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FCRU's Response to JEA's 2nd Interrogatories Nos. 23-28, 30-32, 35

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Application for Original Certificate of Authorization and Initial Rates and Charges for Water and Wastewater Service in Duval, Baker and Nassau Counties, Florida by FIRST COAST REGIONAL UTILITIES, INC.	)))))))	DOCKET NO. 20190168-WS FILED: July 9, 2020

FIRST COAST REGIONAL UTILITIES, INC.'S ANSWERS TO JEA'S SECOND INTERROGATORIES TO FIRST COAST REGIONAL UTILITIES, INC.

First Coast Regional Utilities, Inc. ("Applicant"), pursuant to rule 1.340, Florida Rules of Civil Procedure, responds to JEA's Second Interrogatories to Applicant, and submits the following Answers.

[redacted]

Interrogatory 23: The Feasibility Assessment (Exhibit BAB-2) indicates it was prepared "in conjunction with" Globaltech Design Builders. Please describe the role and extent to which Globaltech Design Builders participated in the preparation of the Assessment and the level of input and oversight Mr. Beaudet provided in the development of the Assessment.

Answer: Mr. Beaudet was Principle-in-Charge of the entire Feasibility Assessment. Globaltech Design/Builders, Inc. was a subcontractor to Mr. Beaudet and worked under his direction on process selection, facilities layout and cost estimates. Mr. Beaudet provided input to Globaltech and made all final decisions as well as reviewing and approving the final deliverable. Globaltech also provided graphics support for production of the Assessment.

Interrogatory 24: Is the Feasibility Assessment limited to Phase 1 of the development?

Answer: The Feasibility Assessment and its cost estimate were for Phase I of the development. The conceptual design, however, contemplated a mirror image addition to the facilities capable of serving Phase II. Some facilities, such as yard piping, raw water main piping, the administration/control building, and structural components for adding high service and recycled water pumps were included in the Phase I design and costing. The site for the treatment facilities was chosen to be sufficient for the full 4 MGD capacity of the utility at full buildout.

Interrogatory 25: The Feasibility Assessment, on page 7, states its purpose as providing a "preliminary" design, layout, and cost estimate. Please identify the portion(s) of the Assessment that are "preliminary" in nature.

Answer: The American Associations of Cost Estimating ("AACE") sets standards of accuracy for cost estimates and methodology based on the purpose of the estimate. While the Feasibility Assessment technically falls into Estimate Class 4 – Study of Feasibility, the Class 3 – Budget Authorization or control methodology was used for the Assessment at the request of the client. Please refer to the table from AACE attached hereto as Exhibit "A".

Interrogatory 26: Please state how many times Mr. Beaudet visited the proposed development site, date(s), and identify anyone who accompanied him.

Answer: Mr. Beaudet visited and inspected the site twice. The first visit was on 2/21/19. This was an all-day visit accompanied by 301 Capital Partners' representatives Robert Kennelly, Michael Braren, and Austen and Avery Roberts. Also accompanying Mr. Beaudet were William Sundstrom and Robert Brannan of Sundstrom & Mindlin, LLP. Not only was the entire property inspected, the geographical area surrounding the development was toured. This included the properties east of the site: US route 301; the CSX railroad yard and tracks; Normandy Blvd. to the end of JEA's service lines; and the JEA treatment facilities at Cecil Field. Mr. Beaudet made a second visit to the site on 3/9/19, to thoroughly inspect the site where the proposed utility facilities are to be located.

Interrogatory 27: Page 12, section 4.1, of the Feasibility Assessment states that "301 Capital Partners has decided upon an absorption rate of 2500 Equivalent Residential Connections (ERC's) through 2030…." What is meant by "absorption rate"?

Answer: Absorption rate refers to the number of ERC's to be constructed in each phase of the development timetable described in Interrogatory 21. Please refer to the table provided to Mr. Beaudet for use in the Feasibility Assessment attached hereto as Exhibit "B".

Interrogatory 28: Regarding Page 12, Section 4.1 of the Feasibility Assessment, what is the basis for Mr. Beaudet's claim that a water demand rate "of 270 gallons per day (GPD) Average daily Flow (ADF) per ERC" is commonly accepted, and conservative?"

Answer: The value in gallons per day per ERC can vary widely depending on locale, type of housing/commercial development and whether reclaimed water is used to irrigate only common property or individual lots. The value of 270 gallons/ERC was selected by reviewing data from the St. Johns River Water Management District (SJRWMD") Water Supply Plan, supplemented by much more detailed data available from the South Florida Water Management District's ("SFWMD") Lower East Coast Water Supply Plan ("LECWSP").

According to Technical Fact Sheet SJ2019-FS1 2018 Survey of Annual Water Use for the SJRWMD the per capita public water supply is 128 gallons/day and has been dropping annually for the past few years as conservation measures are adopted. The Technical Fact Sheet is attached hereto as Exhibit "C" for reference. At a conservative 2.4 persons per dwelling unit the value per ERC would equal 307 gpd/ERC. This value was decreased by 12% to 270 gpd/ERC due to the 100% irrigation by reclaimed water for this subject project which would slightly reduce demand. The SFWMD LECWSP provided much more detail on public water supply demand by reference

in Appendix E, the per capita demand for each of the utilities with the plan area. Palm Beach County Water Utilities' per capita water demand is listed as 111gpd. Its planning ERC, matched by water sales data, is 270 gpd/ERC. Palm Beach County Water Utilities reclaimed water use percentage is about half of the 55% district-wide reclaimed water use percentage reported by the SJWMD, which would align well with the use of 270 gpd/ERC value selected as the demand for water by the planned development. Certainly, this value is reasonable, but it is also moot, because the FCRU Phase I water and wastewater treatment plants are designed for 1 MGD capacity, which is more than the demand regardless of any reasonable value of gpd/ERC. The 1 MGD capacity is due to a non-published but well known JEA requirement that new development facilities be rated at a minimum 1 MGD capacity.

[redacted]

Interrogatory 30: Regarding page 30, Section 7 of the Feasibility Assessment, what is the basis for the statement that the "on site utilities alternative can be designed and constructed within 2 1/3 years"?

Answer: The 2 1/3-year design and construction schedule referred to in this interrogatory is based on many years of experience in Florida by both Mr. Beaudet and Globaltech Design/Builders. The delivery method of design build expedites project completion, and as private

developers, the time-consuming bureaucracy imposed upon governmental agencies is neither required nor experienced.

Interrogatory 31: Detail what permits will be necessary, what inspections will be necessary, and the specific timelines for the design and construction of the water treatment plant.

Answer: The main permits required would be the Consumptive Use Permit ("CUP") and possibly an Environmental Resources Permit ("ERP") from the SJWMD, and the FDEP construction permit. The timelines for these permits can vary. A reasonable estimate is contained in Table-3, page 22 of the Feasibility Assessment. Inspections will be required by the responsible agencies, generally these are conducted during the course of the project and the time frames for such inspections cannot be estimated at this stage of the project.

