
# 2024

# LOWER KISSIMMEE BASIN

## WATER SUPPLY PLAN UPDATE

## PLANNING DOCUMENT/APPENDICES

*Cover Photos*

*Front Top: Agricultural Hay/Pasture Operation*
*Front Middle: Kissimmee River*
*Back: Aquifer Storage and Recovery along the Kissimmee River near Lake Okeechobee*

# 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 *2024 Lower Kissimmee Basin 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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# 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 *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update) is the second update to the *2014 Lower Kissimmee Basin Water Supply Plan* (2014 LKB Plan), which previously was updated in 2019. This plan update is consistent with the water supply planning requirements of Chapter 373, Florida Statutes, 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 development projects completed since the 2019 update.

This 2024 LKB 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 two virtual public workshops for this water supply plan update.

The LKB Planning Area covers approximately 1,805 square miles, including portions of Glades, Highlands, and Okeechobee counties. The Seminole Tribe of Florida's Brighton Reservation is within this planning area. Additionally, the LKB Planning Area generally lies within the Lake Okeechobee watershed. While a portion of the Lake Okeechobee Service Area (LOSA) is within the LKB Planning Area, the entire LOSA is addressed in the Lower East Coast water supply plan updates (last updated in 2023–2024).

Typically, the LKB Planning Area receives abundant rainfall, with volumes exceeding human and natural system needs during wet periods. Water availability varies annually and includes periodic drought years. Annual precipitation averages 48 inches, with nearly two-thirds of rainfall occurring between June and October. There is an extensive network of canals and waterworks used for water supply and flood control in the LKB Planning Area, including the C-38 (Kissimmee River), C-40, C-41, C-41A, and Istokpoga canals.

Climate change, including potential changes in air temperature and rainfall patterns could affect hydrologic conditions, and thus water supply sources, as well as patterns of water demand. 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 LKB Planning Area is home to nearly 52,742 people and supports a large agricultural industry. The permanent population is projected to reach 57,508 people by 2045, which is approximately a 9% increase from the 2022 base year estimate for this plan update. Approximately 75% of the LKB Planning Area's permanent population currently resides in Okeechobee County and is expected to be around 71% in 2045.

Agriculture is a substantial part of the regional economy. Agricultural irrigated acres are projected to increase approximately 6%, from 103,667 acres in 2022 to 109,761 acres in 2045. Hay and pasture is the dominant crop in the LKB Planning Area, covering more than 39,000 acres. However, hay and pasture acreage is projected to decrease by 2045, to approximately 28,000 acres. Citrus also is a dominant crop in the region, accounting for more than 26,000 acres in 2022 and around 24,000 acres in 2045.

Total average water demands by all water use categories are projected to increase by approximately 16%, from an average total water use of approximately 225 million gallons per day (mgd) in 2022 to 261 mgd in 2045 (**Table ES-1**). Projected 1-in-10-year demands are estimated to also increase by 15%.

Agriculture (AG) is projected to remain the largest water use category in the LKB Planning Area, accounting for approximately 91% of the total 2045 projected demand. Landscape/Recreational (L/R) is the second largest water use category in the LKB Planning Area, representing 6% of the total 2045 projected demand. Public Supply (PS), Domestic Self-Supply (DSS), and Commercial/Industrial/Institutional (CII) collectively account for approximately 4% of the total 2045 projected demand. There are no Power Generation (PG) facilities currently operating or proposed through 2045 in the LKB Planning Area; therefore, PG demands are projected to remain at 0.00 mgd through the planning horizon.

Table ES-1. Estimated (2022) and projected (2045) average gross water demands in the LKB Planning Area.

| Water Use Category | 2022 Estimated Use (mgd) | 2045 Projected Demand (mgd) | Percent Change | Percent of Projected 2045 Total Demand |
|---|---|---|---|---|
| Public Supply | 4.14 | 5.03 | 22% | 2% |
| Domestic Self-Supply | 1.80 | 1.84 | 2% | <1% |
| Agriculture[a] | 211.04 | 236.15 | 12% | 91% |
| Commercial/Industrial/Institutional | 2.34 | 2.85 | 22% | 1% |
| Landscape[a]/Recreational | 6.12 | 14.68 | 140% | 6% |
| Power Generation | 0.00 | 0.00 | 0% | 0% |
| **LKB Planning Area Total** | **225.44** | **260.55** | **16%** | **100%** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model.

# 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**). Due to the dominance of agriculture in the LKB Planning Area, conservation efforts will be most effective for reducing total demands through efficient agricultural operations. Analyses suggest the AG use category can save nearly 7 mgd by 2045 through irrigation efficiency and scheduling improvements.

# NATURAL SYSTEMS AND RESOURCE PROTECTION

Natural surface water systems in the LKB Planning Area include the Kissimmee River, Arbuckle Creek, Lake Istokpoga, Fisheating Creek, Taylor Creek, Nubbin Slough, and Lake Okeechobee (**Chapter 5**). Natural systems are protected and addressed through regulatory mechanisms, restoration efforts, and water resource development projects.

Minimum flows and minimum water levels (MFLs) that affect the LKB Planning Area have been adopted for Lake Istokpoga, Lake Okeechobee, and the Lower West Coast aquifers (**Chapter 4**). Prevention strategies have been adopted for the Lake Istokpoga and Lower West Coast aquifers MFLs, and a recovery strategy has been adopted for the Lake Okeechobee MFL. The MFL for Lake Okeechobee affects portions of the LKB Planning Area but is described in the Lower East Coast water supply plan updates (last updated in 2023–2024). Water reservations have been adopted for the Kissimmee River and Chain of Lakes in 2021, reserving water needed for the protection of fish and wildlife in the Upper Chain of Lakes, Headwaters Revitalization Lakes, and the Kissimmee River and floodplain. Restricted allocation area rules have been established for the Lake Istokpoga/Indian Prairie Canal System and LOSA.

Large ecosystem restoration projects are under way in the LKB Planning Area (**Chapter 7**) and are vital to maintaining the health of the region's water resources, including elements identified in MFL prevention and recovery 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 water supply planning in the LKB Planning Area. CERP includes capital projects needed to protect and restore natural systems and enhance water availability. The primary CERP components in the LKB Planning Area are the Lake Okeechobee Watershed Restoration Project (LOWRP) and the Lake Okeechobee Component A Storage Reservoir (LOCAR). These projects aim to significantly increase water storage capabilities and improve lake levels, decrease harmful discharges to estuaries, improve wetland habitats, and increase water supply for existing legal users. In addition, major construction projects for the Kissimmee River Restoration Project were completed in 2021. To date, continuous water flow has been re-established to 24 miles of the original river, along with intermittent inundation of the floodplain by backfilling a central section of the C-38 Canal. When complete, the project will re-establish flow to approximately 40 miles of historical river channel and restore almost 25,000 acres of floodplain wetlands.

# WATER SOURCE OPTIONS

Water users in the LKB Planning Area primarily rely on surface water from Lake Istokpoga and Lake Okeechobee (and their connected canals) as well as fresh groundwater from the surficial and Floridan aquifer systems to meet urban and agricultural water demands (**Chapter 5**). The SFWMD also uses water from Lake Istokpoga and Lake Okeechobee to ensure surface water availability within the Indian Prairie Canal System, so the Seminole Tribe of Florida can withdraw its entitled amount as specified in the 1987 Water Rights Compact among the Seminole Tribe of Florida, State of Florida, and the SFWMD. Total water use in the LKB Planning Area is projected to increase by 16% over the planning period (**Chapter 2**). Restricted allocation area rules for the Lake Istokpoga/Indian Prairie Canal System and LOSA limit surface water availability to base water allocations (**Chapter 4**).

For surface water users in LOSA, additional water can be stored in Lake Okeechobee resulting from the completion of the Herbert Hoover 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 in August 2024. 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, and additional details about the Lake Okeechobee MFL and updated recovery strategy are provided in Appendix C of the *2023–2024 Lower East Coast Water Supply Plan Update*. The SFWMD will continue to allocate water for existing and future reasonable-beneficial uses pursuant to its regulatory rules and criteria.

Traditional water sources (i.e., fresh surface water and fresh groundwater) appear sufficient to meet the projected water demands of the LKB Planning Area through 2045. Currently, alternative water supply options (e.g., brackish groundwater, reclaimed water, water stored in aquifer storage and recovery wells and in aboveground reservoirs) are not required to meet future demands of the region but may be appropriate at individual locations.

# WATER RESOURCE CONSIDERATIONS AND ANALYSES

Although water sources appear adequate to meet projected 2045 demands for this 2024 LKB Plan Update, there are considerations, similar to those identified in the 2019 LKB Plan Update, that affect the availability of water in the LKB Planning Area. These include environmental water needs for the Kissimmee River Restoration Project, regulatory limitations on surface water bodies, effects of groundwater withdrawals on the Lake Wales Ridge MFL water bodies, and effects of climate change on agricultural needs. Multiple data and information sources were used to evaluate the region's water resources, including their availability and ability to meet projected demands. Projected 2045 water needs in this 2024 LKB Plan are similar to the projected water needs in the 2014 and 2019 LKB water supply plans. As a result, the findings and conclusions of the evaluations and analyses conducted as part of these LKB water supply plans are still representative to address the 2045 projected water demands for the region. Additionally, a recent SFWMD analyses of available data from groundwater monitoring wells in the LKB Planning Area showed that while groundwater levels fluctuate seasonally, generally there are no marked upward or downward trends in water levels.

# FUTURE DIRECTION

**Chapter 8** of this 2024 LKB Plan Update contains guidance to help focus future efforts to meet projected water demands in the region. Collaboration among regional stakeholders, including agricultural interests, utilities, local and tribal governments, and environmental groups is essential to ensure the supply of water is sufficient and sustainable to meet urban, agricultural, and environmental needs. The following actions are suggested:

- Agricultural users are encouraged to reduce or augment use of surface water, when technically and economically feasible, with projects such as stormwater and tailwater recovery, the blending of brackish groundwater with fresh water where available, and more efficient water conservation practices.
- Surface water storage systems (e.g., reservoirs) can help meet urban, agricultural, and environmental water supply needs.
- The design of wells and wellfield locations, configurations, and pumping regimes should maximize withdrawals while avoiding harm to natural systems and other users.
- The SFWMD will continue implementation of MFL prevention and recovery strategies, and review and update these strategies, as appropriate, in conjunction with future water supply plan updates.
- The SFWMD will continue supporting ecosystem restoration efforts including CERP.
- Local water users and utilities developing Floridan aquifer system wellfields are encouraged to collaborate with the SFWMD. Water quality, water level, and hydrologic data from such wells can be used in SFWMD regional models and can increase knowledge and understanding of the Floridan aquifer system.

# CONCLUSIONS

Building on the findings and conclusions of the *2019 Lower Kissimmee Basin Water Supply Plan*, this 2024 LKB Plan Update assesses water supply demands and available sources for the LKB Planning Area 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.

Successful implementation of this 2024 LKB 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 LKB Planning Area continue to be prudently managed and available to meet future demands while also protecting natural systems.

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# Acronyms and Abbreviations

| | |
|---|---|
| AFSIRS | Agricultural Field Scale Irrigation Requirements Simulation |
| AG | Agriculture |
| APPZ | Avon Park permeable zone |
| ASR | aquifer storage and recovery |
| AWS | alternative water supply |
| BEBR | Bureau of Economic and Business Research |
| bls | below land surface |
| BMP | best management practice |
| C&SF Project | Central and Southern Florida Project |
| CERP | Comprehensive Everglades Restoration Plan |
| CFP | Cooperative Funding Program |
| CFWI | Central Florida Water Initiative |
| CII | Commercial/Industrial/Institutional |
| District | South Florida Water Management District |
| DSS | Domestic Self-Supply |
| DWM | Dispersed Water Management |
| EAA | Everglades Agricultural Area |
| EIS | Environmental Impact Statement |
| 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 |
| FPLOS | Flood Protection Level of Service |
| FSAID | Florida Statewide Agricultural Irrigation Demand |
| FY | Fiscal Year |
| IAS | intermediate aquifer system |
| ICU | intermediate confining unit |
| IMWID | Istokpoga Marsh Watershed Improvement District |

| | |
|---|---|
| L/R | Landscape/Recreational |
| LFA | Lower Floridan aquifer |
| LKB | Lower Kissimmee Basin |
| LOCAR | Lake Okeechobee Component A Storage Reservoir |
| LORS08 | Lake Okeechobee Regulation Schedule 2008 |
| LOSA | Lake Okeechobee Service Area |
| LOSOM | Lake Okeechobee System Operating Manual |
| LOWRP | Lake Okeechobee Watershed Restoration Project |
| MFL | minimum flow and minimum water level |
| mg/L | milligrams per liter |
| mgd | million gallons per day |
| MIL | mobile irrigation lab |
| NEEPP | Northern Everglades and Estuaries Protection Program |
| NGVD29 | National Geodetic Vertical Datum of 1929 |
| PCUR | per capita use rate |
| PG | Power Generation |
| PIR | Project Implementation Report |
| 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 |
| SWUCA | Southern Water Use Caution Area |
| TDS | total dissolved solids |
| UFA | Upper Floridan aquifer |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| Work Plan | Water Supply Facilities Work Plan |
| WRDA | Water Resources Development Act |
| WTP | water treatment plant |
| WWTF | wastewater treatment facility |

# 1

# Introduction

The South Florida Water Management District (SFWMD or District) develops and updates regional water supply plans to provide for current and future water needs while protecting Central and South Florida's water resources. This *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update) assesses existing and projected water needs as well as water sources to meet those needs through 2045.

**TOPICS**

- 2024 LKB Plan Update
- Goal and Objectives
- Legal Authority and Requirements
- Seminole Tribe of Florida's Brighton Reservation
- Regional and Local Planning Linkage
- Plan Development Process
- Progress Since the 2019 LKB Plan Update

The Lower Kissimmee Basin (LKB) Planning Area includes portions of Glades, Okeechobee, and Highlands counties (generally northwest of Lake Okeechobee) and the Seminole Tribe of Florida's Brighton Reservation (**Figure 1-1**). This 2024 LKB Plan Update presents population estimates and associated water demands and projections (**Chapter 2**), water resource and water supply development projects (**Chapter 7**), and related water supply planning information for the 2022 to 2045 planning horizon. Designed to be a guide for local and tribal governments, utilities, agricultural operations, and other water users, this 2024 LKB Plan Update provides a framework for local and regional water supply planning and management decisions in the LKB Planning Area.

The LKB Planning Area encompasses approximately 1,805 square miles. To the northeast of the planning area is the St. Johns River Water Management District (SJRWMD), and to the east is the SFWMD's Upper East Coast Planning Area. At the northern boundary of the planning area are the Avon Park Air Force Range in Polk County and the Kissimmee Prairie Preserve State Park in Osceola County (**Figure 1-1**). The Seminole Tribe of Florida's Brighton Reservation and the Miccosukee Tribe of Indians of Florida's Cherry Ranch property also are within the planning area. The western boundary is adjacent to the Southwest Florida Water Management District (SWFWMD). The LKB Planning Area generally is within the larger Lake Okeechobee watershed. There are five subwatersheds (basins) at least partially within the planning area boundaries: Lower Kissimmee River, Taylor Creek/Nubbin Slough, Lake Istokpoga, Indian Prairie, and Fisheating Creek (**Figure 1-2**). These subwatersheds have hydrologic relationships with the Kissimmee River, Lake Istokpoga, Fisheating Creek, and the tributaries and canals associated with these water bodies that eventually drain into Lake Okeechobee.

The primary sources of fresh water throughout the LKB Planning Area are surface water and groundwater. To a much lesser extent, reclaimed water also is reused for nonpotable uses like irrigation. Major surface water resources include Lake Istokpoga and its associated canals in the Indian Prairie Basin, Lake Okeechobee and its hydraulically connected water bodies, and the Kissimmee River. Also discussed in this plan update are Taylor Creek/Nubbin Slough and Fisheating Creek, which drain into Lake Okeechobee. Groundwater resources in the LKB Planning Area include the surficial and Floridan aquifer systems (SAS and FAS). Further information about water source options is provided in **Chapter 5**.

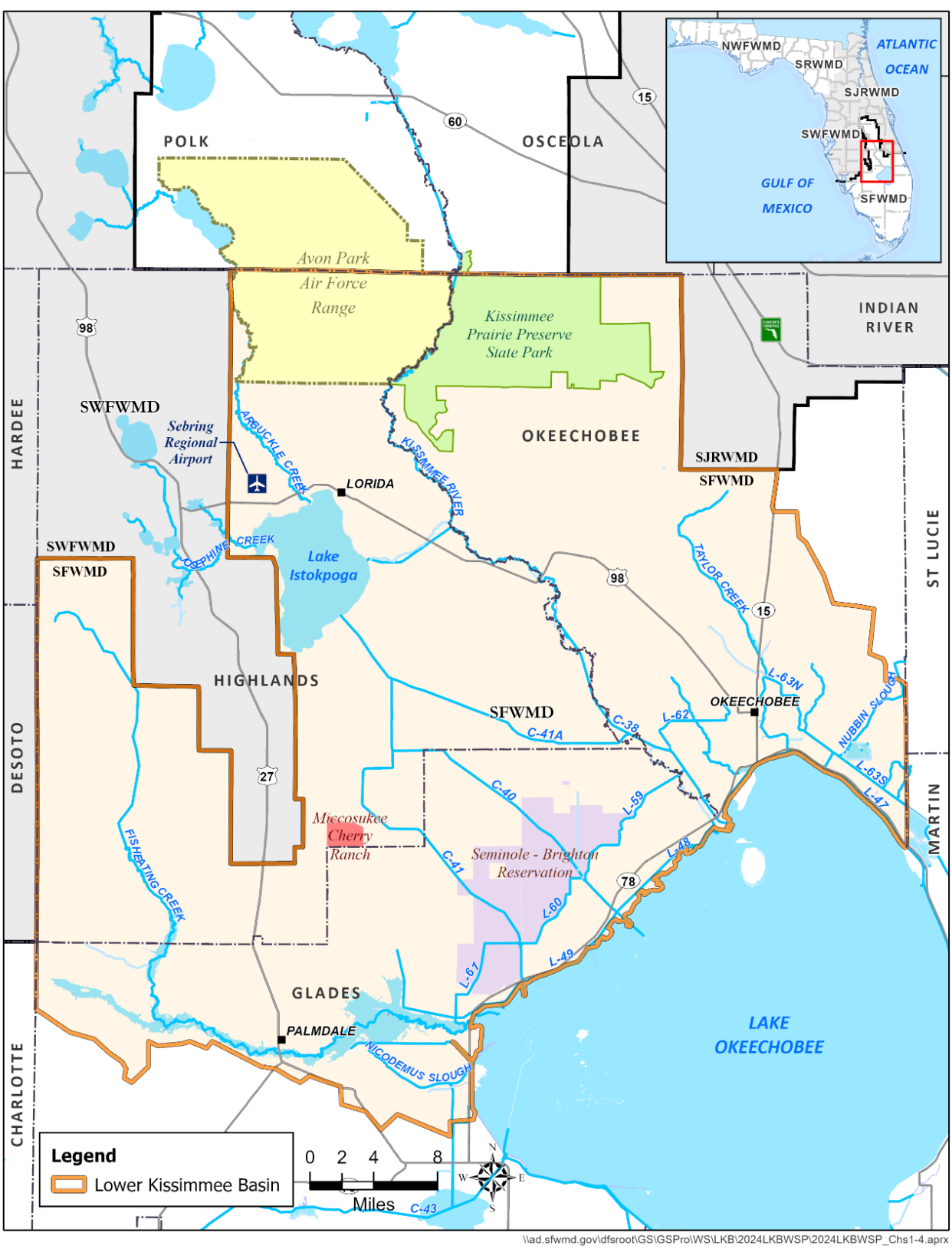



Figure 1-1. LKB Water Supply Planning Area.

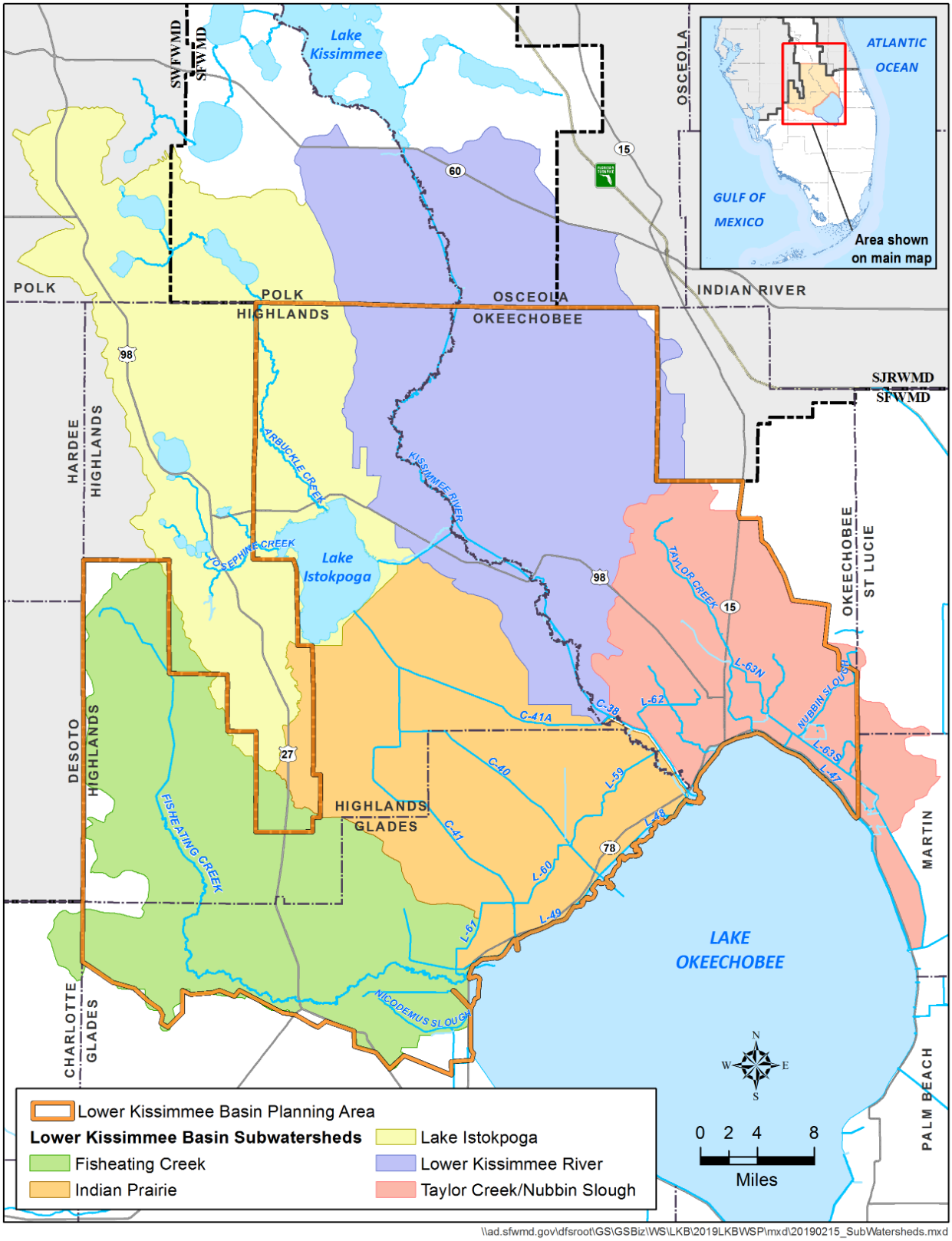



Figure 1-2. Primary subwatersheds within the LKB Planning Area.

# 2024 LKB PLAN UPDATE

The 2024 LKB Plan Update reflects the changes experienced in the LKB Planning Area since 2019 and the effects of those changes on water use and projected demands. This update consists of two documents: a planning document with appendices and the *2021–2024 Support Document for the Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021). The planning document and appendices focus on the LKB Planning Area. The support document discusses aspects common to four of the five SFWMD regional planning areas, including the legal authority and requirements for water supply planning. The Upper Kissimmee Basin Planning Area 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 SFWMD's planning areas is available in the publication titled *Physical Features and Water Resources of the South Florida Water Management District* (SFWMD 2022).

# GOAL AND OBJECTIVES

The goal of the 2024 LKB 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 sustaining water resources and natural systems. The objectives in the *2019 Lower Kissimmee Basin Water Supply Plan Update* (2019 LKB Plan Update; SFWMD 2019) were reviewed and modified for this 2024 LKB Plan Update as follows:

1. **Water Supply** – Quantify sufficient volumes of water and water supply projects to meet the projected demands for 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 Kissimmee River, Lake Istokpoga, Fisheating Creek, Taylor Creek, Nubbin Slough, Lake Okeechobee, and other federal, state, and locally identified 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 2024 LKB Plan Update with local and tribal government land use decisions.

5. **Compatibility and Linkage with Other Efforts** – Achieve compatibility and integration with planning-related activities within the region including:
   - The Comprehensive Everglades Restoration Plan (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 changing rainfall and flood patterns

# LEGAL AUTHORITY AND REQUIREMENTS

The legal authority and requirements for water supply planning are included in Chapters 373, 403, 187, and 163, Florida Statutes (F.S.). In accordance with Florida's Water Protection and Sustainability Program, regional water supply plans and local government Comprehensive Plans must ensure 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* (www.sfwmd.gov/sfer), which is referenced as needed in this plan update.

# SEMINOLE TRIBE OF FLORIDA'S BRIGHTON RESERVATION

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 Brighton Reservation encompasses 35,295 acres within the southern portion of the LKB Planning Area (**Figure 1-1**). Much of the land is used for various agricultural purposes and a small population of approximately 1,000 permanent residents.

# 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 2024 LKB 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 2024 LKB 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 2021).

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 Commerce webpage (https://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/water-supply-planning).

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

# PLAN DEVELOPMENT PROCESS

PLAN DEVELOPMENT PROCESS

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **Planning and Assessment** | **Data Collection, Analyses, and Issue Identification** | **Evaluation of Water Resources and Water Source Options** | **Identification of Water Resource and Water Supply Development Projects** |
| 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 2019 LKB Plan Update (SFWMD 2019) were key starting points. | Using the 2019 LKB Plan Update (SFWMD 2019) 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**). | This phase of the planning process involved reviewing existing monitoring data and 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. | In areas where water resource conditions warranted, water resource development projects were identified (**Chapter 7**). If needed, 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 7**). |

## 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 to meet future water needs. The SFWMD held two virtual workshops within the LKB Planning Area during the water supply plan update process. Stakeholders representing a variety of interests in the LKB Planning Area—agriculture, tribal, industry, environmental protection, utilities, local government planning departments, and state and federal agencies—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 any 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 2019 LKB PLAN UPDATE

Since the 2019 LKB Plan Update (SFWMD 2019), the following activities and programs have been improving the understanding of, while enhancing and protecting, the LKB Planning Area's water resources, water supplies, and natural systems.

## Hydrologic Studies and Modeling

- **FAS Monitoring Network** – The SFWMD continues to maintain and update a network of more than 105 FAS monitor wells, 12 of which are within the LKB Planning Area. Water level data from the monitor wells are evaluated to 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** – Since 2019, the SFWMD and its partners completed the following hydrogeologic investigations relevant to the LKB Planning Area:
  - Seismic characterization of the FAS near Lake Okeechobee (Michelsen and Jansen 2020, Collier Geophysics 2023)
  - Groundwater chemistry of the Lower Floridan aquifer (Geddes et al. 2020)

## Water Supply Studies

- **Annual Estimated Water Use Reports** – The SFWMD prepares 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. A copy of 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 AWS options and treatment facilities, including groundwater wellfields, surface water facilities, water treatment processes, storage, piping, and distribution facilities as well as other ancillary components. A copy of the report completed in 2023 can be found at https://www.sfwmd.gov/our-work/water-supply.

## Regulations and Operations

- **Kissimmee River and Chain of Lakes Water Reservations** – In 2021, the major construction projects for the Kissimmee River Restoration Project were completed and the water reservations rule was adopted for the Kissimmee River and Chain of Lakes that identify and reserve from consumptive use the water needed to protect fish and wildlife in the Upper Chain of Lakes, Headwaters Revitalization Lakes, and the Kissimmee River and floodplain.
- **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

- **Kissimmee River Restoration Project** – In partnership with the USACE, major construction projects for the Kissimmee River Restoration Project were completed in 2021. To date, continuous water flow has been re-established 24 miles of the original river, along with intermittent inundation of the floodplain by backfilling a central section of the C-38 Canal. When complete, the project will re-establish flow to approximately 40 miles of historical river channel and restore almost 25,000 acres of floodplain wetlands.

Kissimmee River Restoration Project

- **Herbert Hoover Dike/Lake Okeechobee** – In 2006, the USACE designated the Herbert Hoover Dike surrounding Lake Okeechobee as a Level 1 risk, the highest risk for dam failure. Rehabilitation and repair of the Herbert Hoover Dike was completed in 2023. 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 (LOWRP)** – The purpose of the LOWRP, as part of CERP, 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. The LOWRP Final Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) was released for public and agency review in 2020. The Recommended Plan included aboveground storage, referred to as the wetland attenuation feature (WAF), 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 WAF component and its 25 WAF-assisted ASR wells, creating a revised Recommended Plan called Alternative ASR with 55 ASR wells and two wetland restoration sites. The SFWMD and USACE determined the ASR well component would provide the greatest benefits to the estuaries. The current revised project components in the Recommended Plan (Alternative ASR) that are under consideration include the 55 ASR wells and approximately 5,900 acres of wetland restoration (**Figure 7-3**). Since 2019, the SFWMD has been implementing the design and construction for the ASR well component in a phased approach while addressing the remaining uncertainties and stakeholder concerns regarding regional implementation of this technology. To address the concerns with ASR technology, the SFWMD updates an ASR Science Plan, including additional studies proposed by the U.S. Army Engineer Research and Development Center (ERDC). The LOWRP Final Revised Integrated PIR/EIS is anticipated to be completed and submitted for congressional authorization in 2028 or 2030 for the ASR and wetland components subsequent to the ERDC studies, which are anticipated to be completed in 2026.
- **Lake Okeechobee Component A Reservoir (LOCAR)** – The SFWMD, working in conjunction with the USACE, conducted and prepared a Feasibility Study and EIS for a separate project known as LOCAR. The Feasibility Study and EIS explored opportunities for 200,000 acre-feet of aboveground water storage north of Lake Okeechobee to maintain the basin storage in the original Recommended Plan for LOWRP. The study area covers a large portion of the Lake Okeechobee Watershed north of Lake Okeechobee and the project will provide ecological benefits to the lake and the northern estuaries. The LOCAR Feasibility Study and EIS were submitted on February 28, 2024, to the Assistant Secretary of the Army for Civil Works for consideration by Congress in the Water Resources Development Act of 2024. By creating additional water storage north of Lake Okeechobee, the LOWRP ASR systems, in addition to the LOCAR project, can improve flexibility in the timing and distribution of water in the lake to the estuaries and throughout the watershed. Water can be stored during wet times to reduce damaging high lake levels and be released into the lake during dry times to reduce adverse impacts of low lake levels, thereby improving the reliability of water supplies.

# REFERENCES


Collier Geophysics. 2023. *Project Report for the High-Resolution 2-D Seismic Reflection Survey for the South Florida Water Management District, Okeechobee, Florida*. Stephenville, TX. September 2023.

Geddes, E., S. Coonts, and R. Carroll. 2020. *Groundwater Chemistry of the Lower Floridan Aquifer–Upper Permeable Zone in Central and South Florida*. Technical Publication WS-57. South Florida Water Management District, West Palm Beach, FL. December 2020.

Michelsen, F.B. and J. Jansen. 2020. *Application of High Definition 2D and 3D Seismic Tests for Characterization of the Floridan Aquifer System in the Lake Okeechobee Area: Project Report*. Submitted to the South Florida Water Management District, West Palm Beach, FL. Collier Consulting, Inc., Stephenville, TX. February 2020.

SFWMD. 2019. *2019 Lower Kissimmee Basin Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. December 2019.

SFWMD. 2021. *2021–2024 Support Document for Water Supply Plan Updates*. South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2022. *Physical Features and Water Resources of the South Florida Water Management District*. South Florida Water Management District, West Palm Beach, FL. December 2022.

# 2

# Demand Estimates and Projections

This chapter summarizes the water demand estimates and projections for the Lower Kissimmee Basin (LKB) Planning Area of the South Florida Water Management District (SFWMD or District) through the planning horizon of 2022 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**.

Demands associated with the LKB Planning Area are different from other planning areas because 94% of the total demand (2022) is attributable to crop irrigation and other agricultural water needs. In more urbanized planning areas within the District, potable water supply for residential uses accounts for a much larger portion of total demand.

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 *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update), gross demand is equal to net demand for all water use categories except PS.

This 2024 LKB 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. 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 2024 LKB Plan Update are estimated in 5-year increments for the following six water use categories established by the Florida Department of Environmental Protection (FDEP) in coordination with the state's water management districts:

- **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, 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 (2022) and projected (2045) average gross water demands, by category, in the LKB Planning Area. The largest water use category is AG, followed by PS, CII, DSS, and L/R. Modest growth is projected for all water use categories except for AG, which is projected to decline through the planning horizon.

Table 2-1. Estimated (2022) and projected (2045) average gross water demands (in mgd) for the LKB Planning Area by use category.

| Water Use Category | 2022 | 2045 |
|---|---|---|
| Public Supply | 4.14 | 5.03 |
| Domestic Self-Supply | 1.80 | 1.84 |
| Agriculture[a] | 211.04 | 236.15 |
| Commercial/Industrial/Institutional | 2.34 | 2.85 |
| Landscape[a]/Recreational | 6.12 | 14.68 |
| Power Generation | 0.00 | 0.00 |
| **LKB Planning Area Total** | **225.44** | **260.55** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model.

# POPULATION ESTIMATES AND PROJECTIONS

Population estimates and projections for the LKB Planning Area are used to develop demands for all water use categories except PG and AG. Developing population estimates and projections required multiple sources of information, including county-level data from the University of Florida's Bureau of Economic and Business Research (BEBR) pursuant to 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 and utilities. **Appendix A** provides further details on the development of population estimates and projections.

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 2022, the total estimated population within the LKB Planning Area was 52,742 permanent residents (**Table 2-2**). BEBR projections indicate the LKB Planning Area population will grow approximately 9% from 2022 to 2045. Approximately 75% of the permanent resident population lives in Okeechobee County, particularly in the southern portion of the county. 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 2023).

Table 2-2. Permanent resident population served by PS and DSS in the LKB Planning Area in 2022 and 2045.

| County[a] | 2022 Population | | | 2045 Population | | |
|---|---|---|---|---|---|---|
| | PS | DSS | **Total** | PS | DSS | **Total** |
| Glades[b] | 4,131 | 391 | **4,522** | 7,511 | 289 | **7,800** |
| Highlands | 3,140 | 5,422 | **8,562** | 3,388 | 5,620 | **9,008** |
| Okeechobee | 25,981 | 13,677 | **39,658** | 26,646 | 14,054 | **40,700** |
| **LKB Planning Area Total** | **33,253** | **19,489** | **52,742** | **37,545** | **19,963** | **57,508** |

DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; PS = Public Supply.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida's Brighton Reservation is included in the calculations for Glades County.

# 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 LKB 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 utility, a net (finished) water PCUR was developed using past population and finished water data reported to the FDEP. The PCUR for each utility is a 5-year (2018 through 2022) 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 raw-to-finished 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 by county. The results indicate PS gross (raw) water demands will increase 22%, from 4.14 mgd in 2022 to 5.03 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 LKB Planning Area by county.

| County[a] | Demand – Average Rainfall Conditions (mgd) | | | | | | | 2045 1-in-10 Year Demand |
|---|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 | |
| Glades[b] | 0.74 | 0.88 | 1.19 | 1.45 | 1.61 | 1.64 | 1.68 | 1.78 |
| Highlands | 0.30 | 0.32 | 0.32 | 0.33 | 0.33 | 0.33 | 0.33 | 0.35 |
| Okeechobee | 2.94 | 2.94 | 2.97 | 2.98 | 3.00 | 3.01 | 3.02 | 3.20 |
| **LKB Planning Area Total** | **3.98** | **4.14** | **4.48** | **4.76** | **4.94** | **4.98** | **5.03** | **5.33** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida's Brighton Reservation is included in the calculations for Glades County.

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

| County[a] | Demand – Average Rainfall Conditions (mgd) | | | | | | | 2045 1-in-10 Year Demand |
|---|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 | |
| Glades[b] | 0.58 | 0.69 | 0.94 | 1.15 | 1.29 | 1.31 | 1.34 | 1.43 |
| Highlands | 0.29 | 0.31 | 0.31 | 0.32 | 0.32 | 0.32 | 0.32 | 0.35 |
| Okeechobee | 2.63 | 2.63 | 2.65 | 2.66 | 2.68 | 2.69 | 2.70 | 2.86 |
| **LKB Planning Area Total** | **3.50** | **3.63** | **3.90** | **4.13** | **4.29** | **4.32** | **4.36** | **4.64** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida's Brighton Reservation is included in the calculations for Glades County.

# DOMESTIC SELF-SUPPLY

The DSS category includes potable water used by households that are served by small utilities with current allocations 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 LKB Planning Area's DSS demand estimates and projections under average rainfall conditions. The average gross (raw) demands in 2022 were 1.80 mgd for 19,489 permanent residents (**Table 2-2**). DSS average demands are expected to increase 2%, to 1.84 mgd in 2045 for 19,963 residents.

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

| County[a] | Demand – Average Rainfall Conditions (mgd) | | | | | | | 2045 1-in-10 Year Demand |
|---|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 | |
| Glades[b] | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 | 0.02 |
| Highlands | 0.38 | 0.37 | 0.36 | 0.37 | 0.38 | 0.38 | 0.39 | 0.41 |
| Okeechobee | 1.40 | 1.40 | 1.39 | 1.40 | 1.42 | 1.43 | 1.43 | 1.52 |
| **LKB Planning Area Total** | **1.81** | **1.80** | **1.79** | **1.80** | **1.83** | **1.84** | **1.84** | **1.95** |

DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida's Brighton Reservation is included in the calculations for Glades County.

# AGRICULTURE

Hay and Pasture

The AG category includes self-supplied water used for commercial crop irrigation, nurseries, greenhouses, livestock watering, pasture, and aquaculture. AG is the largest water use category in the LKB Planning Area, accounting for 211.04 mgd (94%) of the region's total estimated water demand in 2022. Agricultural production in the LKB Planning Area is of regional significance, with more than 103,667 acres under irrigation (**Figure 2-1**). The value of all agricultural commodities produced in Glades, Highlands, and Okeechobee counties was $653 million in 2022 (United States Department of Agriculture 2024). Of all cattle and calves raised in the State of Florida in 2022, 19% were in these three counties.

Agricultural acreage data published by the Florida Department of Agriculture and Consumer Services (FDACS 2023) were used to determine AG water demands for this 2024 LKB 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**.

Agricultural water demand was determined using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model (Smajstrla 1990). No distinction is 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**.

Hay and pasture are the predominant agricultural irrigated land uses in the LKB Planning Area, encompassing more than 39,000 acres and 74.54 mgd in 2022 (**Table 2-6**). Irrigated hay and pasture are followed by citrus, with more than 26,000 acres and 43.97 mgd of irrigation demand in 2022. Together, these two main crop categories account for 63% of the irrigated acreage and 56% of water demands under average rainfall conditions.

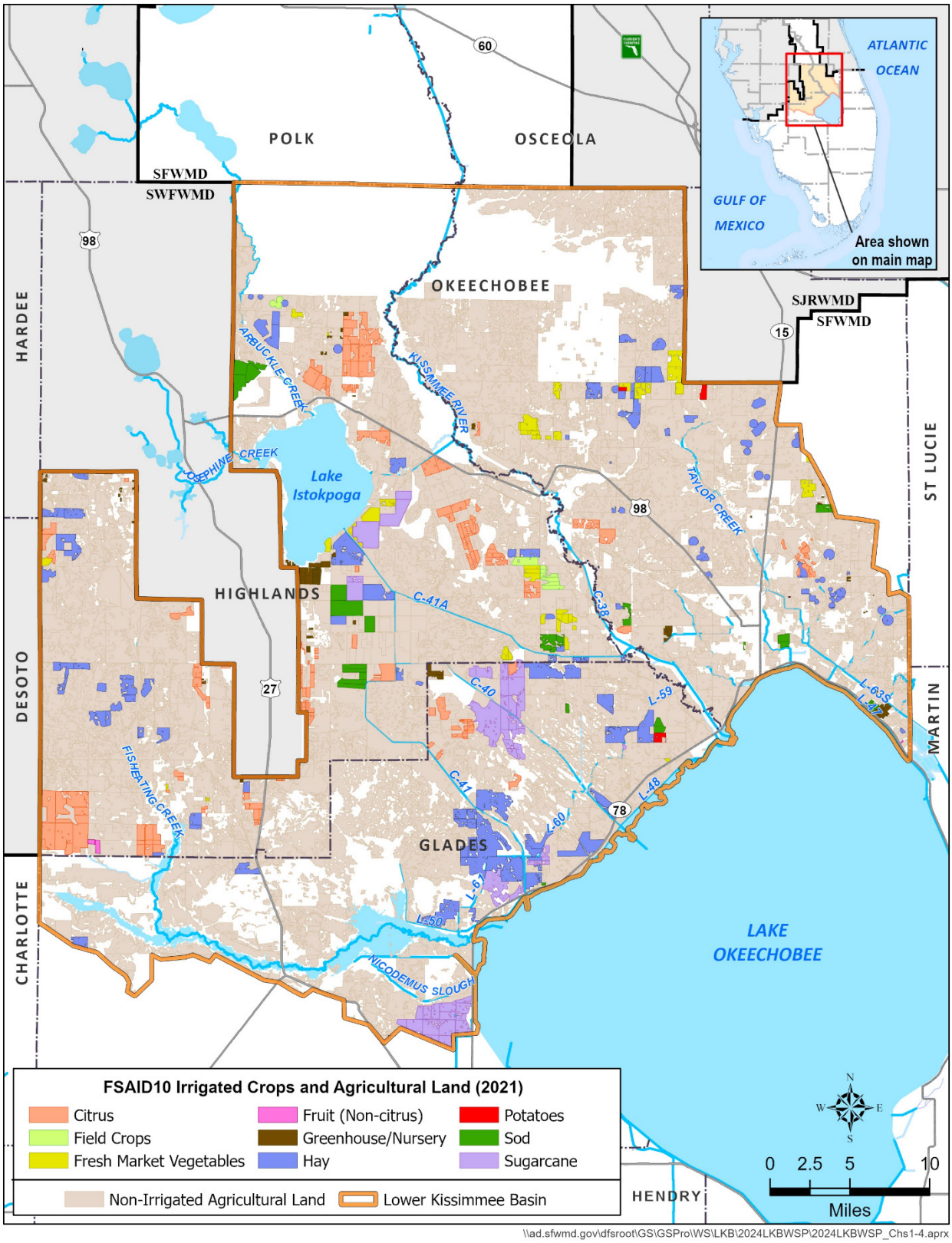



Figure 2-1. Agricultural irrigated land in the LKB Planning Area (Data from FDACS 2023).

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

| Crop | 2022 | | | 2045 | | |
|---|---|---|---|---|---|---|
| | Acres | Average Demand | 1-in-10-Year Demand | Acres | Average Demand | 1-in-10-Year Demand |
| Hay/Pasture | 39,062 | 74.54 | 88.37 | 28,175 | 53.76 | 63.64 |
| Citrus | 26,248 | 43.97 | 54.29 | 24,358 | 40.49 | 50.02 |
| Sugarcane | 17,589 | 38.44 | 45.13 | 17,589 | 38.44 | 45.13 |
| Sod | 7,754 | 18.71 | 21.71 | 7,349 | 17.65 | 20.46 |
| Fresh Market Vegetables | 7,960 | 16.25 | 18.94 | 7,847 | 16.09 | 18.75 |
| Greenhouse/Nursery[a] | 2,773 | 6.62 | 7.41 | 21,504 | 55.68 | 64.61 |
| Field Crops | 1,484 | 2.88 | 3.45 | 2,059 | 4.27 | 5.05 |
| Potatoes | 552 | 1.26 | 1.47 | 565 | 1.29 | 1.50 |
| Fruit (excluding citrus) | 245 | 0.59 | 0.65 | 315 | 0.70 | 0.78 |
| Livestock | N/A | 7.02 | 7.02 | N/A | 7.02 | 7.02 |
| Aquaculture | N/A | 0.76 | 0.76 | N/A | 0.76 | 0.76 |
| **LKB Planning Area Total** | **103,667** | **211.04** | **249.20** | **109,761** | **236.15** | **277.72** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] FSAID acreages were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Total irrigated AG acres in the LKB Planning Area are projected to remain relatively stable, increasing approximately 6% by 2045. Irrigated hay and pasture along with citrus are projected to lose acreage over the planning horizon, likely due to crop conversions. The largest change in irrigated acreage and demands is expected to occur in the greenhouse and nursery crop category, primarily due to projected land use changes approved in the staff report for the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan for the Brighton Reservation through 2030. The tribe anticipates additional land use changes and growth in demands beyond 2030, which may be approved in future work plan amendments. For the purposes of this 2024 LKB Plan Update, 2030 acreages from the work plan amendment were projected to remain stable through 2045. By 2045, greenhouse and nursery acreage is expected to grow to 21,504 acres, an increase of 18,731 acres. Water demands for the greenhouse and nursery crop category are projected to increase as well, reaching 55.68 mgd by 2045.

**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)**:
- Blueberries
- Strawberries

Overall, total AG gross water demands under average rainfall conditions in the LKB Planning Area are projected to increase 12%, from 211.04 mgd in 2022 to 236.15 mgd in 2045 (**Table 2-7**). These totals include demands from livestock and aquaculture in addition to the demands from crop irrigation shown in **Table 2-6**. Demands for livestock and aquaculture in the LKB Planning Area are estimated to be 7.02 mgd and 0.76 mgd, respectively, in 2022 and are projected to remain steady over the planning horizon.

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

| County[a] | Demand – Average Rainfall Conditions (mgd) | | | | | | | 2045 1-in-10 Year Demand |
|---|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 | |
| Glades[b,c] | 74.16 | 70.22 | 79.49 | 104.69 | 105.82 | 107.32 | 108.11 | 126.75 |
| Highlands | 106.51 | 105.79 | 104.69 | 101.76 | 100.81 | 100.23 | 99.40 | 117.78 |
| Okeechobee | 34.40 | 35.03 | 33.49 | 32.51 | 31.65 | 30.24 | 28.64 | 33.19 |
| **LKB Planning Area Total** | **215.07** | **211.04** | **217.67** | **238.96** | **238.28** | **237.79** | **236.15** | **277.72** |

AG = Agriculture; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida's Brighton Reservation is included in the calculations for Glades County.

[c] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# COMMERCIAL/INDUSTRIAL/INSTITUTIONAL

The CII water use category includes water demands at industrial and commercial facilities. CII demands only include self-supplied users and do not include industrial or commercial users that receive water from PS utilities; those users are included in the PS category. CII projections assume demands for average rainfall and 1-in-10-year drought conditions are the same and withdrawal demand is 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 2022 were 2.34 mgd, with projected growth resulting in demands of 2.85 mgd in 2045 (**Table 2-8**).

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

| County[a] | Demand – Average Rainfall Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades[b] | 0.53 | 0.58 | 0.73 | 0.87 | 1.01 | 1.01 | 1.01 |
| Highlands | 1.47 | 1.59 | 1.56 | 1.60 | 1.63 | 1.65 | 1.67 |
| Okeechobee | 0.15 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| **LKB Planning Area Total** | **2.15** | **2.34** | **2.46** | **2.64** | **2.81** | **2.83** | **2.85** |

CII = Commercial/Industrial/Institutional; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida's Brighton Reservation is included in the calculations for Glades County.

# LANDSCAPE/RECREATIONAL

The L/R water use category encompasses irrigation of golf courses and other landscaped areas, such as parks, sports fields, and homeowners' association common areas. Less than one-third of current L/R demands are met with surface water, and the remainder is met with groundwater. Reclaimed water is a major source for the irrigation of landscaped areas that are permitted and not permitted in other planning areas; however, reclaimed water currently is not used or projected to be used for these purposes within the LKB Planning Area. For L/R,

acreage and demands are disaggregated into landscape and golf course irrigation subcategories. Details regarding development of the L/R demands are provided in **Appendix A**.

Within the L/R category in 2022, an estimated 2,210 acres of land were attributed to landscape irrigation. These landscaped areas are expected to grow at the same rate as the local population through 2045. For the Seminole Tribe of Florida's Brighton Reservation, adjustments were made to reflect projected land use changes approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan through 2030. The tribe anticipates additional land use changes and growth in demands beyond 2030, which may be approved in future work plan amendments. For the purposes of this 2024 LKB Plan Update, 2030 acreages from the work plan amendment were projected to remain stable through 2045. In 2022, there were five golf courses irrigating 298 acres under water use permits in the LKB Planning Area (SFWMD 2024). Under average rainfall conditions, this land use required an estimated 0.53 mgd in 2022. Golf course acreage and associated water demands are projected to remain steady through 2045. Under average rainfall conditions, total estimated L/R gross water demands are projected to increase 140%, from 6.12 mgd in 2022 to 14.68 mgd in 2045 (**Table 2-9**).

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

| Land Use | Demand – Average Rainfall Conditions (mgd) | | | | | | | 2045 1-in-10-Year Demand |
|---|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 | |
| Glades County | | | | | | | | |
| Landscape[a] | 2.13 | 4.28 | 7.48 | 12.80 | 12.81 | 12.81 | 12.81 | 15.00 |
| Golf | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Glades County Total** | **2.13** | **4.28** | **7.48** | **12.80** | **12.81** | **12.81** | **12.81** | **15.00** |
| Highlands County | | | | | | | | |
| Landscape | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Golf | 0.41 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.51 |
| **Highlands County Total** | **0.47** | **0.55** | **0.55** | **0.55** | **0.55** | **0.55** | **0.55** | **0.58** |
| Okeechobee County | | | | | | | | |
| Landscape | 0.95 | 1.24 | 1.24 | 1.25 | 1.26 | 1.26 | 1.27 | 1.35 |
| Golf | 0.01 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| **Okeechobee County Total** | **0.96** | **1.29** | **1.29** | **1.30** | **1.31** | **1.31** | **1.32** | **1.40** |
| **LKB Planning Area Total** | | | | | | | | |
| **Landscape** | **3.14** | **5.59** | **8.79** | **14.12** | **14.14** | **14.14** | **14.15** | **16.42** |
| **Golf** | **0.42** | **0.53** | **0.53** | **0.53** | **0.53** | **0.53** | **0.53** | **0.56** |
| **LKB Planning Area Total** | **3.56** | **6.12** | **9.32** | **14.65** | **14.67** | **14.67** | **14.68** | **16.98** |

L/R = Landscape Recreational; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Landscape demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# 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.

The are no power demands estimated for 2022. The power needs of the LKB Planning Area currently are met by facilities located outside of the planning area. There are no new power generation facilities planned. Therefore, PG demands are projected to remain at 0.00 mgd through 2045.

# SUMMARY OF DEMAND ESTIMATES AND PROJECTIONS

Total gross water demands under average rainfall conditions in the LKB Planning Area are projected to be 260.55 mgd by 2045, a 16% increase from 2022 demands (225.44 mgd). **Table 2-10** provides 5-year incremental summaries of gross demands for all water use categories under average rainfall and 1-in-10-year drought conditions, respectively. Gross demands under average rainfall conditions are used to demonstrate projected trends, including the following key highlights:

- AG demands account for 94% of demands in the LKB Planning Area in 2022 and 91% of demands in 2045.
- The combined PS and DSS demands are expected to increase 16%, to 6.87 mgd, by 2045 with the projected population growth of 4,766 permanent residents.
- The demands for all remaining categories (L/R, CII, and PG) are projected to be 17.53 mgd, combined, in 2045.

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

| Water Use Category | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Demand – Average Rainfall Conditions (mgd) | | | | | | | |
| PS | 3.98 | 4.14 | 4.48 | 4.76 | 4.94 | 4.98 | 5.03 |
| DSS | 1.81 | 1.80 | 1.79 | 1.80 | 1.83 | 1.84 | 1.84 |
| AG[a] | 215.07 | 211.04 | 217.67 | 238.96 | 238.28 | 237.79 | 236.15 |
| CII | 2.15 | 2.34 | 2.46 | 2.64 | 2.81 | 2.83 | 2.85 |
| L[a]/R | 3.56 | 6.12 | 9.32 | 14.65 | 14.67 | 14.67 | 14.68 |
| PG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **LKB Planning Area Total** | **226.57** | **225.44** | **235.72** | **262.81** | **262.53** | **262.11** | **260.55** |
| Demand – 1-in-10-Year Drought Conditions (mgd) | | | | | | | |
| PS | 4.22 | 4.39 | 4.75 | 5.04 | 5.24 | 5.28 | 5.33 |
| DSS | 1.91 | 1.90 | 1.89 | 1.90 | 1.94 | 1.95 | 1.95 |
| AG[a] | 254.89 | 249.20 | 256.67 | 281.31 | 280.46 | 279.77 | 277.72 |
| CII | 2.15 | 2.34 | 2.46 | 2.64 | 2.81 | 2.83 | 2.85 |
| L[a]/R | 4.00 | 6.95 | 10.70 | 16.95 | 16.97 | 16.97 | 16.98 |
| PG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **LKB Planning Area Total** | **267.17** | **264.78** | **276.47** | **307.84** | **307.42** | **306.80** | **304.83** |

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

[a] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# DEMAND PROJECTIONS IN PERSPECTIVE

Demand projections presented in this 2024 LKB Plan Update are based on the best available information. **Table 2-11** shows the 2040 average gross demands projected in the *2019 Lower Kissimmee Basin Water Supply Plan Update* (2019 LKB Plan Update; SFWMD 2019) compared to the 2045 demands projected in this 2024 LKB Plan Update. The projection for 2045 in this 2024 LKB Plan Update is 1% higher than the estimated 2040 demand projected in the 2019 LKB Plan (SFWMD 2019). 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.

Table 2-11. Comparison of gross water demands under average rainfall conditions at the end of the respective planning horizons in the 2019 LKB Plan and this 2024 LKB Plan Update.

| Water Use Category | 2019 LKB Plan | 2024 LKB Plan Update | Percent Difference |
|---|---|---|---|
| | 2040 Demand (mgd) | 2045 Demand (mgd) | |
| Public Supply | 3.39 | 5.03 | 48% |
| Domestic Self-Supply | 2.28 | 1.84 | -19% |
| Agriculture | 248.14 | 236.15[a] | -5% |
| Commercial/Industrial/Institutional | 1.95 | 2.85 | 46% |
| Landscape/Recreational | 1.73 | 14.68[a] | 749% |
| Power Generation | 0.00 | 0.00 | 0% |
| **LKB Planning Area Total** | **257.49** | **260.55** | **1%** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# REFERENCES


FDACS. 2023. *Florida Statewide Agricultural Irrigation Demand Estimated Agricultural Water Demand, 2021-2045*. Prepared by The Balmoral Group, Winter Park, FL, for the Florida Department of Agriculture and Consumer Services, Tallahassee, FL. June 30, 2023.

Rayer, S. 2023. *Projections of Florida Population by County, 2025-2050, with Estimates for 2022*. Florida Population Studies, Volume 56, Bulletin 195. University of Florida, Bureau of Economic and Business Research, Gainesville, FL. April 2023.

SFWMD. 2019. *2019 Lower Kissimmee Basin Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. December 2019.

SFWMD. 2021. *2021–2024 Support Document for Water Supply Plan Updates.* South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2024. *South Florida Water Management District 2022 Estimated Water Use Report.* South Florida Water Management District, West Palm Beach, FL. February 2024.

Smajstrla, A.G. 1990. *Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) Model,* Version 5.5. Agricultural Engineering Department, University of Florida, Gainesville, FL.

United States Census Bureau. 2020. *2020 Decennial Census Redistricting Data* (Public Law 94-171). United States Department of Commerce, Washington, DC.

United States Department of Agriculture. 2024. *2022 Census of Agriculture: United States Summary and State Data*. Volume 1, Geographic Area Series, Part 51. United States Department of Agriculture, National Agricultural Statistics Service, Washington, DC. February 2024.

# 3

# Demand Management: Water Conservation

TOPICS

- Conservation Measures
- Conservation Programs
- Regulatory Initiatives
- Potential for Water Conservation Savings
- Summary of 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 7**) exceeds the increase in projected demands for the planning horizon (**Chapter 2**).

All water sources are finite; therefore, conservation and efficiency measures should be maximized, regardless of the 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 (e.g., lower water utility bills, lower costs to heat or move water) for most other users as well.

This chapter describes water conservation measures and programs available to water users in the Lower Kissimmee Basin (LKB) Planning Area of the South Florida Water Management District (SFWMD or District). Where applicable, an estimate of potential water savings achievable in the LKB Planning Area by 2045 is provided. Additional conservation information can be found in the *2021–2024 Support Document for the 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

Per capita water use demand reduction has occurred gradually across the country since the 1980s in part due to implemented conservation measures like irrigation restrictions, but also largely due to passive water savings. Passive savings 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 LKB Planning Area is for irrigation. Irrigation of food and other commodity crops is practiced by agricultural water users, while lawns and landscapes are irrigated by residential and commercial property owners. 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, while the volumes may be small, improvements to irrigation efficiency are still considered a target for conserving water used by urban water users.

Irrigation efficiency improvements can be achieved at single-family and multifamily 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 measures can be actions or hardware that improve water efficiency. Utilities and local governments are the primary entities that typically develop conservation programs. Because Public Supply (PS) makes up a small percentage of demand in the LKB Planning Area, other agencies may assume a leadership role in promoting water conservation at the local, regional, and state level.

The following subsections contain brief descriptions of established conservation programs that may be applicable to different water use categories. A single program or a combination of these can be part of a robust conservation plan. The design and selection of conservation programs depends on the target group and is directed by a conservation strategy created to effectively reach that group.

## Education, Outreach, and Marketing

Education, outreach, and marketing are essential to reducing water use and instilling a lasting conservation ethic in businesses and communities. Although water savings attributed to these campaigns are difficult to quantify, they are considered vital to a successful conservation program and behavioral adoption among users. Campaigns usually are designed to reach a specific user group or subgroup (e.g., residents, schools, commercial properties).

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

Funding programs, such as the ones described below, may be available to specific user groups and should be investigated by agencies, local governments, and end users for applicability to their target water use type.

### *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 (FDEP). CFP funding is considered annually during the SFWMD's budget development process. Since the *2019 Lower Kissimmee Basin Water Supply Plan Update* (SFWMD 2019), the SFWMD has provided approximately $2.5 million in water conservation funding for 43 projects Districtwide. However, no applications were submitted for projects in the LKB for funding consideration. The CFP is expected to continue although future funding levels are uncertain. 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 Fiscal Year (FY) 2018 through FY2023, EQUIP has provided funding for 54 irrigation efficiency projects in the LKB Planning Area. Seven projects were in Glades County, 34 in Highlands County, and 13 in Okeechobee County. These projects have affected 8,396 acres, 20,448 acres, and 2,160 acres in those counties, respectively. EQIP is expected to continue although future funding levels are uncertain.

### *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. These BMPs have been designed primarily to reduce negative impacts on water quality while maintaining or enhancing agricultural production. However, some BMPs (e.g., citrus, dairy, nurseries, sod, specialty fruit and nut crops, vegetable, and other crops) also improve water use efficiency and could reduce the amount of water needed to meet crop demands in average to wet years.

The Lake Okeechobee Basin Management Action Plan, which covers much of the LKB Planning Area, requires agriculture producers to implement FDACS-adopted BMPs or conduct water quality monitoring. FDACS also provides funding to assist producers with implementing BMPs. Agricultural producers may qualify to receive up to 90% of project costs related to water conservation and/or quality. All agricultural water users are encouraged to enroll in the FDACS BMP program. Additional information is available on the FDACS webpage (https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Best-Management-Practices).

## Other Programs

### *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 LKB Planning Area. Presently, the Highlands Soil and Water Conservation District serves Highlands County, the Palm Beach Soil and Water Conservation District serves Okeechobee County, and the Collier Soil and Water Conservation District serves Glades County. More information regarding the MIL program can be found on the FDACS webpage (https://www.fdacs.gov/Water/Mobile-Irrigation-Labs).

### *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). Three FAWN stations (Okeechobee, Palmdale, and Sebring) currently serve the LKB Planning Area. Additional information for these stations is available at https://fawn.ifas.ufl.edu/.

## 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 FDEP'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).

# REGULATORY INITIATIVES

From consumptive use permitting and local landscape ordinances to year-round irrigation conservation measures, rules and regulations have a role in advancing water use efficiency, promoting water conservation as the least-cost source of new water, sustaining limited water supplies, and protecting the natural environment. 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, Florida Administrative Code [F.A.C]) was adopted to help protect South Florida's water resources by addressing landscape irrigation. The rule limits landscape irrigation to 2 days per week in Okeechobee and Highlands counties and 3 days per week in Glades County. This rule applies to all users, with the exception of permitted agricultural operations, and to all sources of water (e.g., utility, lake, canal, well) except reclaimed water. Provisions in the rule for new landscaping and other situations exist, with some limitations. Local governments may adopt more stringent landscape irrigation ordinances based on local water demands, system limitations, or resource availability. More information on watering restrictions is available on the SFWMD's webpage (https://www.sfwmd.gov/community-residents/landscape-irrigation) and in the 2021–2024 Support Document (SFWMD 2021).

# POTENTIAL FOR WATER CONSERVATION SAVINGS

## Agriculture

Agriculture (AG) is the largest water use category in the LKB Planning Area, accounting for 236.15 million gallons per day (mgd), or 91% of the total 2045 projected demand for the region. Therefore, local and regional efforts to increase water conservation implementation in this planning area should focus on this user group, which includes row and field crops, aquaculture, orchards, nurseries, and livestock operations.

The amount of potential AG conservation savings in the LKB Planning Area was determined using the Florida Statewide Agricultural Irrigation Demand (FSAID) geodatabase, which is an online user interface available on the FDACS webpage (https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Water-Supply-Planning). Estimated efficiency improvement (i.e., conservation estimate) is one of the parameters calculated by the FSAID model, and the spatially based data are available for water management district planning basins. According to the 2021–2045 FSAID report (FSAID X), "on a per acre basis, Florida farmers are projected to increase their irrigation efficiency by about 0.25% per year" (FDACS 2023).

The FSAID statewide methodology for calculating the amount of potential AG conservation savings is more fully described in Appendix E of the FSAID X report (FDACS 2023), but generally is based on the United States Department of Agriculture's (USDA) Irrigation and Water Management (IWM) Survey and the MIL actual water savings data. AG water use is based on several site-specific parameters, including crop type, acreage, soil type, evapotranspiration, and rainfall. Conservation savings can be achieved through more efficient irrigation and planting methods as well as other irrigation management strategies. The selection of new irrigation systems and management strategies depends on crop type, water source, food safety requirements, and water availability. Financial incentives may be necessary to help agricultural operations transition to more efficient irrigation systems. The volume of water that could be conserved for an individual project varies depending on the number and magnitude of parameters targeted for change. Using the FSAID statewide methodology, the accuracy of the projected conservation savings for a specific water supply planning area depends on the region's similarities to the USDA IWM survey data (e.g., crop mix, existing irrigation systems, soil types, economic feasibility, financial incentives).

From 1978 to 2018, agricultural operations in Florida that participated in the survey reduced the amount of water used by an average of 6,600 gallons per acre per year, primarily based on irrigation system changes. From 2003 to 2018, the survey data show efficiency improvements of approximately 5,200 gallons per acre per year, due primarily to changes in scheduling and sensor-based automation. "This is reduced to 3,500 gallons/acre/year for the projection period of 2021-2045. Two exponential trends from the IWM dataset were used to estimate future irrigation efficiency improvement. The trend from 1978-2018 is used for currently irrigated fields that are not drip or micro-sprinkler irrigated, and the more conservative trend from 2003-2018 is used for newly irrigated fields or those irrigated with drip or micro-sprinkler" (FDACS 2023).

The total savings calculated by the FSAID model for any given year depends on the crops produced, the acreage of each crop, and the irrigation systems employed, as projected to exist in that year. Because these variables change over the planning horizon (2022 to 2045), the projected savings also change and may be nonlinear. Based on data available in 2021–2045 (FSAID X), the estimated conservation potential for the LKB Planning Area in 2045 is 6.99 mgd (1.39 mgd in Glades County, 4.15 mgd in Highlands County, and 1.45 mgd in Okeechobee County). Future versions of the FSAID report may include different estimates of conservation potential based on new variables and projections.

### Water Conservation Potential for Other Water Use Categories

Florida-Friendly Landscaping

All nonagricultural water use categories combined, including PS, Domestic Self-Supply (DSS), Landscape/Recreational (L/R), and Commercial/Industrial/Institutional (CII), are projected to account for 24.40 mgd of demand in 2045, just 9% of all water use in the LKB Planning Area. Of this, L/R accounts for the highest portion (14.68 mgd; 5.6%) of use. PS accounts for the second highest portion (5.03 mgd; 1.9%). DSS demands are 1.84 mgd or 0.7% of total use. The 2045 projected PS and DSS demands are atypically low compared to the other SFWMD planning areas. Additionally, the per capita use rate for residential users is much lower compared to other similar users in the District, presumably due to less residential use of potable water for lawn and landscape irrigation. The CII use category accounts for 2.85 mgd (1.1%). Since there are no power generation sites located in the LKB Planning Area, there are no demands for this water use category. Given the relatively low nonagricultural water demands and data availability, a potential water savings of 0.10 mgd was assumed for these water use categories. This assumes a conservative volumetric savings of 10% (of demand) at a 10% participation rate.

## SUMMARY OF WATER CONSERVATION

AG is the largest water use category in the LKB Planning Area. FDACS, through the FSAID X model, projected 6.99 mgd of water could be conserved in 2045 through irrigation efficiency and scheduling improvements. Greater conservation savings may be possible if additional measures are implemented or if increased participation rates are realized, which can be facilitated through education programs and other assistance opportunities. Agricultural operations are encouraged to take advantage of the FDACS BMP program as well as funding opportunities (through EQIP or CFP), site audits via MILs, and FAWN to make weather-based irrigation decisions. Water use by all nonagricultural water use categories in the LKB Planning Area is atypically low compared to other SFWMD planning areas. Savings for these users have been estimated, conservatively, to be 0.10 mgd.

Local, regional, and state government agencies as well as utilities in the LKB Planning Area can develop conservation strategies to encourage and assist water users to improve water use efficiency. Because utilities typically promote conservation only within their service

areas, government agencies should consider conducting educational outreach to promote and incentivize conservation among DSS users. Cost-share funding may be available to local governments and, in some cases, directly to large users. Individual users are encouraged to seek out funding and other resources to improve water use efficiency and reduce operational expenses.

