South Florida Water Management District
2014 Estimated Water Use Report

February 2016

South Florida Water Management District
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EXECUTIVE SUMMARY

This report compiles estimated water use by use category within the South Florida Water Management District for calendar year 2014 based primarily on water pumpage records reported pursuant to water use permitting requirements. Water use is defined as any use of water that reduces the supply from which it was withdrawn or diverted.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 2014, approximately 946 billion gallons (2,593 million gallons per day [MGD] average) of surface water and groundwater were used in the following categories:

- Public Water Supply (1,075 MGD)
- Domestic Self-Supply (33 MGD)
- Agriculture Self-Supply (1,077 MGD)
- Industrial/Commercial/Institutional Self-Supply (113 MGD)
- Recreation/Landscape Self-Supply (271 MGD)
- Power Generation Self-Supply (24 MGD)

Of the 2,593 MGD, approximately 1,604 MGD were derived from groundwater and 989 MGD were derived from surface water sources, with 2,456 MGD being freshwater and 137 MGD considered saline water. Additionally, approximately 218 MGD of reclaimed water were used primarily for landscape irrigation and, to a lesser extent, industrial and power generation uses.

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ACRONYMS AND ABBREVIATIONS

AGR	Agricultural Self-Supply
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
ICI	Industrial/Commercial/Institutional Self-Supply
MGD	million gallons per day
mg/L	milligrams per liter
PWR	Power Generation Self-Supply
PWS	Public Water Supply
REC	Recreational/Landscape Self-Supply
SFWMD	South Florida Water Management District
USGS	United States Geological Survey

INTRODUCTION

The South Florida Water Management District (SFWMD or District) is a regional government agency created in 1949 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 16 counties from Orlando to the Florida Keys and serves a current population of approximately 8.1 million residents. It is the oldest and largest of the state's five water management districts. Among other responsibilities, water management districts are responsible for water use permitting as well as water supply planning within their jurisdictional areas.

This report compiles estimated water use within the SFWMD for calendar year 2014. Water use is defined as any use of water that reduces the supply from which it was withdrawn or diverted. The report is a complement to the regional water supply plans, which capture current and projected water use, and the United States Geological Survey (USGS)-Florida Department of Environmental Protection (FDEP) report "Water Withdrawals, Use, and Trends in Florida" produced every 5 years. This is the first District report on water use since 1985 (Marella 2014). The report is based primarily on water pumpage records reported pursuant to water use permitting requirements. This report will be an important source of data and information to support the District's water resource programs and initiatives, including water supply planning, water use permitting, and water conservation.

This report documents the District'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 cover an accounting for all water used or conveyed within the District (e.g., for flood control, natural systems, water quality treatment). This report can be found on the SFWMD website, www.sfwmd.gov.

GEOGRAPHIC DESCRIPTION

As stated previously, the District includes all or part of 16 counties, encompassing more than 18,000 square miles in central and southern Florida. In addition to the permanent residents, the SFWMD is also home to many seasonal residents and hosts 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. For purposes of water supply planning, the District is geographically divided into five regions (**Figure 1**).

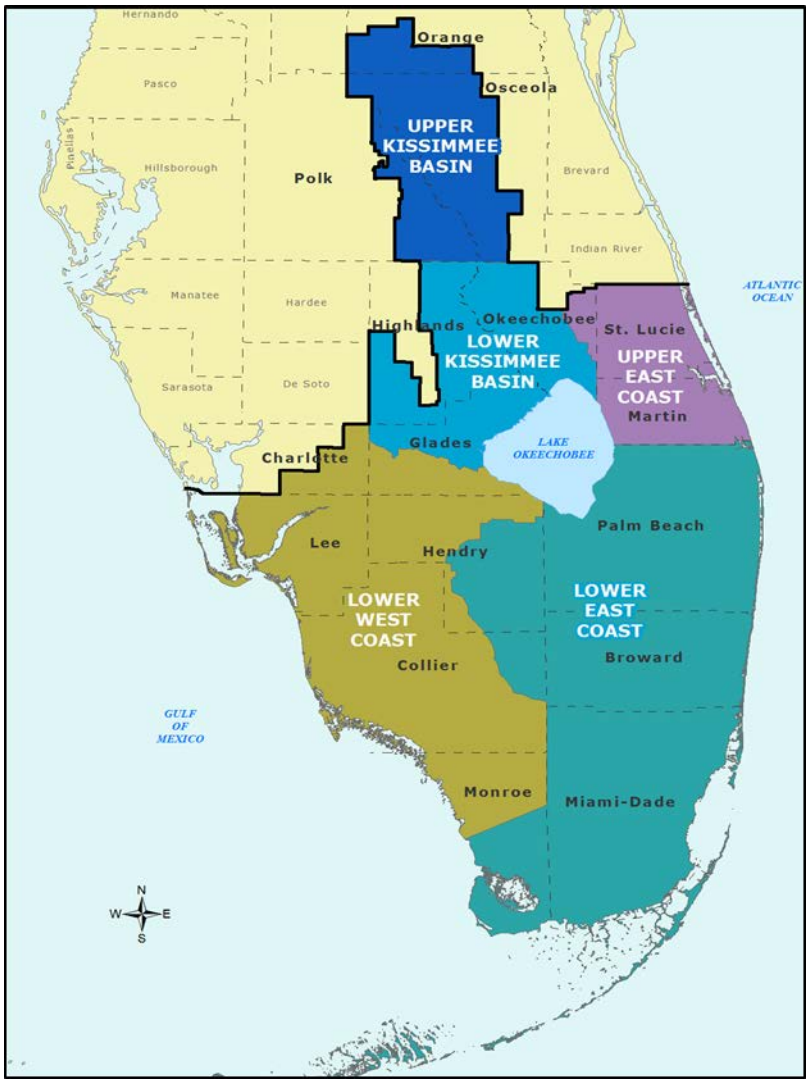

Figure 1. Water Supply Planning Regions

Upper Kissimmee Basin: Osceola County and portions of 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 and Collier counties, and portions of Glades, Hendry, Monroe, and Charlotte counties

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 District'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 2015). Uses exempt from permitting are indoor domestic use at a single family 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 allocated at least 0.1 MGD of water. Regional exceptions exist, such as the South Dade Agricultural Area, where Individual permits are issued for allocations of at least 0.3 MGD, and the Lower West Coast, 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, short-term dewatering, and closed-loop systems. Noticed General permits, those that do

not qualify for a permit by rule, are for water users with usage of <0.1 MGD. 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 District. Individual permits are required to have a reliable, repeatable water use accounting system to record water usage from all withdrawal facilities. For pumped systems, acceptable water use accounting systems include flowmeters, or clocks that total pump operation. For gravity flow systems, acceptable methods include the use of rated water control structures. The water use accounting and calibration methods must be submitted as a part of the permit application. Prior to the use of any authorized facility, the approved water use accounting method must be operating and the initial calibration submitted to the District. Recalibration results for the water use accounting method are required every 5 years (from the date of last calibration).

The water use of 19,138 permits were evaluated for calendar year 2014. There are an additional 1,060 active permits for dewatering, but these users typically recirculate water in such a way that it is not included in the total use estimates. Another 95 permits exist within the boundaries of the Everglades Agricultural Area (EAA), which were evaluated holistically and are discussed later.

WATER USE ESTIMATION METHODOLOGY

The most accurate way to estimate the amount of water used each year would be to total the annual water use of every user. However, as described previously, not all water users are required to account for and report their annual use, and other 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 had reported their use in 2014 and estimated the amount of water used by those who had not reported.

The specific water demands of each permittee are scrutinized at the time of permit application and each permittee has a calculated maximum volume of water allowed for use (i.e., a permit allocation). Annual permit allocation is determined by calculating the quantity of water to be withdrawn over a 12-month period under a 1-in-10 year drought condition for the associated use class. For irrigation users, it is the amount of water a crop needs to supplement the rainfall received during a 1-in-10 year drought condition. For other use classes, 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 a 1-in-10 year drought condition. Therefore, during a 1-in-10 year drought condition for the entire area of the District, the total water use for the District should approximate the summation of all the permit allocations. During a year when it is drier than 1-in-10 year drought condition, additional water, even above the permit allocation, may be used. The year 2014 was less than a 1-in-10 drought year and the amount of water used should be less than the permitted allocations.

The amount of water reported as used in 2014 when compared to the permit allocation (as a percentage) should reflect the demands based on actual 2014 weather conditions. This percentage of reported use to the permit allocation was used as an analogue to obtain an estimate of use for permittees who did not report or were not required to report. For purposes of calculating the

percentages, only permits with at least 10 months of records, including those reporting all zeros, were used and all permits reporting more than their allocation (i.e., out of permit compliance or in obvious error) were excluded from the calculation dataset. Using a combination of reported and estimated water usage for each permittee, the total amount of water used for each use category was estimated. Further information on specific methods by use class are described later in this document.

WATER SOURCES

This report estimates the volume of water withdrawn or diverted from groundwater and surface water sources. Data were collected for this report by permit, not by specific aquifer or water body being used by each permittee. In this report, permittees exclusively utilizing pumps to extract water are ascribed to be surface water users, and those exclusively using wells are ascribed to be groundwater users. In cases where a permittee has both pumps and wells, the estimated volumes were split equally (50/50) between the sources. More specific ratios were utilized for some of the larger agricultural users (>1 MGD) where it was determined to be more appropriate.