Interrogatory 32: Detail what permits will be necessary, what inspections will be necessary, and the specific timelines for the design and construction of the wastewater treatment plant.

Answer: The main permits required would possibly be an Environmental Resources Permit ("ERP") from the SJWMD, the FDEP construction permit, and possibly a land application permit for sludge disposal from the regional office of the FDEP. The timelines for these permits can vary. A reasonable estimate is contained in Table-3, page 22 of the Feasibility Assessment. Inspections will be required by the responsible agencies, generally these are conducted during the course of the project and the time frames for such inspections cannot be estimated at this stage of the project.

Interrogatory 35: On what basis does Mr. Kennelly claim there is "no other entity to provide such service in a timely and economically feasible manner"?

Answer: JEA's timeframe for providing services was too far in the future and too costly compared to the construction of on-site facilities.

Respectfully submitted this 9th day of July, 2020, by:

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By: _____
Robert C. Brannan
For the Firm

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing has been furnished via electronic mail to the following this 9th day of July, 2020.

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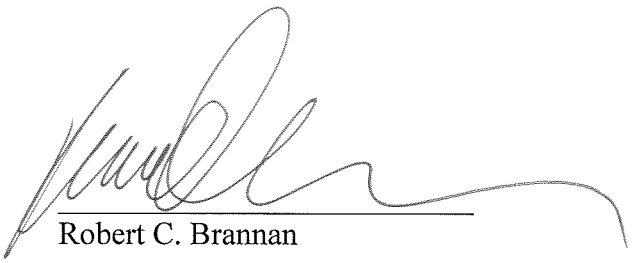
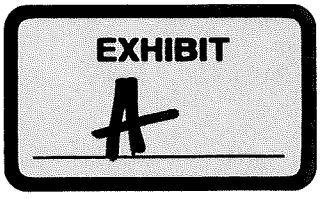


Robert C. Brannan

Table 4-1 AACE Cost Estimating Classes (AACE, 2019)			
Estimate Class	END USAGE Typical purpose of estimate	Methodology	Expected Accuracy Range
Class 5	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%



301 CAPITAL PARTNERS

PRELIMINARY ABSORPTION SCHEDULE

PHASE	NORTH VILLAGE	CENTRAL VILLAGE	WEST VILLAGE	SOUTH VILLAGE	COMMERCIAL VILLAGE	NASSAU COUNTY PROPERTY	BAKER COUNTY PROPERTY	TOTAL
2020-2025	1,500 ERC's				100 ERC's			1,600 ERC's
2025-2030	1,000 ERC's	500 ERC's			200 ERC's			1,700 ERC's
2030-2035		1,000 ERC's	500 ERC's		200 ERC's	100 ERC's	200 ERC's	2,000 ERC's
2035-2040		1,000 ERC's	1,000 ERC's	500 ERC's	300 ERC's	200 ERC's	300 ERC's	3,300 ERC's
2040-2045			1,000 ERC's	1,000 ERC's	300 ERC's	200 ERC's	500 ERC's	3,000 ERC's
2045-2050				1,000 ERC's	300 ERC's	500 ERC's	500 ERC's	2,300 ERC's
TOTAL	2,500 ERC's	2,500 ERC's	2,500 ERC's	2,500 ERC's	1,400 ERC's	1,000 ERC'S	1,500 ERC'S	13,900 ERC's

EXHIBIT B

FCRU 000940
7/9/20 POD to JEA

EXHIBIT
C

Technical Fact Sheet SJ2019-FS1

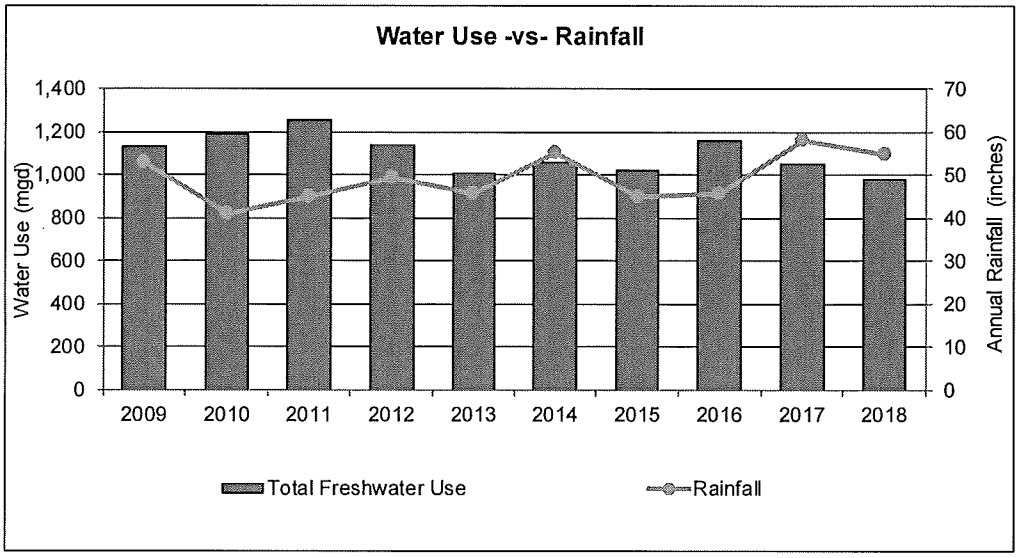
2018 Survey of Annual Water Use for St. Johns River Water Management District

St. Johns River Water Management District
2018 Annual Water Use Executive Summary

This executive summary provides a brief overview and glance of the water use statistics for the last 10 years. Definitions for the categories of water use and explanations regarding changes in water use are included in the report, following the executive summary.

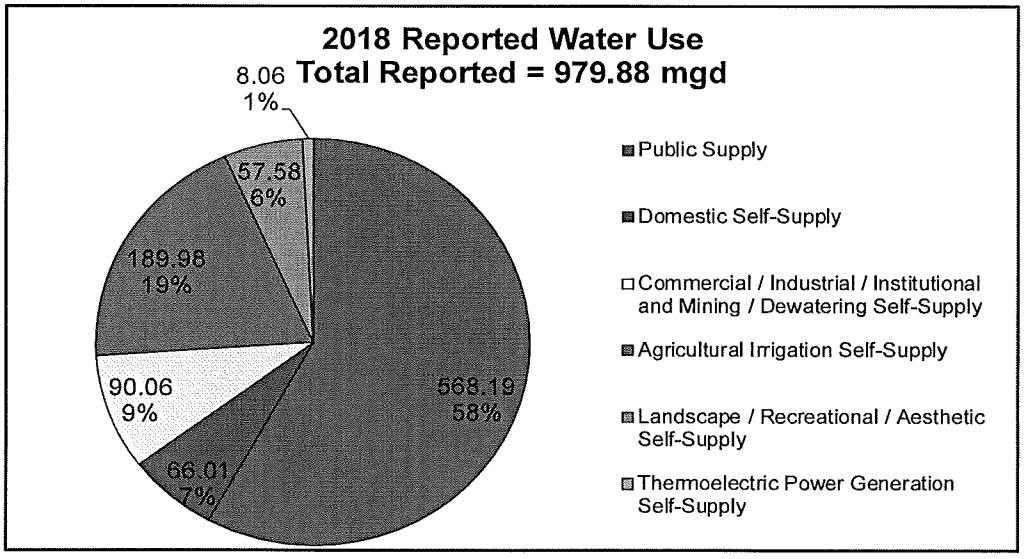
2018 Rainfall

- At 55 inches, it was the third wettest year in the last decade
- 14 inches higher than the 10-year low in 2010 and 5 inches above the 10-year average
- The majority of the rainfall occurred during the second half of 2018



