** – Completed in 2018, this project was designed to restore natural hydrologic conditions in Taylor Slough and the eastern panhandle of Everglades National Park while also preserving the current level of flood protection for agricultural lands in southern Miami-Dade County. Pump replacements at S-332B and S-332C are expected to be completed in 2026.
- ◆ **Combined Operational Plan** – The Combined Operational Plan defines operations for the constructed features of the Modified Water Deliveries (ModWaters) to Everglades National Park and Canal 111 (C-111) South Dade project components to convey water from WCA-3A to Everglades National Park. The construction components have been completed, and the updated Combined Operational Plan has been implemented since 2020.

- ◆ **C-111 Spreader Canal Western Project** – The goal of this project is to establish more natural flows in Taylor Slough, which will improve the timing, distribution, and quantity of water flowing into Florida Bay. The canal operating range was lowered to capture more seepage, and seasonal variation was added in March 2016. In 2018, the capacities of two pump stations were increased to deliver more water to Taylor Slough. Phase 2 is in the planning phase. The project is anticipated to be completed parallel to the Biscayne Bay and Southeastern Everglades Ecosystem Restoration (BBSEER) Project in 2026.
- ◆ **Biscayne Bay and Southeastern Everglades Ecosystem Restoration Project** – The current drainage system and development of wetlands have altered the deliveries of fresh water to Biscayne Bay. The BBSEER Project will restore depth and duration of freshwater flow to the bay, improve diversity of plants and animals, and increase the ecological resiliency of coastal vegetation habitats in southeastern Miami-Dade County to sea level change. The project also will restore the ecological and hydrological connectivity between the bay coastal wetlands, the Model Lands, and Southern Glades. The project is currently in the planning and modeling stages with a tentatively selected plan decision anticipated in 2024.
- ◆ **Western Everglades Restoration Project** – This project aims to improve the quantity, quality, timing, and distribution of water in the western Everglades by making alterations to existing canals. Authorization for the construction of the project is anticipated in 2024.
- ◆ **Sam Jones/Abiaki Prairie C-139 Annex Restoration Project** – The goal of this project is to restore historical Everglades hydrologic conditions to 7,800 acres of former citrus grove. Within the project footprint, a 2,800-acre Phase 1 construction effort was completed which included citrus removal, farm bed leveling, and initial replanting of native vegetation. The remaining project footprint will be completed in the Phase 2 construction effort, which began January 2021 after additional citrus removal within its footprint was performed. Construction is expected to be completed by 2027 and biological restoration will be implemented through 2032.
- ◆ **Biscayne Bay Coastal Wetlands L-31E Flow-way** – This component of CERP is meant to rehydrate coastal wetlands and reduce point source discharges from the C-102, C-103, and Military canals. The SFWMD constructed the final four culverts in 2018. The USACE will construct the remaining features of the L-31 East Flow-way (five pump stations) with anticipated completion by 2024.



Biscayne Bay Coastal Wetlands

Alternative Water Supply and Water Conservation Cost-Share Funding

As part of the regional water supply plans' water resource development component (**Chapter 7**), and to assist local water users in implementation of the water supply development component (**Chapter 8**), the SFWMD periodically provides funding assistance to public water suppliers, local governments, special districts, homeowners' associations, water users, and other public and private organizations for AWS and water conservation

projects that are consistent with the SFWMD's core mission. In 2019, the Florida Department of Environmental Protection and SFWMD initiated annual funding for the construction and implementation of AWS and water conservation projects to qualified applicants through the AWS Funding Program.

- ◆ **Alternative Water Supply** – From Fiscal Year (FY) 2018 through FY2022, the SFWMD provided approximately \$7.8 million for eight AWS projects that have been completed or are under construction in the LEC Planning Area, generating 16 mgd of additional reclaimed water capacity and 2.6 mgd of additional reclaimed distribution or storage.
- ◆ **Water Conservation** – From FY2018 through FY2022, the SFWMD provided approximately \$1.04 million for 20 water conservation projects that were completed or are being implemented in the LEC Planning Area. The projects are estimated to save 413.60 million gallons per year (1.13 mgd).

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2

Demand Estimates and Projections

This chapter summarizes the water demand estimates and projections for the Lower East Coast (LEC) Planning Area of the South Florida Water Management District (SFWMD or District) through the planning horizon (2021 to 2045). Estimates and projections are presented by water use category and were developed in coordination with various stakeholder groups, including agriculture, utilities, industry, local and tribal governments, and other interested groups. A detailed discussion of data collection and analyses methods is provided in **Appendix A**.

Current and future water demands in the LEC Planning Area are heavily influenced by existing and projected population. Population growth will lead to increases in water demands for public supply, landscape irrigation, power generation, and mining operations in the region. Demands associated with irrigated agriculture in the LEC Planning Area are anticipated to decrease due to conversion of farmland to residential developments and environmental restoration projects. The increased pace of population growth and economic expansion, which is projected to continue through 2045, places greater demands on regional water resources in the LEC Planning Area. According to estimates from the University of Florida’s Bureau of Economic and Business Research (BEBR), the permanent population in the LEC Planning Area is expected to increase by more than 1 million people by 2045 (Rayer and Wang 2021).

TOPICS

- ◆ Water Demand
- ◆ Water Use Categories
- ◆ Population Estimates and Projections
- ◆ Public Supply
- ◆ Domestic Self-Supply
- ◆ Agriculture
- ◆ Commercial/Industrial/Institutional
- ◆ Landscape/Recreational
- ◆ Power Generation
- ◆ Summary of Demand Estimates and Projections
- ◆ Demand Projections in Perspective

WATER DEMAND

Water demands can be described and analyzed in two ways: gross demand and net demand. Gross demand is the volume of water withdrawn or diverted from a groundwater or surface water source. This definition serves as the basis for water allocations established through water use permits issued by the SFWMD. Further information on water use permitting is provided in the *2021–2024 Support Document for Water Supply Plan Updates (2021–2024*

Support Document; SFWMD 2021). Net demand refers to the volume of water delivered to end users after accounting for treatment losses and delivery system inefficiencies. For Public Supply (PS) and Domestic Self-Supply (DSS), demands commonly are referred to as raw and finished demands rather than gross and net demands, respectively. In this *2023–2024 Lower East Coast Water Supply Plan Update (2023–2024 LEC Plan Update)*, gross demand is equal to net demand for all water use categories except PS.

This 2023–2024 LEC Plan Update presents demands for average rainfall and 1-in-10-year drought conditions (**Appendix A**). Section 373.709, Florida Statutes (F.S.), states the level-of-certainty planning goal associated with identifying water demands contained in water supply plans shall be based on meeting demands during 1-in-10-year drought conditions for at least a 20-year period. Although not quantified in this plan, environmental demands are addressed through resource protection criteria (**Chapter 4**).

INFO ⓘ

Average Rainfall and 1-in-10-Year Drought

An **average rainfall year** is defined as a year having rainfall with a 50% probability of being exceeded in any other year.

A **1-in-10-year drought** is defined as a year in which below normal rainfall occurs with a 90% probability of being exceeded in any other year. It has an expected return frequency of once in 10 years.

WATER USE CATEGORIES

Water demands for this 2023–2024 LEC Plan Update are estimated in 5-year increments for the six water use categories listed below, which were established by the Florida Department of Environmental Protection (FDEP) in coordination with the state’s water management districts. The water use category names and acronyms have been updated for this plan to align with other water supply planning efforts across the state.

- ◆ **Public Supply (PS)** – Potable water supplied by water treatment plants with a current allocation of 0.10 million gallons per day (mgd) or greater.
- ◆ **Domestic Self-Supply (DSS)** – Potable water used by households served by small utilities (less than 0.10 mgd) or self-supplied by private wells.
- ◆ **Agriculture (AG)** – Self-supplied water used for commercial crop irrigation, greenhouses, nurseries, livestock watering, pasture irrigation, and aquaculture.
- ◆ **Commercial/Industrial/Institutional (CII)** – Self-supplied water associated with the production of goods or provision of services by commercial, industrial, or institutional establishments.
- ◆ **Landscape/Recreational Irrigation (L/R)** – Self-supplied and reclaimed water used to irrigate golf courses, sports fields, parks, cemeteries, and large common areas, such as land managed by homeowners’ associations and commercial developments.
- ◆ **Power Generation (PG)** – Self-supplied and reclaimed water used for cooling, processing, and potable water by power generation facilities.