As stated earlier, the use of reclaimed water is not regulated by the water management districts. However, reclaimed water use is a key component of water resource management in the SFWMD. The beneficial use of reclaimed water for irrigation and other uses has provided a means for reducing surface water and groundwater use. Reclaimed water data are compiled separately in this report based on inventories produced by the FDEP from data submitted by utility providers. Reclaimed water users that did not report water withdrawals were assumed to have met all of their water demands from a reclaimed water supplier and were not estimated individually.

Additional information on sources may be provided under individual use classes 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 2015) are used to define different water qualities:

- ***Freshwater*** 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 SFWMD include the Upper Floridan aquifer in the Kissimmee Basin; 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, 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 SFWMD 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 and 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. As mentioned earlier, the volumes reported and estimated are

not correlated to a source. Furthermore, only a fraction of the permits require actual water quality testing to determine salinity. Therefore, the volumes reported as saline are only for permits known to require treatment or blending from known saline sources, primarily in the Public Water Supply (PWS) category and to a lesser extent the Recreational/Landscape Self-Supply (REC) category. If the salinity of the source water and treatment/blending requirements are unknown, the water quantities are classified as fresh.

WATER SUPPLY CATEGORIES

Water use estimates in this report were developed for each of the following six water supply categories established by the FDEP for use in water supply planning:

- Public Water Supply (PWS)
- Domestic Self-Supply (DSS)
- Industrial/Commercial/Institutional Self-Supply (ICI)
- Agricultural Self-Supply (AGR)
- Recreational/Landscape Self-Supply (REC)
- Power Generation Self-Supply (PWR)

It should be noted that PWS includes treated potable water provided to some of the other use categories within a utility's service area boundaries. The "Self-Supply" designation indicates users that are separately permitted and do not receive their water from a utility but rather have their own water supply withdrawal facilities (i.e., 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, 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 are not required to report water use to the District.

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 system, to provide for the reasonable-beneficial demands of secondary users and consumptive and non-consumptive uses. There are 23 D&I permits outside of the EAA that exclusively serve agriculture. Those estimated volumes are included in the AGR category along with two D&I permits that partially serve agriculture. In addition, there are nine D&I permits within the EAA whose water use is contained in the EAA estimate described later in this report. However, 11 D&I permits that function primarily to recharge the aquifer and canal networks, hydrate wetlands, maintain salinity barriers along the coast, or provide fire protection were not included in the water use estimates in this report.

2014 WEATHER

Average historical (1915 to 2014) annual rainfall within the District is 52.75 inches. **Figure 2** presents the annual deviation from average rainfall over the past century. From 2004 to 2014, average annual rainfall within the District varied by 19 inches; the driest year was 2006 with 40.74 inches (23 percent below average) and the wettest year was 2005 with 60.04 inches (14 percent above average). The District typically receives two-thirds of its annual rainfall between May and October (**Figure 3**). In 2014, the Districtwide average annual rainfall was 51.23 inches, only slightly lower than the historic average year. However, a Districtwide average number does not tell the whole story as rainfall varies not only by year but also by month and location. **Figure 4** presents the rainfall amounts received by each basin within the District for 2014. The figure reveals that the northern basins in the District received higher than average rainfall while the middle basins received about average and the remaining basins received less than average rainfall.

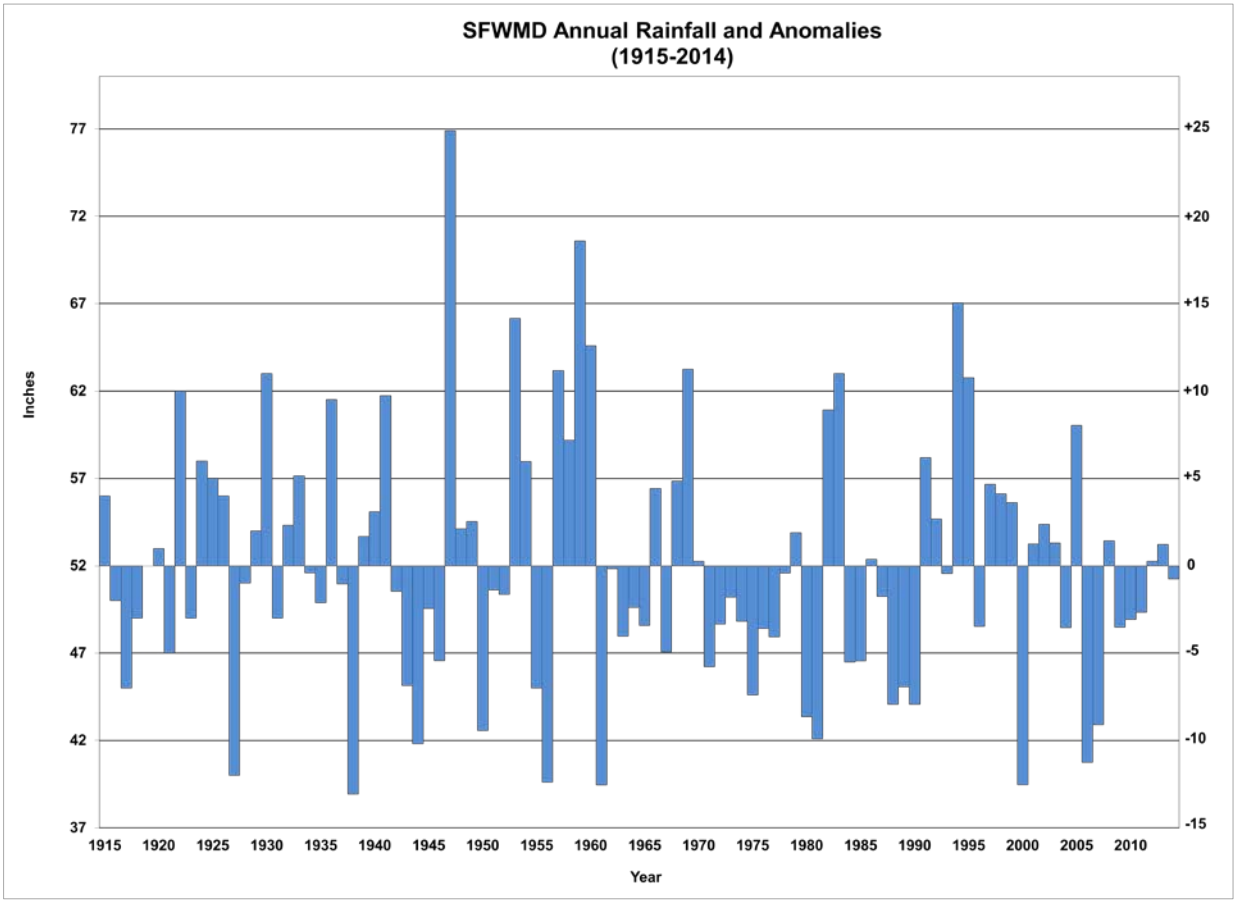

Figure 2. SFWMD Annual Difference from Average Rainfall (1915-2014)