2018 Total Water Use

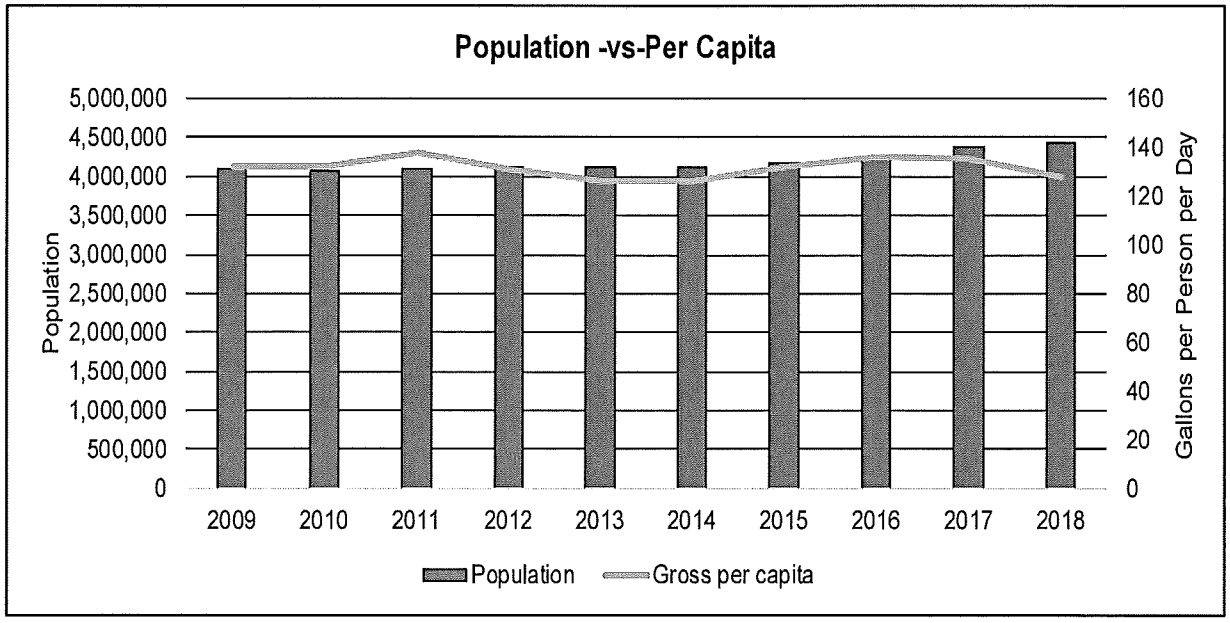
- 11% lower than the 10-year average and 7% lower than 2017 use

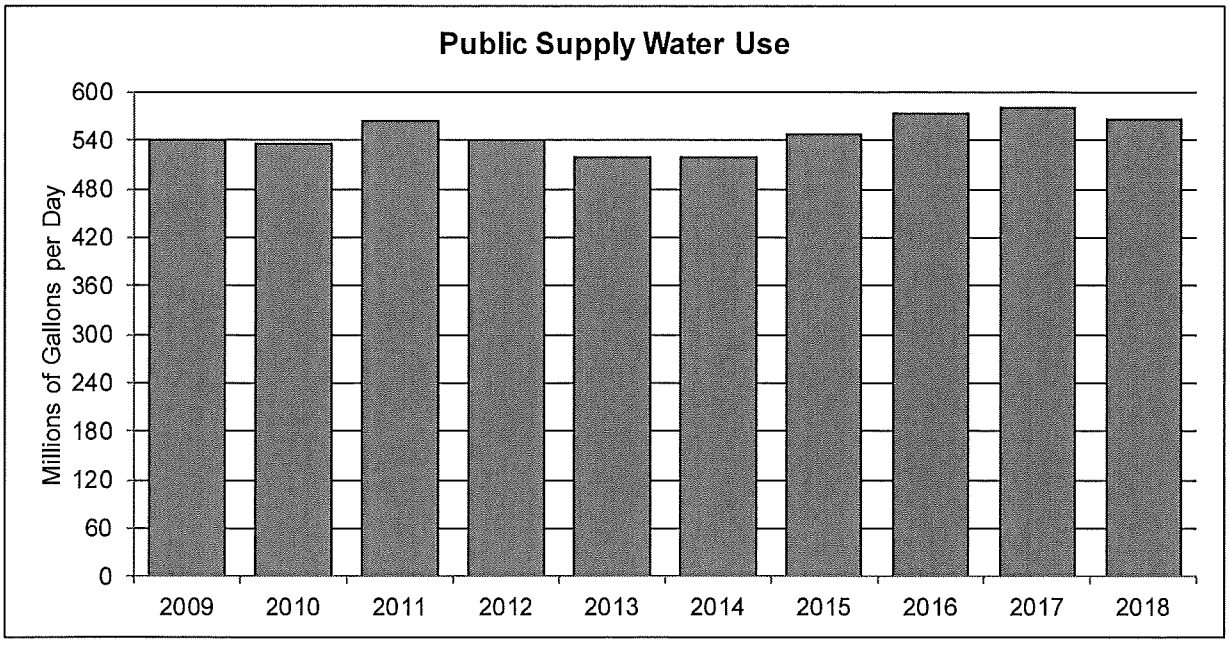


2018 Survey of Annual Water Use for St. Johns River Water Management District

2018 Public Supply Water Use

- Between 2009 and 2018, public supply water use increased 5% from 541.40 million gallons per day (mgd) to 568.19 mgd, while population increased 8% from 4,108,535 to 4,442,419 persons
- Between 2009 and 2018, gross per capita rates decreased 3% from 132 gallons per person per day to 128 gallons per person per day
- Changes in public supply water use can be attributed to several factors, such as rainfall, implementation of conservation, increased use of reclaimed water, economic factors, etc.
- Public supply water use decreased 2% from 2017