SFWMD staff are available to assist conservation program developers in the LKB Planning Area with technical support, collaborative program implementation, ordinance review, long-term demand management planning, and funding assistance via the District's CFP. In addition to the programs and strategies discussed in this chapter, conservation program resources are discussed further in the 2021–2024 Support Document (SFWMD 2021).

# REFERENCES


Chesnutt, T.W., D. Pekelney, and J.M. Spacht. 2018. *Lower Water Bills: The City of Los Angeles Shows How Water Conservation and Efficient Water Rates Produce Affordable and Sustainable Use*. California Water Efficiency Partnership, Sacramento, CA, and Alliance for Water Efficiency, Chicago, IL.

FDACS. 2023. *Florida Statewide Agricultural Irrigation Demand Estimated Agricultural Water Demand, 2021-2045*. Prepared by the Balmoral Group for Florida Department of Agricultural and Consumer Services, Tallahassee, FL. June 2023.

Feinglas, S., C. Gray, and P. Mayer. 2013. *Conservation Limits Rate Increases for a Colorado Utility*. Alliance for Water Efficiency, Chicago, IL.

Golf Course Superintendents Association of America. 2021. *Best Management Practices for the Enhancement of Environmental Quality on Florida Golf Courses*. Published in association with the University of Florida and the Florida Department of Environment Protection. Florida Chapter of the Golf Course Superintendents Association of America, Jensen Beach, FL. September 2021.

SFWMD. 2008. *Water Conservation: A Comprehensive Program for South Florida*. South Florida Water Management District, West Palm Beach, FL. September 2008.

SFWMD. 2013. *Water Efficiency and Self-Conducted Water Audits at Commercial and Institutional Facilities, A Guide for Facility Managers*. South Florida Water Management District, West Palm Beach, FL. July 2013.

SFWMD. 2019. *2019 Lower Kissimmee Basin Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. December 2019.

SFWMD. 2021. *2021–2024 Support Document for the Water Supply Plan Updates*. South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2022. *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District.* South Florida Water Management District, West Palm Beach, FL. June 2022.

UF/IFAS. 2024. *Florida Automated Weather Network*. University of Florida, Institute of Food and Agricultural Sciences Extension, Gainesville, FL. Available online at https://fawn.ifas.ufl.edu.

# 4

# Water Resource Protection

This chapter provides an overview of protections afforded to water resources in the Lower Kissimmee Basin (LKB) Planning Area of the South Florida Water Management District (SFWMD or District) through statutory and regulatory criteria. The ability to meet water demands described in **Chapter 2** largely depends on the future availability of water resources. Understanding the relationship between projected water demands, water sources, and limitations imposed on withdrawals is critical to water supply planning.

**TOPICS**

- Regulatory Protection of Water Resources
- Summary of Water Resource Protection

The LKB Planning Area relies on surface water from Lake Istokpoga and Lake Okeechobee and their connected canals, the Kissimmee River, and fresh groundwater from the surficial and Floridan aquifer systems as the primary water sources for urban, agricultural, and industrial uses. However, rules have been adopted for Lake Istokpoga, the Indian Prairie Canal System, the Kissimmee River, and Lake Okeechobee that limit new or increased allocations beyond existing volumes. Many water users in the region have constructed wells to use groundwater as a supplemental water supply to surface water.

**NOTE**

MFLs and prevention and recovery strategies for Lake Okeechobee and the Lower West Coast aquifers affect portions of the LKB Planning Area but are included in the *2023–2024 Lower East Coast Water Supply Plan Update* (SFWMD 2024) and *2022 Lower West Coast Water Supply Plan Update* (SFWMD 2022a), respectively.

To further protect water resources in the LKB Planning Area, the SFWMD adopted minimum flows and minimum water levels (MFLs) for Lake Istokpoga, Lake Okeechobee, and the Lower West Coast aquifers between 2001 and 2006. The water reservations rule for the Kissimmee River and Chain of Lakes was adopted in 2021 that identify and reserve from consumptive use the water needed to protect fish and wildlife in the Upper Chain of Lakes, Headwaters Revitalization Lakes, and the Kissimmee River and floodplain (Rule 40E-10.071, Florida Administrative Code [F.A.C.]). Restricted allocation areas (RAAs) were established for the Lake Istokpoga/Indian Prairie Canal System in 1981 and the Lake Okeechobee Service Area (LOSA) in 2008. See **Figure 4-1** for MFLs, water reservations, and RAA's in the LKB Planning Area.

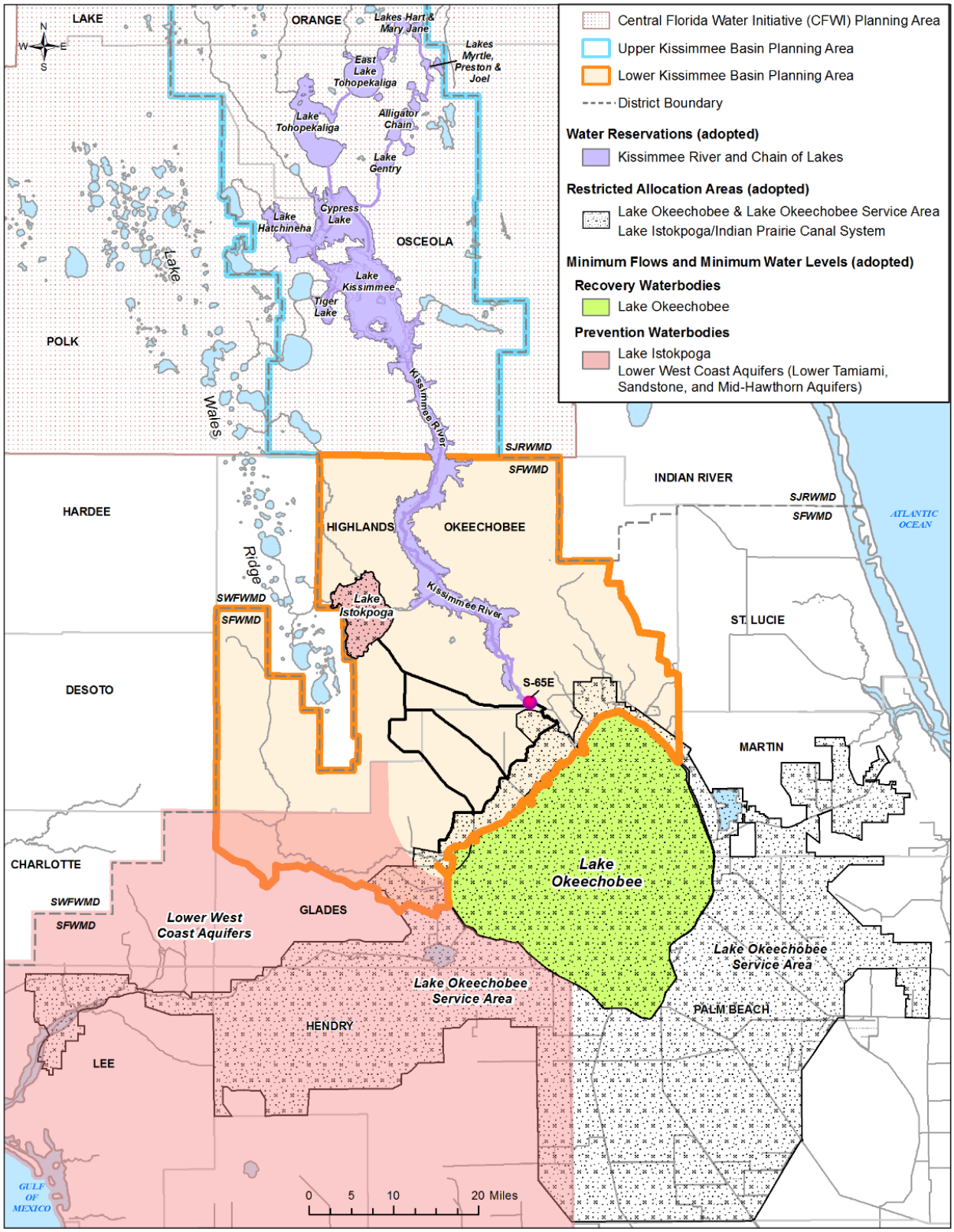



Figure 4-1. Adopted minimum flows and minimum water levels, restricted allocation areas, and water reservations in the LKB Planning Area.

# REGULATORY PROTECTION OF WATER RESOURCES

The intent of Chapter 373, Florida Statutes (F.S.), is to promote the availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems (Section 373.016(3)(d), F.S.). The SFWMD developed water resource protection standards consistent with legislative direction that are implemented to prevent various levels of harm (no harm, harm, significant harm, and serious harm). Each standard plays a role in achieving sustainable water resources. For instance, programs regulating water use permitting must prevent harm to the water resource, including related natural systems. **Figure 4-2** represents the conceptual relationship among water resource protection standards, associated conditions, and water shortage severity. Additional details about water resource protection tools with a brief description of the function of each tool and the respective statutory and regulatory rule sections can be found in the *2021–2024 Support Document for the Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021).

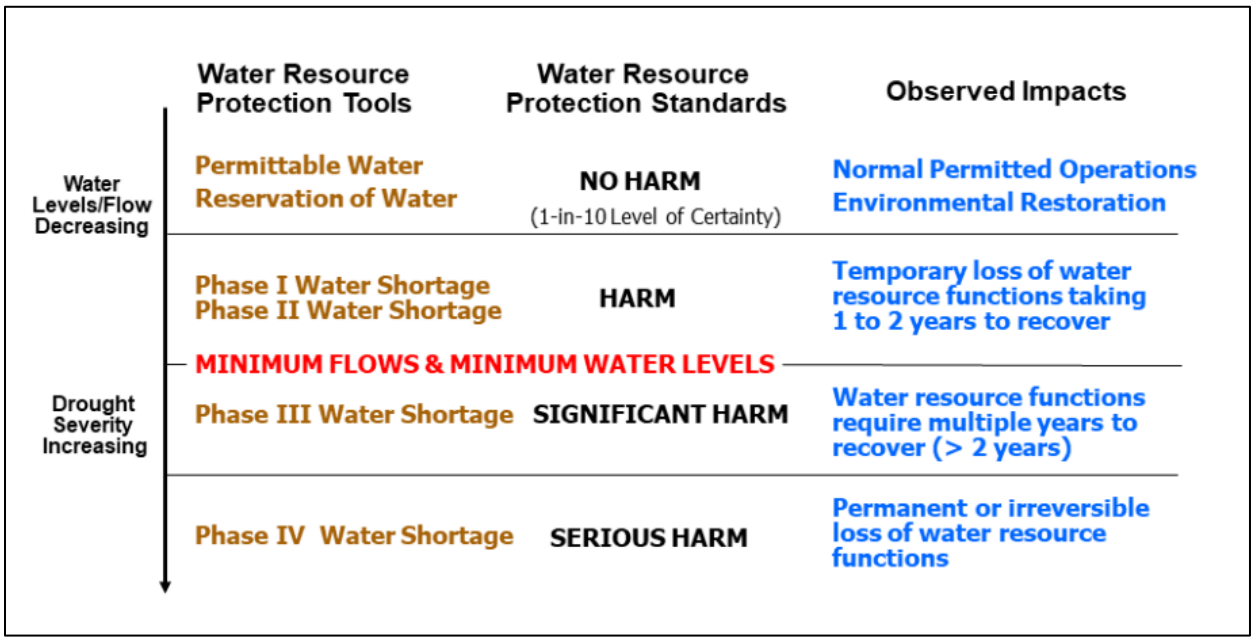



Figure 4-2. Conceptual relationship among water resource protection standards at various levels of water resource harm (Modified from Rule 40E-8.421, Florida Administrative Code).

## Water Use Permitting

Unless exempt by statute or identified in the Water Rights Compact of 1987, the right to use water is authorized by permit, which allows for the use of water for reasonable-beneficial uses while protecting natural systems from harm. Water use permit applicants must provide assurances that the proposed water use 1) is reasonable-beneficial, 2) will not interfere with any existing legal use of water, and 3) is consistent with the public interest as required by Section 373.223(1), F.S. The proposed water use must comply with the water resource protection criteria (see Rule 40E-2.301, F.A.C., and the *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District* [Applicant's Handbook; SFWMD 2022b]), including 1) implementation criteria for regulatory components of an adopted MFL prevention or recovery strategy, 2) implementation criteria for water reservations, and 3) RAA criteria.

**INFO**

The Seminole Tribe of Florida has a surface water entitlement pursuant to the 1987 Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Public Law 100-228, 101 Statute 1556, and Chapter 87-292, Laws of Florida, as codified in Section 285.165, F.S.).

The LOSA RAA criteria adopted by the District in Section 3.2.1F 1-5 of the Applicant's Handbook (SFWMD 2022) for LOSA and the water shortage restrictions as described in Chapter 40E-21 F.A.C. comprise the regulatory component of the Lake Okeechobee MFL recovery strategy. Applications that meet the criteria contained in Section 3.2.1F 1-5 of the Applicant's Handbook satisfy the minimum flow and level implementation strategy. While a portion of LOSA is within the LKB Planning Area, the entire LOSA is addressed in the Lower East Coast water supply plan updates (last updated in 2023–2024). Additional information about water use permitting can be found in the *2021–2024 Support Document for the Water Supply Plan Updates* (2021-2024 Support Document; SFWMD 2021). Additional information about water use permitting can be found in the 2021–2024 Support Document (SFWMD 2021). MFL, water reservation, and RAA status updates are provided annually in Chapter 3 of the *South Florida Environmental Report – Volume II*, available at http://www.sfwmd.gov/sfer.

## Minimum Flows and Minimum Water Levels

MFL criteria are the minimum flows or minimum water levels at which water resources, or the ecology of the area, would experience significant harm from further withdrawals. MFL criteria are applied individually to affected water bodies and define the minimum flow or minimum water level for surface water bodies, or minimum water level for groundwater in aquifers. Adopted MFLs in the SFWMD are contained in Chapter 40E-8, F.A.C. The SFWMD adopts a prevention or recovery strategy

when an MFL is initially adopted (Rule 40E-8.421, F.A.C.) and, if needed, when an MFL is reevaluated or revised. The SFWMD fulfills its statutory obligation to identify key water bodies for which MFLs should be developed or reevaluated by providing a Priority Water Body List and Schedule in Chapter 3 of the annual updates to the *South Florida Environmental Report – Volume II* per Section 373.042(3), F.S. More information about MFLs, including prevention and recovery strategies, is provided in the 2021–2024 Support Document (SFWMD 2021). Additional information about MFLs can be found on the SFWMD webpage (http://www.sfwmd.gov/mfls) and in Chapter 40E-8, F.A.C.

MFLs and associated prevention or recovery strategies have been adopted for three water bodies in the LKB Planning Area: Lake Istokpoga, Lake Okeechobee, and the Lower West Coast aquifers (**Figure 4-1**). The adopted MFL and prevention strategy for Lake Istokpoga is discussed in this plan update. MFLs and prevention and recovery strategies for Lake Okeechobee and the Lower West Coast aquifers affect portions of the LKB Planning Area but are included in the *2023–2024 Lower East Coast Water Supply Plan Update* (SFWMD 2024) and *2022 Lower West Coast Water Supply Plan Update* (SFWMD 2022a), respectively.

## *Lake Istokpoga*

Lake Istokpoga covers 44 square miles, making it the fifth largest lake in Florida (**Figure 4-3**). The lake is shallow, averaging 4 to 6 feet in depth. It is fed by two creeks, Arbuckle Creek and Josephine Creek, and high-water levels are managed through discharges south to Lake Okeechobee through the Indian Prairie Canal System (**Figure 4-3**), pursuant to the regulation schedule (**Figure 4-5**) set by the United States Army Corps of Engineers (USACE).

Lake Istokpoga

An MFL of 36.5 feet National Geodetic Vertical Datum of 1929 (NGVD29) was adopted for the lake in 2006 described in Rule 40E-8.351, F.A.C. At the time of MFL adoption, Lake Istokpoga was meeting the MFL, and no violations were anticipated to occur in the next 20 years. Therefore, a prevention strategy was adopted for it simultaneously with MFL adoption in Subsection 40E-8.421(7), F.A.C.

More information on the Lake Istokpoga MFL and prevention strategy is provided in **Appendix C**. Information on all MFLs and prevention and recovery strategies that have been adopted in the LKB Planning Area and throughout the District can be found and on the SFWMD webpage (http://www.sfwmd.gov/mfls) and in Chapter 40E-8, F.A.C.

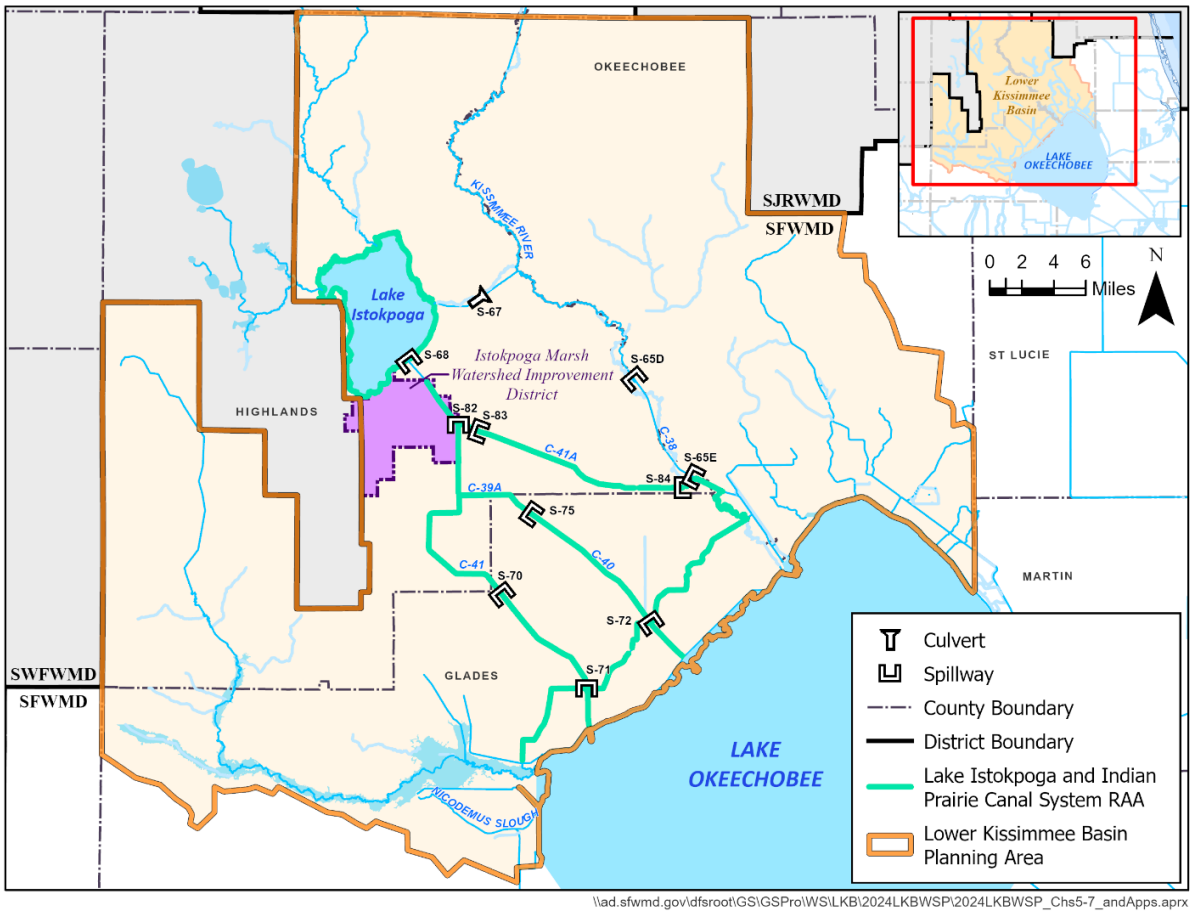



Figure 4-3. Location of Lake Istokpoga relative to the Indian Prairie Canal System and Lake Okeechobee, and the Lake Istokpoga/Indian Prairie Canal System restricted allocation area.

## Water Reservations

Section 373.709, F.S., requires that regional water supply plans include reservations of water for the planning area, which are defined and adopted by rule. A water reservation sets aside a volume of water for the protection of fish and wildlife or public health and safety. Water reservations can be developed based on existing water availability or in consideration of future water supplies made available by water resource development projects. Reserved volumes of water are unavailable for allocation to consumptive uses (Section 373.223, F.S.). Additionally, water reservations may be components of MFL prevention or recovery strategies or be adopted to protect water for Comprehensive Everglades Restoration Plan (CERP) projects prior to their construction.

Adopted water reservations in the SFWMD are contained in Chapter 40E-10, F.A.C. This F.A.C. chapter defines the quantity, location, and timing of waters reserved from allocation for the protection of fish and wildlife or public health and safety for all reservation water bodies in the SFWMD, pursuant to Section 373.223(4), F.S. The water reservations rule for the Kissimmee River and Chain of Lakes was adopted in 2021 for the protection of fish and wildlife in the Upper Chain of Lakes, Headwaters Revitalization Lakes, and the Kissimmee River and floodplain (**Figures 4-1** and **4-4**). More information about water reservations is provided in the 2021–2024 Support Document (SFWMD 2021).

## *Kissimmee River and Chain of Lakes*

Snail Kite (*Rostrhamus sociabilis*) with snail

Maintaining the availability of water is a key component of environmental restoration and management of the Kissimmee River and Chain of Lakes as well as Lake Okeechobee and the Everglades, for which the Kissimmee River and Chain of Lakes provide headwaters. The Kissimmee River and Chain of Lakes provide approximately 50% of the surface water flow into Lake Okeechobee (SFWMD et al. 2011). Together, these remarkable Central Florida water resources shelter 178 species of fish, wetland-dependent wading birds, amphibians, reptiles, and mammals. The LKB Planning Area contains a nationally recognized largemouth bass (*Micropterus salmoides*) fishery, nesting colonies of endangered Wood Storks (*Mycteria americana*) and Snail Kites (*Rostrhamus sociabilis*), and one of the largest concentrations of nesting Bald Eagles (*Haliaeetus leucocephalus*) in the United States (SFWMD 2015).

**NOTE**

The Kissimmee River and Chain of Lakes water reservations (Rule 40E-10.071, F.A.C.) support the Kissimmee River Restoration Project constructed through a 50-50 cost-share agreement between the SFWMD and USACE. The Kissimmee River Restoration Project restored a portion of the historical channel and flows of the Kissimmee River and floodplain to those existing prior to river channelization in the 1960s (USACE 2019).

The Kissimmee River and Chain of Lakes Water Reservations area is 172,500 acres and spans portions of the LKB Planning Area as well as the Upper Kissimmee Basin Planning Area (part of the Central Florida Water Initiative [CFWI]) (**Figure 4-4**). The Kissimmee Chain of Lakes (Upper Chain of Lakes and the Headwaters Revitalization Lakes) are the primary source of water for the Kissimmee River. The Kissimmee River downstream of the S-65A Structure is within the LKB Planning Area.

As shown in **Figure 4-4**, there are three main groupings of water bodies included in the Kissimmee River and Chain of Lakes water reservations: Upper Chain of Lakes, Headwaters Revitalization Lakes, and the Kissimmee River. Within these three groupings are many lakes, canals, floodplains, and remnant channels. These water reservations, which protect the volume of water needed by fish and wildlife under restored conditions, include 1) all surface water in the Kissimmee River and floodplain and in the Headwaters Revitalization Lakes, 2) quantities of surface water up to specified stages in the Upper Chain of Lakes, and 3) groundwater in the surficial aquifer system contributing to the water reservation water bodies. The SFWMD's water use permitting staff use the additional water resource protection criteria in Section 3.11.5 of the Applicant's Handbook (SFWMD 2022b) to ensure future consumptive uses will not withdraw or impact reserved water supplies in the Kissimmee River and Chain of Lakes. More information on the Kissimmee River and Chain of Lakes water reservations and all adopted water reservations in the District can be found on the SFWMD webpage http://www.sfwmd.gov/reservations and in Chapter 40E-10, F.A.C.

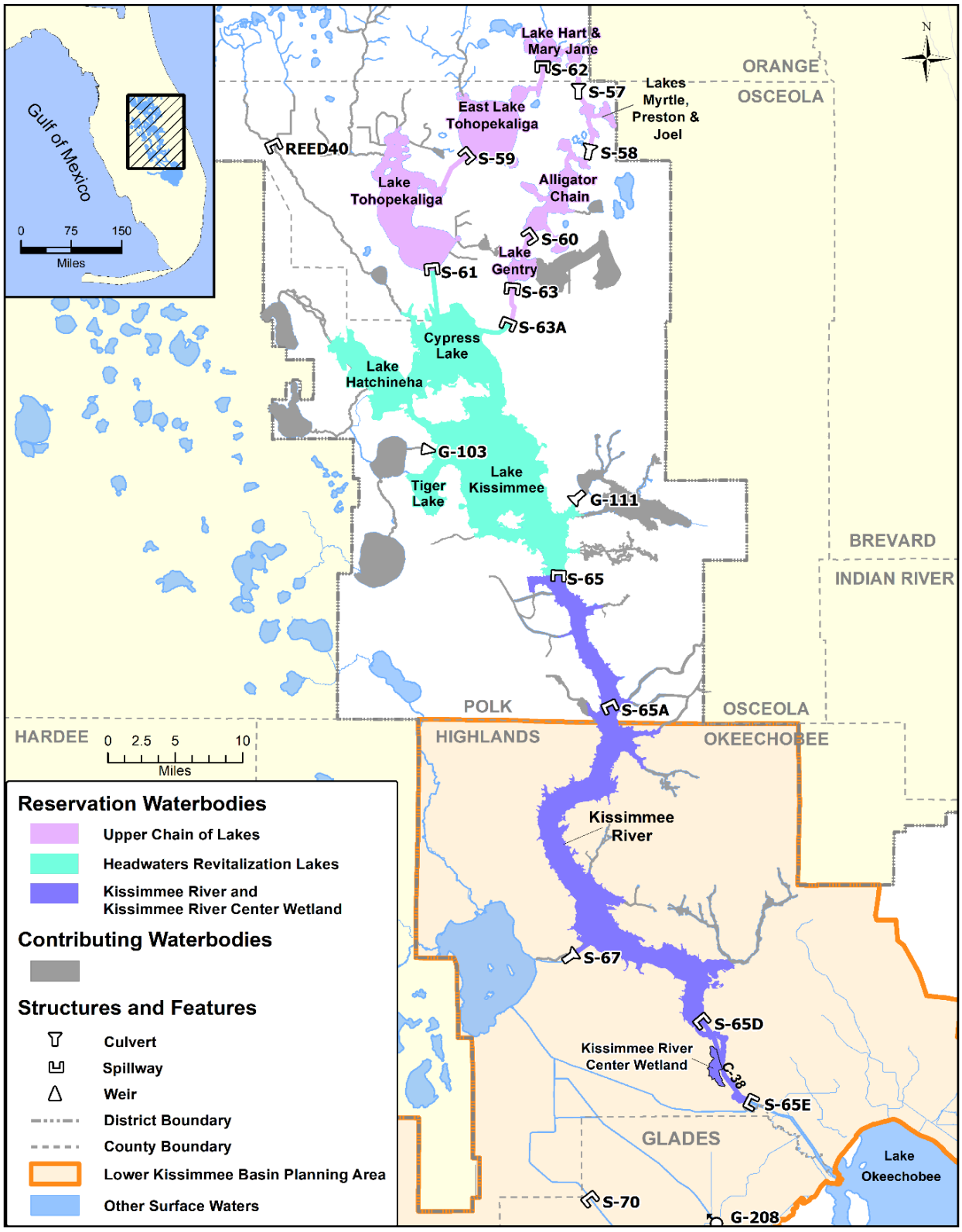



Figure 4-4. Kissimmee River and Chain of Lakes water reservations and contributing water bodies.

## Restricted Allocation Areas

RAAs are defined geographic areas where water allocations from water resources (e.g., lakes, rivers, wetlands, canals, aquifers) are limited. Additional allocations beyond the established limitation are restricted or prohibited. RAAs are established for a variety of reasons, including 1) where there is a lack of available water to meet the projected needs of a region, 2) to protect water for natural systems and future restoration projects (e.g., CERP), 3) as part of MFL prevention or recovery strategies, and 4) to prevent interference among existing legal users. RAA criteria are listed in Section 3.2.1 of the Applicant's Handbook (SFWMD 2022b), which is incorporated by reference in Rule 40E-2.091, F.A.C. **Figure 4-1** shows the locations of established RAAs wholly or partially within the LKB Planning Area.

### *Lake Istokpoga/Indian Prairie Canal System*

The water level in Lake Istokpoga is controlled by operation of water control structures S-67 and S-68 (**Figure 4-2**) in accordance with the Lake Istokpoga Regulation Schedule adopted by the USACE and implemented by the SFWMD (**Figure 4-5**). Lake Istokpoga and the Indian Prairie Canal System are primary water sources for meeting agricultural irrigation demand in the Indian Prairie Basin and the water entitlement for the Seminole Tribe of Florida's Brighton Reservation. During normal rainfall years, releases from the lake can be made for flood control, and sufficient water is available to meet water demand. However, during drought years, releases from the lake become infrequent, and efforts are made to maintain the lake's minimum operating schedule through declared water shortages. Issues of water availability generally have occurred when a late summer drought has caused rainfall to be insufficient to maintain the lake above Zone C of the regulation schedule (**Figure 4-5**).

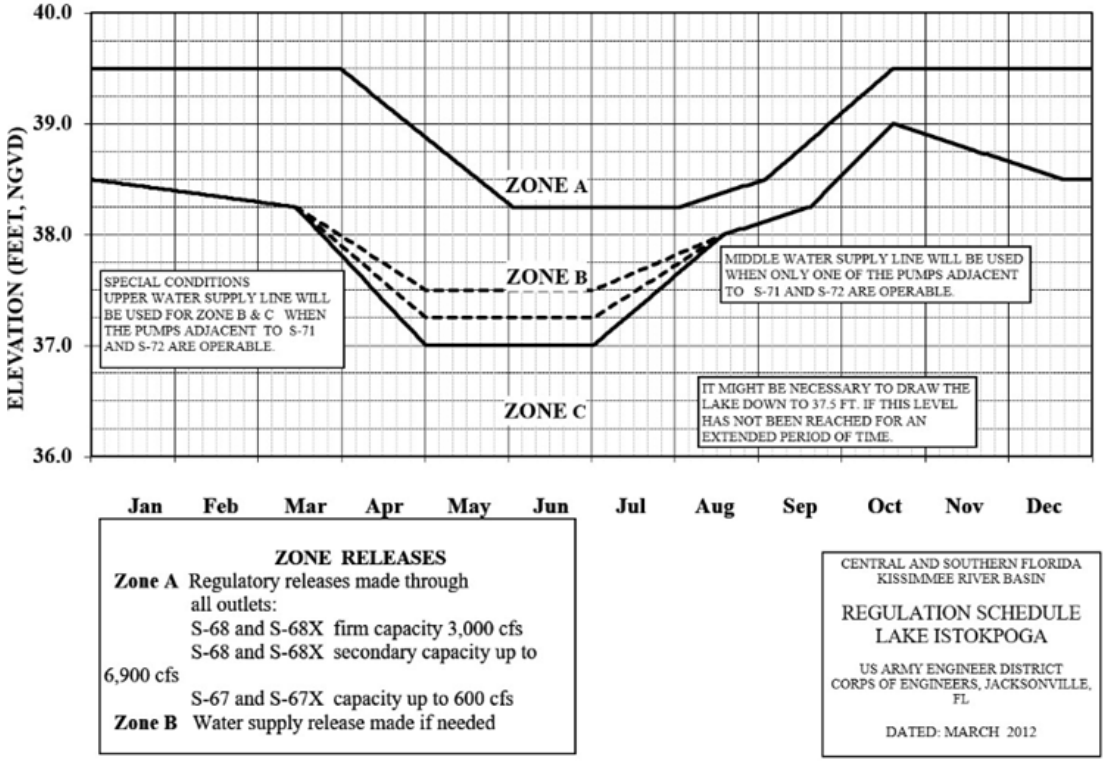



Figure 4-5. Lake Istokpoga Regulation Schedule.

The District Governing Board adopted RAA criteria in 1981 for the Lake Istokpoga/Indian Prairie Canal System (Section 3.2.1.A of the Applicant's Handbook [SFWMD 2022b]). Additional surface water allocations above existing allocations from these waterbodies, as well as increased pump capacities, are prohibited under this RAA. The RAA and District operations minimize the potential for District-declared water shortages in the Indian Prairie Basin during periods of drought and ensures sufficient water for existing allocations and delivery to the Brighton Reservation pursuant to the 1987 Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Public Law 100-228, 101 Statute 1566, and Chapter 87-292, Laws of Florida, as codified in Section 285.165, F.S.) and implementing agreements, as discussed below. Further information about the RAAs established in the LKB Planning Area can be found in the Applicant's Handbook (SFWMD 2022b).

### *Lake Okeechobee Service Area*

In 2008, the SFWMD adopted RAA criteria for LOSA, which spans more than 1.8 million acres (Section 3.2.1.F of the Applicant's Handbook [SFWMD 2022b]). The criteria limit surface water withdrawals from Lake Okeechobee and all surface water hydraulically connected to the lake, such as the C-43 Canal, the C-44 Canal, and secondary canal systems that receive Lake Okeechobee water for water supply purposes via gravity flow or pump. Net increases in the volume of surface water withdrawn from the RAA waterbodies are prohibited over that resulting from base condition water uses occurring from April 1, 2001 to January 1, 2008. Allocations over the base condition water use are only allowed through sources detailed in Section 3.2.1.F.3.c of the Applicant's Handbook (SFWMD 2022b), such as certified project water, implementation of offsets, alternative water supply, available and unassigned base condition water use, or base condition water use that was terminated or reduced after January 1, 2008. The LOSA RAA has been and will continue to be part of the MFL recovery strategy for Lake Okeechobee. While a portion of LOSA is within the LKB Planning Area, the entire LOSA is addressed in the Lower East Coast water supply plan updates (last updated in 2023–2024).

## Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the South Florida Water Management District

The Seminole Tribe of Florida has a surface water entitlement pursuant to the 1987 Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Public Law 100-228, 101 Statute 1566, and Chapter 87-292, Laws of Florida, as codified in Section 285.165, F.S.). Generally, the tribe is entitled to 15% of the total amount of water that can be withdrawn from SFWMD canals and borrow canals by all users from surface water within the Indian Prairie Basin, calculated by the SFWMD on a monthly basis.

The parties executed subsequent documents addressing the entitlement. The *Agreement Between the SFWMD and the Seminole Tribe of Florida and Water Supply Plan for the Brighton Reservation Implementing Section VI.B of the Compact and Subparagraph 3.3.32.A.3 of the Criteria Manual* (Agreement No. C-4121) describes the optimal levels for various canal stretches that would allow the tribe to withdraw the entitlement and outlines an operational plan for releases from Lake Istokpoga or Lake Okeechobee during normal and water shortage conditions. The *Agreement between the South Florida Water Management District and the Seminole Tribe Providing for Water Quality, Water Supply, and Flood Control Plans for the Big*

*Cypress Seminole Indian Reservations and the Brighton Seminole Indian Reservation, Implementing Sections V.C. and VI.D. of the Water Rights Compact* (usually referred to as the 1996 Agreement) addresses the SFWMD's mitigation responsibilities regarding impacts to the Seminole Tribe of Florida's ability to obtain surface water supplies at the Brighton Reservation.

## Other Water Resource Protection Constraints

As part of this *2024 Lower Kissimmee Basin Water Supply Plan Update*, other constraints, and potential constraints in areas outside but adjacent to the LKB Planning Area were considered by the SFWMD in its long-term water supply planning effort. These areas are hydrologically and/or geologically connected to the LKB Planning Area through surface waters or underlying aquifers. Adverse impacts could include lowering water levels in connected surface water bodies through direct surface water withdrawals or lowering water levels in aquifers through groundwater withdrawals, thereby affecting water levels in surface water bodies connected to the aquifers. Of particular interest are water resources in adjacent areas for which constraints have been established or proposed, such as MFL water bodies with prevention or recovery strategies, water reservation water bodies, and water use caution areas. Areas adjacent to the LKB Planning Area with perhaps the greatest potential for water resource impacts from LKB Planning Area's water demand include the following:

- The CFWI Planning Area, north of the LKB Planning Area
- The southern portion of the St. Johns River Water Management District (SJRWMD), northeast of the LKB Planning Area
- The Southern Water Use Caution Area (SWUCA) within the Southwest Florida Water Management District (SWFWMD), west of the LKB Planning Area and containing Lake Wales Ridge

The following provides an overview of the constraints and potential constraints in these three areas, which were identified with the assistance and coordination of the SJRWMD and SWFWMD.

### *CFWI Planning Area*

The CFWI Planning Area encompasses parts of the SFWMD, SJRWMD, and SWFWMD where the boundaries meet. The CFWI Planning Area covers five counties, including Orange, Osceola, Polk, Seminole, and southern Lake. The SFWMD's Upper Kissimmee Basin (UKB) Planning Area is within the boundaries of the CFWI. The UKB adjoins the northern border of the LKB Planning Area (**Figure 4-7**) and is connected hydrologically to the LKB Planning Area through surface waters and underlying aquifers. The northern portion of the Kissimmee River and Chain of Lakes water reservations is located in the Upper Kissimmee Basin Planning Area (**Figure 4-4**). The water reservations ensure future consumptive uses will not withdraw or impact reserved water supplies in the Kissimmee River and Chain of Lakes and adjacent areas.

### *Southern SJRWMD*

The southern part of the SJRWMD adjoins the northern and eastern borders of the LKB Planning Area in Okeechobee County (**Figure 4-6**). The SJRWMD identified three water resources in this area with the potential for impacts from LKB Planning Area water demand over the 2045 planning horizon: Blue Cypress Conservation Area, Blue Cypress Water Management Area within the Blue Cypress Conservation Area, and Fort Drum Marsh Conservation Area. The SJRWMD has adopted an MFL for the Blue Cypress Water Management Area. According to the SJRWMD, determining the sensitivity of these three areas to LKB Planning Area groundwater withdrawals from the Upper Floridan aquifer requires further study that is not currently planned by the SJRWMD. However, in this region the Upper Floridan aquifer is a confined aquifer with approximately 250 feet of hydraulic separation from the surficial aquifer system. Because these three areas are surface water and wetland features, groundwater withdrawals from the Upper Floridan aquifer are unlikely to affect them due to the geologic confinement.

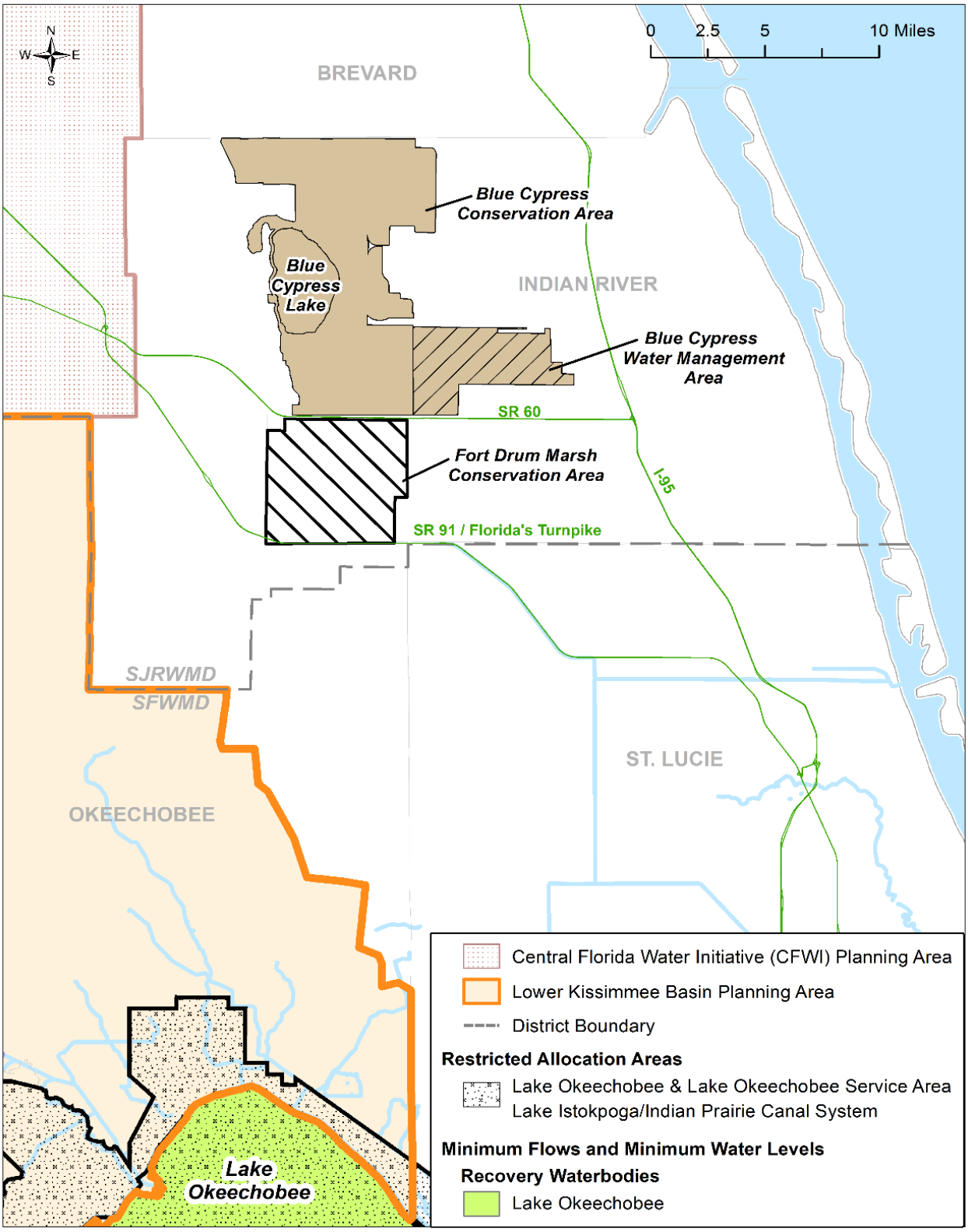



Figure 4-6. St. Johns River Water Management District water resources with constraints northeast of the LKB Planning Area.

## *SWFWMD (SWUCA and Lake Wales Ridge)*

The SWUCA adjoins the western border of the LKB Planning Area in Highlands, Hardee, and DeSoto counties (**Figure 4-7**). A prominent topographic feature in the SWUCA is the Lake Wales Ridge (**Figure 4-7**). According to Yobbi (1996), the western part of the ridge is drained by the Peace River and its major tributaries, Payne, Charlie, Joshua, and Prairie creeks. The eastern part of the ridge is drained by the Kissimmee River and its major tributaries, Arbuckle and Josephine creeks. Previous studies by the SWFWMD concluded that the groundwater levels in the Floridan aquifer system have a close relationship with the water levels observed in the Ridge Lakes along Lake Wales Ridge due to the underlying karst geology and associated connectivity. Since the early 1960s, declines in water levels in many of the lakes on Lake Wales Ridge have occurred due to below normal rainfall, increased groundwater pumpage for agricultural and industrial use, reduced recharge, and alterations to the surface drainage systems (Barcelo et al. 1990). The following constraints were considered by the SFWMD.

### Lake Constraints

The SWFWMD determined several lakes along the Lake Wales Ridge are stressed and currently have 32 MFLs established (SWFWMD 2023) (**Table 4-1**, **Figure 4-7**). At the end of Fiscal Year 2022, 23 of the 32 lakes are meeting their MFLs. Nine of the 32 lakes are not meeting their MFLs (SWFWMD 2023) and are covered by the SWUCA recovery strategy (SWFWMD 2006). All 32 lakes with MFLs are in the SWUCA except Lake Lowery; 20 are in the CFWI Planning Area, and 12 border the LKB Planning Area.

### Well Constraints

The SWFWMD adopted an MFL for the SWUCA–Upper Floridan aquifer, which is covered by the SWUCA recovery strategy (SWFWMD 2006). The regulatory component of the SWUCA recovery strategy requires applicants seeking an allocation from groundwater to provide reasonable assurance the proposed withdrawals will not impact groundwater levels beneath the Upper Peace River where the river's MFL is not being met (CFWI 2020) and Lake Wales Ridge where several lake MFLs also are not being met. Impacts to groundwater levels are assessed by monitoring water levels in five Upper Peace River regulatory wells and five Ridge Lakes regulatory wells (**Figure 4-7**). Moving averages of well water levels are calculated and compared to target regulatory levels to determine groundwater level and to inform water use permitting decisions. The Upper Peace River regulatory wells water level has been above the target level since 1995 and has exhibited a steady increase over the last three decades. As of 2021, the Upper Peace River regulatory well level is being met and is at its highest level in 30 years. Similarly, the 10-year moving average water level of the Ridge Lakes regulatory wells has been above the target level of 91.5 ft above NGVD29 since 1996, and values for the six most recent moving 10-year periods have exhibited a steady increase. As of 2021, the 10-year moving average water level for Lake Wales Ridge regulatory wells is 2.7 feet above the regulatory target level. Therefore, water levels in the Upper Peace River and Ridge Lakes regulatory wells currently are meeting target levels (SWFWMD 2023). Two of the Ridge Lakes regulatory wells are near the LKB Planning Area as described in **Table 4-1**.

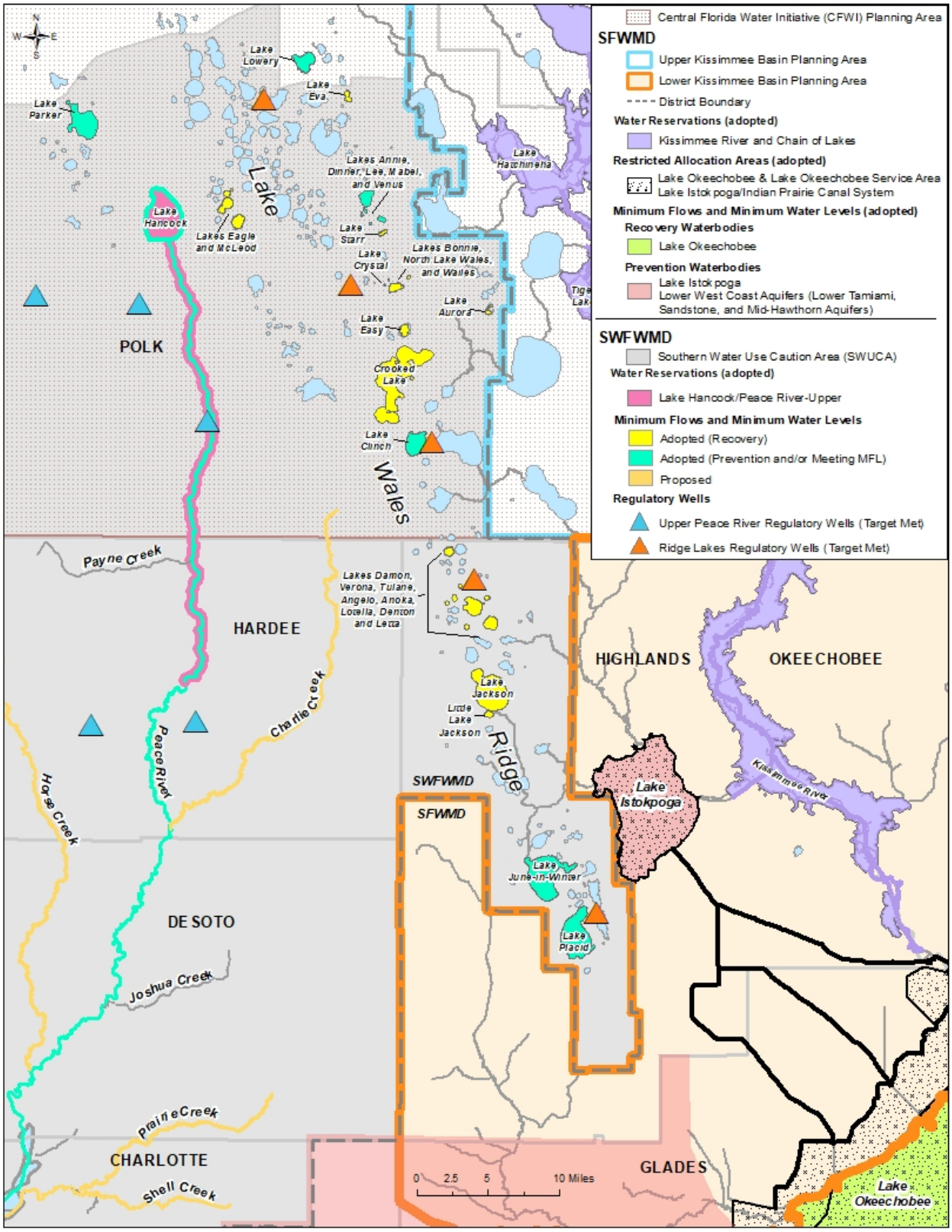



Figure 4-7. Southwest Florida Water Management District water resources with constraints north and west of the LKB Planning Area.

Table 4-1. Southwest Florida Water Management District water bodies with constraints along Lake Wales Ridge and/or in the Southern Water Use Caution Area.

| Water Body | 2022 MFL or Target Status[a] | SWUCA Recovery Strategy | Prevention Strategy | Near LKB Planning Area | In CFWI Planning Area | Potentially Affected by SFWMD Water Withdrawals[b] |
|---|---|---|---|---|---|---|
| Adopted MFLs – Lakes | | | | | | |
| Annie | Meeting | | | | * | * |
| Anoka | Meeting | | | * | | * |
| Clinch | Meeting | | | | * | * |
| Crooked | Meeting | | | | * | * |
| Crystal | Meeting | | | | * | * |
| Damon | Meeting | | | * | | * |
| Dinner | Meeting | | | | * | * |
| Easy | Meeting | | | | * | * |
| Hancock | Meeting | | | | * | |
| Jackson | Meeting | | | * | | * |
| June-in-Winter | Meeting | | | * | | * |
| Lee | Meeting | | | | * | * |
| Little Lake Jackson | Meeting | | | * | | * |
| Lotela | Meeting | | | * | | * |
| Lowery | Meeting | | | | * | * |
| Mabel | Meeting | | | | * | * |
| McLeod | Meeting | | | | * | * |
| North Lake Wales | Meeting | | | | * | * |
| Parker | Meeting | | | | * | |
| Placid | Meeting | | | * | | * |
| Starr | Meeting | | | | * | * |
| Venus | Meeting | | | | * | * |
| Wailes | Meeting | | | | * | * |
| Angelo | Not Meeting | * | | * | | * |
| Aurora | Not Meeting | * | | | * | * |
| Bonnie | Not Meeting | * | | | * | * |
| Denton | Not Meeting | * | | * | | * |
| Eagle | Not Meeting | * | | | * | * |
| Eva | Not Meeting | * | | | * | * |
| Letta | Not Meeting | * | | * | | * |
| Tulane | Not Meeting | * | | * | | * |
| Verona | Not Meeting | * | | * | | * |
| Adopted MFLs – Rivers | | | | | | |
| Peace River – Upper[c] | Meeting | | | | * | |
| Peace River – Middle | Meeting | | | | | |
| Peace River – Lower | Meeting | | | | | |
| Charlie Creek | Meeting | | | * | * | |
| Horse Creek | Meeting | | | | | |
| Shell Creek – Lower | Meeting | | | * | | |

Table 4-1. Continued.

| Water Body | 2022 MFL or Target Status[a] | SWUCA Recovery Strategy | Prevention Strategy | Near LKB Planning Area | In CFWI Planning Area | Potentially Affected by SFWMD Water Withdrawals[b] |
|---|---|---|---|---|---|---|
| Adopted Water Reservations | | | | | | |
| Lake Hancock/Lower Saddle Creek | N/A | N/A | N/A | | * | |
| Regulatory Wells | | | | | | |
| Ridge Lakes Regulatory Wells | Meeting | | | * | * | SWUCA–Upper Floridan aquifer |
| Upper Peace River Regulatory Wells | Meeting | | | | * | SWUCA–Upper Floridan aquifer |

CFWI = Central Florida Water Initiative; LKB = Lower Kissimmee Basin; MFL = minimum flow and minimum water level; N/A = not applicable or available; SFWMD = South Florida Water Management District; SWFWMD = Southwest Florida Water Management District; SWUCA = Southern Water Use Caution Area.

[a] From the Florida Department of Environmental Protection (FDEP 2018), except Lakes Aurora, Damon, and Easy (MFL status obtained from D. Leeper, SWFWMD, personal communication, February 22 and June 25, 2019).

[b] From SWFWMD (2019).

[c] The Upper Peace River is divided into three segments. Two of the three segments currently are not meeting the MFL (CFWI 2020).

# SUMMARY OF WATER RESOURCE PROTECTION

- Unless exempt by statute or identified in the Water Rights Compact of 1987, the right to use water is authorized by permit, which allows for the use of water for reasonable-beneficial uses while protecting natural systems from harm. The proposed water use must comply with the water resource protection criteria (see Rule 40E-2.301, F.A.C., and the Applicant's Handbook (SFWMD 2022b).
- Water reservations were adopted for the Kissimmee River and Chain of Lakes in 2021 for the protection of fish and wildlife in the Upper Chain of Lakes, Headwaters Revitalization Lakes, and the Kissimmee River and floodplain.
- The LOSA RAA currently prohibits net increases in the volume of surface water withdrawn from Lake Okeechobee and all surface water that are hydraulically connected to and receive water from Lake Okeechobee over that resulting from base condition water uses.
- The Lake Istokpoga/Indian Prairie Canal System RAA prohibits additional surface water allocations from these surface water bodies above existing allocations. Lake Istokpoga also is under an MFL prevention strategy.

# REFERENCES


Barcelo, M.D., D.L. Slonena, S.C. Camp, and J.D. Watson. 1990. *Ridge II, A Hydrogeologic Investigation of the Lake Wales Ridge.* Southwest Florida Water Management District, Brooksville, FL.

CFWI. 2020. *2020 Central Florida Water Initiative Regional Water Supply Plan: Planning Document.* Available online at http://cfwiwater.com.

FDEP. 2018. *Florida Statewide Annual Report on Total Maximum Daily Loads, Basin Management Action Plans, Minimum Flows or Minimum Water Levels, and Recovery or Prevention Strategies*. Florida Department of Environmental Protection, Tallahassee, FL. June 2018.

SFWMD. 2015. *Just the Facts: Kissimmee Basin Water Reservations*. South Florida Water Management District, West Palm Beach, FL. April 2015.

SFWMD. 2021. *2021–2024 Support Document for Water Supply Plan Updates*. South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2022a. *2022 Lower West Coast Water Supply Plan Update.* South Florida Water Management District, West Palm Beach, FL. December 2022.

SFWMD. 2022b. *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District.* South Florida Water Management District, West Palm Beach, FL. June 2022.

SFWMD. 2024. *2023–2024 Lower East Coast Water Supply Plan Update.* South Florida Water Management District, West Palm Beach, FL. September 2024.

SFWMD, FDEP, and Florida Department of Agriculture and Consumer Services. 2011. *Lake Okeechobee Protection Plan Update*. South Florida Water Management District, West Palm Beach, FL; Florida Department of Environmental Protection, Tallahassee, FL; and Florida Department of Agriculture and Consumer Services, Tallahassee, FL.

SWFWMD. 2006. *Southern Water Use Caution Area Recovery Strategy, March 2006 Final Report*. Southwest Florida Water Management District, Brooksville, FL.

SWFWMD. 2019. *Consolidated Annual Report: 2018 Priority List and Schedule for the Establishment of Minimum Flows, Minimum Water Levels and Reservations*. Southwest Florida Water Management District, Brooksville, FL. March 1, 2019.

SWFWMD. 2023. *Southern Water Use Caution Area Recovery Strategy Five-Year Assessment, FY2017-2021*. Southwest Florida Water Management District, Brooksville, FL.

USACE. 2019. *Kissimmee River Restoration Project – Facts and Information*. United States Army Corps of Engineers, Jacksonville, FL.

Yobbi, D.K. 1996. *Analysis and Simulation of Ground-Water Flow in Lake Wales Ridge and Adjacent Areas of Central Florida*. Water-Resources Investigations Report 94-4254. Prepared in cooperation with the Southwest Florida Water Management District, Brooksville, FL. United States Geological Survey, Tallahassee, FL.

# 5

# Water Source Options

TOPICS

- Surface Water
- Groundwater
- Reclaimed Water
- Water Storage
- Summary of Water Source Options

This chapter of the *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update) presents water supply source options that could be available through 2045 within the Lower Kissimmee Basin (LKB) Planning Area to accommodate future urban and agricultural demands while sustaining the natural systems. Descriptions of these sources, current and projected uses, and factors that affect availability for water supply purposes are provided. **Chapter 6** presents the South Florida Water Management District's (SFWMD or District) analyses of the surface water and groundwater conditions in the region. Information about water treatment technologies and their related costs is provided in the *2021–2024 Support Document for Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021) and the recently updated *Water Supply Cost Estimation Study* (Kimley Horn 2023).

In the LKB Planning Area, fresh groundwater from the surficial aquifer system (SAS) and Floridan aquifer system (FAS) and surface water from canals and lakes are considered traditional water sources. Alternative water supply (AWS) or nontraditional water source options include brackish groundwater from the FAS, reclaimed water, water stored in aquifer storage and recovery (ASR) wells, and stormwater stored in aboveground reservoirs.

To meet water supply needs, water users primarily rely on fresh groundwater and surface water (**Figures 5-1** and **5-2**). However, withdrawals from the traditional sources have approached sustainable limits because of aquifer productivity, environmental concerns, resource protection criteria, and regulatory limitations (**Chapter 4**). AWS source use can reduce the use of traditional sources and can be an integral part of future water supply strategies. Fresh groundwater and surface water combined currently supply 92% of Agriculture (AG) and 100% of Public Supply (PS) needs in the LKB Planning Area (**Figure 5-2**). Existing allocations and infrastructure can meet a substantial portion of the 2045 water needs for AG.

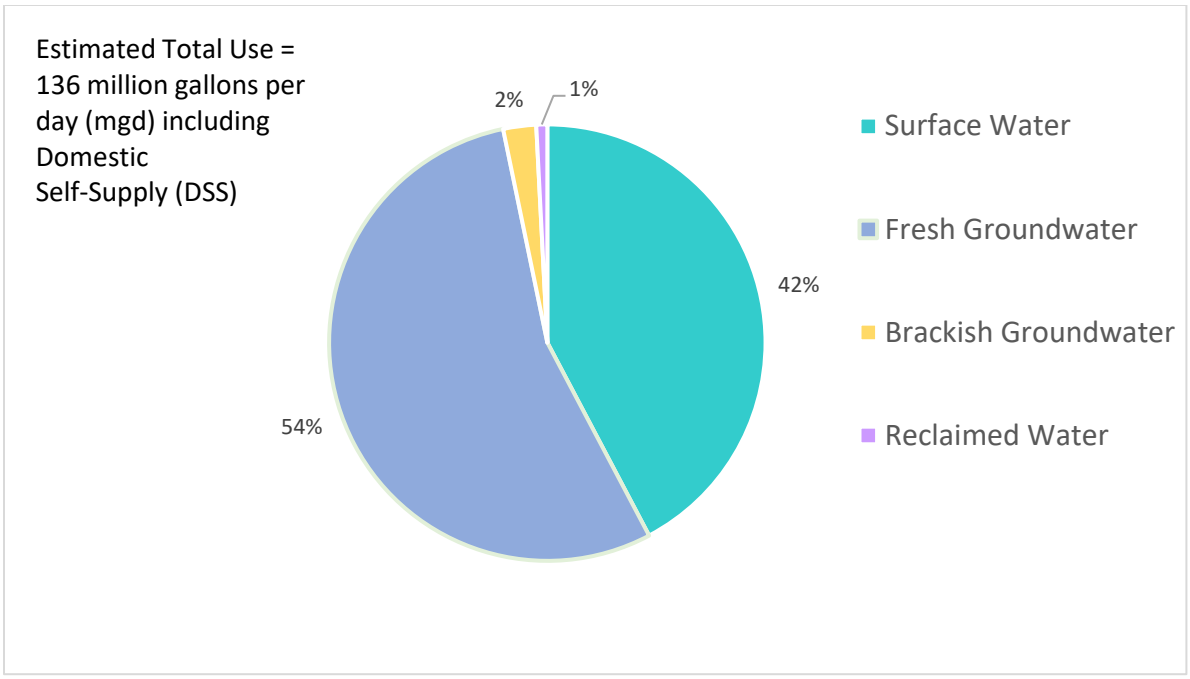



Figure 5-1. Water use percentage of the estimated total use of 136 mgd in the LKB Planning Area in 2022 (Data from SFWMD 2024b) by source. (Note: DSS is supplied by 100% fresh groundwater and is not shown on chart.

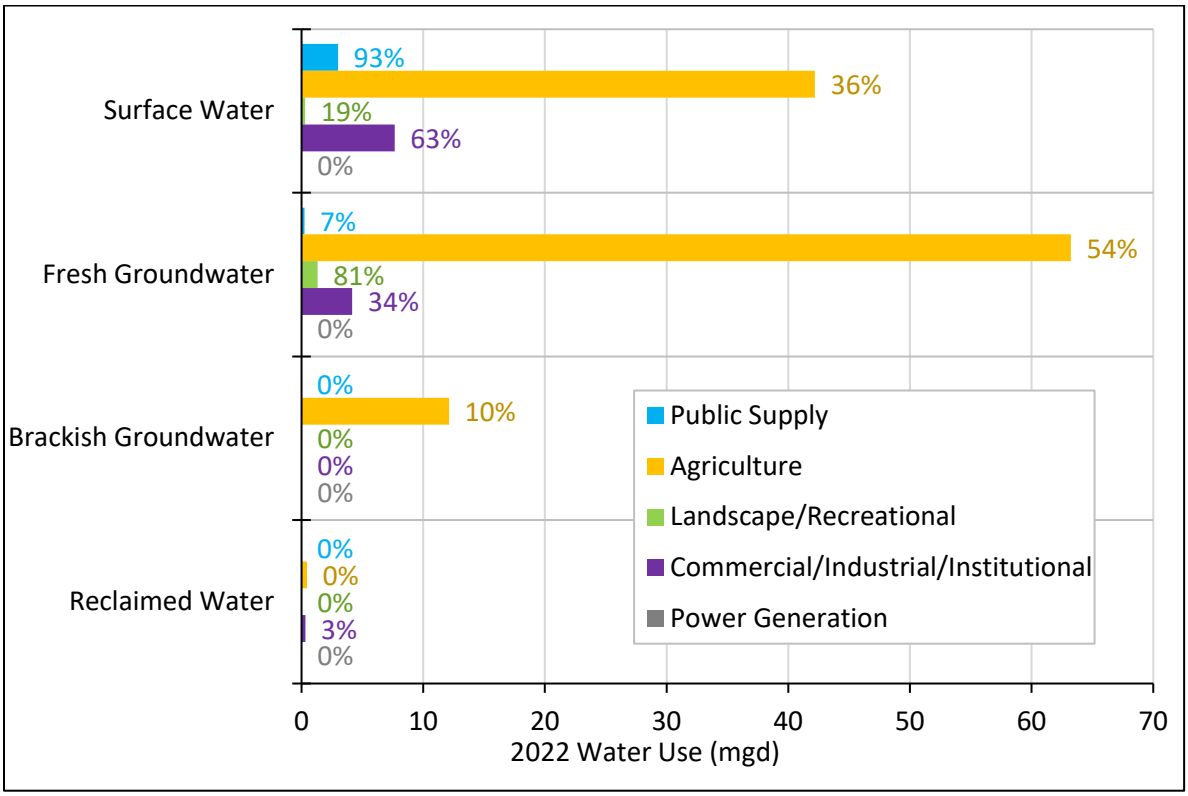



Figure 5-2. Water use in the LKB Planning Area in 2022 (Data from SFWMD 2024b) percentage of demand by source for each use type. (Note: Fresh groundwater supplies 100% of Domestic Self-Supply demand. Percentages may not equal 100% due to rounding.)

# SURFACE WATER

Surface water sources, primarily used for urban and agricultural irrigation, include rivers, canals, lakes, and reservoirs. Although the LKB Planning Area has multiple surface water sources, most are limited by regulatory protections (**Chapter 4**). Primary surface water sources include the Lake Istokpoga/Indian Prairie Canal System, the Kissimmee River (C-38 Canal), Fisheating Creek, and Taylor Creek/Nubbin Slough. These surface water features flow into Lake Okeechobee either directly or indirectly with the use of water control structures and pump stations.

As discussed in **Chapter 4**, restricted allocation area (RAA) criteria have been established for the Lake Istokpoga/Indian Prairie Canal System that prohibit additional surface water allocations from these water bodies above existing allocations. RAA criteria also have been established for the Lake Okeechobee Service Area (LOSA) that currently prohibit net increases in the volume of surface water withdrawn from Lake Okeechobee and the integrated conveyance systems that are hydraulically connected to and receive water from Lake Okeechobee over that resulting from base condition water uses. Therefore, additional demands for new or increased water supply allocations are expected to be met with groundwater or AWS sources.

## Lake Istokpoga and Indian Prairie Canal System

The Lake Istokpoga Basin covers 607 square miles. Rainfall and tributary inflows, primarily from Josephine Creek and Arbuckle Creek, are the source of surface water flows into Lake Istokpoga, which is the fifth largest lake in Florida, spanning 44 square miles and averaging 4 to 6 feet deep. The lake's water levels are maintained in accordance with the United States Army Corps of Engineers (USACE) regulation schedule (**Figure 4-3**). Outflows from Lake Istokpoga are directed either to the Kissimmee River via the Istokpoga Canal or to Lake Okeechobee through the Indian Prairie Canal System. Surface water from Lake Istokpoga and its associated canals has been a primary water source to meet agricultural irrigation demands in the Indian Prairie Basin and the water entitlement for the Seminole Tribe of Florida's Brighton Reservation. The Seminole Tribe of Florida has a surface water entitlement pursuant to the 1987 Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Public Law 100-228, 101 Statute 1556, and Chapter 87-292, Laws of Florida, as codified in Section 285.165, Florida Statutes [F.S.]).

The Indian Prairie Basin, located in the northeastern corner of Glades County and the southeastern corner of Highlands County, drains the northwestern portions of the Lake Okeechobee watershed. Four canals connect Lake Istokpoga to Lake Okeechobee (**Figure 5-3**): C-39A, C-41A, C-40 (Indian Prairie Canal), and C-41 (Harney Pond Canal). The Istokpoga Canal connects Lake Istokpoga to the Kissimmee River. The District Governing Board adopted RAA criteria in 1981 for the Lake Istokpoga/Indian Prairie Canal System (Section 3.2.1.A of the *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District* [SFWMD 2022]), which prohibit additional surface water allocations from the lake and canal system above existing allocations. The RAA minimizes the potential for District-declared water shortages in the basin during periods of drought and ensures sufficient water for existing allocations and delivery to the Seminole Tribe of Florida's water entitlement for the Brighton Reservation. Since implementing the

RAA, additional water demand in the area has been met through water conservation and groundwater allocations, which also are subject to permitting requirements.