Table 2-1 presents a comparison of the estimated (2021) and projected (2045) average gross water demands, by category, in the LEC Planning Area. The largest water use category is PS, followed by AG, L/R, CII, PG, and DSS. PS demands reflect the regional population growth over the planning horizon, while AG demands decrease primarily due to conversion of agricultural land to other uses. An overall increase in total demands is projected through the planning horizon.


Table 2-1. Estimated (2021) and projected (2045) average gross water demands (in mgd) for the LEC Planning Area by use category.

Water Use Category	2021	2045
Public Supply	890.67	1,047.37
Domestic Self-Supply	10.56	14.45
Agriculture	645.20	637.66
Commercial/Industrial/Institutional	87.35	102.57
Landscape/Recreational	178.65	199.18
Power Generation	42.20	62.33
LEC Planning Area Total	1,854.63	2,063.56

LEC = Lower East Coast; mgd = million gallons per day.

POPULATION ESTIMATES AND PROJECTIONS

Population estimates and projections were used to develop demands for all water use categories except AG and PG. Developing population estimates and projections required multiple sources of information, including county-level data from the University of Florida’s BEBR (Rayer and Wang 2021), consistent with Section 373.709(2)(a), F.S., data from the 2020 Decennial Census (United States Census Bureau 2020), and data from local government Comprehensive Plans. **Appendix A** provides further details on the development of population estimates and projections. Draft results were presented to the region’s PS utilities to ensure accuracy and obtain agreement with final 2045 population projections in the plan update.

NOTE 

All population estimates and projections are for permanent residents, as defined by the United States Census Bureau. However, the per capita use rate, which is used to calculate water demands, reflects use by seasonal residents as well.

In 2021, the estimated population within the LEC Planning Area was 6,222,707 permanent residents (**Table 2-2**). BEBR projections indicate the LEC Planning Area population will grow to 7,294,265 permanent residents in 2045, an increase of approximately 17%. Nearly half of the LEC Planning Area population resides in Miami-Dade County, while Broward County accounts for approximately one-third followed by Palm Beach County with less than a quarter, and this trend is expected to continue. As explained in **Appendix A**, BEBR medium projections were used for all counties to develop detailed population projections for PS utilities and county DSS areas (Rayer and Wang 2021).

Table 2-2. Permanent resident population served by PS and DSS in the LEC Planning Area in 2021 and 2045.

County	2021 Population			2045 Population		
	PS	DSS	Total	PS	DSS	Total
Broward ^a	1,947,447	4,190	1,951,637	2,233,517	4,283	2,237,800
Hendry ^{a,b}	948	3,933	4,881	1,729	3,357	5,086
Miami-Dade	2,693,688	9,052	2,702,740	3,179,658	33,021	3,212,679
Monroe	78,267	0	78,267	80,200	0	80,200
Palm Beach	1,430,447	54,736	1,485,183	1,698,451	60,049	1,758,500
LEC Planning Area Total	6,150,797	71,911	6,222,708	7,193,555	100,710	7,294,265

DSS = Domestic Self-Supply; LEC = Lower East Coast; PS = Public Supply.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

PUBLIC SUPPLY

The PS category includes potable water supplied by water treatment plants with a current allocation of 0.10 mgd or greater. Developing PS demand projections in the LEC Planning Area was a multistep process that included determining utility service area and DSS populations, calculating per capita use rates (PCURs), and projecting future water needs.

NOTE

Perceived discrepancies in table totals are due to rounding.

Per Capita Use Rates

For each PS utility, a net (finished) water PCUR was developed using past population estimates and finished water data as reported to the FDEP. The PCUR for each utility is a 5-year (2017 through 2021) average, calculated by dividing annual net (finished) water volumes by the corresponding service area populations for each year. For PS demand projections, PCURs were assumed to remain constant through 2045. To calculate gross (raw) demands, the treatment efficiency for each utility, based on treatment process type(s) expected in 2045, was applied as a finished-to-raw ratio. Any demand reductions due to historical conservation practices are implicitly factored into the projections by using the 5-year average PCUR. Future water conservation savings (**Chapter 3**) were not factored into the demand projections used in this plan update due to water savings uncertainties. PS service area and water treatment plant maps are provided in **Appendix A**. Utility profiles containing population and finished water use data and projections as well as permitted allocations are provided in **Appendix B**.

PS Demand Estimates and Projections

Tables 2-3 and 2-4 present PS gross (raw) and net (finished) water demands, respectively, in 5-year increments (including the current base year of 2021) by county. The results indicate PS gross (raw) water demands will increase 18%, from 890.67 mgd in 2021 to 1,047.37 mgd in 2045, under average rainfall conditions. Calculation of 1-in-10-year demand is based only on the outdoor portion of PS use, and the methodology is explained in **Appendix A**.

Table 2-3. PS gross (raw) water demands in the LEC Planning Area by county.

County	Gross (Raw) Demand – Average Rainfall Conditions (mgd)							2045 1-in-10-Year Demand
	2020	2021	2025	2030	2035	2040	2045	
Broward ^a	238.39	241.08	249.57	263.46	271.53	278.93	285.43	314.00
Hendry ^{a,b}	0.32	0.39	0.50	0.55	0.61	0.67	0.77	0.82
Miami-Dade	375.77	377.84	390.66	406.17	420.70	434.20	446.31	477.54
Monroe	19.20	19.31	19.44	19.59	19.69	19.74	19.79	20.38
Palm Beach	249.29	252.05	260.98	270.99	280.03	287.49	295.07	324.58
LEC Planning Area Total	882.97	890.67	921.15	960.76	992.56	1,021.03	1,047.37	1,137.32

LEC = Lower East Coast; mgd = million gallons per day; PS = Public Supply.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

Table 2-4. PS net (finished) water demands in the LEC Planning Area by county.

County	Net (Finished) Demand – Average Rainfall Conditions (mgd)							2045 1-in-10-Year Demand
	2020	2021	2025	2030	2035	2040	2045	
Broward ^a	215.48	217.94	225.42	233.88	240.98	247.43	253.23	278.58
Hendry ^{a,b}	0.25	0.27	0.35	0.41	0.42	0.47	0.54	0.57
Miami-Dade	346.62	348.60	360.48	374.67	388.04	400.47	411.54	440.35
Monroe	18.29	18.39	18.52	18.66	18.75	18.80	18.85	19.41
Palm Beach	220.67	223.14	231.01	239.80	247.87	254.51	261.30	287.46
LEC Planning Area Total	801.31	808.34	835.78	867.42	896.06	921.68	945.46	1,026.37

LEC = Lower East Coast; mgd = million gallons per day; PS = Public Supply.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

DOMESTIC SELF-SUPPLY

The DSS category includes potable water used by households that are served by small utilities with water withdrawals less than 0.10 mgd or that are self-supplied by private wells. Permanent resident populations within DSS areas were developed simultaneously with the PS population estimates and projections. All permanent residents outside of PS utility service area boundaries were considered DSS population. Population projection methodology and results are provided in the previous section and further described in **Appendix A**.

Table 2-5 contains the LEC Planning Area DSS demand estimates and projections under average rainfall conditions. The average PCUR of PS utilities in each county was used to calculate DSS demands. For DSS demands, the finished-to-raw water ratio is assumed to be 1.00. Therefore, no distinction is made between gross (raw) and net (finished) water demands. Average estimated DSS demands in 2021 were 10.56 mgd for 71,911 permanent residents (**Table 2-2**). DSS demands are expected to increase 37% by 2045. This increase can be attributed to high anticipated growth in DSS areas without expansion of PS utility service within those areas.

Table 2-5. DSS gross (raw) water demands in the LEC Planning Area by county.

