South Florida Water Management District
2020 Estimated Water Use Report

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This report was produced by the Water Supply Bureau of the South Florida Water Management District. For further information about this document, please contact:

James Harmon, P.G.
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406
jharmon@sfwmd.gov

Staff Contributors:

James Harmon, P.G., Principal Hydrogeologist, Water Supply Bureau

Brian Moore, Senior Data Scientist, Water Supply Bureau

Notice of Revision (September 2022)

Figures ES-1, 8 through 12, Tables 1, 5, 8, 9, B-5, B-6, C-1, D-1, and associated text references have been revised since this report was originally published. An error (double counting) was discovered in the reporting of water volumes for the Public Water Supply and Landscape/Recreational sectors. For the Landscape/Recreational sector reporting errors also translate to adjustments in the volumes of water and distribution between sources for permits which are estimated. Other aspects of the report are unaffected by this change. We apologize for any inconvenience caused.

EXECUTIVE SUMMARY

This report compiles estimated water use information by use category within the South Florida Water Management District for calendar year 2020, based primarily on water pumpage records reported pursuant to water use permitting requirements. Water use is defined as any consumptive use of water that reduces the supply from which it is withdrawn or diverted. This report is not intended to comprehensively account for all water used or conveyed within the District (e.g., for flood control, natural systems, water quality treatment). In 2020, approximately 2,507 million gallons per day (mgd) of surface water and groundwater were used in the following categories (**Figure ES-1**):

- Public Supply (1,094 mgd)
- Domestic Self-Supply (39 mgd)
- Commercial/Industrial/Institutional (144 mgd)
- Agriculture (936 mgd)
- Landscape/Recreation 283 mgd)
- Power Generation (11 mgd)

Of the 2,507 mgd, approximately 1,651 mgd were derived from groundwater sources, and 856 mgd were derived from surface water sources, with 2,294 mgd being fresh water and 213 mgd considered saline water. Additionally, approximately 229 mgd of reclaimed water were used, primarily for landscape irrigation and, to a lesser extent, industrial and power generation uses.

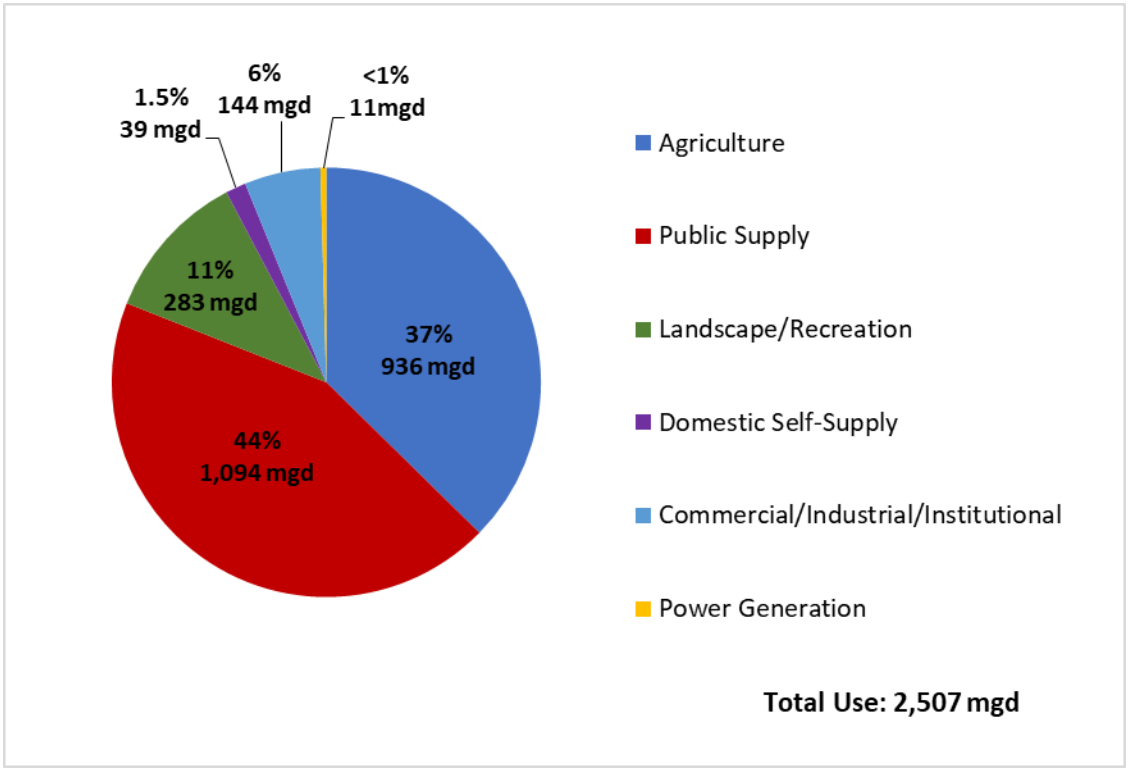

Figure ES-1. Percent Water Use by Category

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ACRONYMS AND ABBREVIATIONS

AG	Agriculture
CII	Commercial/Industrial/Institutional
D&I	Diversion and Impoundment
District	South Florida Water Management District
DSS	Domestic Self-Supply
EAA	Everglades Agricultural Area
FDEP	Florida Department of Environmental Protection
L/R	Landscape/Recreation
mgd	million gallons per day
mg/L	milligrams per liter
PCUR	per capita use rate
PG	Power Generation
PS	Public Supply
SFWMD	South Florida Water Management District

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INTRODUCTION

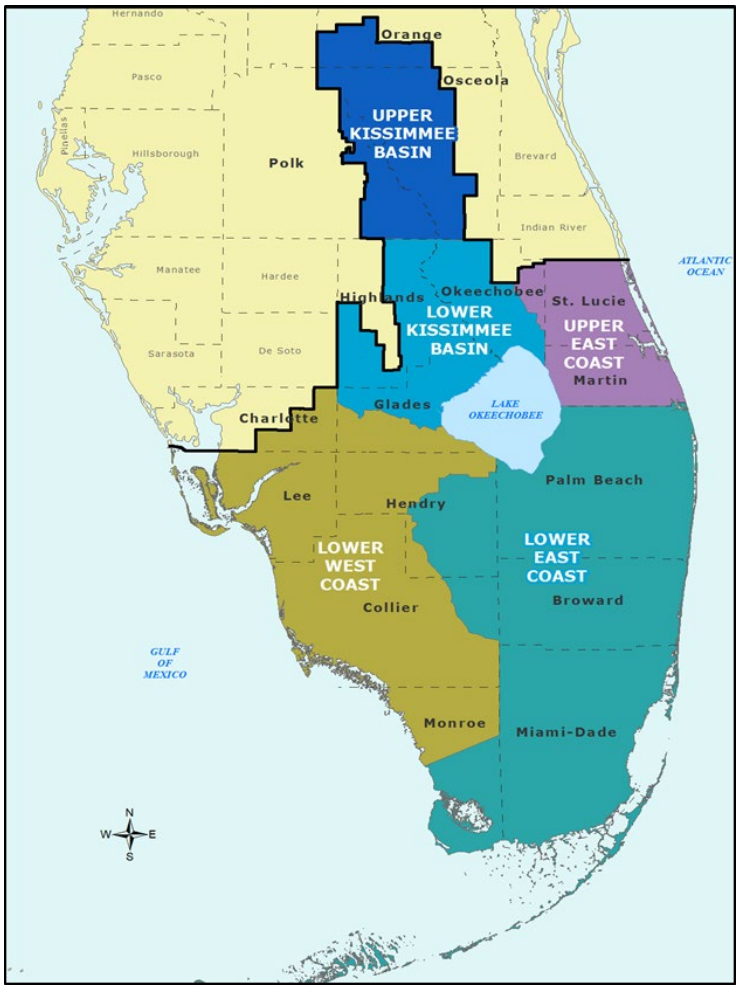
The South Florida Water Management District (SFWMD or District) is a regional government agency responsible for managing and protecting the water resources of South Florida by balancing and improving water quality, flood control, natural systems, and water supply. The District encompasses all or part of 16 counties from Orlando to the Florida Keys and serves a population of approximately 9 million residents. Created in 1949, it is the oldest and largest of the state's five water management districts. Among other duties, water management districts are responsible for water use permitting and water supply planning within their jurisdictional areas.

This report compiles estimated water use within the District for calendar year 2020. Water use is defined as any consumptive use of water that reduces the supply from which it is withdrawn or diverted. This report is a complement to the SFWMD's regional water supply plans, which capture current and projected water use, and to periodic water use reports prepared by the United States Geological Survey (Marella 2014, 2015; Marella and Dixon 2018). This report is based primarily on water pumpage records reported pursuant to water use permitting requirements. However, because a moderate portion (19%) of the overall volume was estimated, rather than reported, this report is called the *Estimated Water Use Report*. This report is an important source of data and information to support the SFWMD's water resource programs and initiatives, including water supply planning, water use permitting, and water conservation.

This report documents the SFWMD's assessment of total water use. Estimated amounts are based on best available data at the time of publication. The document is not intended to comprehensively account for all water used or conveyed within the District (e.g., for flood control, natural systems, water quality treatment).

GEOGRAPHIC DESCRIPTION

The District encompasses more than 18,000 square miles in all or part of 16 counties of central and southern Florida. To manage water supply and plan for current and future water uses, the District is geographically divided into five planning areas (**Figure 1**). These regions are home to many permanent and seasonal residents in addition to a large tourist industry, a significant agricultural industry, and a growing industrial and commercial sector. Several major natural systems are located within the District, including the Upper Chain of Lakes, Kissimmee River and floodplain, Lake Okeechobee, Caloosahatchee River and Estuary, St. Lucie River and Estuary, Big Cypress National Preserve, Everglades water conservation areas, Everglades National Park/Florida Bay, and Biscayne National Park.



Upper Kissimmee Basin: Portions of Osceola, Orange, and Polk counties

Lower Kissimmee Basin: Portions of Okeechobee, Highlands, and Glades counties

Upper East Coast: Martin and St. Lucie counties and a portion of eastern Okeechobee County

Lower East Coast: Palm Beach, Broward, and Miami-Dade counties and portions of Monroe, Collier, and Hendry counties

Lower West Coast: Lee County, most of Collier County, and portions of Glades, Hendry, Monroe, and Charlotte counties

Figure 1. Water Supply Planning Areas

WATER USE PERMITTING AND REPORTING

Ensuring an adequate supply of water to protect, enhance, and restore natural systems and to meet all other existing and projected needs is a fundamental element of the SFWMD's mission. The District has adopted rules for regulating the use of water as contained in Chapter 40E-2, Florida Administrative Code, including the *Applicant's Handbook for Water Use Permit Applications* (Applicant's Handbook; SFWMD 2021). Uses exempt from permitting include indoor domestic use at a single-family or duplex dwelling, water used for firefighting purposes, the use of seawater, and the use of reclaimed water. The SFWMD issues two types of permits based primarily on the quantity of water required: Individual and General (both by rule and noticed). Individual permits normally are those allocating at least 0.10 million gallons per day (mgd) of water (averaged annually). Regional exceptions exist, such as the South Dade Agricultural Area, where Individual permits are issued for allocations of at least 0.30 mgd, and the Lower West Coast Planning Area, where Individual permits are issued for groundwater allocations of at least 0.01 mgd. General permits by rule include landscape irrigation at a single-family dwelling or duplex, on-site short-term dewatering, and closed-loop systems. Noticed General permits typically are for water users consuming less than 0.10 mgd that meet certain other requirements. Users with General permits (whether by rule or noticed) are not required to account for or report their water use.

Users with Individual permits typically are required to account for their water use and report a monthly volume used to the SFWMD. They are required to have a reliable, repeatable water use accounting system to record water use from all withdrawal facilities. For pumped systems, acceptable water use accounting systems include calibrated flowmeters or clocks that totalize pump operation. For gravity flow systems, acceptable accounting methods include the use of rated water control structures in conjunction with certified structure rating curves. Water use accounting and calibration methods must be submitted as part of the permit application. Prior to using any authorized facility, the approved water use accounting method must be operating and the initial calibration must be submitted to the SFWMD. Recalibration results for the water use accounting method are required every 5 years (from the date of last calibration).

For this report, water use under 20,332 permits was evaluated for calendar year 2020. In addition, there are 1,500 active permits for dewatering and 381 active permits for heating/cooling pools and air conditioning units. These 381 permittees recirculate water in such a way that there is no net consumption (closed-loop system); therefore, these permits were not included in the total use estimates. Another 111 permits for surface water within the boundaries of the Everglades Agricultural Area (EAA) were evaluated holistically and are discussed separately. Finally, 17 permits classified as "other" that cumulatively contribute a negligible volume (less than 0.27 mgd) were disregarded.

WATER USE ESTIMATION METHODOLOGY

The most accurate way to determine the amount of water used each year would be to total the annual water use of every user. However, as noted previously, not all water users are required to account for and report their annual use, and some users had not reported their water use at the time of this report. Recognizing these data deficiencies, this report utilized water use information from water users that reported in 2020 and estimated the amount of water used by those who did not or do not report.