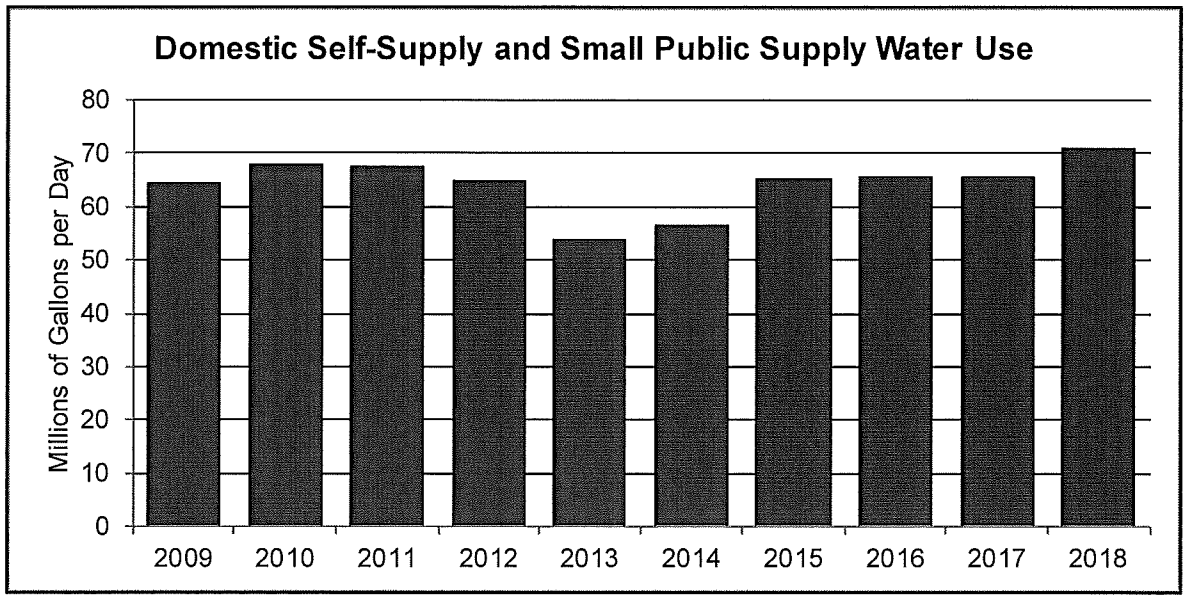




2018 Survey of Annual Water Use for St. Johns River Water Management District

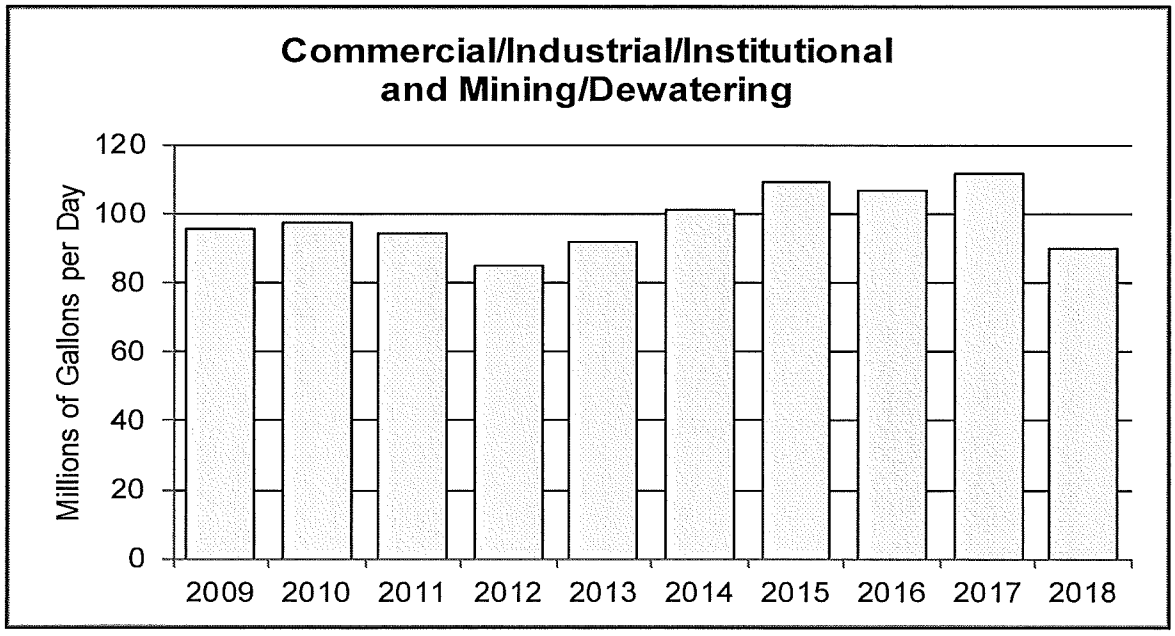
2018 Domestic Self-Supply

- At 66.01 mgd, 2018 use was 4% higher than the average use over the last 10 years
- Additional water use data for small public supply systems was available this year, adding approximately 3.5 mgd
- Self-supplied households consumed an average 84 gallons per person per day



2018 Commercial/Industrial/Institutional and Mining/Dewatering (CII/MD)

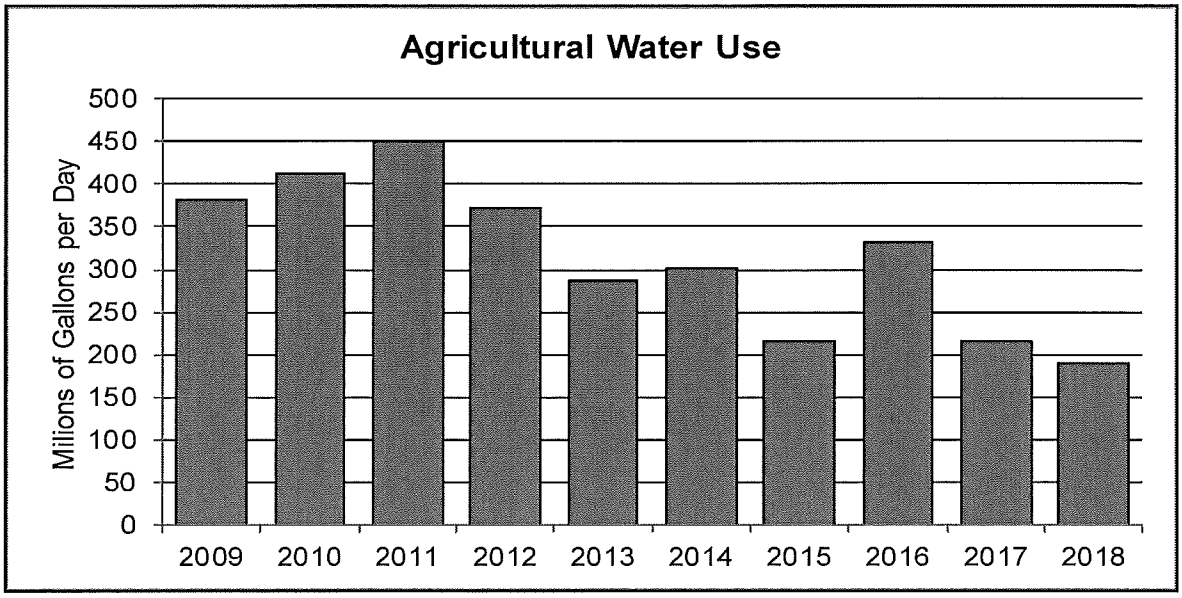
- Mining and pulp and paper make up 99% of CII/MD water use
- At 90.06 mgd, CII/MD use was 8% below the annual average of the last 10 years