County	Gross (Raw) Demand – Average Rainfall Conditions (mgd)							2045 1-in-10-Year Demand
	2020	2021	2025	2030	2035	2040	2045	
Broward ^a	0.53	0.47	0.58	0.58	0.53	0.54	0.48	0.53
Hendry ^{a,b}	0.37	0.37	0.36	0.35	0.33	0.32	0.31	0.33
Miami-Dade	2.64	1.18	2.06	2.61	3.00	3.24	4.29	4.59
Monroe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Palm Beach	8.11	8.54	9.23	9.57	9.75	9.98	9.37	10.30
LEC Planning Area Total	11.65	10.56	12.23	13.11	13.61	14.08	14.45	15.75

DSS = Domestic Self-Supply; LEC = Lower East Coast; mgd = million gallons per day.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

AGRICULTURE



Agricultural Land in Homestead

The AG category includes self-supplied water used for commercial crop irrigation, nurseries, greenhouses, livestock watering, pasture, and aquaculture. AG is the second largest water use category in the LEC Planning Area, accounting for 35% of the region’s total estimated water demand in 2021. Agricultural production in the LEC Planning Area is of regional and national significance, with 566,162 acres of crops under irrigation (**Figure 2-1**).

Agricultural acreage data published by the Florida Department of Agriculture and Consumer Services (FDACS 2022) were used to determine water demands for this 2023–2024 LEC Plan Update. Pursuant to Section 373.709(2)(a), F.S., water management districts are required to consider FDACS water demand projections. Any adjustments or deviations from the projections published by FDACS, “...must be fully described, and the original data must be presented along with the adjusted data.” A detailed description of the analyses and adjustments is provided in **Appendix A**.

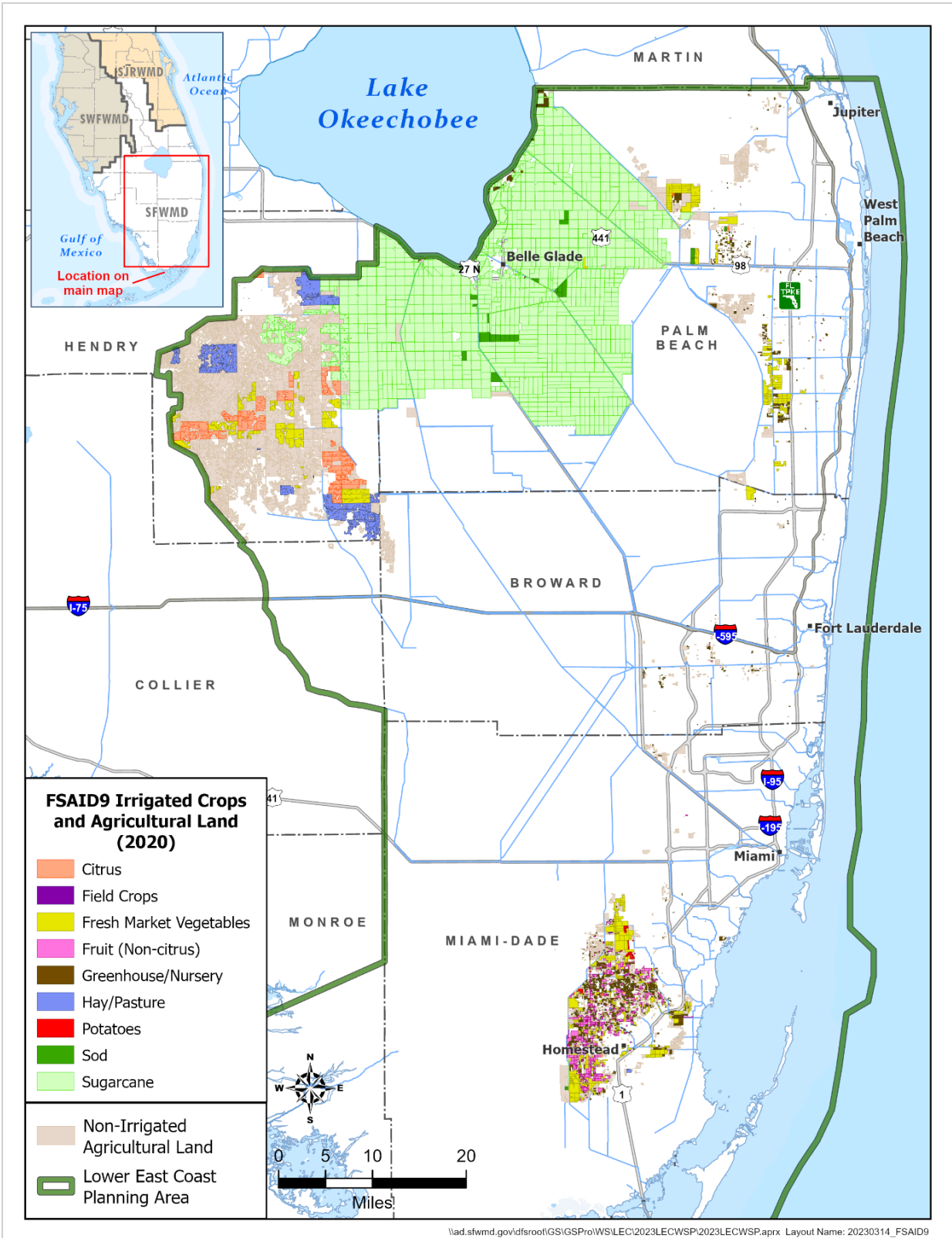


Figure 2-1. Agricultural irrigated land in the LEC Planning Area (Data from FDACS 2022).

Agricultural water demand was determined using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model (Smajstrla 1990). No distinction was made between gross and net water demands. The FDACS irrigated crop acres, soil types, growing seasons, and irrigation methods were used as input data for the AFSIRS model. AG demand estimates and projections are based on the commercially grown crop categories in **Table 2-6**.

Table 2-6. Summary of average and 1-in-10-year water demands (in mgd) for all agricultural acreage, livestock, and aquaculture in the LEC Planning Area.

Crop	2021			2045		
	Acres	Average Demand	1-in-10-Year Demand	Acres	Average Demand	1-in-10-Year Demand
Sugarcane	454,157	479.74	661.75	442,922	467.71	645.12
Fresh Market Vegetables	40,102	41.44	49.17	39,362	40.32	47.93
Citrus	19,564	20.41	24.62	22,112	21.04	25.39
Hay/Pasture	19,795	23.53	28.15	20,253	24.07	28.80
Greenhouse/Nursery	15,016	40.27	43.60	12,841	33.91	36.79
Fruits (excluding citrus)	10,856	25.09	27.80	9,654	22.02	24.33
Sod	5,944	10.21	13.45	5,944	10.21	13.45
Potatoes	677	0.66	0.78	626	0.62	0.75
Field Crops	50	0.01	0.02	983	0.94	1.14
Livestock	N/A	0.64	0.64	N/A	0.64	0.64
Aquaculture	N/A	3.19	3.19	N/A	16.16	16.16
LEC Planning Area Total	566,161	645.20	853.17	554,697	637.64	840.50

LEC = Lower East Coast; mgd = million gallons per day.

Total irrigated acres are projected to remain relatively stable, declining approximately 2% by 2045. Sugarcane currently is the dominant crop in the LEC Planning Area, covering 454,157 acres (**Table 2-6**). More than 95% of the region’s sugarcane acreage and water demands are within the Everglades Agricultural Area, and the remainder is in Hendry County (**Appendix A**). Demands associated with the production of fresh market vegetables, citrus, greenhouse/nursery stock, fruits, and sod are much smaller than sugarcane; however, they account for a substantial amount of the remaining AG demands and are vital industries in terms of economic impact.

Relatively little change is anticipated in AG water demands for nearly all crops within the LEC Planning Area. Mirroring the projected changes in irrigated acreage, AG demands are projected to decrease in Palm Beach and Miami-Dade counties due to conversion of agricultural land to residential and other land uses. By 2045, AG demands in Miami-Dade County are projected to decrease by approximately 10%.