The specific water demands of each permittee are evaluated at the time of permit application, and each permittee has a calculated maximum volume of water allowed for use (i.e., a permit allocation). Water use permits typically are issued for a 20-year duration, and account for projected increases in population or irrigated acreages over that period. The annual permit allocation is determined by calculating the quantity of water to be withdrawn over a 12-month period under 1-in-10-year drought conditions for the associated use category. For agriculture and landscape users, it is the amount of water a crop or the landscape needs to supplement the rainfall received during 1-in-10-year drought conditions. For other use categories, it is the quantity of water required by each component of demand for the particular use, which may include factors such as treatment losses; other sources of water; conservation practices; and water purchased, sold, or transferred. It is important to understand that the allocated permit volume for most categories is the water volume required by those users during 1-in-10-year drought conditions over the duration of the permit. Therefore, during 1-in-10-year drought conditions Districtwide, the total water use for the District should be approximately the sum of all permit allocations (assumes all acreage is planted, projected population is being served, and drought conditions persist for the entire year). Water use in 2020 was less than the amount allocated in permits.

The ratio of reported use to the permit allocation (referred to herein as the allocation utilization ratio) was used as an analogue to obtain an estimate of use for permittees who did not report or were not required to report. The estimation process used in this 2020 report was the same as the 2019 and 2018 report process. Each permit's allocation utilization ratio (of those that reported) was calculated. For each water use category, outlier ratios less than the 10^{th} percentile and greater than the 90^{th} percentile were removed, and the remainder were averaged to calculate the allocation utilization ratios for each water use category. Using a combination of reported and estimated water use for each permittee, the total amount of water used for each use category was estimated. Further information on specific methods by use category is provided later in this document.

WATER SOURCES

This report estimates the volume of water withdrawn or diverted from groundwater and surface water sources. Reported pumpage data were ascribed to specific water sources (i.e., groundwater or surface water). All estimated data were assigned a source based on their related facility types. Permittees exclusively using pumps to extract water were assigned as surface water users, and those exclusively using wells were designated as groundwater users. If a permittee has both pumps and wells, the estimated volumes were split proportionally between surface water and groundwater sources using the average ratio of groundwater to surface water reported by permittees with both groundwater and surface water facilities for each use class. If only a small number of permittees with both types of facilities in a particular use class reported, then the average ratio for all reported permits was used. Some permits employ "recharge" facilities (almost exclusively groundwater sources), which provide recharge water to surface water bodies to be repumped, mostly for irrigation use. In those cases, to avoid double counting, the volume from the groundwater source was subtracted from the volume delivered for irrigation to obtain an adjusted volume attributed to the surface water body.

As stated earlier, the use of reclaimed water is not regulated by water management districts. However, reclaimed water use is a key component of water resource management. The beneficial use of reclaimed water for irrigation and other uses has partially reduced the need for surface water and groundwater sources. Reclaimed water data are compiled separately in this report based on inventories produced by the Florida Department of Environmental Protection (FDEP) from data submitted by utilities. Some permits contain supply sources that are used for blending with reclaimed water or as a backup supply should reclaimed water become unavailable. Permittees with these permit types that did not report water withdrawals were assumed to have met all their water demands with reclaimed water and were not estimated individually. When reclaimed water was partially used (reported) by a permittee, only the volume from the groundwater or surface water source was counted (in the estimation report) to avoid double counting the reclaimed water volumes. Additional information on sources is provided under individual use categories later in this report.

WATER QUALITY

Water use estimates contained in this report are divided into fresh water and saline water. For the purposes of this report, the following terms and definitions from the Applicant's Handbook (SFWMD 2021) are used to define different water qualities:

- ***Fresh water*** is water with a chloride concentration ≤250 milligrams per liter (mg/L)
- ***Saline water*** is water with a chloride concentration between 250 and 19,000 mg/L
- ***Seawater*** or ***Saltwater*** is water with a chloride concentration ≥19,000 mg/L

In general, freshwater sources in the District include the Upper Floridan aquifer in the Upper and Lower Kissimmee Basin planning areas; the surficial aquifer system in the Upper East Coast Planning Area; the Biscayne aquifer in the Lower East Coast Planning Area; the Lower Tamiami, Water Table, Mid-Hawthorn and Sandstone aquifers in the Lower West Coast Planning Area; and surface water upstream of coastal salinity water control structures. Saline water sources in the District include the Floridan aquifer system in the Upper East Coast, Lower East Coast, and Lower West Coast planning areas, while seawater sources include the Atlantic Ocean and Gulf of Mexico as well as connected tidal water bodies. Saline water and saltwater sources require blending with freshwater sources or desalination treatment prior to use as potable water or for irrigation. Only a small fraction of permits require water quality testing to determine salinity. Therefore, the volumes reported as saline water are mostly for permits known to require treatment or blending from known saline sources, primarily in the Public Supply water use category and to a lesser extent the Landscape/Recreation and Agriculture water use categories. If the salinity of the source water and treatment/blending requirements are unknown, the water quantities are classified as fresh.

WATER USE CATEGORIES

Water use estimates in this report were developed for the following six water use categories established by the FDEP in collaboration with the state's five water management districts for use in water supply planning:

- Public Supply (PS)
- Domestic Self-Supply (DSS)
- Commercial/Industrial/Institutional (CII)
- Agriculture (AG)
- Landscape/Recreation (L/R)
- Power Generation (PG)

PS includes treated potable water provided to some of the other use categories within a utility's service area boundaries. The other categories include self-supplied users that are separately permitted and do not receive water from a utility but rather have their own water supply withdrawal facilities (e.g., wells, pumps, structures). These water supply categories are not identical to the use classes utilized in permitting. As a result, permitting use classes were combined in some cases to develop the water use estimate for the water supply categories used in this report.

Dewatering activities are not included in this report. Dewatering involves pumping water from an area to produce a dry working condition and includes withdrawals of water for construction activities, some mining operations, and minor uses such as exploratory testing, short-term remedial action plans, and aquifer performance tests. Water from dewatering activities normally is required to be retained on site such that losses are limited to evaporation, which are considered minimal compared to the volumes pumped. Furthermore, permits for dewatering are not given allocations (although General permits must comply with daily and annual withdrawal limits), and permittees generally are not required to report water use to the SFWMD.

Additionally, there are 381 permits classified as industrial that use wells for their geothermal properties and are not included in this report. These "closed-loop" applications include air conditioning and swimming pool temperature regulation, which extract groundwater, pass it through a heat exchange unit, and then reinject the warm or cool water back into the ground. The result of the closed-loop system operation effectively is a zero-balance withdrawal. Recent changes to water use rules have made these types of systems a "no notice" permit such that they are no longer issued a permit number or tracked.

Diversion and Impoundment (D&I) permits usually are for large parcels of land that contain smaller users within their boundaries. These permittees divert surface water through pumps or control structures or divert a combination of surface water and groundwater into a conveyance canal network, to provide for the demands of secondary users as well as consumptive and non-consumptive uses. Within the District, there are 47 D&I permits. There are 26 D&I permits outside of the EAA that exclusively serve agriculture, and 2 permits that partially serve agriculture. The estimated volumes for these permits are included in the AG category. In addition, there are 9 D&I permits within the EAA whose water use is accounted for in the EAA estimate described later in this report. Finally, 10 D&I permits are primarily for recharging aquifer and canal networks, hydrating wetlands, maintaining salinity barriers along the coast, or providing fire protection and were not included in the water use estimates of this report.

2020 WEATHER

During calendar year 2020, the District received 60.53 inches of rainfall. Average historical (1915 to 2020) annual rainfall within the District is 52.23 inches. **Figure 2** presents the annual deviation from average rainfall over the past century. From 2010 to 2020, average annual rainfall within the District varied by 16.6 inches; the driest year was 2018 with 47.08 inches and the wettest year was 2017 with 63.68 inches. However, a Districtwide average number does not tell the whole story as rainfall varies not only by year but also by month and location. The District typically receives two-thirds of its annual rainfall between May and October (**Figure 3**). Remarkably, March 2020 was the driest March ever recorded at 0.25 inches (monthly average for March is 2.70 inches) while November 2020 was nearly the wettest November ever recorded at 6.39 inches (wettest was 6.46 in 1998). **Figure 4** presents the rainfall amounts received in each basin within the District during 2020. Note that **Figure 4** uses a 30-year annual rainfall average (not the historical average) of 52.59 inches related to percent and inches deviation from "average."

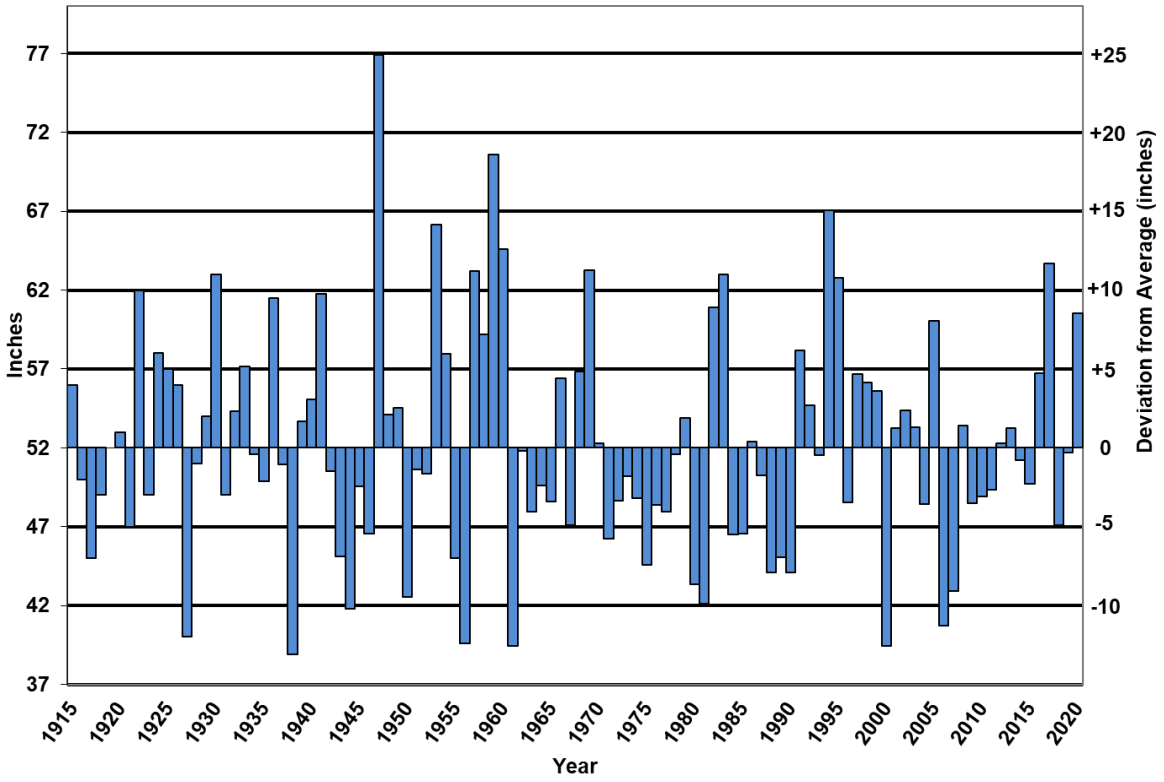


Figure 2. SFWMD Annual Difference from Average Rainfall (1915-2020)