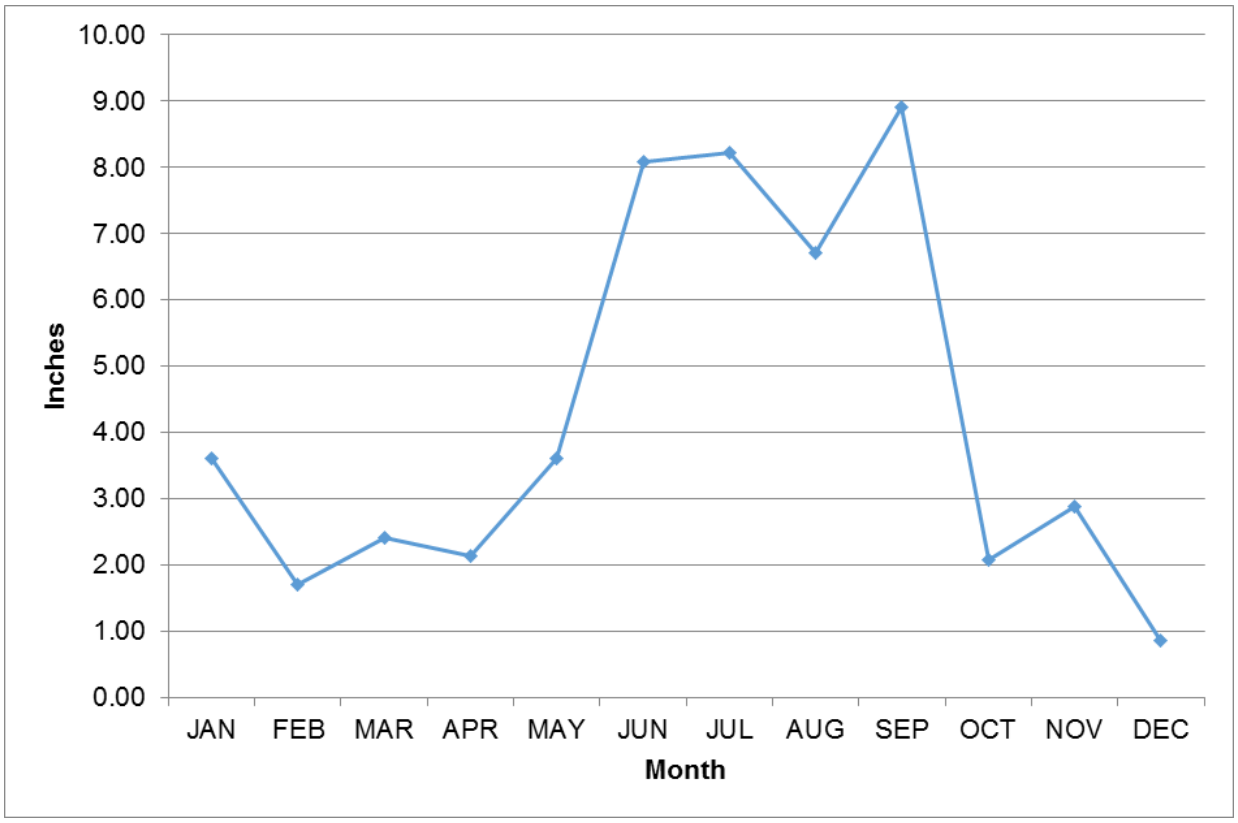

Figure 3. 2014 Average District Monthly Rainfall Distribution

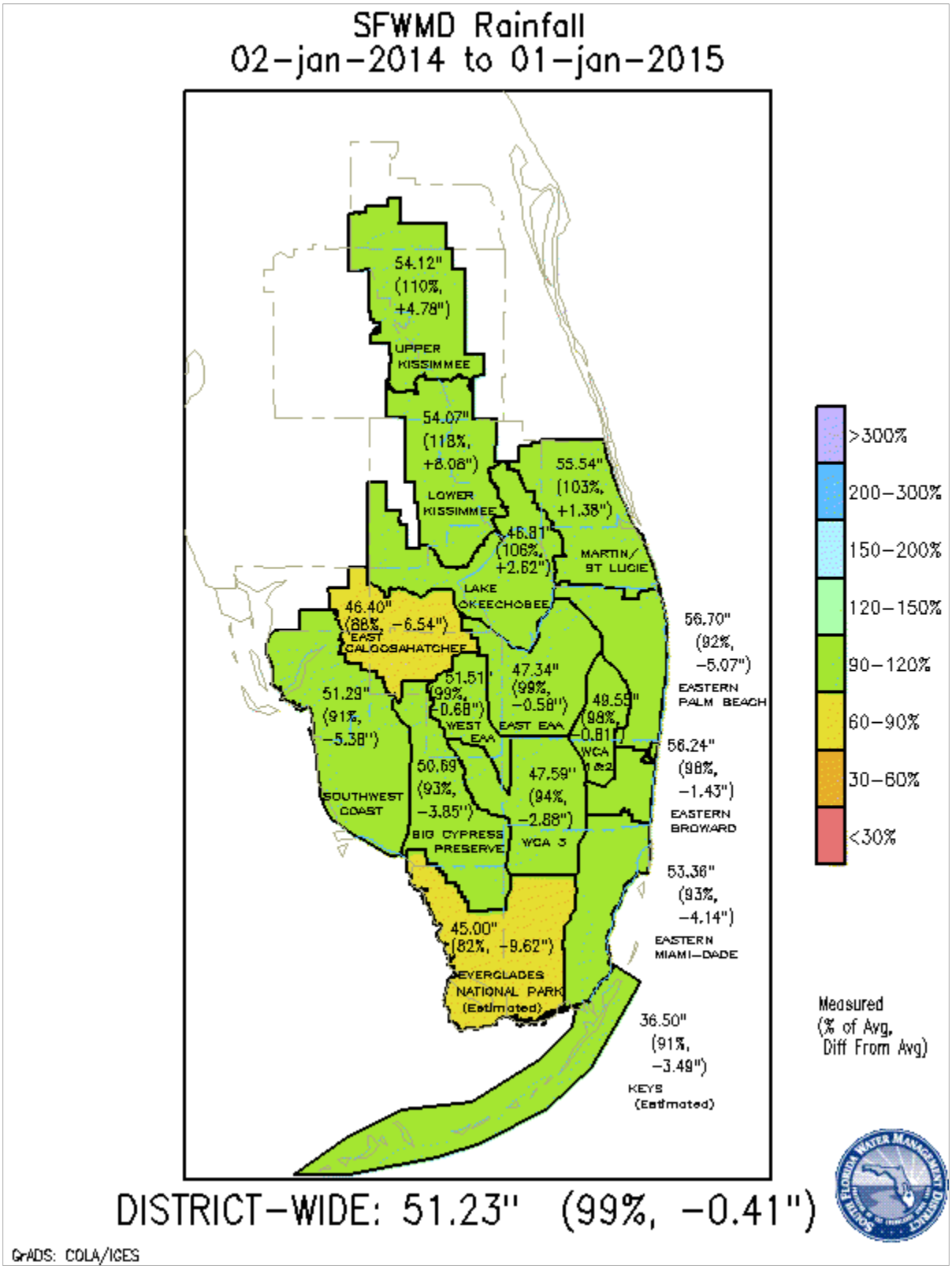

Figure 4. SFWMD 2014 Rainfall Distribution Map

DATA SOURCES

The primary sources of data for this report are permittee-reported monthly pumpage volumes recorded in the SFWMD Water Use Bureau's database (RegDB). Quarterly reporting of monthly data generally is required for all permittees with permit quantities exceeding 0.1 MGD. As discussed earlier in this report, monthly pumpage data are collected using calibrated flow meters or other approved water use accounting methods. Estimates of water use were made for permittees that had not reported based on the assumptions described in the methodology section earlier and in the specific use category sections that follow. Rainfall data were provided by the District's Operations Section.

For this report, the estimated water use amounts are based on an initial data extraction performed for all use classes on April 22, 2015 for active permits through December 31, 2014. Additional data extractions were performed on August 18, 2015 and October 20, 2015 for the AGR and REC use classes, respectively, and on October 21, 2015 for the D&I use class.

2014 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 Water 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 water supply (PWS). This encompasses water supplied by water treatment facilities for potable use (i.e., drinking quality) with projected average pumpage rates >0.1 MGD. The volumes reported represent gross (raw) water withdrawn before treatment and distribution losses. In 2014, there were 117 active PWS permits (>0.1 MGD) serving an estimated 7.68 million people (95 percent of the total population). PWS use often fluctuates during the year in response to seasonal rainfall and variations in temperature and seasonal and tourist population. For 2014, the total water use for PWS was 1,075.42 MGD with 88 percent coming from freshwater sources and 12 percent coming from saline water sources. Groundwater contributed 97 percent of the water and surface water accounted for the remaining 3 percent. **Appendix A**, Table A-1, presents total water use Districtwide and by county from groundwater and surface water sources for fresh and saline water in the PWS category.

Domestic Self-Supply

Domestic self-supply (DSS) use is primarily for individual residences located in rural areas without access to a PWS system, and water for DSS users often is provided by small shallow private wells. Domestic consumption at individual 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. The DSS category for reporting purposes also includes PWS utilities withdrawing <0.1 MGD. These typically serve a limited number of households (e.g., a small subdivison or mobile home park) or a single structure such as a sales trailer, small office, or convenience store. There were

1,153 permits for PWS <100,000 gallons per day in 2014. All water volumes reported under the DSS category are considered fresh groundwater.

Because DSS residential users are not required to report their use, estimations for the DSS category were based on county population data and the PWS use within each county. The DSS demand estimate was calculated by multiplying the 2014 DSS county populations by the 2014 PWS Districtwide uniform residential per capita use rate (PCUR). The 2014 PWS Districtwide uniform residential PCUR was derived from uniform residential PCURs voluntarily reported by utilities to the District as part of their annual reporting required pursuant to Section 373.709(6), Florida Statutes. **Appendix B** contains further information regarding population, PCURs, and self-supplied use calculations.

The 2014 total water use for DSS (and small PWS systems) was estimated to be 32.74 MGD with 100 percent coming from fresh groundwater sources. **Appendix A**, Table A-2, presents total water use Districtwide and by county from groundwater and surface water sources for fresh and saline water in the DSS category.

Industrial/Commercial/Institutional Self-Supply

Industrial/commercial/institutional self-supply (ICI) consists of self-supplied water consumed by business operations of ≥0.1 MGD. The ICI category includes industrial and commercial facilities for production processing, manufacturing, and technical needs such as concrete, and citrus and vegetable processing. Some larger facilities (institutions) such as schools, hospitals, and prisons also are included in the ICI category primarily for heating, ventilation, and cooling (HVAC) system operations. Water use totals for ICI facilities receiving water from PWS utilities (i.e., not self-supplied) are included in the PWS category.

Mining is included in the ICI use category. The mining uses reported herein are for dust suppression, washing and sorting of mined materials, non-recycled transport water, on-site mining processes, water entrained with the product, and minor volumes for potable/sanitary use by on-site employees. The volumes reported do not include dewatering to facilitate mining operations, which is separately permitted under the dewatering use class and is not included in this report.

The volumes reported herein reflect the volumes reported by individual permittees plus an estimated volume for permittees that did not report. The estimated volume was based on the ratio (36 percent in this case) of reported pumpage to allocation for permittees who did report, multiplied by the allocation of the permits that did not report. Permittees reporting zero were not excluded from the dataset in determining the percentage pumpage rate to apply to the estimated permits.

The ICI use category includes 31 mining and 26 industrial permits that have an allocation of >0.1 MGD and 1,033 permits with an allocation <0.1 MGD. ICI does not include water used for power generation or mining dewatering. The total 2014 water use for ICI was 113.33 MGD, with fresh groundwater contributing 54 percent and fresh surface water contributing 46 percent. Industrial use accounted for 38 MGD (34 percent) and mining use accounted for 75 MGD (66 percent) of the total ICI use. **Appendix A**, Table A-3, presents total water use Districtwide and by county from groundwater and surface water sources for fresh and saline water in the ICI category.