Overall, total AG gross water demands under average rainfall conditions in the LEC Planning Area are estimated to decrease approximately 1%, from 645.20 mgd in 2021 to 637.66 mgd

INFO ⓘ

Examples of crop categories used in this report include the following:

Fresh Market Vegetables:

- ◆ Tomatoes
- ◆ Green beans
- ◆ Sweet corn
- ◆ Peppers
- ◆ Melons

Fruits (excluding citrus):

- ◆ Avocados
- ◆ Mangos

in 2045 (**Table 2-7**). These totals include demands from livestock and aquaculture in addition to the demands from crop irrigation shown in **Table 2-7**.

Table 2-7. AG gross water demands for all agricultural acreage, livestock, and aquaculture in the LEC Planning Area by county.

County	Gross Demand – Average Rainfall Conditions (mgd)							2045 1-in-10-Year Demand
	2020	2021	2025	2030	2035	2040	2045	
Broward ^a	2.90	2.82	2.65	2.43	2.23	2.04	1.85	2.13
Hendry ^{a,b}	104.73	105.05	106.01	107.74	109.79	110.98	110.76	141.57
Miami-Dade	73.98	73.03	84.11	81.51	78.87	75.86	73.20	79.20
Monroe	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
Palm Beach	470.51	464.28	451.83	451.83	451.83	451.83	451.82	617.58
LEC Planning Area Total	652.14	645.20	644.62	643.53	642.74	640.73	637.65	840.51

AG = Agriculture; LEC = Lower East Coast; mgd = million gallons per day.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

COMMERCIAL/INDUSTRIAL/INSTITUTIONAL

The CII water use category includes water demands associated with commercial and industrial operations for processing, manufacturing, and technical needs (e.g., concrete, citrus processing, and mining operations). CII demands only include self-supplied users and do not include commercial or industrial users that receive water from PS utilities; those users are included in the PS category. All CII demand estimates and projections are presumed to be the same for average rainfall and 1-in-10-year drought conditions, and withdrawal demand is assumed to be equal to user demand. Therefore, no distinction is made between gross and net water demands. Growth within the CII category is expected to be driven by regional population growth. Estimated CII demands for 2021 were 87.35 mgd, with projected growth resulting in demands of 102.57 mgd in 2045 (**Table 2-8**).

Table 2-8. CII gross water demands in the LEC Planning Area by county.

County	Gross Demand (mgd)						
	2020	2021	2025	2030	2035	2040	2045
Broward ^a	2.82	2.85	2.94	3.04	3.13	3.20	3.27
Hendry ^{a,b}	1.69	1.69	1.69	1.69	1.69	1.69	1.69
Miami-Dade	73.25	73.92	75.92	79.02	81.91	84.56	87.09
Monroe	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Palm Beach	8.77	8.89	9.24	9.64	9.98	10.27	10.52
LEC Planning Area Total	86.53	87.35	89.79	93.39	96.71	99.72	102.57

CII = Commercial/Industrial/Institutional; LEC = Lower East Coast; mgd = million gallons per day.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

LANDSCAPE/RECREATIONAL

L/R is the third largest water use category in the LEC Planning Area, encompassing irrigation of golf courses and other landscaped areas, such as parks, sports fields, and common areas of residential developments. L/R demands are met with the use of groundwater, surface water, and reclaimed water. L/R acreages reflect only the acres under water use permits and do not include acres irrigated solely with reclaimed water that do not have a water use permit for a supplemental or backup supply. For L/R, acreage and demands are disaggregated into landscape and golf irrigation subcategories. Details regarding development of the L/R demands are provided in **Appendix A**.

Within the L/R category in 2021, 49,998 permitted acres were attributed to landscape irrigation. These landscaped areas are expecting growth of 17% to 58,466 acres by 2045. In 2021, there were 159 golf courses irrigating 21,032 acres under water use permits in the LEC Planning Area (SFWMD 2023), and this is projected to increase by 315 acres by 2045.

Under average rainfall conditions, total estimated L/R gross water demands are projected to increase from 178.65 mgd in 2021 to 199.18 mgd in 2045 (**Table 2-9**). Groundwater and surface water supply sources met approximately 74% of the 2021 L/R water demands, with reclaimed water supplementing the remaining 26%. The ratio of reclaimed water to groundwater/surface water used to meet future landscape demands is assumed to remain constant through 2045. Golf course acreage is projected to remain relatively stable over the planning period and, as a result, water demand for golf is held relatively constant over the planning horizon, with a slight increase in Palm Beach County. Reclaimed water use accounts for 26% of the water use for golf courses. **Chapter 5** provides a discussion of reclaimed water as an alternative water supply source.

Table 2-9. L/R gross water demands (in mgd) in the LEC Planning Area.

Land Use	Demand – Average Rainfall Conditions (mgd)							2045 1-in-10-Year Demand
	2020	2021	2025	2030	2035	2040	2045	
Broward County ^a								
Landscape	33.25	33.60	34.65	35.86	36.87	37.74	38.52	48.54
Golf	11.80	11.80	11.80	11.80	11.80	11.80	11.80	15.34
Broward County Total	45.05	45.40	46.45	47.66	48.67	49.54	50.32	63.88
Hendry County ^{a,b}								
Landscape	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Golf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hendry County Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miami-Dade County								
Landscape	11.13	11.23	11.54	12.01	12.45	12.85	13.23	16.67
Golf	3.51	3.51	3.51	3.51	3.51	3.51	3.51	4.56
Miami-Dade County Total	14.64	14.74	15.05	15.52	15.96	16.36	16.74	21.23
Monroe County								
Landscape	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.15
Golf	2.36	2.36	2.36	2.36	2.36	2.36	2.36	3.07
Monroe County Total	2.58	2.58	2.58	2.58	2.58	2.58	2.58	3.22

Table 2-9. Continued.

Land Use	Demand – Average Rainfall Conditions (mgd)							2045 1-in-10-Year Demand
	2020	2021	2025	2030	2035	2040	2045	
Palm Beach County								
Landscape	67.93	68.84	71.56	74.68	77.29	79.53	81.45	102.63
Golf	47.09	47.09	47.59	48.09	48.09	48.09	48.09	62.52
Palm Beach County Total	115.02	115.93	119.15	122.77	125.38	127.62	129.54	165.15
LEC Planning Area Total								
Landscape	112.53	113.89	117.97	122.77	126.83	130.34	133.42	167.99
Golf	64.76	64.76	65.26	65.76	65.76	65.76	65.76	85.49
LEC Planning Area Total	177.29	178.65	183.23	188.53	192.59	196.10	199.18	253.48

L/R = Landscape/Recreational; LEC = Lower East Coast; mgd = million gallons per day.

^a The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Broward and Hendry counties. However, for discussion purposes, information relating to the Seminole Tribe of Florida Hollywood Reservation and the Seminole Tribe of Florida Big Cypress Basin Reservation is included in the calculations for Broward and Hendry counties, respectively.

^b Values listed for Hendry County are only for the areas within the LEC Planning Area boundaries.

POWER GENERATION

Demands under the PG category include use of groundwater, fresh surface water, or reclaimed water by thermoelectric power generation facilities. PG demands do not include the use of surface water returned to its withdrawal source, harvested rainfall, city water, or seawater. Demands under average rainfall and 1-in-10-year drought conditions are assumed to be equal in the PG category; no distinction is made between gross and net water demands.

There are 12 power generation facilities operating in the LEC Planning Area (**Figure 2-2**). However, only seven of these facilities have demands that are addressed in this plan update: Florida Power & Light (FPL) Riviera Beach Next Generation Clean Energy Center, FPL Turkey Point Clean Energy Center, FPL West County Energy Center, Homestead G.W. Ivey Power Plant, Miami-Dade County Resources Recovery Facility, Okeelanta Cogeneration Facility, and Palm Beach County Solid Waste Authority Renewable Energy Park.

No new power generation facilities requiring water supply are planned for construction or operation through 2045. New solar power facilities are in development, but these do not have PG water demands. However, PG demands could increase up to 20.13 mgd from 2021 to 2045 (**Table 2-10**) mainly due to potential future cooling canal system needs at the FPL Turkey Point Clean Energy Center, which are dependent on environmental conditions. **Appendix A** provides further information. The other six facilities with water supply demands are projected to remain relatively stable over the planning period.