The Istokpoga Marsh Watershed Improvement District (IMWID) is located south of Lake Istokpoga (**Figure 5-3**). The IMWID was established in 1962, prior to the SFWMD regulatory requirements. It encompasses approximately 34 square miles (22,000 acres) and has a 28-mile internal canal system that provides water supply and drainage, primarily for agriculture. The IMWID withdraws water from Lake Istokpoga pursuant to the surface water agreement with the SFWMD. Additionally, nearly 16 square miles (approximately 10,000 acres) of agricultural lands within the IMWID have separate SFWMD individual water use permits for various reasons, including use of groundwater wells not covered by the surface water agreement.

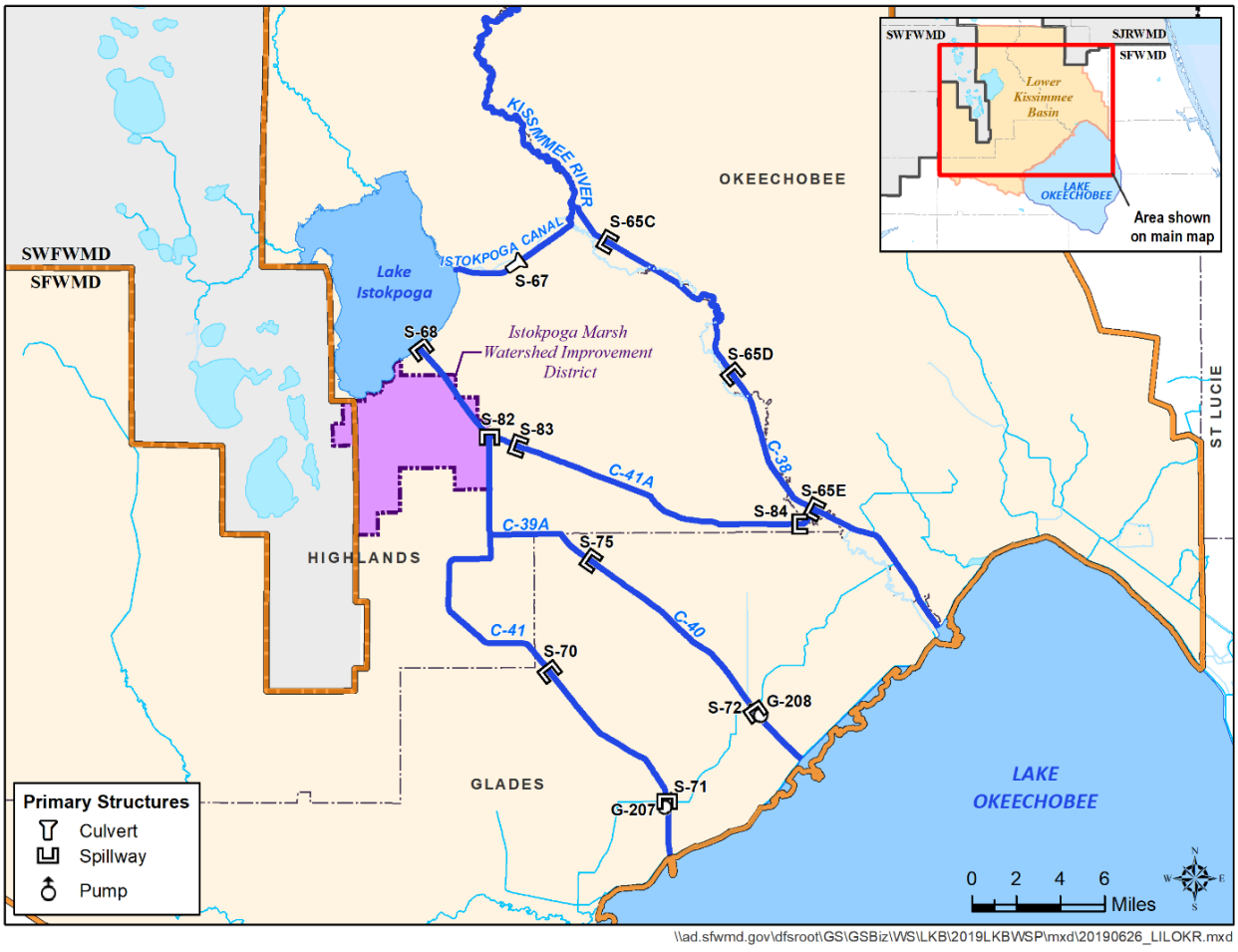



Figure 5-3. Canals and structures connecting Lake Istokpoga, Lake Okeechobee, and the Kissimmee River (C-38 Canal).

## Kissimmee River

The Kissimmee River is the longest surface water feature in the LKB Planning Area and contributes close to 50% of the total flow to Lake Okeechobee (SFWMD et al. 2011). Historically, the Kissimmee River was 134 miles long; however, channelization as part of the Central and Southern Florida Project in the 1960s reduced the river to a 56-mile canal (C-38) controlled by a series of locks and structures.

C-38 Canal to Lake Okeechobee

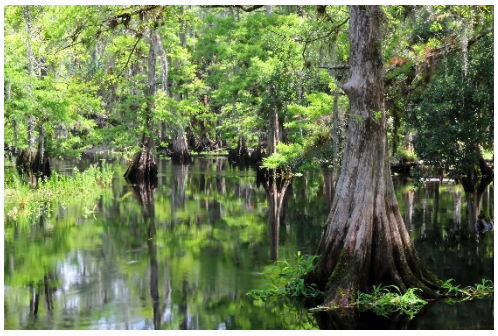
Water released from the headwaters of the Kissimmee River in the Kissimmee Chain of Lakes (part of the Upper Kissimmee Basin Planning Area) flows south through the Kissimmee River Restoration Project, which aims to restore ecological integrity to the Kissimmee River and its floodplain by re-establishing historical hydrology while providing an equivalent pre-project level of flood control in the area. Further detail about the Kissimmee River Restoration Project is provided in **Chapter 7**.

The Kissimmee River and Chain of Lakes water reservations rule was adopted in 2021 (Rule 40E-10.071, Florida Administrative Code [F.A.C.]). The water reservations reserve the volume of water needed for the protection of fish and wildlife from increased consumptive uses. Further information about the water reservations is provided in **Chapter 4**.

Historically, the Kissimmee River has not been used as a water supply source. Due to water needed for environmental purposes in support of the Kissimmee River Restoration Project and the water reservations rule, future water availability from the Kissimmee River is limited.

## Fisheating Creek

Fisheating Creek, west of Lake Okeechobee, marks the southernmost boundary of the LKB Planning Area and is the second largest inflow to Lake Okeechobee. Much of the land surrounding the creek is publicly owned or under conservation easements. The Fisheating Creek Basin originates in western Highlands County and flows south through Cypress Swamp into Glades County. From central Glades County, water leaves the creek channel and flows east through Cowbone Marsh into Lake Okeechobee. Previous studies in the Fisheating Creek watershed have focused on creating water storage and improving water quality discharges to Lake Okeechobee. Fisheating Creek is the only basin with an uncontrolled "natural" discharge to Lake Okeechobee. Currently, Fisheating Creek is not used as a water supply source and is not expected to be used as such in the future.



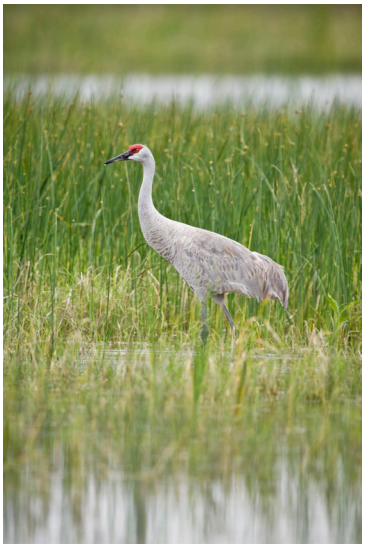
Fisheating Creek

## Taylor Creek/Nubbin Slough

Taylor Creek and Nubbin Slough are interconnected basins that drain into Lake Okeechobee from the north and northeast. Surface water use in the basins is primarily for agriculture, including pasture and dairies. The Nubbin Slough Basin includes three tributaries: Lettuce Creek, Henry Creek, and Mosquito Creek. The three tributaries, along with Nubbin Slough, are intercepted by the L-63, L-64, and C-59 canals and enter Lake Okeechobee through the S-191 Structure. Chandler Hammock Slough is a small tributary in the northern part of the Taylor Creek Basin that allows water to flow eastward into Taylor Creek or westward to Popash Slough and the G-80 Structure. Taylor Creek provides drainage to an area just north of the City of Okeechobee, passes through the eastern part of the city, then flows south into the L-63N and C-59 canals and discharges to Lake Okeechobee via the S-191 Structure.

## Lake Okeechobee

Lake Okeechobee is a key component of the South Florida hydrologic system. It serves multiple purposes, including flood protection; urban, tribal, agricultural, and environmental water supply; navigation; commercial and recreational fisheries; and fish and wildlife habitat. The lake is critical for flood control during wet seasons and water supply during dry seasons. It also is a key ecological component of the Greater Everglades ecosystem.


Sandhill Crane, Lake Okeechobee

Lake Okeechobee has multiple inflows, including the Kissimmee River, and receives water from a watershed in excess of 4,600 square miles. The lake's watershed consists of several agricultural irrigation basins surrounding Lake Okeechobee and includes areas southeast of the L-59, L-60, and L-61 canals within the LKB Planning Area. Since 2008, net increases in the volume of surface water withdrawn from Lake Okeechobee and the integrated conveyance systems that are hydraulically connected to and receive water from Lake Okeechobee over that resulting from base condition water uses have been restricted due to LOSA RAA criteria (**Chapter 4**).

The lake has two major outlets for flood control purposes: one to the east coast via the St. Lucie River (C-44 Canal) and one to the west coast via the Caloosahatchee River (C-43 Canal). Additional limited flood control discharges from Lake Okeechobee to the SFWMD's Lower East Coast Planning Area are possible via the West Palm Beach, Hillsboro, North New River, and Miami canals.

Lake Okeechobee provides water supply to a small portion of the LKB Planning Area throughout the year and is critical for flood control during wet periods. The lake serves as a supplemental water supply source for agriculture when rainfall is insufficient and can be used as a backup source for agricultural areas directly adjacent to the L-59, L-60, and L-61 canals on the north and west sides of the lake during dry periods. Additionally, Pump G-207 on the C-41 (Harney Pond) Canal and Pump G-208 on the C-40 (Indian Prairie) Canal allow

for water deliveries during periods of drought to the southern portion of the basin, which includes the Seminole Tribe of Florida's Brighton Reservation. The Okeechobee Utility Authority (OUA) is the only utility using water directly from Lake Okeechobee. Increased withdrawals from the lake are limited due to the adoption of the LOSA RAA criteria by the SFWMD, which was necessitated by the USACE's implementation of the Lake Okeechobee Regulation Schedule LORS (LORS08). The LORS08 was updated to the new Lake Okeechobee System Operating Manual (LOSOM) in 2024. Analyses conducted as part of LOSOM indicate the LOSOM water control plan modestly improves water supply performance; therefore, Lake Okeechobee will remain in a minimum flow and minimum water level (MFL) recovery status. The MFL recovery strategy has been revised, and additional details are provided in Appendix C of the *2023–2024 Lower East Coast Water Supply Plan Update* (SFWMD 2024a).

## Existing and Future Use of Surface Water

AG is the largest user of surface water in the LKB Planning Area. In 2022, AG accounted for 85% of the surface water use in the LKB Planning Area, followed by Commercial/Industrial/Institutional (CII) at 11%, then PS at 4% (SFWMD 2024b).

In addition, the Seminole Tribe of Florida's Brighton Reservation has a surface water entitlement as previously discussed. The water entitlement is accomplished through surface water deliveries from the Indian Prairie Canal System.

Approximately 50% of AG demands in the LKB Planning Area, were met with surface water in 2022 (**Figure 5-2**). Withdrawals primarily are from onsite ponds or adjacent local canals. Total AG use is expected to increase approximately 12% by 2045.

Approximately 93% of PS demands were met with surface water (**Figure 5-2**), and this percentage is expected to remain the same through 2045. The OUA is the only utility in the LKB Planning Area that uses surface water as its main source, and it is the largest of the region's utilities.

In 2022, surface water was used to meet 63% of CII demands in the LKB Planning Area (**Figure 5-2**). Sand, gravel, and stone mining operations account for most of the CII water demands.

Surface water is used primarily for AG and to a lesser extent PS, CII, and Landscape/Recreational (L/R) uses. Based on the regulatory constraints discussed in **Chapter 4**, additional allocations of surface water are not anticipated through 2045. Therefore, surface water sources are sufficient to meet existing demands, and future growth would rely on groundwater. Permitted surface water withdrawal locations in the LKB Planning Area are shown in **Figure 5-4**.

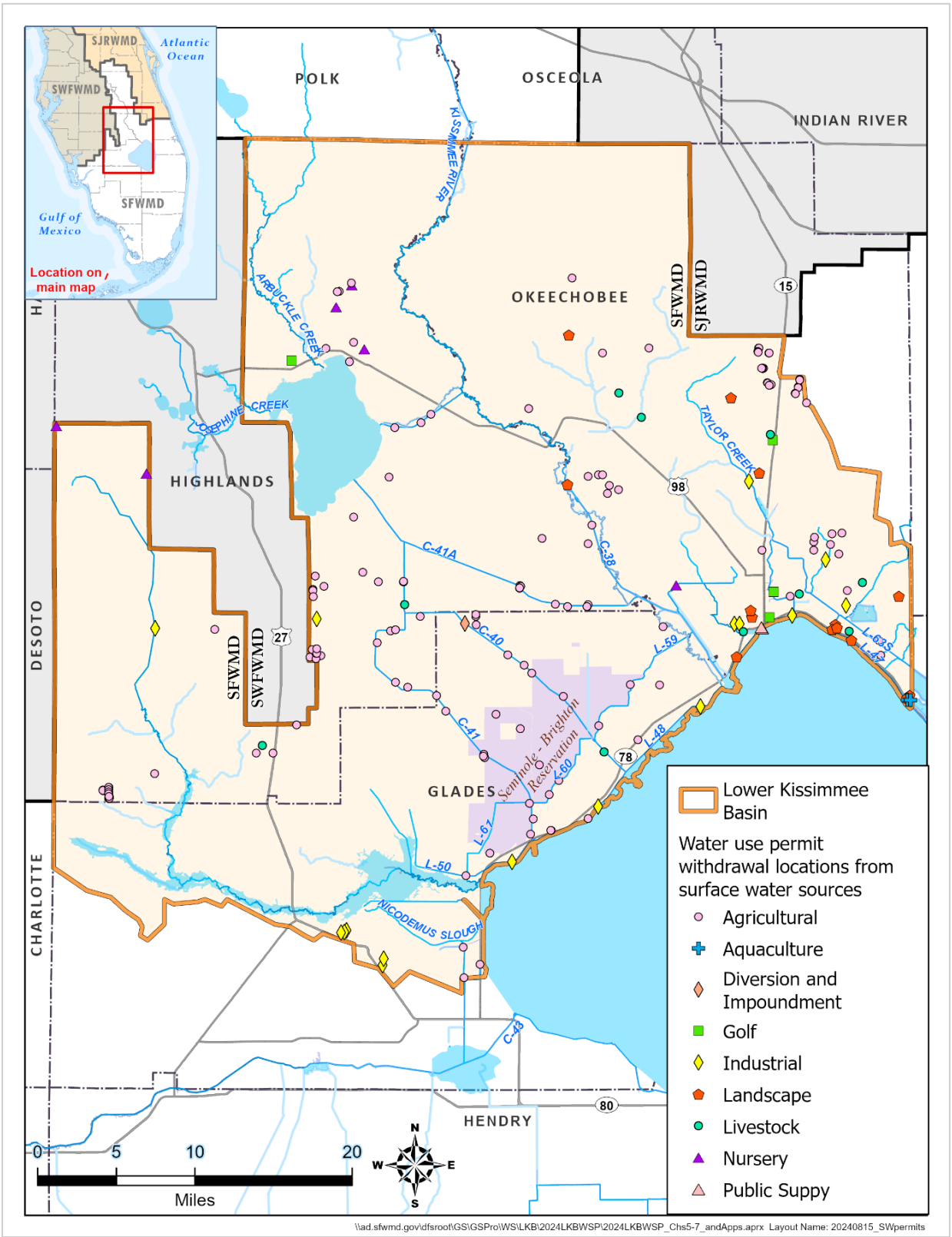



Figure 5-4. Water use permit withdrawal locations from surface water within the LKB Planning Area.

# GROUNDWATER

Groundwater sources in the LKB Planning Area are fresh groundwater from the SAS, the intermediate aquifer system/intermediate confining unit (IAS/ICU), and the FAS. The FAS is the primary groundwater source in the region and includes the Upper Floridan aquifer (UFA) and the Lower Floridan aquifer (LFA). The UFA has an upper permeable zone that contains relatively fresh water and the deeper Avon Park permeable zone, which contains brackish water. Water availability from the SAS and IAS in the LKB Planning Area is limited due to low aquifer yields and the limited extent of the IAS within the region. **Figure 5-5** presents a generalized cross section of these hydrogeologic units within the Upper and Lower Kissimmee Basin planning areas.

Fresh groundwater is a primary water supply source for all water use categories in the LKB Planning Area except PS, which relies heavily on surface water. Water availability from the SAS and IAS is limited by the rate of groundwater recharge, potential wetland impacts, proximity to contamination sources, saltwater intrusion from brackish aquifers or connate water zones within the SAS or IAS/ICU, and other existing legal users in the area.

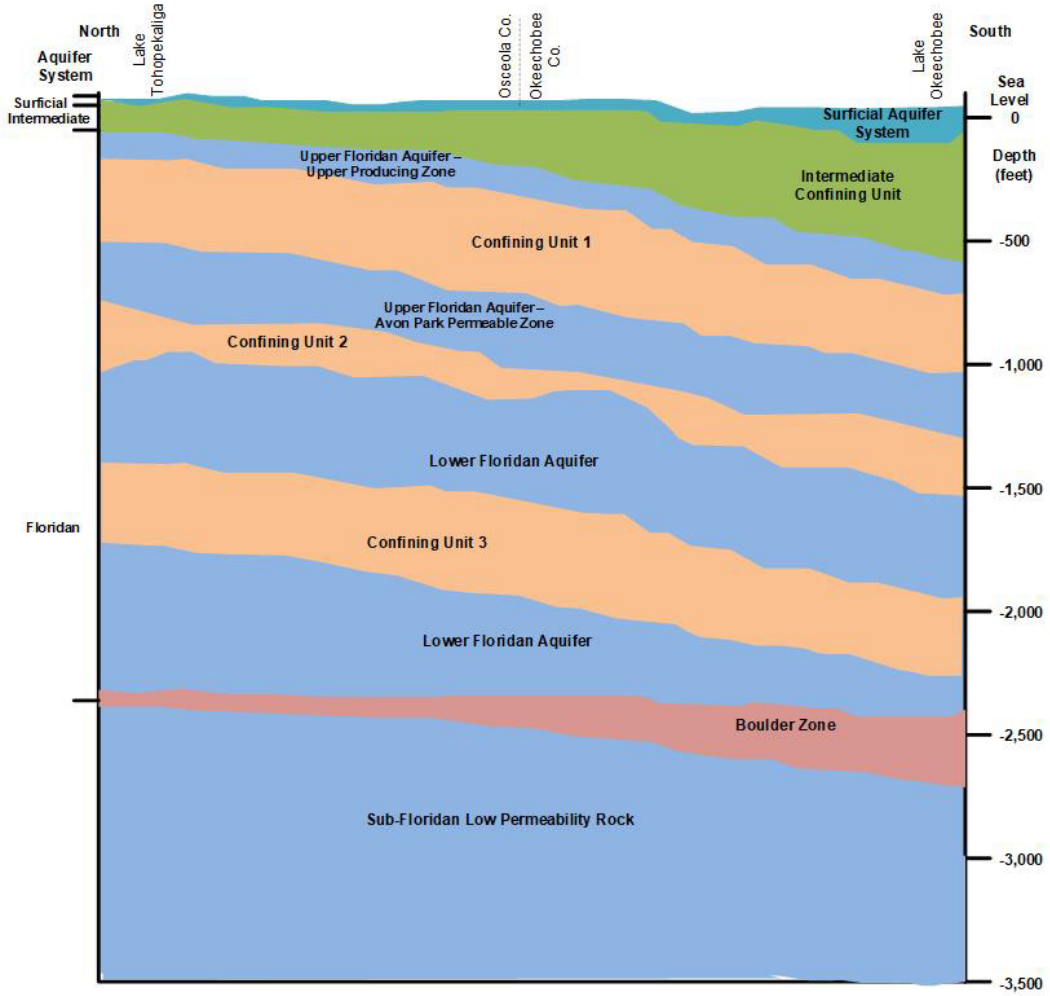



Figure 5-5. Generalized hydrogeologic cross section (north to south) of the Upper and Lower Kissimmee Basin planning areas.

## Surficial Aquifer System

The SAS, an unconfined aquifer, produces small quantities of good-to-fair quality water within the LKB Planning Area. Regionally, it is primarily used for Domestic Self-Supply (DSS), lawn irrigation, and small-scale agricultural uses. The OUA uses the SAS as a secondary source and for backup, and the SAS may need to be used for supplemental water in the future to meet projected demand growth. The Seminole Tribe of Florida's Brighton Reservation currently relies on the FAS for AG and PS and plans to use its existing SAS wells for PS backup or for AG. Permitted SAS withdrawal locations in the LKB Planning Area are shown in **Figure 5-6.**

## Intermediate Aquifer System/Intermediate Confining Unit

In the LKB Planning Area, the SAS and FAS are separated by the IAS/ICU. While a few locally occurring water-producing zones within the IAS exist in the LKB Planning Area, they generally do not produce large amounts of water. Some wells in southern Okeechobee County and the western portions of the planning area along the Lake Wales Ridge have exhibited moderate yields due to local sand beds in the IAS. The confining properties of the IAS are less effective near the ridge due to geologic features that allow an enhanced connection between the SAS and FAS. Overall, the IAS is not seen as a viable source for water supply in the LKB Planning Area due to its low-yielding nature. Permitted IAS withdrawal locations in the LKB Planning Area are shown in **Figure 5-6**.

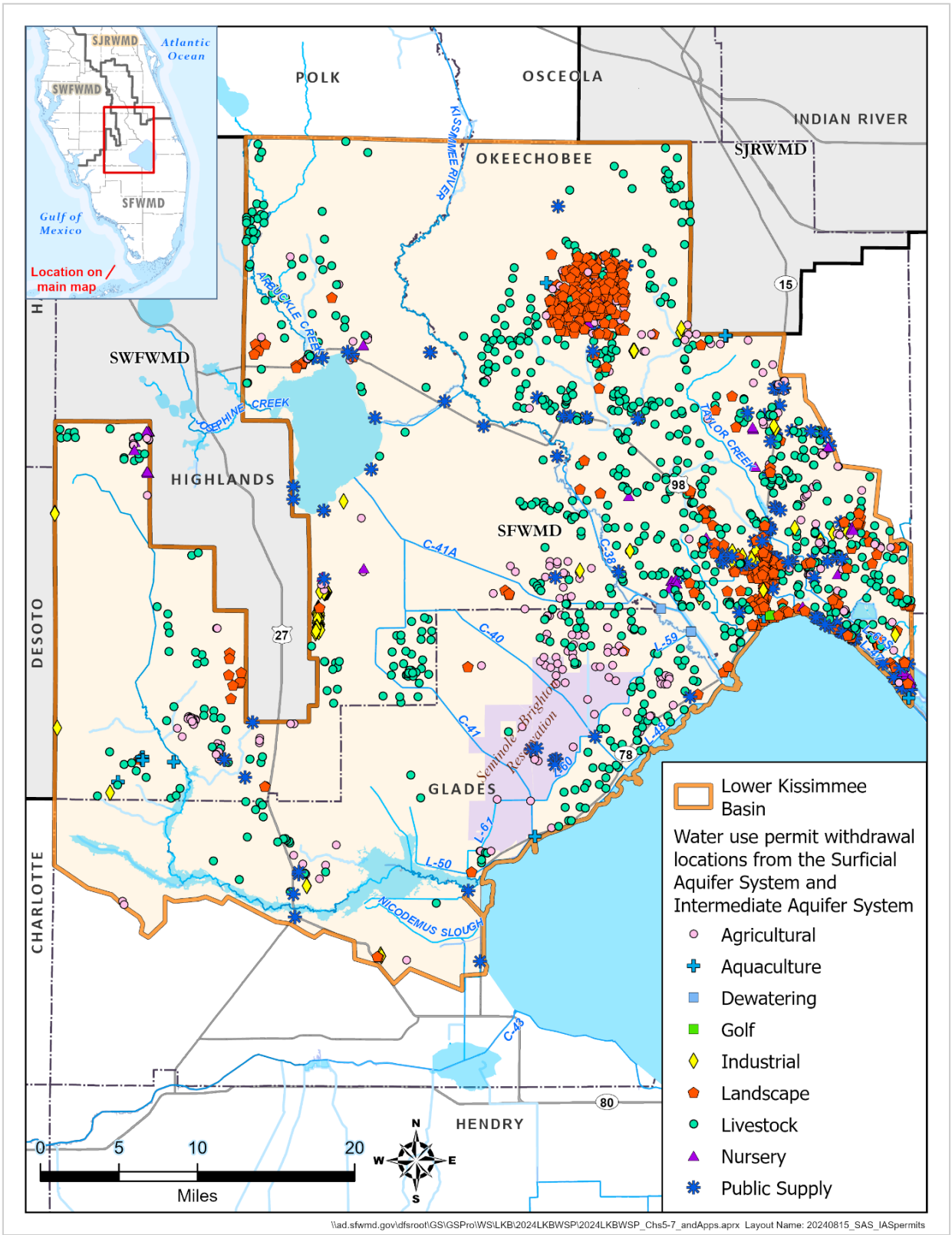



Figure 5-6. Water use permit withdrawal locations from the surficial and intermediate aquifer systems within the LKB Planning Area.

## Floridan Aquifer System

The FAS is a high-yield aquifer system that provides substantial volumes of good-quality water for a wide variety of uses within the LKB Planning Area. The FAS is the most used source in the region and is composed of the UFA and the LFA. Permitted FAS withdrawal locations are shown in **Figure 5-7**.

The UFA is a primary source of water for many use categories in the LKB Planning Area. In particular, the UFA is of suitable quality and has demonstrated a high yield sufficient to meet PS and AG demands. The UFA is thickest in Glades and Okeechobee counties, averaging more than 1,000 feet. Chloride, total dissolved solids (TDS), and sulfate concentrations increase with depth and distance to the south and west. Water quality and aquifer yield deteriorate near Lake Okeechobee. The UFA is further divided by confining units into the upper permeable zone and the Avon Park permeable zone, which also can vary in water quality and yield.

Water quality within the LFA is saline throughout most of the LKB Planning Area; however, fresh water has been found in the northwestern portion of Highlands County close to the Lake Wales Ridge. The production characteristics of the LFA are not well documented, but it is being developed in the Upper Kissimmee Basin as an AWS by the Toho Water Authority at its Cypress Lakes Wellfield in Osceola County, for example. Use of the LFA as a water source has been limited in the region due to TDS concentrations that generally are too high for crop production and public supply without desalination treatment. Water derived from the brackish portions of the LFA might be useful for blending with other freshwater sources.

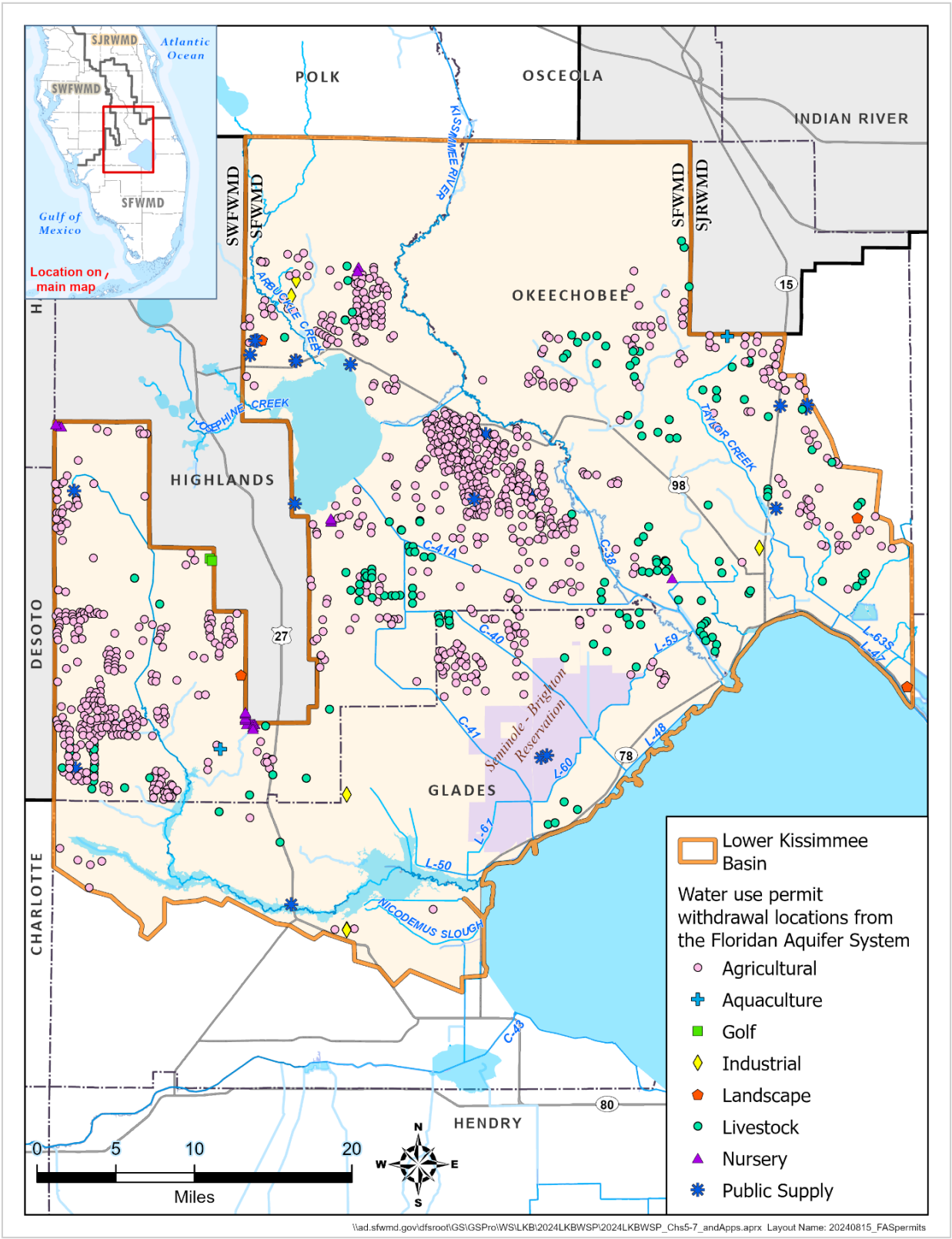



Figure 5-7. Water use permit withdrawal locations from the Floridan aquifer system within the LKB Planning Area.

## Existing and Future Use of Groundwater

AG is the largest user of groundwater in the LKB Planning Area. In 2022, AG accounted for 90% of the groundwater use in the LKB Planning Area, followed by CII (8%), then L/R (8%) (SFWMD 2024b). In 2022, approximately 42% of total AG demand in the LKB Service Areas was met using fresh groundwater (**Figure 5-2**). Use of fresh groundwater for AG is projected to decrease slightly over the planning period.

Fresh groundwater supplied 34% of the estimated demand for CII in 2022 (**Figure 5-2**). By 2045, CII demands are expected to increase approximately 22%, and fresh groundwater and reclaimed water are expected to continue to meet the additional demands.

In the LKB Planning Area, fresh groundwater supplied 100% of the estimated demand (approximately 1.80 million gallons per day [mgd]) for DSS users in 2022. By 2045, DSS demand is expected to increase slightly to 1.84 mgd. Fresh groundwater from the SAS will continue to supply 100% of the DSS demands through 2045.

In 2022, approximately 81% of the L/R demand was met with fresh groundwater (**Figure 5-2**). A projected increase in landscape irrigation acreage is expected to increase the total L/R demand 140% by 2045, and fresh groundwater and surface water are expected to continue to meet the additional demands.

Fresh groundwater is used primarily for AG and to a much lesser extent CII, DSS, L/R, and PS uses. Development of groundwater sources may be feasible in some areas within the LKB Planning Area; however, that will depend on local resource conditions. Based on demand projections in this plan update, groundwater availability appears adequate to meet 2045 demands.

# RECLAIMED WATER

Reclaimed water is wastewater that has received at least secondary treatment and basic disinfection and is reused after leaving a domestic wastewater treatment facility in accordance with Rule 62-610.200, F.A.C. Reuse is the deliberate application of reclaimed water for a beneficial purpose. Criteria used to classify projects as "reuse" or "effluent disposal" are contained in Rule 62-610.810, F.A.C.

Section 373.250, F.S., identifies reclaimed water as an AWS, including declaring reclaimed water supply projects as eligible for AWS funding. The Water Resource Implementation Rule (Chapter 62-40, F.A.C.) requires the Florida Department of Environmental Protection (FDEP) and water management districts to advocate and direct the use of reclaimed water as an integral part of water management programs, rules, and plans. The SFWMD requires all water use permit applicants proposing to use more than 0.10 mgd of water and applicants within a mandatory reuse zone, as designated by local governments

through ordinance, or by a utility through a condition of service, to use reclaimed water if feasible. In addition, substitution credits and impact offsets, resulting from use of reclaimed water, may be included in a water use permit. A substitution credit is the use of reclaimed water to replace a portion, or all, of an existing permitted use of a limited surface water or groundwater resource, allowing a different user to initiate or increase withdrawals from the resource. Impact offsets are derived from the use of reclaimed water to reduce or eliminate a harmful impact that has occurred or would occur due to a surface water or groundwater withdrawal.

Wastewater reuse conserves water resources and is an environmentally sound alternative to deep well injection and other traditional disposal methods. Although disposal methods may be needed during wet periods, use of reclaimed water during normal to dry periods minimizes wasteful disposal of water resources. In addition, reclaimed water provides an acceptable alternative to potable water for uses like irrigation, normally at a lower cost.

## Existing Reuse

As of 2022, there were three domestic wastewater treatment facilities in the LKB Planning Area with a capacity of 0.10 mgd or greater (**Appendix D**): the Okeechobee Correctional Institution, OUA, and Sebring Airport. The Sebring Airport (permitted at 0.09 mgd) is included in the analysis of reclaimed water in the LKB as it is the only other larger facility in the LKB which produces reclaimed water. The Seminole Tribe of Florida's Brighton Reservation facility is not required to report flows to the FDEP and thus is omitted.

In 2022, the three facilities analyzed for this plan update treated a total of 1.13 mgd of wastewater and reused 68% (0.77 mgd). Sebring Airport applied 0.03 mgd of reclaimed water for spray field irrigation. Most of the OUA reclaimed water (0.42 mgd) was used to irrigate grass, hay/pasture, and citrus. The remaining reclaimed water produced by the OUA (0.09 mgd) was released to a percolation pond. The Okeechobee Correctional Institution applied 0.23 mgd of reclaimed water for spray field irrigation. None of these facilities added supplemental water to their reclaimed water systems. Only the OUA disposed of treated effluent (0.36 mgd) via deep well injection. Existing capacity and flow information was obtained from the individual reuse inventory reports for the year 2022, filed by each facility to the FDEP (FDEP 2023).

## Future Reuse

Over the planning period (to 2045), Sebring Airport projects only a slight increase in treated effluent and water reuse from 0.03 mgd to 0.05 mgd. The Okeechobee Correctional Institution expects to increase the efficiency of controls and replace fittings inside the dorms of the institution which is expected to decrease both treated effluent and reuse from 0.23 mgd to 0.20 mgd. The OUA anticipates some planned-community development and adding some users to its sewer collection system via a septic-to-sewer conversion program over the planning horizon which are projected to increase treated wastewater and reuse flows to 3.00 mgd and 1.43 mgd, respectively. The cumulative total reuse for the three facilities is projected to reach 1.68 mgd by 2045. **Table 5-1** shows the documented 2022 and projected 2045 annual average daily reuse and related flows for the three facilities analyzed for this plan update.

Table 5-1. Documented 2022 and projected 2045 annual average daily reuse and related flows for the LKB Planning Area.

| Facility | AAD Wastewater Flows (mgd) | | AAD Disposal Flows (mgd) | | AAD Reuse (mgd) | |
|---|---|---|---|---|---|---|
| | 2022 | 2045 | 2022 | 2045 | 2022 | 2045 |
| Okeechobee Correctional | 0.23 | 0.20 | 0.00 | 0.00 | 0.23 | 0.20 |
| Okeechobee Utility Authority | 0.87 | 3.00 | 0.36 | 1.57 | 0.51 | 1.43 |
| Sebring Airport | 0.03 | 0.05 | 0.00 | 0.00 | 0.03 | 0.05 |
| **LKB Planning Area Totals** | **1.13** | **3.25** | **0.36** | **1.57** | **0.77** | **1.68** |

AAD = annual average daily; mgd = million gallons per day.

# WATER STORAGE

Capturing surface water and groundwater during wet conditions for use during dry conditions increases the amount of available water. Approximately three-quarters of the LKB Planning Area average annual rainfall of 48 inches occurs during the wet season. Without sufficient storage capacity, much of this water discharges to the ocean through surface water management systems and natural drainage. In the LKB Planning Area, potential water storage options include ASR systems and reservoirs, both of which are considered AWS options.

## Aquifer Storage and Recovery

Kissimmee River ASR Facility

ASR involves storing stormwater, surface water, fresh groundwater, potable water, or reclaimed water in an aquifer that has appropriate attributes (e.g., modest transmissivity, intergranular porosity, overlain by a competent confining unit, low ambient water salinity) and subsequently recovering the water when needed. In this process, an aquifer acts as an underground reservoir for injected water. The injected water is treated to appropriate standards, which may vary depending on the water quality of the receiving aquifer, and then pumped into the aquifer through a well (stored). The water is pumped back out (recovered) at a later date and treated for use when needed. The amount of water recovered depends on subsurface conditions, storage time, and water quality. The level of treatment required during recovery depends on the intended use of the water (e.g., public consumption, irrigation, surface water augmentation, wetlands enhancement).

The volume of water made available through ASR depends on several factors, including well yield, water availability, aquifer characteristics, variability in water supply and demand, and use type. There are uncertainties that need to be addressed with the implementation of ASR systems, but this storage option has the potential to retain substantial quantities of water that otherwise would be lost through discharge to the ocean, deep well injection, or evaporation.

To date, two ASR facilities have been constructed and tested within the LKB Planning Area. One facility was built and operated by the SFWMD in the 1980s along the L-63N Canal within Taylor Creek. The USACE built the second facility along the Kissimmee River, just north of Lake Okeechobee, as a Comprehensive Everglades Restoration Plan (CERP) pilot project and tested it from 2010 through 2012. In addition to these early projects, multiple FAS wells have been constructed by the Seminole Tribe of Florida, and agricultural landowners throughout the planning area that indicate favorable hydrogeologic conditions for ASR development. ASR wells are a component of the Lake Okeechobee Watershed Restoration Project's Tentatively Selected Plan developed by the USACE and SFWMD. As part of the project, up to 55 ASR wells could be constructed around Lake Okeechobee and will work in tandem with other components such as the Kissimmee River Center and Paradise Run wetland restoration projects totaling 5,900 acres. Further information about these projects is provided in **Chapter 7**.

### Local and Regional Reservoirs

Surface water reservoirs allow storage of water, primarily captured during wet weather conditions, for use during the dry season and are considered an AWS source. Water typically is captured and pumped from rivers or canals and stored in aboveground or inground reservoirs. Small-scale (local) reservoirs are used by agricultural operations for storage of recycled irrigation water or collection of stormwater runoff. These reservoirs also may provide water quality treatment before off-site discharge. Large-scale (regional) reservoirs are used for stormwater attenuation, water quality treatment in conjunction with stormwater treatment areas, and storage of seasonally available water, which may have a water supply component. An example of a regional reservoir in the LKB Planning Area is the 200,000-acre-foot reservoir proposed as part of the Lake Okeechobee Component A Storage Reservoir. In addition, the IMWID 308-acre reservoir and pump station are used for water quality treatment and water supply for agricultural uses in the area. The IMWID also has plans to build a 400-acre reservoir for the same purposes.

## SUMMARY OF WATER SOURCE OPTIONS

Water users in the LKB Planning Area rely on surface water and fresh groundwater for urban, agricultural, and industrial uses. Most PS demand is met by the OUA with surface water from Lake Okeechobee. The other four utilities in the LKB Planning Area rely on fresh groundwater. AG relies on a combination of surface water and fresh groundwater and is the largest user of both surface water and groundwater.

Increased use of surface water in the LKB Planning Area is limited by RAAs. Existing and proposed regulatory measures (e.g., MFLs, RAAs, water reservations) limit surface water availability from Lake Istokpoga, the Kissimmee River, and Lake Okeechobee.

Withdrawals from the SAS primarily are for AG, CII, and DSS uses. The FAS produces fresh water in much of the LKB Planning Area and is the most used water source. Use of the FAS likely will continue to meet future water demands in the region as it is a practical solution to meet some of the region's AG needs when surface water availability is limited.

Reclaimed water can be used to meet new uses or replace freshwater sources and potable water currently used for irrigation or industrial purposes. Additionally, water storage

features such as reservoirs, ASR wells, and impoundments can capture excess stormwater, groundwater, and surface water during wet weather periods and provide supplemental water supply for AG, PS, natural systems, and other needs.

Overall, water demands in the LKB Planning Area can continue to be met during 1-in-10-year drought conditions over the planning horizon using traditional sources. Because surface water sources are limited by regulatory constraints, any increases in future demands are expected to be met using groundwater, primarily from the UFA.

# REFERENCES


FDEP. 2023. *OCULUS Electronic Document Management System*. Florida Department of Environmental Protection, Tallahassee, FL. Available online at https://depedms.dep.state.fl.us/Oculus/servlet/login.

Kimley Horn. 2023. *Water Supply Cost Estimation Study*. Prepared for the South Florida Water Management District, West Palm Beach, FL. Kimley Horn, West Palm Beach, FL. January 2023.

SFWMD. 2021. *2021–2024 Support Document for Water Supply Plan Updates*. South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2022. *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District*. South Florida Water Management District, West Palm Beach, FL. June 13, 2022.

SFWMD. 2024a. *2023–2024 Lower East Coast Water Supply Plan Update.* South Florida Water Management District, West Palm Beach, FL. September 2024.

SFWMD. 2024b. *South Florida Water Management District 2022 Estimated Water Use Report.* South Florida Water Management District, West Palm Beach, FL. February 2024.

SFWMD, FDEP, and Florida Department of Agriculture and Consumer Services. 2011. *Lake Okeechobee Protection Plan Update*. South Florida Water Management District, West Palm Beach, FL; Florida Department of Environmental Protection, Tallahassee, FL; and Florida Department of Agriculture and Consumer Services, Tallahassee, FL. March 2011.

# 6

# Water Resource Analyses

This chapter provides historical data and analyzes the current and future status of water resources in the Lower Kissimmee Basin (LKB) Planning Area of the South Florida Water Management District (SFWMD or District) as well as their limitations and ability to meet the projected demands described in **Chapter 2**. The issues identified in this chapter may affect the use of existing water resources and the development of new supplies to meet projected water demands for 2045. Understanding the relationship and effect of meeting water demands through withdrawals from water resources while not causing harm to the water resource and related natural systems is critical to water supply planning.

TOPICS

- Summary of Issues and Considerations Identified for 2045
- Evaluation and Analyses
- Surface Water Availability
- Groundwater Availability
- Climate Change
- Summary of Water Resource Analyses

## SUMMARY OF ISSUES AND CONSIDERATIONS IDENTIFIED FOR 2045

Past analyses have concluded groundwater, in conjunction with currently permitted surface water, is adequate to meet existing and future needs of the LKB Planning Area during 1-in-10-year drought conditions. Although water sources appear sufficient to meet projected 2045 demands for this *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update), there are issues, similar to those identified in the *2019 Lower Kissimmee Basin Water Supply Plan Update* (2019 LKB Plan; SFWMD 2019), that affect the availability of water in the LKB Planning Area. The following water supply issues continue to influence water supply planning efforts:

- Water needs of the Kissimmee River Restoration Project and the Kissimmee River and Chain of Lakes water reservations (Rule 40E-10.071, Florida Administrative Code)
- Regulatory limitations that prohibit additional surface water allocations from Lake Istokpoga and the Indian Prairie Canal System above existing allocations
- Regulatory limitations that currently prohibit net increases in the volume of surface water withdrawn from Lake Okeechobee and the integrated conveyance systems that are hydraulically connected to and receive water from Lake Okeechobee over that resulting from base condition water uses

- Continued compliance with the 1987 Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Public Law 100-228, 101 Statute 1566, and Chapter 87-292, Laws of Florida, as codified in Section 285.165, Florida Statutes) and the implementing agreements
- The cumulative effects of groundwater withdrawals on the Lake Wales Ridge water bodies in the Southwest Florida Water Management District (SWFWMD) that have associated minimum flow and minimum water level (MFL) criteria
- The effects of climate change, particularly changes in rainfall patterns, including drought and storm frequency and intensity, on agricultural irrigation demands

# EVALUATION AND ANALYSES

Data and information from many sources were considered in developing this water supply plan update. The following information sources were used to evaluate water resources in the LKB Planning Area, including their availability and ability to meet projected demands considering the issues listed above:

- Input from planning area stakeholders and the public
- Analyses and modeling results from the *2014 Lower Kissimmee Basin Water Supply Plan* (2014 LKB Plan; SFWMD 2014)
- Water Supply Facilities Work Plans and capital improvement elements from local governments
- Amendments to Work Plans provided by the Seminole Tribe of Florida
- Activities and progress since the 2019 LKB Plan Update (SFWMD 2019), including water supply diversification
- Water use permits and permit applications
- Water supply demand projections for 2045 (**Chapter 2** and **Appendix A**)
- Hydrologic data for the surficial and Floridan aquifer systems (SAS and FAS) from monitoring wells in the LKB Planning Area
- Data and information from the Comprehensive Everglades Restoration Plan (CERP), including status of CERP projects from the associated Integrated Delivery Schedule
- Analyses performed as part of the 2024 Lake Okeechobee System Operating Manual (LOSOM) development

Based on information from the aforementioned sources, it was determined the analyses conducted in support of the 2014 LKB Plan and the 2019 LKB Plan Update (SFWMD 2014, 2019) are still valid for this 5-year plan update. The demand projections, assumptions, and resource protection criteria used in those analyses were reviewed and compared to current information. The projected groundwater demands in this plan update are lower than those previously analyzed; therefore, the 2014 and 2019 conclusions from groundwater simulations are considered conservative compared to current and projected scenarios. As a result, the findings and conclusions of the previous evaluations and analyses are still representative to address the 2045 projected water demands for the region.

# SURFACE WATER AVAILABILITY

In the LKB Planning Area, surface water is primarily used for agricultural irrigation and to a much lesser extent Commercial/Industrial/Institutional and direct withdrawal for Public Supply (PS). As described in **Chapter 5**, there are several surface water sources in the LKB Planning Area that could be considered to meet limited water supply needs. Most notably, the Kissimmee River, Lake Okeechobee, Lake Istokpoga, and the Indian Prairie Canal System. Resource protection criteria (**Chapter 4**) must be considered when determining the availability of water sources. Surface water use is limited by water reservations, MFLs, and restricted allocation area (RAA) rules and criteria.

## Kissimmee River

The potential to use the Kissimmee River as a water source to meet consumptive water supply needs is minimal due to the water reservations rule, limited physical access, and seasonal water availability. In addition, major segments of the river and surrounding floodplain wetlands have been restored to their prior channelization state. The Headwaters Revitalization component of the Kissimmee River Restoration Project creates additional water storage north of the LKB Planning Area, providing the water needed to improve the quantity and timing of the river's inflows and contributing to the restoration of the natural hydroperiod of floodplain wetlands. Further information about the Kissimmee River Restoration Project is provided in **Chapter 7**. The water reservations rule was adopted in 2021 for the Kissimmee River and Chain of Lakes, which identified and reserved water from consumptive use for the protection of fish and wildlife. Further information about the water reservations rule is provided in **Chapter 4**.

## Lake Okeechobee

Lake Okeechobee is formally addressed in the *2023–2024 Lower East Coast Water Supply Plan Update* (SFWMD 2024a). The Lake Okeechobee Service Area RAA criteria cover Lake Okeechobee and all surface water hydraulically connected to Lake Okeechobee. Net increases in the volume of surface water withdrawn from the RAA are prohibited over that resulting from base condition water use. Allocations over the base condition water use are only allowed through sources detailed in Section 3.2.1.F.3.c of the *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District* (Applicant's Handbook; SFWMD 2022).

## Lake Istokpoga and Indian Prairie Canal System

The RAA criteria were adopted in 1981 for the Lake Istokpoga/Indian Prairie Canal System (Section 3.2.1.A of the Applicant's Handbook [SFWMD 2022]) that prohibit additional surface water allocations from the lake and canal system above existing allocations. Lake Istokpoga is an MFL waterbody under a prevention plan, discussed further in **Chapter 4** and **Appendix C**. Previous water supply plans evaluated the amount of surface water in Lake Istokpoga and the Indian Prairie Canal System and found that water demands could be met during a 1-in-10-year drought with supplemental groundwater.

### *Surface Water Supplies to the Seminole Tribe of Florida–Brighton Reservation*

The Seminole Tribe of Florida has a surface water entitlement pursuant to the 1987 Water Rights Compact among the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Public Law 100-228, 101 Statute 1566, and Chapter 87-292, Laws of Florida, as codified in Section 285.165, Florida Statutes). Generally, the tribe is entitled to 15% of the total amount of water that can be withdrawn from SFWMD canals and borrow canals by all users from surface water within the Indian Prairie Basin, calculated by the SFWMD on a monthly basis. The parties executed subsequent documents addressing the entitlement. The *Agreement Between the SFWMD and the Seminole Tribe of Florida and Water Supply Plan for the Brighton Reservation Implementing Section VI.B of the Compact and Subparagraph 3.3.32.A.3 of the Criteria Manual* (Agreement No. C-4121) describes the optimal levels for various canal stretches that would allow the tribe to withdraw the entitlement and outlines an operational plan for releases from Lake Istokpoga or Lake Okeechobee during normal and water shortage conditions. The *Agreement between the South Florida Water Management District and the Seminole Tribe Providing for Water Quality, Water Supply, and Flood Control Plans for the Big Cypress Seminole Indian Reservations and the Brighton Seminole Indian Reservation, Implementing Sections V.C. and VI.D. of the Water Rights Compact* (usually referred to as the 1996 Agreement) addresses the SFWMD's mitigation responsibilities regarding impacts to the Seminole Tribe of Florida's ability to obtain surface water supplies at the Brighton Reservation.

In support of the 1987 Water Rights Compact and the tribe's water entitlement, as well as quantification of future growth at the Brighton Reservation, the SFWMD and the tribe initiated efforts in 2019 to determine future demands and to quantify regional surface water availability. The coordination effort resulted in a determination of the tribe's projected land use changes and associated allocation approved in the staff report for the Third Amendment to the 33rd Annual Work Plan. The SFWMD modeling efforts determined the regional surface water availability to be less than the allocation. To meet the difference between allocation and regional surface water availability, additional sources will need to be developed such as groundwater and reservoirs.

## Surface Water and Groundwater Relationships

The relationship between a surface water feature and the underlying groundwater system is based on the hydraulic characteristics of each aquifer and the thickness and type of soils separating the two features. When a river, canal, or wetland has a higher water level than the water table, these surface water bodies provide seepage into the local, shallow groundwater system. Conversely, when the water level of the surface water bodies is lower than the water table, groundwater discharge to surface water may occur. The rate at which this transfer occurs depends on the difference in these two levels and the permeability and thickness of the materials separating the surface water and groundwater. The SAS primarily is recharged by rainfall and interacts with surface water features such as rivers, canals, wetlands, and lakes. The SAS provides temporary storage for infiltrating water that eventually recharges underlying aquifers or moves laterally to discharge areas. Recharge to the FAS occurs along the central highlands of Florida, including the Lake Wales Ridge, north of the LKB Planning Area (**Figure 6-1**). Due to the highly transmissive and confined nature of the FAS, the effects of withdrawals from this aquifer system may extend long distances from the point of withdrawal.

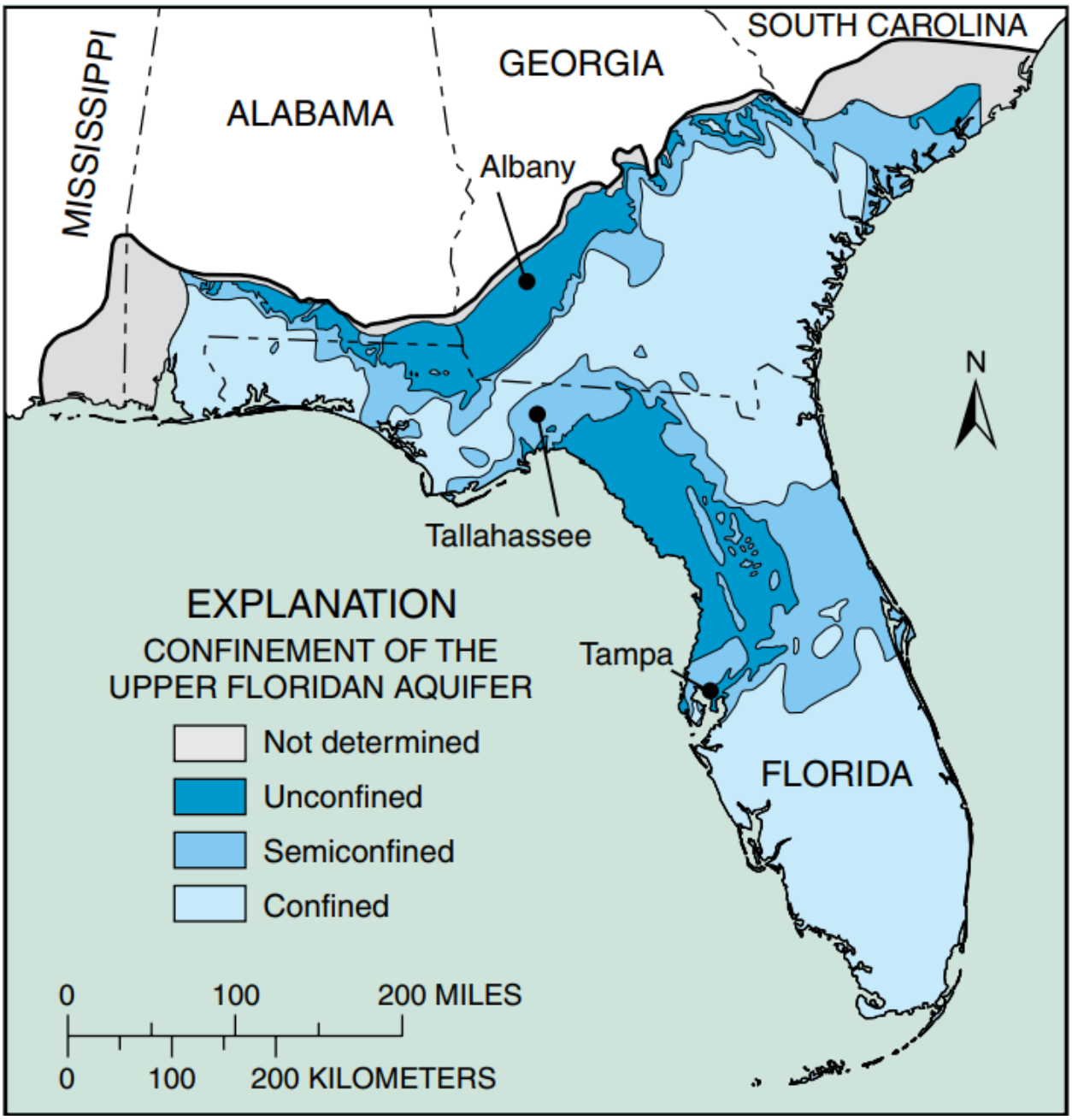



Figure 6-1. Extent and permeability of the Upper Floridan aquifer (From Marella and Berndt 2005). Recharge occurs where the aquifer is unconfined.

Differences between existing and projected future water demands have been minimal in previous plans and remain so in this water supply plan update. Because of the small projected increases in regional water demands, previous groundwater modeling efforts for the LKB Planning Area determined the potential for increased risk to lakes and wetlands, including areas along the Lake Wales Ridge, was minimal. Several lakes along the Lake Wales Ridge in Highlands County, such as lakes Placid, June-in-Winter, and Jackson, which are under the jurisdiction of the SWFWMD, have established MFLs. These lakes may have enhanced connections to the underlying aquifer systems. Due to these connections, increasing water supply withdrawals from the Upper Floridan aquifer (UFA) could affect water levels in the lakes. Further information about these water bodies and their MFLs is provided in **Chapter 4**.

### *2014 LKB Plan Analyses*

As summarized in the 2019 LKB Plan Update, the Lower Kissimmee Basin Groundwater Model (LKBGWM), simulated water levels for 2010 and 2035 as part of the 2014 LKB Plan Update (SFWMD 2014). Results of the LKBGWM simulations indicated FAS levels beneath the SWFWMD's Lake Wales Ridge MFL lakes will not be reduced due to water supply withdrawals in the LKB Planning Area. Therefore, the risk of adversely impacting the MFL prevention and recovery strategies for those lakes as a result of projected demands in the LKB Planning Area is considered low. The risk of impacts to Lake Istokpoga and Lake Okeechobee from increased groundwater use is believed to be minimal due to the small projected increase in groundwater withdrawals and the high degree of confinement between the FAS and the overlying SAS. The 2035 groundwater demands simulated by the LKBGWM (SFWMD 2014) were higher than the projected 2045 groundwater demands in this 2024 plan update. Therefore, the 2014 model results are considered a conservative representation of current and future conditions for this 2024 LKB Plan Update. Impacts to water resources, including the SWFWMD's Lake Wales Ridge MFL lakes, are not expected.

## GROUNDWATER AVAILABILITY

There are three aquifer systems in the LKB Planning Area: the SAS, the intermediate aquifer system/intermediate confining unit (IAS/ICU), and the FAS. In some locations, these systems are isolated from each other by confining units, while in other areas they are hydraulically connected. Additionally, in some places, these aquifer systems are well connected to surface water features, such as lakes and wetlands, but in other areas they are separated. The LKB Planning Area contains both well-confined aquifers near Lake Okeechobee and more hydraulically connected aquifers adjacent to the Lake Wales Ridge area. Groundwater availability could be limited in certain areas by the production capacity of the aquifer or by declines in water levels under lakes and wetlands as a result of groundwater withdrawals. **Figure 6-2** presents a map of individually permitted wells (excluding domestic wells) currently penetrating the various aquifers discussed in this section. In addition, hydrographs from selected monitoring wells from different aquifers are presented below to show changes in groundwater elevations. The locations of these wells are shown on **Figure 6-3**. Analyses of water levels from groundwater wells in the LKB Planning Area during this plan update showed that while groundwater levels fluctuate seasonally, few wells (in any aquifer system) exhibit a significant upward or downward trend in water levels.

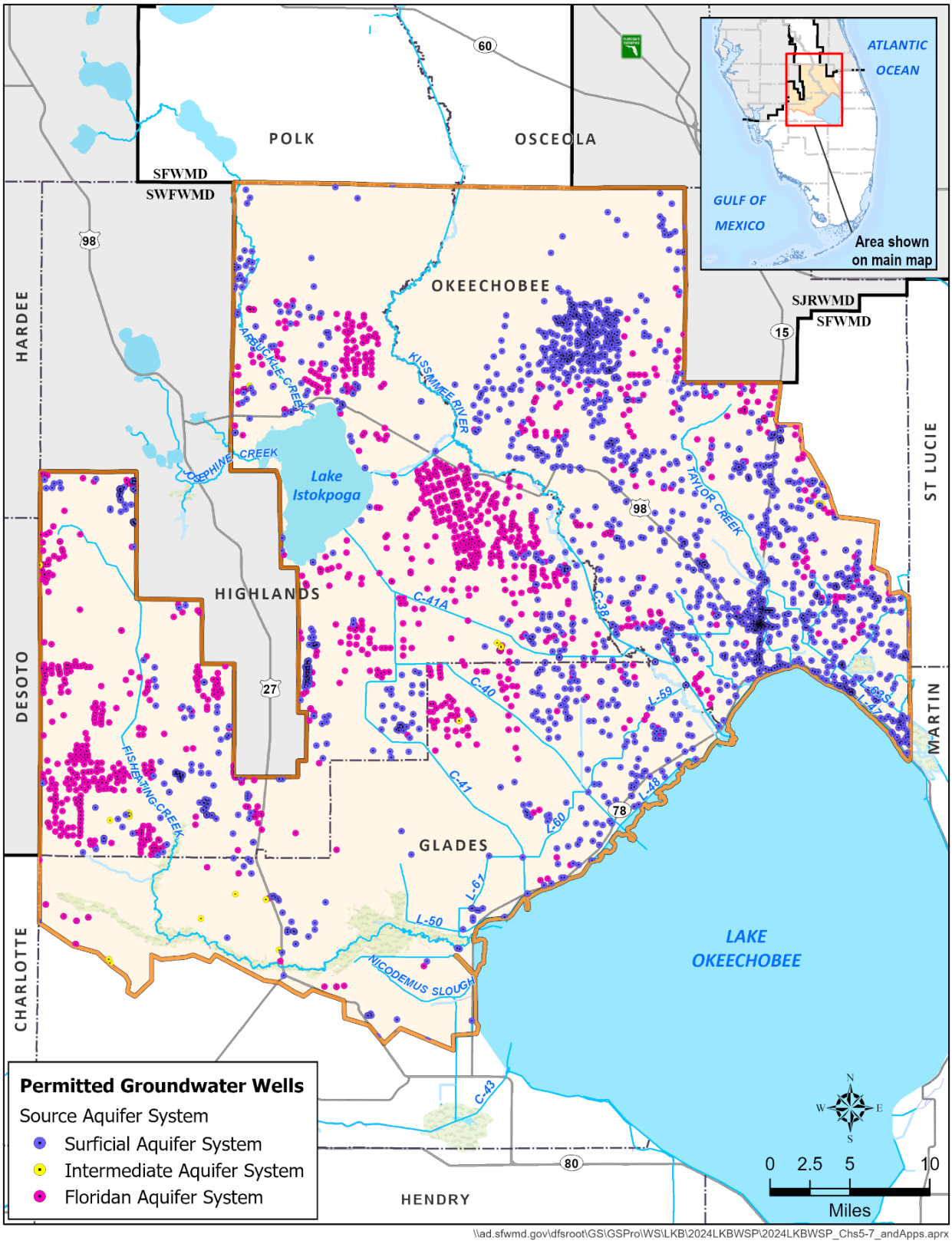



Figure 6-2. Permitted groundwater wells in the LKB Planning Area.

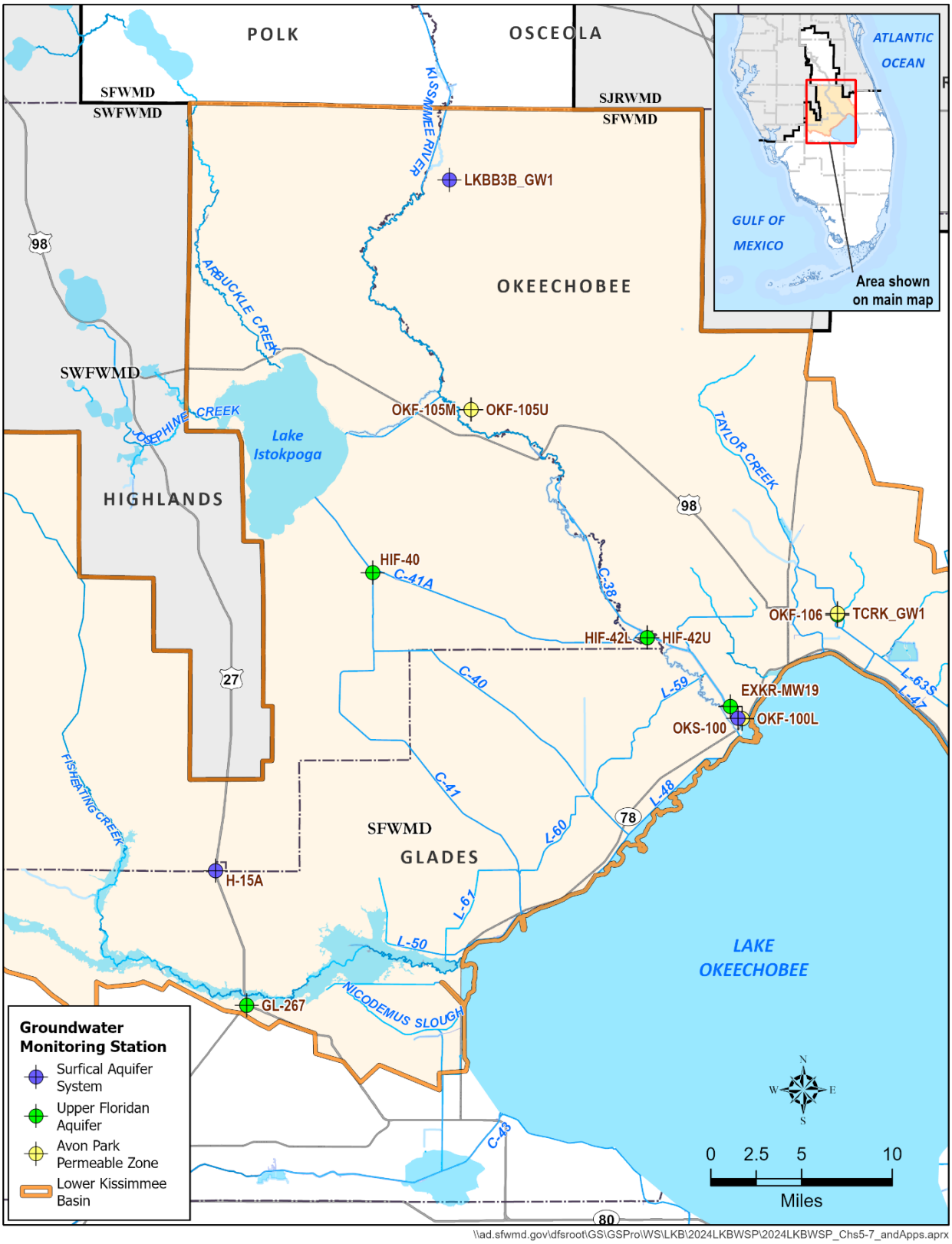



Figure 6-3. Groundwater monitoring wells used for analyses in this plan update.