2018 Survey of Annual Water Use for St. Johns River Water Management District

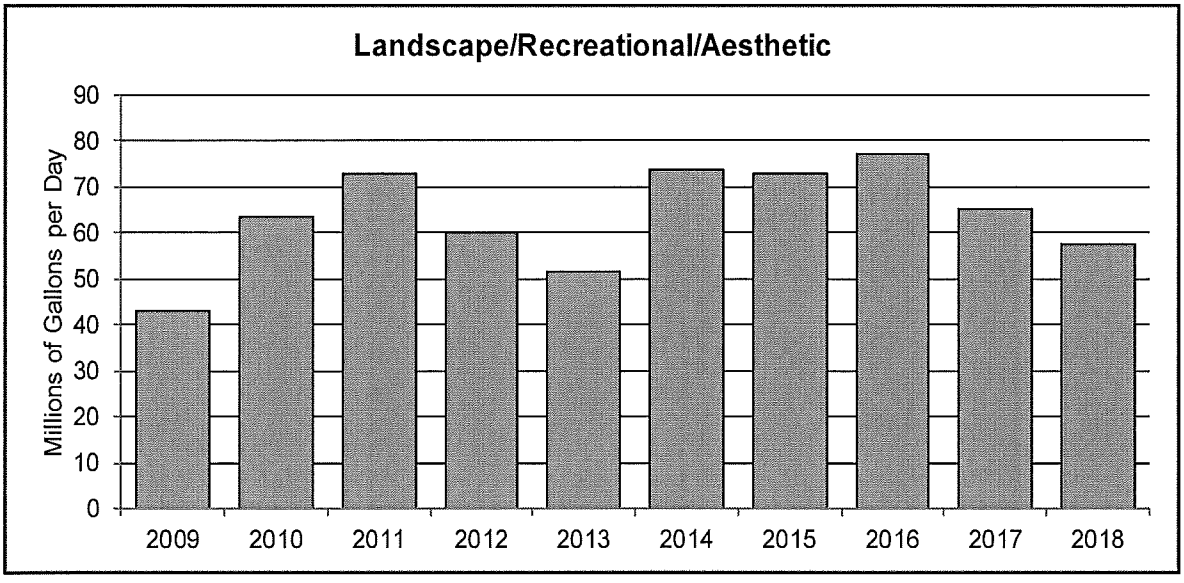
2018 Agricultural Water Use

- At 189.98 mgd, reported water use was 40% lower than the annual average over the last 10 years
- As stated earlier, 2018 was the third wettest year since 2009, with the majority of the rainfall occurring during the second half of the year, requiring less water for irrigation of crops



2018 Landscape/Recreational/Aesthetic (L/R/A)

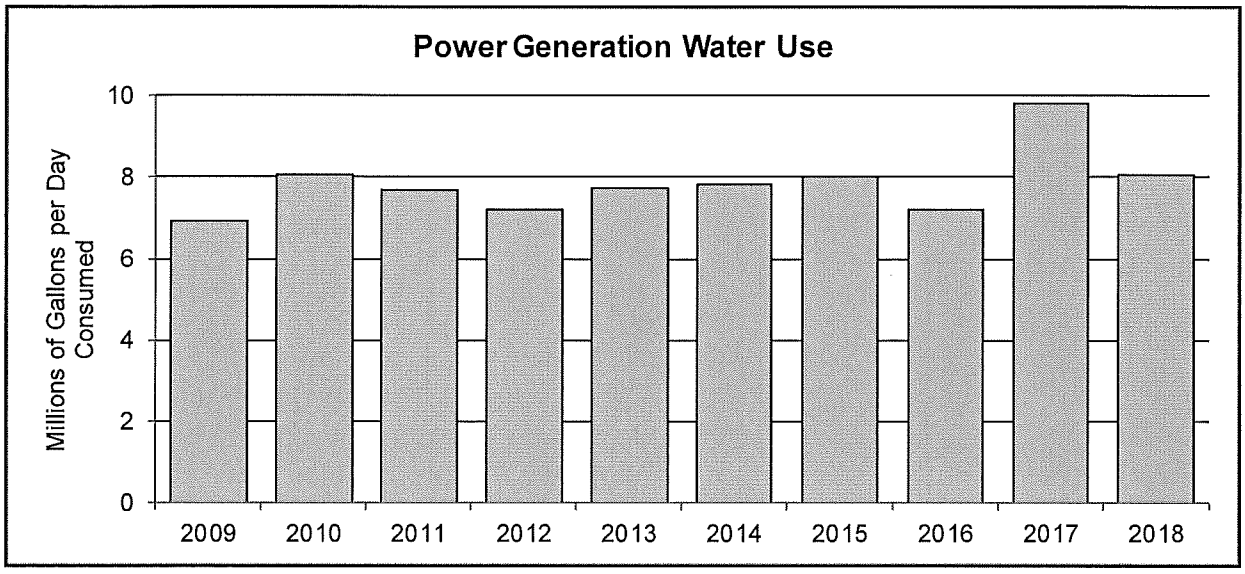
- At 57.58 mgd, active golf courses represent 48% of the water use under this category (26.48 mgd)
- Although total L/R/A water use was 12% lower than 2017, it was 10% lower than the annual average over the last 10 years