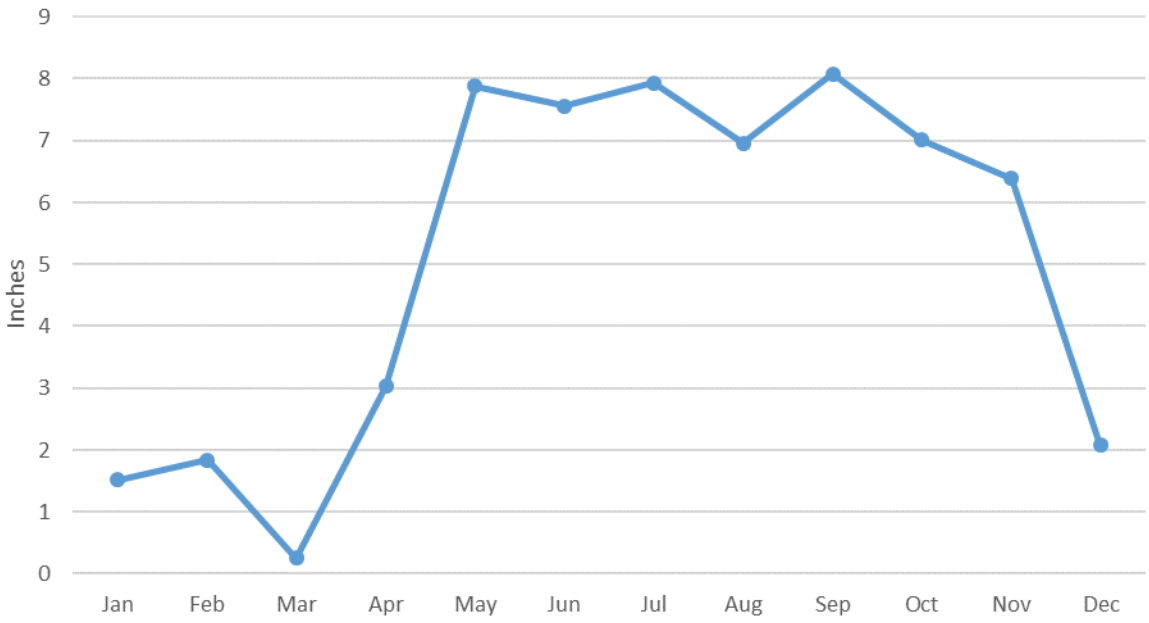


Figure 3. 2020 Average District Monthly Rainfall Distribution

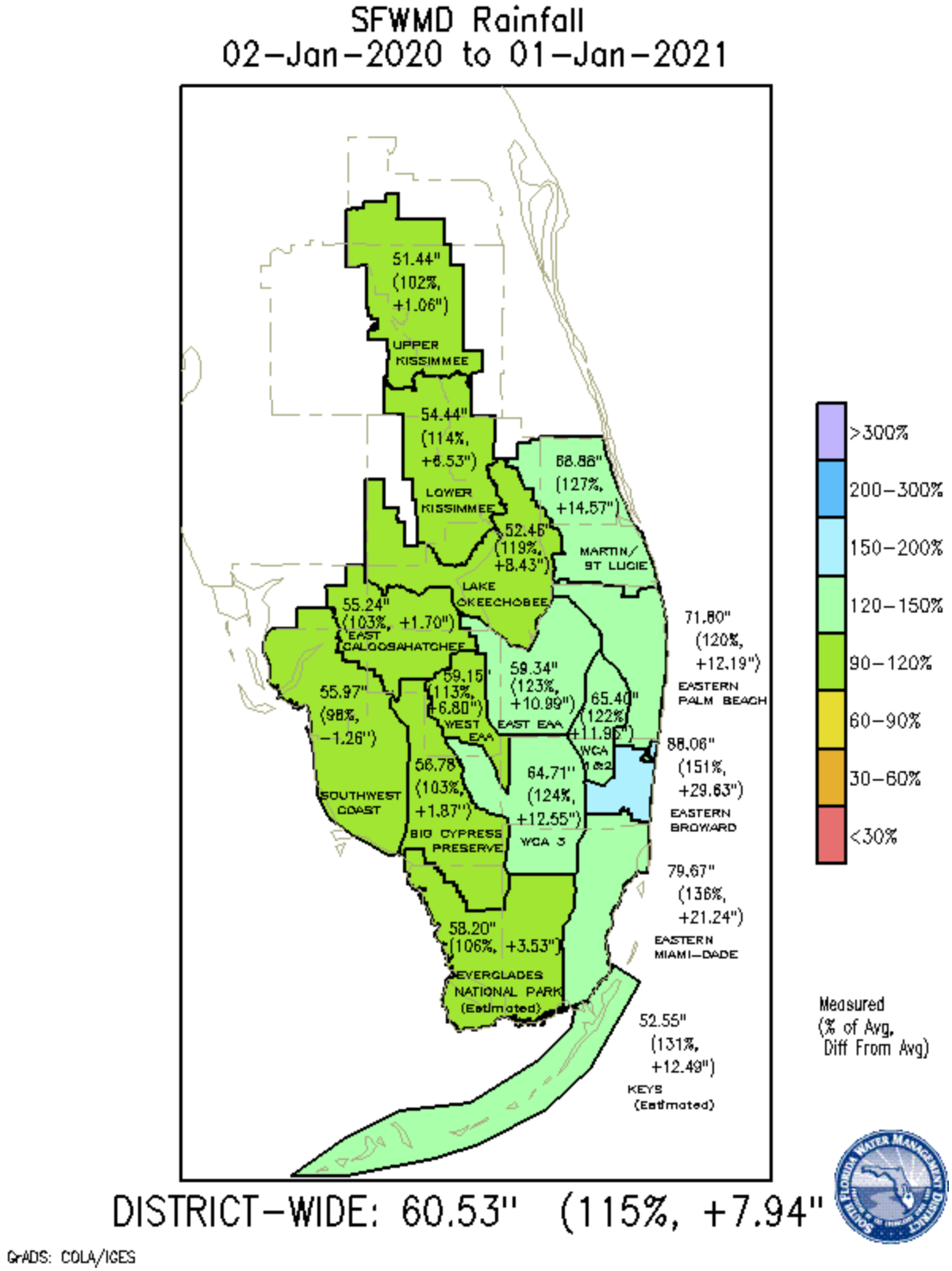


Figure 4. SFWMD 2020 Rainfall Distribution Map Compared to 30-Year Historical Average

DATA SOURCES

The primary sources of data for this report are permittee-reported monthly pumpage volumes recorded in the SFWMD's regulatory database (RegDB). Quarterly or semi-annual reporting of monthly data generally is required for all permittees with permit allocations of 0.10 mgd or greater. Monthly pumpage data are collected using calibrated flowmeters or other approved water use accounting methods as discussed earlier. Water use was estimated for permittees who had not reported based on the assumptions described in the *Water Use Estimation Methodology* section earlier and in the specific use category sections that follow. Rainfall data were provided by the SFWMD's Operations Section.

For this report, data for all use categories were obtained for active permits from January 1, 2020 through December 31, 2020. Analysis of reported water use was performed by specialists within the SFWMD's Water Supply Bureau to compile the best available data. Work on this report typically begins in September, which allows time for the SFWMD's Water Use Bureau to receive semi-annual data (June reporting of December data) and to contact permittees regarding absent and outlier data. For this report, the SFWMD's Water Supply Bureau must do additional manipulation and validation of the data to determine the surface water to groundwater and saline to freshwater source ratios. Water use estimates in this report are based on a final RegDB query performed on January 11, 2022 (subsequent revisions to PS and L/R data were made in September 2022). The SFWMD cannot guarantee the validity of the reported data or that permittees have used consistent measurement techniques or quality control standards in their data collection and reporting. Additionally, data sources used for this report may be updated after publication.

2020 ESTIMATED WATER USE BY CATEGORY

Water use was estimated by category from fresh, saline, and reclaimed water sources and reported as an average (in mgd, unless noted otherwise).

Public Supply

Water withdrawn, treated, and delivered to service areas within the SFWMD by privately and publicly owned water supply utilities (or systems) is defined as Public Supply (PS). This encompasses water supplied by water treatment facilities for potable use (i.e., drinking quality) with projected average pumpage rates of 0.10 mgd or greater. The reported volumes represent gross (raw) water withdrawn before treatment and distribution losses. In 2020, there were 122 active PS permits (0.10 mgd or greater) serving an estimated 8.43 million people (95% of the total District population). PS utilities and individuals using less than 0.10 mgd are included in the DSS category described later. PS demand often fluctuates during the year in response to seasonal rainfall and variations in temperature as well as seasonal and tourist populations. For 2020, the total water use for PS was 1,094 mgd, with 84% coming from freshwater sources and 16% coming from saline water sources. Groundwater sources contributed 97% of the water, and surface water bodies accounted for the remaining 3%. **Table 1** presents total PS category water use Districtwide and by county for fresh and saline water from groundwater and surface water sources.

Table 1. Public Supply (in mgd)[1]

County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Number of Permits
Broward	216.00	12.62	0.00	228.62	**228.62**	26
Charlotte	0.25	0.00	0.00	0.25	**0.25**	3
Collier	39.46	15.20	4.85	49.81	**54.66**	9
Glades	0.53	0.00	0.00	0.53	**0.53**	2
Hendry	0.68	3.25	0.00	3.93	**3.93**	3
Highlands	0.29	0.00	0.00	0.29	**0.29**	2
Lee	15.88	58.02	0.99	72.91	**73.90**	13
Martin	8.11	12.47	0.00	20.58	**20.58**	8
Miami-Dade	336.11	15.62	0.00	351.73	**351.73**	7
Monroe[2]	0.00	0.00	0.00	0.00	**0.00**	0
Okeechobee	2.96	0.00	0.00	2.96	**2.96**	2
Orange	27.99	5.20	0.00	33.19	**33.19**	4
Osceola	46.57	0.00	0.00	46.57	**46.57**	8
Palm Beach	212.49	27.51	27.03	212.97	**240.00**	20
Polk	2.48	0.00	0.00	2.48	**2.48**	6
St. Lucie	7.42	26.96	0.00	34.39	**34.39**	9
Total	**917.23**	**176.85**	**32.87**	**1,061.21**	**1,094.09**	**122**

[1] Values are only for the portions of the counties located within the SFWMD.

[2] The Florida Keys Aqueduct Authority (FKAA) serves the Florida Keys in Monroe County. Because the FKAA's wellfields are located in Miami-Dade County, the volume delivered to Monroe County (18.44 mgd of groundwater [17.26 mgd fresh and 1.18 mgd saline]) is included in the Miami-Dade County totals.

Domestic Self-Supply

Domestic Self-Supply (DSS) is primarily for individual residences in rural areas without access to a PS system, and often is provided by small, shallow private wells. Domestic consumption at single-family and duplex residences is exempt from water use permitting and reporting. Landscape irrigation at a single-family dwelling or duplex is granted a General permit by rule. For reporting purposes, the DSS category includes small PS utilities and users providing potable water withdrawing less than 0.10 mgd. These typically serve a limited number of households (e.g., a small subdivision or mobile home park). Other small self-supply permits classified as public supply are for domestic indoor use (and possibly landscape irrigation) at a single structure such as a sales trailer, small office, or convenience store. There were 1,028 permits for public supply with an allocation less than 0.10 mgd in 2020.

Because DSS residential users are not required to report their use, estimations for the DSS category are based on county population data and the PS per capita use within each county. The DSS demand estimate was calculated by multiplying the 2020 DSS county populations by the 2020 PS Districtwide uniform residential per capita use rate (PCUR), which was derived from water use reported by utilities to the SFWMD as part of the annual reporting required pursuant to Section 373.709(6), Florida Statutes. **Appendix A** contains further information regarding population, PCURs, and DSS use calculations.

The 2020 total water use for DSS was estimated to be 38.61 mgd, with 100% coming from fresh groundwater sources. **Table 2** presents total DSS category water use Districtwide and by county for fresh and saline water from groundwater and surface water sources.

Table 2. Domestic Self-Supply (in mgd)[1]

County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Number of Permits[2]
Broward	0.87	0.00	0.00	0.87	**0.87**	24
Charlotte	0.01	0.00	0.00	0.01	**0.01**	12
Collier	4.38	0.00	0.00	4.38	**4.38**	63
Glades	0.44	0.00	0.00	0.44	**0.44**	34
Hendry	1.24	0.00	0.00	1.24	**1.24**	74
Highlands	1.29	0.00	0.00	1.29	**1.29**	25
Lee	12.86	0.00	0.00	12.86	**12.86**	134
Martin	0.66	0.00	0.00	0.66	**0.66**	95
Miami-Dade	1.81	0.00	0.00	1.81	**1.81**	101
Monroe	0.00	0.00	0.00	0.00	**0.00**	0
Okeechobee	1.33	0.00	0.00	1.33	**1.33**	77
Orange	4.22	0.00	0.00	4.22	**4.22**	10
Osceola	0.49	0.00	0.00	0.49	**0.49**	87
Palm Beach	5.85	0.00	0.00	5.85	**5.85**	138
Polk	0.70	0.00	0.00	0.70	**0.70**	23
St. Lucie	2.45	0.00	0.00	2.45	**2.45**	131
Total	**38.61**	**0.00**	**0.00**	**38.61**	**38.61**	**1,028**

[1] Values are only for the portions of the counties located within the SFWMD.
[2] Public supply permits less than 0.10 mgd.

Commercial/Industrial/Institutional

The Commercial/Industrial/Institutional (CII) category consists of self-supplied water consumed by business operations. Industrial uses include processing and manufacturing, dust control, maintenance, cleaning, and washing. Groundwater remediation projects also are classified as an industrial use. However, remediation projects that reinject treated water back into the same aquifer are not included in this report. Commercial facilities under the CII category include office complexes, hotels, restaurants, gas stations, car washes, laundromats, theme parks, and zoos, among others. Some larger institutions such as schools, hospitals, and prisons also are included in the CII category primarily for heating, ventilation, and air conditioning (HVAC) system operations. Water use for CII facilities receiving water from PS utilities (i.e., not self-supplied) are included in the PS category. CII does not include water used for power generation.

Mining is included in the CII use category. The mining uses reported herein include dust suppression, non-recycled water use as part of on-site mining processes, water entrained within commercial products, and minor volumes for potable/sanitary use by on-site employees. The volumes reported do not include recycled surface water or dewatering volumes, which are separately permitted under the dewatering use class and not included in this report.

The average allocation utilization ratio of reporting CII permits was 30% after removing permits below the 10th percentile and above the 90th percentile. Water use for CII permits that did not report

in 2020 was estimated by multiplying the average allocation utilization ratio of 30% by the permit allocations.

The CII category includes 22 mining and 64 industrial permits that have an allocation of 0.10 mgd or greater, and 570 permits with an allocation less than 0.10 mgd. The total 2020 water use for CII was 143.78 mgd, with fresh groundwater contributing 56% and fresh surface water contributing 44%. Industrial use accounted for 55.31 mgd (38%) and mining use accounted for 88.46 mgd (62%) of the total CII use. **Table 3** presents total CII category water use Districtwide and by county for fresh and saline water from groundwater and surface water sources. Further detail is provided in **Appendix B**.