## Surficial Aquifer System Evaluation

The SAS, including the Water Table aquifer, has been the primary source for potable water and urban irrigation throughout the LKB Planning Area. Utilities currently use surface water, the SAS, and FAS as water supply sources but are phasing out use of the SAS in favor of the UFA within the FAS. The SAS is recharged by infiltration from rain and local surface water bodies. Water availability from the SAS is affected by the rate of recharge and limited permeability of the aquifer system, potential wetland impacts from groundwater withdrawals, proximity to contamination sources, and other existing legal users. **Table 6-1** lists the SAS monitor wells used for evaluation.

Table 6-1. Minimum, maximum, and average groundwater elevations for select surficial aquifer system monitor wells in the LKB Planning Area.

| County | Well Name | Total Depth (ft bls) | Minimum Groundwater Elevation (ft NGVD29) | Maximum Groundwater Elevation (ft NGVD29) | Average Groundwater Elevation (ft NGVD29) |
|---|---|---|---|---|---|
| Okeechobee | OKS-100 | 110 | 9.72 | 16.17 | 13.43 |
| | LKBB3B_GW1 | 15 | 45.74 | 51.15 | 48.74 |
| Highlands | H-15A | 23 | 50.47 | 60.71 | 57.32 |

bls = below land surface; ft = feet; NGVD29 = National Geodetic Vertical Datum of 1929.

**Figures 6-4** to **6-6** are time-series hydrographs for three representative SAS monitor wells located in Okeechobee and Highlands counties (**Figure 6-3**). These time-series hydrographs illustrate long-term seasonal fluctuations in groundwater elevations between each wet and dry season, as well as long-term trends in groundwater elevations.

**Figure 6-4** shows the relationship between the wet and dry seasons and SAS groundwater levels in monitor well LKBB3B_GW1, located in the northern portion of Okeechobee County near the Kissimmee River. Groundwater elevations in this well have not shown any signs of decline since 2004. The groundwater elevation time-series plot shows the seasonality of the SAS, with the lowest groundwater elevations recorded around May of each year, near the end of the dry season, and the highest groundwater elevations recorded around October of each year, towards the end of each wet season.

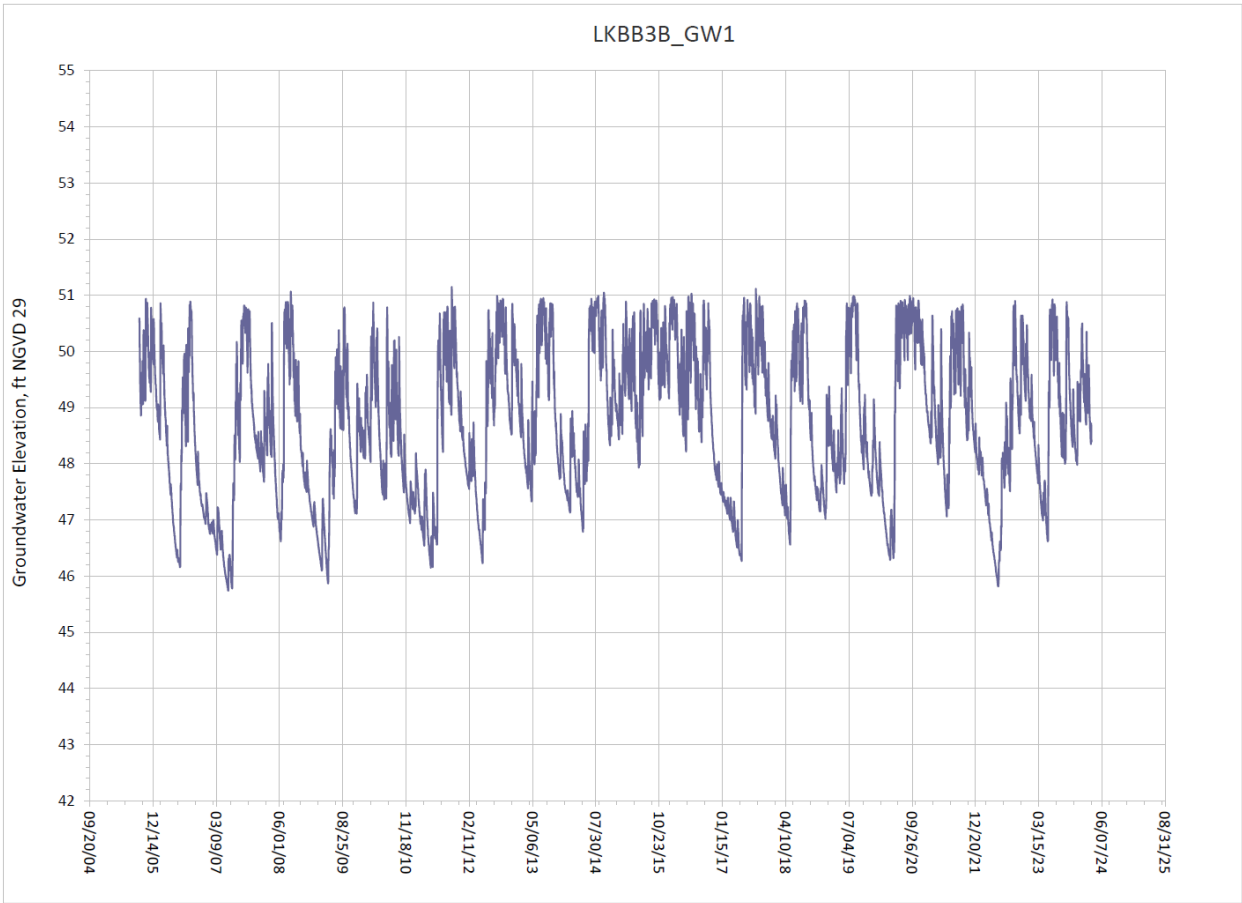



Figure 6-4. Groundwater elevations at surficial aquifer system monitor well LKBB3B_GW1, located in the northern portion of Okeechobee County near the Kissimmee River.

The long-term hydrograph for SAS monitor well OKS-100 (**Figure 6-5**), located on the eastern bank of the Kissimmee River at the southern outlet of the C-38S Canal near Lake Okeechobee, shows seasonal groundwater elevation trends and an upward trend in groundwater elevations over approximately the last 18 years. The groundwater elevations at this well are more erratic and variable than the other SAS wells analyzed, perhaps due to the seasonal variability of flows in the Kissimmee River that could affect SAS recharge.

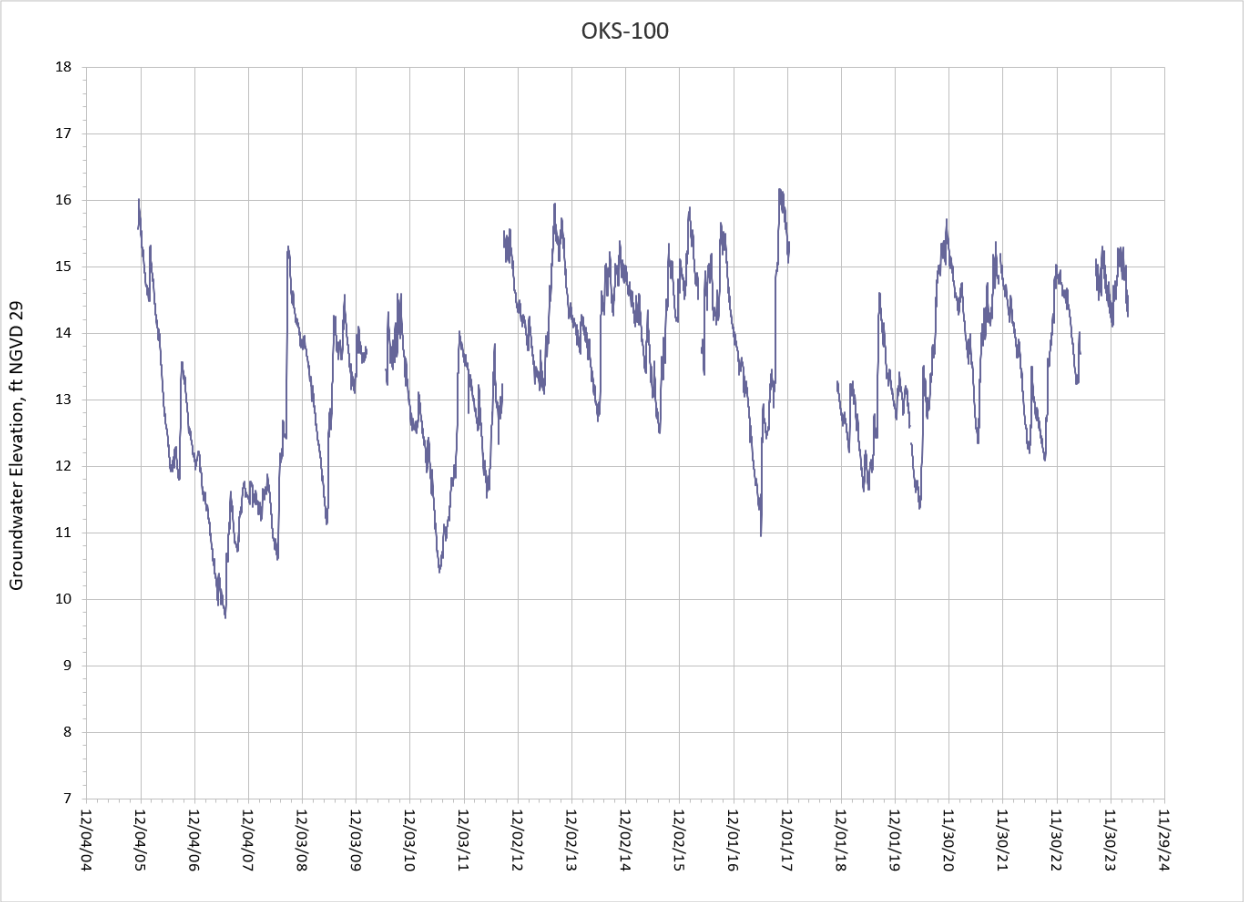



Figure 6-5. Groundwater elevations at surficial aquifer system monitor well OKS-100, located at the southern end of the C-38 Canal near Lake Okeechobee.

The long-term hydrograph for SAS monitor well H-15A, located east of US Highway 27 in northwestern Glades County, shows a slight downward trend in groundwater elevations and consistent seasonal high and low groundwater elevations over the nearly 40 year-long time series (**Figure 6-6**). The lowest groundwater elevations at this well have occurred between April and June of each year at the end of the dry season, and the highest groundwater elevations have occurred between June and October of each wet season. The record low for this well occurred in May 2009.

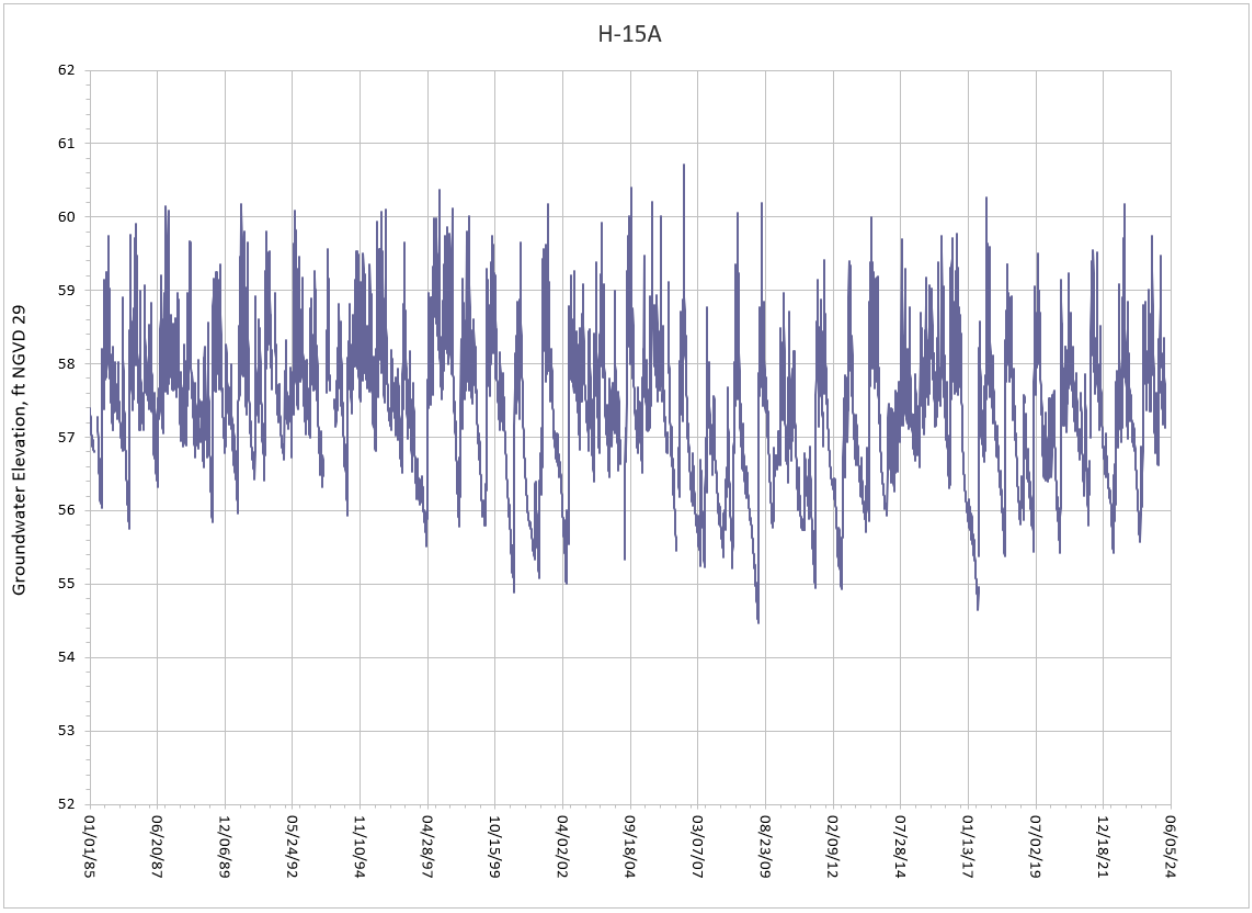



Figure 6-6. Groundwater elevations at surficial aquifer system monitor well H-15A, located in Glades County.

## Intermediate Aquifer System Evaluation

The IAS/ICU includes all of the rock units that lie between the SAS and the underlying FAS. In the LKB Planning Area, except in portions of western Highlands County, the IAS/ICU primarily acts as a confining layer, restricting vertical movement of water between the SAS and the underlying FAS. Due to a lack of geologic data, it is not clear where in Highlands County the transitional boundary of the sediments changes from a confining unit to an aquifer system. The entire system, including the water-producing units, has substantially lower permeability than the UFA. However, there are some permitted water users in southwestern Highlands and northwestern Glades counties that use the IAS as a water supply source. Water uses include livestock water supply, aquaculture, landscape irrigation, and domestic water supply. Where the IAS/ICU is productive, it is a source with moderate yield; well capacities range from 150 to 350 gallons per minute.

## Floridan Aquifer System Evaluation

The FAS is substantially more productive than the SAS and IAS in the LKB Planning Area; however, the water is naturally brackish in deeper portions. Within the FAS, the UFA is a primary source of water for many use categories in the LKB Planning Area and has demonstrated a high yield, with fresh water in the northern part of the planning area. The UFA is thickest in Glades and Okeechobee counties, averaging more than 1,000 feet. Water quality parameters such as chloride, total dissolved solids (TDS), and sulfate concentrations increase with depth and distance to the south, east, and west. Recharge to the FAS occurs along the central highlands of Florida, including the Lake Wales Ridge outside the LKB Planning Area. Due to the highly transmissive and confined nature of the FAS, the effects of withdrawals from this aquifer system may extend long distances from the point of withdrawal. The FAS also is under artesian conditions (i.e., the wells flow naturally at land surface), except in the area around Lake Wale Ridges where land surface elevation may be higher than the potentiometric surface of the aquifer.

There is little hydraulic, water level, or water quality data available for the Lower Floridan aquifer (LFA) in the LKB Planning Area. Use of the LFA as a water source historically has been limited in the region due to TDS levels that are too high for crop irrigation and public consumption without membrane treatment. For this alternative water source to be considered for future development, additional drilling and testing will be necessary to determine aquifer transmissivity and water quality characteristics.

### *Upper Floridan Aquifer Water Levels*

**Table 6-2** provides a summary of the four UFA wells analyzed for this water supply plan. **Figures 6-7** to **6-10** are time-series hydrographs for these FAS monitor wells located in Okeechobee, Glades, and Highlands counties (**Table 6-2**). The time-series hydrographs illustrate long-term seasonal fluctuations in groundwater elevations between each wet and dry season, as well as long-term groundwater elevation trends in the UFA.

Table 6-2. Minimum, maximum, and average groundwater elevations for select Upper Floridan aquifer monitor wells in the LKB Planning Area.

| County | Well Name | Total Depth (ft bls) | Minimum Groundwater Elevation (ft NGVD29) | Maximum Groundwater Elevation (ft NGVD29) | Average Groundwater Elevation (ft NGVD29) |
|---|---|---|---|---|---|
| Okeechobee | OKF-105U | 525 | 41.66 | 48.15 | 45.89 |
| | OKF-106 | 818 | 41.96 | 47.80 | 45.47 |
| Glades | GL-267 | 600 | 30.06 | 45.07 | 40.15 |
| Highlands | HIF-40 | 600 | 42.41 | 49.95 | 47.01 |

bls = below land surface; ft = feet; NGVD29 = National Geodetic Vertical Datum of 1929.

**Figure 6-7** shows that the groundwater elevations at UFA well OKF-105U, located just north of the Kissimmee River in central Okeechobee County, have been steadily increasing over the last 15 years, with seasonal wet season highs occurring in October or November of each year and the lowest groundwater elevations occurring generally around May of each year near the end of each dry season. During 2012 and 2017, groundwater elevations reached the two lowest elevations recorded at this well. The seasonal lows have been consistent since 2018.

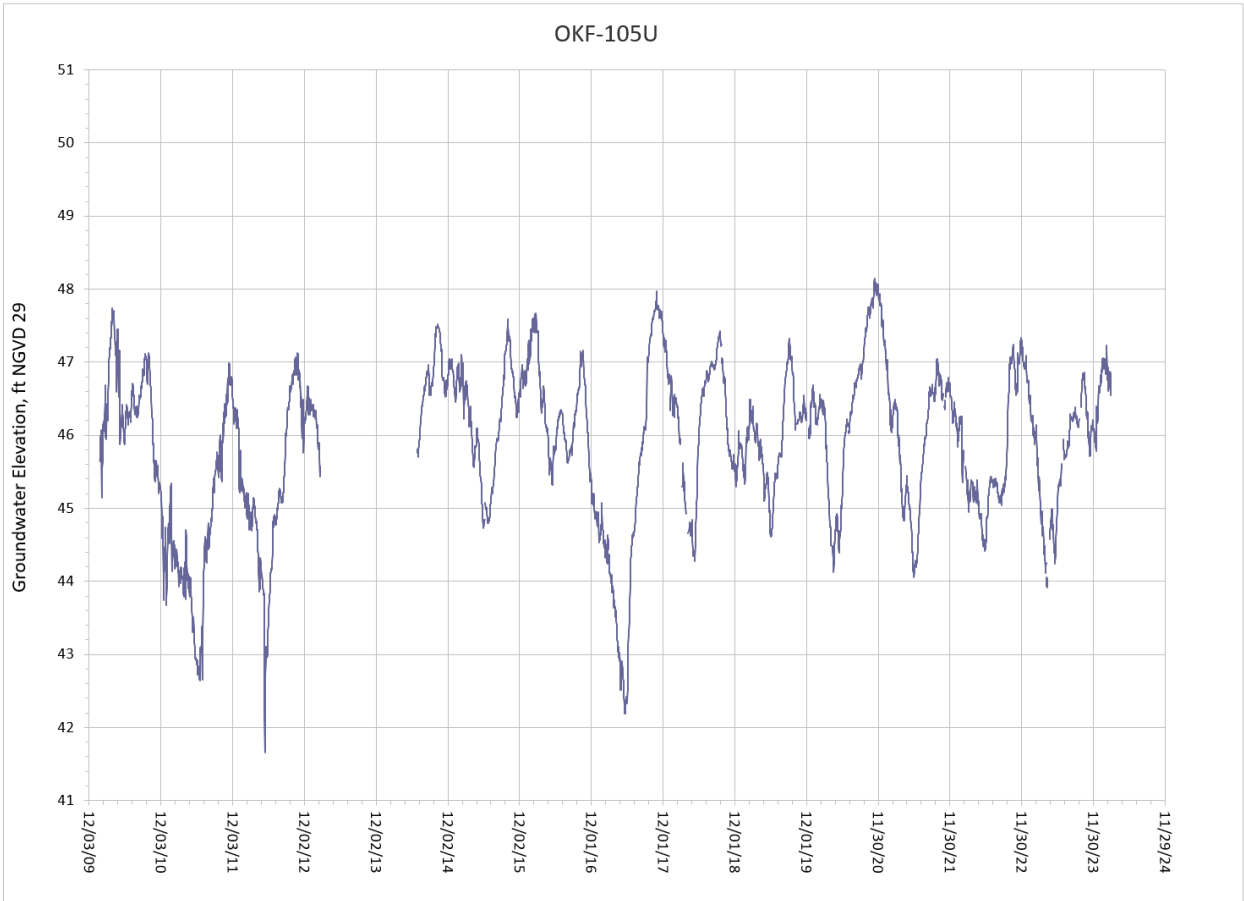



Figure 6-7. Groundwater elevations in Upper Floridan aquifer monitor well OKF-105U, located just north of the Kissimmee River in central Okeechobee County.

**Figure 6-8** shows that the groundwater elevations at UFA monitor well OKF-106, located at the Taylor Creek pilot aquifer storage and recovery site in eastern Okeechobee County, have been steadily increasing since 2009, with seasonal wet season highs occurring in October or November of each year and the lowest groundwater elevations occurring generally around May or June of each year near the end of each dry season. During 2009, 2011, and 2016, groundwater elevations reached the lowest elevations recorded at this well. The seasonal lows have been consistent since 2018.

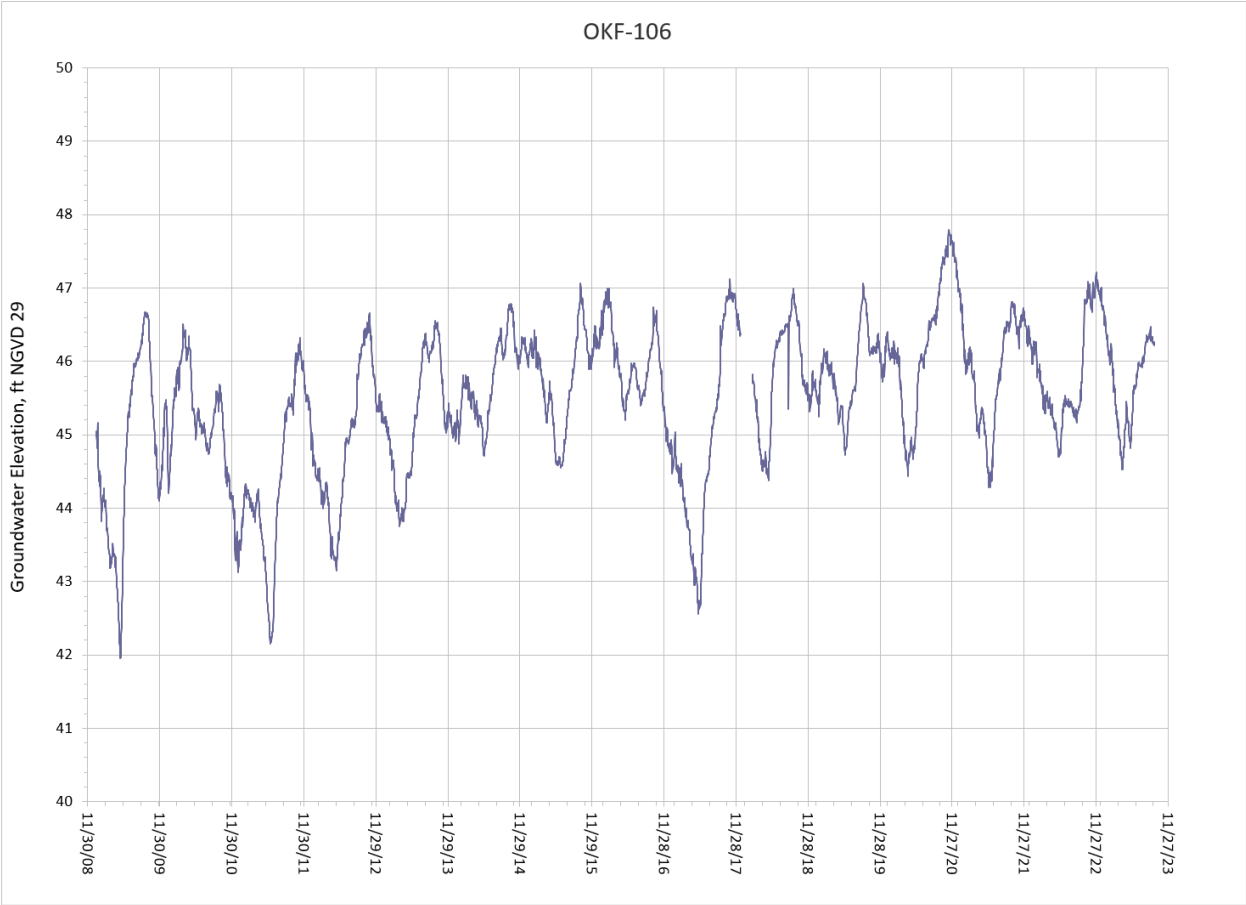



Figure 6-8. Groundwater elevations in Upper Floridan aquifer monitor well OKF-106, located at the Taylor Creek pilot aquifer storage and recovery site in eastern Okeechobee County.

**Figure 6-9** shows that the groundwater elevations at UFA monitor well GL-267, located near Fisheating Creek in Glades County, have decreased approximately 5 feet since 1998. Seasonal wet season highs were recorded between August and October of each year, and the lowest groundwater elevations occurred between April and June of each year near the end of each dry season. On April 11, 2023, groundwater elevations reached the lowest elevation recorded at this well.

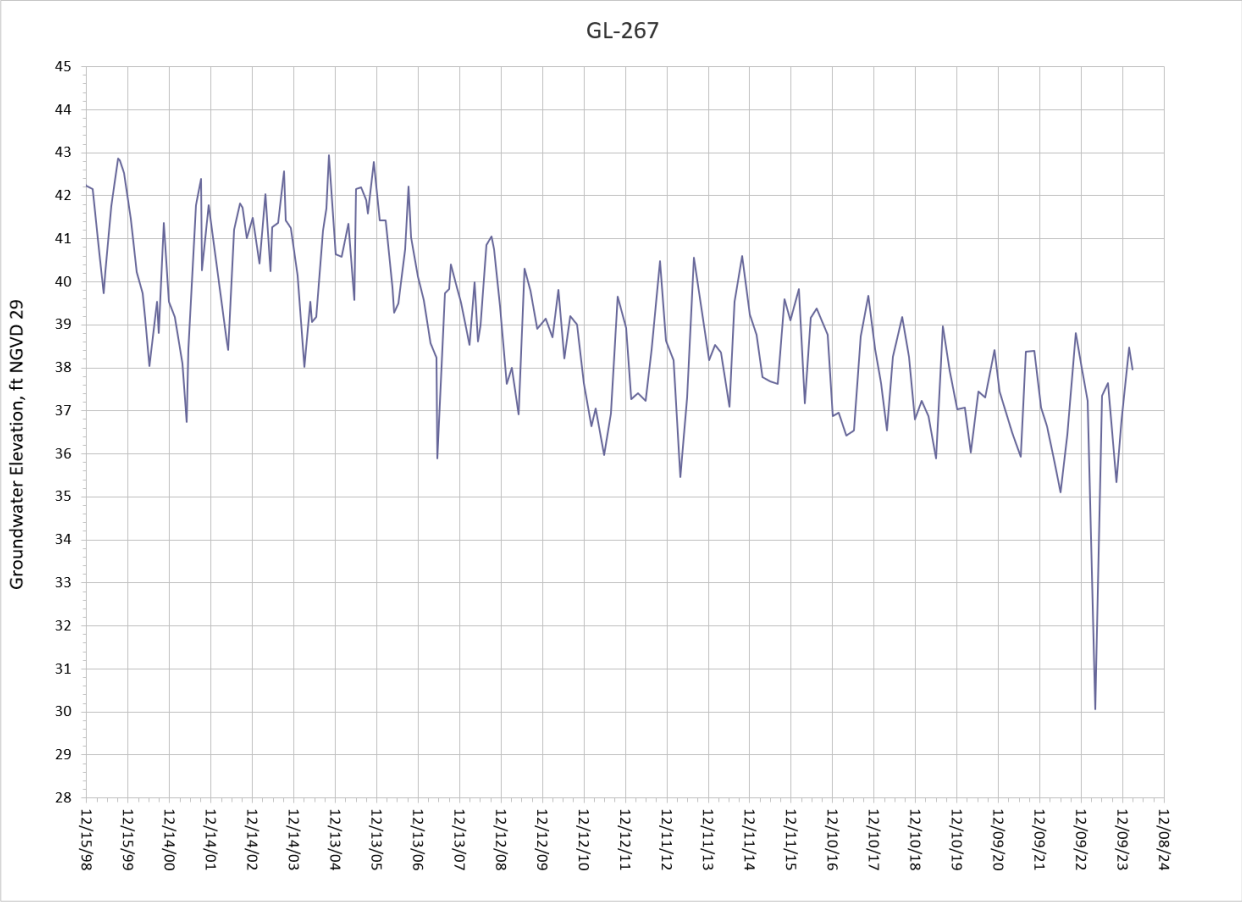



Figure 6-9. Groundwater elevations in Upper Floridan aquifer monitor well GL-267, located near Fisheating Creek in Glades County.

Groundwater elevations at UFA monitor well HIF-40, located at the C-41/C-41A Canal juncture in Highlands County, recorded an increasing ground water elevation trend from 2007 to 2017 (**Figure 6-10**). From 2017 to 2024, however, groundwater elevations have shown a slight decreasing trend. Seasonal wet season highs were recorded in September and October of each year, and the lowest groundwater elevations occurred in April, May, or June of each year near the end of each dry season. On May 12, 2009, groundwater elevations reached the lowest elevation recorded at this well.

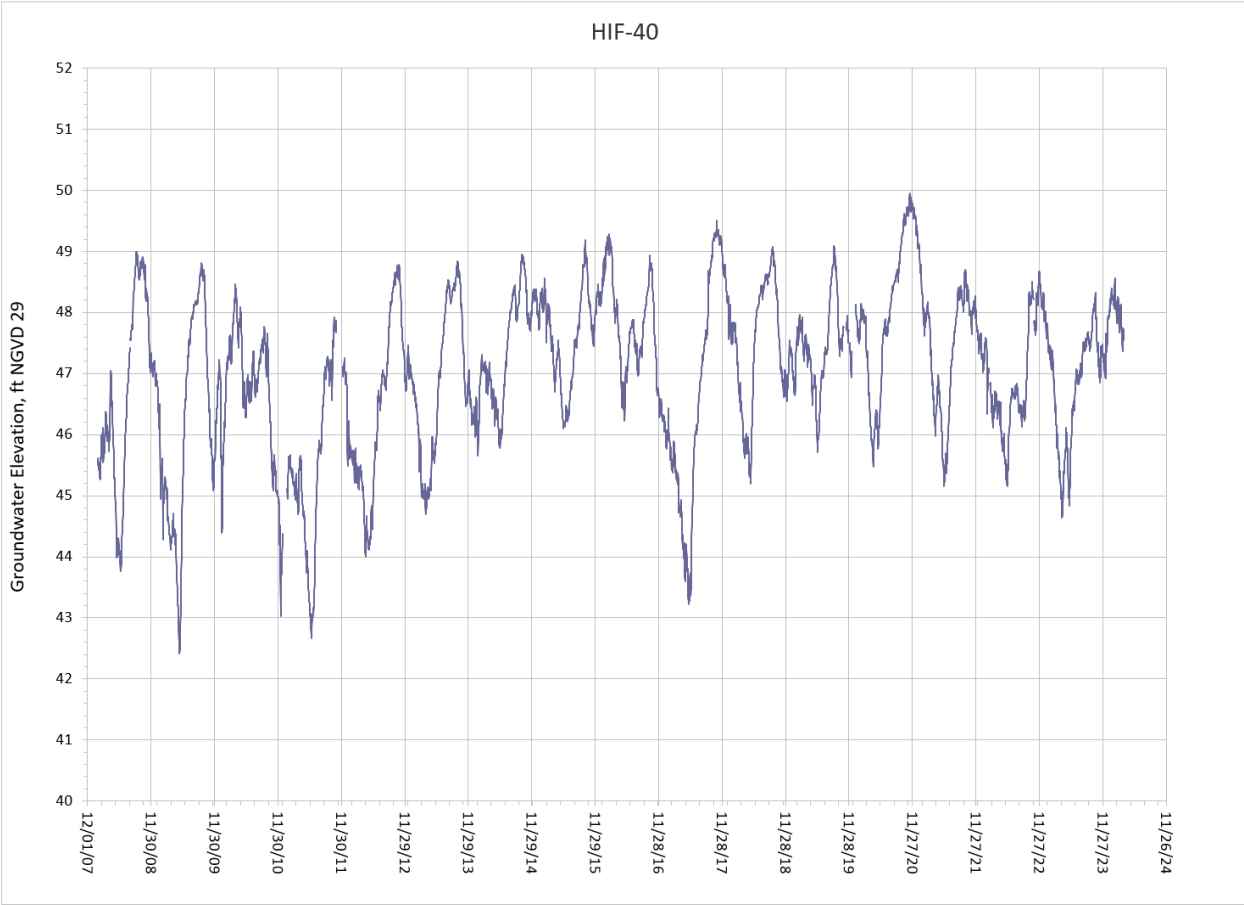



Figure 6-10. Groundwater elevations in Upper Floridan aquifer monitor well HIF-40, located at the C-41/C-41A Canal juncture in Highlands County.

### *Avon Park Permeable Zone Water Levels*

The Avon Park permeable zone (APPZ) is a regionally extensive, highly productive aquifer zone within one or more fractured dolostone intervals in the Avon Park Formation of the FAS. Monitor well TCRK_GW1, located at the Taylor Creek aquifer storage and recovery site near Taylor Creek and the L-63S Canal in Okeechobee County (**Figure 6-3**), monitors groundwater elevations in the APPZ. **Table 6-3** provides the summary of groundwater elevation information for this well.

Table 6-3. Minimum, maximum, and average groundwater elevations for Avon Park permeable zone monitor well TCRK_GW1 in the LKB Planning Area.

| County | Well Name | Total Depth (ft bls) | Minimum Groundwater Elevation (ft NGVD29) | Maximum Groundwater Elevation (ft NGVD29) | Average Groundwater Elevation (ft NGVD29) |
|---|---|---|---|---|---|
| Okeechobee | TCRK_GW1 | 1,075 | 42.41 | 48.73 | 46.04 |

bls = below land surface; ft = feet; NGVD29 = National Geodetic Vertical Datum of 1929.

The groundwater elevations recorded at TCRK_GW1 since September 2002 (**Figure 6-11**) have remained consistent with only a very slight downward trend. Since 2014, however, groundwater elevations at this well have been stable and show no indication of an increasing or decreasing trend. Seasonal highs at this APPZ well occur between September and October of each year, and seasonal lows occur from April to June of each year, with the three lowest groundwater elevations recorded in May 2009, June 2011, and May 2017.

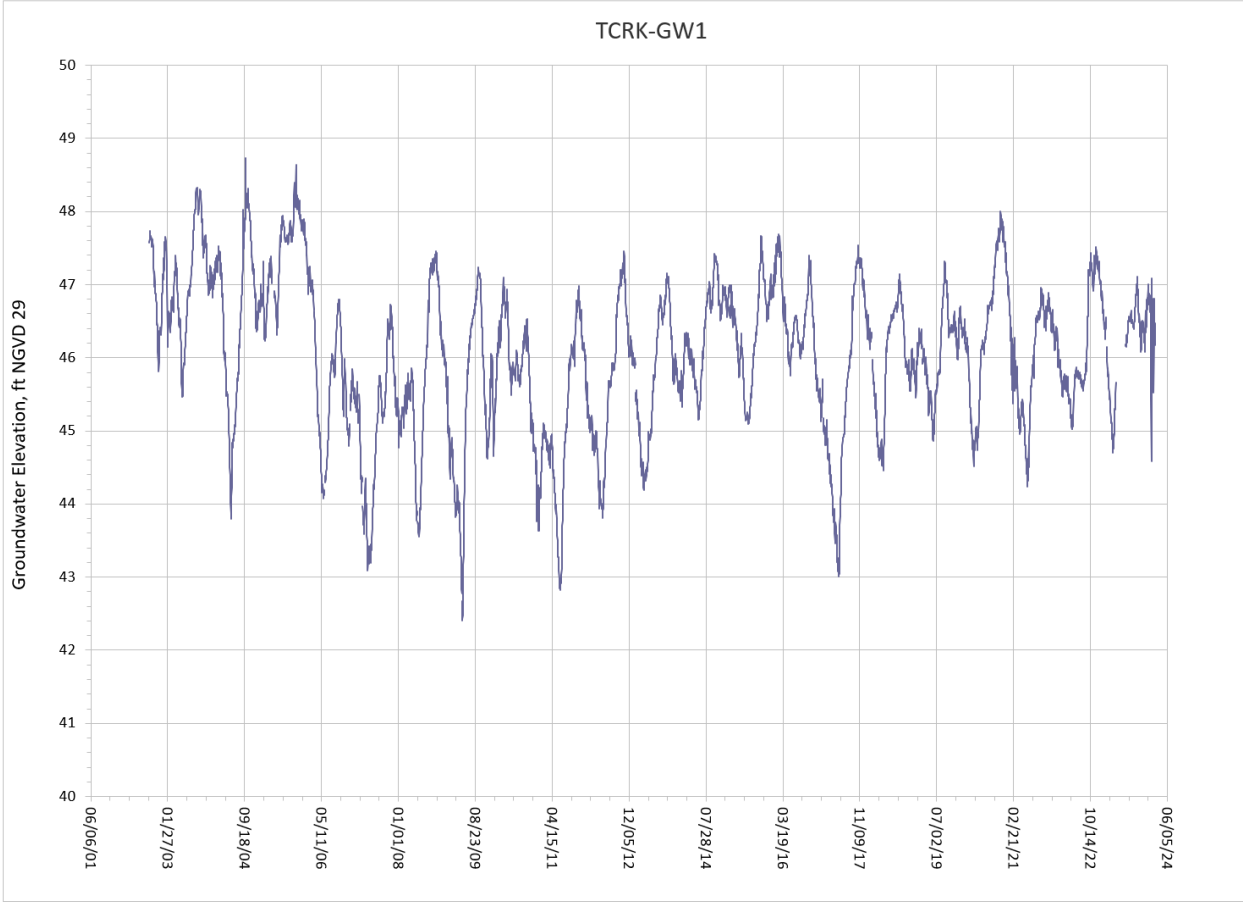



Figure 6-11. Groundwater elevations in Avon Park permeable zone monitor well TCRK_GW1, located at the Taylor Creek aquifer storage and recovery site near Taylor Creek and the L-63S Canal in Okeechobee County.

## *Upper Floridan Aquifer and Avon Park Permeable Zone Water Quality*

Most water withdrawn from the FAS comes from the UFA because it is less mineralized than water from the APPZ. Overall, water quality in the UFA is suitable for PS and agricultural irrigation; however, high TDS concentrations in some areas of the planning region have limited use of the UFA. Chloride and sulfate concentrations as well as water hardness may require advanced treatment prior to use, which adds to operating costs for utilities and agricultural operations. The SFWMD and the United States Geological Survey (USGS) monitor the FAS using a regional network of monitor wells. Additional data are collected by water use permittees as part of their water use permit monitoring requirements (issued by the SFWMD) and injection wells (issued by the Florida Department of Environmental Protection). The SFWMD's Regional Floridan Groundwater monitoring program consists of a network of monitor wells completed in the various producing zones of the FAS (i.e., UFA, APPZ, LFA) from which groundwater elevations and water quality samples are collected. Time-series plots showing changes in chloride concentration over time are presented in **Figures 6-12** to **6-19** for five UFA monitor wells (EXKR-MW19, HIF-40, HIF-42U, OKF-105U, and OKF-106) and three APPZ wells (HIF-42L, OKF-100L, and OKF-105M).

As shown in **Figure 6-12**, chloride concentrations in UFA monitor well EXKR-MW19, located near the Kissimmee River and Lake Okeechobee juncture in Glades County remained stable between September 2018 and February 2022, followed by a decline of 32 milligrams per liter (mg/L) between February 2022 and October 2022.

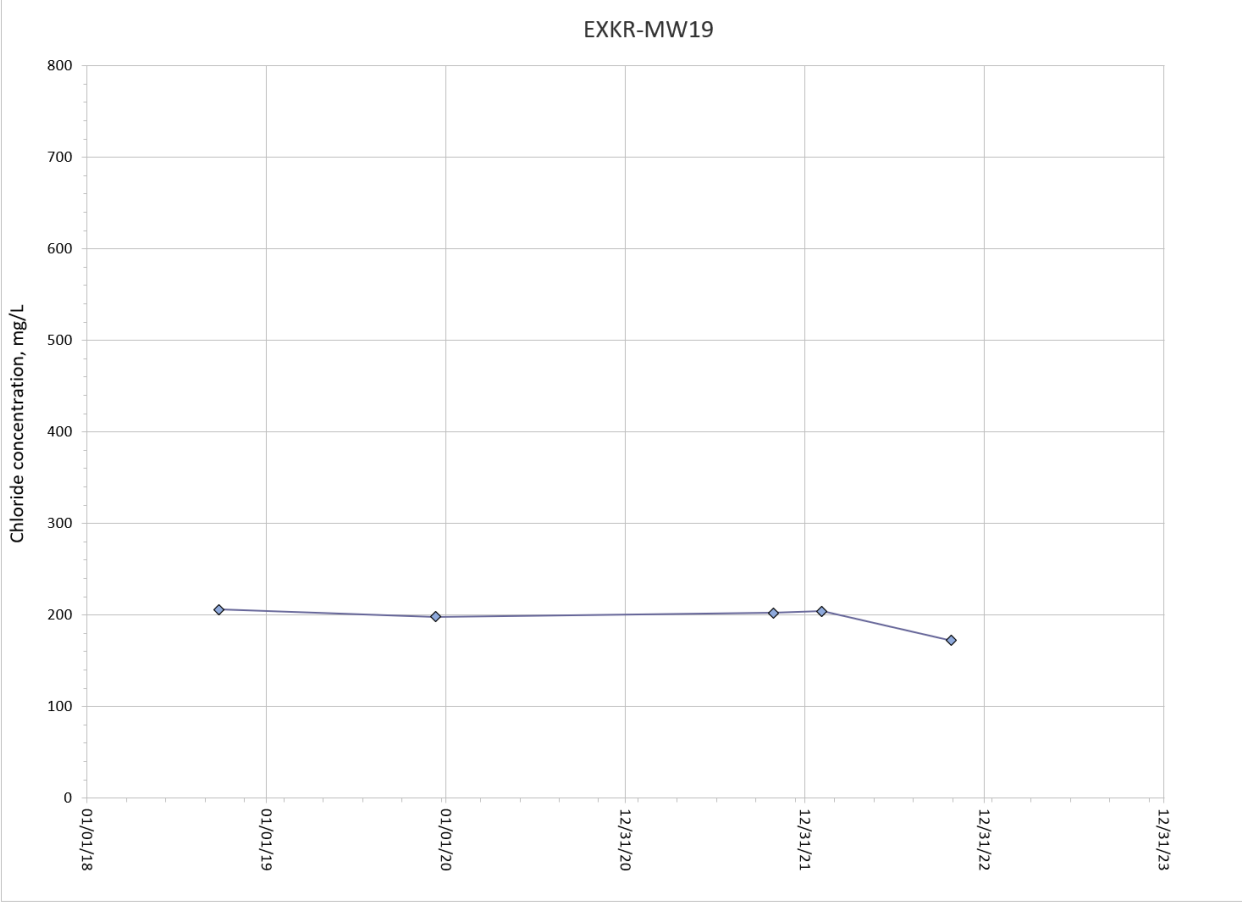



Figure 6-12. Chloride concentrations in Upper Floridan aquifer monitor well EXKR-MW19, located near the Kissimmee River and Lake Okeechobee juncture in Glades County.

As shown in **Figure 6-13**, chloride concentrations in UFA monitor well HIF-40, located at the C-41/C-41A Canal juncture in Highlands County, remained stable between January 2008 and October 2022.

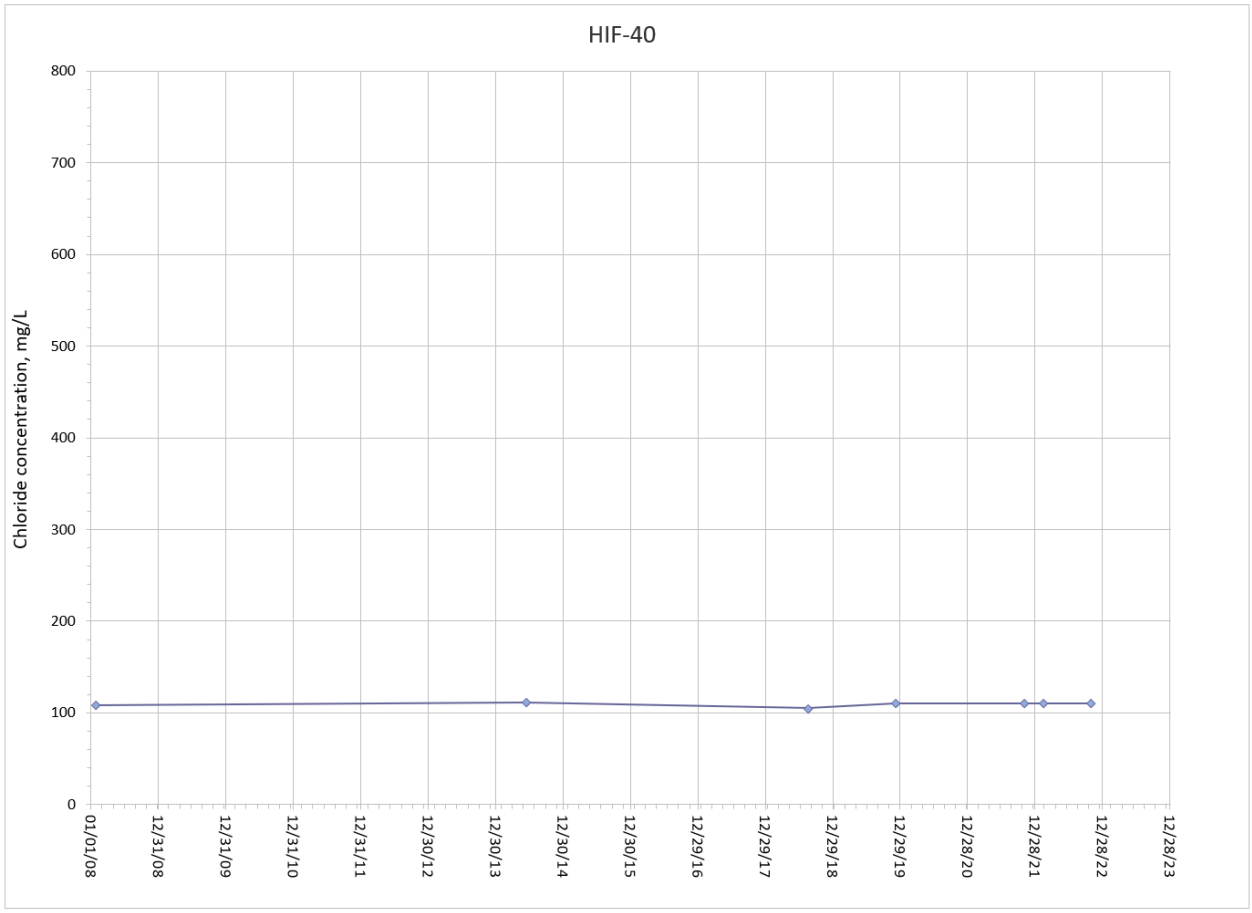



Figure 6-13. Chloride concentrations in Upper Floridan aquifer monitor well HIF-40, located at the C-41/C-41A Canal juncture in Highlands County.

As shown in **Figure 6-14**, chloride concentrations in UFA monitor well HIF-42U, located near the Kissimmee River and the C-41A Canal juncture in Highlands County, have remained stable since May 2008.

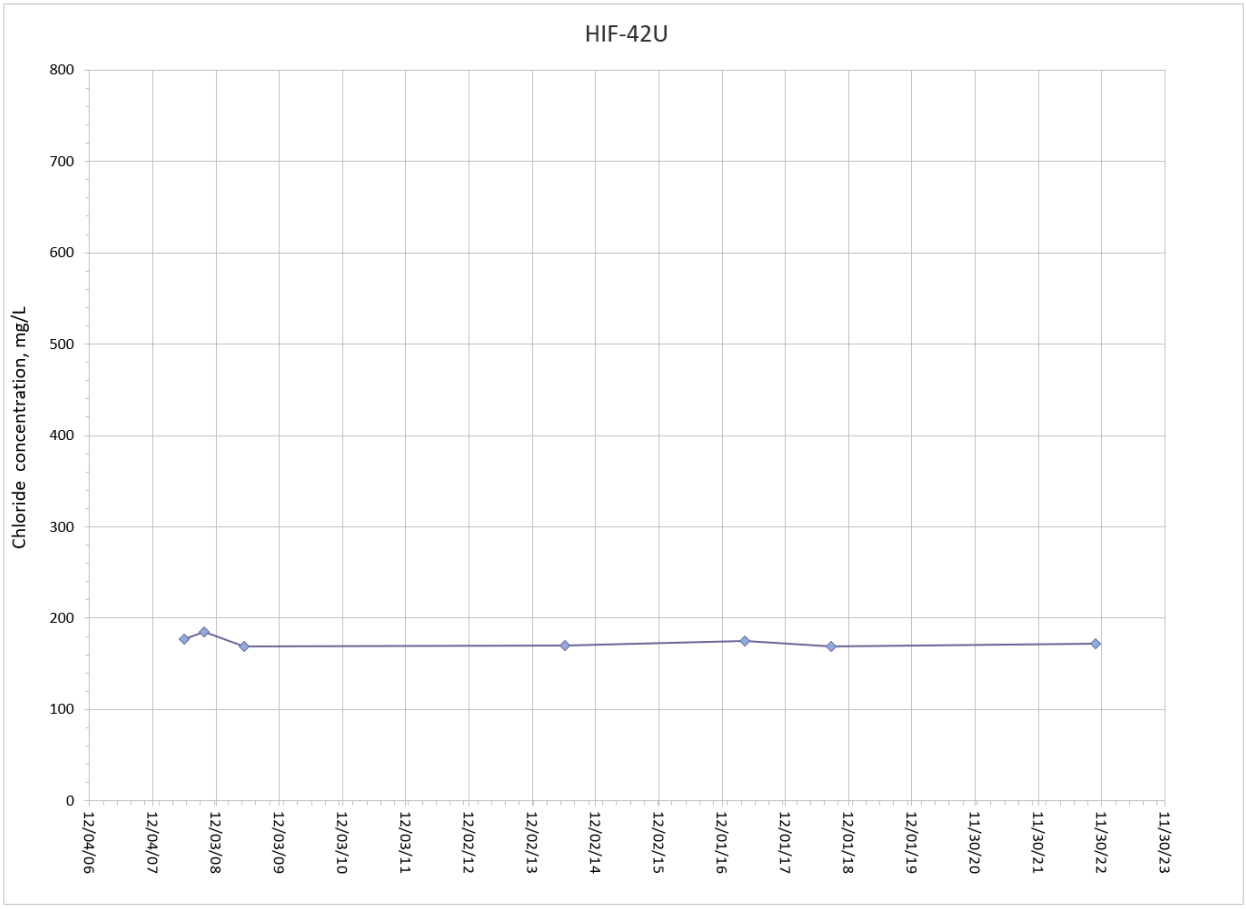



Figure 6-14. Chloride concentrations in Upper Floridan aquifer monitor well HIF-42U, located near the Kissimmee River and the C-41A Canal juncture in Highlands County.

As shown in **Figure 6-15**, chloride concentrations in UFA monitor well OKF-105U, located near the Istokpoga Canal and the Kissimmee River juncture in Okeechobee County, have remained stable since June 2015. Since June 2015, the chloride concentrations have remained low, with concentrations ranging from 113 to 128 mg/L.

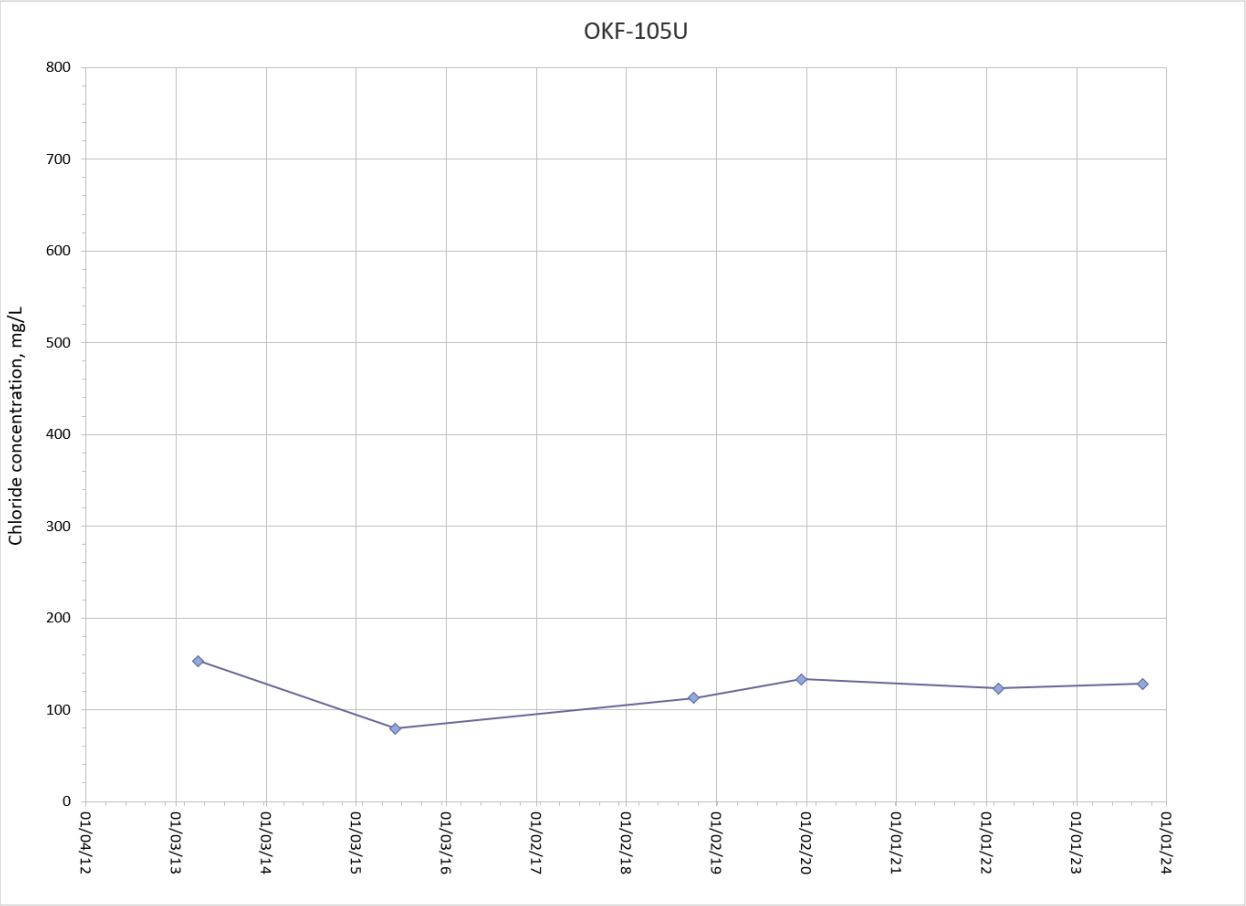



Figure 6-15. Chloride concentrations in Upper Floridan aquifer monitor well OKF-105U, located near the Istokpoga Canal and the Kissimmee River juncture in Okeechobee County.

As shown in **Figure 6-16**, chloride concentrations in UFA monitor well OKF-106, located at the Taylor Creek pilot aquifer storage and recovery site in eastern Okeechobee County, have remained relatively stable between June 2014 and October 2022, with chloride concentrations ranging from 576 mg/L to 650 mg/L.

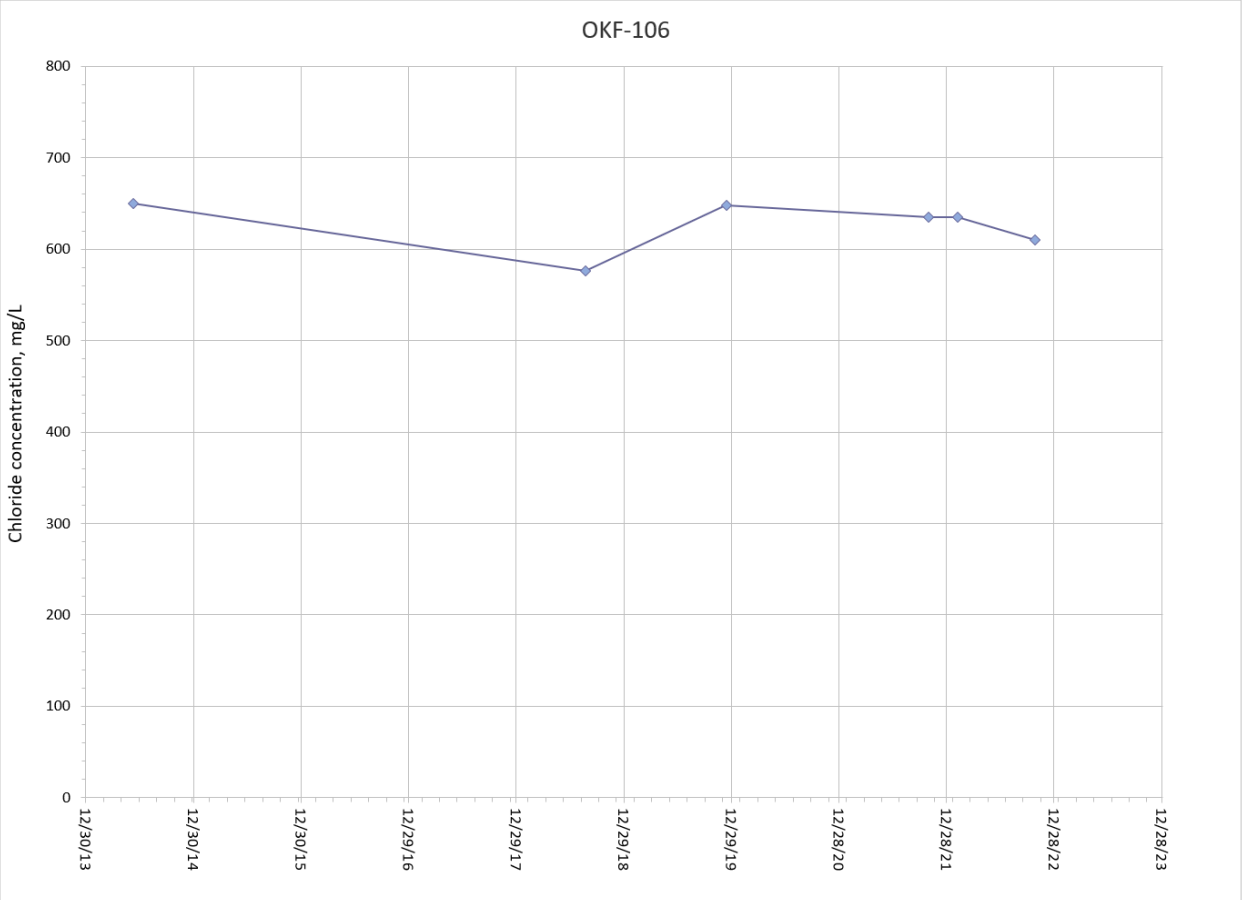



Figure 6-16. Chloride concentrations in Upper Floridan aquifer monitor well OKF-106, located at the Taylor Creek pilot aquifer storage and recovery site in eastern Okeechobee County.

As shown in **Figure 6-17**, chloride concentrations in APPZ monitor well HIF-42L, located near the C-41A Canal and the Kissimmee River juncture in Highlands County, have fluctuated between May 2008 and October 2022, with chloride concentrations ranging from 1,566 mg/L (August 2018) to 1,829 mg/L (October 2022). Groundwater samples collected from companion UFA well HIF-42U, on the other hand, have chloride concentrations that are nearly an order of magnitude lower and have remained consistent over the same time frame, indicating that the fresher groundwater present in the UFA at this site is likely not in communication with the deeper, saltier groundwater within the APPZ.

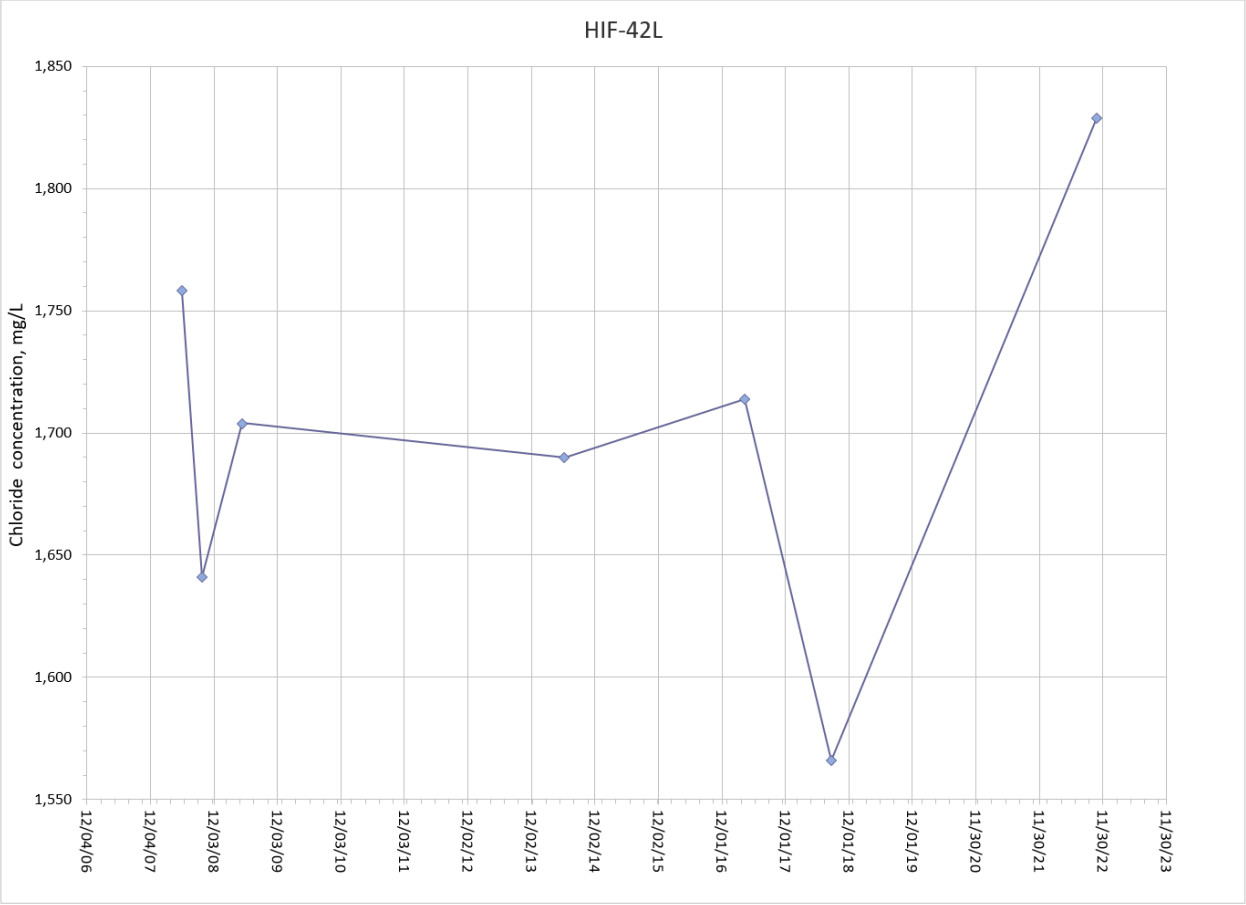



Figure 6-17. Chloride concentrations in Avon Park permeable zone monitor well HIF-42L, located near the C-41A Canal and the Kissimmee River juncture in Highlands County.

As shown in **Figure 6-18**, chloride concentrations in APPZ monitor well OKF-100L, located near the Kissimmee River and Lake Okeechobee juncture in Okeechobee County, have remained relatively stable between June 2007 and December 2019.