2018 Survey of Annual Water Use for St. Johns River Water Management District

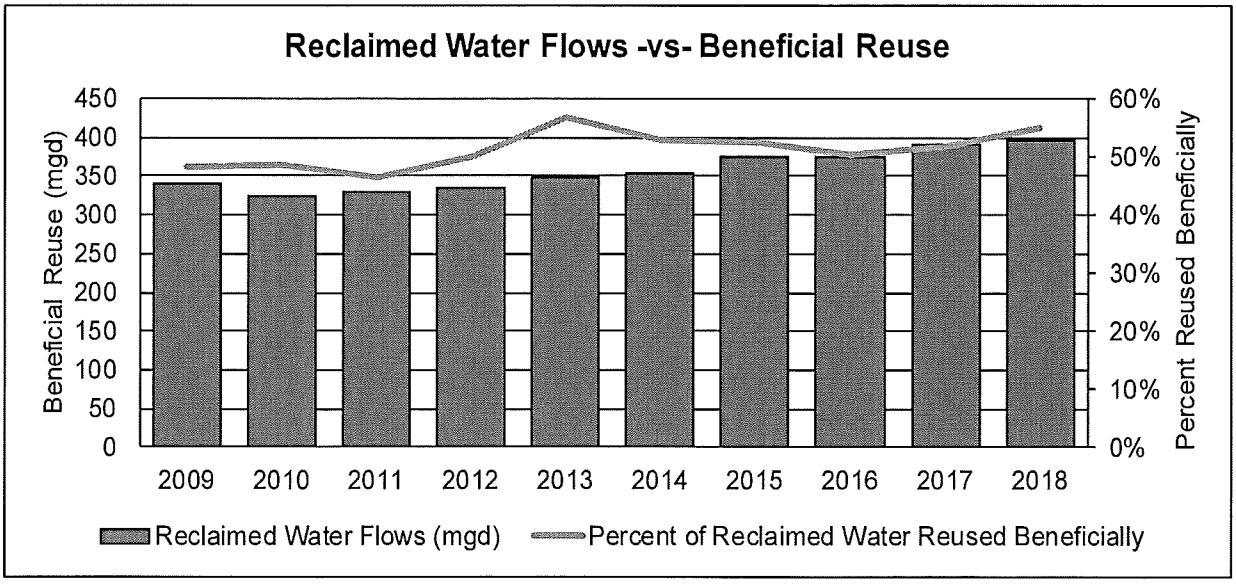
2018 Power Generation Water Use

- In 2018, the combined consumptive water use was 8.06 mgd
- Based upon stakeholder feedback, 2% of surface water withdrawals have been included to account for evaporative losses
- In 2018, the combined consumptive water use was 8.06 mgd
- This category represents approximately 1% of the total water withdrawals



2018 Beneficial Reuse

- At 218 mgd, beneficial reuse set another record for highest reclaimed water used beneficially; this includes 9 mgd of recharge in Alachua County
- Districtwide, more than 50% of wastewater flows have been reused beneficially since 2010
- Countywide reuse utilization rates range from 7% (Baker) to 96% (Alachua)



2018 Survey of Annual Water Use for St. Johns River Water Management District

20-Year Historical Perspective

Category	1999		2018		% Change
	Water Use	Percent of Total	Water Use	Percent of Total	
Public supply (PS)	542.66	47	568.19	58	5
Agriculture irrigation self-supply (AG)	343.16	30	189.98	19	-45
Thermoelectric power generation self-supply (PG)	25.75	2	8.06	1	-69
Commercial / Industrial / Institutional and Mining Dewatering self-supply (CII/MD)	128.82	11	90.06	9	-30
Landscape / Recreational / Aesthetic self-supply (LRA)	32.42	3	57.58	6	78
Domestic self-supply and small public supply systems (DSS)	90.38	7	66.01	7	-27
Total	**1,163.19**	**100**	**979.88**	**100**	**-16**

Category	1999		2018		% Change
	Population	Percent of Total	Population	Percent of Total	
Public supply	3,248,234	86	4,442,419	85	37
Domestic self-supply and small public supply systems	537,156	14	775,965	15	44
Total	**3,785,390**	**100**	**5,218,384**	**100**	**38**

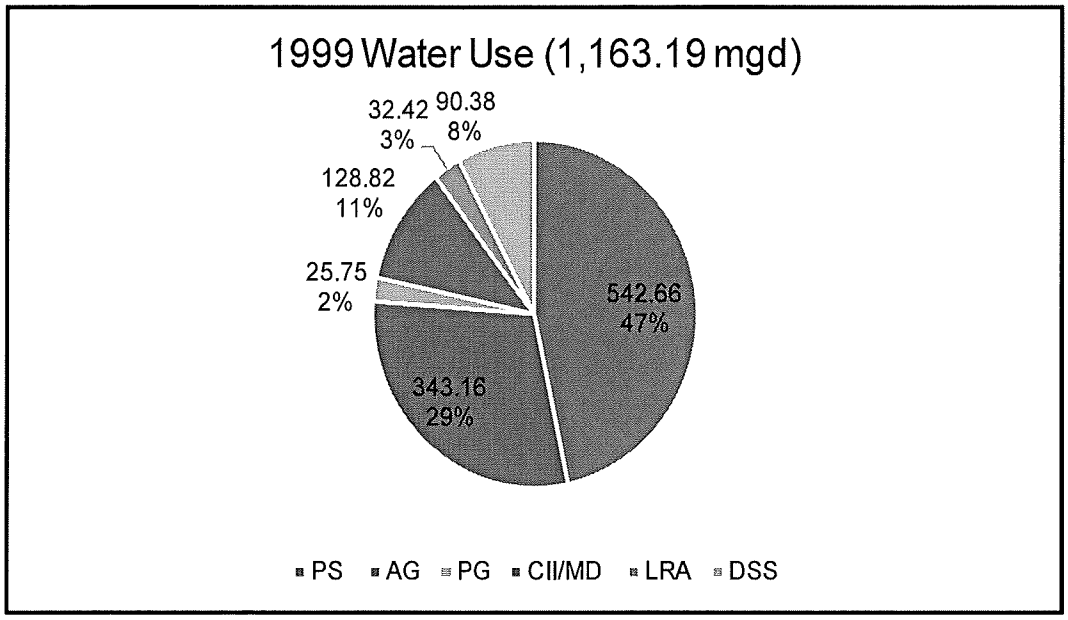
Per Capita Rates	1999	2018	% Change
Gross Per Capita	167	121	-23
Residential Per Capita	167	84	-50