Agricultural Self-Supply

Agricultural self-supply (AGR) includes water used for commercial crop irrigation, nurseries, livestock watering, pasture, and aquaculture. AGR estimates were based on the methodology described in the Water Use Estimation Methodology section of this report with the following exceptions:

- For the agriculture and nursery permitting use classes, the ratio of use multipliers were determined by water supply planning regions to take regional weather effects into account.
- For the aquaculture permitting use class, only one permittee reported. All others were estimated using that permittees ratio of use multiplier (86 percent).
- For the livestock permitting use class, only one region reported. All other regions were estimated using that region's ratio of use multiplier (74 percent).

The AGR category included 3,876 permits (2,520 agriculture, 847 nursery, 430 livestock, and 79 aquaculture). Additionally, the AGR category includes water used by 23 permits from the D&I permitting use class, described in the Water Supply Categories section, which exclusively serve agriculture as well as 2 D&I permits that partially serve agriculture.

Everglades Agricultural Area

The Everglades Agricultural Area (EAA) is located south of Lake Okeechobee and was created from drainage of the northern Everglades. The EAA encompasses approximately 700,000 acres (1,158 square miles) of highly productive agricultural land, most of which is sugar cane with other crops such as winter vegetables, sod, and rice making up the remainder. The EAA extends south from Lake Okeechobee to the northern levee 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 (**Figure 5**). Four major canals (West Palm Beach, Hillsboro, North New River, and Miami) pass through the EAA and supply agricultural irrigation, mainly through gravity release from Lake Okeechobee. Farmers utilize a set of secondary and tertiary farm canals to distribute water from several gated culverts and pumps to their respective fields. Flows from Lake Okeechobee into the canals are from structures S-351, S-352, and S-354. Runoff (outflow from the EAA) from the four canals to the Stormwater Treatment Areas are discharged through pump structures S-5A, S-319, S-6, G-370, G-372, and G-434. Daily records of the volumes into and out of these structures are kept such that a demand volume of the EAA can be calculated using a water balance method. A total volume of 349.74 MGD was calculated for water demands within the EAA for 2014 by the Technical Support Unit of the District's Everglades Regulation Bureau. Within the EAA, there are 9 agricultural permits in Hendry County and 77 permits in Palm Beach County serving 367,057 acres (573.5 square miles) of agriculture. There is one D&I permit in the EAA in Hendry County and eight D&I permits in Palm Beach County serving 99,290 acres (155.1 square miles) of primarily agriculture.

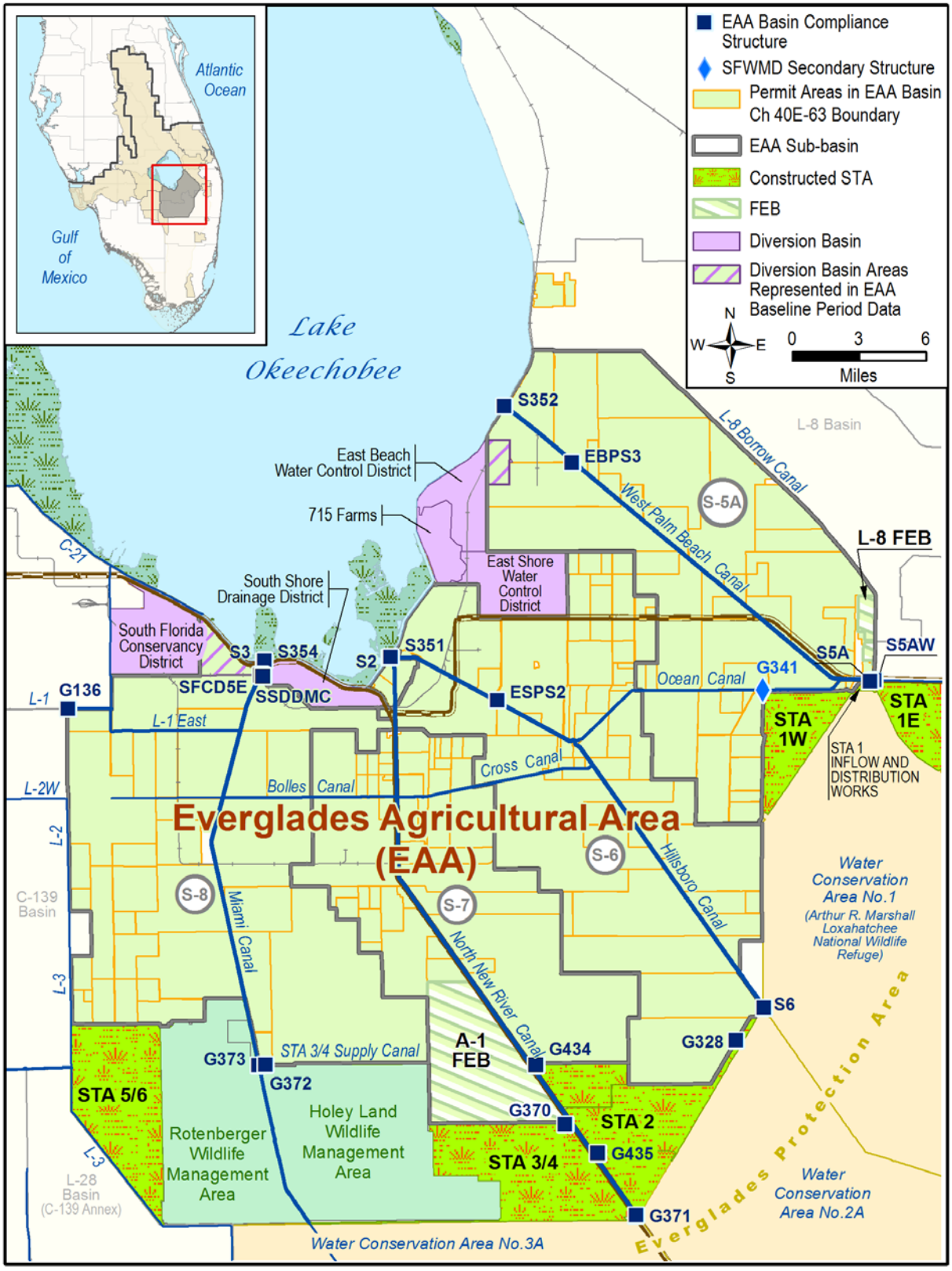

Figure 5. Everglades Agricultural Area Map

The total 2014 water use for AGR (including the EAA) was 1,076.82 MGD. Of this total volume, agriculture (crop irrigation) outside the EAA accounted for 550 MGD (51 percent); agriculture in the EAA was 350 MGD (32 percent); agriculture within D&I areas was 147 MGD (14 percent); and aquaculture, livestock, and nursery combined were 31 MGD (3 percent). The water was derived from fresh surface water sources (69 percent) and fresh groundwater sources (31 percent). **Appendix A**, Table A-4, presents total water use Districtwide and by county from groundwater and surface water sources for fresh and saline water in the AGR category.

Recreational/Landscape Self-Supply

Recreational/landscape self-supply (REC) 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 >0.1 MGD. The volumes reflect those reported plus an estimated volume based on the ratio (percentage) of reported pumpage to allocation for permittees who did report multiplied by the allocation of the permits that did not report. A percentage was calculated for each planning area to take regional weather effects into account.

There were 12,516 permits for landscape irrigation and 337 permits for golf courses in 2014. An additional 10 permits, classified as PWS, were used for augmentation of reclaimed water (or other water sources) for landscape irrigation use and are included in the REC category. Total water use for REC was 271 MGD for 2014. Of this, landscape irrigation accounted for 182 MGD (67 percent), golf course irrigation was 86 MGD (32 percent), and reclaimed supplementation for irrigation use was 4 MGD (1 percent). Fifty-five percent of the total water use was surface water and 45 percent was groundwater. There were nine golf and two landscape permits utilizing a total of 3.2 MGD of saline water. **Appendix A**, Table A-5, presents total water use Districtwide and by county from groundwater and surface water sources for fresh and saline water in the REC category.

Power Generation Self-Supply

Power generation self-supply (PWR) 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 2014 water use for PWR was 23.60 MGD, with 96 percent coming from freshwater sources and 4 percent coming from saline water sources. Groundwater contributed 56 percent of the water and surface water contributed the remaining 44 percent. **Appendix A**, Table A-6, presents total water use Districtwide and by county from groundwater and surface water sources for fresh and saline water in the PWR category.

A very large amount of water is used for once-through cooling at power plants in the District. The once-through cooling volumes are considered non-consumptive and are being provided for informational purposes only. The total 2014 water use reported to the District for once-through cooling for PWR was 2,698 MGD. Of this volume, 2,694 MGD was saline water and the remaining 3.95 MGD was fresh water. Only 1.4 MGD of the total water was derived from groundwater.

Reclaimed Water

Reclaimed water is water flowing out of a domestic wastewater treatment facility that has received at least secondary treatment and basic disinfection and is reused for some beneficial purpose. The SFWMD requires all applicants for water use permits proposing to irrigate with >0.1 MGD of water, and applicants within a municipal mandatory reuse zone, to use reclaimed water if it is 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 2014, a total of 277.90 MGD of reclaimed water was used in the District. Of this, 217.53 MGD was reused for the six water supply categories, and 60.37 MGD was reused for groundwater recharge and other non-water-use purposes. **Tables 1** and **2** as well as **Appendix A**, Table A-7 and Figures A-2 and A-3, present reclaimed water use by county and use category.