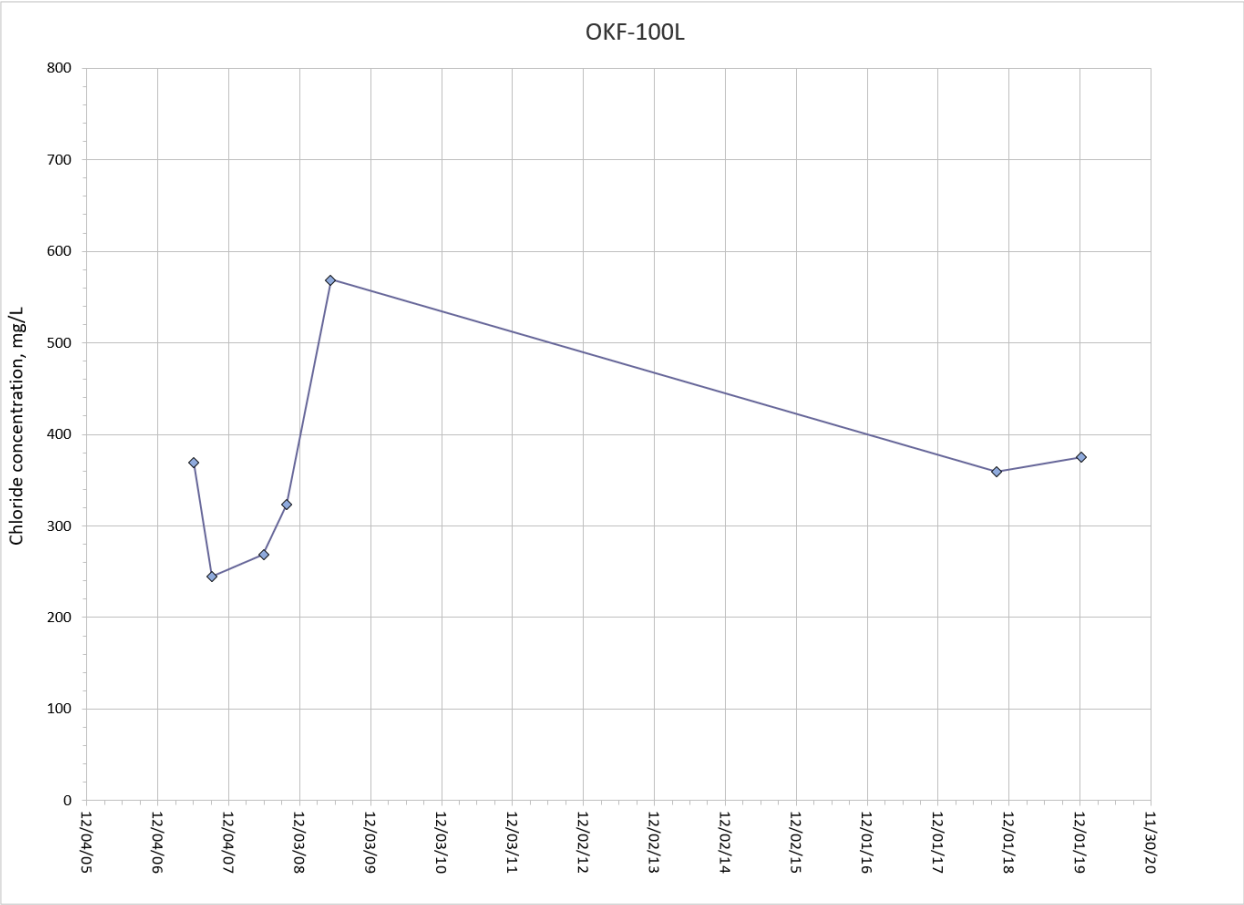



Figure 6-18. Chloride concentrations in Avon Park permeable zone monitor well OKF-100L, located near the Kissimmee River and Lake Okeechobee juncture in Okeechobee County.

As shown in **Figure 6-19**, chloride concentrations in APPZ monitor well OKF-105M, located near the Istokpoga Canal and the Kissimmee River juncture in Okeechobee County, have remained relatively stable, with chloride concentrations ranging from 344 mg/L to 584 mg/L between December 2009 and April 2023. Between December 2019 and April 2023, chloride concentrations declined from 584 mg/L to 344 mg/L.

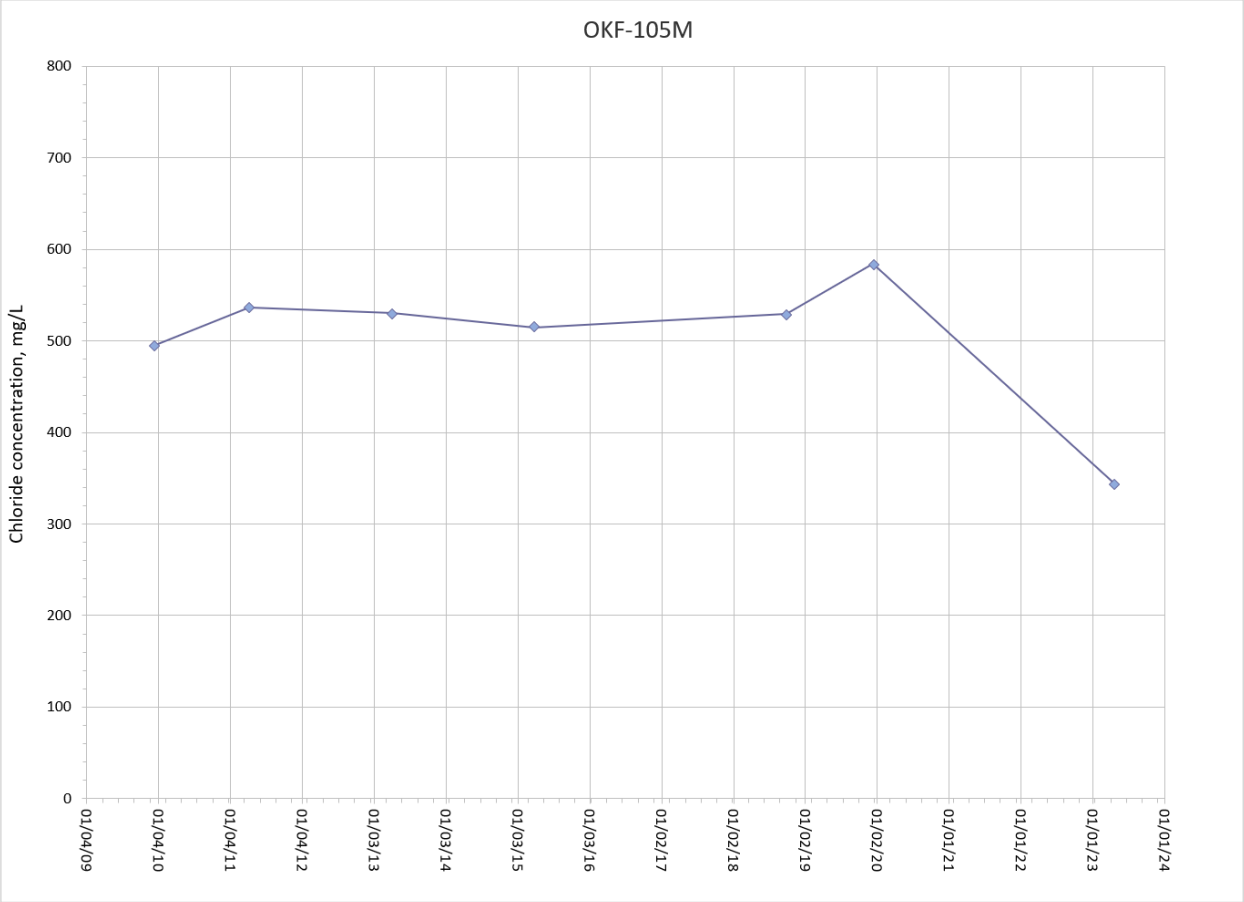



Figure 6-19. Chloride concentrations in Avon Park permeable zone monitor well OKF-105M, located near the Istokpoga Canal and the Kissimmee River juncture in Okeechobee County.

Wells or wellfields pumping from the UFA and APPZ need to be carefully designed, evaluated, and operated to minimize the potential for water quality degradation over time due to the potential for upward migration of underlying saline groundwater (i.e., upconing) and possible cross contamination of poor-quality water between aquifers.

# CLIMATE CHANGE

Since a reliable and economical supply of water is necessary for a strong Florida economy, climate change and its effects on hydrologic conditions are considered in water supply planning. Sea level rise and changes in temperature and rainfall patterns, among other evolving conditions, affect the implementation of the SFWMD's mission elements to safeguard and restore South Florida's water resources and ecosystems, protect communities from flooding, and meet the region's water needs. The effects of sea level rise, as they relate to flooding events such as those caused by high tides and storm surge, have no impact on the water resources of the LKB Planning Region. Therefore, they will not be discussed here but are considered in all coastal water supply plans. The SFWMD's resiliency efforts focus on 1) using science and advanced technical analyses to characterize climate change impacts on water resources management and future water supply sources, and 2) continuing to successfully implement the agency's mission through ongoing infrastructure investments, supported by robust technical analyses, planning, and adaptive management. Over the last decade, the SFWMD has implemented strategies to build resiliency by developing tools and models to assess current and future conditions, maintaining and optimizing its operations, and implementing key infrastructure projects. These efforts require collaboration and cooperation with local and tribal governments; other regional, state, and federal agencies; universities; nongovernmental entities; a wide array of stakeholders; and citizens throughout South Florida.

## Historical Observations, Current Conditions, and Future Projections

The SFWMD has resiliency initiatives that require assessing water and climate resilience metrics to track and document shifts and trends in water and climate-observed data. These efforts support the assessment of current and future climate condition scenarios, operational decisions, and SFWMD resiliency priorities. The water and climate resilience metrics and related data analyses are featured on the Resilience Metrics Hub on the SFWMD website (SFWMD 2024c).

The SFWMD keeps up with the latest science by utilizing the best available data sets for historical observations and best available models for current conditions and future projections. Historical data for temperature, rainfall, and evapotranspiration are collected by the SFWMD and federal partners — National Oceanic and Atmospheric Administration (NOAA) and USGS. These data are available from the DBHYDRO and DBHYDRO Insights databases on the SFWMD webpage https://www.sfwmd.gov/science-data/dbhydro. The USGS and Florida International University (FIU) are partnering with the SFWMD to assess and develop suites of future rainfall and evapotranspiration data sets to be used for regional and subregional planning and modeling efforts.

The SFWMD and USGS have evaluated projections of future (2056-2095) droughts for South Florida based on climate model output from the Multivariate Adaptive Constructed Analogs (MACA) downscaled climate data set from the Coupled Model Intercomparison Project Phase 5 (Irizarry-Ortiz 2024). The analysis was performed for four regions in the SFWMD: (1) the entire SFWMD, (2) the Lower West Coast (LWC) water supply region, (3) the Lower East Coast (LEC) water supply region, and (4) the Okeechobee plus (OKEE+) water supply meta-region consisting of Lake Okeechobee, the Upper and Lower Kissimmee basins, and Upper East Coast (UEC) water supply region (**Figure 6-20**).

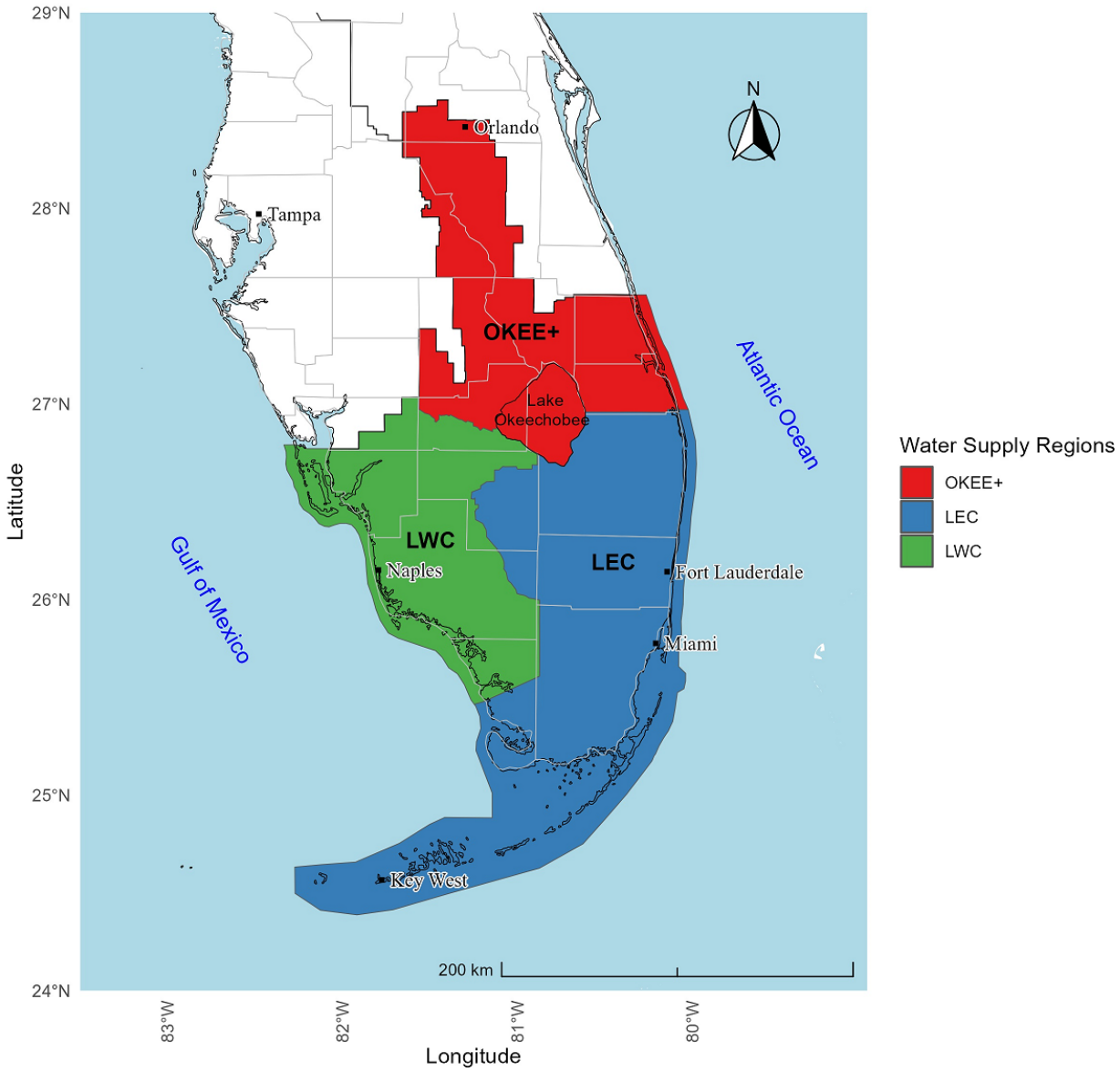



Figure 6-20. Regions evaluated for projections of future droughts using the MACA model.

These data sets will be analyzed to best determine the characterization of extreme wet and dry future conditions to be used for long-term water supply vulnerability assessments. Additional regional future conditions such as temperature, rainfall, and evapotranspiration projections may be developed to reduce future climate scenario uncertainty and will support the needs and outputs of regional groundwater and surface water models. The results from the development and analyses of the data sets will continue to be updated and made available through the Resilience Metrics Hub (SFWMD 2024c).

## *Air Temperature Rise and Evapotranspiration*

Current predictions from multiple climate models summarized by the Intergovernmental Panel on Climate Change (IPCC 2021) stated that global temperatures are expected to reach or exceed 1.5°C of warming between 2030 and 2052. Warmer air temperatures will increase evapotranspiration, resulting in lower surface water levels (e.g., in lakes, canals, rivers); increased irrigation demands; and impacts to stormwater runoff, soil moisture, groundwater recharge, and water quality.

As shown in **Figure 6-21**, the average daily maximum temperature for Okeechobee County is projected to increase from 85.4°F during the 2020s to a range of 86.6°F to 87.5°F by 2045. The figure is generated from a climate toolkit developed by an interagency team, including NOAA, National Aeronautics and Space Administration (NASA), USGS, United States Environmental Protection Agency (USEPA), United States Bureau of Reclamation (USBR), National Environmental Modeling and Analysis Center (NEMAC) at the University of North Carolina, and United States Global Change Research Program (USGCRP).

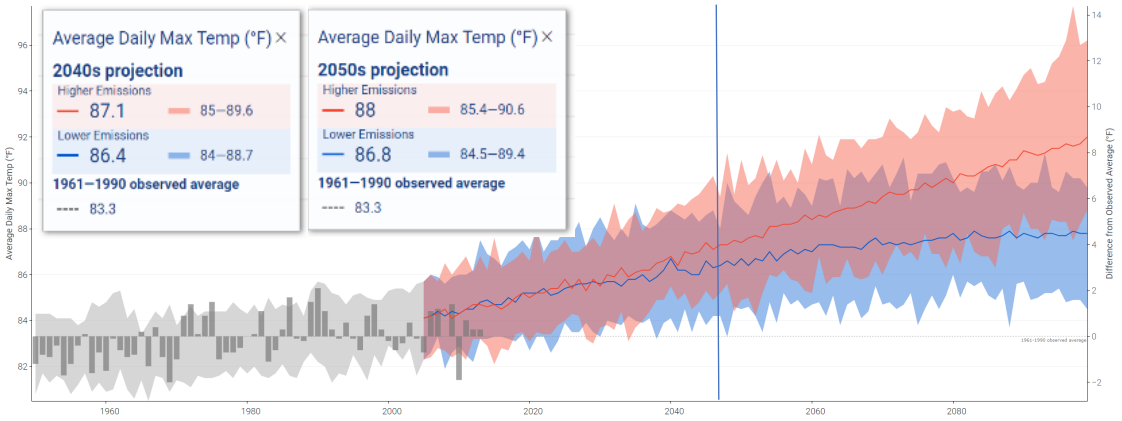



Figure 6-21. Projected average daily maximum temperature in Okeechobee County (NOAA et al. 2024).

In 2021, as part of the water and climate resilience metrics efforts, the SFWMD assessed observed evapotranspiration data and found a statistically significant upward trend (**Figure 6-22**). The effect of this increase on water demand and availability is being evaluated in South Florida through advanced hydrology and hydraulics models. It is likely that as evapotranspiration increases, water demand for irrigation needs will also increase and aquifer recharge may be negatively affected (SFWMD 2021, Cortez et al. 2022).

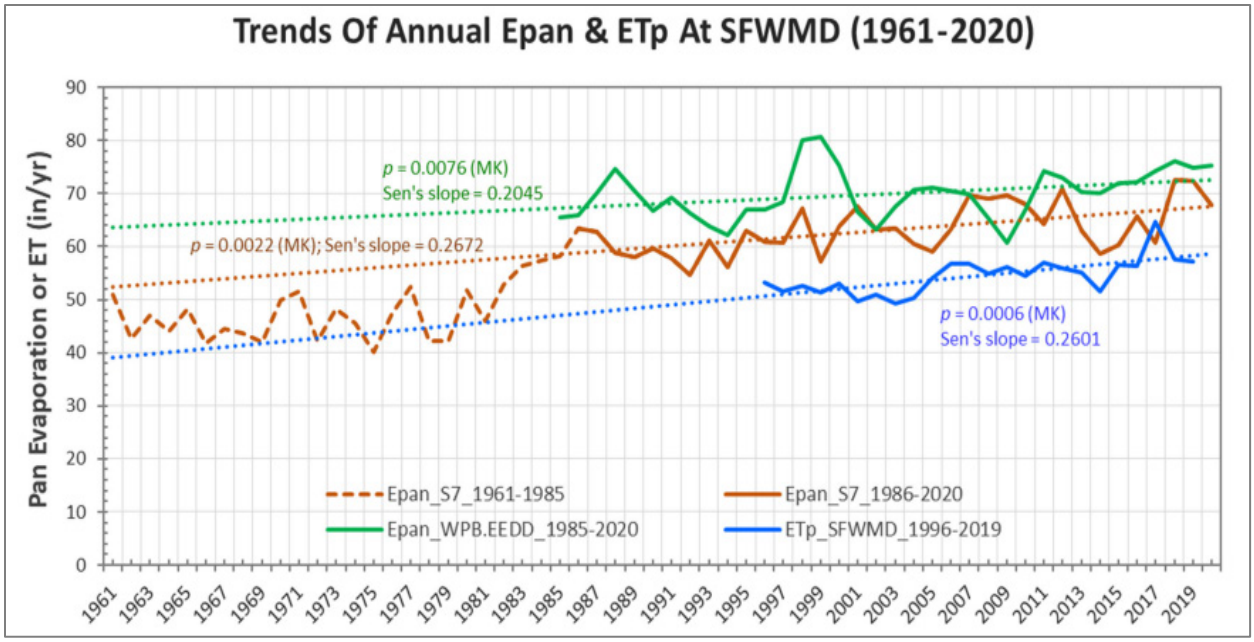



Figure 6-22. Trend of annual pan evaporation (Epan) and potential evapotranspiration (ETp) across the SFWMD, 1961 to 2020 (Cortez et al. 2022).

While the preliminary results highlighted in **Figure 6-22** imply increased water losses due to increased evapotranspiration and higher temperatures, comprehensive evapotranspiration assessments require additional input from other climatic variables, such as wind speed, relative humidity, and plant stomatal resistance. Further analyses are under way focusing on estimating drought projections, based on indices relevant to irrigation and other water uses, that will support the assessment of vulnerability of water supply sources more comprehensively.

### *Rainfall Patterns and Extrema*

The effects of climate change on rainfall patterns will likely have a significant impact on future regional water supplies. The SFWMD is focused on understanding existing conditions and anticipating future conditions through the above-mentioned water and climate resilience metrics studies, which examine temporal and spatial rainfall duration, frequency, and intensity. Initial regional rainfall wet season analyses evaluated the entire period of record for all the SFWMD's rainfall basins. In the LKB Planning Area, the wet season rainfall in the Lower Kissimmee rainfall basin does not show a statistically significant trend up or down (**Figure 6-23**).

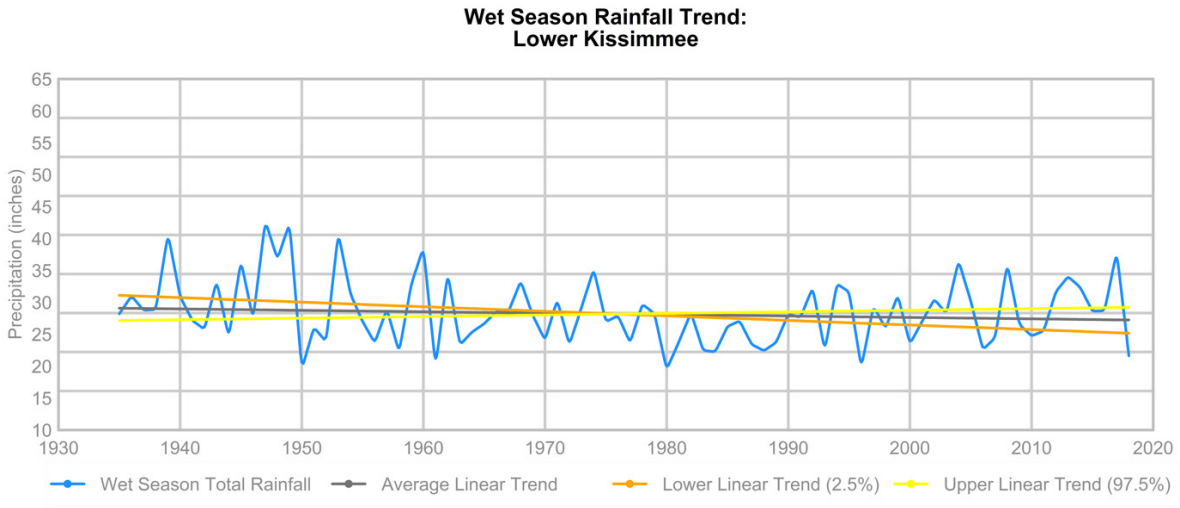



Figure 6-23. Trend analyses of average rainfall during the wet season in the Lower Kissimmee Basin (SFWMD 2021).

In the future, more frequent, intense rainfall events with longer interim dry periods could decrease effective rainfall (i.e., aquifer recharge) as more water may be lost to runoff, prompting the need for increased storage alternatives. In addition, climate change can cause longer interim dry periods, which would increase the need for supplemental irrigation.

Initial results from the study developed in partnership with FIU to investigate average annual and seasonal future rainfall patterns (Obeysekera et al. 2021) are estimating a potential reduction in the annual average precipitation. Additionally, the study evaluates a potential shift in seasonality, such as varying start and end dates of the wet and dry seasons. These results support the need for further rainfall projection assessments that emphasize not just the chronic effects of changes in rainfall averages, but the acute event effects associated with changes in rainfall extrema, such as those related to droughts. Further development of these projections is already under way, and they will be used to examine the effects of extrema when applied to model analyses.

## Current and Future Planning and Adaptive Management Strategies

The SFWMD has been evaluating climate change and its effects since 2008 to determine the best short- and long-term strategies to address water resource management and prepare for related impacts (SFWMD 2009, Obeysekera et al. 2011). Long-established networks of rainfall and surface water flow monitoring, with real-time automation, provide continuous data to monitor changes in local hydrology. In addition, an extensive network of coastal and inland surface water and groundwater monitoring sites has been established to collect and analyze water level and quality data.

The Resilience Metrics Hub (SFWMD 2024c) is continually updated with new metrics, trend, and correlation analyses as well as relevant data sets. This effort supports the SFWMD's resiliency goals of ensuring ecosystem restoration, flood protection, and water supply mission elements while accounting for current and future climate conditions. The analyses of trends and shifts in observed data, along with the collective experience and best professional

judgment of SFWMD technical staff, serve as the foundation for more robust infrastructure planning and operational decisions.

Initiated in 2015, the SFWMD's Flood Protection Level of Service (FPLOS) Program evaluates the effectiveness of flood control assets (e.g., canals, structures, and pump stations) to determine their ability to continue meeting the flood protection needs of the region under current and future conditions, including sea level rise and extreme rainfall projections. The program assesses vulnerabilities in the regional flood control system and recommends adaptation strategies within the primary, secondary, and tertiary flood control system. FPLOS Phase 1 assessments in the Lower Kissimmee Basin are scheduled for 2027–2031 (**Figure 6-24**).

The SFWMD has developed its *2024 Sea Level Rise and Flood Resiliency Plan* (SFWMD 2024b) through ongoing coordination with local governments, stakeholders, and communities to address the impacts of a changing climate, including sea level rise and extreme rainfall events, on the SFWMD's critical assets, water management operations, water supplies, and water resources. The plan, updated annually, is the first SFWMD initiative to compile a comprehensive list of priority resiliency projects with the goal of reducing the risks of flooding, sea level rise, and other climate impacts on water resources and increasing community and ecosystem resiliency in South Florida. Initial projects moving into implementation stages are flood risk management related projects, which have been technically supported through the FPLOS adaptation planning efforts.

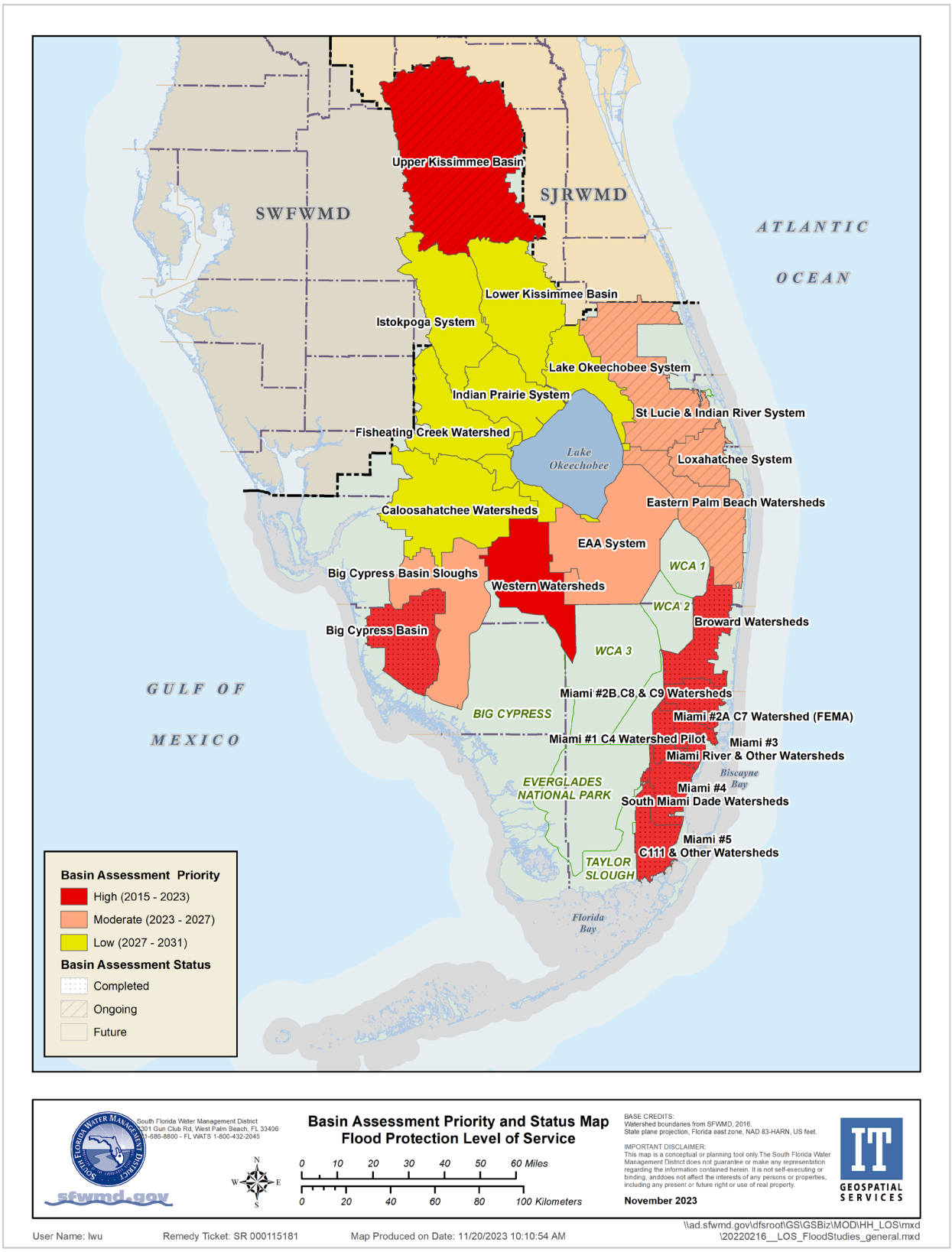



Figure 6-24. FPLOS basin assessment priority and status map.

# SUMMARY OF WATER RESOURCE ANALYSES

The findings and conclusions of the 2014 LKB Plan and 2019 LKB Plan Update (SFWMD 2014, 2019) continue to represent the issues considered to meet the 2045 projected water demands in the LKB Planning Area. The following are findings regarding the availability of water resources within the LKB Planning Area to meet the projected 2045 water demands:

- Surface water and fresh groundwater will remain primary sources for existing urban (including PS) and AG uses and, in combination, are adequate to meet the current and projected water needs of the LKB Planning Area. Expansion of surface water withdrawals is limited due to resource constraints, though there is potential for construction of small, local reservoirs.
- The water reservations rule was adopted in 2021 for the Kissimmee River and Chain of Lakes, which identified and reserved water from consumptive use for the protection of fish and wildlife.
- Surface water withdrawals from Lake Okeechobee and the integrated conveyance systems that are hydraulically connected to and receive water from Lake Okeechobee currently are restricted due to Lake Okeechobee Service Area RAA criteria.
- Water in Lake Istokpoga is protected by an MFL and the Lake Istokpoga/Indian Prairie Canal System RAA. The RAA prohibits additional surface water allocations from the lake and canal system above existing allocations.
- The monitoring networks used for aquifer assessment and groundwater modeling are a hybrid of regional monitoring and monitoring required by or performed by regulatory programs and show no concerning trends.
- Changes in climate conditions, including rising air temperature and increased evapotranspiration and changing rainfall patterns affecting the frequency and severity of storms and droughts, could impact water resources and demands and will continue to be evaluated.

# REFERENCES


Cortez, N.A., C. Maran, Y.K. Zhu, N. Iricanin, A. Ali, and T. Dessalegne. 2022. Chapter 2B: Water and Climate Resilience Metrics. In: *2022 South Florida Environmental Report – Volume I*. South Florida Water Management District, West Palm Beach, FL.

IPCC. 2021. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY.

Irizarry-Ortiz, M.M. 2024. *Characterizing Projected Future (2056-95) Droughts in South Florida Based on the Multivariate Adaptive Constructed Analogs (MACA) Downscaled Climate Dataset from the Coupled Model Intercomparison Project Phase 5*. Public Data Release 2024. United States Geological Survey, Caribbean–Florida Water Science Center, Orlando, FL. Available online at https://doi.org/10.5066/P14RO4HF.

Marella, R.L. and M.P. Berndt. 2005. *Water Withdrawals and Trends from the Floridan Aquifer System in the Southeastern United States, 1950-2000*. Circular 1278. United States Geological Survey, Reston, VA.

NOAA, NASA, USGS, USEPA, USBR, NEMAC The University of North Carolina Asheville, and USGCRP. 2024. *United States Climate Resilience Toolkit Climate Explorer*. Available online at https://crt-climate-explorer.nemac.org.

Obeysekera, J., J.J. Park, M. Irizarry-Ortiz, P. Trimble, J. Barnes, J. VanArman, W. Said, and E. Gadzinski. 2011. *Past and Projected Trends in Climate and Sea Level for South Florida*. South Florida Water Management District, West Palm Beach, FL. July 2011.

Obeysekera, J., J. Barnes, and A. John. 2021. *Climate Scenarios for Regional and Subregional Modeling: DRAFT Task 6 and Task 7 Report*. Florida International University, Sea Level Solutions Center, Miami, FL. December 31, 2021.

SFWMD. 2009. *Climate Change & Water Management in South Florida*. Interdepartmental Climate Change Group. South Florida Water Management District, West Palm Beach, FL. November 2009.

SFWMD. 2014. *2014 Lower Kissimmee Basin Water Supply Plan*. South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2019. *2019 Lower Kissimmee Basin Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. December 2019.

SFWMD. 2021. *Water and Climate Resilience Metrics, Phase 1: Long-Term Observed Trends*. South Florida Water Management District, West Palm Beach, FL. December 2021.

SFWMD. 2022. *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District*. South Florida Water Management District, West Palm Beach, FL. June 2022.

SFWMD. 2024a. *2023–2024 Lower East Coast Water Supply Plan Update.* South Florida Water Management District, West Palm Beach, FL. September 2024.

SFWMD. 2024b. *2024 Sea Level Rise and Flood Resiliency Plan*. South Florida Water Management District, West Palm Beach, FL. September 2024.

SFWMD. 2024c. *Resilience Metrics Hub*. Available online at https://sfwmd-district-resiliency-sfwmd.hub.arcgis.com.

# 7

# Water Resource and Supply Development Projects

This chapter addresses the roles of the South Florida Water Management District (SFWMD or District) and other parties in water resource development projects and provides a summary of projects in the Lower Kissimmee Basin (LKB) Planning Area. Water supply development projects are briefly discussed at the end of the chapter. The efforts presented in this chapter reflect the current budget categories the SFWMD uses for funding new and ongoing water resource development projects. This chapter was created using the Fiscal Year (FY) 2024 Districtwide water resource budget and includes schedules and costs for FY2024 to FY2028. Additional detail on the status of these projects can be found in Chapter 5A (Payseno and Beerens 2024) of the *2024 South Florida Environmental Report* (SFER) (https://www.sfwmd.gov/sfer).

TOPICS

- Regional Groundwater Modeling
- Districtwide Water Resource Development Projects
- Kissimmee River Restoration Project
- Comprehensive Everglades Restoration Plan
- Dispersed Water Management Program
- Northern Everglades and Estuaries Protection Program
- Water Supply Development Projects
- Summary of Water Resource Development Projects

Florida water law identifies two types of projects to meet water needs: water resource development projects and water supply development projects. Water resource development is defined in Section 373.019(24), Florida Statutes (F.S.), as follows:

> *…the formulation and implementation of regional water resource management strategies, including the collection and evaluation of surface water and groundwater data; structural and non-structural programs to protect and manage water resources; development of regional water resource implementation programs; construction, operation, and maintenance of major public works facilities to provide for flood, surface, and underground water storage and groundwater recharge augmentation; and related technical assistance to local governments and to government-owned and privately owned water utilities.*

Most water resource development activities in the SFWMD support and enhance water supply development but do not directly yield specific quantities of water. Instead, these projects are intended to assess the availability of an adequate water supply for existing and future uses, including maintaining the functions of natural systems. For example, project-related hydrologic investigations as well as groundwater monitoring and modeling provide important information about aquifer characteristics (e.g., hydraulic properties, water quality), which are useful for designing appropriate facilities, identifying safe aquifer yields, and evaluating the economic viability of projects, but do not increase water availability.

Water supply development projects generally are the responsibility of water users (e.g., utilities) and involve the water source options described in **Chapter 5** to meet specific needs. These projects typically include construction of wellfields, water treatment plants, distribution lines, reclaimed water facilities, and storage systems.

Water resource development in the LKB Planning Area is influenced by the Comprehensive Everglades Restoration Plan (CERP), which is a component of the South Florida Ecosystem Restoration Program. Authorized by the United States Congress in 2000, CERP builds on and complements other state and federal initiatives to revitalize South Florida's ecosystems. These efforts have multiple implementation phases, which are supported by water resource development activities, such as planning; land acquisition; design, including modeling; construction; and long-term operations and maintenance. CERP efforts are described in this chapter and in the annual updates of the SFER (https://www.sfwmd.gov/sfer).

## REGIONAL GROUNDWATER MODELING

The SFWMD funds development and application of numerical models for evaluation of groundwater and surface water resources in the District's planning areas. The models support development of regional water supply plans, minimum flows and minimum water levels (MFLs), water reservations, restricted allocation areas (RAAs), and other projects benefiting water resources. Regional groundwater flow models simulate the rate and direction of water movement through the subsurface. Such models include the major components of the hydrologic cycle and the hydrogeologic system and are used in water supply planning to understand and evaluate the effects of current and future water use. More recently, advances in groundwater modeling to incorporate density-dependency and solute transport have been incorporated to better analyze brackish aquifers, such as the Floridan aquifer system (FAS), and are being developed to analyze the effects of climate change and sea level rise on the surficial aquifer system (SAS).

# DISTRICTWIDE WATER RESOURCE DEVELOPMENT PROJECTS

Water resource development projects encompassing more than one planning area generally are considered Districtwide projects. The SFWMD is the implementing agency for the projects described in this section. **Table 7-1** summarizes the estimated costs through 2028 of Districtwide water resource development projects and regional projects that benefit water supply. **Table 7-1** does not include other programs, such as CERP, that have their own budgets and primarily are ecosystem restoration projects. The following categories are types of Districtwide water resource development projects:

- MFL, water reservation, and RAA rules
- Comprehensive Water Conservation Program
- Cooperative Funding Program
- Drilling and testing groundwater resources
- Groundwater assessment through data collection and modeling
- Groundwater, surface water, and wetland monitoring

## MFL, Water Reservation, and RAA Rules

MFL, water reservation, and RAA rules as well as other water resource protection measures have been developed to ensure the sustainability of water resources within the SFWMD. **Chapter 4** summarizes MFL, water reservation, and RAA rules in effect as of 2024. Additional information can be found in **Appendix C**.

## Comprehensive Water Conservation Program

The long-standing conservation goal of SFWMD is to prevent and reduce wasteful, uneconomical, impractical, or unreasonable uses of water resources. This goal is addressed through planning; regulation; and use of alternative sources, including reclaimed water, public education, demand reduction through conservation technology, best management practices, and water-saving programs. The Comprehensive Water Conservation Program combines a series of implementation strategies designed to create an enduring conservation ethic and permanent reduction in water use. The program was developed in conjunction with stakeholders, and the program's planning document was approved by the District Governing Board in 2008. The program is organized into regulatory, voluntary, incentive-based, educational, and marketing initiatives. More detailed information is provided in *Water Conservation: A Comprehensive Program for South Florida* (SFWMD 2008) and on the SFWMD webpage (https://www.sfwmd.gov/conserve). Additional supporting information can be found in the *2021–2024 Support Document for the Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021).

Table 7-1. Fiscal Year 2024–2028 implementation schedule and projected expenditures (including salaries, benefits, and operating expenses) for water resource development activities within the SFWMD. All activities are ongoing unless noted otherwise (Modified from Payseno and Beerens 2024).

| Regional Water Activities | Plan Implementation Costs ($ thousands) | | | | | Total |
|---|---|---|---|---|---|---|
| | 2024 | 2025 | 2026 | 2027 | 2028 | |
| Water Supply Planning | 1,155 | 1,155 | 1,155 | 1,155 | 1,155 | **5,775** |
| CFWI Water Supply Planning Project | 583 | 583 | 583 | 583 | 583 | **2,915** |
| Comprehensive Plan, Documents Review, and Technical Assistance to Local Governments | 208 | 208 | 208 | 208 | 208 | **1,040** |
| Water Supply Implementation | 264 | 264 | 264 | 264 | 264 | **1,320** |
| MFL, Water Reservation, and RAA Rule Activities | 170 | 170 | 170 | 170 | 170 | **850** |
| Comprehensive Water Conservation Program | 397 | 397 | 397 | 397 | 397 | **1,985** |
| Cooperative Funding Program | 22,121 | 0[a] | 0[a] | 0[a] | 0[a] | **22,121** |
| Groundwater Monitoring | 1,576 | 1,576 | 1,576 | 1,576 | 1,576 | **7,880** |
| Groundwater Modeling | 1,048 | 1,048 | 1,048 | 1,048 | 1,048 | **5,240** |
| Estimated Portion of C&SF Project Operation & Maintenance Budget Allocated to Water Supply[b] | 161,670 | 161,670 | 161,670 | 161,670 | 161,670 | **808,350** |
| **Subtotal** | **189,192** | **167,071** | **167,071** | **167,071** | **167,071** | **857,476** |
| Regional Projects Benefiting Water Supply | | | | | | |
| Lake Okeechobee Watershed Restoration[c] | 50,000[d] | 50,000[d] | 50,000[d] | 50,000[d] | 50,000[d] | 250,000 |
| EAA Storage Reservoir Conveyance Improvements and STA[c,e] | 171,818 | 142,782 | 192,088 | 150,904 | 110,405 | 767,997 |
| Other Projects Associated with MFL Prevention/Recovery Strategies[f] | 178,876 | 346,618 | 368,259 | 487,327 | 465,225 | 1,848,305 |
| C-25 Reservoir and STA | 14,700 | 24,000 | 79,300 | 79,000 | 94,000 | 291,000 |
| **Subtotal** | **415,394** | **565,400** | **689,647** | **767,231** | **719,630** | **3,157,302** |
| **Total** | **604,586** | **732,471** | **856,718** | **934,302** | **886,701** | **4,014,778** |

C&SF Project = Central and Southern Florida Project; CFP = Cooperative Funding Program; CFWI = Central Florida Water Initiative; EAA = Everglades Agricultural Area; FY = Fiscal Year; MFL = minimum flow and minimum water level; RAA = restricted allocation area; SFWMD = South Florida Water Management District; STA = stormwater treatment area.

[a] A determination of what funds, if any, will be allocated for CFP projects will be made by the SFWMD Governing Board during the fiscal year budget development process.

[b] Approximated based on 50% of the FY2024 operation and maintenance budget, including resiliency funding.

[c] Project cost based on information contained in the FY2024-2028 SFWMD Five-Year Capital Improvement Plan.

[d] Funding contingent upon future state appropriations.

[e] Includes Reservoir Inflow Pump Station, Inflow Canal Reservoir/STA, A-2 Reservoir and STA, North New River and Miami Canal Improvements, and Bridges.

[f] Totals are from the South Florida Environmental Report (SFER) Table 5A-3, less the funding for the Lake Okeechobee Watershed Restoration and EAA Storage Reservoir Conveyance Improvements and STA. Refer to SFER Table 5A-6 for additional information.

## Cooperative Funding Program

Alternative water supply (AWS) projects and source diversification are important supplements and replacements to traditional water sources in order to meet current and future water needs Districtwide. The SFWMD has provided cost-share funding for AWS development for more than two decades. In 2016, the SFWMD combined funding programs for stormwater, AWS, and water conservation projects into one streamlined program, the Cooperative Funding Program. AWS funding helps water users develop reclaimed water projects, water reclamation facilities, brackish water wellfields, reverse osmosis treatment

facilities, stormwater capture systems, and aquifer storage and recovery (ASR) well systems. A full description of AWS related projects and associated funding is contained in the SFWMD's alternative water supply annual reports, prepared pursuant to Section 373.707(7), F.S., and published in annual updates of the SFER (https://www.sfwmd.gov/sfer). Further information about AWS options (e.g., reservoirs, ASR systems) is provided in **Chapter 5**.

## Drilling and Testing Groundwater Resources

Evaluation of groundwater resources involves the installation of wells for short- and long-term monitoring of aquifer water levels and water quality. This work includes drilling and well construction, geophysical logging, aquifer tests, sediment analysis, lithologic descriptions, and water quality sampling to determine if the water is fresh or brackish. Knowledge of South Florida hydrogeology is enhanced through construction of exploratory and test wells and has improved the accuracy of the SFWMD's groundwater modeling and decision-making regarding water use permits.

## Groundwater Assessment through Data Collection and Modeling

Groundwater assessment includes analyzing results of drilling and testing programs as well as development of hydrostratigraphic maps and saltwater interface maps (for the coastal water supply planning areas). In the LKB Planning Area, the SFWMD recently conducted geophysical seismic characterization of the FAS near Lake Okeechobee to complement existing knowledge in support of using ASR subsurface storage systems to reduce harmful discharges to estuaries (Michelsen and Jansen 2020, Collier Geophysics 2023). The drilling and testing of multiple wells at the C-38S, C-28N, L-63N, L-63S, and C-59 sites have provided abundant lithologic, geophysical, and hydrologic data with which to assess groundwater in the FAS around Lake Okeechobee.

## Groundwater, Surface Water, and Wetland Monitoring

Water level and water quality monitoring at existing wells provide critical information for developing groundwater models, assessing groundwater conditions, and managing groundwater resources. The SFWMD maintains extensive groundwater monitoring networks and partners with the United States Geological Survey (USGS) to provide additional support for ongoing monitoring. The USGS monitors, archives, and publishes data annually. The SFWMD archives data in its corporate environmental database, DBHYDRO, which stores hydrologic, meteorologic, hydrogeologic, and water quality data. Data are available on the SFWMD webpage https://www.sfwmd.gov/science-data/dbhydro. In 2021, the SFWMD released the new tool called DBHYDRO Insights to make data more easily accessible to the public and stakeholders. As the SFWMD continues to advance its applications, DBHYDRO Insights will replace DBHYDRO in the future.

Districtwide monitoring activities related to the LKB Planning Area include the following:

- **USGS water level monitoring** – In an ongoing effort, the USGS collects groundwater level monitoring data with funding support from the SFWMD. The project includes well and recorder maintenance as well as archiving data in a USGS database for sites throughout the SFWMD.

- **Groundwater level monitoring** – In an ongoing effort, the SFWMD monitors groundwater levels throughout the District. As of 2022, Districtwide monitoring includes 601 active SFWMD groundwater stations for the SAS, intermediate aquifer system, and FAS as well as an additional 501 USGS groundwater stations. Data are collected, analyzed, validated, and archived in DBHYDRO.
- **Groundwater quality monitoring** – FAS wells are sampled for major ions and field parameters on a 5-year rotating basis based on upcoming water supply plan updates. Samples are analyzed and validated by the SFWMD Laboratory and archived in DBHYDRO. Groundwater quality data are used for mapping and in support of density-dependent groundwater modeling.
- **Regional FAS well maintenance** – Water level and water quality monitoring is ongoing at 105 FAS well sites in the SFWMD, as of 2022. Well maintenance is conducted as needed.
- **Hydrogeologic database improvements** – A data lens is now available in DBHYDRO Insights, a map-based application providing quick access to hydrogeologic data, such as well construction, borehole, lithology, and hydrostratigraphy, among other data categories.
- **Surface water monitoring** – The SFWMD monitors the water levels and water quality of several surface water bodies (e.g., Lake Okeechobee, Kissimmee River, and Lake Istokpoga) and integrated conveyance canals. Data are collected, analyzed, validated, and archived in DBHYDRO.
- **MFL-required monitoring** – In support of adopted MFL prevention and recovery strategies, the SFWMD monitors changes in surface water and groundwater levels, flows, and specific MFL-related constituents; the location of the saltwater interface; and the floral and faunal populations.

# KISSIMMEE RIVER RESTORATION PROJECT

The Kissimmee River Restoration Project aims to restore ecological integrity to a portion of the Kissimmee River and its floodplain by re-establishing historical hydrology while providing an equivalent pre-project level of flood control in the area (**Figure 7-1**). The Kissimmee River Headwaters Revitalization Project, jointly authorized with the Kissimmee River Restoration Project, will change the regulation schedule for the S-65 Structure at the outlet of Lake Kissimmee to allow additional water storage in lakes Kissimmee, Cypress, and Hatchineha. This additional storage volume is needed to provide sufficient flow for successful restoration of the Kissimmee River and its floodplain. Coupled with appropriate water management, the new schedule will improve the quantity and timing of inflow to the Kissimmee River. The regulation schedule modifications also are expected to increase the quantity and quality of shoreline habitat in the Headwater Lakes for the benefit of fish and wildlife. Restoration and protection efforts are focused on the section of the river between the S-65A and S-65D water control structures. To date, continuous water flow has been re-established to 24 miles of the original river, along with intermittent inundation of the floodplain by backfilling a central section of the C-38 Canal. When complete, the project will re-establish flow to approximately 40 miles of historical river channel and restore almost 25,000 acres of floodplain wetlands.

The major construction projects for the Kissimmee River Restoration were completed in 2021. Once the Headwaters Revitalization Schedule is fully implemented, which is expected in 2027, water will be released from the Headwater Lakes as part of a management strategy to balance the water needs of the Kissimmee River and floodplain, the Headwater Lakes, flood control, and the timing of flows into Lake Okeechobee. The project will not change the volume of water moving into Lake Okeechobee but may improve the quality and timing of incoming water.

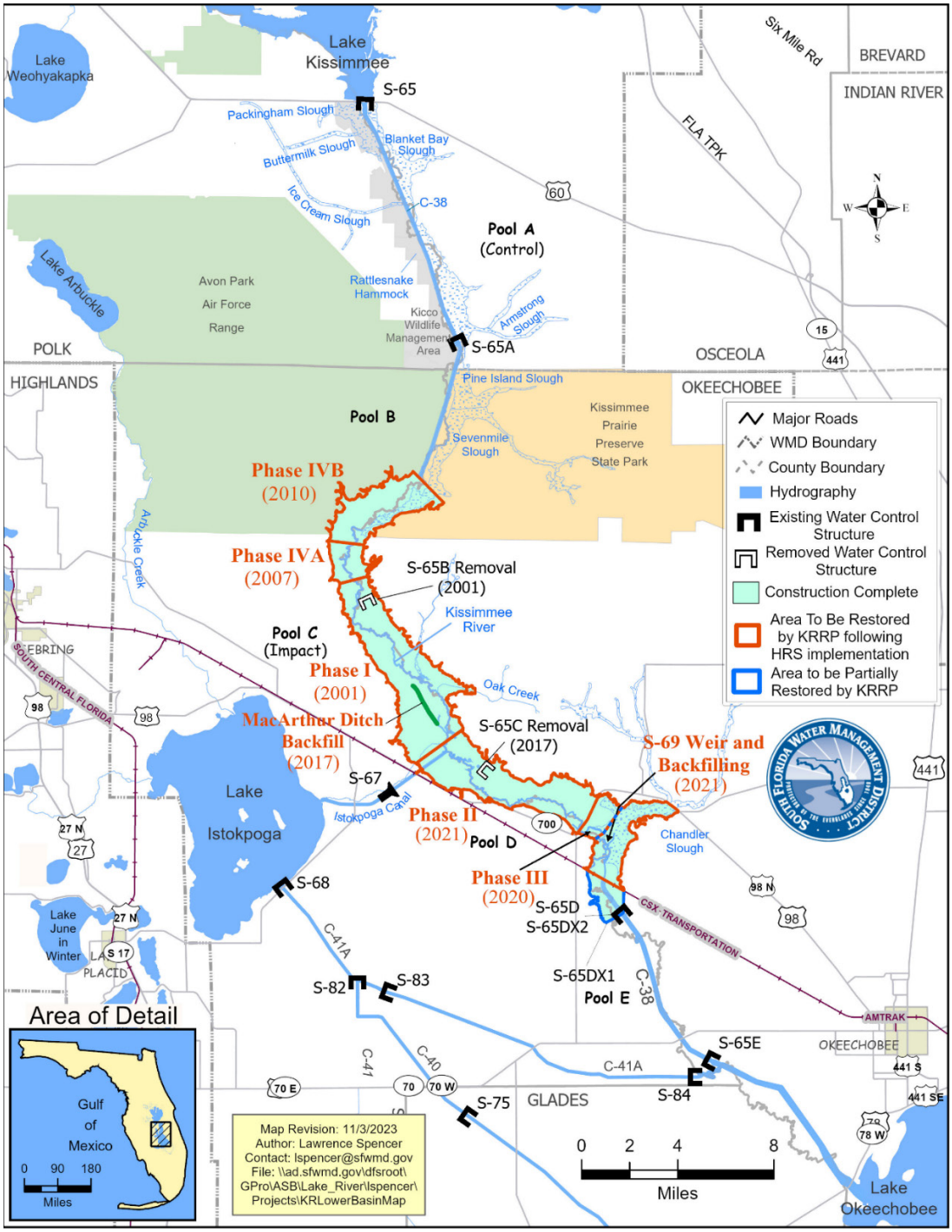



Figure 7-1. Kissimmee River Restoration Project area.

# COMPREHENSIVE EVERGLADES RESTORATION PLAN

CERP provides a framework to restore, protect, and preserve the greater Everglades system. The United States Congress approved the restoration plan in the Water Resources Development Act (WRDA) of 2000. The lead federal agency is the United States Army Corps of Engineers (USACE), and SFWMD is the local non-federal sponsor. CERP efforts are reported in annual updates of the SFER (https://www.sfwmd.gov/sfer). CERP projects in the LKB Planning Area are summarized below.

## Lake Okeechobee Watershed Restoration Project

The CERP Lake Okeechobee Watershed Restoration Project (LOWRP) study area (**Figure 7-2**) covers approximately 920,000 acres, including the four major drainage basins that supply water to Lake Okeechobee: Fisheating Creek, Indian Prairie, Taylor Creek/Nubbin Slough, and Lower Kissimmee (S-65D and S-65E). LOWRP covers a large portion of the Lake Okeechobee watershed north of the lake and within the LKB Planning Area. In 2016, the USACE and SFWMD began planning efforts for the LOWRP, with the following goals and objectives:

- Improve the quantity, timing, and distribution of flows into Lake Okeechobee to maintain ecologically desired lake stages more often.
- Improve the quantity and timing of discharges to the St. Lucie and Caloosahatchee estuaries.
- Increase the extent and functionality of aquatic and wildlife habitat within Lake Okeechobee and the surrounding watershed.
- Increase the availability of water supply to existing legal water users of Lake Okeechobee.

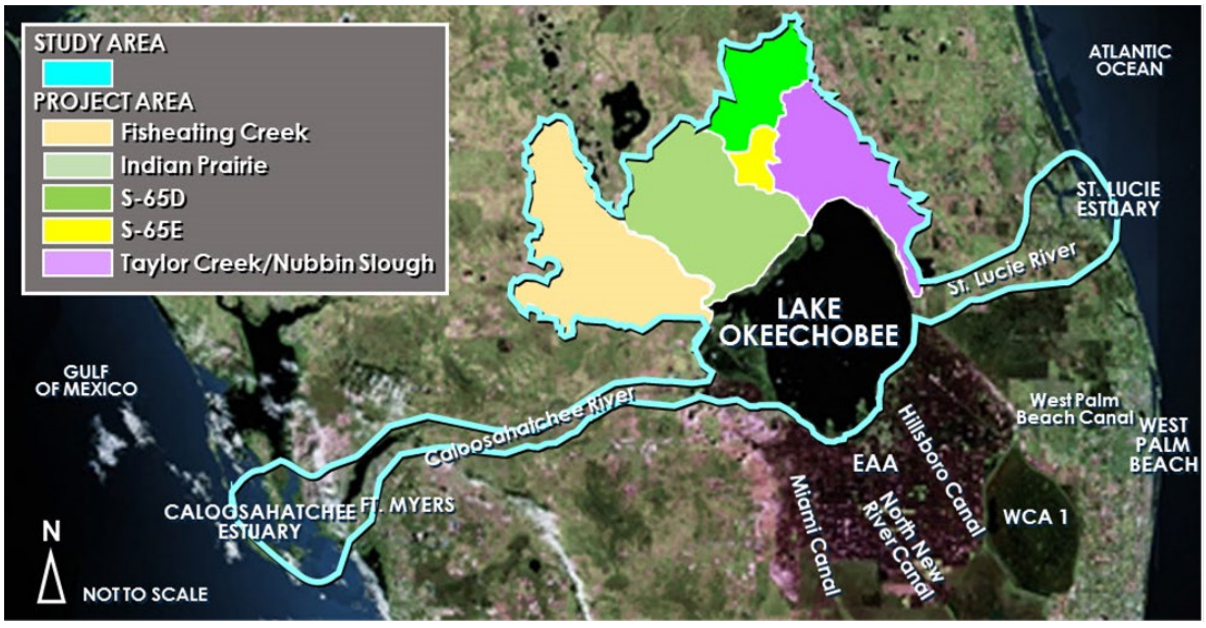



Figure 7-2. Lake Okeechobee Watershed Restoration Project.

Several versions of the LOWRP Draft and Final Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) were released for public, state, and agency review from 2018 through 2020. After the release and review of the LOWRP Final Integrated PIR/EIS in August 2020 and the LOWRP Draft Report of the Chief of Engineers, the USACE determined a revision to the documented Recommended Plan, Alternative 1BWR, was warranted. Concerns brought forward by stakeholders about Alternative 1BWR were related to the acceptability of aboveground storage sited directly upstream from a community and adjacent to the Seminole Tribe of Florida's Brighton Reservation as well as the high cost per acre-foot of shallow aboveground storage. The concerns were addressed by removing the aboveground storage feature, referred to as the wetland attenuation feature (WAF), and its 25 WAF-assisted ASR wells from the plan, creating a revised Recommended Plan called Alternative ASR. The current project components in the Recommended Plan or Alt ASR that are under consideration include 55 ASR wells and approximately 5,900 acres of wetland restoration (**Figure 7-3**).

The Florida State Legislature appropriated funding to the SFWMD for LOWRP in 2019–2021 under State Appropriation 1642A. During the 2021 legislative session, the Florida Legislature also passed Senate Bill 2516 to further support and expedite the implementation of LOWRP. This funding was provided to the SFWMD for the design, engineering, and construction of specific LOWRP components designed to achieve the greatest reduction in harmful discharges to the Caloosahatchee and St. Lucie estuaries. The SFWMD and USACE determined the ASR well component would provide the greatest benefits to the estuaries. Since 2019, the SFWMD has been implementing the design and construction for the ASR well component in a phased approach while addressing the remaining uncertainties and stakeholder concerns regarding regional implementation of this technology. To address the concerns with ASR technology, the SFWMD updates an ASR Science Plan, including additional studies proposed by the U.S. Army Engineer Research and Development Center (ERDC). The LOWRP Final Revised Integrated PIR/EIS is anticipated to be completed and submitted for congressional authorization in 2028 or 2030 for the ASR and wetland components subsequent to the ERDC studies, which are anticipated to be completed in 2026.

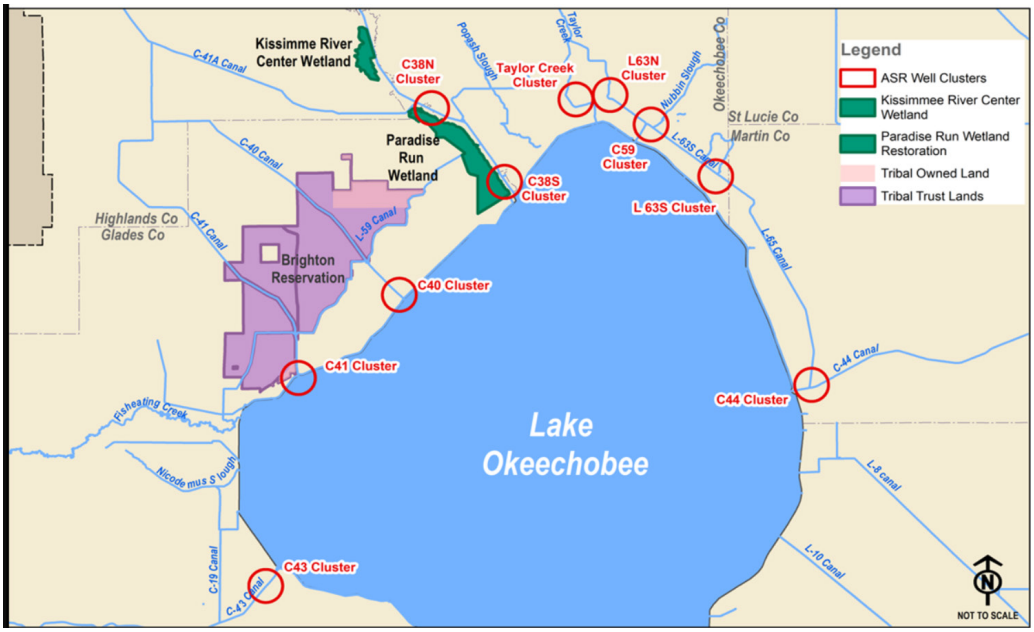



Figure 7-3. Lake Okeechobee Watershed Restoration Project Recommended Plan features.

## *Aquifer Storage and Recovery*

Kissimmee ASR Test Well

As part of CERP, the USACE and SFWMD jointly developed the ASR Regional Study (USACE and SFWMD 2015) as a technical guide for considering ASR as part of Everglades restoration efforts, including the LOWRP (discussed in the previous section). The study incorporated results from two pilot ASR systems, numerous exploratory tests, and multiple regional investigations (a groundwater flow model, baseline ecological studies, and geochemical analyses) to address technical uncertainties and assess risks. The study concluded that large-capacity (5 million gallons per day per well) ASR systems are feasible in South Florida where suitable aquifer characteristics exist. Additionally, ASR can be implemented as part of CERP projects as a means of optimizing environmental restoration features. An incremental adaptive restoration approach for future ASR systems as part of CERP should involve one or more clusters of ASR wells to address uncertainties such as recovery efficiency, performance, long-term water quality, and ecological effects.

The USGS, under contract with the SFWMD, is studying the potential for nutrient reduction via ASR systems after a substantial reduction in phosphorus concentration was observed in water recovered from the CERP Kissimmee ASR facility. The USGS is evaluating the microbial community in the FAS and the rates of nutrient reduction that might be anticipated as ASR is implemented.

## *Lake Okeechobee Component A Storage Reservoir*

To achieve the CERP project goals and objectives discussed above, the SFWMD evaluated various management measures such as water storage features (e.g., aboveground reservoirs, ASR wells) and wetland restoration/attenuation components. Since the reservoir and wetland attenuation feature has been removed from the original LOWRP project design, to maintain the planned aboveground storage in the basin, the SFWMD began a Feasibility Study pursuant to Section 203 of the WRDA of 1986, as amended, for the Lake Okeechobee Component A Storage Reservoir (LOCAR). The LOCAR Section 203 Feasibility Study and EIS for LOCAR were submitted on February 28, 2024 to the Assistant Secretary of the Army for Civil Works for consideration by Congress in the WRDA of 2024. The Feasibility Study and EIS explored opportunities for 200,000 acre-feet of aboveground water storage north of Lake Okeechobee (**Figure 7-4**) to maintain the basin storage in the original Recommended Plan for LOWRP.

LOCAR is a distinctly separate project from the LOWRP and not formally considered a CERP project. By creating additional water storage north of Lake Okeechobee, the LOWRP ASR systems, in addition to the LOCAR Reservoir, can improve flexibility in the timing and distribution of water in the lake to the estuaries and throughout the watershed. Water can be stored during wet times to reduce damaging high lake levels and be released into the lake during dry times for water supply and to reduce adverse impacts of low lake levels.

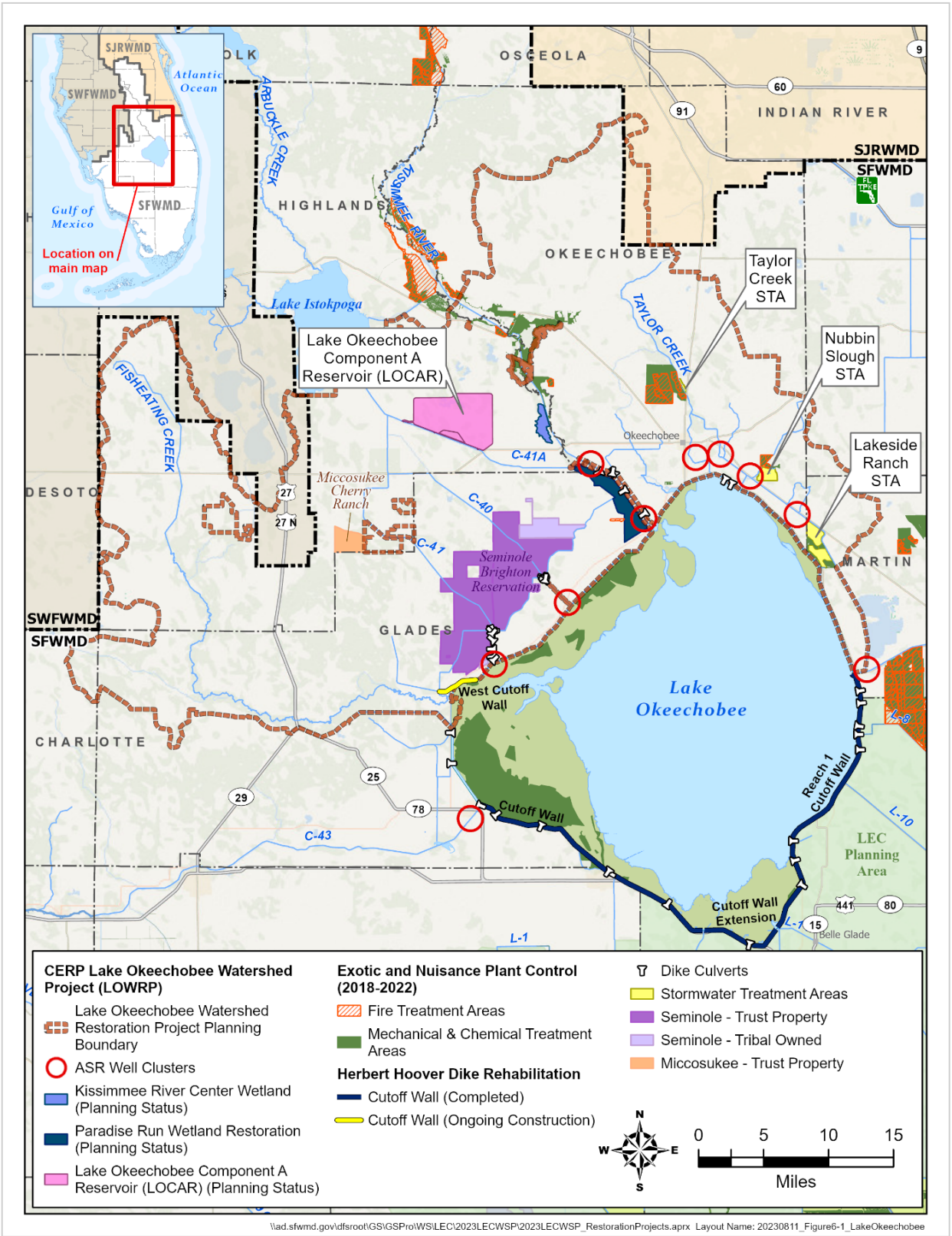



Figure 7-4. Lake Okeechobee Watershed Restoration Project components and Lake Okeechobee Component A Storage Reservoir.