Table 3. Commercial/Industrial/Institutional (in mgd)[1]

County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Number of Permits
Broward	2.82	0.00	0.10	2.72	**2.82**	86
Charlotte	0.07	0.00	0.01	0.06	**0.07**	9
Collier	7.52	0.00	6.84	0.68	**7.52**	59
Glades	20.08	0.00	19.86	0.22	**20.08**	13
Hendry	6.28	0.00	1.71	4.58	**6.28**	49
Highlands	1.47	0.00	0.00	1.46	**1.47**	15
Lee	11.79	0.00	11.39	0.40	**11.79**	86
Martin	5.16	0.00	0.11	5.05	**5.16**	38
Miami-Dade	73.25	0.00	20.16	53.10	**73.25**	85
Monroe	0.00	0.00	0.00	0.00	**0.00**	1
Okeechobee	3.94	0.00	1.95	1.98	**3.94**	24
Orange	2.23	0.00	0.00	2.23	**2.23**	13
Osceola	0.11	0.00	0.00	0.11	**0.11**	23
Palm Beach	8.77	0.00	1.71	7.07	**8.77**	118
Polk	0.00	0.00	0.00	0.00	**0.00**	1
St. Lucie	0.29	0.00	0.08	0.21	**0.29**	36
Total	**143.78**	**0.00**	**63.92**	**79.86**	**143.78**	**656**

[1] Values are only for the portions of the counties located within the SFWMD.

Agriculture

The Agriculture (AG) category includes water used for commercial crop irrigation, nurseries, livestock watering, pasture, and aquaculture. AG estimates were based on the methodology described in the *Water Use Estimation Methodology* section earlier in this report, with the following exceptions:

- For the agriculture permitting use class, 673 users in all 5 planning areas of the SFWMD reported. The reported water use to permitted allocation ratios were determined by water supply planning area to take regional weather effects into account. Statistical analysis (the Mann-Whitney *U* test) supported using unique allocation utilization ratios for each planning area rather than a single ratio for the entire use category. The AG allocation utilization ratios for each planning area are as follows:
    - Upper Kissimmee Basin – 10.7%
    - Lower Kissimmee Basin – 12.6%

    - Upper East Coast – 11.9%
    - Lower West Coast – 21.3%
    - Lower East Coast – 25.0%

- For the aquaculture permitting use class, 5 out of 81 users in 2 of the 5 planning areas reported. Permittees that did not report were estimated using an allocation utilization ratio of 19.6% based on the permittees that did report.
- For the nursery permitting use class, 43 out of 893 users in all 5 planning areas reported. Permittees that did not report were estimated using an allocation utilization ratio of 44.1% based on the permittees that did report.
- For the livestock permitting use class, 10 out of 620 users in 3 of the 5 planning areas reported. Permittees that did not report were estimated using an allocation utilization ratio of 61.2% based on the permittees that did report.

The AG category is made up of 4,078 permits, including 2,343 for agriculture, 895 for nursery, 620 for livestock, 81 for aquaculture, 28 D&I permits that serve agricultural operations, and the EAA represented by 1 "permit" (which includes 111 permitted AG and other users).

Everglades Agricultural Area (EAA)

The EAA is located south of Lake Okeechobee and was created from drainage of the northern Everglades. The EAA is composed primarily of highly productive agricultural land and land used by the SFWMD for water storage and treatment (e.g., stormwater treatment areas). The agricultural land is mostly sugarcane interspersed with winter vegetables, sod, and rice. The EAA extends south from Lake Okeechobee to the northern levee/boundary of Water Conservation Area 3A, from its eastern boundary at the L-8 Canal to the western boundary along the L-1, L-2, and L-3 levees. Four major canals (West Palm Beach, Hillsboro, North New River, and Miami) pass through the EAA and supply agricultural irrigation water, mainly through gravity release from Lake Okeechobee. The primary irrigation method in the EAA is seepage irrigation. Farmers use secondary and tertiary canals to distribute surface water from gated culverts and pumps to their respective fields. Daily records of the water volumes from Lake Okeechobee into and out through primary canals are kept such that a surface water demand volume for the area can be estimated using a water balance method. The SFWMD's Everglades Technical Support Bureau produces flow volume data sets for this area (to be used in the EAA Regulatory Model as part of the annual total phosphorus load compliance assessment required by Chapter 40E-63, Florida Administrative Code), from which the irrigation water volume can be calculated. In calendar year 2020, 264 mgd of water were used by 473,776 acres of the EAA. This acreage excludes lands that were part of the historical EAA acreage and are currently used by the District for water storage and treatment (**Figure 5**). For more information regarding the EAA Regulatory Model, please refer to Chapter 4, Appendix 4-1 of the South Florida Environmental Report, which is published annually and available on the SFWMD's website.

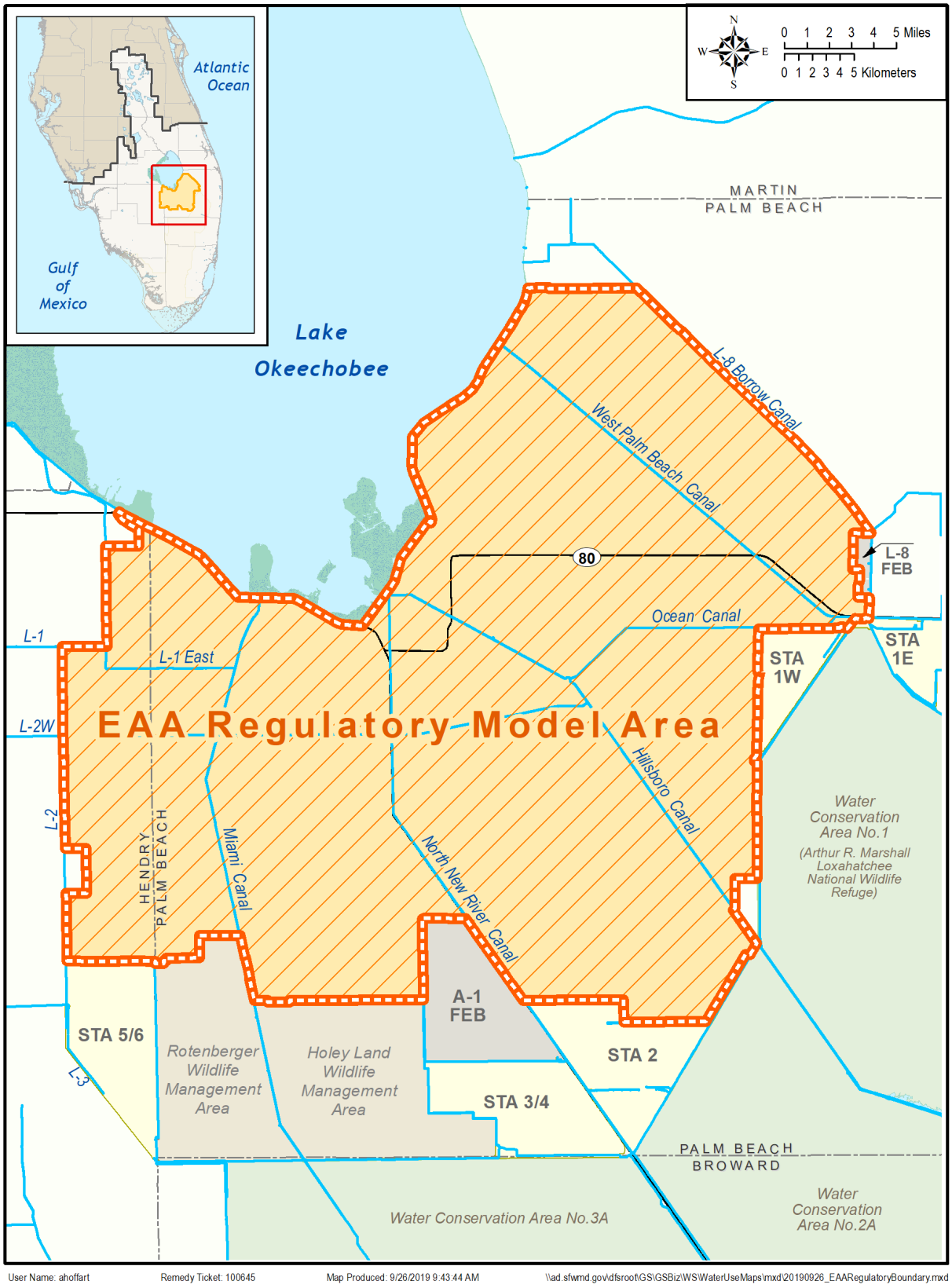


Figure 5. Map of the Everglades Agricultural Area Regulatory Model Area

Within the EAA Regulatory Model area, there are 3 agricultural permits in Hendry County and 84 permits in Palm Beach County using surface water sources. There is 1 D&I permit in Hendry County and 8 D&I permits in Palm Beach County. The D&I permits are primarily for agricultural land, but 3 permits also include residential and commercial areas (e.g., the towns of Canal Point, Pahokee, Belle Glade, and South Bay). Also included in this surface water delivery volume are 13 permits for industrial operations, 8 permits for landscape irrigation, 1 for livestock water use, and 2 for nursery irrigation. Agricultural permits within the EAA that only draw from groundwater sources are not included in this estimated volume but are included in the overall AG water use estimates. For simplification, the irrigation water volume for permittees located within the EAA Regulatory Model area are reported as being in Palm Beach County.

The total 2020 water use for AG, including the EAA, was 936.48 mgd. Of this total volume, agriculture (crop irrigation) outside the EAA accounted for 493.79 mgd (52.7%); agriculture within the EAA was 263.57 mgd (28.1%); agriculture within D&I areas was 148.28 mgd (15.8%); and aquaculture, livestock, and nursery combined were 30.84 mgd (3.3%). Water was derived from 67% surface water and 33% groundwater sources and from 98.2% fresh water and 1.8% saline water sources. **Table 4** presents total AG category water use Districtwide and by county for fresh and saline water from groundwater and surface water sources. Further detail is provided in **Appendix B**.

Table 4. Agriculture (in mgd)[1]

County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Number of Permits
Broward	1.65	0.00	1.16	0.48	**1.65**	108
Charlotte	3.78	2.92	1.22	5.49	**6.71**	22
Collier	82.47	0.00	1.79	80.68	**82.47**	178
Glades	60.08	2.76	52.25	10.60	**62.84**	161
Hendry	279.81	0.00	174.25	105.55	**279.81**	302
Highlands	47.88	0.00	20.50	27.38	**47.88**	208
Lee	18.82	0.00	4.19	14.63	**18.82**	338
Martin	51.80	0.07	48.40	3.48	**51.88**	237
Miami-Dade	23.52	1.94	0.75	24.71	**25.46**	1111
Monroe	0.01	0.00	0.00	0.01	**0.01**	1
Okeechobee	15.84	0.00	5.08	10.76	**15.84**	284
Orange	0.11	0.00	0.01	0.10	**0.11**	24
Osceola	10.76	0.00	1.76	9.00	**10.76**	141
Palm Beach	284.61	0.00	280.40	4.21	**284.61**	557
Polk	1.82	0.00	0.93	0.89	**1.82**	32
St. Lucie	36.28	9.56	30.93	14.91	**45.84**	374
Total	**919.22**	**17.26**	**623.61**	**312.87**	**936.48**	**4,078**

[1] Values are only for the portions of the counties located within the SFWMD.

Landscape/Recreation

Landscape/Recreation (L/R) is water used for irrigation of golf courses, parks, cemeteries, large common areas (such as homeowners' associations and commercial developments), and other self-supplied irrigation uses with demands of 0.10 mgd or greater. The total volume reflects volumes of permittees who reported plus an estimated volume for permittees who did not report. The average allocation utilization ratios (after removing permits below the 10th percentile and above the 90th percentile) of reporting L/R permits were 50% for landscape and 52% for golf. Water use for L/R permits that did not report in 2020 was estimated by multiplying the average allocation utilization ratios by the permit allocations.

There were 14,047 permits for landscape irrigation and 375 permits for golf courses in 2020. An additional 9 permits, classified as PS, were used for augmentation of reclaimed water (or ther water sources) for landscape irrigation use and are included in the L/R category. Total water use for L/R was 282.86 mgd in 2020. Of this, landscape irrigation accounted for 178.96 mgd (55.6%), golf course irrigation was 96.78 mgd (30.1%), and reclaimed water supplementation for irrigation was 7.12 mgd (2.2%). Surface water was used for 48% of the total water use, and groundwater accounted for the remaining 52%. There were 20 golf and 24 landscape permits, using a total of 10.03 mgd of saline water. **Table 5** presents total L/R category water use Districtwide and by county for fresh and saline water from groundwater and surface water sources. Further detail is provided in **Appendix B**.

Table 5. Landscape/Recreation (in mgd)[1]

County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Number of Permits
Broward	36.74	0.37	24.90	12.21	37.11	2,889
Charlotte	0.97	0.00	0.17	0.81	0.97	10
Collier	57.48	0.25	29.07	28.66	57.73	965
Glades	0.17	0.00	0.08	0.09	0.17	15
Hendry	0.63	0.00	0.18	0.45	0.63	117
Highlands	0.47	0.00	0.21	0.26	0.47	14
Lee	49.78	5.43	23.41	31.81	55.22	2,741
Martin	9.82	0.93	2.85	7.90	10.75	754
Miami-Dade	14.64	0.00	3.76	10.88	14.64	1,242
Monroe	0.72	1.56	0.33	1.95	2.28	3
Okeechobee	1.04	0.00	0.17	0.87	1.04	264
Orange	9.46	0.00	2.34	7.12	9.46	221
Osceola	5.12	0.00	1.63	3.49	5.12	197
Palm Beach	75.51	1.32	42.59	34.25	76.83	4,018
Polk	0.80	0.00	0.00	0.80	0.80	18
St. Lucie	9.47	0.17	3.48	6.16	9.64	963
Total	**272.83**	**10.03**	**135.16**	**147.70**	**282.86**	**14,431**

[1] Values are only for the portions of the counties located within the SFWMD.