SUMMARY OF 2014 ESTIMATED WATER USE

As shown in **Table 1**, the total amount of water withdrawn from the groundwater and surface water resources in 2014 in the District was approximately 2,593 MGD. The two largest water users were PWS and AGR, split nearly equally at 1,075 MGD and 1,077 MGD, respectively. These two users constitute 83 percent of the total water use. Of the total use, 1,604 MGD (62 percent) came from groundwater and 989 MGD (38 percent) came from surface water sources. Approximately 2,456 MGD (95 percent) was withdrawn from fresh water sources and 137 MGD (5 percent) was derived from saline water sources. In addition, reclaimed water for water use totaled almost 218 MGD in 2014. Of the total 2,593 MGD, 25 percent (650 MGD) was estimated and 75 percent (1,943 MGD) was derived from reported pumpage (**Appendix C**). PWS is largest in Miami-Dade County while Palm Beach County has the largest estimated AGR use. Palm Beach County also has the greatest use of reclaimed water by volume.

Table 1. Total Water Use by Category and Source (Including Reclaimed Water) in MGD[1]

Water Use Category	Fresh Water	Saline Water	Surface Water	Groundwater	**Total Use**	Reclaimed Water	**Total Use with Reclaimed Water**
Agriculture Self-Supply	1,076.82	0.00	741.83	334.99	**1,076.82**	6.51	**1,083.33**
Industrial/Commercial/ Institutional Self-Supply	113.34	0.00	51.94	61.41	**113.34**	26.72	**140.06**
Domestic Self-Supply	32.74	0.00	0.00	32.74	**32.74**	0.00	**32.74**
Recreation/Landscape Self-Supply	267.84	3.16	147.78	123.22	**271.00**	165.70	**436.70**
Power Generation Self-Supply	22.88	0.73	10.34	13.27	**23.61**	18.60	**42.21**
Public Water Supply	942.03	133.38	37.01	1,038.41	**1,075.42**	0.00	**1,075.42**
Total	**2,455.66**	**137.27**	**988.90**	**1,604.04**	**2,592.94**	**217.53**	**2,810.47**

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

Figure 6 depicts the percentage of total water use by category. **Table 2** presents the breakdown of water use by county of fresh, saline, surface, and groundwater. **Figure 7** depicts fresh water versus

saline water use by county. **Figure 8** depicts surface water versus groundwater by county. **Table 3** presents the breakdown of water used by county and by use category (excluding reclaimed).

Table 2. 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	262.35	9.10	27.84	243.61	**271.45**	15.86	**287.31**
Charlotte	5.29	0.00	2.50	2.79	**5.29**	0.12	**5.41**
Collier	198.40	13.01	43.88	167.52	**211.40**	23.32	**234.72**
Glades	96.91	0.34	83.48	13.78	**97.25**	0.00	**97.25**
Hendry	257.48	2.24	159.44	100.27	**259.72**	1.36	**261.08**
Highlands	45.97	0.51	8.96	37.52	**46.48**	0.00	**46.48**
Lee	130.65	39.62	53.41	116.87	**170.28**	49.68	**219.96**
Martin	117.77	11.76	91.43	38.11	**129.53**	4.03	**133.56**
Miami-Dade	418.78	12.75	19.22	412.31	**431.53**	12.94	**444.47**
Monroe	0.05	1.12	0.00	1.17	**1.17**	0.37	**1.54**
Okeechobee	30.77	0.00	13.86	16.91	**30.77**	0.52	**31.29**
Orange	87.61	0.00	4.06	83.55	**87.61**	35.25	**122.86**
Osceola	57.87	0.00	2.09	55.78	**57.87**	15.47	**73.34**
Palm Beach	667.00	26.32	442.87	250.45	**693.33**	54.44	**747.77**
Polk	9.81	0.00	0.49	9.32	**9.81**	0.05	**9.86**
St. Lucie	68.94	20.51	35.37	54.08	**89.45**	4.12	**93.57**
Total	**2,455.64**	**137.28**	**988.90**	**1,604.04**	**2,592.94**	**217.53**	**2,810.47**