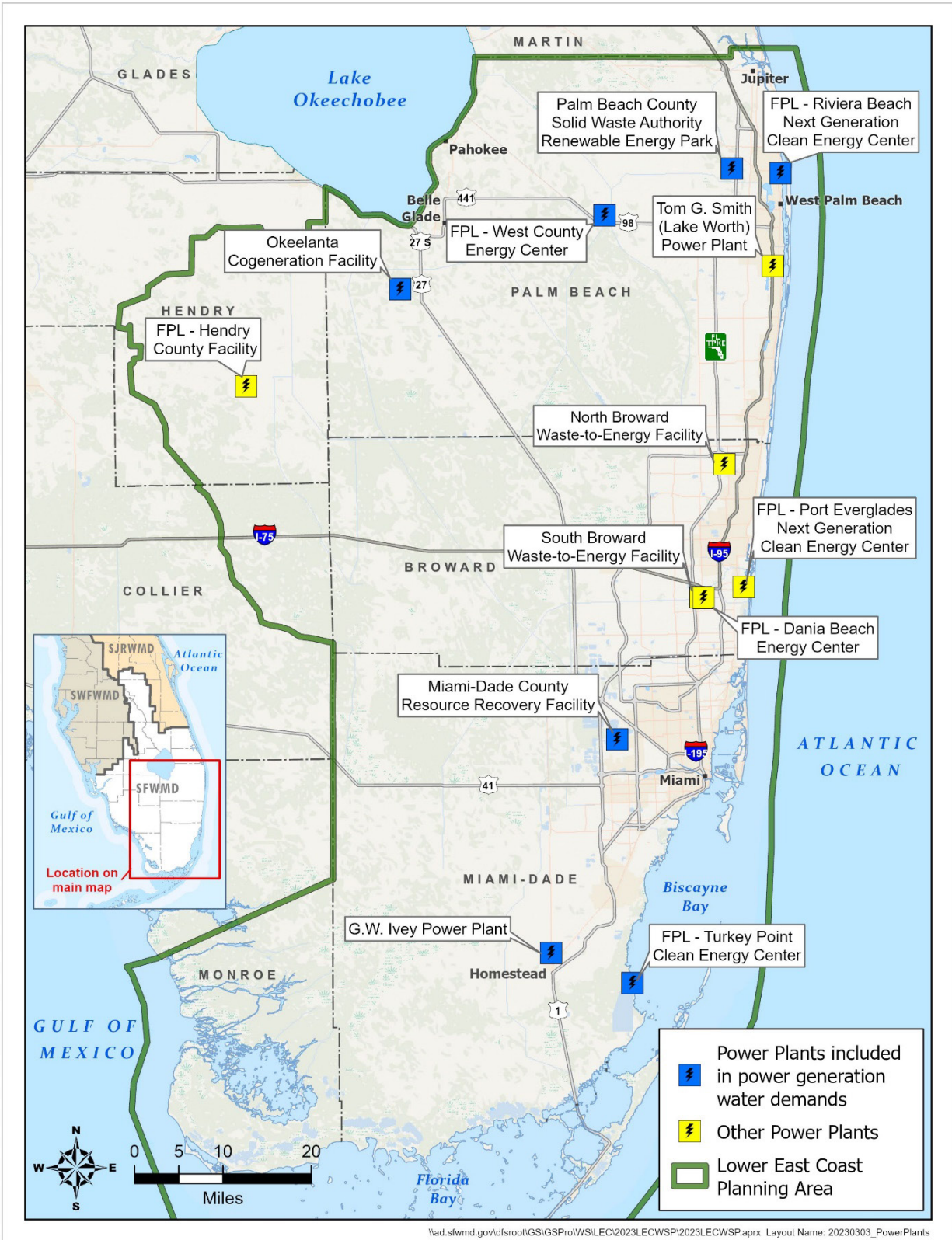


Figure 2-2. Power Generation facilities in the LEC Planning Area.

Table 2-10. PG water demands in the LEC Planning Area.

Facilities	Gross Demand (mgd) ^a						
	2020	2021	2025	2030	2035	2040	2045
FPL – Riviera Beach Clean Energy Center	0.09	0.02	0.10	0.10	0.10	0.10	0.10
FPL – Turkey Point Clean Energy Center ^{b,c}	17.49	21.86	42.60	42.60	42.60	42.60	42.60
FPL – West County Energy Center ^d	13.02	14.22	13.53	13.53	13.53	13.53	13.53
Homestead G.W. Ivey Power Plant	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Miami-Dade County Resources Recovery Facility	1.76	1.76	1.76	1.76	1.76	1.76	1.76
Okeelanta Cogeneration Facility	1.17	1.17	1.17	1.17	1.17	1.17	1.17
Palm Beach County SWA Renewable Energy Park	1.08	1.77	1.77	1.77	1.77	1.77	1.77
LEC Planning Area Total	36.01	42.20	62.33	62.33	62.33	62.33	62.33

FPL = Florida Power & Light; LEC = Lower East Coast; mgd = million gallons per day; PG = Power Generation; SWA = Solid Waste Authority.

- ^a Includes groundwater from the surficial and Floridan aquifer systems, reclaimed water, and surface water; does not include harvested rainwater, seawater, city water, or surface water returned to the source.
- ^b The FPL Turkey Point Clean Energy Center has an allocation of 12.6 mgd from the Upper Floridan aquifer and reclaimed water combined. Additionally, there is an allocation of 30 mgd from the Upper Floridan aquifer for cooling canal freshening; actual demand will depend on environmental conditions.
- ^c FPL and Miami-Dade Water and Sewer Department are coordinating future use of reclaimed water at the Turkey Point Clean Energy Center.
- ^d The West County Energy Center has a backup allocation from the Upper Floridan aquifer and the L-10/L-12 canals when reclaimed water is unavailable.

SUMMARY OF DEMAND ESTIMATES AND PROJECTIONS

Total gross water demands under average rainfall conditions in the LEC Planning Area are projected to be 2,063.56 mgd by 2045, an 11% increase from 2021 demands (1,854.63 mgd). **Table 2-11** provides 5-year incremental summaries of gross demands for all water use categories in the LEC Planning Area under average rainfall and 1-in-10-year drought conditions. Gross demands under average rainfall conditions are used to demonstrate projected trends, including the following key highlights:

- ◆ PS and DSS average gross (raw) demands combined are expected to increase 18% from 901.23 mgd in 2021 to 1,061.82 mgd in 2045. PS will remain the largest water use category in the LEC Planning Area.
- ◆ AG average gross demands are projected to decrease from 645.20 mgd in 2021 to 637.66 mgd by 2045. This reduction is primarily due to the conversion of farmland in Palm Beach and Miami-Dade counties to other uses. AG will remain the second largest water use category in the LEC Planning Area through 2045.
- ◆ CII gross demands are projected to increase by 15.22 mgd over the planning period. The projected demand growth is related to regional population growth.
- ◆ L/R demands are projected to increase by 20.53 mgd over the planning period due to expansion of landscaped areas commensurate with population growth. Golf course acres are expected to remain relatively stable from 2021 to 2045.
- ◆ PG demands are projected to increase from 42.20 mgd in 2021 to 62.33 mgd in 2025 and then remain stable up to 2045.

Table 2-11. Summary of gross water demands under average rainfall and 1-in-10-year drought conditions in the LEC Planning Area by water use category.