Power Generation

Power Generation (PG) is water consumed by power plants for use in the production of electricity. The volume reported is for a variety of on-site uses and does not include once-through cooling water. It can include both fresh and saline water but excludes the use of seawater and reclaimed water sources. The total 2020 water use for PG was 10.98 mgd, with 20% coming from freshwater sources and 80% coming from saline water sources. Groundwater sources contributed nearly all the water, while surface water contributions were negligible. **Table 6** presents total PG category water use Districtwide and by county for fresh and saline water from groundwater and surface water sources.

Table 6. Power Generation (in mgd)[1]

County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Number of Permits[2]
Lee	0.50	0.00	0.00	0.50	**0.50**	2
Martin	0.01	0.00	0.00	0.01	**0.01**	2
Miami-Dade	0.00	8.78	0.00	8.78	**8.78**	3
Osceola	0.13	0.00	0.00	0.13	**0.13**	1
Palm Beach	0.08	0.00	0.00	0.08	**0.08**	4
St. Lucie	1.48	0.00	0.00	1.48	**1.48**	2
Total	**2.20**	**8.78**	**0.00**	**10.98**	**10.98**	**14**

[1] Values are only for the portions of the counties located within the SFWMD.
[2] Power generation facilities are permitted by the FDEP under the Power Plant Siting Act, Sections 403.501-403.518, Florida Statutes.

A substantial volume of saline/ocean water is used for once-through cooling at power plants, primarily in coastal areas of the District. The once-through cooling volumes are considered non-consumptive and are provided herein for informational purposes only. The total 2020 water use reported to the SFWMD for once-through cooling in PG was 3,230 mgd. Of this volume, 3,213 mgd were saline water, and 17 mgd were fresh water. Only 14 mgd of the total water were derived from groundwater, while 3,216 mgd were from surface water sources. The FDEP reported 20.65 mgd of reclaimed water were delivered to "other facilities" (see below), presumed to be power plants.

Reclaimed Water

Reclaimed water is water flowing out of a domestic wastewater treatment facility that has received at least secondary treatment as well as basic disinfection and is reused for some beneficial purpose. The SFWMD requires all applicants for water use permits proposing to irrigate with more than 0.10 mgd of water and applicants within a municipal mandatory reuse zone to use reclaimed water if feasible. However, reclaimed water is not a regulated source for consumptive use. Annual wastewater and reclaimed water volumes are compiled by the FDEP and are reported here for informational purposes. In 2020, 288.14 mgd of reclaimed water were used in the District. Of this, 229.43 mgd were reused for four of the six water supply categories, and 58.71 mgd were reused for groundwater recharge and other non-consumptive water use purposes. **Tables 7** to **9** as well as **Figures 6** and **7** present reclaimed water use by county and use category.

Table 7. Reclaimed Water Use (in mgd) by County and Use Type (FDEP 2021)

County	Reclaimed Water Flow[1]	Commercial/ Industrial/ Institutional[2]	Agriculture[3]	Landscape/ Recreation[4]	Power Generation[5]
Broward	**19.45**	10.09	0.00	9.28	0.08
Charlotte[6]	**0.15**	0.15	0.00	0.00	0.00
Collier	**25.37**	0.00	0.38	24.99	0.00
Glades	**0.00**	0.00	0.00	0.00	0.00
Hendry	**0.00**	0.00	0.00	0.00	0.00
Highlands[6]	**0.00**	0.00	0.00	0.00	0.00
Lee[7]	**44.96**	0.24	0.00	43.71	1.01
Martin	**3.47**	0.15	0.16	3.13	0.03
Miami-Dade	**14.41**	14.41	0.00	0.00	0.00
Monroe	**0.29**	0.02	0.00	0.28	0.00
Okeechobee	**0.00**	0.00	0.00	0.00	0.00
Orange[6,7]	**36.98**	3.22	1.10	32.66	0.00
Osceola[6,7]	**22.77**	0.00	0.52	19.78	2.48
Palm Beach	**57.34**	3.68	0.00	36.61	17.05
Polk[6]	**0.10**	0.00	0.10	0.00	0.00
St. Lucie	**4.13**	0.07	0.00	4.07	0.00
Total	**229.43**	**32.03**	**2.25**	**174.49**	**20.65**

Note: Reclaimed water was not used for Public Supply or Domestic Self-Supply.

[1] Annual average reclaimed water flows as reported in the FDEP 2020 Reuse Inventory (FDEP 2021) from October 1, 2019 through September 30, 2020 and not including 58.71 mgd for groundwater recharge and other non-water-use purposes.

[2] Industrial reuse (excluding power generation).

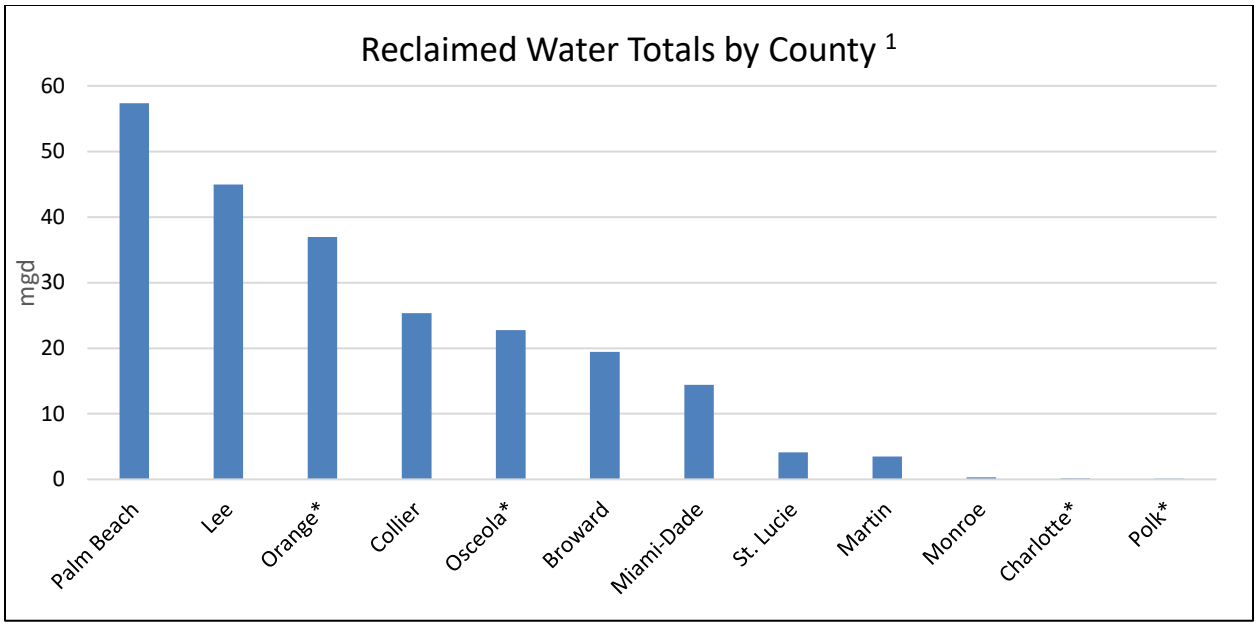
[3] Edible and other crops.

[4] All public access areas and landscape irrigation.

[5] Reclaimed water flow to power generation facilities based on "at other facility" use type in the FDEP 2020 Reuse Inventory (FDEP 2021).

[6] Includes only facilities within the SFWMD.

[7] FDEP 2020 Reuse Inventory (FDEP 2021) data corrected to account for reporting errors.



[1]Counties with 0.0 flow not shown.
*Shows flow for only the portion of the county located within the SFWMD.

Figure 6. Reclaimed Water Use by County

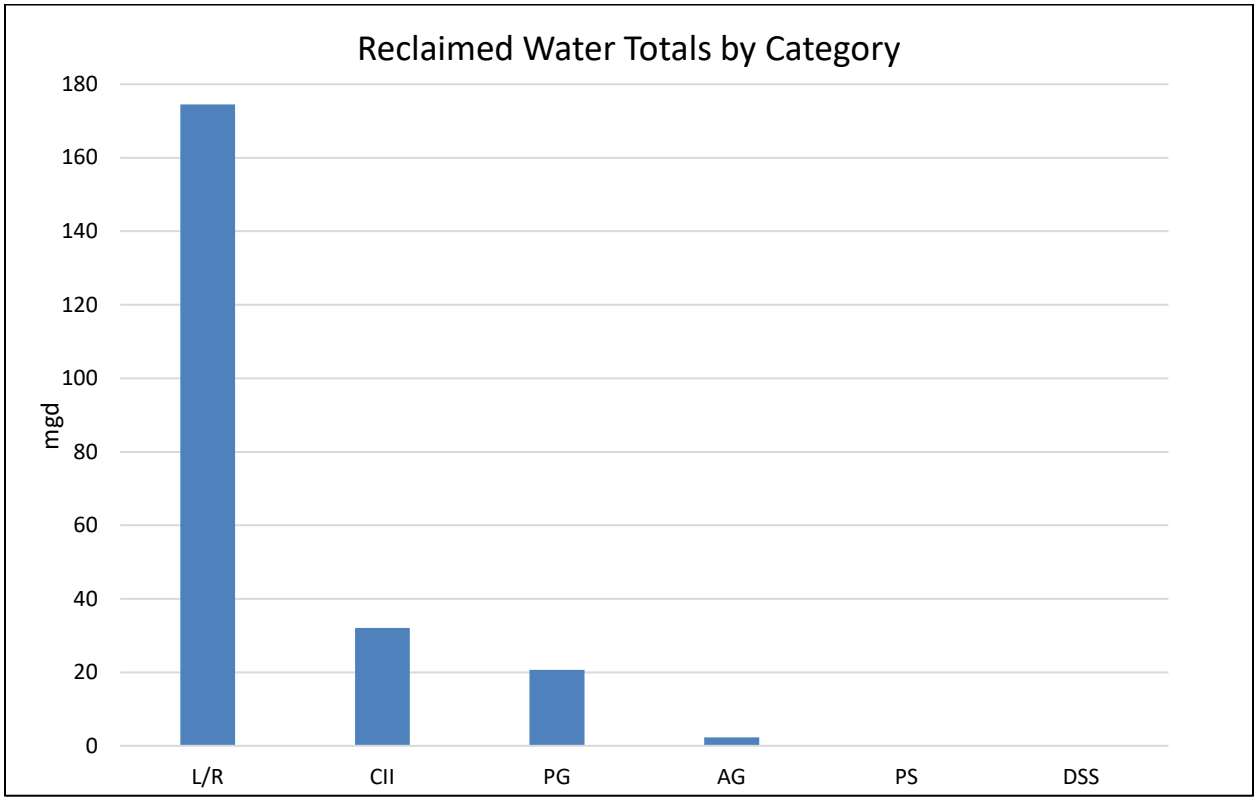


Figure 7. Reclaimed Water Use by Category

SUMMARY OF 2020 ESTIMATED WATER USE

The total amount of water withdrawn from groundwater and surface water resources in 2020 within the District was approximately 2,507 mgd (**Table 8**). The two largest water use categories were PS and AG, using 1,094 mgd and 936 mgd, respectively. These two categories constitute 81% of the total water use. Additionally, of the total water use, 856 mgd (34%) came from surface water bodies, and 1,651 mgd (66%) came from groundwater sources. Approximately 2,294 mgd (92%) were withdrawn from freshwater sources, and 213 mgd (8%) were derived from saline water sources. Reclaimed water use totaled 229 mgd in 2020. Of the total 2,507 mgd, 19% (477 mgd) was estimated, and 81% (2,030 mgd) was derived from reported pumpage (**Appendix C**). PS is the largest use category in Miami-Dade County, while Palm Beach County has the largest estimated AG volume. Palm Beach County also has the greatest use of reclaimed water by volume. A summary of the data presented by water supply planning area is contained in **Appendix D**.

Figure 8 depicts the distribution of total water use (including reclaimed water) by source and category. **Figure 9** depicts the distribution of total water use by category (excluding reclaimed water). **Table 9** presents the breakdown of water use by county and source. **Figure 10** depicts fresh water versus saline water use by county. **Figure 11** depicts surface water versus groundwater use by county. **Table 10** presents water use by county and by use category (excluding reclaimed water).

Table 8. Total Water Use by Category and Source, Including Reclaimed Water (in mgd)

Water Use Category	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Reclaimed Water	**Total Use with Reclaimed Water**
Agriculture	919.22	17.26	623.61	312.87	**936.48**	2.26	**938.74**
Public Supply	917.23	176.85	32.87	1,061.21	**1,094.09**	0.00	**1,094.09**
Landscape/Recreation	272.83	10.03	135.16	147.70	**282.86**	174.51	**457.37**
Domestic Self-Supply	143.78	0.00	63.92	79.86	**143.78**	32.03	**175.81**
Commercial/Industrial/ Institutional	2.20	8.78	0.00	10.98	**10.98**	20.65	**31.63**
Power Generation	38.61	0.00	0.00	38.61	**38.61**	0.00	**38.61**
Total	**2,293.87**	**212.92**	**855.56**	**1,651.23**	**2,506.79**	**229.45**	**2,736.24**

Note: Minor discrepancies in table totals are due to rounding.