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

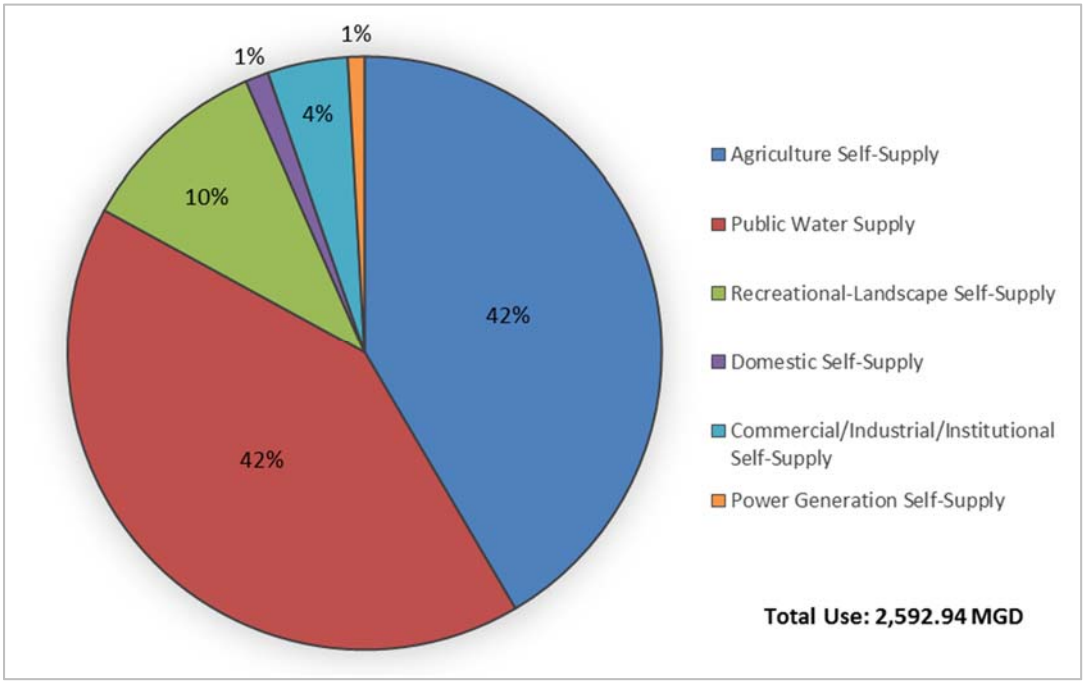

Figure 6. Percentage Water Use by Category

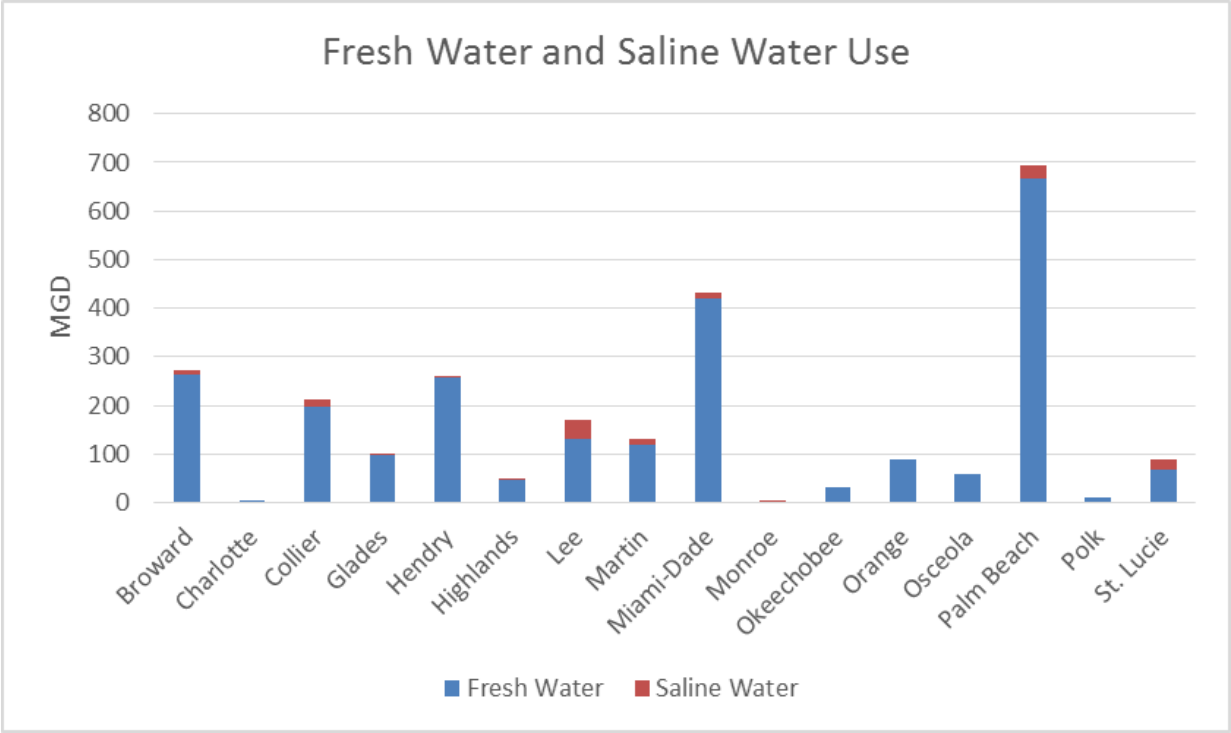

Figure 7. Fresh Water and Saline Water Use by County for All Use Categories

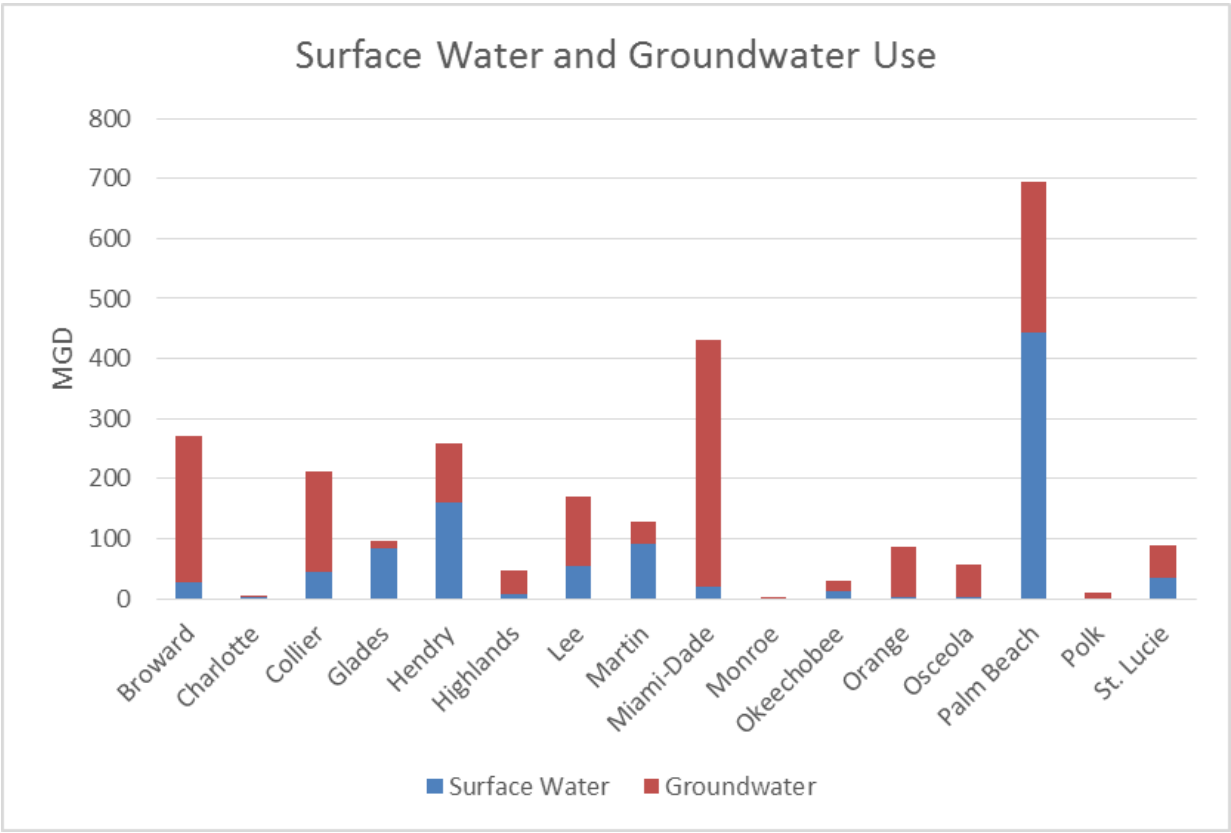

Figure 8. Surface Water and Groundwater Use by County for All Use Categories

Table 3. Water Use by County and Category in MGD (Excludes Reclaimed Water)[1]

County	Agriculture Self-Supply	Industrial/ Commercial/ Institutional Self-Supply	Domestic Self-Supply	Recreation/ Landscape Self-Supply	Power Generation Self-Supply	Public Water Supply	**Total**
Broward	3.44	5.20	0.66	37.81	0.00	224.35	**271.45**
Charlotte	4.97	0.12	0.01	0.09	0.00	0.10	**5.29**
Collier	102.80	5.11	2.28	47.24	0.00	53.98	**211.40**
Glades	88.46	7.19	0.60	0.17	0.00	0.84	**97.25**
Hendry	251.48	2.77	1.06	1.26	0.00	3.14	**259.72**
Highlands	43.42	1.86	0.50	0.45	0.00	0.24	**46.48**
Lee	21.74	16.34	6.82	61.09	0.28	64.00	**170.28**
Martin	88.75	2.06	0.63	8.70	9.83	19.56	**129.53**
Miami-Dade	22.14	48.78	2.07	14.70	10.60	333.22	**431.53**
Monroe	0.02	0.01	0.00	1.13	0.00	0.00	**1.17**
Okeechobee	15.93	10.01	1.31	1.02	0.00	2.49	**30.77**
Orange	0.30	2.52	0.56	9.82	0.00	74.42	**87.61**
Osceola	11.20	0.19	5.90	5.93	0.11	34.54	**57.87**
Palm Beach	371.18	10.80	6.68	72.32	1.49	230.86	**693.33**
Polk	2.14	0.04	1.44	0.78	0.00	5.42	**9.81**
St. Lucie	48.85	0.33	2.22	8.49	1.29	28.26	**89.45**
Total	**1,076.82**	**113.33**	**32.74**	**271.00**	**23.60**	**1,075.42**	**2,592.94**

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

REFERENCES

Marella, R.L. 2014. *Water Withdrawals, Use, and Trends in Florida, 2010*. U.S. Geological Survey Scientific Investigations Report 2014-5088. 59 pp. http://pubs.usgs.gov/sir/2014/5088/.

South Florida Water Management District. 2015. *Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District.* http://www.sfwmd.gov/portal/page/portal/xrepository/sfwmd_repository_pdf/wu_applicants_handbook.pdf

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APPENDIX A: WATER USE BY CATEGORY

Table A-1. Public Water Supply[1]

County	Fresh Water (MGD)	Saline Water (MGD)	Surface Water (MGD)	Groundwater (MGD)	**Total Use (MGD)**	Number of Permits
Broward	215.25	9.10	0.00	224.35	**224.35**	26
Charlotte	0.10	0.00	0.00	0.10	**0.10**	3
Collier	40.97	13.01	6.42	47.56	**53.98**	9
Glades	0.50	0.34	0.00	0.84	**0.84**	2
Hendry	0.90	2.24	0.00	3.14	**3.14**	3
Highlands	0.00	0.24	0.00	0.24	**0.24**	2
Lee	24.38	39.62	1.98	62.02	**64.00**	12
Martin	8.61	10.95	0.00	19.56	**19.56**	10
Miami-Dade	303.57	12.18	0.00	315.75	**315.75**	7
Monroe*	0.00	0.00	0.00	0.00	**0.00**	0
Okeechobee	2.49	0.00	1.78	0.71	**2.49**	2
Orange	74.42	0.00	0.00	74.42	**74.42**	4
Osceola	34.54	0.00	0.00	34.54	**34.54**	4
Palm Beach	206.22	24.64	26.83	204.03	**230.86**	20
Polk	5.42	0.00	0.00	5.42	**5.42**	5
St. Lucie	7.77	20.49	0.00	28.26	**28.26**	8
Total	**942.04**	**133.38**	**37.01**	**1,038.41**	**1,075.42**	**117**

[1] Values are only for the portions of the county located within the SFWMD.
*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 (17.47 MGD of groundwater [16.90 MGD fresh and 0.57 MGD saline]) is included in the Miami-Dade County totals.

Table A-2. Domestic Self-Supply[1]

County	Fresh Water (MGD)	Saline Water (MGD)	Surface Water (MGD)	Groundwater (MGD)	**Total Use (MGD)**	Number of Permits*
Broward	0.66	0.00	0.00	0.66	**0.66**	22
Charlotte	0.01	0.00	0.00	0.01	**0.01**	7
Collier	2.28	0.00	0.00	2.28	**2.28**	88
Glades	0.60	0.00	0.00	0.60	**0.60**	25
Hendry	1.06	0.00	0.00	1.06	**1.06**	64
Highlands	0.50	0.00	0.00	0.50	**0.50**	29
Lee	6.82	0.00	0.00	6.82	**6.82**	159
Martin	0.63	0.00	0.00	0.63	**0.63**	132
Miami-Dade	2.07	0.00	0.00	2.07	**2.07**	78
Monroe	0.00	0.00	0.00	0.00	**0.00**	0
Okeechobee	1.31	0.00	0.00	1.31	**1.31**	89
Orange	0.56	0.00	0.00	0.56	**0.56**	16
Osceola	5.90	0.00	0.00	5.90	**5.90**	88
Palm Beach	6.68	0.00	0.00	6.68	**6.68**	153
Polk	1.44	0.00	0.00	1.44	**1.44**	25
St. Lucie	2.22	0.00	0.00	2.22	**2.22**	178
Total	**32.74**	**0.00**	**0.00**	**32.74**	**32.74**	**1,153**

[1] Values are only for the portions of the county located within the SFWMD.
*PWS permits <0.1 MGD included.