Water Use Category	2020	2021	2025	2030	2035	2040	2045
Demand – Average Rainfall Conditions (mgd)							
PS	882.97	890.67	921.15	960.76	992.56	1,021.03	1,047.37
DSS	11.65	10.56	12.23	13.11	13.61	14.08	14.45
AG	652.14	645.20	644.62	643.53	642.74	640.73	637.66
CII	86.53	87.35	89.79	93.39	96.71	99.72	102.57
L/R	177.29	178.65	183.23	188.53	192.59	196.10	199.18
PG	36.01	42.20	62.33	62.33	62.33	62.33	62.33
LEC Planning Area Total	1,846.59	1,854.63	1,913.35	1,961.65	2,000.54	2,033.99	2,063.56
Demand – 1-in-10-Year Drought Conditions (mgd)							
PS	958.69	967.04	1,000.17	1,043.26	1,077.76	1,108.68	1,137.32
DSS	12.73	11.56	13.38	14.32	14.87	15.38	15.75
AG	862.50	853.17	847.87	846.90	846.10	844.00	840.51
CII	86.53	87.35	89.79	93.39	96.71	99.72	102.57
L/R	225.99	227.70	233.48	240.18	245.17	249.58	253.47
PG	36.01	42.20	62.33	62.33	62.33	62.33	62.33
LEC Planning Area Total	2,182.42	2,189.01	2,247.02	2,300.38	2,342.94	2,379.69	2,411.95

AG = Agriculture; CII = Commercial/Industrial/Institutional; DSS = Domestic Self-Supply; L/R = Landscape Recreational; LEC = Lower East Coast; mgd = million gallons per day; PG = Power Generation; PS = Public Supply.

DEMAND PROJECTIONS IN PERSPECTIVE

Demand projections presented in this 2023–2024 LEC Plan Update are based on the best available information. **Table 2-12** shows the 2040 average gross demands projected in the *2018 Lower East Coast Water Supply Plan Update* (2018 LEC Plan Update; SFWMD 2018) compared to the 2045 demands projected in this 2023–2024 LEC Plan Update. The projections reflect trends, economic circumstances, and industry intentions that will change over time. Like any predictive tool based on past assumptions, there is uncertainty and a margin for error. Although the estimated total demand is for 5 years later, the projection for 2045 in this 2023–2024 LEC Plan Update is 3% more than the estimated 2040 demand projected in the 2018 LEC Plan Update (SFWMD 2018).

Table 2-12. Comparison of gross water demands under average rainfall conditions at the end of the respective planning horizons in the 2018 LEC Plan Update and this 2023–2024 LEC Plan Update.

Water Use Category	2018 LEC Plan Update	2023–2024 LEC Plan Update	Percent Difference
	2040 Demand (mgd)	2045 Demand (mgd)	
Public Supply	1,089.34	1,047.37	-4%
Domestic Self-Supply	15.76	14.45	-8%
Agriculture	625.27	637.66	2%
Commercial/Industrial/Institutional	66.96	102.57	53%
Landscape/Recreational	156.46	199.18	27%
Power Generation	52.75	62.33	18%
LEC Planning Area Total	2,006.54	2,063.56	3%

LEC = Lower East Coast; mgd = million gallons per day.

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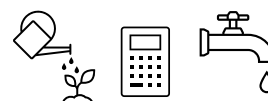
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Demand Management: Water Conservation

An important element of water supply planning is accounting for the reduction in water demands that can be achieved through water conservation efforts. Water conservation entails reducing the quantity of water required to meet demands through water use efficiency improvements, the prevention or reduction of unnecessary uses, or the cessation of water losses contributing to the sustainability of water supply resources. Section 373.709(2), Florida Statutes (F.S.), requires that water conservation be considered when determining if the total capacity of the water supply development project options included in a water supply plan (**Chapter 8**) exceeds the increase in projected demands for the planning horizon (**Chapter 2**).

TOPICS

- ◆ Conservation Measures
- ◆ Conservation Programs
- ◆ Regulatory Initiatives
- ◆ Potential for Water Conservation Savings
- ◆ Conclusions



All water sources are finite; therefore, conservation and efficiency measures should be maximized, regardless of the water source, before more costly development options are implemented. Water conservation can reduce, defer, or eliminate the need to develop new water supply sources to meet current or future demands, which has the same effect as expanding the existing water supply. Moreover, conservation and demand management have been shown to reduce costs to utilities and customers over the long term (Feinglas et al. 2013, Chesnutt et al. 2018). Improving water use efficiency can reduce operational costs for most other users as well.

This chapter describes water conservation measures and programs and provides an estimate of potential water savings (demand reduction) achievable by 2045 in the Lower East Coast (LEC) Planning Area of the South Florida Water Management District (SFWMD or District). Additional conservation information can be found in the *2021–2024 Support Document for Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021), in *Water Conservation: A Comprehensive Program for South Florida* (SFWMD 2008), and on the SFWMD webpage (<https://www.sfwmd.gov/conserve>).

CONSERVATION MEASURES

The average per capita water use rate in the LEC Planning Area has decreased from approximately 176 gallons per capita per day (gpcd) in 2000 to about 131 gpcd in 2021 (Figure 3-1).

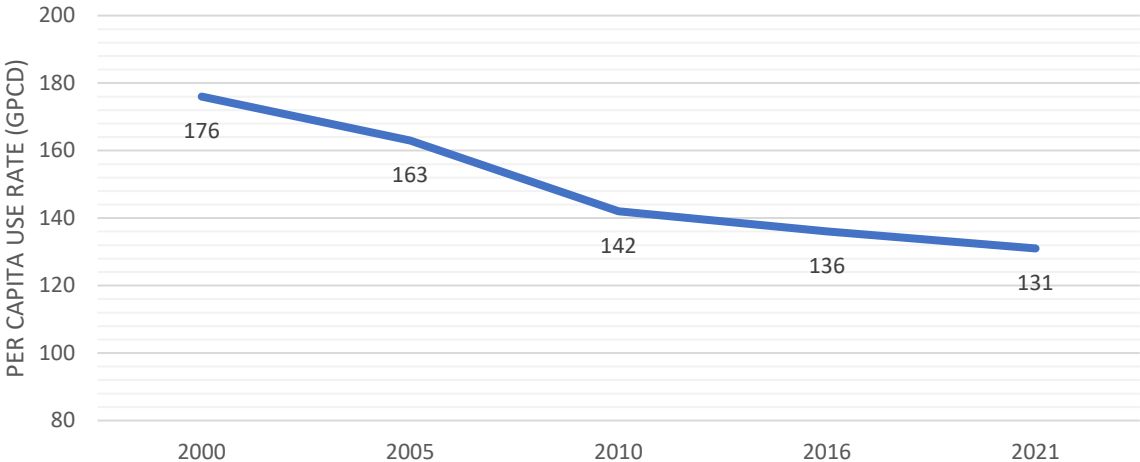


Figure 3-1. Finished Public Supply per capita use rate (in gallons per capita per day) in Palm Beach, Broward, Miami-Dade, and Monroe counties within the LEC Planning Area.

Although the reduction of per capita water use is in part due to implemented conservation measures like irrigation restrictions, it is thought to be largely due to passive water savings, which result from replacing older appliances and fixtures with more water-efficient models, and designing new homes with less irrigated green space. Federal, state, and local codes and standards promote the development and use of more efficient devices, increasing passive savings.

However, depending solely on passive savings will delay or exclude substantial conservation savings potential. Therefore, additional proactive conservation measures and programs are necessary to encourage the use of high-efficiency equipment or improved water use behaviors that yield water savings, including increased outreach, education, and messaging to water users. Local governments, utilities, and large water users are encouraged to research which types of programs would be most appropriate and cost-effective for their residents and specific user groups and to develop goal-based water conservation plans that include development and deployment of public education and outreach materials. Cost-share funding and other collaborative opportunities may be available to help implement conservation measures and programs. The following subsections include a brief description of outdoor and indoor water conservation measures that can be implemented.

Outdoor Water Use (Irrigation)

A significant share of water used outdoors in the LEC Planning Area is for irrigation. Lawns and landscapes are irrigated by residential and commercial property owners, while irrigation of food and other commodity crops is practiced by agricultural water users. Many irrigation

efficiency principles are common across these user groups; however, patterns and scales of use, system design, hardware and components, and operator knowledge can vary widely.