Figure 8. Water Use by Source and Category

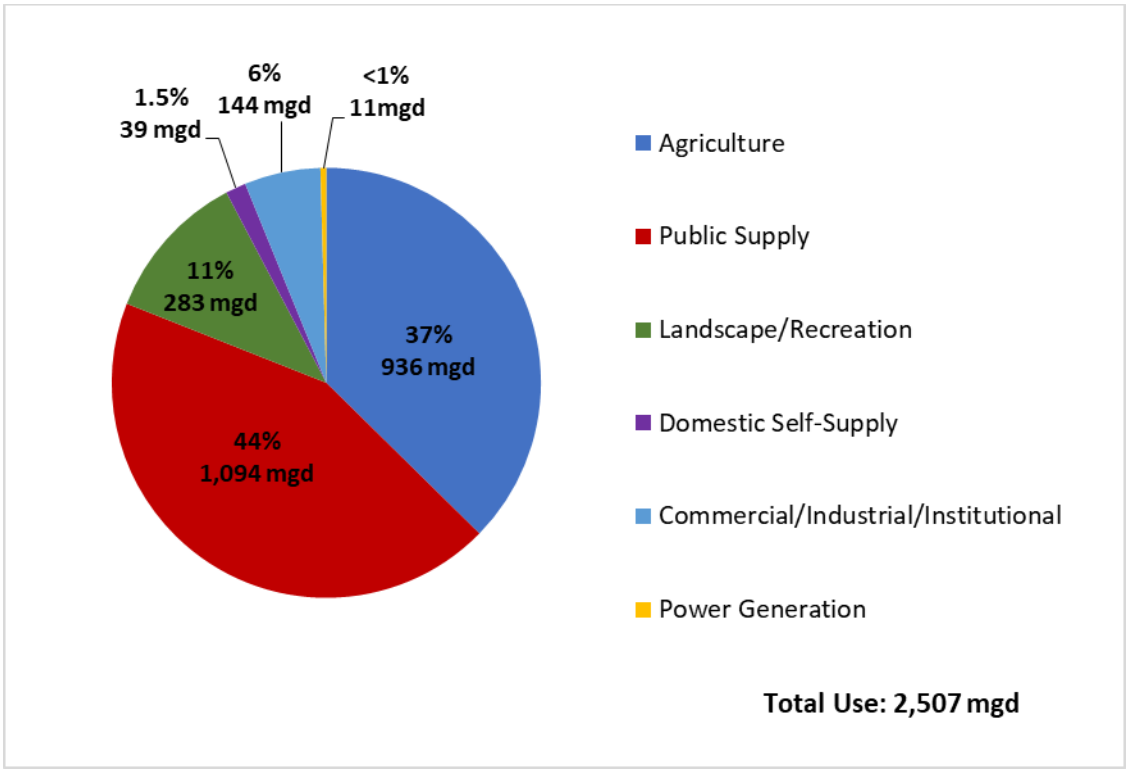
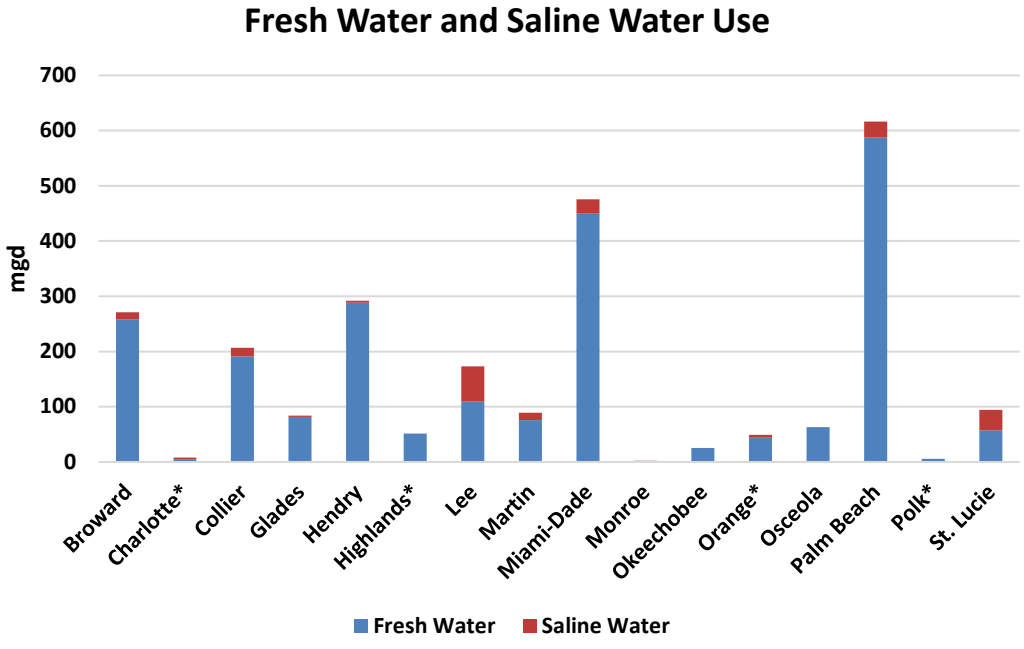


Figure 9. Percent Water Use by Category (Excluding Reclaimed)

Table 9. Total Water Use by County and Source (in mgd)[1]

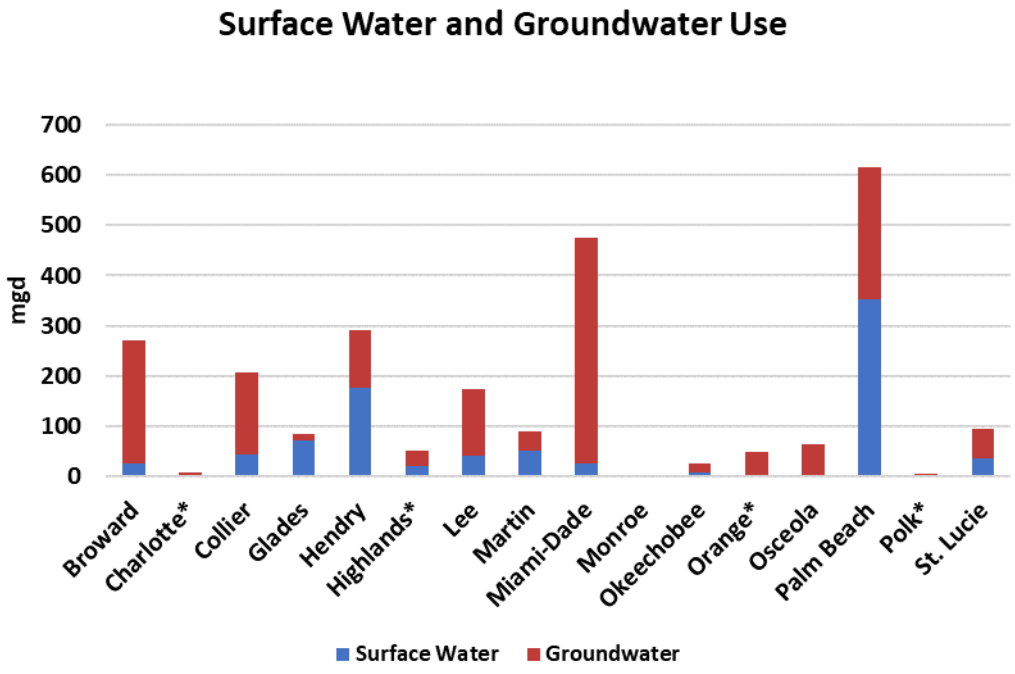
County	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Reclaimed Water	**Total Use with Reclaimed Water**
Broward	258.07	12.99	26.16	244.90	**271.07**	19.45	**290.52**
Charlotte	5.08	2.92	1.40	6.61	**8.01**	0.15	**8.16**
Collier	191.30	15.45	42.54	164.21	**206.75**	25.37	**232.12**
Glades	81.31	2.76	72.19	11.89	**84.07**	0	**84.07**
Hendry	288.64	3.25	176.14	115.75	**291.89**	0	**291.89**
Highlands	51.40	-	20.72	30.69	**51.40**	0	**51.40**
Lee	109.64	63.46	39.97	133.12	**173.09**	44.96	**218.05**
Martin	75.56	13.47	51.36	37.67	**89.03**	3.47	**92.50**
Miami-Dade	449.33	26.34	24.66	451.01	**475.67**	14.41	**490.08**
Monroe	0.73	1.56	0.33	1.95	**2.29**	0.3	**2.59**
Okeechobee	25.11	-	7.21	17.90	**25.11**	0	**25.11**
Orange	44.01	5.20	2.35	46.85	**49.21**	36.98	**86.19**
Osceola	63.19	-	3.39	59.80	**63.19**	22.78	**85.97**
Palm Beach	587.31	28.83	351.72	264.42	**616.14**	57.34	**673.48**
Polk	5.80	-	0.93	4.87	**5.80**	0.1	**5.90**
St. Lucie	57.39	36.70	34.49	59.59	**94.08**	4.14	**98.22**
Total	**2,293.87**	**212.92**	**855.56**	**1,651.23**	**2,506.79**	**229.45**	**2,736.24**

Note: Minor discrepancies in table totals are due to rounding.
[1] Values are only for the portions of the counties located within the SFWMD.



*Only the portion of the county located within the SFWMD.

Figure 10. Fresh Water and Saline Water Use by County for All Use Categories



*Only the portion of the county located within the SFWMD.

Figure 11. Surface Water and Groundwater Use by County for All Use Categories

Table 10. Total Water Use by County and Category, Excluding Reclaimed Water (in mgd)[1]

County	Agriculture	Commercial/ Industrial/ Institutional	Domestic Self-Supply	Landscape/ Recreation	Power Generation	Public Supply	**Total**
Broward	1.65	2.82	0.87	37.11	0.00	228.62	**271.07**
Charlotte	6.71	0.07	0.01	0.97	0.00	0.25	**8.01**
Collier	82.47	7.52	4.38	57.73	0.00	54.66	**206.75**
Glades	62.84	20.08	0.44	0.17	0.00	0.53	**84.07**
Hendry	279.81	6.28	1.24	0.63	0.00	3.93	**291.89**
Highlands	47.88	1.47	1.29	0.47	0.00	0.29	**51.40**
Lee	18.82	11.79	12.86	55.22	0.50	73.90	**173.09**
Martin	51.88	5.16	0.66	10.75	0.01	20.58	**89.03**
Miami-Dade	25.46	73.25	1.81	14.64	8.78	351.73	**475.67**
Monroe	0.01	0.00	0.00	2.28	0.00	0.00	**2.29**
Okeechobee	15.84	3.94	1.33	1.04	0.00	2.96	**25.11**
Orange	0.11	2.23	4.22	9.46	0.00	33.19	**49.21**
Osceola	10.76	0.11	0.49	5.12	0.13	46.57	**63.19**
Palm Beach	284.61	8.77	5.85	76.83	0.08	240.00	**616.14**
Polk	1.82	0.00	0.70	0.80	0.00	2.48	**5.80**
St. Lucie	45.84	0.29	2.45	9.64	1.48	34.39	**94.08**
Total	**936.48**	**143.78**	**38.61**	**282.86**	**10.98**	**1,094.09**	**2,506.79**

Note: Minor discrepancies in table totals are due to rounding.

[1] Values are only for the portions of the counties located within the SFWMD.

DISCUSSION OF RESULTS

This is the seventh year that the SFWMD has compiled an estimated water use report. Caution should be exercised when comparing water use estimates between this report and its predecessors as adjustments have been made to the water use estimation method from year to year. There were no significant changes to the overall methodology since the last (2019) report. Refinements in the methodology could occur for future reports to improve the accuracy of water use estimates.

When considering water use estimates and changes between years, it is important to recognize that the quantity and quality of reported water use data can vary over time and between water use categories. The PS and PG use categories are unique in that nearly 100% of permittees submit water use reports; estimates for other categories are calculated based on a much smaller proportion of permittees. Relying on a small and potentially non-representative portion of users inhibits the ability to make some conclusions with a high degree of confidence. This is particularly notable for the aquaculture, livestock, and nursery portions of the AG use category. The impacts of non-universal reporting are further complicated by inconsistent reporting from year to year. Errors in data, inaccurate measurements, and the complexity of some permitted water systems introduce inaccuracies and biases that often are undetected (or extremely difficult to measure), hindering better analyses.

Water use within the District decreased 17% (from 3,029 to 2,507 mgd) between 2019 and 2020. A comparison of changes in water use between 2019 and 2020 is provided in **Figure 12**. More detailed analyses of inter-year changes for use categories, water sources, and/or geographical areas are not provided due to the reasons listed above. The District received approximately 8.8 inches more rain in 2020 than in 2019. The 2020 dry season (specifically January to March) received 4.53 inches less rainfall than 2019 for the same period.