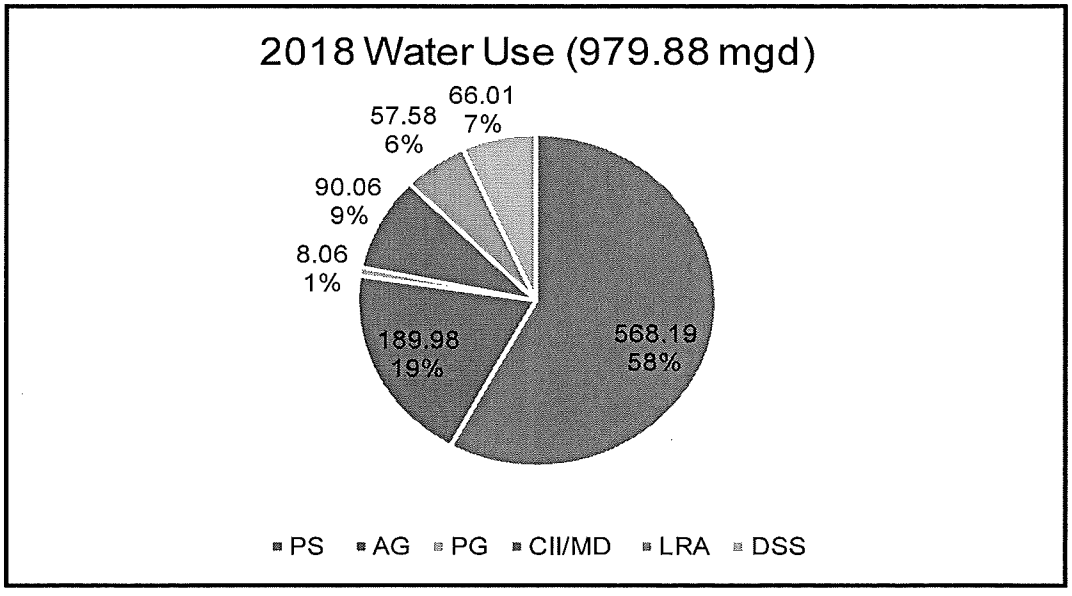
Reclaimed Water	1999	2018	% Change
Total flow	297.35	396.11	33
Beneficially used	110.65	217.52	97
Percent beneficially used	37	55	49

Note: Water use and reclaimed water flows are shown in million gallons per day (mgd).

2018 Survey of Annual Water Use for St. Johns River Water Management District

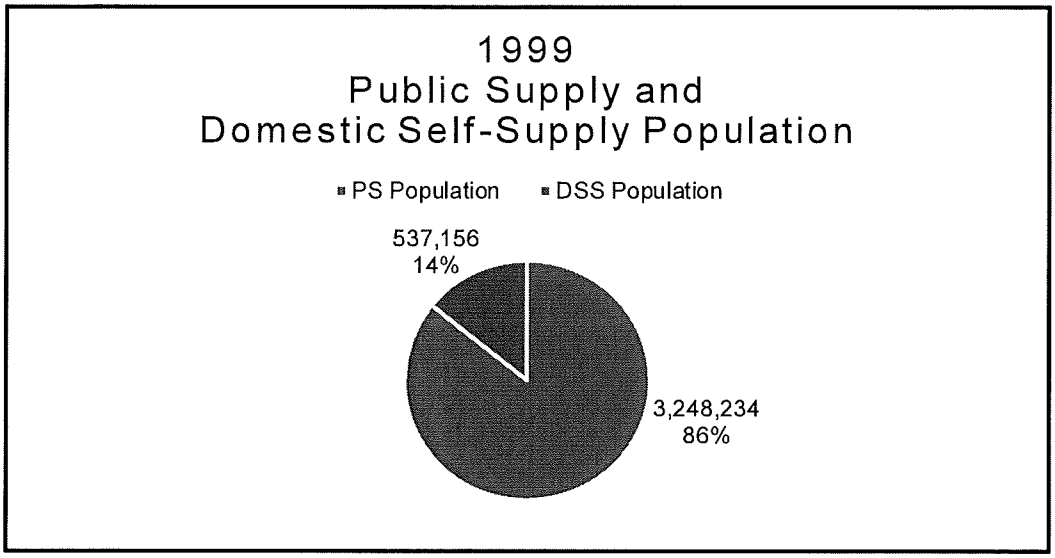
20-Year Historical Perspective (Cont.)

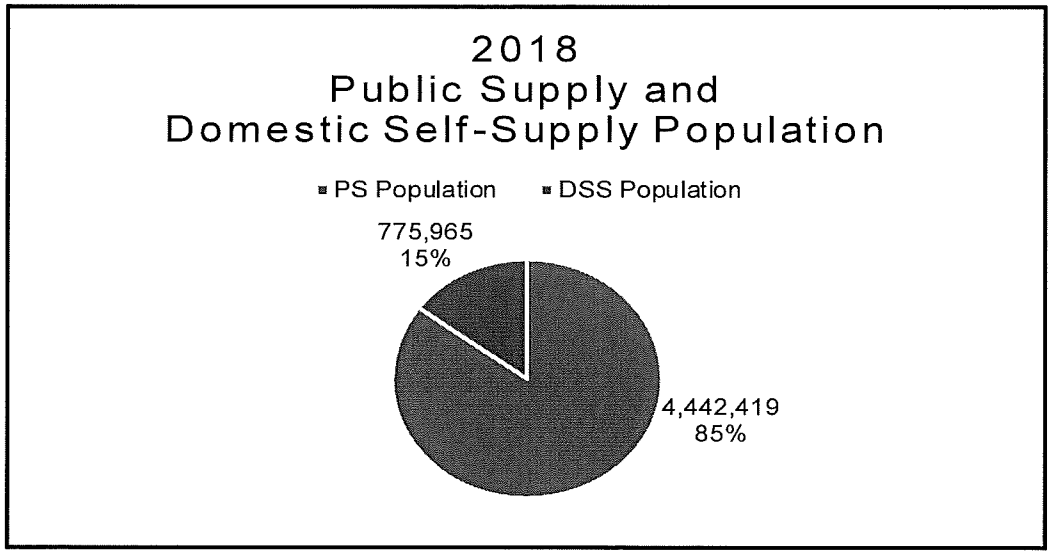


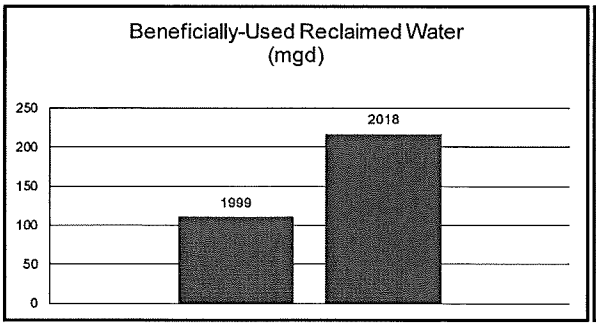


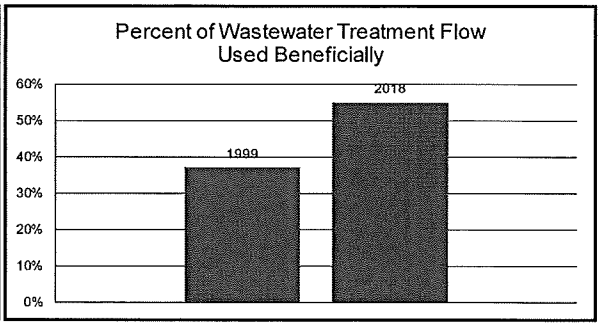
2018 Survey of Annual Water Use for St. Johns River Water Management District

20-Year Historical Perspective (Cont.)