Agriculture

Many alternatives for improving irrigation efficiency and conserving water in agricultural operations are available and should be considered for implementation when economically feasible. Typically, agricultural water conservation measures fall under three categories: 1) converting from one irrigation method (or system type) to a more efficient one; 2) improving the precision irrigation management capabilities of the system; and 3) implementing best management practices (BMPs). Real-time information on soil moisture and weather conditions, along with remote operation to allow quick irrigation changes in response to changing weather, can help adjust when water is delivered to precisely meet crop needs. Hardware and technology that can improve system management, reduce water quantities used to meet crop needs, and minimize water losses include the following:

- ◆ Flowmeters
- ◆ Weather stations
- ◆ Soil moisture sensors
- ◆ Variable-frequency pump drives
- ◆ Automated control systems
- ◆ Best management practices (e.g., laser leveling, irrigation system maintenance)



Urban

In South Florida, where irrigation occurs year-round, the largest portion of water used by urban water users often is for irrigation. Moreover, the United States Environmental Protection Agency (USEPA) estimates approximately 50% of water used outdoors is wasted due to inefficient watering methods and systems. Therefore, improvements to irrigation efficiency are considered a primary target for conserving water used by urban water users.

Irrigation efficiency improvements can be achieved at single- and multi-family residences, commercial and institutional properties, recreational areas (e.g., parks, athletic fields), and other landscaped areas (e.g., roadway medians) by replacing outdated irrigation systems and timers. Automatic controllers should be tested and shown to meet the USEPA's WaterSense program specifications for water efficiency and performance. More information on the WaterSense program and labeled irrigation controllers is available at <https://www.epa.gov/watersense>. In Florida, all automatic lawn and landscape irrigation systems must be properly equipped with technology that inhibits or interrupts the system's operation during periods of sufficient rainfall (Section 373.62, F.S.) and should be programmed to irrigate only as necessary to supplement rainfall following any mandatory irrigation restrictions.



Golf courses typically are irrigated with a high degree of efficiency. However, opportunities to improve efficiency may exist using the same types of hardware and technology as described above. Additional practices for efficient golf course water use can be found in *Best Management Practices for the Enhancement of Environmental Quality on Florida Golf Courses*

published by the Golf Course Superintendents Association of America (2021) for golf course managers <https://www.gcsaa.org/environment/bmp-planning-guide>.

Indoor Water Use

Another area of potential conservation savings is indoor water use in single-family and multifamily residences and commercial/institutional buildings (e.g., office buildings, restaurants, movie theaters, long-term care facilities, and hospitals). Feasible measures include detecting and repairing water leaks and replacing older, inefficient plumbing fixtures



(e.g., toilets, urinals, faucets, showerheads) with models that have been tested and shown to meet the USEPA's WaterSense program specifications for water efficiency and performance. For more information on the WaterSense program and to find labeled products, visit <https://www.epa.gov/watersense>. Older, inefficient appliances can be replaced with water-efficient models that have received the ENERGY STAR label. For more information on the ENERGY STAR program and to find labeled products, visit <https://www.energystar.gov>.

Common water efficiency improvement measures for commercial and industrial users are outlined in the SFWMD's (2013) *Water Efficiency Audit Guide*, which is discussed in greater detail in the 2021–2024 Support Document (SFWMD 2021). Measures for improving water efficiency in nonresidential settings may be applicable to specific operations or facilities, such as autoclaves in hospitals; pre-rinse spray valves, food steamers, and waste grinders in restaurants; heating, ventilation, and air conditioning (HVAC) system efficiency upgrades; converting water-based cooling devices to air-based; and water reuse/recycling in industrial operations. Other applicable measures may exist for specific industrial processes.

CONSERVATION PROGRAMS

Conservation programs help reduce water demands through incentives (educational, financial, and regulatory) and implementation of effective water conservation measures by specific user groups. Conservation can be actions or hardware that improve water use efficiency. Utilities and local governments are the primary entities that develop and implement conservation programs. Other regional and state agencies may also assume a leadership role in promoting and providing cost-share funding for water conservation. Utilities and local governments are encouraged to analyze their service areas and jurisdictions to determine potential user groups and programs that may be most suitable for them. The following subsections contain brief descriptions of established conservation programs that may be applicable to different water use categories.

Education, Outreach, and Marketing

Although water savings attributed to education, outreach, and marketing campaigns are difficult to quantify, such campaigns are essential to reducing water use and instilling a lasting conservation ethic in businesses and communities. Developing a conservation ethic and educating water users enable people to understand why conservation is important and necessary, what conservation measures are available, and how they can implement them. Campaigns usually are conducted by regional/local agencies or utilities and are designed to

reach specific user groups (e.g., residents, schools, commercial properties), providing consistent and regular messaging.

The SFWMD maintains its commitment to water conservation education through distributing educational materials, conducting speaking engagements, and utilizing social media platforms to raise awareness about the necessity of saving water.

Cost-Share Funding Programs

SFWMD Cooperative Funding Program

The Water Conservation component of the SFWMD Cooperative Funding Program (CFP) seeks to financially support projects that improve water use efficiency and conservation. The CFP provides financial incentives to local governments and utilities, homeowners' associations, commercial entities, and agricultural operations to implement technology and hardware-based water conservation projects. Historically, funding for the CFP has come from both ad valorem taxes and the Florida Legislature through the Florida Department of Environmental Protection. CFP funding is considered annually during the SFWMD's budget development process. Since the *2018 Lower East Coast Water Supply Plan Update* (SFWMD 2018), the SFWMD has provided approximately \$2.5 million in water conservation funding for 43 projects Districtwide. Over the same period (Fiscal Year [FY] 2018 through FY2022), 20 water conservation projects were funded in the LEC Planning Area for a total of \$1.04 million with 1.13 million gallons per day (mgd) of water saved. Projects supported by the CFP between FY2018 to FY2022 are listed in **Chapter 8**. The CFP is expected to continue although future funding levels are uncertain. Beginning in FY2023, the District's Governing Board requires that local governments must have an adopted year-round irrigation ordinance that fully comports with the SFWMD's Mandatory Year-Round Landscape Irrigation Conservation Measures Rule (Chapter 40E-24, Florida Administrative Code [F.A.C.]) in order to be eligible for alternative water supply or water conservation funding through the CFP. Additional information regarding the CFP can be found on the SFWMD's webpage (<https://www.sfwmd.gov/doing-business-with-us/coop-funding>).

Environmental Quality Incentives Program

The Environmental Quality Incentives Program (EQIP), implemented through the United States Department of Agriculture – Natural Resources Conservation Service, promotes agricultural production and environmental quality. Financial and technical assistance is offered to participants to address natural resource concerns and deliver environmental benefits, such as improved water and air quality, conserved groundwater and surface water, reduced soil erosion and sedimentation, and improved or created wildlife habitat. From FY2018 through FY2022, EQIP has provided more than \$1.9 million in funding for irrigation projects covering a total of 1,211 acres. EQIP is expected to continue although future funding levels are uncertain.

Certification and Recognition Programs

There are several national and statewide certification and recognition programs that direct builders, property owners, and building managers toward meeting environmentally friendly standards. Such programs include the Florida Green Building Coalition's green certification programs, the Florida Department of Environmental Protection's Green Lodging Program, the United States Green Building Council's Leadership in Energy and Environmental Design (LEED), and the Green Building Initiative's Green Globes Certification. These holistic programs typically include criteria affecting water use, energy efficiency, climate-adaptive landscaping, sustainable building material, site selection, indoor environmental quality, and greenhouse gas emissions.

INFO ⓘ

Florida-Friendly Landscaping means using low-maintenance plants and environmentally sustainable landscaping practices to conserve water, reduce pollution and erosion, and create wildlife habitat.



With respect to growing development and finite water resources, there are single-focus programs that target water use efficiency. These programs often are less expensive for builders and property managers than holistic ones. Two single-focus programs endorsed by all Florida water management districts are Florida Water Star and Florida-Friendly Landscaping Recognition. More information on these programs can be found on their individual program webpages and on the SFWMD's water conservation webpage (<https://www.sfwmd.gov/conserve>).

Other Programs

Agricultural Best Management Practices Program

The Florida Department of Agriculture and Consumer Services (FDACS) develops and adopts agricultural BMPs by rule for different types of agricultural operations. As of November 2022, there are 627,733 acres within the LEC Planning Area enrolled in the FDACS BMP program. All agricultural water users are encouraged to enroll in the FDACS BMP program and to learn about the FDACS Agricultural-Environmental Leadership Award which recognizes environmentally innovative farming practices. Local governments and agencies should consider promoting these programs to agricultural operations.