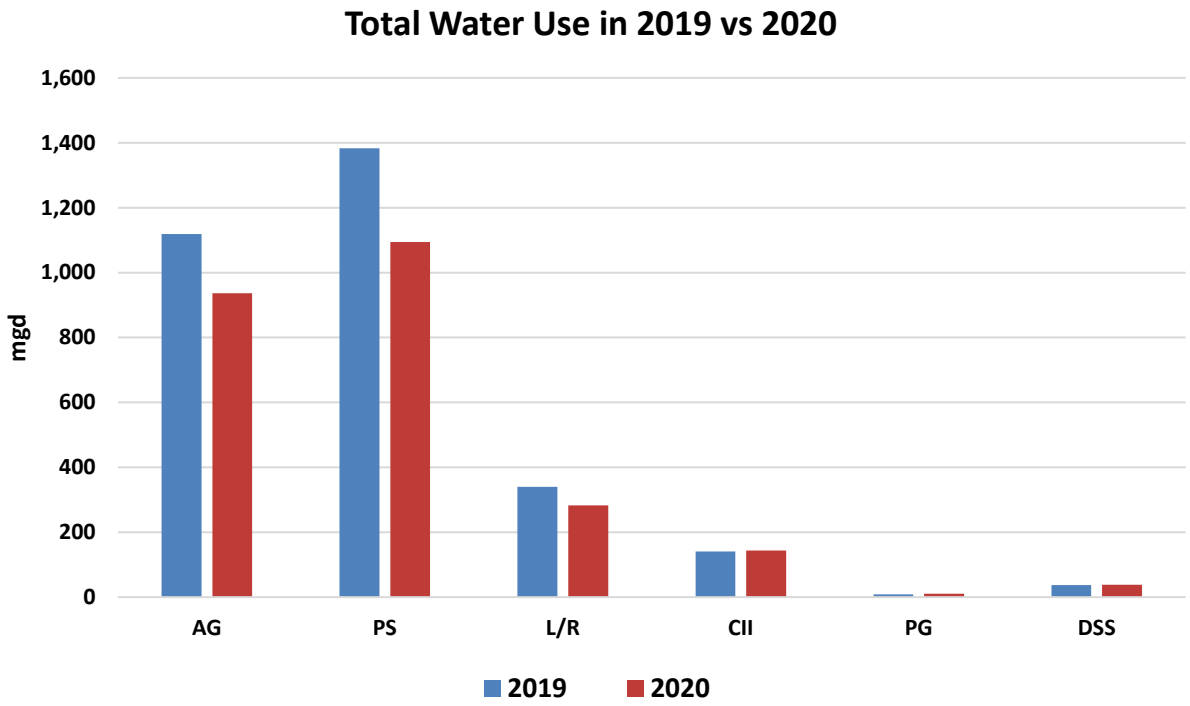


Figure 12. Comparison of 2019 to 2020 Total Estimated Water Use by Use Category

CONCLUSIONS

For 2020, 2,507 mgd of water were estimated to have been used throughout the District, distributed among the six water use categories. Approximately 1,651 mgd were derived from groundwater sources, and 856 mgd were derived from surface water sources, with 2,294 mgd being fresh water and 213 mgd considered saline water. This is 522 mgd less than was used in 2019.

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APPENDIX A: DSS POPULATION AND DEMAND METHODOLOGY

Population

Population estimates are intended for planning purposes only. The 2020 county population census-based estimates of permanent residents are from the Bureau of Economic and Business Research (BEBR; Rayer et al. 2021). For counties located within more than one water management district, the proportion of a county's residents within the SFWMD was calculated using the population reported in the applicable water supply plan update and the full county population published in the corresponding year's BEBR report. Three counties are split across SFWMD planning areas, necessitating an extrapolation of the population in the earlier plan to that of the later plan. Those extrapolations were based on the historical average rate of growth reported in Table 3 of the 2017 BEBR report (Rayer and Wang 2018). The percentage of population within the District for the water supply plans was then multiplied by the 2020 BEBR county population to get an estimate of the 2020 District population for that county. The Domestic Self-Supply (DSS) population was estimated by multiplying the county population by the percentage of the population self-supplied (from the latest regional water supply plan updates). The reader is advised against utilizing the populations estimated in this report for other purposes as they likely will not be consistent with populations reported elsewhere or obtained by other estimation methods.

Demand Estimates

The DSS water use estimates were calculated by multiplying the 2020 DSS population by the 2020 Public Supply (PS) Districtwide uniform residential per capita use rate (PCUR), which was derived from uniform residential PCURs (treated water) voluntarily reported by utilities to the SFWMD as part of their annual reporting, required pursuant to Section 373.709(6), Florida Statutes. Based on the reported values, the SFWMD calculated a 2020 Districtwide, population-weighted residential PCUR of 80.89 gallons per day (treated water). Minimal treatment and distribution losses are anticipated in DSS and smaller scale utility systems such that the uniform residential PCUR and DSS PCUR are comparable. **Table A-1** provides the PS and DSS populations and demand estimates.

Table A-1. Public Supply and Domestic Self-Supply Population and Demand by County

County	PS Total Population	DSS Total Population	Total Population	% DSS/ Total	2018 County Total Population BEBR[1]	2020 PS Population for Report (% x County BEBR)	2020 DSS Population for Report (% × County BEBR)	DSS[6] (mgd)
Broward	2016	1,844,174	10,340	1,854,514	0.6%	1,921,439	10,773	0.87
Charlotte[1]	2014	1,968	72	2,040	3.5%	2,175	80	0.01
Collier	2014	289,738	47,045	336,783	14.0%	333,327	54,123	4.38
Glades[2]	2014/2017	7,765	5,220	12,985	40.2%	8,138	5,471	0.44
Hendry[3]	2014/2016	23,813	14,202	38,015	37.4%	25,653	15,300	1.24
Highlands[1]	2017	24,046	15,543	39,589	39.3%	24,706	15,970	1.29
Lee	2014	512,504	137,797	650,301	21.2%	591,466	159,027	12.86
Martin	2019	143,122	7,588	150,710	5.0%	153,180	8,121	0.66
Miami Dade	2016	2,679,429	21,365	2,700,794	0.8%	2,810,385	22,409	1.81
Monroe	2016	76,047	-	76,047	0.0%	77,823	-	-
Okeechobee[1,4]	2017/2019	24,046	16,094	40,140	40.1%	24,597	16,463	1.33
Orange[1]	2015	318,050	45,936	363,986	12.6%	361,102	52,154	4.22
Osceola[1]	2015	305,735	4,904	310,639	1.6%	379,040	6,080	0.49
Palm Beach	2016	1,323,103	68,636	1,391,739	4.9%	1,394,171	72,323	5.85
Polk[1]	2015	27,317	7,754	35,071	22.1%	30,634	8,696	0.70
St. Lucie	2019	256,196	26,566	282,762	9.4%	291,988	30,277	2.45
Total[7]		**7,857,053**	**429,062**	**8,286,115**	**5.2%**	**8,429,824**	**477,265**	**38.61**

BEBR = Bureau of Economic and Business Research; DSS = Domestic Self-Supply; mgd = million gallons per day; PS = Public Supply.

1 Percentage of county population in base year used for multiplier of 2020 BEBR population for report population.

2 Lower West Coast (2014): 4,252 PS and 4,610 DSS, adjusted to (2017): 4,281 PS and 4,642 DSS; Lower Kissimmee Basin (2017): 3,484 PS and 578 DSS.

3 Lower West Coast (2014): 23,297 PS and 10,641 DSS, adjusted to (2016): 23,284 PS and 10,635 DSS; Lower East Coast (2016): 529 PS and 3,567 DSS.

4 Upper East Coast (2019): 0 PS and 544 DSS; Lower Kissimmee Basin (2017) adjusted to 2019; 24,255 PS and 15,707 DSS.

5 Medium BEBR 2020 county totals (April 2020).

6 The 2020 Districtwide, population-weighted uniform residential per capita use rate = 80.89 gallons per day.

7 Due to rounding and use of significant figures the summation of individual county totals for last 3 columns mathematically yields a slightly different value than computation using the total county data independently (i.e. last row of table).

References

Rayer, S. and Y. Wang. 2018. Projections of Florida Population by County, 2020–2045, with Estimates for 2017. Florida Population Studies 51(180). January 2018. University of Florida, Bureau of Economic and Business Research, Gainesville, FL.

Rayer, S., R. Doty, S. Roulston-Doty, and Y. Wang. 2021. Revised Annual Population Estimates for Florida and Its Counties, 2010-2020, with Components of Growth. Special Populations Report Number 11, November 2021. University of Florida, Bureau of Economic and Business Research, Gainesville, FL.

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APPENDIX B: WATER USE CATEGORY BREAKDOWN BY PERMIT USE CLASS

Table B-1. Agriculture by Use Class Quantity (in mgd)[1]

County	Agriculture		Aquaculture		Livestock		Nursery		Agriculture D&I		Agriculture-EAA		**Total**
	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	SW	GW	
Broward	0.88	0.13	0.00	0.03	0.00	0.07	0.29	0.25	0.00	0.00	0.00	0.00	**1.65**
Charlotte	1.22	5.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.71**
Collier	1.62	80.11	0.00	0.02	0.00	0.02	0.17	0.53	0.00	0.00	0.00	0.00	**82.47**
Glades	50.70	4.33	0.00	0.00	0.00	0.54	0.00	0.03	1.55	5.69	0.00	0.00	**62.84**
Hendry	63.32	104.73	0.00	0.32	0.00	0.29	0.04	0.21	110.89	0.00	0.00	0.00	**279.81**
Highlands	20.42	25.18	0.01	0.05	0.01	0.81	0.06	1.34	0.00	0.00	0.00	0.00	**47.88**
Lee	0.43	13.95	0.00	0.04	0.00	0.10	0.83	0.54	2.93	0.00	0.00	0.00	**18.82**
Martin	33.50	2.51	0.00	0.03	0.00	0.13	0.31	0.81	14.60	0.01	0.00	0.00	**51.88**
Miami-Dade	0.60	9.98	0.00	2.87	0.00	0.01	0.15	11.85	0.00	0.00	0.00	0.00	**25.46**
Monroe	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Okeechobee	5.08	7.65	0.00	0.03	0.00	2.76	0.00	0.32	0.00	0.00	0.00	0.00	**15.84**
Orange	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	**0.11**
Osceola	1.76	8.55	0.00	0.00	0.00	0.17	0.00	0.28	0.00	0.00	0.00	0.00	**10.76**
Palm Beach	4.47	1.74	0.00	0.02	0.00	0.04	1.22	2.41	11.14	0.00	263.57	0.00	**284.61**
Polk	0.93	0.82	0.00	0.00	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.00	**1.82**
St. Lucie	29.38	14.22	0.00	0.01	0.00	0.38	0.08	0.29	1.47	0.00	0.00	0.00	**45.84**
Total	**214.31**	**279.48**	**0.01**	**3.44**	**0.01**	**5.36**	**3.13**	**18.89**	**142.57**	**5.70**	**263.57**	**0.00**	**936.48**
% of Total	**22.9%**	**29.8%**	**0.0%**	**0.4%**	**0.0%**	**0.6%**	**0.3%**	**2.0%**	**15.2%**	**0.6%**	**28.1%**	**0.0%**	**100.0%**

D&I = Diversion and Impoundment; EAA = Everglades Agricultural Area; GW = groundwater; mgd = million gallons per day; SW = surface water.

[1] Values are only for the portions of the counties located within the SFWMD.

Table B-2. Agriculture by Use Class Quality (in mgd)[1]

County	Agriculture		Aquaculture		Livestock		Nursery		Agriculture D&I		Agriculture-EAA		**Total**
	Fresh	Saline	Fresh	Saline	Fresh	Saline	Fresh	Saline	Fresh	Saline	Fresh	Saline	
Broward	1.01	0.00	0.03	0.00	0.07	0.00	0.54	0.00	0.00	0.00	0.00	0.00	**1.65**
Charlotte	3.78	2.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.71**
Collier	81.73	0.00	0.02	0.00	0.02	0.00	0.70	0.00	0.00	0.00	0.00	0.00	**82.47**
Glades	52.27	2.76	0.00	0.00	0.54	0.00	0.03	0.00	7.24	0.00	0.00	0.00	**62.84**
Hendry	168.05	0.00	0.32	0.00	0.29	0.00	0.25	0.00	110.89	0.00	0.00	0.00	**279.81**
Highlands	45.60	0.00	0.06	0.00	0.82	0.00	1.40	0.00	0.00	0.00	0.00	0.00	**47.88**
Lee	14.39	0.00	0.04	0.00	0.10	0.00	1.36	0.00	2.93	0.00	0.00	0.00	**18.82**
Martin	35.93	0.07	0.03	0.00	0.13	0.00	1.11	0.00	14.61	0.00	0.00	0.00	**51.88**
Miami-Dade	10.58	0.00	0.94	1.94	0.01	0.00	12.00	0.00	0.00	0.00	0.00	0.00	**25.46**
Monroe	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Okeechobee	12.72	0.00	0.03	0.00	2.76	0.00	0.32	0.00	0.00	0.00	0.00	0.00	**15.84**
Orange	0.10	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	**0.11**
Osceola	10.30	0.00	0.00	0.00	0.17	0.00	0.28	0.00	0.00	0.00	0.00	0.00	**10.76**
Palm Beach	6.21	0.00	0.02	0.00	0.04	0.00	3.62	0.00	11.14	0.00	263.57	0.00	**284.61**
Polk	1.75	0.00	0.00	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00	**1.82**
St. Lucie	34.04	9.56	0.01	0.00	0.38	0.00	0.37	0.00	1.47	0.00	0.00	0.00	**45.84**
Total	**478.47**	**15.32**	**1.52**	**1.94**	**5.37**	**0.00**	**22.02**	**0.00**	**148.28**	**0.00**	**263.57**	**0.00**	**936.48**
% of Total	**51.1%**	**1.6%**	**0.2%**	**0.2%**	**0.6%**	**0.0%**	**2.4%**	**0.0%**	**15.8%**	**0.0%**	**28.1%**	**0.0%**	**100.0%**

D&I = Diversion and Impoundment; EAA = Everglades Agricultural Area; mgd = million gallons per day.