# DISPERSED WATER MANAGEMENT PROGRAM

Since 2005, the SFWMD has been working with a coalition of government agencies, nongovernmental organizations, farmers, ranchers, and researchers to enhance opportunities for storing excess surface water on private and public lands, collectively known as the Dispersed Water Management (DWM) program, under the Northern Everglades and Estuaries Protection Program (NEEPP). DWM projects are constructed and managed primarily to attenuate wet season water releases and improve water quality entering Lake Okeechobee and the coastal estuaries, with ancillary benefits including increased opportunities for groundwater recharge, hydrological enhancement, nutrient reduction, and habitat improvement. In some cases, DWM projects with storage features are constructed and operated to offset irrigation demands and other water-related needs of the system. However, because this is shallow storage, the volume of water is insufficient to be considered a reliable water source during the dry season. During Water Year 2024, 27 projects were operational in the Northern Everglades watersheds, including both DWM and other regional restoration projects that provide water storage benefits. Collectively, these projects provided an estimated storage volume of approximately 214,110 acre-feet across the Northern Everglades region (SFWMD 2025). There are DWM projects in the LKB Planning Area (**Figure 7-5**). Additional information can be found on the NEEPP webpage http://www.sfwmd.gov/WPPs.

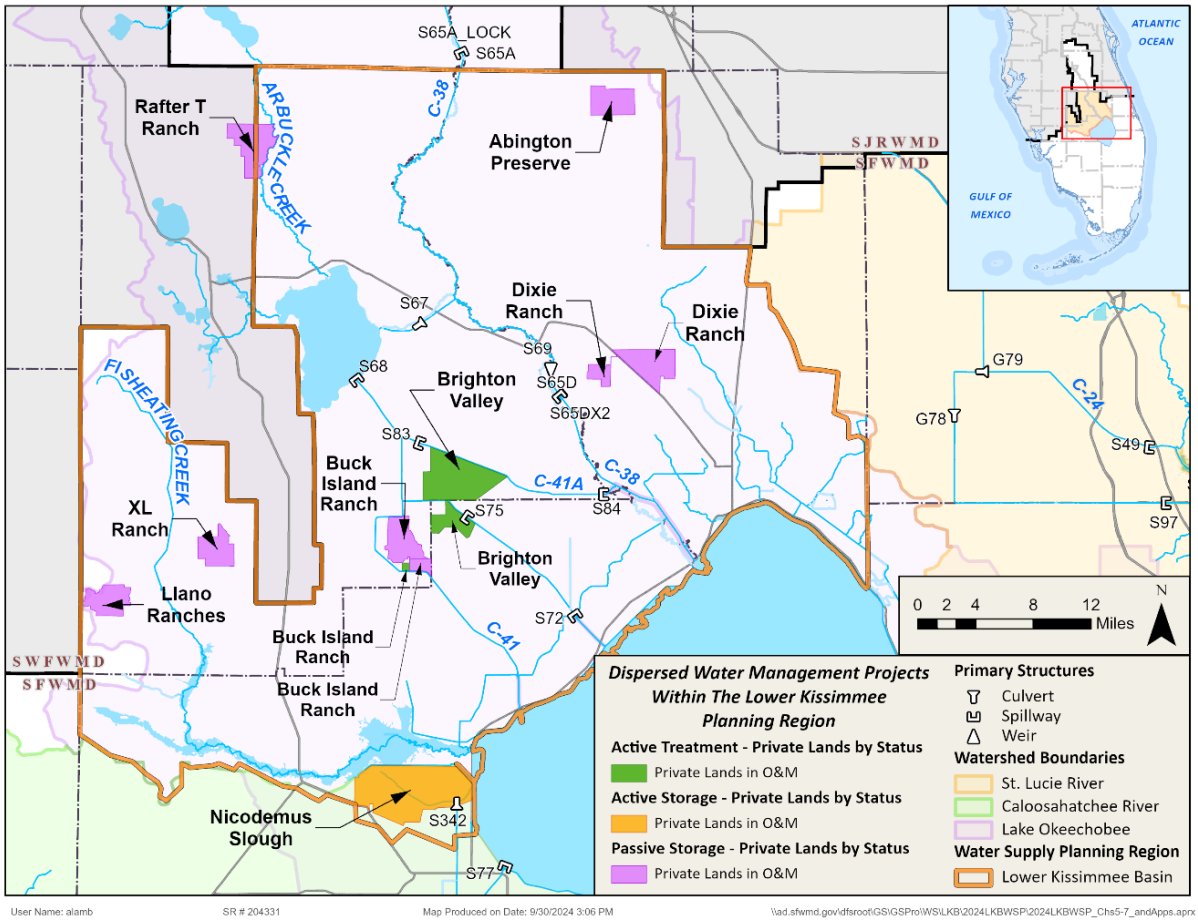



Figure 7-5. Dispersed water management projects within the LKB Planning Area.

# NORTHERN EVERGLADES AND ESTUARIES PROTECTION PROGRAM

The 2016 Northern Everglades and Estuaries Protection Program (NEEPP) (Section 373.4595, F.S.), expands the existing Lake Okeechobee Protection Act with the intent to protect and restore surface water resources and achieve and maintain compliance with water quality standards in the Northern Everglades through a phased, comprehensive and innovative protection program. Legislation requires the completion of protection plans for the Lake Okeechobee watershed, Caloosahatchee River, and St. Lucie River watersheds and estuaries as part of NEEPP. The watershed protection plans build on existing approaches and consolidate restoration efforts throughout the Northern Everglades system. NEEPP requires watershed protection programs to improve the quality, quantity, timing, and distribution of water in the Northern Everglades ecosystem. These measures include reservoirs, Dispersed Water Management Program projects, and ASR systems, which primarily benefit stormwater attenuation and water quality while providing ancillary water supply benefits. More details about specific projects and activities under the watershed protection plans are included in annual updates of the SFER (https://www.sfwmd.gov/sfer). Further information about NEEPP can be found on the SFWMD webpage https://www.sfwmd.gov/our-work/wpps.

# WATER SUPPLY DEVELOPMENT PROJECTS

Water supply development projects include the planning, design, construction, operation, and maintenance of public or private facilities for water collection, production, treatment, transmission, or distribution for sale, resale, or end use and are proposed by water users to meet existing and future demands. Water users such as Public Supply (PS) utilities, local and tribal governments, and self-suppliers including Commercial/Industrial/Institutional (CII) and Agriculture (AG) users are primarily responsible for water supply development projects.

The existing treatment capacity for all PS utilities in the LKB Planning Area is sufficient to meet the projected 2045 demands during average and 1-in-10-year drought conditions. Additionally, while surface water supplies are limited in the LKB Planning Area, groundwater is believed to be adequate to meet projected demands through 2045. Therefore, additional water supply development projects do not appear to be needed at this time and users, including PS utilities, have not proposed any projects.

Should a user determine a water supply development project is needed in the future, each proposed use of water must meet the conditions for permit issuance found in Section 373.223, F.S., and the implementing rules found in Chapter 40E-2, Florida Administrative Code. The SFWMD water supply planning staff will coordinate with permitting staff regarding initial screening of any proposed water supply development project before including it in future water supply plan updates to ensure the project has a likelihood of being permittable.

Although water supply developments are not needed at this time for this plan update, AWS and Comprehensive Water Conservation Program projects can be implemented to increase water supply and reduce the reliance on traditional water sources.

# SUMMARY OF WATER RESOURCE DEVELOPMENT PROJECTS

Water resource development projects serve various purposes in support of managing, protecting, and restoring water resources. Benefits of the water resource development projects discussed in this chapter include the following:

- Restoration of natural resources and prevention of further loss
- Support for MFL prevention or recovery strategies
- Protection of existing water supplies through better resource management and continued implementation of regional resource monitoring
- Water conservation as a demand management tool to expand current water supplies
- Improved understanding of the hydrogeologic system that provides traditional and alternative water supplies for the LKB Planning Area
- Increased future supply availability

# REFERENCES


Collier Geophysics. 2023. *Project Report for the High-Resolution 2-D Seismic Reflection Survey for the South Florida Water Management District, Okeechobee, Florida*. Stephenville, TX. September 2023.

Michelsen, F.B. and J. Jansen. 2020. *Application of High Definition 2D and 3D Seismic Tests for Characterization of the Floridan Aquifer System in the Lake Okeechobee Area: Project Report*. Submitted to the South Florida Water Management District, West Palm Beach, FL. Collier Consulting, Inc., Stephenville, TX. February 2020.

Payseno, S. and J. Beerens. 2024. Chapter 5A: Fiscal Year 2024 Five-Year Water Resource Development Work Program. In: *2024 South Florida Environmental Report – Volume II.* South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2008. *Water Conservation: A Comprehensive Program for South Florida*. South Florida Water Management District, West Palm Beach, FL. September 2008.

SFWMD. 2021. *2021–2024 Support Document for Water Supply Plan Updates*. South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2025. *2025 South Florida Environmental Report DRAFT*. South Florida Water Management District, West Palm Beach, FL.

USACE and SFWMD. 2015. *Central and Southern Florida Project Comprehensive Everglades Restoration Plan Final Technical Data Report Aquifer Storage and Recover Regional Study*. United States Army Corps of Engineers, Jacksonville, FL and South Florida Water Management District, West Palm Beach, FL. May 2015.

# 8

# Conclusions and Future Direction

This chapter of the *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update) provides conclusions and summarizes the future direction of water supply planning in the LKB Planning Area of the South Florida Water Management District (SFWMD or District). This plan update assesses the water supply demand and available sources for the LKB Planning Area through 2045. Water demand is expected to increase by approximately 35.11 million gallons per day (mgd) in the LKB Planning Area by 2045, as discussed in **Chapter 2**. Water conservation is an important component of integrated water resource management and may reduce, defer, or eliminate the need to expand water supply infrastructure. Water conservation by all users reduces the amount of water needed to meet current and future demands (**Chapter 3**).

TOPICS

- Demand Summary
- Demand Management: Water Conservation
- Natural Systems and Resource Protection
- Water Source Options
- Coordination
- Climate Change
- Conclusions

Activities related to natural systems can affect future water supplies within the LKB Planning Area, including Comprehensive Everglades Restoration Plan (CERP) projects and changes to lake regulation schedules. In addition, regulatory criteria designed to protect water resources, including elements identified in minimum flow and minimum water level (MFL) prevention and recovery strategies, place limitations on water available for allocation (**Chapter 4** and **Appendix C**).

Guidance in this 2024 LKB Plan Update should be considered when developing water supply options to meet future needs. Statutory requirements, existing conditions, resource constraints (including protection tools and criteria), and the needs of all water users are addressed. All water users are encouraged to be prudent with water use decisions and to use water efficiently. The SFWMD's recommendations for water supply planning in the LKB Planning Area include continued coordination with agricultural stakeholders, utilities, and other water users; protection of natural resources; diversification of water supply sources; and monitoring to develop responses to changes in water levels and quality in surface water and groundwater.

# DEMAND SUMMARY

Total average annual demands for all water use categories in 2045 are projected to be 260.55 mgd (**Table 8-1**). This is a 15.6% increase from the estimated 2022 demands (225.44 mgd) and 1% more than the projected 2040 demands (257.49 mgd) in the *2019 Lower Kissimmee Basin Water Supply Plan Update* (SFWMD 2019).

Table 8-1. Change in water use demands in the LKB Planning Area from 2022 to 2045.

| Water Use Category | 2022 Estimated Use (mgd) | 2045 Projected Demand (mgd) | Percent Change | Percent of Projected 2045 Total Demand |
|---|---|---|---|---|
| PS | 4.14 | 5.03 | 21.5% | 1.9% |
| DSS | 1.80 | 1.84 | 2.2% | 0.7% |
| AG[a] | 211.04 | 236.15 | 11.9% | 90.6% |
| CII | 2.34 | 2.85 | 21.8% | 1.1% |
| L[a]/R | 6.12 | 14.68 | 139.9% | 5.6% |
| PG | 0.00 | 0.00 | 0.0% | 0.0% |
| **LKB Planning Area Total** | **225.44** | **260.55** | **15.6%** | **100.0%** |

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

[a] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model.

# DEMAND MANAGEMENT: WATER CONSERVATION

Water conservation measures and programs by all water use categories offer the potential to reduce the water needed to meet future demands (**Chapter 3**). All water users are urged to implement water conservation measures to reduce water supply demands. The following conservation-related actions are recommended:

- The SFWMD will continue to implement its Comprehensive Water Conservation Program.
- Agricultural water users are encouraged to install or upgrade to high-efficiency irrigation systems, advanced irrigation technology (controllers), and when applicable Florida Automated Weather Network (FAWN) irrigation tools. More efficient irrigation systems could substantially reduce the amount of water needed to meet future crop demands; however, implementation of such systems may be economically and technically challenging.
- Utilities are encouraged to develop goal-based water conservation plans and proactively implement water-saving measures and programs, such as incentives to promote replacement of older water fixtures with new high-efficiency ones.
- Local governments should evaluate whether mandated water conservation measures, such as requirements for construction of water-efficient homes and commercial properties, are appropriate for their jurisdiction.

- Local governments should adopt a 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.]).
- Local governments should develop or adopt ordinances to promote and be consistent with Florida-Friendly Landscaping provisions (Section 373.185, Florida Statutes).
- Landscape/Recreational (L/R) water users are encouraged to implement advanced irrigation technology, improve landscape design and best management practices, and participate in recognition programs (e.g., Florida-Friendly Landscaping program) to further increase landscape water use efficiency.
- Commercial/Industrial/Institutional (CII) entities are encouraged to use the *Water Efficiency and Self-Conducted Water Audits at Commercial and Institutional Facilities: A Guide for Facility Managers* (SFWMD 2013) to improve water use efficiency and reduce operating costs.
- Public education programs can help instill a year-round conservation ethic. Local and tribal governments and utilities are encouraged to provide conservation-related information, messaging, and educational programs in cooperation with the SFWMD.
- All eligible water users are encouraged to seek cost-share funding opportunities that may be available for water conservation projects.

# NATURAL SYSTEMS AND RESOURCE PROTECTION

In addition to the protection of water resources, a wide range of activities related to natural systems can affect future water supplies within the LKB Planning Area, including CERP projects and changes by the United States Army Corps of Engineers (USACE) to regulation schedules for Lake Okeechobee and other water bodies. In addition, regulatory criteria designed to protect water resources and related natural systems, including elements identified in MFL prevention and recovery strategies, place limitations on water available for allocation (**Chapter 4** and **Appendix C**).

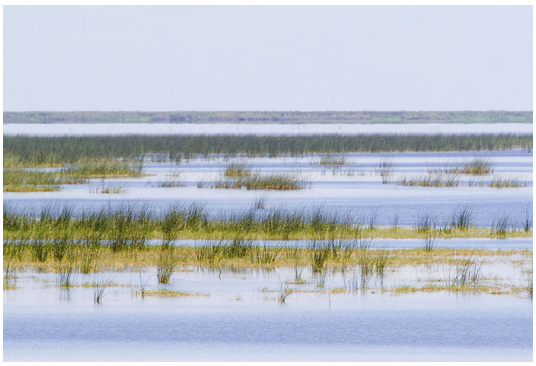
Restored Kissimmee River

Water supply needs for natural systems are addressed by water resource development projects such as CERP (**Chapter 7**). CERP includes regional projects to improve the quality, timing, volume, distribution, and delivery of water to the natural system and other water-related needs. The ongoing environmental restoration and water resource protection efforts are as follows:

- The major construction projects for the Kissimmee River Restoration Project were completed by the SFWMD and the USACE in 2021. Once the Headwaters Revitalization Schedule is fully implemented, which is expected in 2027, water will be released from the Headwater Lakes as part of a management strategy to balance the water needs of the Kissimmee River and floodplain, the Headwater Lakes, flood control, and the timing of flows into Lake Okeechobee. When complete, the project will re-establish flow to approximately 40 miles of historical river channel and restore almost 25,000 acres of floodplain wetlands.
- The SFWMD will continue to partner with the USACE on planning and construction of CERP projects such as the Lake Okeechobee Watershed Restoration Project (LOWRP) and the Lake Okeechobee Component A Storage Reservoir (LOCAR).
- The SFWMD will continue partnerships with private landowners for dispersed water management, water quality, and water storage reservoir projects, where appropriate.
- The SFWMD will continue to monitor and research natural areas, including Lake Istokpoga, Taylor Creek/Nubbin Slough, the Kissimmee River, and Lake Okeechobee and provide annual updates in the *South Florida Environmental Report* (https://www.sfwmd.gov/sfer) to track the health of the areas and meet regulatory requirements.
- The SFWMD will continue to implement, review, and update MFL prevention and recovery strategies, as appropriate, in conjunction with future water supply plan updates.
- The SFWMD will continue to implement the Kissimmee River and Chain of Lakes water reservations (Rule 40E-10.071, F.A.C.) adopted in 2021 to reserve water for the protection of fish and wildlife from increased consumptive uses.

# WATER SOURCE OPTIONS

Surface water and fresh groundwater combined currently supply 96% of all water needs in the LKB Planning Area. Most Public Supply (PS) demand is met by the Okeechobee Utility Authority with surface water from Lake Okeechobee. The other four utilities in the LKB Planning Area rely on fresh groundwater from the surficial and Floridan aquifer systems (SAS and FAS). Agriculture (AG) relies on a combination of surface water and fresh groundwater to meet 97% of demand (**Chapter 5**).



Lake Okeechobee

Withdrawals from the SAS primarily are for Domestic Self-Supply (DSS) and small-scale AG uses. The Seminole Tribe of Florida's Brighton Reservation currently relies primarily on surface water for AG and groundwater from the FAS for PS. The FAS produces good quality water and is the most used groundwater source in the LKB Planning Area. Use of the FAS likely will continue increasing to meet future water demands in the region as it is a practical solution to meet some of the region's AG needs when surface water availability is limited.

Reclaimed water can be used to meet new uses or replace freshwater sources and potable water currently used for irrigation or industrial purposes. Additionally, water storage features (e.g., reservoirs, aquifer storage and recovery [ASR] wells, and impoundments) can capture excess stormwater, groundwater, and surface water during wet weather periods and provide supplemental water supply for AG, PS, natural systems, and other needs.

The following sections offer guidance for consideration by local and tribal governments, utilities, agricultural entities, other water users, and the SFWMD as a basis for the future availability of water supply sources in the LKB Planning Area.

## Surface Water

Surface water is the most used source in the LKB Planning Area and is the primary source of water for potable use by the Okeechobee Utility Authority, which represents approximately two-thirds of current PS demand. Surface water supply sources in and adjacent to the LKB Planning Area include Lake Istokpoga, the Kissimmee River, and Lake Okeechobee and its connected secondary canal system located in the Lake Okeechobee Service Area (LOSA). Water availability from these systems is limited due to restricted allocation area criteria and water reservations.

For surface water users in LOSA, additional water can be stored in Lake Okeechobee resulting from the completion of the Herbert Hoover 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 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, and additional details are provided in Appendix C of the *2023–2024 Lower East Coast Water Supply Plan Update* (SFWMD 2024). The SFWMD will continue to allocate water for existing and future reasonable-beneficial uses pursuant to its regulatory rules and criteria.

Additional water storage features could enhance water availability. The following actions should be implemented:

- The SFWMD and the USACE will continue to design and construct capital projects to increase storage, such as ASR systems and aboveground storage reservoirs.
- The SFWMD and the USACE will complete and implement the components identified in the LOWRP. Part of CERP, the LOWRP will increase the watershed's storage capacity and improve the quantity and timing of water deliveries to Lake Okeechobee.
- The SFWMD will continue to partner with the USACE to design and construct the LOCAR to provide up to 200,000 acre-ft of storage north of Lake Okeechobee.
- The SFWMD will continue to implement the regulatory component of the Kissimmee River and Chain of Lakes water reservations rule, which was adopted in 2021, and continue development of the planned 2027 implementation of the Headwaters Revitalization Schedule.

- The SFWMD will continue to implement MFL prevention and recovery strategies for Lake Istokpoga and Lake Okeechobee and update these, if needed, in conjunction with future plan updates.
- The USACE has commenced implementation of LOSOM, which was approved in August of 2024. The SFWMD will provide weekly operational guidance to the USACE and use available storage and conveyance capacity to achieve water supply performance consistent with the state's water supply authority.
- Agricultural users are encouraged to reduce or augment use of surface water, when technically and economically feasible, with projects such as stormwater and tailwater recovery, the blending of brackish groundwater with fresh water where available, and more efficient water conservation practices.
- Local and tribal governments, utilities, and agricultural operations are encouraged to create additional storage capacity for excess surface water to use for water supply purposes, when technically and economically feasible.

## Groundwater

Groundwater, particularly from the FAS, is the primary source of water for AG. Many agricultural users also use groundwater from the SAS and intermediate aquifer system as supplemental sources. Although most PS demand currently is met with surface water, utilities may need to rely more on groundwater in the future, as restricted allocation areas or other protective measures have been adopted restricting increases in allocations of surface water.

### *Surficial Aquifer System*

At current use rates and locations, water levels in the SAS appear to be stable. Increased use of the SAS is projected to be minor. The potential use of the SAS for new or increased allocations will be evaluated on an application-by-application basis to determine if the project meets water use permitting criteria. The following actions are suggested:

- All local water users are encouraged to coordinate with the SFWMD to determine if the SAS is an appropriate source for their intended use.
- The design of wells and wellfield locations, configurations, and pumping regimes should maximize withdrawals while avoiding harm to natural systems and other users.

### *Floridan Aquifer System*

The FAS typically is productive in the LKB Planning Area and expected to be the primary source, in combination with surface water, to meet 2045 demands. While generally fresh, the upper portions of the FAS become brackish near Lake Okeechobee. In addition, points of withdrawal in the FAS near the boundary between the SFWMD and the Southwest Florida Water Management District increase the potential to impact MFL water bodies along the Lake Wales Ridge. The following actions are suggested:

- Brackish water from the FAS may be blended with fresh groundwater and/or surface water to produce acceptable irrigation-quality water. Blended water supplies depend on crop requirements, water sources, volume of stored water, and natural system requirements. They also require monitoring to ensure acceptable water quality.
- Local water users and utilities developing FAS wellfields are encouraged to collaborate with the SFWMD. Water quality, water level, and hydrologic data from such wells can be used in SFWMD regional groundwater flow models and can increase knowledge and understanding of the FAS.
- Landowners are encouraged to plug and abandon free-flowing, inactive, or nonfunctional FAS wells in accordance with existing rules and regulations. This will prevent loss of water via free-flowing wells and contamination of the overlying SAS with more saline water from the FAS.

## Reclaimed Water

Reclaimed water can be used to meet new uses or replace traditional freshwater sources currently used for irrigation or industrial purposes; however, its availability in the LKB Planning Area is very limited. The following actions are suggested:

- Utilities are encouraged to expand the efficient use of reclaimed water and minimize disposal practices where feasible.
- Local government and utilities should support septic to sewer conversions for water quality benefits, which could increase wastewater flow and the potential for water reuse.

## New Storage Capacity for Surface Water or Groundwater

Water storage options include reservoirs, ASR wells, and surface water impoundments that capture excess groundwater or surface water for later use. In addition, ASR can be used to store excess potable water and reclaimed water for seasonal or longer-term drought resilience. Proposed projects that develop new storage and create additional water supply may be considered alternative water supply sources. Opportunities for new storage capacity include the following:

Kissimmee River ASR Facility

- Surface water storage systems (e.g., reservoirs) can help meet urban, agricultural, and environmental water supply needs.
- New or retrofitted surface water storage systems for agricultural operations could provide additional water supply for irrigation but may have limited availability during a 1-in-10-year drought.
- ASR systems can store water during periods of low demand and high-water levels (i.e., during the wet season) for subsequent recovery during dry periods, which could reduce withdrawals from traditional sources.

# COORDINATION

Collaboration among regional, local, tribal, and utility planning entities is essential to ensure the supply of water is sufficient and sustainable to meet urban, agricultural, and environmental needs. Examples of coordination activities include the following:

- Water Supply Facilities Work Plans are due within 18 months of approval of this 2024 LKB Plan Update. Local governments must provide linkages and coordination between the SFWMD's plan update and the water supply-related components of their Comprehensive Plans.
- The SFWMD will continue coordination with the USACE to implement CERP projects (e.g., LOWRP) within the region.
- The SFWMD will continue to work with the Florida Department of Agriculture and Consumer Services and agricultural stakeholders to provide data for annual updates to the Florida Statewide Agricultural Irrigation Demand simulation for future crop acreage and water demand projections.
- The SFWMD will coordinate ongoing activities outside the basin with the Southwest Florida Water Management District, St. Johns River Water Management District, and Central Florida Water Initiative (including the Upper Kissimmee Basin of the SFWMD) planning efforts.
- The SFWMD will continue collaboration with the Florida Department of Environmental Protection and Department of Agriculture and Consumer Services through the Lake Okeechobee Basin Management Action Plan, including stormwater, water quality, and water storage in the LKB Planning Area.
- The SFWMD will coordinate with stakeholders on the development and use of regional groundwater and surface water models to evaluate regional water resource availability.

# CLIMATE CHANGE

Climate change, including potential changes in air temperature and rainfall patterns, could affect hydrologic conditions, and thus water supply sources, as well as patterns of water demand. Recommendations related to climate change include the following:

- The SFWMD will continue to investigate climate change projection patterns and models for use in water supply planning in the next 5-year cycle of water supply plan updates and system operations.
- The SFWMD will continue to partner with other agencies, local and tribal governments, utilities, academic institutions, and other stakeholders to identify methods to evaluate the potential impacts of climate change in the planning area.
- Water users should periodically review irrigation schedules and consider installing weather-based controllers.

# CONCLUSIONS

Building on the findings and conclusions of the *2019 Lower Kissimmee Basin Water Supply Plan Update* (SFWMD 2019), this 2024 LKB Plan Update assesses water supply demands and available sources for the LKB Planning Area 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.

Successful implementation of this 2024 LKB 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 LKB Planning Area continue to be prudently managed and available to meet future demands while also protecting natural systems.

# REFERENCES

SFWMD. 2013. *Water Efficiency and Self-Conducted Water Audits at Commercial and Institutional Facilities: A Guide for Facility Managers*, *2nd Edition*. South Florida Water Management District, West Palm Beach, FL. July 2013.

SFWMD. 2019. *2019 Lower Kissimmee Basin Water Supply Plan Update.* South Florida Water Management District, West Palm Beach, FL. December 2019.

SFWMD. 2024. *2023–2024 Lower East Coast Water Supply Plan Update.* South Florida Water Management District, West Palm Beach, FL. September 2024.

# Glossary

**1-in-10-year drought** 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.

**1-in-10-year level of certainty** (see *Level of Certainty*)

**Acre-foot, acre-feet** The volume of water that covers 1 acre (43,560 square feet) to a depth of 1 foot. The equivalent of 43,560 cubic feet, 1,233.5 cubic meters, or 325,872 gallons.

**Agricultural best management practice (Agricultural BMP)** A practice or combination of agricultural practices, based on research, field testing, and expert review, determined to be the most effective and practicable means of improving water quality or quantity while maintaining or even enhancing agricultural production.

**Agricultural Field-Scale Irrigation Requirements Simulation (AFSIRS)** A water budget model for calculating irrigation demands that estimates demand based on basin-specific data. The AFSIRS model calculates both net and gross irrigation requirements for average and 1-in-10-year drought irrigation requirements. A crop's net irrigation requirement is the amount of water delivered to the root zone of the crop, while the gross irrigation requirement includes both the net irrigation requirement and the losses incurred in the process of delivering irrigation to the crop's root zone.

**Agriculture (AG)** Self-supplied water used for commercial crop irrigation, greenhouses, nurseries, livestock watering, pasture, and aquaculture.

**Alternative water supply** Salt water; brackish surface water and groundwater; surface water captured predominately during wet-weather flows; sources made available through the addition of new storage capacity for surface water or groundwater; water that has been reclaimed after one or more public supply, municipal, industrial, commercial, or agricultural uses; the downstream augmentation of water bodies with reclaimed water; stormwater; and, any other water supply source that is designated as nontraditional for a water supply planning region in the applicable regional water supply plan (Section 373.019, Florida Statutes [F.S.]).

***Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District* (Applicant's Handbook)** Read in conjunction with Chapter 40E-2, Florida Administrative Code (F.A.C.), the Applicant's Handbook further specifies the general procedures and criteria used by SFWMD staff for review of water use permit applications to ensure water uses permitted by the SFWMD are reasonable-beneficial, do not interfere with existing legal users, and are in the public interest.

**Aquifer** A geologic formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.

**Aquifer storage and recovery (ASR)** The underground storage of potable water, stormwater, surface water, fresh groundwater, or reclaimed water, which is appropriately treated to potable standards and injected into an aquifer through wells. The aquifer (typically the Floridan aquifer system in South Florida) acts as an underground reservoir for the injected water, reducing water loss to evaporation. The water is injected during the wet season or when water is readily available and stored with the intent to recover it for use during future dry periods.

**Aquifer system** A heterogeneous body of (interbedded or intercalated) permeable and less permeable material that functions regionally as a water-yielding hydraulic unit and may be composed of more than one aquifer separated at least locally by confining units that impede groundwater movement, but do not greatly affect the hydraulic continuity of the system.

**Average rainfall year** A year having rainfall with a 50% probability of being exceeded over a 12-month period.

**Base condition** A specified period of time during which collected data are used for comparison with subsequent data.

**Basin** There are two types of basins: 1) a groundwater basin is a hydrologic unit consisting of one large aquifer, or several connecting and interconnecting aquifers; and 2) a surface water basin is a tract of land drained by a surface water body or its tributaries.

**Below land surface** Depth below land surface regardless of land surface elevation.

**Boulder Zone** A highly transmissive, cavernous zone of dolomite within the Lower Floridan aquifer used to dispose of secondary-treated effluent from wastewater treatment facilities and concentrate from membrane water treatment plants via deep injection wells.

**Brackish water** Water with a chloride concentration greater than 250 milligrams per liter (mg/L) and less than 19,000 mg/L.

**Canal** A manmade waterway used for draining or irrigating land or for navigation by boat.

**Capacity** The ability to treat, move, or reuse water. Typically, capacity is expressed in millions of gallons per day (mgd).

**Central and Southern Florida Flood Control Project (C&SF Project)** A complete system of canals, storage areas, and water control structures spanning the area from Lake Okeechobee to the east and west coasts and from Orlando south to the Everglades. It was designed and constructed during the 1950s by the United States Army Corps of Engineers (USACE) to provide flood control and improve navigation and recreation.

**Commercial/Industrial/Institutional (CII)** Self-supplied water associated with the production of goods or provision of services by industrial, commercial, or institutional establishments.

**Comprehensive Everglades Restoration Plan (CERP)** The federal-state partnership framework and guide for the restoration, protection, and preservation of the South Florida ecosystem. CERP also provides for water-related needs of the region, such as water supply and flood protection.

**Confined aquifer** An aquifer containing groundwater that is confined under pressure and bounded between substantially less permeable materials such that water will rise in a fully penetrating well above the top of the aquifer. In cases where the hydraulic head is greater than the elevation of the overlying land surface, a fully penetrating well will naturally flow at the land surface without means of pumping or lifting.

**Confining unit** A body of significantly less permeable material than the aquifer, or aquifers, that it stratigraphically separates. The hydraulic conductivity may range from nearly zero to some value significantly lower than that of the adjoining aquifers, and impedes the vertical movement of water.

**Conservation** (see *Water conservation*)

**Consumptive use** Any use of water that reduces the supply from which it is withdrawn or diverted**.**

**Control structure** An artificial structure designed to regulate the level/flow of water in a canal or other water body (e.g., weirs, dams).

**Cubic feet per second (cfs)** A rate of flow (e.g., in streams and rivers) equal to a volume of water 1 foot high and 1 foot wide flowing a distance of 1 foot in 1 second. One cfs is equal to 7.48 gallons of water flowing each second.

**DBHYDRO** The SFWMD's corporate environmental database, storing hydrologic, meteorologic, hydrogeologic, and water quality data.

**Demand** The quantity of water needed to fulfill a requirement.

**Demand management** Reducing the demand for water through activities that alter water use practices, improve efficiency in water use, reduce losses of water, reduce waste of water, alter land management practices, and/or alter land uses.

**Dike** An embankment to confine or control water, especially one built along the banks of a river or lake to prevent overflow of lowlands; a levee.

**Discharge** The rate of water movement past a reference point, measured as volume per unit of time (usually expressed as gallons per minute, cubic feet per second, or cubic meters per second).

**Disinfection** The process of inactivating microorganisms that cause disease. All potable water requires disinfection as part of the treatment process prior to distribution. Disinfection methods include chlorination, ultraviolet radiation, and ozonation.

**Disposal** Effluent disposal involves the practice of releasing treated effluent back to the environment using ocean outfalls, surface water discharges, or deep injection wells.

**Domestic Self-Supply (DSS)** Potable water used by households served by small utilities (less than 0.10 mgd) or self-supplied by private wells.

**Domestic wastewater** Wastewater derived principally from residential dwellings, commercial buildings, and institutions; sanitary wastewater; sewage.

**Drainage basin** The land area where precipitation ultimately drains to a particular watercourse (e.g., river, stream) or body of water (e.g., lake, reservoir). Drainage basins in South Florida are defined by rule and periodically are redefined to reflect changes in the regional drainage network.

**Drawdown** 1) The vertical distance between the static water level and the surface of the cone of depression. 2) A lowering of the groundwater surface caused by pumping.

**Drought** A long period of abnormally low rainfall, especially one that reduces water supply availability.

**Ecology** The study of the inter-relationships of plants and animals to one another and to their physical and biological environment.

**Ecosystem** Biological communities together with their environment, functioning as a unit.

**Ecosystem restoration** The process of re-establishing to as near its natural condition as possible, the structure, function, and composition of an ecosystem.

**Elevation** The height in feet above mean sea level according to National Geodetic Vertical Datum of 1929 (NGVD29) or North American Vertical Datum of 1988 (NAVD88). May also be expressed in feet above mean sea level as reference datum.

**Environmental impact statement** An evaluation of the positive and negative environmental effects of a proposed agency action required under United States environmental law by the National Environmental Policy Act for federal government agency actions "significantly affecting the quality of the human environment."

**Estuary** A body of water found where a river meets the ocean that is characterized by fresh water mixing with salt water.

**Evapotranspiration (ET)** The total loss of water to the atmosphere by evaporation from land and water surfaces and by transpiration from plants.

**Exceedance** The violation of the pollutant levels permitted by environmental protection standards.

**Exceedance (MFL)** As defined in Rule 40E-8.021, F.A.C., to fall below a minimum flow or level, which is established in Parts II and III of Chapter 40E-8, F.A.C, for a duration greater than specified for the MFL water body.

**Finished water** Water that has undergone a purification or treatment process; water that has passed through all the processes in a water treatment plant and is ready to be delivered to consumers. Contrast with *Raw water*.

**Finished water demand** (see *Net water demand*)

**Fiscal Year (FY)** The South Florida Water Management District's fiscal year begins on October 1 and ends on September 30 the following year.

**Florida Administrative Code (F.A.C.)** The Florida Administrative Code is the official compilation of the administrative rules and regulations of state agencies.

**Florida Department of Agriculture and Consumer Services (FDACS)** An executive department of the Government of Florida. FDACS supports and promotes Florida agriculture, protects the environment, safeguards consumers, ensures the safety and wholesomeness of food and implements agricultural best management practices, addressing water quality and water conservation.

**Florida-Friendly Landscaping** Quality landscapes that conserve water, protect the environment, are adaptable to local conditions, and are drought tolerant. The principles of such landscaping include planting the right plant in the right place, efficient watering, appropriate fertilization, mulching, attraction of wildlife, responsible management of yard pests, recycling yard waste, reduction of stormwater runoff, and waterfront protection.

**Florida Statutes (F.S.)** The Florida Statutes are a permanent collection of state laws organized by subject area into a code made up of titles, chapters, parts, and sections. The Florida Statutes are updated annually by laws that create, amend, or repeal statutory material.

**Floridan aquifer system (FAS)** A highly used, deep aquifer system composed of the Upper and Lower Floridan aquifers. It is the principal source of water supply north of Lake Okeechobee and is highly mineralized south of the lake, requiring membrane treatment prior to use.

**Flow** The actual amount of water flowing by a particular point over some specified time. In the context of water supply, flow represents the amount of water being treated, moved, or reused. Flow is frequently expressed in millions of gallons per day (mgd).

**Fresh water** An aqueous solution with a chloride concentration less than or equal to 250 mg/L.

**Geologic unit** A geologic unit is a volume of rock or ice of identifiable origin and age range that is defined by the distinctive and dominant, easily mapped and recognizable petrographic, lithologic, or paleontologic features that characterize it.

**Gross (raw) water demand** The amount of water withdrawn from a water resource to meet a particular need of a water user or customer. Gross demand is the amount of water allocated in a water use permit. Gross or raw water demands are nearly always higher than net or user/customer water demands to account for treatment and distribution losses.

**Groundwater** Water beneath the surface of the ground, whether or not flowing through known and definite channels. Specifically, that part of the subsurface water in the saturated zone, where the water is under pressure greater than the atmosphere.

**Groundwater recharge** (see *Recharge*)

**Harm** As defined in Chapter 40E-8, F.A.C., the temporary loss of water resource functions that results from a change in surface or groundwater hydrology and takes a period of one to two years of average rainfall conditions to recover.

**Headwater(s)** 1) Water that is typically of higher elevation (with respect to tailwater) or on the controlled side of a structure. 2) The waters at the highest upstream point of a natural system that are considered the major source waters of the system.

**Hydrogeologic unit** Any rock unit or zone that because of its hydraulic properties has a distinct influence on the storage or movement of groundwater.

**Hydrogeology** The geology of groundwater, with emphasis on the chemistry and movement of water.

**Hydrologic condition(s)** The state of an area pertaining to the amount and timing of water present.

**Hydrologic model** A conceptual or physically based procedure for numerically simulating a process or processes that occur in a watershed.

**Hydrology** The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

**Impoundment** Any lake, reservoir, or other containment of surface water occupying a depression or bed in the earth's surface and having a discernible shoreline.

**Infiltration** The movement of water through the soil surface into the soil under the forces of gravity and capillarity.

**Inflow** 1) The act or process of flowing in or into. 2) The measured quantity of water that has moved into a specific location.

**Injection well** Refers to a well constructed to inject treated wastewater directly into the ground. Wastewater is generally forced (pumped) into the well for dispersal or storage in a designated aquifer. Injection wells are generally drilled below freshwater levels, or into unused aquifers or aquifers that do not contain drinking water.

**Irrigation** The application of water to crops and other plants by artificial means to supplement rainfall.

**Landscape irrigation** The outside watering of shrubbery, trees, lawns, grass, ground covers, vines, gardens, and other such flora, not intended for resale, which are planted and are situated in such diverse locations as residential and recreational areas, cemeteries, public, commercial and industrial establishments, and public medians and rights-of-way.

**Landscape/Recreational (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.

**Levee** An embankment to prevent flooding or a continuous dike or ridge for confining the irrigation areas of land to be flooded.

**Level of certainty** A water supply planning goal to assure at least a 90% probability during any given year that all the needs of reasonable-beneficial water uses will be met, while sustaining water resources and related natural systems during a 1-in-10-year drought event.

**Marsh** A frequently or continually inundated unforested wetland characterized by emergent herbaceous vegetation adapted to saturated soil conditions.

**Miccosukee Tribe of Indians of Florida** A federally recognized Native American tribe, who was part of the Seminole Nation until they organized as an independent tribe in 1962. The Miccosukee Tribe of Indians of Florida is recognized by the State of Florida pursuant to Chapter 285, Florida Statutes.

**Million gallons per day (mgd)** A rate of flow of water equal to 133,680.56 cubic feet per day, 1.5472 cubic feet per second, or 3.0689 acre-feet per day. A flow of one million gallons per day for one year equals 1,120 acre-feet (365 million gallons).

**Minimum flow and minimum water level (MFL)** A flow or level established by the SFWMD pursuant to Sections 373.042 and 373.0421, F.S., for a given water body, at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

**Mobile irrigation lab (MIL)** A vehicle furnished with irrigation evaluation equipment that is used to carry out on-site evaluations of irrigation systems and to provide recommendations on improving irrigation efficiency.

**Model** A computer model is a representation of a system and its operations and provides a cost-effective way to evaluate future system changes, summarize data, and help understand interactions in complex systems. Hydrologic models are used for evaluating, planning, and simulating the implementation of operations within the SFWMD's water management system under different climatic and hydrologic conditions. Water quality and ecological models are also used to evaluate other processes vital to the health of ecosystems. Groundwater flow models are a numerical representation of water flow and water quality within an aquifer or aquifer system.

**Monitor well** Any human-made excavation by any method to monitor fluctuations in groundwater levels, quality of underground waters, or the concentration of contaminants in underground waters.

**National Geodetic Vertical Datum of 1929 (NGVD29)** A geodetic datum derived from a network of information collected in the United States and Canada. It was formerly called the "Sea Level Datum of 1929" or "mean sea level." As technology has improved and the demand for greater accuracy increased, inherent inaccuracies were uncovered in NGVD29. As a result, NGVD29 has been superseded by the North American Vertical Datum (NAVD) of 1988.

**Natural system(s)** A self-sustaining living system that supports an interdependent network of aquatic, wetland-dependent, and upland living resources.

**Outflow** The measured quantity of water that has left an area or water body (through pumping or gravity) during a certain period of time.

**Per capita use** 1) The average amount of water used per person during a standard time period, generally per day. 2) Total use divided by the total population served.

**Permeability** The capacity of a porous rock, sediment, or soil for transmitting a fluid.

**Planning Area** The SFWMD is divided into five areas within which planning activities are focused: Upper Kissimmee Basin (part of the Central Florida Water Initiative), Lower Kissimmee Basin, Upper East Coast, Lower West Coast, and Lower East Coast.

**Potable water** Water that is suitable for drinking, culinary, or domestic purposes.

**Potentiometric head** The level to which water will rise when a well is placed in a confined aquifer.

**Power Generation (PG)** The difference in the amount of water withdrawn by electric power generating facilities for cooling purposes and the water returned to the hydrologic system near the point of withdrawal.

**Priority Water Bodies List and Schedule** Required in Section 373.042(2), F.S. of the state's five water management districts to provide the Florida Department of Environmental Protection with an annual list and schedule of specific surface waters and groundwaters with minimum flows and levels and water reservation rules that will be adopted to protect them from the effects of consumptive use allocations.

**Process water** Water used for nonpotable industrial use, e.g., mixing cement.

**Public Supply (PS)** Water supplied by water treatment facilities for potable use (drinking quality) with projected average pumpages greater than 0.10 million gallons per day.

**Public Supply (PS) demand** All potable (drinking quality) water supplied by water treatment plants with projected average pumpages of 0.10 million gallons per day or greater to all types of customers, not just residential.

**Rapid infiltration basin** A disposal method by which treated wastewater is applied in deep and permeable deposits of highly porous soils for percolation.

**Raw water** 1) Water that is direct from the source—groundwater or surface water—without any treatment. 2) Untreated water, usually that entering the first unit of a water treatment plant. Contrast with *Finished Water*.

**Raw water demand** The amount of water that must be withdrawn from the groundwater or surface water system to meet a particular need. Withdrawal demands are almost always higher than user/customer demands because of treatment and process losses, and inefficiencies associated with delivering water from the source to the end user.

**Reasonable-beneficial use** Use of water in such quantity as is needed for economic and efficient use for a purpose, which is both reasonable and consistent with the public interest.

**Recharge (groundwater)** The natural or intentional infiltration of surface water or reclaimed water into the ground to raise groundwater levels.

**Reclaimed water** Water that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility (Rule 62-610.200, F.A.C.).

**Recovery** The rate and extent of return of a natural population or community to some aspect(s) of its previous condition. Because of the dynamic nature of ecological systems, the attributes of a "recovered" system should be carefully defined.

**Reservoir** An artificial or natural water body used for water storage. Reservoirs can be above or below ground.

**Restoration** The recovery of a natural system's vitality and biological and hydrological integrity to the extent that the health and ecological functions are self-sustaining over time.

**Restricted allocation area** An area designated within the South Florida Water Management District boundaries for which allocation restrictions are applied regarding the use of specific sources of water. The water resources in these areas are managed in response to specific sources of water in the area for which there is a lack of water availability to meet the projected needs of the region from that specific source of water.

**Retrofit** 1) Indoor: The replacement of existing water fixtures, appliances, and devices with more efficient fixtures, appliances, and devices for the purpose of water conservation. 2) Outdoor: The replacement or changing out of an existing irrigation system with a more efficient irrigation system, such as a conversion from an overhead sprinkler system to a micro-irrigation system. May also include rain or soil moisture sensors to increase efficiency.

**Reuse** The deliberate application of reclaimed water for a beneficial purpose. Criteria used to classify projects as "reuse" or "effluent disposal" are contained in Rule 62-610.810, F.A.C. The term "reuse" is synonymous with "water reuse."

**Reverse osmosis** A treatment process for desalting water using applied pressure to drive the feed water (source water) through a semipermeable membrane.

**Rule(s)** Of or pertaining to the SFWMD's regulatory programs, which are set forth in various statutes, codes, and criteria.

**Runoff** That component of rainfall, which is not absorbed by soil, intercepted and stored by surface water bodies, evaporated to the atmosphere, transpired and stored by plants, or infiltrated to groundwater, but which flows to a watercourse as surface water flow.

**Salinity** Of or relating to chemical salts, usually measured in milligrams per liter (mg/L), or practical salinity units.

**Salt water** (see *Seawater or Salt water*)

**Saltwater interface** The hypothetical surface of chloride concentration between fresh water and seawater where the chloride concentration is 250 mg/L at each point on the surface.

**Saltwater intrusion** The invasion of a body of fresh water by a body of salt water due to its greater density. It can occur either in surface water or groundwater bodies. The term is applied to the flooding of freshwater marshes by seawater, the upward migration of seawater into rivers and navigation channels, and the movement of seawater into freshwater aquifers along coastal regions.

**Seawater** or **Salt water** Water with a chloride concentration at or above 19,000 mg/L.

**Seepage** The passage of water or other fluid through a porous medium, such as the passage of water through an earth embankment or masonry wall. Groundwater emerging on the face of a stream bank; the slow movement of water through small cracks, pores, interstices, etc., of a material into or out of a body of surface or subsurface water. Seepage is generally expressed as flow volume per unit of time.

**Seminole Tribe of Florida** 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, Florida Statutes.

**Serious harm** As defined in Chapter 40E-8, F.A.C., the long-term, irreversible, or permanent loss of water resource functions resulting from a change in surface water or groundwater hydrology.

**Service area** The geographical region in which a water supplier has the ability and the legal right to distribute water for use.

**Significant harm** As defined in Chapter 40E-8, F.A.C., the temporary loss of water resource functions that results from a change in surface water or groundwater hydrology and takes more than 2 years to recover, but which is considered less severe than serious harm.

**Stormwater** Water that does not infiltrate but accumulates on land as a result of storm runoff, snowmelt, irrigation, or drainage from impervious surfaces.

**Stormwater discharge** Precipitation runoff from roadways, parking lots, and roof drains that is collected in gutters and drains. A major source of nonpoint source pollution to water bodies and sewage treatment facilities in municipalities where stormwater is combined with the flow of domestic wastewater (sewage) before entering the wastewater treatment facility.

**Stormwater treatment area (STA)** A system of constructed water quality treatment wetlands that use natural biological processes to reduce levels of nutrients and pollutants from surface water runoff.

**Surface water** Water above the soil or substrate surface, whether contained in bounds, created naturally or artificially, or diffused. Water from natural springs is classified as surface water when it exits from the spring onto the earth's surface.

**Surficial aquifer system (SAS)** Often the principal source of water for urban uses. This aquifer is unconfined, consisting of varying amounts of limestone and sediments that extend from the land surface to the top of an intermediate confining unit.

**Treatment facility** Any facility or other works used for the purpose of treating, stabilizing, or holding water or wastewater.

**Tributary** A stream that flows into a larger stream or other body of water.

**United States Army Corps of Engineers (USACE)** As part of the Department of the Army, the USACE has responsibilities in civil and military areas. In civil works, the USACE has authority for approval of dredge and fill permits in navigable waters and tributaries thereof; the USACE enforces wetlands regulations, and constructs and operates a variety of water resource projects, mostly notably reservoirs, levee, dams, and locks.

**United States Geological Survey (USGS)** The federal agency chartered in 1879 by Congress to classify public lands, and to examine the geologic structure, mineral resources, and products of the national domain. As part of its mission, the USGS provides information and data on the nation's rivers and streams that are useful for mitigation of hazards associated with floods and droughts, including streamflow, groundwater, water quality, and water use and availability.

**Utility** Any legal entity responsible for supplying potable water for a defined service area.

**Violation (MFL)** As defined in Rule 40E-8.021, F.A.C., to fall below an adopted minimum flow or level criterion for a duration and frequency greater than specified for the MFL water body. Unless otherwise specified herein, in determining the frequency with which water flows and levels fall below an established MFL for purposes of determining an MFL violation, a "year" means 365 days from the last day of the previous MFL exceedance.

**Wastewater** The combination of liquid and water-carried pollutants from residences, commercial buildings, industrial plants, and institutions together with any groundwater, surface runoff, or leachate that may be present.

**Water conservation** The permanent, long-term reduction of daily water use. Permanent water use reduction requires the implementation of water saving technologies and measures that reduce water use while satisfying consumer needs. Water conservation is considered a demand management measure because it reduces the need for future expansion of water supply infrastructure (see *Demand management*).

**Water conservation rate structure** A water rate structure designed to conserve water. Examples of conservation rate structures include increasing block rates, seasonal rates, and quantity-based surcharges.

**Water management** The general application of practices to obtain added benefits from precipitation, water or water flow in any of a number of areas, such as irrigation, drainage, wildlife and recreation, navigation, water supply, watershed management, and water storage in soil for crop production. Watershed management is the analysis, protection, development, operation, or maintenance of the land, vegetation, and water resources of a drainage basin for the conservation of all its resources for the benefit of its residents. Watershed management for water production is concerned with the quality, quantity and timing of the water which is produced.

**Water quality** 1) A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose. 2) The physical, chemical, and biological condition of water as applied to a specific use. Federal and state guidelines set water quality standards based on the water's intended use, whether it is for recreation, fishing, drinking, navigation, shellfish harvesting, or agriculture.

**Water reservation** A legal mechanism to set aside water for the protection of fish and wildlife or the public health and safety from consumptive water use. The reservation is composed of a quantification of the water to be protected, which includes a seasonal and a location component.

**Water resource development** The formulation and implementation of regional water resource management strategies, including collection and evaluation of surface water and groundwater data; structural and nonstructural programs to protect and manage the water resources; development of regional water resource implementation programs; construction, operation and maintenance of major public works facilities to provide for flood control, surface and groundwater storage, and groundwater recharge augmentation; and related technical assistance to local governments and to government-owned and privately owned water utilities (Section 373.019, F.S.).

**Water reuse** (see *Reuse*)

**Watershed** A region or area bounded peripherally by a water parting and draining ultimately to a particular watercourse or body of water. Watersheds conform to federal hydrologic unit code standards and can be divided into subwatersheds and further divided into catchments, the smallest water management unit recognized by SFWMD Operations. Unlike drainage basins, which are defined by Rule, watersheds are continuously evolving as the drainage network evolves.

**Water Shortage Plan(s)** This effort includes provisions in Chapters 40E-21 and 40E-22, F.A.C., and identifies how water supplies are allocated to users during declared water shortages. The plan allows for supply allotments and cutbacks to be identified on a weekly basis based on the water level within Lake Okeechobee, demands, time of year, and rainfall forecasts.

**Water supply development** The planning, design, construction, operation, and maintenance of public or private facilities for water collection, production, treatment, transmission, or distribution for sale, resale, or end use (Section 373.019, F.S.).

**Water Supply Plan** Detailed water supply plan developed by the water management districts under Section 373.709, F.S., providing an evaluation of available water supply and projected demands at the regional scale. The planning process projects future demand for at least 20 years and recommends projects to meet identified needs.

**Water table** The surface of a body of unconfined groundwater at which the pressure is equal to that of the atmosphere; defined by the level where water within an unconfined aquifer stands in a well.

**Water use** Any use of water that reduces the supply from which it is withdrawn or diverted.

**Water use permitting** The issuance of permits by the South Florida Water Management District, under the authority of Chapter 40E-2, F.A.C., allowing a specified quantity of water withdrawal for consumptive use over a specified time period.

**Wellfield** One or more wells producing water from a groundwater source. A tract of land that contains a number of wells for supplying a large municipality or irrigation district.

**Wetland** An area that is inundated or saturated by surface water or groundwater with vegetation adapted for life under those soil conditions (e.g., swamps, bogs, marshes).

**Withdrawal** Water removed from a groundwater or surface water source for use.

**Yield** The quantity of water (expressed as rate of flow or total quantity per year) that can be collected for a given use from surface or groundwater sources.

# Appendices

# A

# Water Demand Projections

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# POPULATION ESTIMATES AND PROJECTIONS

The South Florida Water Management District (SFWMD or District) develops water demand estimates and projections in coordination with stakeholder groups, other agencies, utilities, and local governments. **Chapter 2** of the *2024 Lower Kissimmee Basin Water Supply Plan Update* (2024 LKB Plan Update) provides summary information, and this appendix describes the methods used to develop water demand estimates for the 2022 base year as well as projections through 2045 for the LKB Planning Area. Demands are developed for six water use categories: Public Supply (PS), Domestic Self-Supply (DSS), Agriculture (AG), Commercial/Industrial/Institutional (CII), Landscape/Recreational (L/R), and Power Generation (PG). Water demand estimates and projections are provided in 5-year increments through 2045 for average rainfall and 1-in-10-year drought conditions. In addition, demands for PS are described and analyzed in two ways: gross (or raw) demand and net (or finished) demand.

This section presents the methodology used to develop the 2022 population estimates and 2045 population projections for the LKB Planning Area, which are essential to determining water demands. The University of Florida's Bureau of Economic and Business Research (BEBR) provides population estimates and projections at the county level; however, water supply planning requires population projections at the subcounty level to delineate domestic self-supply and utility service areas for DSS and PS demands. Section 373.709(2)(a)1., Florida Statutes (F.S.), prescribes the use of population projections in determining water supply needs in regional water supply plans, as follows:

> *Population projections used for determining public water supply needs must be based upon the best available data. In determining best available data, the district shall consider the University of Florida's Bureau of Economic and Business Research (BEBR) medium population projections and any population projection data and analysis submitted by a local government pursuant to the public workshop described in subsection (1) if the data and analysis support the local government's comprehensive plan. Any adjustment of or deviation from the BEBR projections must be fully described, and the original BEBR data must be presented along with the adjusted data.*

In accordance with Section 373.709(2)(a)1., F.S., permanent resident estimates and projections for each county, published by BEBR (Rayer 2023), were used as the basis of population projections in this 2024 LKB Plan Update. BEBR county population estimates and projections also are used by local governments in their Comprehensive Plans. Adjustments were made to include only the portions of Glades, Highlands, and Okeechobee counties within the LKB Planning Area. The 2022 permanent resident populations within the LKB Planning Area were as follows:

- Glades County: 4,522 permanent residents
- Highlands County: 8,562 permanent residents
- Okeechobee County: 39,658 permanent residents

## Utility Service Areas

To establish current and future PS and DSS populations, each PS utility's 2022 and 2045 potable water service area was delineated. A utility service area refers to the area with water distribution infrastructure and water customers served by a particular PS utility. The SFWMD developed 2022 and 2045 utility service area maps based on information from utilities and the SFWMD's permit database. Okeechobee Utility Authority is the only PS utility with an expanded service area since 2019. Accuracy of the service area maps was verified through correspondence with all PS utilities.

## Population Projection Methodology

Census block populations from the 2020 United States Census (United States Census Bureau 2020) and 2022 PS service area maps were used to estimate the 2022 permanent resident populations for PS utilities and DSS areas. Each census block within the LKB Planning Area was assigned to a PS service area or DSS area. The distribution of population in census blocks not entirely within a single PS service area or DSS area was based on visual comparison of residential land use coverage. PS service area and DSS population estimates for 2018 through 2022 were calculated by applying annual county growth rates published by BEBR with 2022 population estimates (Rayer 2023) and the United States Census Bureau (2020).

Population projections to 2045 were calculated using Future Utility Service Area distributions of population served with the 2020 Decennial Census data (United States Census Bureau 2020). Population growth rate was provided by the county population projections (BEBR medium) from BEBR (Rayer 2023). BEBR publishes low, medium, and high population projections to account for uncertainty in future population growth.

## Population Projection Results

**Table A-1** provides the results of the population distributions by county and PS utility (or DSS) from 2022 to 2045. The results were shared with and reviewed by utility, municipal, local government, and tribal staff.

The populations shown in **Table A-1** indicate the LKB Planning Area will contain 4,766 additional permanent residents by 2045, an increase of approximately 9%. The Okeechobee Utility Authority has the largest current and future populations, accounting for 51% of the region's projected 2045 PS population.

Table A-1. Service area population projections in the LKB Planning Area.

| PS Utility or DSS | Service Area Population Projections | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Lakeport | 1,579 | 1,662 | 1,662 | 1,662 | 1,662 | 1,662 | 1,662 |
| Okeechobee Utility Authority (Glades Portion) | 1,488 | 1,493 | 2,579 | 3,658 | 4,728 | 4,740 | 4,752 |
| STOF – Brighton[b] | 948 | 976 | 985 | 1,013 | 1,041 | 1,069 | 1,097 |
| **PS Total** | **4,015** | **4,131** | **5,226** | **6,333** | **7,431** | **7,471** | **7,511** |
| **DSS Total** | **361** | **391** | **461** | **427** | **381** | **336** | **289** |
| **Glades County Total** | **4,376** | **4,522** | **5,687** | **6,760** | **7,812** | **7,807** | **7,800** |
| Highlands County[a] | | | | | | | |
| Sebring Airport[c] | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Spring Lake Improvement District | 3,108 | 3,140 | 3,189 | 3,265 | 3,311 | 3,351 | 3,388 |
| **PS Total** | **3,108** | **3,140** | **3,189** | **3,265** | **3,311** | **3,351** | **3,388** |
| **DSS Total** | **5,567** | **5,422** | **5,203** | **5,343** | **5,473** | **5,553** | **5,620** |
| **Highlands County Total** | **8,675** | **8,562** | **8,392** | **8,608** | **8,784** | **8,904** | **9,008** |
| Okeechobee County[a] | | | | | | | |
| Okeechobee Correctional | 2,320 | 2,320 | 2,320 | 2,320 | 2,320 | 2,320 | 2,320 |
| Okeechobee Utility Authority (Okeechobee Portion) | 23,586 | 23,661 | 23,775 | 23,965 | 24,085 | 24,205 | 24,326 |
| **PS Total** | **25,906** | **25,981** | **26,095** | **26,285** | **26,405** | **26,525** | **26,646** |
| **DSS Total** | **13,725** | **13,677** | **13,605** | **13,715** | **13,895** | **13,975** | **14,054** |
| **Okeechobee County Total** | **39,631** | **39,658** | **39,700** | **40,000** | **40,300** | **40,500** | **40,700** |
| **LKB Planning Area Total** | | | | | | | |
| **LKB Planning Area PS Total** | **33,029** | **33,253** | **34,509** | **35,883** | **37,147** | **37,347** | **37,545** |
| **LKB Planning Area DSS Total** | **19,653** | **19,489** | **19,270** | **19,485** | **19,749** | **19,864** | **19,963** |
| **LKB Planning Area Total** | **52,682** | **52,742** | **53,779** | **55,368** | **56,896** | **57,211** | **57,508** |

DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] Population projections for the Sebring Airport are zero because there is no permanent population within the service area boundaries.

Comparing these 2024 LKB Plan Update population projections to those published in the *2019 Lower Kissimmee Basin Water Supply Plan* (2019 LKB Plan Update; SFWMD 2019) can provide insight into the importance of population growth rates based on BEBR medium projections. Prior to the national economic downturn in 2008, high rates of development in the region pointed to higher population growth rates (**Figure A-1**). The population projections in the *2005–2006 Kissimmee Basin Water Supply Plan Update* (SFWMD 2006) were a result of the higher population growth rates prior to the recession. The BEBR medium projections used in the 2019 and this 2024 LKB Plan Update indicated slower growth rates compared to previous plans.

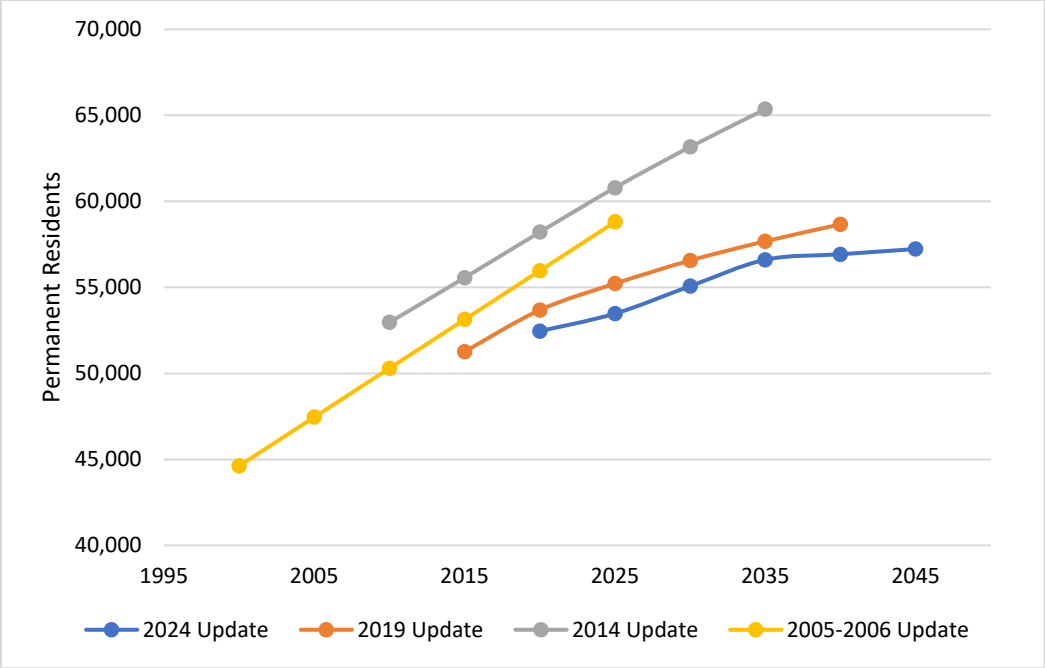


Figure A-1. Comparison of population projections from the *2005–2006 Kissimmee Basin Water Supply Plan Update* and the 2014, 2019, and 2024 LKB plan updates.

# PUBLIC SUPPLY

The PS category includes potable water supplied by water treatment plants with a current allocation of 0.10 million gallons per day (mgd) or greater. Developing PS demand projections in the LKB Planning Area was a multistep process that included determining PS 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.

## PS Projection Methodology

### *Per Capita Use Rates*

For each PS utility, a net (finished) water PCUR was developed by dividing the annual net (finished) water volume for 2018 through 2022 by the corresponding service area populations (permanent residents) for each year. The five annual PCURs were then averaged (**Table A-2**). Net (finished) water volumes for 2018 through 2022 were obtained from the PS utility monthly operating reports submitted to the Florida Department of Environmental Protection (FDEP). The net (finished) water volume reported to the FDEP includes all water produced for permanent and seasonal residents; industrial, landscaping, and irrigation water supplied by PS utilities; and any water distribution losses. The resulting PCURs conform to guidance provided by the FDEP for consistent statewide water supply planning. Future water conservation savings were not factored into demand projections and PCURs due to water savings uncertainty. The average PCURs for each county were calculated by averaging PS and DSS PCURs, weighted by their respective permanent resident populations.

Table A-2. Average net (finished) water per capita use rates (in gallons per capita per day) in the LKB Planning Area.

| PS Utility or DSS | 2018-2022 Average PCUR |
|---|---|
| Glades County[a] | |
| Lakeport | 60 |
| Okeechobee Utility Authority (Glades Portion) | 102 |
| STOF – Brighton[b] | 451[c] |
| Glades County DSS | 81 |
| **Glades County Average** | **160** |
| Highlands County[a] | |
| Sebring Airport | N/A |
| Spring Lake Improvement District | 69 |
| Highlands County DSS | 69 |
| **Highlands County Average** | **69** |
| Okeechobee County[a] | |
| Okeechobee Correctional | 95 |
| Okeechobee Utility Authority (Okeechobee Portion) | 102 |
| Okeechobee County DSS | 102 |
| **Okeechobee County Average** | **102** |
| **LKB Planning Area Average** | **100** |

DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; PCUR = per capita use rate; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] The estimated per capita use rate includes additional water used for seasonal and transient populations and other potable water uses.

## *Finished-to-Raw Water Conversion*

Net (finished) demands (**Table A-3**) were calculated by multiplying the PS service area or DSS area population and the 5-year average PCUR. Gross (raw) water withdrawals are the volumes needed from the water source(s) to produce the required net (finished) water volumes considering water treatment process losses. Water use permit allocations are based on the gross (raw) water volume needed to meet service area demands, based on the demands projected at the time of the permit application. Therefore, it is important to present gross (raw) demands in water supply plans along with the net (finished) demands. To determine the projected gross (raw) water demand for each PS utility, net (finished) water projections were multiplied by finished-to-raw ratios (**Table A-4**), which are based on the treatment efficiency of each PS treatment plant. For example, if a typical reverse osmosis treatment facility withdraws a gross (raw) volume of 10.00 mgd and produces 8.00 mgd of net (finished) water, its treatment losses are 20%. Therefore, its finished-to-raw ratio would be 1.25 (10 mgd divided by 8 mgd).

Treatment efficiencies were determined from information supplied in the water use permit applications, from the FDEP Drinking Water Database (FDEP 2023), and from actual pumpage reports. The assumed losses are 0% for aeration/disinfection only, 3% for lime softening/flocculation, 15% for nanofiltration, and 25% for reverse osmosis. If a utility has more than one treatment method, the ratio reflects combined treatment efficiencies.

Finished-to-raw adjustments for potable water treatment plants in the LKB Planning Area based on their treatment processes are shown in **Figure A-2**. Recent developments by the United States Environmental Protection Agency on the regulatory criteria for polyfluoroalkyl substances or PFAS could require changes in the level of treatment required and may result in increased future demands.