Agricultural Mobile Irrigation Labs

The FDACS Mobile Irrigation Lab (MIL) program performs free evaluations of irrigation system efficiency on agricultural lands and makes recommendations for physical and operational improvements. Such recommendations may include modification of irrigation systems and equipment, alteration of irrigation scheduling, and other aspects of system management. FDACS has MIL service available for all counties within the LEC Planning Area, except Monroe County.

Two agricultural MILs serve Miami-Dade, Broward, and Palm Beach counties, operated by the Palm Beach Soil and Water Conservation District. Since the last plan update, these

agricultural MILs conducted initial evaluations on participating agricultural properties, covering a total of 4,450 acres. A potential water savings of 2,696 million gallons per year (7.39 mgd) was estimated by these MILs if all recommended irrigation improvements were implemented.

During the period from 2018 to 2022, FDACS performed follow-up evaluations of the participating agricultural properties. Based on the improvements that were made to the properties following their initial evaluations, there was an estimated actual water savings of 579 million gallons per year (1.59 mgd) for those properties.

Urban Irrigation Audit Programs

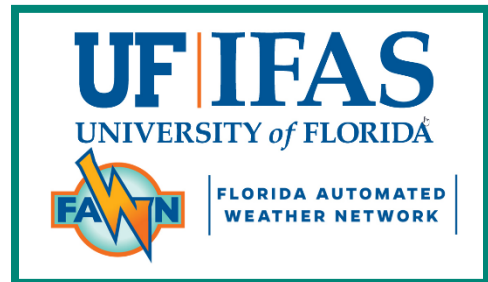


There are two urban irrigation audit programs currently operating in the LEC Planning Area: one operated by Broward County's Natural Resources Division and the other operated by Miami-Dade County through the Miami-Dade Water and Sewer Department. These local programs are not affiliated with the FDACS MIL network. The goal of these programs is to increase irrigation water use efficiency in parks, government-owned facilities, commercial properties, and single-family and multifamily homes. Both programs evaluate irrigation systems and replace irrigation

controllers and other hardware to produce greater water use efficiency. Since 2018, Broward County, through its NatureScape Irrigation Service program, provided assessment services to 525 single-family homes resulting in an estimated savings of more than 260,000 gallons of water per day. Since 2018, Miami-Dade County provided assessment services to 247 single-family homes and 70 large properties, resulting in an estimated savings of more than 282,000 gallons of water per day.

Florida Automated Weather Network

The Florida Automated Weather Network (FAWN), operated by the University of Florida – Institute of Food and Agricultural Sciences (UF/IFAS), provides weather information throughout the state at 15-minute intervals. FAWN management tools provide decision support functions to growers using historical and real-time weather data as well as crop modeling technology to help with short- and long-term planning, thereby maximizing the efficiency of irrigation practices (UF/IFAS 2024). Currently, there are five FAWN stations (Fort Lauderdale, Clewiston, Wellington, Belle Glade, and Homestead) supported by the SFWMD in the LEC Planning Area. Additional information for these stations is available at <https://fawn.ifas.ufl.edu/>.



REGULATORY INITIATIVES

Regulations are useful tools to assist in the implementation of better practices and more efficient devices. The SFWMD requires that water conservation measures and programs be considered for users with water use permits. For a proposed use of water to be deemed reasonable-beneficial, water users requiring a permit must include a water conservation plan in the permit application. Section 2.3.2 of the *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District* (SFWMD 2022) includes specific water conservation requirements for various water use categories.

The SFWMD's Mandatory Year-Round Landscape Irrigation Conservation Measures Rule (Chapter 40E-24, F.A.C.) was adopted to help protect South Florida's water resources by addressing landscape irrigation (the largest portion of residential water use and the greatest opportunity for viable water use reduction). In short, the rule limits landscape irrigation to 2 or 3 days per week, depending on location and local circumstances; restricts irrigation between the hours of 10 am and 4 pm; and contains provisions for new landscaping and other situations that require a deviation from the rule requirements.

Adoption of local ordinances that comport with Chapter 40E-24, F.A.C., and associated outreach and education to residents, is crucial to reducing landscape irrigation water use. When local governments implement irrigation ordinances, it demonstrates a commitment to water resource protection through conservation.

To assist local governments in adopting such an ordinance, the SFWMD has created a model ordinance, a model code, and several customizable outreach materials designed to educate residents on their local irrigation ordinance. As of March 2023, 69 of 116 local governments within the LEC Planning Area, which includes approximately 84% of the population, had adopted a year-round irrigation ordinance. Additional information and example documents for local implementation are on the SFWMD's webpage Local Government Model Ordinances and Codes available at <https://www.sfwmd.gov/consERVE>.

POTENTIAL FOR WATER CONSERVATION SAVINGS

Potential water savings of 62.13 mgd for the LEC Planning Area were estimated for the following water use categories: Agriculture (AG), Public Supply (PS), Domestic Self-Supply (DSS), and Landscape/Recreational (L/R). **Table 3-1** summarizes prospective savings for each category. For the Commercial/Industrial/Institutional (CII) and Power Generation (PG) water use categories, potential water savings were estimated only for potable indoor water use, which was assumed to be provided by a PS utility. Therefore, those potential savings are accounted for under PS. The methods used to estimate the savings for each category are discussed in each subsection.

Public Supply and Domestic Self-Supply



PS is the largest water use category in the LEC Planning Area, and water use demands are projected to increase through the planning horizon. PS accounted for an estimated 808.34 mgd of finished water demands in 2021 and 945.46 mgd of projected demands in 2045 (**Chapter 2**). DSS is estimated to have demands of 10.56 mgd in 2021 and projected to have 14.45 mgd in 2045. Historical conservation efforts in PS are reflected in the per capita use rate, which has declined 26% between 2000 and 2021. This decline likely is the result of new

construction using higher-efficiency fixtures and/or designed for more efficient water use, the SFWMD's Mandatory Year-Round Landscape Irrigation Conservation Measures Rule (Chapter 40E-24, F.A.C.), the adoption of local ordinances modeled on this rule, conservation rate structures, public education, and other conservation factors.

Estimates of active and passive water conservation potential for each county in the LEC Planning Area were made for residential and nonresidential users (in both PS service areas and DSS areas) using the Alliance for Water Efficiency Conservation Tracking Tool (AWE Tool), Version 4.0 (AWE 2021). The AWE Tool calculates active water savings for user-selected conservation measures based on the number of measures implemented annually over the planning horizon, and the per unit savings and service lives of each measure. Passive savings are generated by the AWE Tool based on natural replacement of toilets, showerheads, and water-using appliances at the end of their service lives, whose current or future minimum efficiency is dictated by national, state, or local code requirements. Baseline data include Florida Department of Revenue parcel information, University of Florida Bureau of Economic and Business Research household data and population projections, and Florida Department of Environmental Protection finished water monthly operating reports (as used in this plan update for demand projections; **Appendix A**). Conservation potential for DSS was analyzed along with PS users and extracted in proportion to its percentage of the total population in each county.

For this *2023–2024 Lower East Coast Water Supply Plan Update*, seven frequently implemented measures were selected and quantified to generate the potential water savings for the PS and DSS user groups. Conservation measures utilized in the estimates for residential users supplied by PS utilities and DSS users were as follows: high-efficiency toilets, showerheads, clothes washers, irrigation audits, landscape evaluations, advanced irrigation controllers, and water use audits. For many types of permit holders, including CII and PG, indoor potable water use often is provided by a PS utility. Conservation measures for nonresidential users served by PS utilities were limited to high-efficiency toilets and urinals.

For all measures, the conservation (demand reduction) estimate assumes a participation rate of 10% of the total annual potential implementations for each applicable measure. This assumption means 10% of all possible implementations would be accomplished over the planning horizon (2021 to 2045), which is thought to be an achievable participation rate for most conservation measures. The combined estimated conservation potential by PS and DSS (active and passive savings) in the LEC Planning Area in 2045 is 39.59 mgd. However, while