Table A-3. Industrial/Commercial/Institutional Self-Supply[1]

County	Fresh Water (MGD)	Saline Water (MGD)	Surface Water (MGD)	Groundwater (MGD)	**Total Use (MGD)**	Number of Permits
Broward	5.20	0.00	0.01	5.19	**5.20**	212
Charlotte	0.12	0.00	0.10	0.02	**0.12**	6
Collier	5.11	0.00	2.93	2.18	**5.11**	240
Glades	7.19	0.00	6.15	1.04	**7.19**	89
Hendry	2.77	0.00	0.23	2.54	**2.77**	13
Highlands	1.86	0.00	0.02	1.84	**1.86**	39
Lee	16.34	0.00	13.43	2.91	**16.34**	16
Martin	2.06	0.00	0.54	1.52	**2.06**	178
Miami-Dade	48.78	0.00	14.19	34.59	**48.78**	48
Monroe	0.01	0.00	0.00	0.01	**0.01**	2
Okeechobee	10.01	0.00	9.80	0.21	**10.01**	25
Orange	2.52	0.00	0.00	2.52	**2.52**	17
Osceola	0.19	0.00	0.03	0.16	**0.19**	23
Palm Beach	10.80	0.00	4.45	6.35	**10.80**	183
Polk	0.04	0.00	0.00	0.04	**0.04**	2
St. Lucie	0.33	0.00	0.04	0.29	**0.33**	36
Total	**113.33**	**0.00**	**51.92**	**61.41**	**113.33**	**1,129**

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

Table A-4. Agriculture Self-Supply[1]

County	Fresh Water (MGD)	Saline Water (MGD)	Surface Water (MGD)	Groundwater (MGD)	**Total Use (MGD)**	Number of Permits
Broward	3.44	0.00	2.81	0.63	**3.44**	123
Charlotte	4.97	0.00	2.39	2.58	**4.97**	22
Collier	102.80	0.00	6.75	96.05	**102.80**	179
Glades	88.46	0.00	77.24	11.22	**88.46**	142
Hendry	251.48	0.00	158.74	92.74	**251.48**	278
Highlands	43.42	0.00	8.88	34.54	**43.42**	187
Lee	21.74	0.00	6.08	15.66	**21.74**	321
Martin	88.75	0.00	77.22	11.53	**88.75**	204
Miami-Dade	22.14	0.00	0.51	21.63	**22.14**	1,132
Monroe	0.02	0.00	0.00	0.02	**0.02**	2
Okeechobee	15.93	0.00	1.92	14.01	**15.93**	195
Orange	0.30	0.00	0.09	0.21	**0.30**	28
Osceola	11.20	0.00	0.64	10.56	**11.20**	149
Palm Beach	371.18	0.00	366.17	5.01	**371.18**	540
Polk	2.14	0.00	0.49	1.65	**2.14**	31
St. Lucie	48.85	0.00	31.90	16.95	**48.85**	343
Total	**1,076.82**	**0.00**	**741.83**	**334.99**	**1,076.82**	**3,876**

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

Table A-5. Recreational/Landscape Self-Supply[1]

County	Fresh Water (MGD)	Saline Water (MGD)	Surface Water (MGD)	Groundwater (MGD)	**Total Use (MGD)**	Number of Permits
Broward	37.81	0.00	25.02	12.79	**37.81**	2,795
Charlotte	0.09	0.00	0.00	0.09	**0.09**	6
Collier	47.24	0.00	27.79	19.45	**47.24**	875
Glades	0.17	0.00	0.09	0.08	**0.17**	14
Hendry	1.26	0.00	0.47	0.79	**1.26**	100
Highlands	0.19	0.27	0.05	0.41	**0.45**	12
Lee	61.09	0.00	31.92	29.17	**61.09**	2,358
Martin	7.89	0.81	4.00	4.70	**8.70**	694
Miami-Dade	14.70	0.00	4.52	10.18	**14.70**	965
Monroe	0.01	1.12	0.00	1.13	**1.13**	3
Okeechobee	1.02	0.00	0.36	0.66	**1.02**	127
Orange	9.82	0.00	3.97	5.85	**9.82**	200
Osceola	5.93	0.00	1.41	4.52	**5.93**	183
Palm Beach	71.37	0.95	44.75	27.57	**72.32**	3,659
Polk	0.78	0.00	0.00	0.78	**0.78**	14
St. Lucie	8.47	0.01	3.43	5.05	**8.49**	858
Total	**267.84**	**3.16**	**147.78**	**123.22**	**271.00**	**12,863**

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

Table A-6. Power Generation Self-Supply[1]

County	Fresh Water (MGD)	Saline Water (MGD)	Surface Water (MGD)	Groundwater (MGD)	**Total Use (MGD)**
Lee	0.28	0.00	0.00	0.28	**0.28**
Martin	9.83	0.00	9.65	0.18	**9.83**
Miami-Dade	10.60	0.00	0.00	10.60	**10.60**
Osceola	0.11	0.00	0.00	0.11	**0.11**
Palm Beach	0.76	0.73	0.68	0.81	**1.49**
St. Lucie	1.29	0.00	0.00	1.29	**1.29**
Total	**22.87**	**0.73**	**10.33**	**13.27**	**23.60**

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

Table A-7. Reclaimed Water Use by County and Use Types (From: FDEP 2015)

County	Reclaimed Water Flow[1] (MGD)	Public Water Supply (MGD)	Domestic Self-Supply (MGD)	Industrial/ Commercial/ Institutional Self-Supply[2] (MGD)	Agricultural Irrigation Self-Supply[3] (MGD)	Recreational/ Landscape Self-Supply[4] (MGD)	Power Generation Self-Supply[5] (MGD)
Broward	15.86	0.00	0.00	7.83	0.00	7.13	0.90
Charlotte	0.12	0.00	0.00	0.12	0.00	0.00	0.00
Collier	23.32	0.00	0.00	0.00	0.53	22.79	0.00
Glades	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hendry	1.36	0.00	0.00	0.00	1.36	0.00	0.00
Highlands	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lee	49.68	0.00	0.00	0.34	0.05	48.35	0.94
Martin	4.03	0.00	0.00	0.04	0.22	3.52	0.25
Miami-Dade	12.94	0.00	0.00	12.84	0.00	0.10	0.00
Monroe	0.37	0.00	0.00	0.01	0.00	0.36	0.00
Okeechobee	0.52	0.00	0.00	0.00	0.52	0.00	0.00
Orange	35.25	0.00	0.00	4.05	3.71	27.49	0.00
Osceola	15.47	0.00	0.00	0.01	0.04	13.41	2.01
Palm Beach	54.44	0.00	0.00	1.32	0.03	38.59	14.50
Polk	0.05	0.00	0.00	0.00	0.05	0.00	0.00
St. Lucie	4.12	0.00	0.00	0.16	0.00	3.96	0.00
Total	**217.53**	**0.00**	**0.00**	**26.72**	**6.51**	**165.70**	**18.60**

[1] Reclaimed water flows as reported in the FDEP 2014 Reuse Inventory, not including 60.37 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".