[1] Values are only for the portions of the counties located within the SFWMD.

Table B-3. Commercial/Industrial/Institutional by Use Class Quantity (in mgd)[1]

County	Industrial		Mining		Total
	Surface Water	Groundwater	Surface Water	Groundwater	
Broward	0.10	2.72	0.00	0.00	**2.82**
Charlotte	0.00	0.06	0.01	0.00	**0.07**
Collier	3.87	0.68	2.96	0.00	**7.52**
Glades	0.06	0.05	19.80	0.17	**20.08**
Hendry	1.71	4.58	0.00	0.00	**6.28**
Highlands	0.00	1.46	0.00	0.00	**1.47**
Lee	0.08	0.40	11.31	0.00	**11.79**
Martin	0.11	5.05	0.00	0.00	**5.16**
Miami-Dade	0.02	24.11	20.13	28.98	**73.25**
Monroe	0.00	0.00	0.00	0.00	**0.00**
Okeechobee	1.95	1.98	0.00	0.00	**3.94**
Orange	0.00	2.23	0.00	0.00	**2.23**
Osceola	0.00	0.11	0.00	0.00	**0.11**
Palm Beach	0.97	2.71	0.74	4.36	**8.77**
Polk	0.00	0.00	0.00	0.00	**0.00**
St. Lucie	0.08	0.21	0.00	0.00	**0.29**
Total	**8.97**	**46.35**	**54.95**	**33.51**	**143.78**
% of Total	**6%**	**32%**	**38%**	**23%**	**100%**

mgd = million gallons per day.

[1] Values are only for the portions of the counties located within the SFWMD.

Table B-4. Commercial/Industrial/Institutional by Use Class Quality (in mgd)[1]

County	Industrial		Mining		Total
	Fresh	Saline	Fresh	Saline	
Broward	2.82	0.00	0.00	0.00	**2.82**
Charlotte	0.06	0.00	0.01	0.00	**0.07**
Collier	4.55	0.00	2.96	0.00	**7.52**
Glades	0.11	0.00	19.98	0.00	**20.08**
Hendry	6.28	0.00	0.00	0.00	**6.28**
Highlands	1.47	0.00	0.00	0.00	**1.47**
Lee	0.49	0.00	11.31	0.00	**11.79**
Martin	5.16	0.00	0.00	0.00	**5.16**
Miami-Dade	24.14	0.00	49.11	0.00	**73.25**
Monroe	0.00	0.00	0.00	0.00	**0.00**
Okeechobee	3.94	0.00	0.00	0.00	**3.94**
Orange	2.23	0.00	0.00	0.00	**2.23**
Osceola	0.11	0.00	0.00	0.00	**0.11**
Palm Beach	3.68	0.00	5.09	0.00	**8.77**
Polk	0.00	0.00	0.00	0.00	**0.00**
St. Lucie	0.29	0.00	0.00	0.00	**0.29**
Total	**55.31**	**0.00**	**88.46**	**0.00**	**143.78**
% of Total	**38%**	**0%**	**62%**	**0%**	**100%**

mgd = million gallons per day.

[1] Values are only for the portions of the counties located within the SFWMD.

Table B-5. Landscape/Recreation by Use Class Quantity (in mgd)[1]

County	Golf Course		Landscape		PS-Irrigation Supplement		**Total**
	Surface Water	Groundwater	Surface Water	Groundwater	Surface Water	Groundwater	
Broward	5.15	2.94	19.75	9.28	0.00	0.00	**37.11**
Charlotte	0.16	0.76	0.00	0.04	0.00	0.00	**0.97**
Collier	14.62	15.22	12.44	12.40	2.01	1.04	**57.73**
Glades	0.02	0.02	0.06	0.07	0.00	0.00	**0.17**
Hendry	0.00	0.00	0.18	0.45	0.00	0.00	**0.63**
Highlands	0.21	0.20	0.00	0.06	0.00	0.00	**0.47**
Lee	8.99	7.71	14.41	23.87	0.00	0.23	**55.22**
Martin	1.51	2.77	1.34	5.13	0.00	0.00	**10.75**
Miami-Dade	1.25	2.28	2.51	8.60	0.00	0.00	**14.64**
Monroe	0.33	1.94	0.00	0.01	0.00	0.00	**2.28**
Okeechobee	0.01	0.03	0.16	0.84	0.00	0.00	**1.04**
Orange	1.46	2.66	0.88	1.63	0.00	2.83	**9.46**
Osceola	0.96	1.09	0.67	1.61	0.00	0.79	**5.12**
Palm Beach	11.59	10.34	31.00	23.68	0.00	0.22	**76.83**
Polk	0.00	0.45	0.00	0.35	0.00	0.00	**0.80**
St. Lucie	1.27	0.81	2.20	5.35	0.00	0.00	**9.64**
Total	**47.55**	**49.23**	**85.60**	**93.36**	**2.01**	**5.11**	**282.86**
% of Total	**16.8%**	**17.4%**	**30.3%**	**33.0%**	**0.7%**	**1.8%**	**100.0%**

mgd = million gallons per day; PS = Public Supply.

[1] Values are only for the portions of the counties located within the SFWMD.

Table B-6. Landscape/Recreation by Use Class Quality (in mgd)[1]

County	Golf Course		Landscape		PS-Irrigation Supplement		**Total**
	Fresh	Saline	Fresh	Saline	Fresh	Saline	
Broward	8.09	0.00	28.65	0.37	0.00	0.00	**37.11**
Charlotte	0.93	0.00	0.05	0.00	0.00	0.00	**0.97**
Collier	29.80	0.05	24.64	0.20	3.05	0.00	**57.73**
Glades	0.05	0.00	0.13	0.00	0.00	0.00	**0.17**
Hendry	0.00	0.00	0.63	0.00	0.00	0.00	**0.63**
Highlands	0.41	0.00	0.06	0.00	0.00	0.00	**0.47**
Lee	15.32	1.38	34.24	4.05	0.23	0.00	**55.22**
Martin	3.45	0.83	6.37	0.10	0.00	0.00	**10.75**
Miami-Dade	3.53	0.00	11.11	0.00	0.00	0.00	**14.64**
Monroe	0.71	1.56	0.01	0.00	0.00	0.00	**2.28**
Okeechobee	0.05	0.00	1.00	0.00	0.00	0.00	**1.04**
Orange	4.12	0.00	2.51	0.00	2.83	0.00	**9.46**
Osceola	2.05	0.00	2.28	0.00	0.79	0.00	**5.12**
Palm Beach	21.21	0.72	54.08	0.60	0.22	0.00	**76.83**
Polk	0.45	0.00	0.35	0.00	0.00	0.00	**0.80**
St. Lucie	2.00	0.09	7.47	0.09	0.00	0.00	**9.64**
Total	**92.15**	**4.62**	**173.55**	**5.41**	**7.12**	**0.00**	**282.86**
% of Total	**32.6%**	**1.6%**	**61.4%**	**1.9%**	**2.5%**	**0.0%**	**100%**

Note: Minor discrepancies in or between table totals are due to rounding.
mgd = million gallons per day; PS = Public Supply.
[1] Values are only for the portions of the counties located within the SFWMD.

APPENDIX C: METADATA TABLES

Table C-1. Reported Versus Estimated Use (in mgd)[1] by County

County	Reported	Estimated	% Estimated	**Total**
Broward	245.68	25.38	9%	**271.07**
Charlotte	7.44	0.56	7%	**8.01**
Collier	185.48	21.27	10%	**206.75**
Glades	82.81	1.26	2%	**84.07**
Hendry	278.01	13.87	5%	**291.89**
Highlands	47.11	4.29	8%	**51.40**
Lee	143.98	29.11	17%	**173.09**
Martin	82.17	6.86	8%	**89.03**
Miami-Dade	439.59	36.08	8%	**475.67**
Monroe	1.56	0.73	32%	**2.29**
Okeechobee	20.69	4.42	18%	**25.11**
Orange	42.16	7.05	14%	**49.21**
Osceola	59.94	3.24	5%	**63.19**
Palm Beach*	307.68	308.46	50%	**616.14**
Polk	4.80	1.00	17%	**5.80**
St. Lucie	80.65	13.44	14%	**94.08**
Total	**2,029.76**	**477.02**	**19%**	**2,506.78**

mgd = million gallons per day.
* 264 mgd is estimated EAA volume.
[1] Values are only for the portions of the counties located within the SFWMD.

Table C-2. Reported Versus Estimated Use (in mgd)[1] by Water Use Category

Water Use Category	Reported	Estimated	% Estimated	**Total**
Agriculture	614.92	321.55	**34%**	**936.48**
Commercial/Industrial/Institutional	127.76	16.02	**11%**	**143.78**
Domestic Self-Supply	0.00	38.61	**100%**	**38.61**
Power Generation	10.98	0.00	**0%**	**10.98**
Public Supply	1094.09	0.00	**0%**	**1,094.09**
Landscape/Recreation	182.01	100.84	**36%**	**282.86**
Total	**2029.76**	**477.02**	**19%**	**2,506.78**

mgd = million gallons per day.
[1] Values are only for the portions of the counties located within the SFWMD.

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APPENDIX D: TOTAL WATER USE BY SFWMD PLANNING REGION

Table D-1. Total Water Use by Category and Source (in mgd)

Water Use Category	Surface Water	Groundwater	Fresh Water	Saline Water	**Total**	Number of Permits
Lower East Coast						
Agriculture	302.26	113.69	414.01	1.94	**415.95**	1,845
Domestic Self-Supply	0.00	8.58	8.58	0.00	**8.58**	279
Commercial/Industrial/Institutional	23.65	62.89	86.53	0.00	**86.53**	295
Landscape/Recreation	71.58	59.29	127.61	3.25	**130.86**	8,153
Power Generation	0.00	8.86	0.08	8.78	**8.86**	7
Public Supply	27.03	793.31	764.60	55.75	**820.35**	51
Lower East Coast Total	**424.51**	**1,046.62**	**1,401.41**	**69.72**	**1,471.13**	**10,630**
Lower Kissimmee						
Agriculture	46.68	40.07	84.04	2.71	**86.75**	532
Domestic Self-Supply	0.00	2.74	2.74	0.00	**2.74**	101
Commercial/Industrial/Institutional	8.05	3.63	11.68	0.00	**11.68**	45
Landscape/Recreation	0.34	1.08	1.42	0.00	**1.42**	274
Power Generation	0.00	0.00	0.00	0.00	**0.00**	0
Public Supply	0.00	3.25	3.25	0.00	**3.25**	4
Lower Kissimmee Basin Total	**55.07**	**50.77**	**103.13**	**2.71**	**105.84**	**956**
Lower West Coast						
Agriculture	189.02	129.67	315.71	2.98	**318.69**	859
Domestic Self-Supply	0.00	18.75	18.75	0.00	**18.75**	291
Commercial/Industrial/Institutional	32.01	5.72	37.74	0.00	**37.74**	203
Landscape/Recreation	52.90	61.83	109.05	5.68	**114.73**	3846
Power Generation	0.00	0.50	0.50	0.00	**0.50**	2
Public Supply	5.84	127.44	56.80	76.48	**133.28**	30
Lower West Coast Total	**279.78**	**343.90**	**538.55**	**85.13**	**623.68**	**5,231**
Upper East Coast						
Agriculture	82.95	19.46	92.77	9.64	**102.41**	645
Domestic Self-Supply	0.00	3.12	3.12	0.00	**3.12**	237
Commercial/Industrial/Institutional	0.21	5.28	5.49	0.00	**5.49**	76
Landscape/Recreation	6.37	14.10	19.36	1.10	**20.46**	1722
Power Generation	0.00	1.49	1.49	0.00	**1.49**	4
Public Supply	0.00	54.97	15.54	39.43	**54.97**	16
Upper East Coast Total	**89.52**	**98.42**	**137.78**	**50.17**	**187.94**	**2,700**
Upper Kissimmee						
Agriculture	2.70	9.99	12.69	0.00	**12.69**	197
Domestic Self-Supply	0.00	5.41	5.41	0.00	**5.41**	120
Commercial/Industrial/Institutional	0.00	2.34	2.34	0.00	**2.34**	37
Landscape/Recreation	3.97	11.41	15.38	0.00	**15.38**	436
Power Generation	0.00	0.13	0.13	0.00	**0.13**	1
Public Supply	0.00	82.24	77.04	5.20	**82.24**	17
Upper Kissimmee Basin Total	**6.67**	**111.52**	**113.00**	**5.20**	**118.19**	**808**
Districtwide Total	**855.56**	**1,651.23**	**2,293.87**	**212.92**	**2,506.79**	**20,325**

sfwmd.gov

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406
561-686-8800 • 1-800-432-2045
www.sfwmd.gov

MAILING ADDRESS: P.O. Box 24680
West Palm Beach, FL 33416-4680