Table A-3. PS net (finished) water demands under average rainfall conditions in the LKB Planning Area.

| PS Utility | Net (Finished) Demand – Average Rainfall Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Lakeport | 0.09 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Okeechobee Utility Authority (Glades Portion) | 0.15 | 0.15 | 0.26 | 0.37 | 0.48 | 0.48 | 0.48 |
| STOF – Brighton[b] | 0.34 | 0.44 | 0.58 | 0.68 | 0.71 | 0.73 | 0.76 |
| **Glades County Total** | **0.58** | **0.69** | **0.94** | **1.15** | **1.29** | **1.31** | **1.34** |
| Highlands County[a] | | | | | | | |
| Sebring Airport | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 |
| Spring Lake Improvement District | 0.21 | 0.22 | 0.22 | 0.23 | 0.23 | 0.23 | 0.23 |
| **Highlands County Total** | **0.29** | **0.31** | **0.31** | **0.32** | **0.32** | **0.32** | **0.32** |
| Okeechobee County[a] | | | | | | | |
| Okeechobee Correctional | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Okeechobee Utility Authority (Okeechobee Portion) | 2.41 | 2.41 | 2.43 | 2.44 | 2.46 | 2.47 | 2.48 |
| **Okeechobee County Total** | **2.63** | **2.63** | **2.65** | **2.66** | **2.68** | **2.69** | **2.70** |
| **LKB Planning Area Total** | **3.50** | **3.63** | **3.90** | **4.13** | **4.29** | **4.32** | **4.36** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

Table A-4. Finished-to-raw water adjustment ratios for PS utilities in the LKB Planning Area.

| PS Utility | Finished-to-Raw Ratio |
|---|---|
| Glades County[a] | |
| Lakeport | 1.33 |
| Okeechobee Utility Authority (Glades Portion) | 1.13 |
| STOF – Brighton[b] | 1.33 |
| Highlands County[a] | |
| Sebring Airport | 1.00 |
| Spring Lake Improvement District | 1.03 |
| Okeechobee County[a] | |
| Okeechobee Correctional | 1.00 |
| Okeechobee Utility Authority (Okeechobee Portion) | 1.13 |

LKB = Lower Kissimmee Basin; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

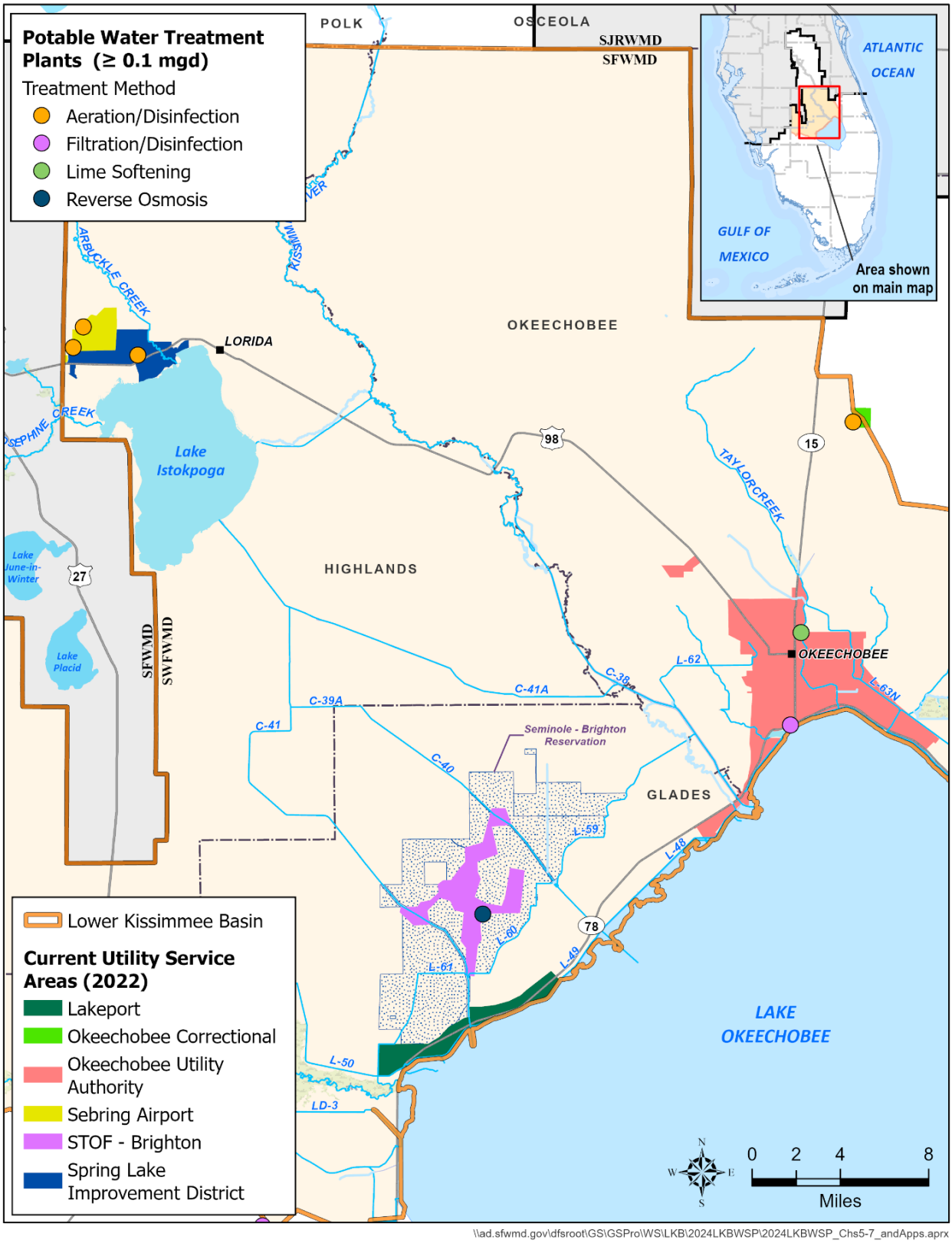


Figure A-2. Potable water treatment plants and Public Supply utility service areas in the LKB Planning Area.

## PS Projection Results

### *Average Rainfall Conditions*

Gross (raw) demands for PS under average rainfall conditions for 2020 through 2045 are provided in **Table A-5**.

Table A-5. PS gross (raw) water demands under average rainfall conditions in the LKB Planning Area.

| PS Utility | Gross (Raw) Water Demand – Average Rainfall Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Lakeport | 0.12 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Okeechobee Utility Authority (Glades Portion) | 0.17 | 0.17 | 0.29 | 0.42 | 0.54 | 0.54 | 0.54 |
| STOF – Brighton[b] | 0.45 | 0.58 | 0.77 | 0.90 | 0.94 | 0.97 | 1.01 |
| **Glades County Total** | **0.74** | **0.88** | **1.19** | **1.45** | **1.61** | **1.64** | **1.68** |
| Highlands County[a] | | | | | | | |
| Sebring Airport | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 |
| Spring Lake Improvement District | 0.22 | 0.23 | 0.23 | 0.24 | 0.24 | 0.24 | 0.24 |
| **Highlands County Total** | **0.30** | **0.32** | **0.32** | **0.33** | **0.33** | **0.33** | **0.33** |
| Okeechobee County[a] | | | | | | | |
| Okeechobee Correctional | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Okeechobee Utility Authority (Okeechobee Portion) | 2.72 | 2.72 | 2.75 | 2.76 | 2.78 | 2.79 | 2.80 |
| **Okeechobee County Total** | **2.94** | **2.94** | **2.97** | **2.98** | **3.00** | **3.01** | **3.02** |
| **LKB Planning Area Total** | **3.98** | **4.14** | **4.48** | **4.76** | **4.94** | **4.98** | **5.03** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

### *1-in-10-Year Drought Conditions*

Section 373.709, F.S., states that the level-of-certainty planning goal associated with identifying water demands shall be based on meeting demands during 1-in-10-year drought conditions. A 1-in-10-year drought is characterized by diminished rain and increased evapotranspiration relative to the historical record for a particular location. The increased PS demands during 1-in-10-year drought conditions were calculated using the method described in the Districtwide Water Supply Assessment (SFWMD 1998), which considers the increased demands on the irrigation portion of PS during droughts. The drought demand factor is 1.06 for each county portion within the LKB Planning Area. Average water demands were multiplied by the drought demand factor to calculate demands during 1-in-10-year drought conditions (**Tables A-6** and **A-7**).

**NOTE**

**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.

Table A-6. PS net (finished) water demands under 1-in-10-year drought conditions in the LKB Planning Area.

| PS Utility | Net (Finished) Water Demand – 1-in-10-Year Drought Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Lakeport | 0.10 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| Okeechobee Utility Authority (Glades Portion) | 0.16 | 0.16 | 0.28 | 0.40 | 0.51 | 0.51 | 0.51 |
| STOF – Brighton[b] | 0.36 | 0.46 | 0.61 | 0.72 | 0.75 | 0.77 | 0.81 |
| **Glades County Total** | **0.62** | **0.73** | **1.00** | **1.23** | **1.37** | **1.39** | **1.43** |
| Highlands County[a] | | | | | | | |
| Sebring Airport | 0.08 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Spring Lake Improvement District | 0.23 | 0.23 | 0.23 | 0.24 | 0.24 | 0.25 | 0.25 |
| **Highlands County Total** | **0.31** | **0.33** | **0.33** | **0.34** | **0.34** | **0.35** | **0.35** |
| Okeechobee County[a] | | | | | | | |
| Okeechobee Correctional | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| Okeechobee Utility Authority (Okeechobee Portion) | 2.55 | 2.56 | 2.57 | 2.59 | 2.60 | 2.62 | 2.63 |
| **Okeechobee County Total** | **2.78** | **2.79** | **2.80** | **2.82** | **2.83** | **2.85** | **2.86** |
| **LKB Planning Area Total** | **3.71** | **3.85** | **4.13** | **4.39** | **4.54** | **4.59** | **4.64** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

Table A-7. PS gross (raw) water demands under 1-in-10-year drought conditions in the LKB Planning Area.

| PS Utility | Gross (Raw) Water Demand – 1-in-10-Year Drought Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Lakeport | 0.13 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 |
| Okeechobee Utility Authority (Glades Portion) | 0.18 | 0.18 | 0.31 | 0.44 | 0.57 | 0.57 | 0.57 |
| STOF – Brighton[b] | 0.48 | 0.61 | 0.82 | 0.96 | 1.00 | 1.03 | 1.07 |
| **Glades County Total** | **0.79** | **0.93** | **1.27** | **1.54** | **1.71** | **1.74** | **1.78** |
| Highlands County[a] | | | | | | | |
| Sebring Airport | 0.08 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Spring Lake Improvement District | 0.23 | 0.24 | 0.24 | 0.25 | 0.25 | 0.25 | 0.25 |
| **Highlands County Total** | **0.31** | **0.34** | **0.34** | **0.35** | **0.35** | **0.35** | **0.35** |
| Okeechobee County[a] | | | | | | | |
| Okeechobee Correctional | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| Okeechobee Utility Authority (Okeechobee Portion) | 2.89 | 2.89 | 2.91 | 2.92 | 2.95 | 2.96 | 2.97 |
| **Okeechobee County Total** | **3.12** | **3.12** | **3.14** | **3.15** | **3.18** | **3.19** | **3.20** |
| **LKB Planning Area Total** | **4.22** | **4.39** | **4.75** | **5.04** | **5.24** | **5.28** | **5.33** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply; STOF = Seminole Tribe of Florida.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

# DOMESTIC SELF-SUPPLY

The DSS category typically includes potable water used by households that are served by small utilities with current allocations less than 0.10 mgd or that are self-supplied by private wells. In the LKB Planning Area, there are no small utilities; therefore, the DSS category only includes households that are self-supplied by private wells. The permanent resident populations within DSS areas were developed simultaneously with the PS population estimates and projections, as described earlier. To determine the current and future DSS demands, the weighted average PS PCURs (**Table A-2**) were multiplied by the DSS permanent resident populations in each county. DSS county PCURs remain constant through 2045. 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.

**Tables A-8** and **A-9** contain the LKB Planning Area's DSS demand estimates and projections under average rainfall and 1-in-10-year drought conditions. The drought demand factor used for PS also was used to calculate 1-in-10-year drought DSS demands. The average gross (raw) DSS demands in 2022 were 1.80 mgd for 19,489 permanent residents (**Table A-1**) and are expected to grow to 1.84 mgd in 2045.

Table A-8. DSS gross (raw) water demands under average rainfall conditions in the LKB Planning Area.

| County DSS[a] | Demand – Average Rainfall Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades[b] | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 |
| Highlands | 0.38 | 0.37 | 0.36 | 0.37 | 0.38 | 0.38 | 0.39 |
| Okeechobee | 1.40 | 1.40 | 1.39 | 1.40 | 1.42 | 1.43 | 1.43 |
| **LKB Planning Area Total** | **1.81** | **1.80** | **1.79** | **1.80** | **1.83** | **1.84** | **1.84** |

DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

Table A-9. DSS gross (raw) water demands under 1-in-10-year drought conditions in the LKB Planning Area.

| County DSS[a] | Demand – 1-in-10-Year Drought Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades[b] | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 |
| Highlands | 0.40 | 0.39 | 0.38 | 0.39 | 0.40 | 0.40 | 0.41 |
| Okeechobee | 1.48 | 1.48 | 1.47 | 1.48 | 1.51 | 1.52 | 1.52 |
| **LKB Planning Area Total** | **1.91** | **1.90** | **1.89** | **1.90** | **1.94** | **1.95** | **1.95** |

DSS = Domestic Self- Supply; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

# AGRICULTURE

Water demands reported under AG include water used for agricultural production, such as farm irrigation, operation of greenhouses and nurseries, and raising livestock. Water used in the processing of agricultural commodities is accounted for under the CII category.

Previous LKB plan updates relied on various sources to develop agricultural acreage estimates and projections, including agricultural water use permits, parcel-level land use maps, and results from the United States Census of Agriculture. Irrigated acres were translated to water volume (mgd) estimates using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model (Smajstrla 1990).

Florida State legislation passed in 2013 prescribed a new approach for water management districts to consider agricultural water demands from the Florida Department of Agriculture and Consumer Services (FDACS). Section 570.93, F.S., directs the FDACS to develop annual statewide agricultural acreage and water demand projections based on the same 20-year planning horizon used in water supply planning. Under Section 373.709(2)(a), F.S., water management districts are required to consider FDACS projections, and 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."

## AG Projection Methodology

### *FSAID Acreage and Demands Data*

FDACS publishes 20-year agricultural acreage and associated water demand projections in annual Florida Statewide Agricultural Irrigation Demand (FSAID) reports. The 10th annual report (referred to as FSAID X) was published in 2023 (FDACS 2023). The FSAID X acre projections (**Tables A-10** and **A-11**) are used in this 2024 LKB Plan Update to calculate AG demands, with some adjustments.

Table A-10. Unadjusted irrigated agricultural acres in the LKB Planning Area (From FDACS 2023).

| Crop | 2021 | 2022[a] | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Hay/Pasture | 36,867 | 39,062 | 36,088 | 34,764 | 35,107 | 34,476 | 34,189 |
| Citrus | 27,225 | 26,393 | 26,784 | 26,747 | 26,178 | 25,988 | 25,460 |
| Sugarcane | 17,507 | 17,589 | 17,507 | 17,507 | 17,507 | 17,507 | 17,507 |
| Sod | 7,646 | 7,754 | 7,608 | 7,608 | 7,455 | 7,455 | 7,241 |
| Fresh Market Vegetables | 7,345 | 7,960 | 7,345 | 7,180 | 7,144 | 7,026 | 7,266 |
| Greenhouse/Nursery | 3,155 | 2,773 | 3,102 | 3,082 | 2,930 | 2,987 | 2,858 |
| Field Crops | 1,484 | 1,484 | 1,484 | 1,667 | 1,768 | 2,043 | 2,059 |
| Potatoes | 552 | 552 | 552 | 552 | 552 | 552 | 565 |
| Fruit (excluding citrus) | 245 | 245 | 245 | 268 | 283 | 305 | 315 |
| **Total** | **102,026** | **103,812** | **100,715** | **99,375** | **98,924** | **98,339** | **97,460** |

FDACS = Florida Department of Agriculture and Consumer Services; LKB = Lower Kissimmee Basin.
[a] Irrigated agricultural acres listed for 2022 were from draft FSAID XI data.

Table A-11. Unadjusted irrigated agricultural demands (in mgd) in the LKB Planning Area (From FDACS 2023).

| Crop | 2021 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Hay/Pasture | 24.60 | 23.67 | 22.68 | 22.85 | 22.31 | 21.99 |
| Citrus | 23.70 | 23.61 | 23.70 | 23.18 | 23.01 | 22.52 |
| Sugarcane | 22.08 | 22.08 | 22.08 | 22.08 | 22.08 | 22.08 |
| Sod | 7.29 | 7.23 | 7.23 | 7.07 | 7.07 | 6.86 |
| Fresh Market Vegetables | 10.03 | 10.04 | 9.80 | 9.75 | 9.57 | 9.86 |
| Greenhouse/Nursery | 7.70 | 7.57 | 7.52 | 7.14 | 7.27 | 6.97 |
| Field Crops | 1.42 | 1.41 | 1.56 | 1.65 | 1.87 | 1.88 |
| Potatoes | 0.62 | 0.62 | 0.63 | 0.63 | 0.63 | 0.64 |
| Fruit (excluding citrus) | 0.46 | 0.46 | 0.50 | 0.53 | 0.58 | 0.59 |
| **Total** | **97.90** | **96.69** | **95.70** | **94.88** | **94.39** | **93.39** |

FDACS = Florida Department of Agriculture and Consumer Services; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

One adjustment made to FSAID acreage for this 2024 LKB Plan Update involved the base year estimation. The base year contained in the FSAID X report was 2021, while the base year in this plan is 2022. Data for the year 2020 were also presented in the tables to show trends in 5-year increments. Therefore, irrigated crop acreages for 2020 were from the FSAID IX report (FDACS 2022). For 2022, draft data from FSAID XI were used. Acreage projections from

FSAID X were also adjusted in cases where updated crop and county combinations reflected different trends than were projected in past iterations of the report. In these cases, the growth rate provided in the FSAID X dataset was applied to the updated 2022 acreage from the FSAID XI draft data. These methodologies and data adjustments were collaboratively developed and reviewed with FDACS staff and consultants.

In addition, adjustments were made to the FSAID acreages to reflect the recently approved Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan for the Brighton Reservation. In the work plan amendment, land use changes for pasture, citrus, and palm trees (in this plan categorized as greenhouse and nursery) were approved through 2030. The tribe anticipates additional land use changes and growth in demands beyond 2030, which may be approved in future work plan amendments. For the purposes of this 2024 LKB Plan Update, 2030 acreages from the current work plan amendment were projected to remain stable through 2045.

### *Comparison of FSAID X and AFSIRS Demands*

The estimated 2022 and projected 2045 demands from the AFSIRS model were compared to the FSAID X report. The demand projections differed by more than 100 mgd despite sharing a similar irrigated acreage footprint (**Figure A-3**).

The SFWMD uses AFSIRS to estimate crop irrigation demands simulated in regional groundwater models, and the demands using AFSIRS resemble those obtained through the SFWMD's permitting methods. After reviewing water demands from FSAID X and AFSIRS, the SFWMD chose to use water demand estimates and projections from AFSIRS based on irrigated acres published in the FSAID X report (FDACS 2023). The decision to deviate from water demands published in the FSAID X report (FDACS 2023) was made to maintain a consistent approach with previous planning and regional modeling efforts.

Data for soil type, rainfall, and reference evapotranspiration are among the key inputs used with AFSIRS to calculate current and future demands. Soil input data were obtained from the Natural Resources Conservation Service's Soil Survey Geographic (SSURGO) database. Daily rainfall data were obtained from the SFWMD's Next Generation Radar (NEXRAD) rainfall data set. Reference evapotranspiration data were obtained from the United States Geological Survey's South Florida Information Access (SOFIA) database. The irrigation method for each irrigated parcel used with AFSIRS is provided in the FSAID X data set. Most citrus groves are irrigated via microspray. Flood and seepage irrigation are the most common methods for all other crop categories.

Water demands associated with livestock and aquaculture production complete the demands for the AG category. Demands for these activities are taken directly from the FSAID reports (FDACS 2022, 2023) without adjustment.

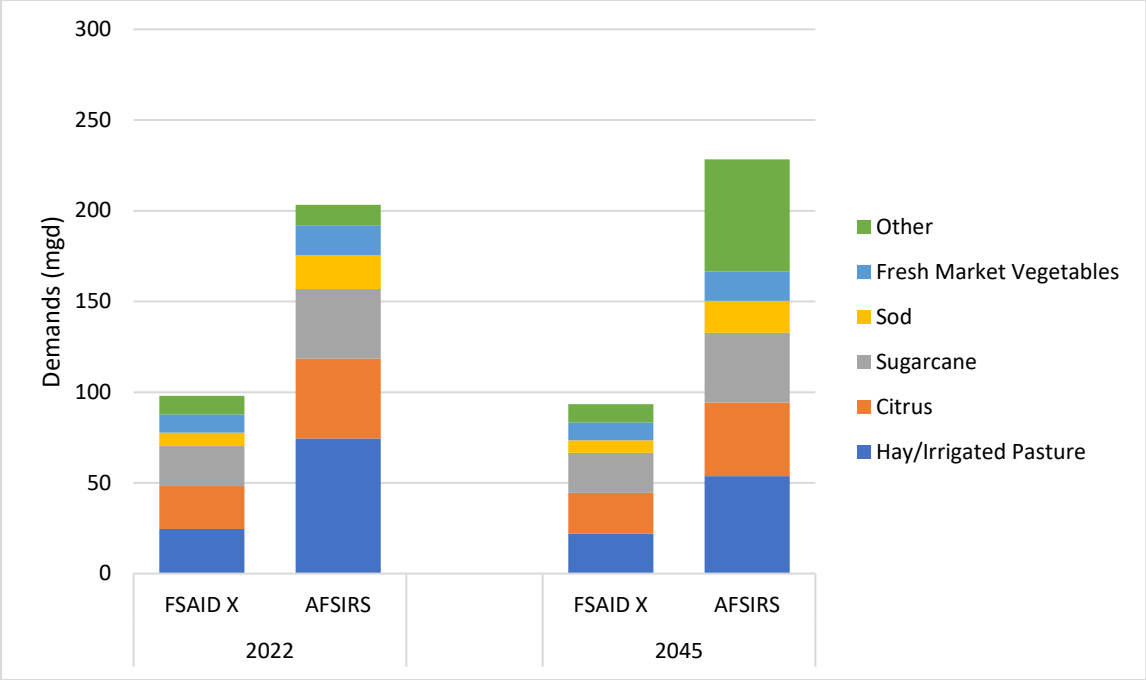


Figure A-3. Comparison of average water demands from the 10th Florida Statewide Agricultural Irrigation Demand (FSAID X) report and the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS). The demands were adjusted to reflect projected land use changes approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. (Note: The "Other" category includes commodities from **Table A-11** that are not graphed individually.)

## AG Projection Results

AG acres and water demands depend on the choices of individual agricultural producers from year to year. Those choices are affected by several factors, including weather, markets, disease, proprietary information, and urban development pressure. AG projections can be affected by population changes as well as future land use conversions.

The gross irrigation requirements for various crop types under the AG category are provided in **Tables A-12** to **A-20**. Tables **A-21** and **A-22** summarize the gross water requirements for livestock and aquaculture. Table **A-23** summarizes all irrigated agricultural acreage and gross water demands in the LKB Planning Area by county, and **Table A-24** summarizes all irrigated agricultural acreage and gross water demands by commodity.

### *Hay/Pasture*

**Table A-12** presents the SFWMD's hay/pasture acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions. The FSAID acres for this category are labeled and modeled as hay/pasture. The associated demands calculated with AFSIRS are assumed to capture irrigation for hay and any irrigation used for improved pasture.

Table A-12. Gross irrigation demands (in mgd) for hay/pasture acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres[b] | 17,004 | 17,192 | 11,546 | 9,192 | 9,550 | 9,734 | 9,812 |
| Average rainfall | 33.83 | 34.20 | 22.78 | 18.15 | 18.85 | 19.21 | 19.37 |
| 1-in-10-year drought | 40.08 | 40.52 | 27.00 | 21.50 | 22.34 | 22.77 | 22.95 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 12,862 | 14,942 | 14,742 | 13,648 | 13,648 | 13,267 | 13,205 |
| Average rainfall | 24.33 | 28.28 | 27.97 | 25.92 | 25.92 | 25.51 | 25.39 |
| 1-in-10-year drought | 28.54 | 33.17 | 32.79 | 30.38 | 30.38 | 29.87 | 29.73 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 7,110 | 6,928 | 6,371 | 5,976 | 5,962 | 5,470 | 5,158 |
| Average rainfall | 12.38 | 12.06 | 10.94 | 10.29 | 10.36 | 9.55 | 9.00 |
| 1-in-10-year drought | 15.07 | 14.68 | 13.37 | 12.58 | 12.63 | 11.63 | 10.96 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **36,976** | **39,062** | **32,659** | **28,816** | **29,160** | **28,471** | **28,175** |
| **Average rainfall** | **70.54** | **74.54** | **61.69** | **54.36** | **55.13** | **54.27** | **53.76** |
| **1-in-10-year drought** | **83.69** | **88.37** | **73.16** | **64.46** | **65.35** | **64.27** | **63.64** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] FSAID acreages were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Hay Farming

## *Citrus*

**Table A-13** presents the SFWMD's citrus acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions.

Table A-13. Gross irrigation demands (in mgd) for citrus acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres[b] | 3,535 | 1,188 | 1,065 | 1,235 | 1,235 | 1,235 | 1,235 |
| Average rainfall | 6.52 | 2.19 | 1.96 | 2.20 | 2.20 | 2.20 | 2.20 |
| 1-in-10-year drought | 8.15 | 2.74 | 2.42 | 2.72 | 2.72 | 2.72 | 2.72 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 26,887 | 23,174 | 22,875 | 22,617 | 22,064 | 21,936 | 21,567 |
| Average rainfall | 43.80 | 37.93 | 37.22 | 36.79 | 35.94 | 35.77 | 35.17 |
| 1-in-10-year drought | 54.14 | 46.85 | 46.04 | 45.51 | 44.43 | 44.22 | 43.48 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 2,095 | 1,886 | 1,777 | 1,777 | 1,769 | 1,710 | 1,556 |
| Average rainfall | 4.13 | 3.85 | 3.58 | 3.58 | 3.54 | 3.42 | 3.12 |
| 1-in-10-year drought | 5.09 | 4.70 | 4.39 | 4.39 | 4.35 | 4.20 | 3.82 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **32,517** | **26,248** | **25,717** | **25,629** | **25,068** | **24,881** | **24,358** |
| **Average rainfall** | **54.45** | **43.97** | **42.76** | **42.57** | **41.68** | **41.39** | **40.49** |
| **1-in-10-year drought** | **67.38** | **54.29** | **52.85** | **52.62** | **51.50** | **51.14** | **50.02** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] FSAID acreages were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Citrus Grove

## *Sugarcane*

**Table A-14** presents the SFWMD's sugarcane acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions.

Table A-14. Gross irrigation demands (in mgd) for sugarcane acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres | 13,792 | 13,676 | 13,676 | 13,676 | 13,676 | 13,676 | 13,676 |
| Average rainfall | 30.16 | 30.21 | 30.21 | 30.21 | 30.21 | 30.21 | 30.21 |
| 1-in-10-year drought | 35.73 | 35.68 | 35.68 | 35.68 | 35.68 | 35.68 | 35.68 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 3,831 | 3,913 | 3,913 | 3,913 | 3,913 | 3,913 | 3,913 |
| Average rainfall | 8.06 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 |
| 1-in-10-year drought | 9.25 | 9.45 | 9.45 | 9.45 | 9.45 | 9.45 | 9.45 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average rainfall | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-in-10-year drought | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **17,623** | **17,589** | **17,589** | **17,589** | **17,589** | **17,589** | **17,589** |
| **Average rainfall** | **38.22** | **38.44** | **38.44** | **38.44** | **38.44** | **38.44** | **38.44** |
| **1-in-10-year drought** | **44.98** | **45.13** | **45.13** | **45.13** | **45.13** | **45.13** | **45.13** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Sugarcane

## *Sod*

**Table A-15** presents the SFWMD's sod acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions.

Table A-15. Gross irrigation demands (in mgd) for sod acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres | 403 | 403 | 403 | 403 | 403 | 403 | 403 |
| Average rainfall | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 |
| 1-in-10-year drought | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 6,029 | 6,137 | 6,137 | 6,137 | 6,137 | 6,137 | 6,137 |
| Average rainfall | 14.37 | 14.63 | 14.63 | 14.63 | 14.63 | 14.63 | 14.63 |
| 1-in-10-year drought | 16.55 | 16.85 | 16.85 | 16.85 | 16.85 | 16.85 | 16.85 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 1,214 | 1,214 | 1,176 | 1,176 | 1,023 | 1,023 | 809 |
| Average rainfall | 3.01 | 3.01 | 2.89 | 2.89 | 2.47 | 2.47 | 1.95 |
| 1-in-10-year drought | 3.60 | 3.60 | 3.47 | 3.47 | 2.97 | 2.97 | 2.35 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **7,646** | **7,754** | **7,716** | **7,716** | **7,563** | **7,563** | **7,349** |
| **Average rainfall** | **18.45** | **18.71** | **18.59** | **18.59** | **18.17** | **18.17** | **17.65** |
| **1-in-10-year drought** | **21.41** | **21.71** | **21.58** | **21.58** | **21.08** | **21.08** | **20.46** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Sod Farm

## *Fresh Market Vegetables*

**Table A-16** presents the SFWMD's fresh market vegetable acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions, assuming 2 plantings per year lasting 4 months each.

Table A-16. Gross irrigation demands (in mgd) for fresh market vegetable acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres | 35 | 35 | 35 | 186 | 265 | 420 | 677 |
| Average rainfall | 0.07 | 0.07 | 0.07 | 0.39 | 0.55 | 0.87 | 1.41 |
| 1-in-10-year drought | 0.08 | 0.08 | 0.08 | 0.45 | 0.64 | 1.01 | 1.62 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 3,115 | 3,758 | 3,758 | 3,569 | 3,569 | 3,569 | 3,549 |
| Average rainfall | 6.26 | 7.55 | 7.55 | 7.15 | 7.15 | 7.15 | 7.10 |
| 1-in-10-year drought | 7.34 | 8.84 | 8.84 | 8.38 | 8.38 | 8.38 | 8.32 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 3,649 | 4,167 | 4,167 | 4,009 | 3,894 | 3,621 | 3,621 |
| Average rainfall | 7.55 | 8.63 | 8.63 | 8.30 | 8.06 | 7.58 | 7.58 |
| 1-in-10-year drought | 8.77 | 10.02 | 10.02 | 9.64 | 9.37 | 8.81 | 8.81 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **6,799** | **7,960** | **7,960** | **7,764** | **7,728** | **7,610** | **7,847** |
| **Average rainfall** | **13.88** | **16.25** | **16.25** | **15.84** | **15.76** | **15.60** | **16.09** |
| **1-in-10-year drought** | **16.19** | **18.94** | **18.94** | **18.47** | **18.39** | **18.20** | **18.75** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Tomato Crop

## *Greenhouse/Nursery*

**Table A-17** presents the SFWMD's greenhouse/nursery acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions.

Table A-17. Gross irrigation demands (in mgd) for greenhouse/nursery acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres[b] | 325 | 325 | 8,325 | 19,325 | 19,325 | 19,382 | 19,382 |
| Average rainfall | 0.85 | 0.85 | 21.77 | 50.54 | 50.54 | 50.69 | 50.69 |
| 1-in-10-year drought | 0.99 | 0.99 | 25.36 | 58.87 | 58.87 | 59.04 | 59.04 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 1,853 | 1,623 | 1,588 | 1,572 | 1,526 | 1,526 | 1,502 |
| Average rainfall | 4.35 | 3.81 | 3.73 | 3.68 | 3.58 | 3.58 | 3.52 |
| 1-in-10-year drought | 4.90 | 4.28 | 4.19 | 4.15 | 4.03 | 4.03 | 3.96 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 778 | 825 | 815 | 815 | 720 | 720 | 620 |
| Average rainfall | 1.84 | 1.96 | 1.93 | 1.93 | 1.70 | 1.70 | 1.47 |
| 1-in-10-year drought | 2.01 | 2.14 | 2.11 | 2.11 | 1.87 | 1.87 | 1.61 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **2,956** | **2,773** | **10,728** | **21,712** | **21,571** | **21,628** | **21,504** |
| **Average rainfall** | **7.04** | **6.62** | **27.43** | **56.15** | **55.82** | **55.97** | **55.68** |
| **1-in-10-year drought** | **7.90** | **7.41** | **31.66** | **65.13** | **64.77** | **64.94** | **64.61** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] FSAID acreages were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Florida Nursery

## *Field Crops*

**Table A-18** presents the SFWMD's field crops acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions. The field crops category includes soybeans, field corn, peanuts, dried beans, lentils, and other grains.

Table A-18. Gross irrigation demands (in mgd) for field crops acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres | 0 | 0 | 0 | 183 | 284 | 559 | 575 |
| Average rainfall | 0.00 | 0.00 | 0.00 | 0.46 | 0.71 | 1.35 | 1.39 |
| 1-in-10-year drought | 0.00 | 0.00 | 0.00 | 0.53 | 0.82 | 1.55 | 1.60 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 1,484 | 1,484 | 1,484 | 1,484 | 1,484 | 1,484 | 1,484 |
| Average rainfall | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 | 2.88 |
| 1-in-10-year drought | 3.45 | 3.45 | 3.45 | 3.45 | 3.45 | 3.45 | 3.45 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average rainfall | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-in-10-year drought | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **1,484** | **1,484** | **1,484** | **1,667** | **1,768** | **2,043** | **2,059** |
| **Average rainfall** | **2.88** | **2.88** | **2.88** | **3.34** | **3.59** | **4.23** | **4.27** |
| **1-in-10-year drought** | **3.45** | **3.45** | **3.45** | **3.98** | **4.27** | **5.00** | **5.05** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Corn Field

## *Potatoes*

**Table A-19** presents the SFWMD's potatoes acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions.

Table A-19. Gross irrigation demands (in mgd) for potatoes acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres | 229 | 229 | 229 | 229 | 229 | 229 | 242 |
| Average rainfall | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.60 |
| 1-in-10-year drought | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.69 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average rainfall | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1-in-10-year drought | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 323 | 323 | 323 | 323 | 323 | 323 | 323 |
| Average rainfall | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 |
| 1-in-10-year drought | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **552** | **552** | **552** | **552** | **552** | **552** | **565** |
| **Average rainfall** | **1.26** | **1.26** | **1.26** | **1.26** | **1.26** | **1.26** | **1.29** |
| **1-in-10-year drought** | **1.47** | **1.47** | **1.47** | **1.47** | **1.47** | **1.47** | **1.50** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Potato Crop

## *Fruit (Excluding Citrus)*

**Table A-20** presents the SFWMD's fruit (excluding citrus) acreage and gross irrigation requirement (water withdrawal demand) projections under average rainfall and 1-in-10-year drought conditions.

Table A-20. Gross irrigation demands (in mgd) for fruit (excluding citrus) acreage in the LKB Planning Area.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres | 0 | 0 | 0 | 23 | 38 | 60 | 70 |
| Average rainfall | 0.00 | 0.00 | 0.00 | 0.04 | 0.06 | 0.09 | 0.11 |
| 1-in-10-year drought | 0.00 | 0.00 | 0.00 | 0.04 | 0.07 | 0.11 | 0.13 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 228 | 230 | 230 | 230 | 230 | 230 | 230 |
| Average rainfall | 0.54 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 |
| 1-in-10-year drought | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Average rainfall | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| 1-in-10-year drought | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **243** | **245** | **245** | **268** | **283** | **305** | **315** |
| **Average rainfall** | **0.58** | **0.59** | **0.59** | **0.63** | **0.65** | **0.68** | **0.70** |
| **1-in-10-year drought** | **0.65** | **0.65** | **0.65** | **0.69** | **0.72** | **0.76** | **0.78** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Strawberry Harvest

## *Livestock*

**Table A-21** presents the FSAID X water demand projections for livestock. Livestock demands published in the FSAID X report were developed with assumed water requirements per head of livestock. Livestock demands are assumed to be the same under average rainfall and 1-in-10-year drought conditions.

Table A-21. Gross water demands (in mgd) for livestock in the LKB Planning Area.

| 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | |
| 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| Highlands County[a] | | | | | | |
| 1.77 | 1.78 | 1.78 | 1.78 | 1.78 | 1.78 | 1.78 |
| Okeechobee County[a] | | | | | | |
| 4.70 | 4.73 | 4.73 | 4.73 | 4.73 | 4.73 | 4.73 |
| **LKB Planning Area Total** | | | | | | |
| **6.98** | **7.02** | **7.02** | **7.02** | **7.02** | **7.02** | **7.02** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Note: Water demands for livestock were obtained from the FSAID X report and not calculated using the AFSIRS model.

Cattle Ranch

## *Aquaculture*

**Table A-22** presents the FSAID X water demand projections for aquaculture. Aquaculture demands are assumed to be the same under average rainfall and 1-in-10-year drought conditions.

Table A-22. Gross water demands (in mgd) for aquaculture in the LKB Planning Area.

| 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | |
| 0.58 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 |
| Highlands County[a] | | | | | | |
| 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Okeechobee County[a] | | | | | | |
| 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| **LKB Planning Area Total** | | | | | | |
| **0.79** | **0.76** | **0.76** | **0.76** | **0.76** | **0.76** | **0.76** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

Note: Water demands for aquaculture were obtained from the FSAID X report and not calculated using the AFSIRS model.

## *Summary of Agricultural Results*

Irrigated agricultural acres are projected to increase 6% over the planning horizon, from 103,667 to 109,761 acres (**Tables A-23** and **A-24**). Highlands and Okeechobee counties are projected to experience reductions in demands, while demands in Glades County are projected to increase (**Table A-23**). The largest increase in demands is projected for the greenhouse and nursery category (**Table A-24**). Greenhouse and nursery demands are projected to grow more than 49 mgd, becoming the dominant AG category by 2030 and accounting for 24% of the overall AG demand in 2045. Overall, the LKB Planning Area total gross water demands under average rainfall conditions for AG are projected to increase approximately 12%, from 211.04 mgd in 2022 to 236.15 mgd in 2045.

Table A-23. Summary of gross water demands (in mgd) for all agricultural acreage, livestock, and aquaculture in the LKB Planning Area by county.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Glades County[a] | | | | | | | |
| Irrigated acres[b] | 35,323 | 33,048 | 35,279 | 44,452 | 45,005 | 45,698 | 46,072 |
| Average rainfall | 74.16 | 70.22 | 79.49 | 104.69 | 105.82 | 107.32 | 108.11 |
| 1-in-10-year drought | 88.04 | 82.99 | 93.52 | 122.77 | 124.12 | 125.86 | 126.75 |
| Highlands County[a] | | | | | | | |
| Irrigated acres | 56,289 | 55,261 | 54,728 | 53,171 | 52,571 | 52,062 | 51,587 |
| Average rainfall | 106.51 | 105.79 | 104.69 | 101.76 | 100.81 | 100.23 | 99.40 |
| 1-in-10-year drought | 126.70 | 125.43 | 124.15 | 120.71 | 119.51 | 118.79 | 117.78 |
| Okeechobee County[a] | | | | | | | |
| Irrigated acres | 15,184 | 15,358 | 14,644 | 14,091 | 13,706 | 12,882 | 12,102 |
| Average rainfall | 34.40 | 35.03 | 33.49 | 32.51 | 31.65 | 30.24 | 28.64 |
| 1-in-10-year drought | 40.15 | 40.78 | 39.00 | 37.83 | 36.83 | 35.12 | 33.19 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **106,796** | **103,667** | **104,651** | **111,714** | **111,282** | **110,642** | **109,761** |
| **Average rainfall** | **215.07** | **211.04** | **217.67** | **238.96** | **238.28** | **237.79** | **236.15** |
| **1-in-10-year drought** | **254.89** | **249.20** | **256.67** | **281.31** | **280.46** | **279.77** | **277.72** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] FSAID acreages were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Table A-24. Summary of gross water demands (in mgd) for all agricultural acreage, livestock, and aquaculture in the LKB Planning Area by commodity.

| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|
| Sugarcane | | | | | | | |
| Irrigated acres | 17,623 | 17,589 | 17,589 | 17,589 | 17,589 | 17,589 | 17,589 |
| Average rainfall | 38.22 | 38.44 | 38.44 | 38.44 | 38.44 | 38.44 | 38.44 |
| 1-in-10-year drought | 44.98 | 45.13 | 45.13 | 45.13 | 45.13 | 45.13 | 45.13 |
| Fresh Market Vegetables | | | | | | | |
| Irrigated acres | 6,799 | 7,960 | 7,960 | 7,764 | 7,728 | 7,610 | 7,847 |
| Average rainfall | 13.88 | 16.25 | 16.25 | 15.84 | 15.76 | 15.60 | 16.09 |
| 1-in-10-year drought | 16.19 | 18.94 | 18.94 | 18.47 | 18.39 | 18.20 | 18.75 |
| Citrus | | | | | | | |
| Irrigated acres | 32,517 | 26,248 | 25,717 | 25,629 | 25,068 | 24,881 | 24,358 |
| Average rainfall | 54.45 | 43.97 | 42.76 | 42.57 | 41.68 | 41.39 | 40.49 |
| 1-in-10-year drought | 67.38 | 54.29 | 52.85 | 52.62 | 51.50 | 51.14 | 50.02 |
| Hay/Pasture | | | | | | | |
| Irrigated acres | 36,976 | 39,062 | 32,659 | 28,816 | 29,160 | 28,471 | 28,175 |
| Average rainfall | 70.54 | 74.54 | 61.69 | 54.36 | 55.13 | 54.27 | 53.76 |
| 1-in-10-year drought | 83.69 | 88.37 | 73.16 | 64.46 | 65.35 | 64.27 | 63.64 |
| Greenhouse/Nursery | | | | | | | |
| Irrigated acres[a] | 2,956 | 2,773 | 10,728 | 21,712 | 21,571 | 21,628 | 21,504 |
| Average rainfall | 7.04 | 6.62 | 27.43 | 56.15 | 55.82 | 55.97 | 55.68 |
| 1-in-10-year drought | 7.90 | 7.41 | 31.66 | 65.13 | 64.77 | 64.94 | 64.61 |

Table A-24. Continued.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fruit (Excluding Citrus) | | | | | | | |
| Irrigated acres | 243 | 245 | 245 | 268 | 283 | 305 | 315 |
| Average rainfall | 0.58 | 0.59 | 0.59 | 0.63 | 0.65 | 0.68 | 0.70 |
| 1-in-10-year drought | 0.65 | 0.65 | 0.65 | 0.69 | 0.72 | 0.76 | 0.78 |
| Sod | | | | | | | |
| Irrigated acres | 7,646 | 7,754 | 7,716 | 7,716 | 7,563 | 7,563 | 7,349 |
| Average rainfall | 18.45 | 18.71 | 18.59 | 18.59 | 18.17 | 18.17 | 17.65 |
| 1-in-10-year drought | 21.41 | 21.71 | 21.58 | 21.58 | 21.08 | 21.08 | 20.46 |
| Potatoes | | | | | | | |
| Irrigated acres | 552 | 552 | 552 | 552 | 552 | 552 | 565 |
| Average rainfall | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.29 |
| 1-in-10-year drought | 1.47 | 1.47 | 1.47 | 1.47 | 1.47 | 1.47 | 1.50 |
| Field Crops | | | | | | | |
| Irrigated acres | 1,484 | 1,484 | 1,484 | 1,667 | 1,768 | 2,043 | 2,059 |
| Average rainfall | 2.88 | 2.88 | 2.88 | 3.34 | 3.59 | 4.23 | 4.27 |
| 1-in-10-year drought | 3.45 | 3.45 | 3.45 | 3.98 | 4.27 | 5.00 | 5.05 |
| Livestock | | | | | | | |
| Irrigated acres | -- | -- | -- | -- | -- | -- | |
| Average rainfall | 6.98 | 7.02 | 7.02 | 7.02 | 7.02 | 7.02 | 7.02 |
| 1-in-10-year drought | 6.98 | 7.02 | 7.02 | 7.02 | 7.02 | 7.02 | 7.02 |
| Aquaculture | | | | | | | |
| Irrigated acres | -- | -- | -- | -- | -- | -- | |
| Average rainfall | 0.79 | 0.76 | 0.76 | 0.76 | 0.76 | 0.76 | 0.76 |
| 1-in-10-year drought | 0.79 | 0.76 | 0.76 | 0.76 | 0.76 | 0.76 | 0.76 |
| **LKB Planning Area Total** | | | | | | | |
| **Irrigated acres** | **106,796** | **103,667** | **104,651** | **111,714** | **111,282** | **110,642** | **109,761** |
| **Average rainfall** | **215.07** | **211.04** | **217.67** | **238.96** | **238.28** | **237.79** | **236.15** |
| **1-in-10-year drought** | **254.89** | **249.20** | **256.67** | **281.31** | **280.46** | **279.77** | **277.72** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] FSAID acreages were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# COMMERCIAL/INDUSTRIAL/INSTITUTIONAL

The CII water use category includes demands associated with commercial and industrial operations for processing, manufacturing, and technical needs (e.g., concrete production, citrus and vegetable processing, and mining operations). Commercial, industrial, or institutional users that receive water from PS utilities or use recirculated water in closed-loop geothermal heating and cooling systems are not included in CII demand calculations. Although a large portion of CII water used by the mining industry for activities such as rock washing is returned to the source, all mining water use is included in demand estimates and projections. All CII demand estimates and projections are presumed to be the same for average rainfall and 1-in-10-year drought conditions.

## CII Projection Methodology

CII estimates and projections are based on water use data from the SFWMD's regulatory database. If an active CII permit holder did not report water use, demand estimates were calculated as described in the *2022 Estimated Water Use Report* (SFWMD 2024).

Increases in the CII category are expected to be driven by growth of the regional economy and permanent resident population. Therefore, CII projections are anticipated to increase steadily as county permanent resident populations increase. Previous analyses of the relationship between CII demands and population growth support this approach.

## CII Projection Results

**Table A-25** summarizes the current and projected CII demands in the LKB Planning Area in 5-year increments through 2045. Highlands County maintains a dominant share of the region's CII demands over the planning horizon.

Table A-25. CII demand projections in the LKB Planning Area.

| County[a] | Demand (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades[b] | 0.53 | 0.58 | 0.73 | 0.87 | 1.01 | 1.01 | 1.01 |
| Highlands | 1.47 | 1.59 | 1.56 | 1.60 | 1.63 | 1.65 | 1.67 |
| Okeechobee | 0.15 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| **LKB Planning Area Total** | **2.15** | **2.34** | **2.46** | **2.64** | **2.81** | **2.83** | **2.85** |

CII = Commercial/Industrial/Institutional; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

# LANDSCAPE/RECREATIONAL

L/R water demands include irrigation for golf courses and other landscaped areas, such as parks, sports fields, and common areas of residential developments. 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. Demands under the L/R category include areas permitted by the SFWMD including those that use reclaimed water that have a water use permit for supplemental or backup supply and areas not permitted that rely solely on reclaimed water. L/R demands were calculated using a combination of water use reported to the SFWMD as part of its regulatory compliance program and reclaimed water use reported by wastewater utilities to the FDEP.

There are two types of irrigated landscaped areas outside those permitted by the SFWMD that are excluded from the L/R demands. The first type includes landscaped areas irrigated with potable water provided by PS utilities. These demands are accounted for in PS estimates and projections. The second type is irrigated landscaped areas served by individual residential wells and surface water pumps permitted by rule (Rule 40E-2.061, Florida Administrative Code).

Reclaimed water is a major source for the irrigation of permitted and nonpermitted landscaped areas in other planning areas; however, reclaimed water currently is not used for these purposes within the LKB Planning Area. No new uses of reclaimed water under the L/R water use category are expected over the planning horizon.

## L/R Projection Methodology

L/R 2022 water use data reported to the SFWMD and estimated data for those not required to report are available in the *2022 Estimated Water Use Report* (SFWMD 2024). The use of data from this source was considered representative of demands under average rainfall conditions for 2022.

The SFWMD's reported water use allows for the disaggregation of L/R demands into the landscape and golf irrigation subcategories. Irrigated landscape and golf course acres indicated in **Table A-26** were calculated using the permitted L/R acreage from the SFWMD's Water Use Permit database. 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 supplemental or backup supply.

Table A-26. L/R permitted acres in the LKB Planning Area.

| Land Use | L/R Permitted Acres in the LKB Planning Area | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a,b] | | | | | | | |
| Landscape[c] | 802 | 1,610 | 2,813 | 4,815 | 4,817 | 4,817 | 4,817 |
| Golf | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Glades County Total** | **802** | **1,610** | **2,813** | **4,815** | **4,817** | **4,817** | **4,817** |
| Highlands County[a] | | | | | | | |
| Landscape | 26 | 27 | 26 | 27 | 28 | 28 | 28 |
| Golf | 241 | 234 | 234 | 234 | 234 | 234 | 234 |
| **Highlands County Total** | **267** | **261** | **260** | **261** | **262** | **262** | **262** |
| Okeechobee County[a] | | | | | | | |
| Landscape | 433 | 573 | 574 | 578 | 582 | 585 | 588 |
| Golf | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| **Okeechobee County Total** | **497** | **637** | **638** | **642** | **646** | **649** | **652** |
| **LKB Planning Area Total** | | | | | | | |
| **Landscape** | **1,261** | **2,210** | **3,413** | **5,420** | **5,427** | **5,430** | **5,433** |
| **Golf** | **305** | **298** | **298** | **298** | **298** | **298** | **298** |
| **LKB Planning Area Total** | **1,566** | **2,508** | **3,711** | **5,718** | **5,725** | **5,728** | **5,731** |

L/R = Landscape/Recreational; LKB = Lower Kissimmee Basin.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] Landscape acreages include adjustments made to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan.

The distinction is made between the acres and demands for golf courses and landscaped areas because they are projected to grow at different rates. Landscape irrigation was assumed to increase at the same rate as the counties' permanent resident populations. For the Seminole Tribe of Florida's Brighton Reservation, an adjustment was made to landscape acreages to reflect the recently approved Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan for the Brighton Reservation. In the work plan amendment, land use changes for turf were approved through 2030. The tribe anticipates additional land use changes and growth in demands beyond 2030, which may be approved in future work plan amendments. For this 2024 LKB Plan Update, 2030 acreages from the work plan amendment were projected to remain stable through 2045. Golf course acreage and associated water demands are projected to remain stable through 2045. This approach is used in other planning areas within the SFWMD and by other water management districts in Florida.

## L/R Projection Results

Gross water demands for L/R were met with a combination of traditional water sources (groundwater and surface water).

L/R gross irrigation demand projections under average rainfall conditions are presented in **Table A-27**. **Table A-28** shows the estimated quantity of water provided to meet projected demands during 1-in-10-year drought conditions.

Table A-27. L/R gross irrigation demands under average rainfall conditions in the LKB Planning Area.

| Land Use | Demand – Average Rainfall Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a,b] | | | | | | | |
| Landscape[c] | 2.13 | 4.28 | 7.48 | 12.80 | 12.81 | 12.81 | 12.81 |
| Golf | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Glades County Total** | **2.13** | **4.28** | **7.48** | **12.80** | **12.81** | **12.81** | **12.81** |
| Highlands County[a] | | | | | | | |
| Landscape | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Golf | 0.41 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 |
| **Highlands County Total** | **0.47** | **0.55** | **0.55** | **0.55** | **0.55** | **0.55** | **0.55** |
| Okeechobee County[a] | | | | | | | |
| Landscape | 0.95 | 1.24 | 1.24 | 1.25 | 1.26 | 1.26 | 1.27 |
| Golf | 0.01 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| **Okeechobee County Total** | **0.96** | **1.29** | **1.29** | **1.30** | **1.31** | **1.31** | **1.32** |
| **LKB Planning Area Total** | | | | | | | |
| **Landscape** | **3.14** | **5.59** | **8.79** | **14.12** | **14.14** | **14.14** | **14.15** |
| **Golf** | **0.42** | **0.53** | **0.53** | **0.53** | **0.53** | **0.53** | **0.53** |
| **LKB Planning Area Total** | **3.56** | **6.12** | **9.32** | **14.65** | **14.67** | **14.67** | **14.68** |

L/R = Landscape/Recreational; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] Landscape demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Table A-28. L/R gross irrigation demands under 1-in-10-year drought conditions in the LKB Planning Area.

| Land Use | Demand – 1-in-10-Year Drought Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a,b] | | | | | | | |
| Landscape[c] | 2.49 | 5.01 | 8.76 | 14.99 | 15.00 | 15.00 | 15.00 |
| Golf | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Glades County Total** | **2.49** | **5.01** | **8.76** | **14.99** | **15.00** | **15.00** | **15.00** |
| Highlands County[a] | | | | | | | |
| Landscape | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Golf | 0.43 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| **Highlands County Total** | **0.49** | **0.58** | **0.58** | **0.58** | **0.58** | **0.58** | **0.58** |
| Okeechobee County[a] | | | | | | | |
| Landscape | 1.01 | 1.31 | 1.31 | 1.33 | 1.34 | 1.34 | 1.35 |
| Golf | 0.01 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| **Okeechobee County Total** | **1.02** | **1.36** | **1.36** | **1.38** | **1.39** | **1.39** | **1.40** |
| **LKB Planning Area Total** | | | | | | | |
| **Landscape** | **3.56** | **6.39** | **10.14** | **16.39** | **16.41** | **16.41** | **16.42** |
| **Golf** | **0.44** | **0.56** | **0.56** | **0.56** | **0.56** | **0.56** | **0.56** |
| **LKB Planning Area Total** | **4.00** | **6.95** | **10.70** | **16.95** | **16.97** | **16.97** | **16.98** |

L/R = Landscape/Recreational; LKB = Lower Kissimmee Basin; mgd = million gallons per day

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] Landscape demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# POWER GENERATION

Demands under the PG category typically include use of groundwater, fresh surface water, or reclaimed water by thermoelectric power generation facilities. However, the are no power demands estimated for 2022 since the power needs of the LKB Planning Area currently are met by facilities located outside of the planning area. There are no new power generation facilities planned. Therefore, PG demands are projected to remain at 0.00 mgd through 2045.

# SUMMARY OF DEMAND PROJECTIONS

Total demands for the LKB Planning Area are anticipated to increase by 35.11 mgd (16%), largely due to increased demands from the AG and L/R categories. The combined PS and DSS demands are expected to increase 16%, to 6.87 mgd by 2045, with the projected population growth of 4,766 permanent residents. The demands for all remaining categories (L/R, CII, and PG) are projected to be 17.53 mgd, combined, in 2045. Gross water demands in 5-year increments, by county and water use category, are provided in **Table A-29** for average rainfall conditions and **Table A-30** for 1-in-10-year drought conditions.

Table A-29. Summary of gross water demands under average rainfall conditions in the LKB Planning Area by water use category.

| Water Use Category | Demand – Average Rainfall Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Public Supply[b] | 0.74 | 0.88 | 1.19 | 1.45 | 1.61 | 1.64 | 1.68 |
| Domestic Self-Supply | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 |
| Agriculture[c] | 74.16 | 70.22 | 79.49 | 104.69 | 105.82 | 107.32 | 108.11 |
| Commercial/Industrial/Institutional | 0.53 | 0.58 | 0.73 | 0.87 | 1.01 | 1.01 | 1.01 |
| Landscape[c]/Recreational | 2.13 | 4.28 | 7.48 | 12.80 | 12.81 | 12.81 | 12.81 |
| Power Generation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Glades County Total** | **77.59** | **75.99** | **88.93** | **119.84** | **121.28** | **122.81** | **123.63** |
| Highlands County[a] | | | | | | | |
| Public Supply | 0.30 | 0.32 | 0.32 | 0.33 | 0.33 | 0.33 | 0.33 |
| Domestic Self-Supply | 0.38 | 0.37 | 0.36 | 0.37 | 0.38 | 0.38 | 0.39 |
| Agriculture | 106.51 | 105.79 | 104.69 | 101.76 | 100.81 | 100.23 | 99.40 |
| Commercial/Industrial/Institutional | 1.47 | 1.59 | 1.56 | 1.60 | 1.63 | 1.65 | 1.67 |
| Landscape/Recreational | 0.47 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 |
| Power Generation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Highlands County Total** | **109.13** | **108.62** | **107.48** | **104.61** | **103.70** | **103.14** | **102.34** |
| Okeechobee County[a] | | | | | | | |
| Public Supply | 2.94 | 2.94 | 2.97 | 2.98 | 3.00 | 3.01 | 3.02 |
| Domestic Self-Supply | 1.40 | 1.40 | 1.39 | 1.40 | 1.42 | 1.43 | 1.43 |
| Agriculture | 34.40 | 35.03 | 33.49 | 32.51 | 31.65 | 30.24 | 28.64 |
| Commercial/Industrial/Institutional | 0.15 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| Landscape/Recreational | 0.96 | 1.29 | 1.29 | 1.30 | 1.31 | 1.31 | 1.32 |
| Power Generation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Okeechobee County Total** | **39.85** | **40.83** | **39.31** | **38.36** | **37.55** | **36.16** | **34.58** |
| **LKB Planning Area Total** | | | | | | | |
| Public Supply | **3.98** | **4.14** | **4.48** | **4.76** | **4.94** | **4.98** | **5.03** |
| Domestic Self-Supply | **1.81** | **1.80** | **1.79** | **1.80** | **1.83** | **1.84** | **1.84** |
| Agriculture | **215.07** | **211.04** | **217.67** | **238.96** | **238.28** | **237.79** | **236.15** |
| Commercial/Industrial/Institutional | **2.15** | **2.34** | **2.46** | **2.64** | **2.81** | **2.83** | **2.85** |
| Landscape/Recreational | **3.56** | **6.12** | **9.32** | **14.65** | **14.67** | **14.67** | **14.68** |
| Power Generation | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **LKB Planning Area Total** | **226.57** | **225.44** | **235.72** | **262.81** | **262.53** | **262.11** | **260.55** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

Table A-30. Summary of gross water demands under 1-in-10-year drought conditions in the LKB Planning Area by water use category.

| Water Use Category | Demand – 1-in-10-Year Drought Conditions (mgd) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2020 | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
| Glades County[a] | | | | | | | |
| Public Supply[b] | 0.79 | 0.93 | 1.27 | 1.54 | 1.71 | 1.74 | 1.78 |
| Domestic Self-Supply | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 |
| Agriculture[c] | 88.04 | 82.99 | 93.52 | 122.77 | 124.12 | 125.86 | 126.75 |
| Commercial/Industrial/Institutional | 0.53 | 0.58 | 0.73 | 0.87 | 1.01 | 1.01 | 1.01 |
| Landscape[c]/Recreational | 2.49 | 5.01 | 8.76 | 14.99 | 15.00 | 15.00 | 15.00 |
| Power Generation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Glades County Total** | **91.88** | **89.54** | **104.32** | **140.20** | **141.87** | **143.64** | **144.56** |
| Highlands County[a] | | | | | | | |
| Public Supply | 0.31 | 0.34 | 0.34 | 0.35 | 0.35 | 0.35 | 0.35 |
| Domestic Self-Supply | 0.40 | 0.39 | 0.38 | 0.39 | 0.40 | 0.40 | 0.41 |
| Agriculture | 126.70 | 125.43 | 124.15 | 120.71 | 119.51 | 118.79 | 117.78 |
| Commercial/Industrial/Institutional | 1.47 | 1.59 | 1.56 | 1.60 | 1.63 | 1.65 | 1.67 |
| Landscape/Recreational | 0.49 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 |
| Power Generation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Highlands County Total** | **129.37** | **128.33** | **127.01** | **123.63** | **122.47** | **121.77** | **120.79** |
| Okeechobee County[a] | | | | | | | |
| Public Supply | 3.12 | 3.12 | 3.14 | 3.15 | 3.18 | 3.19 | 3.20 |
| Domestic Self-Supply | 1.48 | 1.48 | 1.47 | 1.48 | 1.51 | 1.52 | 1.52 |
| Agriculture | 40.15 | 40.78 | 39.00 | 37.83 | 36.83 | 35.12 | 33.19 |
| Commercial/Industrial/Institutional | 0.15 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| Landscape/Recreational | 1.02 | 1.36 | 1.36 | 1.38 | 1.39 | 1.39 | 1.40 |
| Power Generation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Okeechobee County Total** | **45.92** | **46.91** | **45.14** | **44.01** | **43.08** | **41.39** | **39.48** |
| **LKB Planning Area Total** | | | | | | | |
| Public Supply | **4.22** | **4.39** | **4.75** | **5.04** | **5.24** | **5.28** | **5.33** |
| Domestic Self-Supply | **1.91** | **1.90** | **1.89** | **1.90** | **1.94** | **1.95** | **1.95** |
| Agriculture | **254.89** | **249.20** | **256.67** | **281.31** | **280.46** | **279.77** | **277.72** |
| Commercial/Industrial/Institutional | **2.15** | **2.34** | **2.46** | **2.64** | **2.81** | **2.83** | **2.85** |
| Landscape/Recreational | **4.00** | **6.95** | **10.70** | **16.95** | **16.97** | **16.97** | **16.98** |
| Power Generation | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **LKB Planning Area Total** | **267.17** | **264.78** | **276.47** | **307.84** | **307.42** | **306.80** | **304.83** |

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

[a] Values listed are only for the areas within the LKB Planning Area boundaries.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] The demands were adjusted to reflect projected land use changes as approved in the Third Amendment to the Seminole Tribe of Florida's 33rd Annual Work Plan. The demands were calculated using the AFSIRS model.

# REFERENCES


FDACS. 2022. *Florida Statewide Agricultural Irrigation Demand Estimated Agricultural Water Demand, 2020-2045.* Prepared by The Balmoral Group, Winter Park, FL, for the Florida Department of Agriculture and Consumer Services, Tallahassee, FL. June 30, 2022.

FDACS. 2023. *Florida Statewide Agricultural Irrigation Demand Estimated Agricultural Water Demand, 2021-2045*. Prepared by The Balmoral Group, Winter Park, FL, for the Florida Department of Agriculture and Consumer Services, Tallahassee, FL. June 30, 2023.

FDEP. 2023. *Information from the Drinking Water Database: Flow Data and Plant Treatment Data*. Florida Department of Environmental Protection, Tallahassee, FL. Available online at https://floridadep.gov/water/source-drinking-water/content/information-drinking-water-database.

Rayer, S. 2023. *Projections of Florida Population by County, 2025-2050, with Estimates for 2022*. Florida Population Studies, Volume 56, Bulletin 195. University of Florida, Bureau of Economic and Business Research, Gainesville, FL. April 2023.

SFWMD. 1998. *1998 Districtwide Water Supply Assessment.* South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2006. *2005–2006 Kissimmee Basin Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2019. *2019 Lower Kissimmee Basin Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. December 2019.

SFWMD. 2024. *South Florida Water Management District 2022 Estimated Water Use Report*. South Florida Water Management District, West Palm Beach, FL. February 2024.

Smajstrla, A.G. 1990. *Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) Model,* Version 5.5. Agricultural Engineering Department, University of Florida, Gainesville, FL.

United States Census Bureau. 2020. *2020 Decennial Census Redistricting Data* (Public Law 94-171). United States Department of Commerce, Washington, DC.

# B

# Public Supply Utility Summaries

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# PUBLIC SUPPLY UTILITY SUMMARIES

This appendix provides summaries of the Public Supply (PS) utilities that have an allocation of 0.10 million gallons per day (mgd) or greater of gross (raw) water within the Lower Kissimmee Basin (LKB) Planning Area (**Table B-1**). The utility summaries were updated with data from the Florida Department of Environmental Protection (FDEP) Drinking Water Database (FDEP 2023a), permanent resident population estimates and projections as described in **Appendix A**, the FDEP OCULUS database (FDEP 2023b), and the South Florida Water Management District (SFWMD or District) Water Use Permit database. In addition, proposed water supply projects were updated based on utility reports provided to the SFWMD in November 2023 and through direct contact with utilities in 2023–2024. Each summary was shared with its specific utility for review and feedback. To help understand the information in the utility summaries, a sample profile with descriptions is provided. The utility summaries are ordered alphabetically by county for easy navigation. **Figures B-1** and **B-2** show the current (2022) and future (2045) PS service areas and wellfields for the LKB Planning Area. A discussion of utilities and the local governments they serve is provided at the end of the appendix. Potential future water conservation savings are not included in the utility summaries. **Chapter 3** of this plan update addresses conservation and potential water savings.

INFO

**Acronyms and Abbreviations**

ASR – aquifer storage and recovery

FAS – Floridan aquifer system

FDEP – Florida Department of Environmental Protection

LKB – Lower Kissimmee Basin

mgd – million gallons per day

PS – Public Supply

PWS ID – Public Water System Identification Number

RO – reverse osmosis

SAS – surficial aquifer system

STOF – Seminole Tribe of Florida

UFA – Upper Floridan aquifer

WTP – water treatment plant

WWTF – wastewater treatment facility

Table B-1. Summary of the Public Supply utilities with a capacity of 0.10 mgd or greater in the LKB Planning Area.

| Supply Entity/Facility | SFWMD Permit Number | Gross (Raw) Water (mgd) | | | FDEP PWS ID | Rated Net (Finished) Capacity (mgd) |
|---|---|---|---|---|---|---|
| | | Annual Allocation | SAS | FAS | | |
| Glades County | | | | | | |
| Lakeport | N/A[a] | 0.00 | 0.00 | 0.00 | 5220166 | 0.35 |
| STOF – Brighton[b] | N/A[c] | 0.58[c] | 0.00 | 0.58 | N/A | 2.80 |
| **Glades County Total** | | **0.58** | **0.00** | **0.58** | | **3.15** |
| Highlands County | | | | | | |
| Sebring Airport | 28-00139-W | 0.12 | 0.00 | 0.12 | 6280250 | 1.00 |
| Spring Lake Improvement District | 28-00122-W | 0.42 | 0.00 | 0.42 | 5280266 | 1.99 |
| **Highlands County Total** | | **0.54** | **0.00** | **0.54** | | **2.00** |
| Okeechobee County | | | | | | |
| Okeechobee Correctional | 47-00421-W | 0.19 | 0.00 | 0.19 | 4474497 | 0.86 |
| Okeechobee Utility Authority | 47-00004-W | 3.48[d] | 0.73 | 0.00 | 4470257 | 5.99 |
| **Okeechobee County Total** | | **3.67** | **0.73** | **0.19** | | **6.85** |
| **LKB Planning Area Total** | | **4.79** | **0.73** | **1.31** | | **12.00** |

[a] Lakeport does not treat raw water; therefore, it does not have an SFWMD water use permit. Treated water is provided by the STOF–Brighton.

[b] The STOF is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the STOF Brighton Reservation is included in the calculations for Glades County.

[c] The allocation was established in the Water Rights Compact of 1987 not through an SFWMD water use permit, and there is no FDEP PWS ID for the STOF.

[d] The allocation includes 2.75 mgd of surface water from Lake Okeechobee and 0.73 mgd from the SAS. The allocation for surface water from Lake Okeechobee increased 1.08 mgd above the base condition allocation (1.67 mgd) by variance (Governing Board Order 2012-042-DAO-WU).