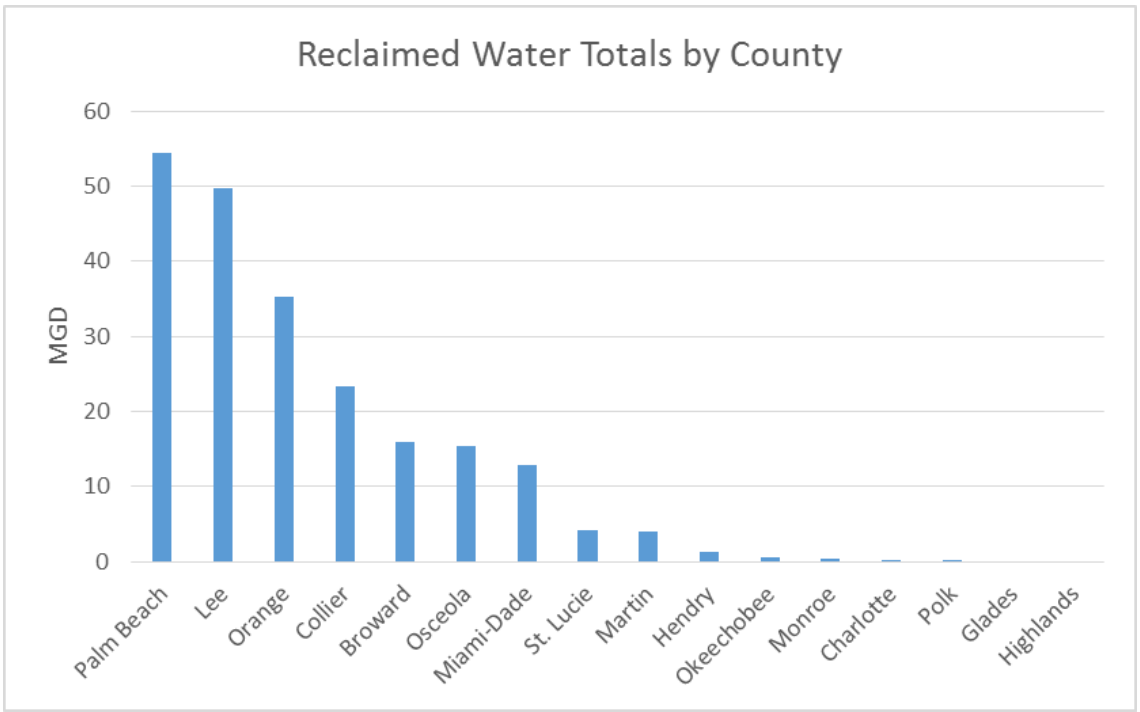

Figure A-1. Reclaimed Water Reused by County

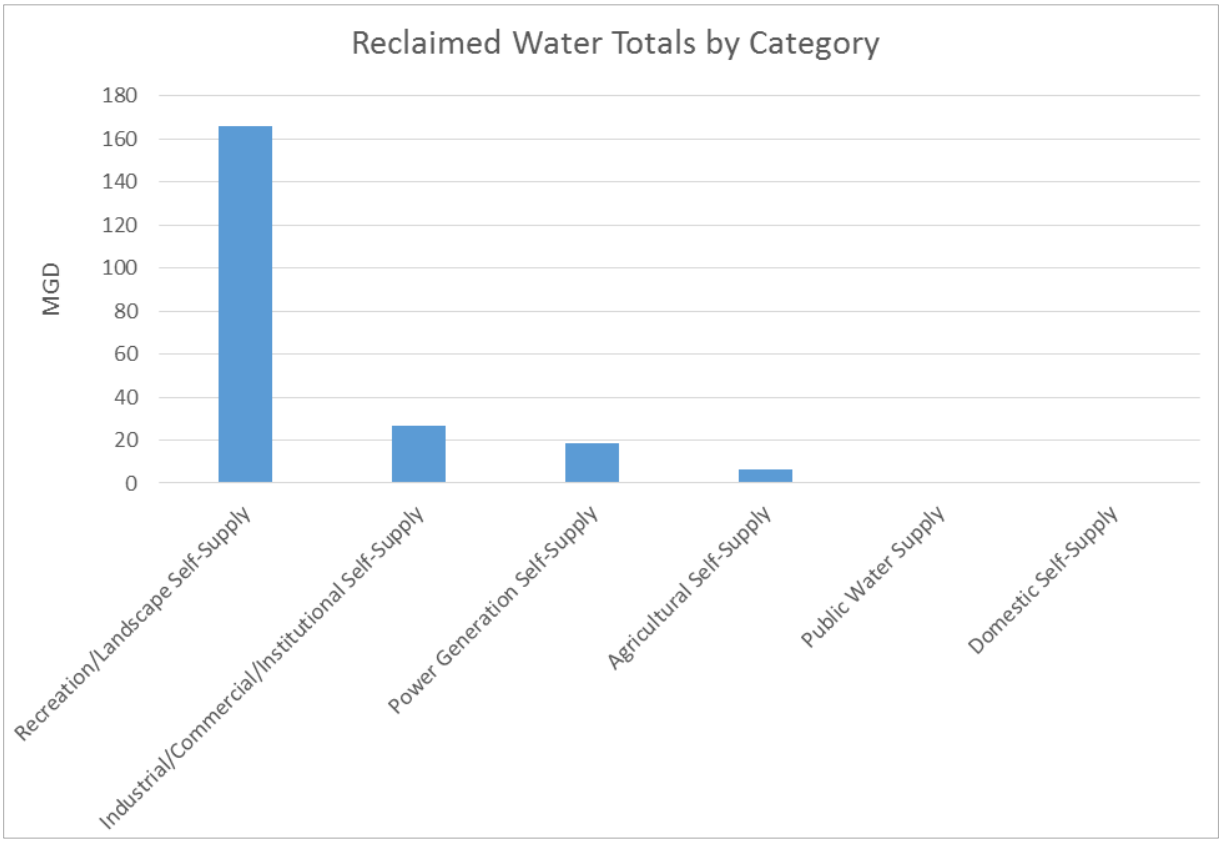

Figure A-2. Reclaimed Water Reused by Category

References

Florida Department of Environmental Protection. 2015. *2014 Reuse Inventory*. S. Speas-Frost (ed.), Florida Department of Environmental Protection, Water Reuse Program, Tallahassee. www.dep.state.fl.us/water/reuse/inventory.htm

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APPENDIX B: DSS POPULATION AND DEMAND METHODOLOGY

Population

Population estimates are intended for planning purposes only; 2014 permanent county population estimates are from the Bureau of Economic and Business Research (BEBR 2014). For counties located within more than one water management district, the 2014 estimates within the South Florida Water Management District (SFWMD) were derived by approximating the SFWMD's portion of the 2010 U.S. Census population at the block level. Domestic Self-Supply (DSS) population was estimated by multiplying the 2014 BEBR estimated county population by the percentage of the population self-supplied as contained in the current water supply plan.

Demand Estimates

The DSS demand estimate was calculated by multiplying the 2014 DSS county populations by the 2014 Public Water Supply (PWS) Districtwide uniform residential per capita use rate (PCUR). The 2014 PWS Districtwide uniform residential PCUR was derived from uniform residential PCURs (treated water) voluntarily reported by utilities to the District as part of their annual reporting required pursuant to Section 373.709(6), Florida Statutes. Based on the reported submissions the District has calculated a 2014 Districtwide, population weighted, residential PCUR of 83.64 gallons (treated water). Minimal treatment and distribution losses are anticipated in DSS and smaller scale utility systems such that the uniform residential per capita use rate and domestic self-supplied per capita use rates are comparable. **Table B-1** provides the PWS and DSS populations and estimates of the DSS demands.

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

County	PWS Total Population[1]	DSS Total population[1]	Total Population	% DSS/ Total	2014 County Total Population BEBR[2]	DSS Population for Report (% × County BEBR)	2014 Uniform Residential Per Capita (Weighted Avg.)	DSS (MGD)
Broward	1,740,468	7,598	1,748,066	0.4%	1,803,903	7,841	83.64	0.66
Charlotte	0	68	68	N/A	1,401	68	83.64	0.01
Collier	292,113	25,676	317,789	8.1%	336,783	27,211	83.64	2.28
Glades	2,648	3,309	5,957	55.5%	12,977	7,208	83.64	0.60
Hendry	23,416	11,600	35,016	33.1%	38,228	12,664	83.64	1.06
Highlands	3,230	7,258	10,488	69.2%	8,697	6,019	83.64	0.50
Lee	480,875	68,566	549,441	12.5%	653,485	81,550	83.64	6.82
Martin	143,122	7,588	150,710	5.0%	148,585	7,481	83.64	0.63
Miami-Dade	2,472,741	23,694	2,496,435	0.9%	2,613,692	24,807	83.64	2.07
Monroe	73,090	0	73,090	0.0%	74,044	0	83.64	0.00
Okeechobee	23,327	15,161	38,488	39.4%	39,828	15,689	83.64	1.31
Orange[3]	331,634	6,529	338,163	1.9%	346,824	6,696	83.64	0.56
Osceola[3]	201,922	63,238	265,160	23.8%	295,553	70,486	83.64	5.90
Palm Beach	1,242,621	77,513	1,320,134	5.9%	1,360,238	79,868	83.64	6.68
Polk[3]	13,830	13,333	27,163	49.1%	35,178	17,267	83.64	1.44
St. Lucie[4]	256,196	26,566	282,762	9.4%	282,821	26,572	83.64	2.22
Total	**7,301,233**	**357,697**	**7,658,930**	**4.7%**	**8,052,237**	**391,426**	**83.64**	**32.74**

[1] Obtained from Appendix A of the current SFWMD water supply plan: 2012 Lower West Coast Water Supply Plan Update, 2013 Lower East Coast Water Supply Plan Update, 2014 Lower Kissimmee Basin Water Supply Plan Update.
[2] April 2014, partial counties adjusted by 2010 census block level.
[3] Obtained from Appendix A (Tables A-2 and A-3) of the 2015 Central Florida Water Initiative Regional Water Supply Plan.
[4] Obtained from Table 2-1 of the Draft 2016 Upper East Coast Water Supply Plan Update.

References

Bureau of Economic and Business Research. 2014. *Florida Estimates of Population 2014: April 1, 2014.* Gainesville, FL. Bureau of Economic Business and Research, University of Florida. https://www.bebr.ufl.edu/sites/default/files/population/Estimates_2014.pdf

APPENDIX C: METADATA TABLES

Table C-1. Reported versus Estimated Use by County

County	Total (MGD)	Reported (MGD)	Estimated (MGD)	% Estimated
Broward	271.45	243.95	27.50	10%
Charlotte	5.29	4.96	0.33	6%
Collier	211.40	190.98	20.43	10%
Glades	97.25	84.83	12.42	13%
Hendry	259.72	201.35	58.36	22%
Highlands	46.48	40.58	5.90	13%
Lee	170.28	131.64	38.64	23%
Martin	129.53	118.02	11.51	9%
Miami-Dade	431.53	400.53	31.00	7%
Monroe	1.17	1.12	0.05	4%
Okeechobee	30.77	21.83	8.94	29%
Orange	87.61	80.01	7.60	9%
Osceola	57.87	45.00	12.87	22%
Palm Beach	693.33	300.33	393.00	57%
Polk	9.81	6.85	2.96	30%
St. Lucie	89.45	70.60	18.85	21%
Total	**2,592.94**	**1,942.58**	**650.36**	**25%**

Table C-2. Reported versus Estimated Use by Water Use Category

Water Use Category	Total (MGD)	Reported (MGD)	Estimated (MGD)	% Estimated
Agriculture Self-Supply	1,076.82	596.75	480.07	45%
Industrial/Commercial/Institutional Self-Supply	113.35	91.90	21.45	19%
Domestic Self-Supply	32.74	0.00	32.74	100%
Power Generation Self-Supply	23.61	23.61	0.00	0%
Public Water Supply	1,075.42	1,075.42	0.00	0%
Recreation/Landscape Self-Supply	271.00	154.90	116.10	43%
Total	**2,592.94**	**1,942.58**	**650.36**	**25%**