# SAMPLE UTILITY COMPANY

**Service Area**: Sample city and portions of unincorporated county

**Description**: This description includes water sources, type of WTPs, and other relevant information about the utility.

| Population and Finished Water Demand | | | | |
|---|---|---|---|---|
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Population | 100,000 | 110,000 | 120,000 | 130,000 |
| Average 2018-2022 Per Capita (gallons per day finished water) | 100 | | | |
| **Potable Water Demands** (daily average annual finished water in mgd) | **10.00** | **11.00** | **12.00** | **13.00** |

| SFWMD Water Use Permitted Allocation (mgd) | |
|---|---|
| Potable Water Source | Permit Number 12-34567-W (expires 2045) |
| Surface Water | 2.00 |
| Surficial Aquifer System | 14.00 |
| Floridan Aquifer System | 0.00 |
| **Total Allocation** | **16.00** |

| FDEP Potable Water Treatment Capacity (mgd) (PWS ID # 1234567) | | | | |
|---|---|---|---|---|
| Permitted Capacity by Source | Cumulative Facility & Project Capacity (mgd) | | | |
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Surficial Aquifer System/Surface Water | 18.00 | 18.00 | 18.00 | 18.00 |
| Floridan Aquifer System | 0.00 | 2.00 | 3.00 | 3.00 |
| **Total Potable Capacity** | **18.00** | **20.00** | **21.00** | **21.00** |

| Nonpotable Alternative Water Source Capacity (mgd) | | | | |
|---|---|---|---|---|
| Reclaimed Water | 1.00 | 1.00 | 4.00 | 4.00 |
| **Total Nonpotable Capacity** | **1.00** | **1.00** | **1.00** | **1.00** |

| Project Summary | | | | | | |
|---|---|---|---|---|---|---|
| Water Supply Project | Source | Completion Date | Total Capital Cost ($ million) | Projected Cumulative Design Capacity (mgd) | | |
| | | | | 2025 | 2035 | 2045 |
| Potable Water | | | | | | |
| 2.00 mgd Expansion of Floridan RO Treatment Plant | FAS | 2022 | $14.00 | 2.00 | 2.00 | 2.00 |
| Floridan Wells and RO Treatment Plant Expansion | FAS | 2029 | $4.00 | 0.00 | 1.00 | 1.00 |
| **Total Potable Water** | | | **$18.00** | **0.00** | **3.00** | **3.00** |
| Nonpotable Water | | | | | | |
| 3.00 mgd Reclaimed Water Facility | Reclaimed | 2029 | $5.00 | 0.00 | 3.00 | 3.00 |
| ASR and Irrigation Supply | Stormwater | 2034 | $2.00 | 0.00 | 1.00 | 1.00 |
| **Total Nonpotable Water** | | | **$7.00** | **0.00** | **4.00** | **4.00** |
| **Total New Water** | | | **$25.00** | **2.00** | **7.00** | **7.00** |

| | |
|---|---|
| 1 | **Population** – The 2022 permanent resident populations were determined by assigning 2020 United States Census Bureau (2020) block data to 2022 PS utility service areas. To project permanent resident populations to 2045, the relative growth rates for PS utility service areas were developed from county population projections. (See **Appendix A** for more information.) |
| 2 | **Average 2018-2022 Per Capita** (gallons per day finished water) – A PS utility's per capita is calculated by dividing total net (finished) water produced each year from monthly operating reports submitted by utilities to the FDEP (2023a) by the utility's permanent service area population for that year. Each utility's per capita was calculated for 2018 to 2022, then averaged over the 5 years. |
| 3 | **Potable Water Demands** (daily average annual finished water in mgd) – The 2022 base year demand was calculated using the PS utility's average 2018 to 2022 per capita multiplied by the 2022 service area permanent resident population. The projected demands for 2022 to 2045 were calculated using the utility's average 2018 to 2022 per capita multiplied by the utility's projected populations for those years. |
| 4 | **Allocation from the SFWMD Water Use Permit** – The total allocation is composed of gross (raw) surface water and groundwater (from the SAS and FAS) allocations, as described in the utility's water use permit. The 2022 allocation is assumed to continue through 2045 unless noted otherwise. |
| 5 | **Total Allocation** – The total gross (raw) water allocation in the water use permit. For utilities with multiple sources, total allocation may be less than the sum of the individual source allocations; this is indicated in the appropriate profiles. |
| 6 | **FDEP Permitted Capacity** – The total net (finished) water treatment capacity of the WTP(s), as provided by the FDEP (2023a). The treatment capacity is split into the capacity available to process raw water from surface water as well as groundwater. |
| 7 | **Future Projected Treatment Capacity** – The net (finished) water treatment capacity created by projects listed in the Project Summary (Item 10). Project treatment capacity to be completed by 2025 is shown in the 2025 column, treatment capacity to be completed between 2026 and 2035 is in the 2035 column, and treatment capacity to be completed between 2036 and 2045 is in the 2045 column. |
| 8 | **Total Potable Capacity** – The existing net (finished) water capacity of the WTP(s) owned/operated by the utility in addition to the volumes of net (finished) water produced by future planned projects. |
| 9 | **Reclaimed Water** – The capacity of the WWTF(s) to produce reclaimed water, as provided by the FDEP (2023b). Additional capacity is from projects planned by the utility (listed under Item 12). |
| 10 | **Potable Water Projects Summary** – A description of the potable water supply projects the utility is proposing to construct. Only projects that produce additional potable water (e.g., wells, WTPs) are included; maintenance or replacement projects are not included. Each project has a water source, anticipated completion date, estimated total capital cost, and projected volume of treatment capacity. Proposed projects have been screened at a planning level but must meet permit issuance criteria. |
| 11 | **Total Projected Cumulative Design Capacity for Potable Water for 2025, 2035, and 2045** – The total volume of potable water supply projects expected to be completed by 2025, 2035, and 2045, respectively. The totals are added to the appropriate projected capacities in Item 7. |
| 12 | **Nonpotable Water Projects Summary** – A description of the nonpotable water supply projects the utility is proposing to construct. Only projects that produce additional nonpotable water are included; maintenance or replacement projects are not included. Each project has a water source, anticipated completion date, estimated total capital cost, and projected volume of treatment capacity. |
| 13 | **Total Projected Cumulative Design Capacity for Nonpotable Water for 2025, 2035, and 2045** – The total volume of nonpotable water supply projects expected to be completed by 2025, 2035, and 2045, respectively. If the project provides reclaimed water, totals are added to the appropriate projected capacities in Item 9. |
| 14 | **Total Projected Cumulative Design Capacity for New Water for 2025, 2035, and 2045** – The total projected cost and capacity of potable and nonpotable water supply projects the utility is proposing to construct between 2022 and 2045. |

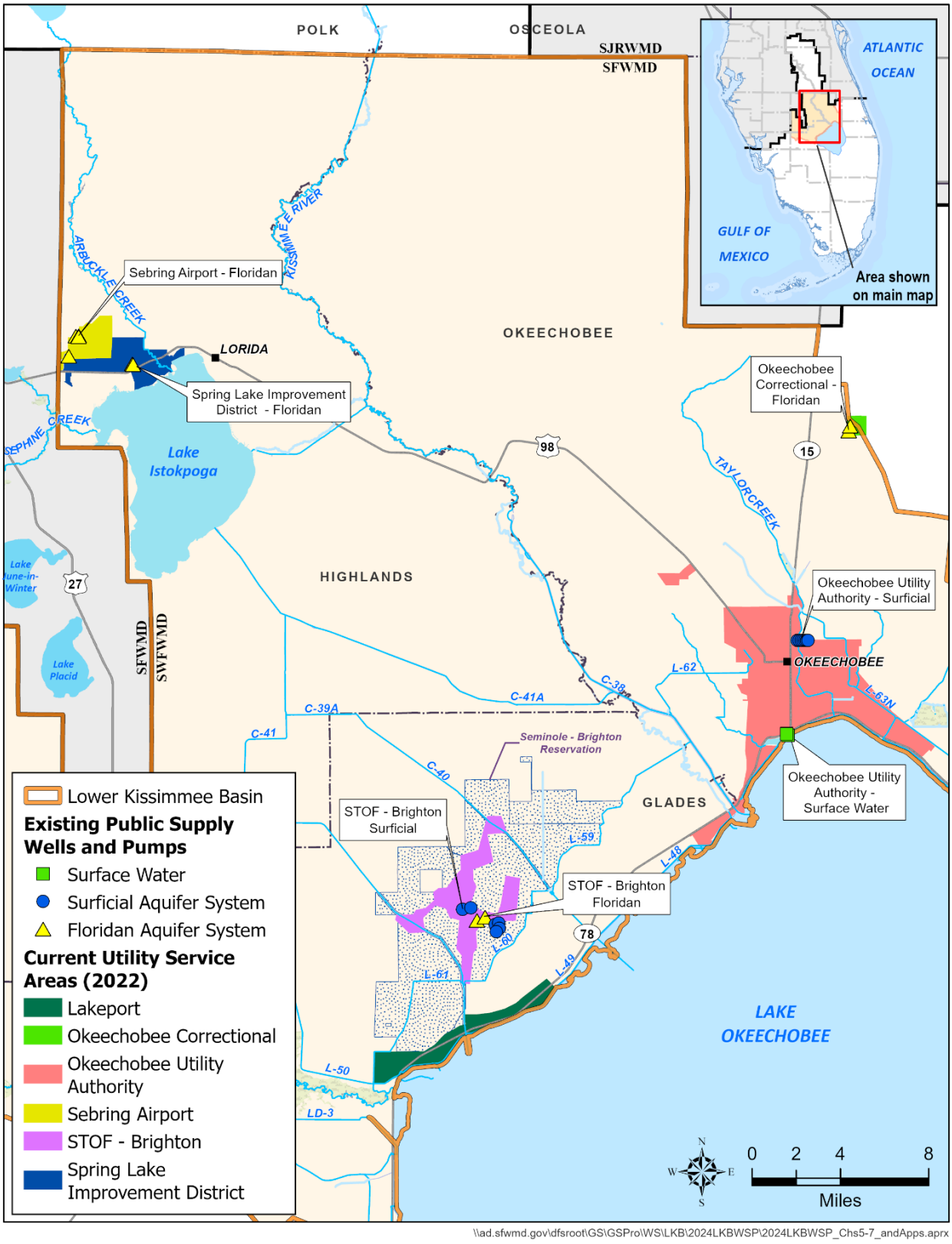


Figure B-1. Existing (2022) Public Supply utility service areas and wellfields in the LKB Planning Area.

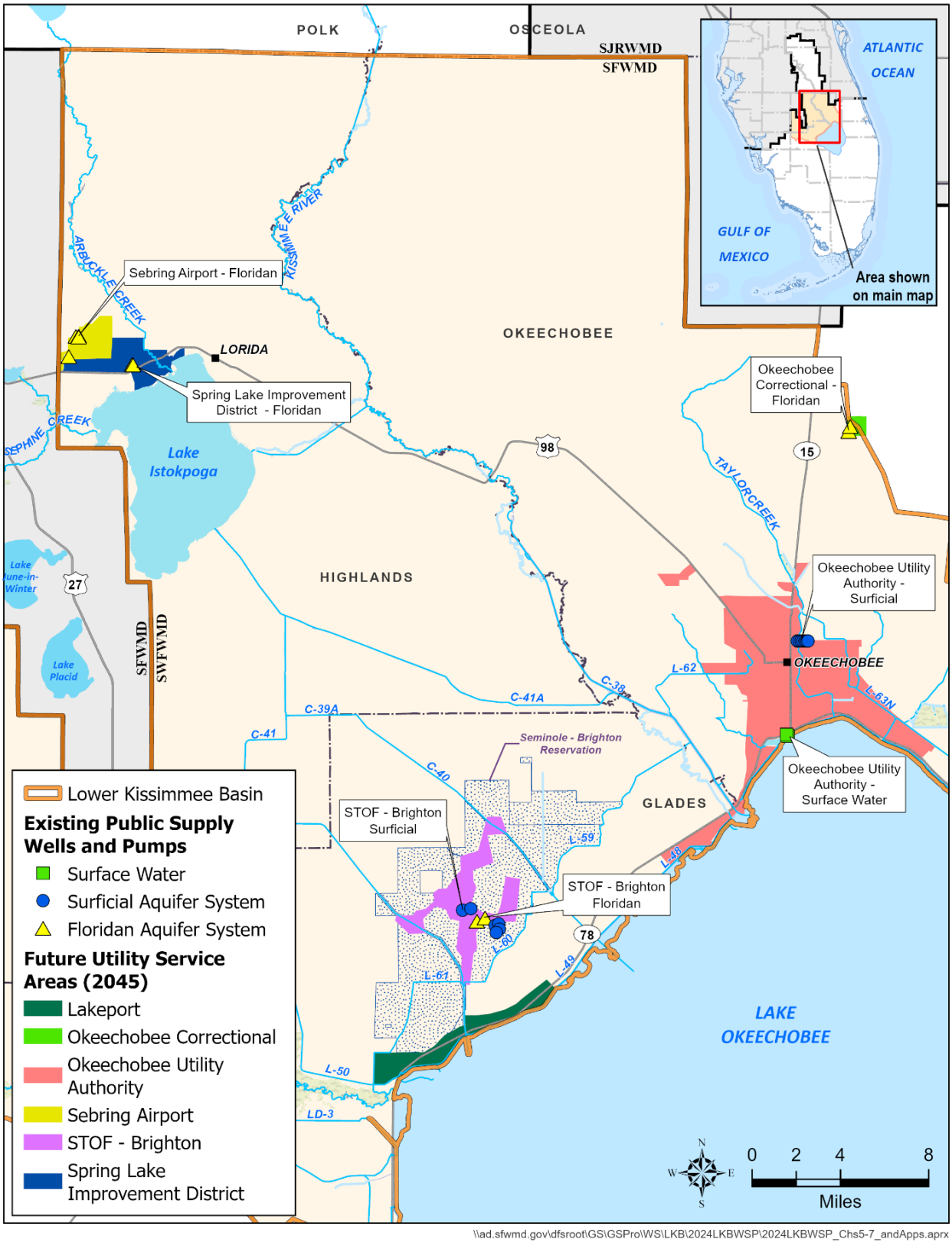


Figure B-2. Projected (2045) Public Supply utility service areas and wellfields in the LKB Planning Area.

# SEMINOLE TRIBE OF FLORIDA – BRIGHTON

**Service Area**: STOF–Brighton Reservation.

**Description**: Raw water supplies are obtained from one UFA wellfield with backup from one SAS wellfield and treated at the STOF–Brighton WTP using RO. Utility information is based on Annual Work Plans,[a] United States Census data, and historical water deliveries to Lakeport.

| Population and Finished Water Demand | | | | |
|---|---|---|---|---|
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Population | 976 | 985 | 1,041 | 1,097 |
| Per Capita (gallons per day finished water)[b] | 451 | 589 | 682 | 693 |
| **Potable Water Demands** (daily average annual finished water in mgd) | **0.44** | **0.58** | **0.71** | **0.76** |
| Bulk Potable Water Demands (daily average annual finished water in mgd delivered directly to Lakeport Water Association) | 0.10 | 0.10 | 0.10 | 0.10 |
| **Total Potable Water Demands** (daily average annual finished water in mgd) | **0.54** | **0.68** | **0.81** | **0.86** |

| Water Use Rights (mgd) | |
|---|---|
| Potable Water Source | 28th Annual Work Plan |
| SAS | 0.00[c] |
| FAS | 0.58 |
| **Total Allocation** | **0.58** |

| Potable Water Treatment Capacity | | | | |
|---|---|---|---|---|
| Permitted Capacity by Source | Cumulative Facility & Project Capacity (mgd) | | | |
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| SAS | 0.80 | 0.80 | 0.80 | 0.80 |
| FAS | 2.00 | 2.00 | 2.00 | 2.00 |
| **Total Potable Capacity** | **2.80** | **2.80** | **2.80** | **2.80** |

| Nonpotable Alternative Water Source Capacity (mgd) | | | | |
|---|---|---|---|---|
| | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Nonpotable Capacity** | **0.00** | **0.00** | **0.00** | **0.00** |

| Project Summary | | | | | | |
|---|---|---|---|---|---|---|
| Water Supply Projects | Source | Completion Date | Total Capital Cost ($ million) | Projected Cumulative Design Capacity (mgd) | | |
| | | | | 2025 | 2035 | 2045 |
| Potable Water | | | | | | |
| No Projects | | | | | | |
| **Total Potable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| Nonpotable Water | | | | | | |
| No Projects | | | | | | |
| **Total Nonpotable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| **Total New Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |

[a] The Seminole Tribe of Florida submits an Annual Work Plan to the SFWMD per the Water Rights Compact of 1987.

[b] The estimated per capita use rates include additional water used for seasonal and transient populations and other potable water uses.

[c] SAS wells are expected to be maintained to serve as backup.

# SEBRING AIRPORT

**Service Area**: Sebring Airport and surrounding commercial and industrial areas in unincorporated Highlands County.

**Description**: Raw water supplies are obtained from one FAS wellfield. Water is treated at the Sebring Airport Authority WTP using aeration and chlorination.

| Population and Finished Water Demand | | | | |
|---|---|---|---|---|
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Population | N/A[a] | N/A[a] | N/A[a] | N/A[a] |
| Average 2018-2022 Per Capita (gallons per day finished water) | N/A[a] | | | |
| **Potable Water Demands** (daily average annual finished water in mgd) | **0.09** | **0.09** | **0.09** | **0.09** |

| SFWMD Water Use Permitted Allocation (mgd) | |
|---|---|
| Potable Water Source | Permit Number 28-00139-W (expires 2031) |
| FAS | 0.12 |
| **Total Allocation** | **0.12** |

| FDEP Potable Water Treatment Capacity (PWS ID # 6280250) | | | | |
|---|---|---|---|---|
| Permitted Capacity by Source | Cumulative Facility & Project Capacity (mgd) | | | |
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| FAS | 1.00 | 1.00 | 1.00 | 1.00 |
| **Total Potable Capacity** | **1.00** | **1.00** | **1.00** | **1.00** |
| Nonpotable Alternative Water Source Capacity (mgd) | | | | |
| | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Nonpotable Capacity** | 0.00 | 0.00 | 0.00 | 0.00 |

| Project Summary | | | | | | |
|---|---|---|---|---|---|---|
| Water Supply Projects | Source | Completion Date | Total Capital Cost ($ million) | Projected Cumulative Design Capacity (mgd) | | |
| | | | | 2025 | 2035 | 2045 |
| Potable Water | | | | | | |
| No Projects | | | | | | |
| **Total Potable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| Nonpotable Water | | | | | | |
| No Projects | | | | | | |
| **Total Nonpotable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| **Total New Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |

[a] Because this utility does not provide water to a permanent population, the projected water use rate is based on historical use and projected population growth rates for Highlands County.

# SPRING LAKE IMPROVEMENT DISTRICT

**Service Area**: The independent special district known as Spring Lake Improvement District and unincorporated areas in Highlands County.

**Description**: Raw water supplies are obtained from one FAS wellfield. Water is treated at two WTPs (#1 and #2) using chlorination and aeration.

| Population and Finished Water Demand | | | | |
|---|---|---|---|---|
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Population | 3,140 | 3,189 | 3,311 | 3,388 |
| Average 2018-2022 Per Capita (gallons per day finished water) | 69 | | | |
| **Potable Water Demands** (daily average annual finished water in mgd) | **0.22** | **0.22** | **0.23** | **0.23** |

| SFWMD Water Use Permitted Allocation (mgd) | |
|---|---|
| Potable Water Source | Permit Number 28-00122-W (expires 2039) |
| FAS | 0.42 |
| **Total Allocation** | **0.42** |

| FDEP Potable Water Treatment Capacity (PWS ID # 5280266) | | | | |
|---|---|---|---|---|
| Permitted Capacity by Source | Cumulative Facility & Project Capacity (mgd) | | | |
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| FAS | 1.99 | 1.99 | 1.99 | 1.99 |
| **Total Potable Capacity** | **1.99** | **1.99** | **1.99** | **1.99** |

| Nonpotable Alternative Water Source Capacity (mgd) | | | | |
|---|---|---|---|---|
| | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Nonpotable Capacity** | **0.00** | **0.00** | **0.00** | **0.00** |

| Project Summary | | | | | | |
|---|---|---|---|---|---|---|
| Water Supply Projects | Source | Completion Date | Total Capital Cost ($ million) | Projected Cumulative Design Capacity (mgd) | | |
| | | | | 2025 | 2035 | 2045 |
| Potable Water | | | | | | |
| No Projects | | | $0.00 | 0.00 | 0.00 | 0.00 |
| **Total Potable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| Nonpotable Water | | | | | | |
| No Projects | | | | | | |
| **Total Nonpotable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| **Total New Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |

# OKEECHOBEE CORRECTIONAL

**Service Area**: The Okeechobee Correctional Institution.

**Description**: Raw water supplies are obtained from one FAS wellfield. Water is treated at the Okeechobee Correctional Institution WTP using aeration and chlorination.

| Population and Finished Water Demand | | | | |
|---|---|---|---|---|
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Population | 2,320 | 2,320 | 2,320 | 2,320 |
| Average 2018-2022 Per Capita (gallons per day finished water) | 95 | | | |
| **Potable Water Demands** (daily average annual finished water in mgd) | **0.22** | **0.22** | **0.22** | **0.22** |

| SFWMD Water Use Permitted Allocation (mgd) | |
|---|---|
| Potable Water Source | Permit Number 47-00421-W (expires 2035) |
| FAS | 0.19 |
| **Total Allocation** | **0.19** |

| FDEP Potable Water Treatment Capacity (PWS ID # 4474497) | | | | |
|---|---|---|---|---|
| Permitted Capacity by Source | Cumulative Facility & Project Capacity (mgd) | | | |
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| FAS | 0.86 | 0.86 | 0.86 | 0.86 |
| **Total Potable Capacity** | **0.86** | **0.86** | **0.86** | **0.86** |
| Nonpotable Alternative Water Source Capacity (mgd) | | | | |
| Reclaimed | 0.20 | 0.20 | 0.20 | 0.20 |
| **Total Nonpotable Capacity** | **0.20** | **0.20** | **0.20** | **0.20** |

| Project Summary | | | | | | |
|---|---|---|---|---|---|---|
| Water Supply Projects | Source | Completion Date | Total Capital Cost ($ million) | Projected Cumulative Design Capacity (mgd) | | |
| | | | | 2025 | 2035 | 2045 |
| Potable Water | | | | | | |
| No Projects | | | | | | |
| **Total Potable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| Nonpotable Water | | | | | | |
| No Projects | | | | | | |
| **Total Nonpotable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| **Total New Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |

# OKEECHOBEE UTILITY AUTHORITY

**Service Area**: City of Okeechobee, portions of unincorporated Okeechobee County, and Buckhead Ridge in Glades County.

**Description**: Raw water supplies are obtained from one SAS wellfield and surface water from Lake Okeechobee. The Okeechobee Utility Authority operates two WTPs. Groundwater from the SAS is treated using aeration, filtration, and disinfection at the groundwater WTP. Surface water from Lake Okeechobee is treated at the surface water WTP using flocculation and sedimentation, followed by ozonation, filtration, and disinfection.

| Population and Finished Water Demand | | | | |
|---|---|---|---|---|
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| Population | 25,154 | 26,354 | 28,813 | 29,078 |
| Average 2018-2022 Per Capita (gallons per day finished water) | 102 | | | |
| **Potable Water Demands** (daily average annual finished water in mgd) | **2.56** | **2.69** | **2.94** | **2.96** |

| SFWMD Water Use Permitted Allocation (mgd) | |
|---|---|
| Potable Water Source | Permit Number 47-00004-W (expires 2032) |
| SAS | 0.73 |
| Surface Water (Lake Okeechobee) | 2.75[a] |
| **Total Allocation** | **3.48** |

| FDEP Potable Water Treatment Capacity (PWS ID # 4470257) | | | | |
|---|---|---|---|---|
| Permitted Capacity by Source | Cumulative Facility & Project Capacity (mgd) | | | |
| | Existing | Projected | | |
| | 2022 | 2025 | 2035 | 2045 |
| SAS | 1.00 | 1.00 | 1.00 | 1.00 |
| Surface Water | 4.99 | 4.99 | 4.99 | 4.99 |
| **Total Potable Capacity** | **5.99** | **5.99** | **5.99** | **5.99** |
| Nonpotable Alternative Water Source Capacity (mgd) | | | | |
| Reclaimed | 3.00 | 3.00 | 3.00 | 3.00 |
| **Total Nonpotable Capacity** | **3.00** | **3.00** | **3.00** | **3.00** |

| Project Summary | | | | | | |
|---|---|---|---|---|---|---|
| Water Supply Projects | Source | Completion Date | Total Capital Cost ($ million) | Projected Cumulative Design Capacity (mgd) | | |
| | | | | 2025 | 2035 | 2045 |
| Potable Water | | | | | | |
| No Projects | | | | | | |
| **Total Potable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| Nonpotable Water | | | | | | |
| No Projects | | | | | | |
| **Total Nonpotable Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |
| **Total New Water** | | | **$0.00** | **0.00** | **0.00** | **0.00** |

[a] The allocation for surface water from Lake Okeechobee increased by 1.08 mgd above the base condition allocation (1.67 mgd) by variance (Governing Board Order 2012-042-DAO-WU).

# UTILITIES SERVING LOCAL GOVERNMENTS

**Table B-2** identifies the local governments within the LKB Planning Area and the PS utilities with treatment capacity and water use of 0.10 mgd or greater. The first column in **Table B-2** lists the name of the local government, and the second column identifies the local government(s) or private PS utility, or utilities, providing gross (raw) or net (finished) water to the local government.

**Table B-3** identifies the PS utilities providing gross (raw) or net (finished) water to the local governments within the LKB Planning Area. The first column of **Table B-3** lists the name of the PS utility, the second column provides the type of utility, and the third column identifies the incorporated and unincorporated areas of the LKB Planning Area within that PS utility's service area.

Table B-2. Local and tribal governments served by utilities/entities in the LKB Planning Area.

| Local and Tribal Governments | Utilities/Entities Serving Local and Tribal Governments |
|---|---|
| Glades County | |
| Glades County (unincorporated) | STOF–Brighton (bulk sales from Brighton Reservation to Lakeport); Okeechobee Utility Authority |
| STOF–Brighton | STOF–Brighton |
| Highlands County | |
| Highlands County (unincorporated) | Spring Lake Improvement District; Sebring Airport (serving Sebring Regional Airport only) |
| Okeechobee County | |
| Okeechobee County (unincorporated) | Okeechobee Correctional; Okeechobee Utility Authority |
| Okeechobee, City of | Okeechobee Utility Authority |

Table B-3. Types of utilities/entities serving local and tribal governments in the LKB Planning Area.

| Utilities/Entities | Utilities/Entities Type | Local and Tribal Governments Served |
|---|---|---|
| Glades County | | |
| Lakeport | Private | Unincorporated Glades County |
| STOF–Brighton | Tribal Government | STOF–Brighton |
| Highlands County | | |
| Sebring Airport | Local Government | Unincorporated Highlands County (Sebring Regional Airport only) |
| Spring Lake Improvement District | Special District | Unincorporated Highlands County |
| Okeechobee County | | |
| Okeechobee Utility Authority | Private | City of Okeechobee; unincorporated Okeechobee County; and a portion of unincorporated Glades County |

# REFERENCES

FDEP. 2023a. *Flow Data and Treatment Data from the Drinking Water Database*. Florida Department of Environmental Protection, Tallahassee, FL. Available online at https://floridadep.gov/water/source-drinking-water/content/information-drinking-water-database.

FDEP. 2023b. *OCULUS Electronic Document Management System*. Florida Department of Environmental Protection, Tallahassee, FL. Available online at https://depedms.dep.state.fl.us/Oculus/servlet/login.

United States Census Bureau. 2020. *2020 Decennial Census Redistricting Data* (Public Law 94-171). United States Department of Commerce, Washington, DC.

# C

# MFLs and Prevention and Recovery Strategies

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# MINIMUM FLOWS AND MINIMUM WATER LEVELS

The South Florida Water Management District (SFWMD or District) adopts minimum flows and minimum water levels (MFLs) to establish the point at which water resources, or the ecology of the area, will experience significant harm from further withdrawals (Chapter 40E-8, Florida Administrative Code [F.A.C.]). Additionally, the SFWMD adopts prevention and recovery strategies with MFLs to prevent the MFL from being violated in the future or to recover the waterbody to meet the MFL as soon as practicable. Further information on MFLs and the associated prevention and recovery strategies can be found in the *2021–2024 Support Document for Water Supply Plan Updates* (2021–2024 Support Document; SFWMD 2021) and on the District's webpage (http://www.sfwmd.gov/mfls).

# LOWER KISSIMMEE BASIN MFL WATER BODIES

In the Lower Kissimmee Basin (LKB) Planning Area, the SFWMD has adopted an MFL and a prevention strategy for Lake Istokpoga. The Lower West Coast aquifers affect portions of the LKB Planning Area but are included in the *2022 Lower West Coast Water Supply Plan Update* (SFWMD 2022a). Lake Okeechobee, located outside of the LKB Planning Area, is an important component of the LKB Planning Area. The MFL and recovery strategy for Lake Okeechobee are included in the *2023–2024 Lower East Coast Water Supply Plan Update* (SFWMD 2024). The MFL waterbodies in the SFWMD are depicted in **Figure C-1**. The MFL and prevention strategy for Lake Istokpoga remain unchanged and are discussed in this appendix.

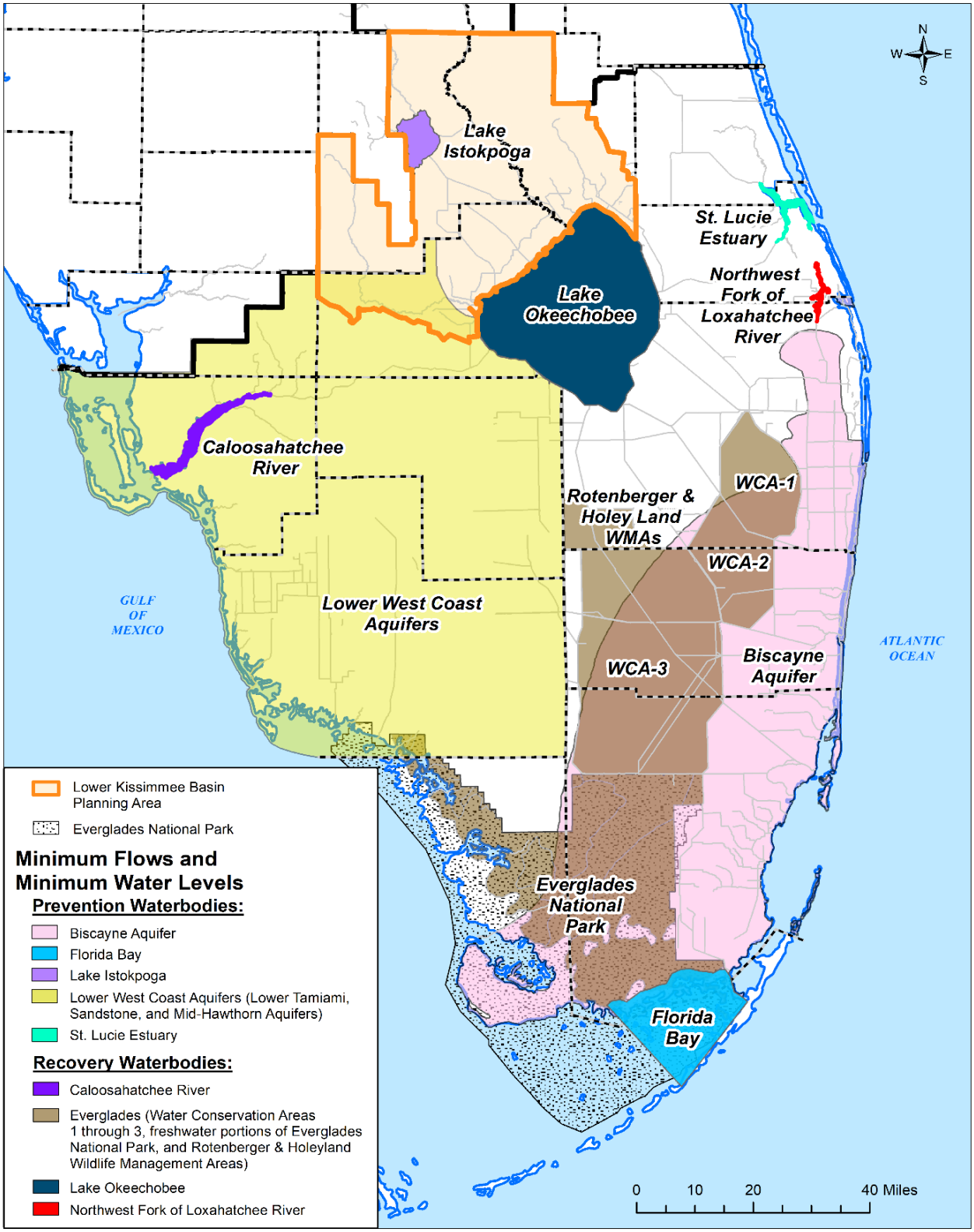


Figure C-1. Adopted MFLs in the South Florida Water Management District.

## Lake Istokpoga

### *MFL Criteria*

Osprey Nesting on Lake Istokpoga

Lake Istokpoga covers 27,692 acres, making it the fifth largest lake in Florida (**Figure C-1**). The lake is shallow, averaging 4 to 6 feet in depth. It is fed from the north by two creeks, Arbuckle Creek and Josephine Creek, and drains southward to Lake Okeechobee through the Indian Prairie Canal System (**Chapter 4, Figure 4-1**). The water level in Lake Istokpoga is controlled by operation of the S-67 (replaced G-85) and S-68 water control structures in accordance with the Lake Istokpoga Regulation Schedule adopted by the United States Army Corps of Engineers (USACE) and implemented by the SFWMD (**Chapter 4**, **Figure 4-4**). Lake Istokpoga is defined in Subsection 40E-8.021(11), F.A.C., as the lands and waters contained within the lake below 40 feet National Geodetic Vertical Datum of 1929 (NGVD29), the top of the USACE Lake Istokpoga Regulation Schedule.

Surface water from Lake Istokpoga and its associated canals traditionally has been used to meet irrigation demands in the Indian Prairie Basin between Lake Istokpoga and Lake Okeechobee in Highlands and Glades counties. This area includes the Seminole Tribe of Florida's Brighton Reservation and the Istokpoga Marsh Watershed Improvement District (IMWID), both of which receive water from Lake Istokpoga and the canal system through agreements with the SFWMD. Additionally, approximately 10,000 acres of agricultural lands within the IMWID have separate SFWMD individual water use permits for various reasons, including use of groundwater wells not covered by the surface water agreement.

Historically, most irrigation demands in these areas have been met with water from Lake Istokpoga and the canal system. However, a lack of water storage capacity in the watershed and the challenges of flood control do not allow significant storage of water for use during periods of drought, when rainfall has been insufficient to maintain the lake above Zone C of the Lake Istokpoga Regulation Schedule (**Chapter 4**, **Figure 4-4**). During such periods, the SFWMD may implement water restrictions to limit water use from the lake and canal system.

To protect water levels in Lake Istokpoga, an MFL of 36.5 feet NGVD29 was adopted in 2006 (Rule 40E-8.351, F.A.C.). Significant harm criteria are based on the relationship between water levels in the lake and the health of littoral zone wetlands, which provide habitat for ecologically and economically important fish and wildlife; navigational and recreational access; and maintenance of historical runoff from Lake Istokpoga through the Indian Prairie Basin and canal system to Lake Okeechobee (SFWMD 2005). An MFL violation occurs in Lake Istokpoga when surface water levels fall below 36.5 feet NGVD29 for 20 or more weeks, within a calendar year, more often than once every 4 years.

A restricted allocation area (RAA) for Lake Istokpoga/Indian Prairie Canal System was established in 1981 as described in Section 3.2.1.A of the *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District* (Applicant's Handbook; SFWMD 2022b) that prohibits additional surface water allocations from the lake and canal system above existing allocations and any increases in surface water pump capacity. The RAA reduces the potential for District-declared water shortages in the basin during dry periods and prevents new users from reducing the level of certainty for existing permitted users and tribal entitlements.

### *Prevention Strategy*

At the time of MFL adoption, Lake Istokpoga was meeting the MFL, and no violations were anticipated to occur in the next 20 years. Therefore, a prevention strategy pursuant to Subsection 40E-8.421(7), F.A.C. was adopted for the lake simultaneously with MFL adoption. The prevention strategy for Lake Istokpoga consists of continuation of the current operational plan and regulation schedule as well as planning and operating extreme lake drawdowns in coordination with other agencies for environmental purposes in a manner that avoids an MFL violation in accordance with Subsection 40E-8.421(7), F.A.C.

Further information about the MFLs and prevention and recovery strategies adopted for the LKB Planning Area, and throughout the District, can be found in Chapter 40E-8, F.A.C., and on the SFWMD webpage http://www.sfwmd.gov/mfls. More information on the RAA established for the Lake Istokpoga/Indian Prairie Canal System is provided in **Chapter 4** of this plan update and in Section 3.2.1.A of the Applicant's Handbook (SFWMD 2022b).

## REFERENCES


SFWMD. 2005. *Technical Document to Support Development of Minimum Levels for Lake Istokpoga, November 2005*. South Florida Water Management District. West Palm Beach, FL.

SFWMD. 2021. *2021–2024 Support Document for Water Supply Plan Updates*. South Florida Water Management District, West Palm Beach, FL. November 2021.

SFWMD. 2022a. *2022 Lower West Coast Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. December 2022.

SFWMD. 2022b. *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District*. South Florida Water Management District, West Palm Beach, FL. June 2022.

SFWMD. 2024. *2023–2024 Lower East Coast Water Supply Plan Update*. South Florida Water Management District, West Palm Beach, FL. September 2024.

# D

# Wastewater Treatment Facilities

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# WASTEWATER TREATMENT FACILITIES

Wastewater generated by homes and businesses is either directed to an on-site septic tank for treatment and disposal or collected via sanitary sewer and conveyed to a wastewater treatment facility (WWTF) for treatment and disposal or reuse. WWTFs can either be smaller "package plants" or larger, more regional, facilities. This appendix focuses on the larger facilities with a Florida Department of Environmental Protection (FDEP) permitted treatment capacity of 0.10 million gallons per day (mgd) or greater in the Lower Kissimmee Basin (LKB) Planning Area. Additionally, the Sebring Airport, permitted at 0.09 mgd, is included in this appendix as it is one of three facilities in the LKB Planning Area which produces reclaimed water. These treatment facilities allow economy of operation and have sufficient flows that, if properly treated and reused as reclaimed water, positively impact water resources.

# DATA AND METRICS

In 2022, there were two domestic WWTFs within the LKB Planning Area with a permitted treatment capacity of 0.10 mgd or greater (omitting the Seminole Tribe of Florida's Brighton Reservation facility, which is not required to report flows to the FDEP). **Table D-1** lists those WWTFs, plus the Sebring Airport, and shows annual average daily flows for 2022 and projected flows for 2045. **Tables D-2** and **D-3** show 2022 and projected 2045 utilization of reclaimed water, respectively, for those facilities. **Table D-4** shows 2022 and 2045 methods and flows of treated effluent disposal for the three profiled facilities.

Reuse percentage is a metric frequently used when describing reuse facilities and is intended to reflect the amount of reclaimed water reused, relative to the amount of water the facility has potentially available for that purpose. The potential reuse at a facility is equal to the sum of wastewater treated at the facility, water imported from another facility, and supplemental water added to the system to meet reclaimed water demands, minus the water exported to another facility.

INFO ⓘ

Reuse Percentage:

A Metric for Reclaimed Water Use Efficiency

Reuse Percentage = Reuse / Potential Reuse

Not to exceed 100%

Potential Reuse = (Wastewater Flow + Supplemental Flow + Imports) - Exports

For the tables that follow, the following acronyms and abbreviations are defined here.

**INFO**

**Acronyms and Abbreviations**

BA – basic-level disinfection indicates a facility's level of effluent disinfection as described in Subsection 62-600.440(5), Florida Administrative Code (F.A.C.)

FDEP – Florida Department of Environmental Protection

HI – high-level disinfection indicates a facility's level of effluent disinfection as described in Subsection 62-600.440(6), F.A.C.

mgd – million gallons per day

WWTF – wastewater treatment facility

Table D-1. Summary of 2022 and 2045 wastewater treatment facilities with current or projected capacities of 0.10 mgd or greater in the LKB Planning Area.

| County | Facility | Disinfection Level | FDEP Rated Capacity (mgd) | 2022 | | | 2045 | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Annual Average Daily Wastewater Flow (mgd) | Annual Average Daily Reuse Flow (mgd) | Reuse Percentage | Annual Average Daily Wastewater Flow (mgd) | Annual Average Daily Reuse Flow (mgd) | Reuse Percentage |
| Okeechobee | Okeechobee Correctional | BA | 0.20 | 0.23 | 0.23 | 100.0% | 0.20 | 0.20 | 100.0% |
| | Okeechobee Utility Authority | HI | 3.90 | 0.87 | 0.51 | 58.9% | 3.00 | 1.43 | 47.7% |
| **Okeechobee County Total** | | | **4.10** | **1.10** | **0.74** | **67.5%** | **3.20** | **1.63** | **50.9%** |
| Highlands | Sebring Airport[a] | BA | 0.09 | 0.03 | 0.03 | 100.0% | 0.05 | 0.05 | 100.0% |
| **Highlands County Total** | | | **0.09** | **0.03** | **0.03** | **100.0%** | **0.05** | **0.05** | **100.0%** |
| **Lower Kissimmee Basin Total[b]** | | | **4.19** | **1.13** | **0.77** | **68.4%** | **3.25** | **1.68** | **51.7%** |

[a] The Sebring Airport, permitted at 0.09 mgd, is included in this plan update as it is the only other facility in the region that produces reclaimed water.
[b] The Seminole Tribe of Florida's Brighton Reservation is not included in planning area totals as it is not required to report flows to the FDEP.

Table D-2. 2022 utilization of reclaimed water (in mgd) from wastewater treatment facilities in the LKB Planning Area with current or projected capacities of 0.10 mgd or greater.

| County | Facility | 2022 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Golf Course Irrigation | Residential Irrigation | Other Irrigation[a] | Groundwater Recharge[b] | Wetlands | Industrial & Other Types of Reuse[c] | Potable Reuse | Reuse Total |
| Okeechobee | Okeechobee Correctional | 0.00 | 0.00 | 0.00 | 0.23 | 0.00 | 0.00 | 0.00 | 0.23 |
| | Okeechobee Utility Authority | 0.00 | 0.00 | 0.42 | 0.09 | 0.00 | 0.00 | 0.00 | 0.51 |
| **Okeechobee County Total** | | **0.00** | **0.00** | **0.42** | **0.32** | **0.00** | **0.00** | **0.00** | **0.74** |
| Highlands | Sebring Airport[d] | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |
| **Highlands County Total** | | **0.00** | **0.00** | **0.00** | **0.03** | **0.00** | **0.00** | **0.00** | **0.03** |
| **Lower Kissimmee Basin Total[e]** | | **0.00** | **0.00** | **0.42** | **0.36** | **0.00** | **0.00** | **0.00** | **0.77** |

[a] Other irrigation includes crop irrigation and public access irrigation, such as parks, schools, roadway medians, and other common areas.
[b] Groundwater recharge includes rapid infiltration basins, percolation ponds, sprayfields, etc.
[c] Other reuse types includes other permitted uses (e.g., cooling water at the treatment facility or at other facilities and toilet flushing).
[d] The Sebring Airport, permitted at 0.09 mgd, is included in this plan update as it is the only other facility in the region that produces reclaimed water.
[e] The Seminole Tribe of Florida's Brighton Reservation is not included in planning area totals as it is not required to report flows to the FDEP.

Table D-3. 2045 projected utilization of reclaimed water (in mgd) from wastewater treatment facilities in the LKB Planning Area with current or projected capacities of 0.10 mgd or greater.

| County | Facility | 2045 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Golf Course Irrigation | Residential Irrigation | Other Irrigation[a] | Groundwater Recharge[b] | Wetlands | Industrial & Other Types of Reuse[c] | Potable Reuse | Reuse Total |
| Okeechobee | Okeechobee Correctional | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.20 |
| | Okeechobee Utility Authority | 0.00 | 0.00 | 1.30 | 0.13 | 0.00 | 0.00 | 0.00 | 1.43 |
| **Okeechobee County Total** | | **0.00** | **0.00** | **1.30** | **0.33** | **0.00** | **0.00** | **0.00** | **1.63** |
| Highlands | Sebring Airport[d] | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.05 |
| **Highlands County Total** | | **0.00** | **0.00** | **0.00** | **0.05** | **0.00** | **0.00** | **0.00** | **0.05** |
| **Lower Kissimmee Basin Total[e]** | | **0.00** | **0.00** | **1.30** | **0.38** | **0.00** | **0.00** | **0.00** | **1.68** |

[a] Other irrigation includes crop irrigation and public access irrigation, such as parks, schools, roadway medians, and other common areas.
[b] Groundwater recharge includes rapid infiltration basins, percolation ponds, sprayfields, etc.
[c] Other reuse types includes other permitted uses (e.g., cooling water at the treatment facility or at other facilities and toilet flushing).
[d] The Sebring Airport, permitted at 0.09 mgd, is included in this plan update as it is the only other facility in the region that produces reclaimed water.
[e] The Seminole Tribe of Florida's Brighton Reservation is not included in planning area totals as it is not required to report flows to the FDEP.

Table D-4. 2022 and 2045 methods of wastewater disposal for facilities (in mgd) with current or projected capacities of 0.10 mgd or greater in the LKB Planning Area.

| County | Facility | 2022 | | | | | 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Deep Well Injection | Surface Water Discharge | Ocean Outfall | Other[a] | Total Disposals | Deep Well Injection | Surface Water Discharge | Ocean Outfall | Other[a] | Total Disposals |
| Okeechobee | Okeechobee Correctional | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Okeechobee Utility Authority | 0.36 | 0.00 | 0.00 | 0.00 | 0.36 | 1.57 | 0.00 | 0.00 | 0.00 | 1.57 |
| **Okeechobee County Total** | | **0.36** | **0.00** | **0.00** | **0.00** | **0.36** | **1.57** | **0.00** | **0.00** | **0.00** | **1.57** |
| Highlands | Sebring Airport[a] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Highlands County Total** | | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Lower Kissimmee Basin Total[b]** | | **0.36** | **0.00** | **0.00** | **0.00** | **0.36** | **1.57** | **0.00** | **0.00** | **0.00** | **1.57** |

[a] The Sebring Airport, permitted at 0.09 mgd, is included in this plan update as it is the only other facility in the region that produces reclaimed water.
[b] The Seminole Tribe of Florida's Brighton Reservation is not included in planning area totals as it is not required to report flows to the FDEP.

# WASTEWATER/REUSE FACILITY PROFILES

This section contains profiles for three of the wastewater/reuse facilities within the LKB Planning Area, two with a treatment capacity of 0.10 mgd or greater, and the Sebring Airport, permitted at 0.09 mgd. The profiles are organized by county, then alphabetically by utility. Each profile contains the existing facility information, followed by the current (2022) and projected (2045) annual average daily flows of treated effluent and reclaimed water. Existing capacity and flow information were obtained from the individual reuse inventory reports for the year 2022, filed by each facility to the FDEP (FDEP 2023). For 2045, flow projections for annual average daily wastewater, reuse, and total discharges are based on data obtained from each utility. The Seminole Tribe of Florida's Brighton Reservation facility is not required to provide flow data to the FDEP; therefore, it is not included in this appendix.

Reclaimed Water Pump

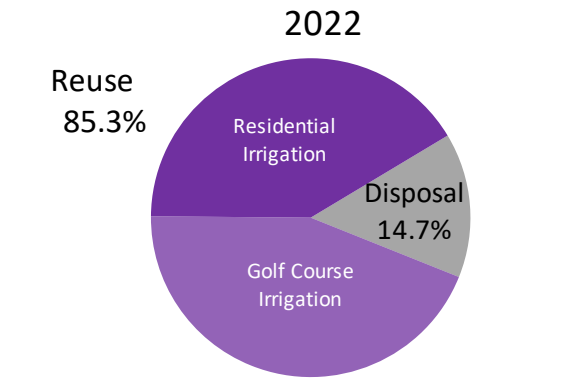
To help understand the information in the facility profiles, a sample profile with descriptions is provided. **Figure D-1** shows WWTFs with a permitted capacity of 0.10 mgd or greater in the Lower Kissimmee Basin, but also includes the Sebring Airport, permitted at 0.09 mgd.

# SAMPLE UTILITY NAME

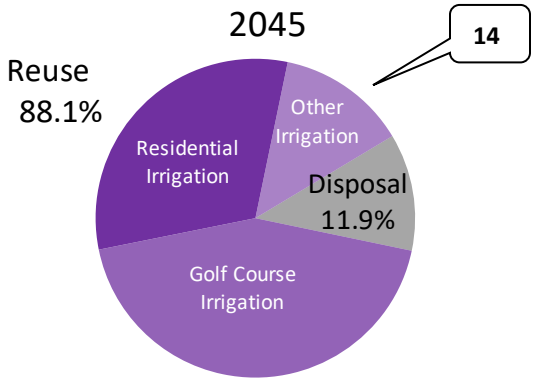
**Description**: Descriptions may include any of the following types of information but are not limited to service area identification/description, interconnections with other facilities, ocean outfall requirements (if applicable), and significant projects.

| Wastewater Treatment Facility Information | | | |
|---|---|---|---|
| FDEP Wastewater Facilities Regulation Identification | | **FLA99999** | |
| Wastewater Treatment Capacity (mgd) | | **0.90** | |
| Disinfection | | High Level | |
| Public Access Users Served Reclaimed Water: | | | |
| Residences – 10,690 | Golf Courses – 3 | Parks and Schools – 5 | |
| **Annual Average Daily Flows (mgd)** | | | |
| | | **2022** | **2045** |
| **Total Wastewater Treated** | | **4.96** | **6.76** |
| **Total Wastewater Disposed** | | **0.89** | **0.95** |
| Deep Well Injection | | 0.89 | 0.89 |
| **Total Water Reused**[a] | | **5.17** | **7.04** |
| Golf Course Irrigation | | 2.67 | 3.48 |
| Residential Irrigation | | 2.51 | 2.51 |
| Other Irrigation | | 0.00 | 1.05 |
| **Supplemental to Reclaimed Water** | | **2.12** Groundwater | **2.37** Groundwater |
| **Reuse Percentage** | | **92.6%** | **92.6%** |
| **Facility Water Imports/Exports (mgd)** | | | |
| Importing Utility/Facility | | 1.02 – Sea Grape WWTF | 1.14 – Sea Grape WWTF |
| **Reclaimed Water Project Summary** | | | |
| Project Name | Completion Date | Total Capital Cost ($ million) | Added Capacity (mgd) |
| WRF Phase II Expansion | 2025 | $6.5 | 1.25 |

[a] Includes supplemental water blended with treated wastewater.




**Wastewater Treated 4.96 mgd**
**1.02 mgd Exported**
**Water Reuse 5.17 mgd**
**Supplemental flow 2.12 mgd**




**Wastewater Treated 6.76 mgd**
**1.14 mgd Exported**
**Water Reuse 7.04 mgd**
**Supplemental flow 2.37 mgd**

| | |
|---|---|
| 1 | **FDEP Wastewater Facilities Regulation Identification** – A unique identification number assigned by the FDEP to each domestic WWTF or master reuse system; it is also the first part of each facility's permit number. |
| 2 | **Wastewater Treatment Capacity** – The capacity of the WWTF to produce treated wastewater as permitted by the FDEP, presented in mgd. |
| 3 | **Disinfection** – This represents the disinfection level at the facility: basic level, as described in Subsection 62-600.440(5), F.A.C. and high level, as described in Subsection 62-600.440(6), F.A.C. |
| 4 | **Public Access Users Served Reclaimed Water** – Indicates the number of reclaimed water recipients in the following classes: Residences, Golf Courses, Parks, and Schools. |
| 5 | **Annual Average Daily Flows** – Flows in mgd at the facility, broken out as follows below in items 6, 7, 8, 9, 10, and 12 for the planning base year and the final year of the planning period. |
| 6 | **Total Wastewater Treated** – The net (treated) wastewater flow in mgd. |
| 7 | **Total Wastewater Disposed** – Wastewater flow (mgd) not reused or sent to another facility, shown as a Total Wastewater Disposed and broken out into disposal type: Deep or Shallow Well Injection, Surface Water Discharge, Coastal or Estuarine, Wetlands, or Ocean Outfall. |
| 8 | **Total Water Reused** – Application (reuse) of treated wastewater, shown as a Total Water Reused and broken out into the following reuse types: Golf Course Irrigation; Residential Irrigation; Other Irrigation (including parks, schools, common areas); Groundwater Recharge (including rapid infiltration basins, percolation ponds, and sprayfields); Wetlands (reuse for recharge and hydroperiod management); Industrial (including, but not limited to, use at the facility as part of treatment operations or at another facility, primarily for industrial cooling); Other (including, but not limited to, toilet flushing and other processes). All flows are shown in mgd. |
| 9 | **Supplemental to Reclaimed Water** – Supplemental flows added to reclaimed water to meet high-demand periods. Supplemental sources can include, but may not be limited to, Demineralized Concentrate, Drinking Water, Groundwater, Stormwater, and Surface Water. All flows are shown in mgd. |
| 10 | **Supplemental Source Indication** – Uses the acronyms as defined in the Data and Metrics section of this appendix to indicate the source of supplemental flows at the facility. |
| 11 | **Reuse Percentage** – A metric used when describing reuse facilities and intended to reflect the amount of water reused when compared with the amount of water available for reuse. Reuse Percentage = Reuse / Potential Reuse, where Potential Reuse = (Wastewater Flow + Supplemental Flow + Imports) - Exports. If supplemental flows cause the calculated reuse percentage to exceed 100%, the reuse percentage will be shown as 100%. |
| 12 | **Facility Water Imports/Exports** – Indicates whether the flow, shown in mgd, is an Import or Export, the facility sending flow to the profiled facility (for Imports) or receiving flow from the profiled facility (for Exports). This flow is treated effluent unless noted otherwise. |
| 13 | **Reclaimed Water Project Summary** – Information on utility-forecasted projects that will result in increased reclaimed water production capacity including the following: Project Name, Completion Date (anticipated), Total Capital Cost (in $ millions), and Added Capacity (in mgd). |
| 14 | **Pie Graphs** – Showing planning base year and final planning year (projected) reuse and disposal flows as well as percentages and breakdowns of flows for the relevant reuse types. |

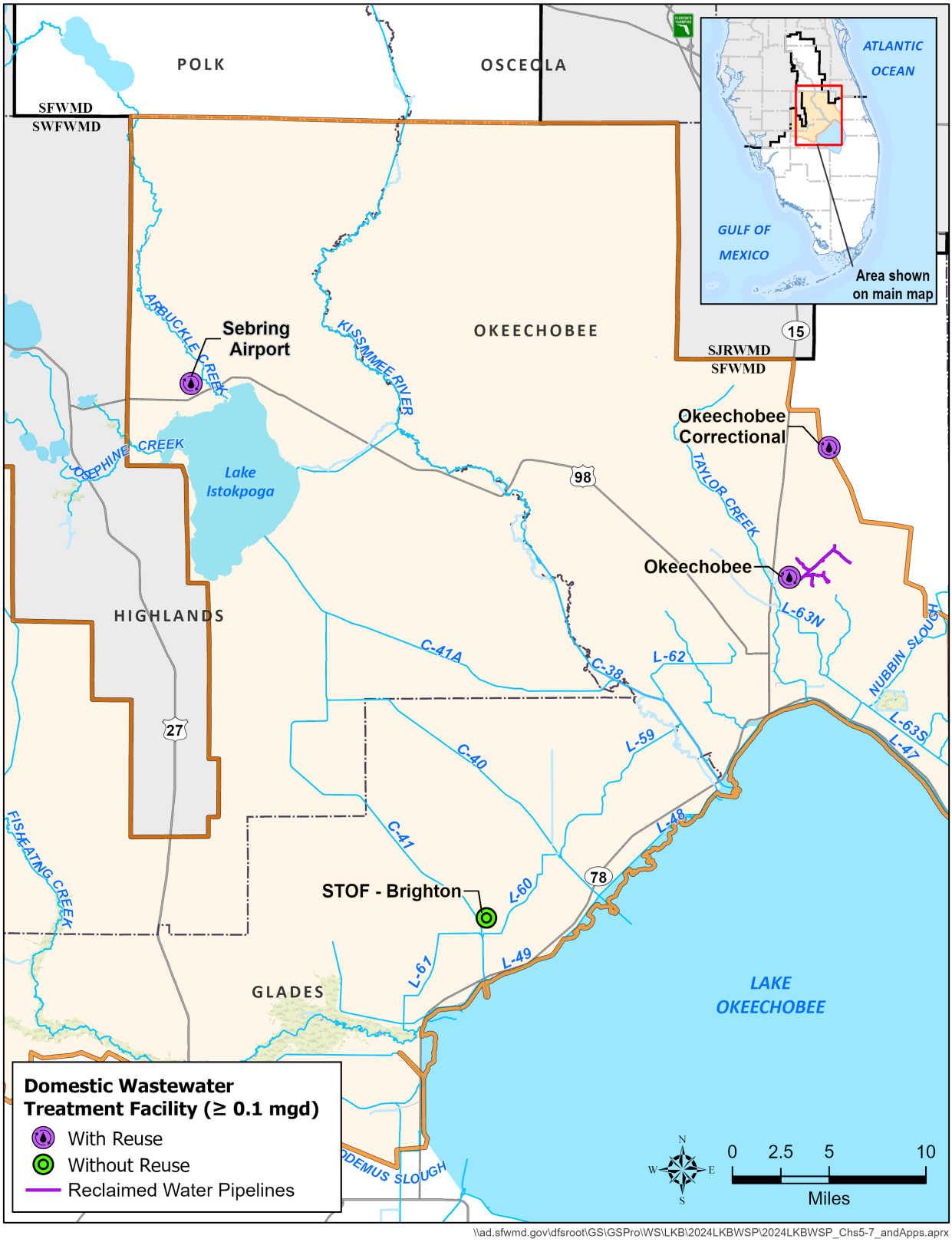



Figure D-1. Wastewater treatment facilities in the LKB Planning Area with a permitted capacity of 0.10 mgd or greater.

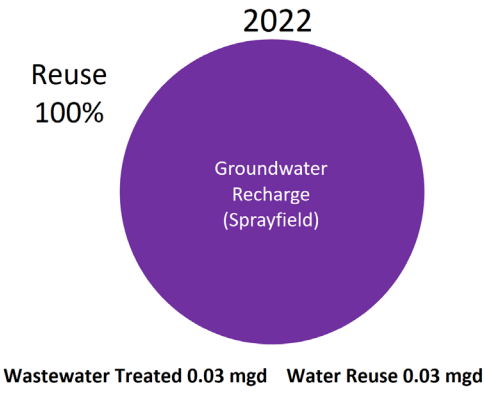
# SEBRING AIRPORT

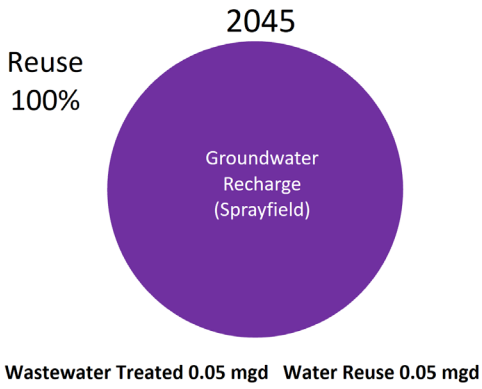
**Description**: This facility provides wastewater services to an airport and industrial park with 62 commercial service connections. Treated effluent is applied to a 67-acre slow-rate restricted public access sprayfield. Currently, there are no plans to expand the wastewater or reuse systems beyond the existing design.

| Wastewater Treatment Facility Information | | | |
|---|---|---|---|
| FDEP Wastewater Facilities Regulation Identification | | **FLA013940** | |
| Wastewater Treatment Capacity (mgd) | | **0.09** | |
| Disinfection | | Basic Level | |
| Public Access Users Served Reclaimed Water 2022: | | | |
| Residences – 0 | Golf Courses – 0 | Parks and Schools – 0 | |

| Annual Average Daily Flows (mgd) | | |
|---|---|---|
| | **2022** | **2045** |
| **Total Wastewater Treated** | **0.03** | **0.05** |
| **Total Wastewater Disposed** | **0.00** | **0.00** |
| **Total Water Reused** | **0.03** | **0.05** |
| Groundwater Recharge (sprayfields) | 0.03 | 0.05 |
| **Supplemental to Reclaimed Water** | **0.00** | **0.00** |
| **Reuse Percentage** | **100.0%** | **100.0%** |

| Reclaimed Water Project Summary | | | |
|---|---|---|---|
| Project Name | Completion Date | Total Capital Cost ($ million) | Added Capacity (mgd) |
| No projects | | | |



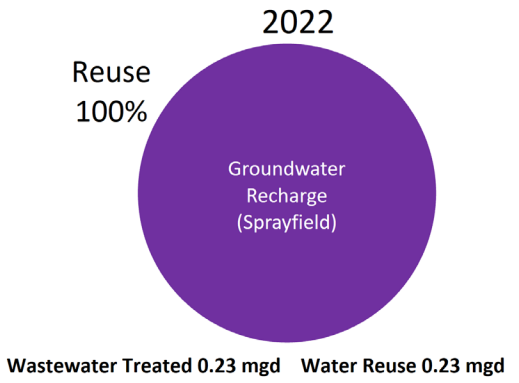



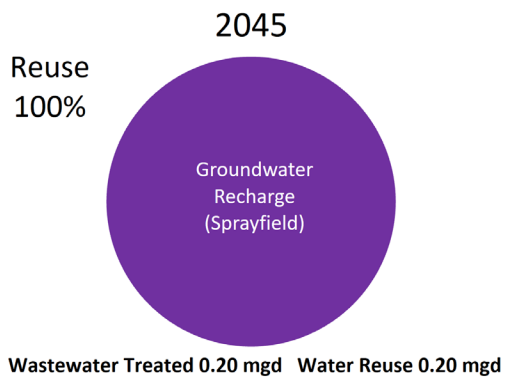
# OKEECHOBEE CORRECTIONAL

**Description**: This facility provides wastewater services for the Okeechobee Correctional Institution, the Juvenile Offender Corrections Center, and, at times, the Work Camp. The treatment system uses extended aeration and applies reclaimed water to a sprayfield after basic disinfection. In 2022, the facility treated wastewater above its permitted capacity but has identified issues with controls and will replace fittings inside the dorms of the institution, thereby expecting to restore the wastewater treatment flow to permitted capacity. There are no plans to expand the wastewater or reuse systems beyond existing design.

| Wastewater Treatment Facility Information | | | |
|---|---|---|---|
| FDEP Wastewater Facilities Regulation Identification | | **FLA013940** | |
| Wastewater Treatment Capacity (mgd) | | **0.20** | |
| Disinfection | | Basic Level | |
| Public Access Users Served Reclaimed Water 2022: | | | |
| Residences – 0 | Golf Courses – 0 | Parks and Schools – 0 | |
| **Annual Average Daily Flows (mgd)** | | | |
| | | **2022** | **2045** |
| **Total Wastewater Treated** | | **0.23** | **0.20** |
| **Total Wastewater Disposed** | | **0.00** | **0.00** |
| **Total Water Reused** | | **0.23** | **0.20** |
| Groundwater Recharge (sprayfield) | | 0.23 | 0.20 |
| **Supplemental to Reclaimed Water** | | **0.00** | **0.00** |
| **Reuse Percentage** | | **100.0%** | **100.0%** |

| Reclaimed Water Project Summary | | | |
|---|---|---|---|
| Project Name | Completion Date | Total Capital Cost ($ million) | Added Capacity (mgd) |
| No projects | | | |



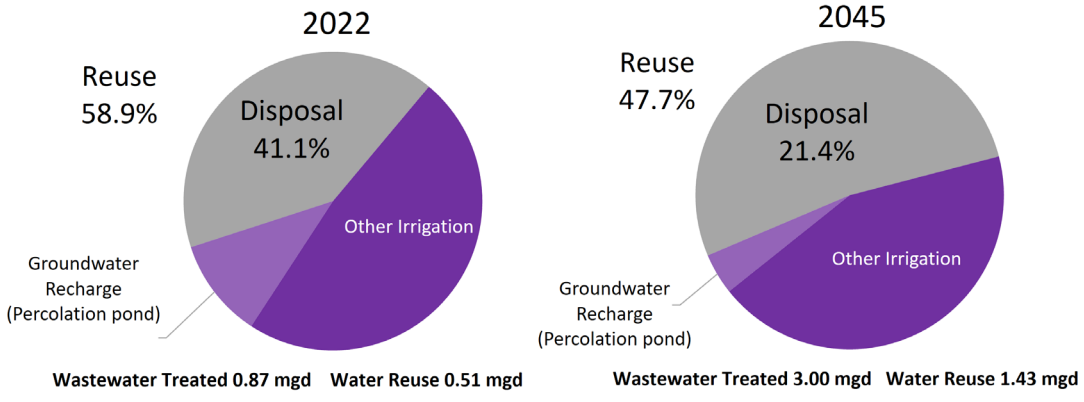
# OKEECHOBEE UTILITY AUTHORITY

**Description**: This facility provides wastewater treatment service for a portion of the City of Okeechobee and a mostly rural service area in Okeechobee County, though some planned community development is expected over the planning horizon. Currently, reclaimed water is applied as on-site irrigation of grass and hay and an adjoining 781-acre citrus grove, with the remainder sent to a percolation pond. Excess reclaimed water/effluent is disposed of through deep well injection. Okeechobee Utility Authority currently has no plans to expand the reclaimed water system beyond its existing design. However, the utility is expanding its septic-to-sewer program to include over 500 new customers and some future residential development.

| Wastewater Treatment Facility Information | | |
|---|---|---|
| FDEP Wastewater Facilities Regulation Identification | **FLA013888** | |
| Wastewater Treatment Capacity (mgd) | **3.90** | |
| Disinfection | High Level | |
| Public Access Users Served Reclaimed Water 2022: | | |
| Residences – 0 | Golf Courses – 0 | Parks and Schools – 0 |

| Annual Average Daily Flows (mgd) | | |
|---|---|---|
| | **2022** | **2045** |
| **Total Wastewater Treated** | **0.87** | **3.00** |
| **Total Wastewater Disposed** | **0.36** | **1.57** |
| Deep Well Injection | 0.36 | 1.57 |
| **Total Water Reused** | **0.51** | **1.43** |
| Other Irrigation | 0.42 | 1.30 |
| Groundwater Recharge (percolation pond) | 0.09 | 0.13 |
| **Supplemental to Reclaimed Water** | **0.00** | **0.00** |
| **Reuse Percentage** | **58.9%** | **47.7%** |

| Reclaimed Water Project Summary | | | |
|---|---|---|---|
| Project Name | Completion Date | Total Capital Cost ($ million) | Added Capacity (mgd) |
| No projects | | | |



# REFERENCES

FDEP. 2023. *OCULUS Electronic Document Management System*. Florida Department of Environmental Protection, Tallahassee, FL. Available online at https://depedms.dep.state.fl.us/Oculus/servlet/login.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