Technical Fact Sheet SJ2019-FS1
2018 Survey of Annual Water Use
for St. Johns River Water Management District

Introduction. St. Johns River Water Management District (SJRWMD) has published annual water use data since 1978. These "annual water use surveys" assess total water use, with data arranged by source, category of use, and county. Amounts are based on best available data at the time of publication. Published reports can be found on the SJRWMD website, *www.sjrwmd.com*. In publishing the annual data, SJRWMD cooperates with the U.S. Geological Survey (USGS) that compiles national water use data on 5-year intervals.

Since 1999, total public supply water use, which represents 58% of total water use in 2018, has increased by 5% (from 542.66 mgd to 568.19 mgd). At the same time, total population served by public supply has increased 37% (from 3,248,234 to 4,442,419 persons). In the 10-year period ending in 2018, public supply water use increased 5% (from 541.40 mgd to 568.19 mgd), while population served by public supply increased 8% from 4,108,535 to 4,442,419 persons. Although public supply water use in 2018 is higher than the 10-year average (due to factors such as rainfall / drought conditions and economic factors), the gross per capita rate has seen a significant decrease since 1999 and is 3% lower than 2009.

Factors such as conservation, less landscape irrigation with potable water and increases in multifamily housing occupancy can decrease gross per capita rates. Conversely, expanded tourism and other commercial development, larger irrigated lots, and increases in single family housing can increase gross per capita rates. Since 1999, gross per capita water use has decreased from 167 gallons per person per day to 128 gallons per person per day.

Geographic Survey Area. SJRWMD includes all or part of 18 counties, encompassing 12,300 square miles in northeast and east-central Florida and representing more than 5.0 million people, or approximately 26% of the state's population. The following water basins are located within SJRWMD: the entire St. Johns River and Nassau River basins, the Indian River Lagoon and Northern Coastal Basins, and portions of the St. Marys River Basin and Florida Ridge.

Area Rainfall Statistics. Average annual rainfall within SJRWMD for 2018 was 54.74 inches. From the most recent 10-year period, 2009–2018, average annual rainfall within SJRWMD varied by 16.86 inches (from 41.10 to 57.96 inches). Average annual rainfall within SJRWMD for the 10-year period January 2009–December 2018 was 49.30 inches. A comparison of rainfall and water use over the most recent 10-year period, 2009-2018, is shown in Figures 11 and 12.

Through evapotranspiration, nearly 70% of rainfall within SJRWMD is returned to the atmosphere, while the remaining 30% becomes runoff to surface waters or recharge to aquifers (Fernald and Purdum 1998).

Data Sources, Methodology and Terminology. Data for the 2018 Annual Water Use Survey (AWUS) came from a variety of sources: raw water withdrawal data submitted to SJRWMD (via EN-50 forms; which represents 82% of the 2018 water use in this report) and treated water data from Florida Department of Environmental Protection (DEP) monthly operating reports (MORs). Reuse water data were derived from the *Draft 2018 Reuse Inventory Report* (DEP 2018). Rainfall by county was obtained from SJRWMD's monthly hydrologic conditions reports

(SJRWMD 2018). Water use for those small users (18% of the 2018 total water use) that are not required to report information to SJRWMD or DEP is estimated using professional analyses of historical data and trends.

Freshwater. Water with concentration of total dissolved solids (TDS) less than 1,000 milligrams per liter (mg/L) is considered freshwater and may be withdrawn from either groundwater or surface water sources. This definition is based on the one provided by USGS, in Water Supply Paper 2254 (Hem 1985), and has been used for reporting consistency with USGS. This definition differs from that used by SJRWMD in determining if a source is "brackish" when identifying an alternative water supply source. Source waters that do not always meet federal and state drinking water standards for chloride, sulfate, or total dissolved solids are generally identified by SJRWMD as "brackish" waters. The state's five water management districts have efforts underway to standardize the classification of freshwater for water supply planning and consumptive use permitting practices.

Saline water. Water with more than 1,000 mg/L TDS is considered saline. All water reported as saline is withdrawn from surface water or surficial aquifer sources in SJRWMD.

Reuse. Reclaimed water is treated wastewater that has received at least secondary treatment and basic disinfection. It may be distributed for nonpotable uses that achieve a water resource benefit (SJRWMD 2006).

Data Source/Methodology: SJRWMD's methodology is based on quantities of reuse water reported by DEP in the *Draft 2018 Reuse Inventory Report* (DEP 2018). Water

management districts refine the quantities of beneficial reuse reports in DEP's Reuse Inventory Report to reflect those uses of reclaimed water that achieve a water resource benefit. In particular, reuse must take the place of an existing or potential use of higher-quality water or be used to grow useful crops; restore or maintain adopted minimum flows and/or levels of a river, lake, or wetland; or effectively recharge a useable aquifer. If the water applied does not meet one of these requirements, it is considered as disposal. Types of reclaimed water considered as reuse by DEP are as follows: underground injection for disposal; absorption fields and rapid infiltration basins located in discharge areas; surface water augmentation where not required; spray fields; artificial wetlands.

Florida population. This is the number of permanent residents living within Florida.

Data Source/Methodology: The source for population is *Projections of Florida Population by County, 2020–2045, with Estimates for 2018* (BEBR 2018a).

SJRWMD population. This is the number of permanent residents living within SJRWMD's 18-county region.

Data Source/Methodology: Population estimates are intended for planning purposes only; 2018 county population estimates are from *Projections of Florida Population by County, 2020–2045, with Estimates for 2018* (BEBR 2018a).

Water use category. Classification of water use is based on one of the following six categories: (1) public supply, (2) domestic self-supply and small public supply systems, (3) agricultural self-supply, (4) commercial/industrial/institutional and mining/dewatering self-supply, (5) landscape/recreational/aesthetic self-supply, and (6) thermoelectric power generation self-supply. Beneficial use of reclaimed water is also included in this report. Listed below are the definitions for each water use category and the source or methodology for the data presented in this report.

Public supply. Water withdrawn, treated, and delivered to service areas within SJRWMD by privately and publicly owned water supply utilities (or systems) is defined as public supply. This encompasses both residential and nonresidential uses by utilities that are permitted to withdraw equal to or more than 0.10 million gallons per day (mgd) from groundwater or surface water sources.

Data Source/Methodology: Water use data in this category were obtained from two sources: SJRWMD EN-50 forms and DEP's MOR datasets. All Individual Consumptive Use Permits (CUPs) require the permittee to measure their water use. Individual CUPs that are permitted to withdraw more than 0.10 mgd are required to submit this pumpage data to SJRWMD via the EN-50. Water use data for permits with allocations of 0.10 mgd or less are also required to measure their water use and maintain the data, but are not required to report water use to SJRWMD unless specifically requested. The water use data for these CUPs was obtained from MORs. These are submitted to DEP by approximately 98% of the public supply utilities for which SJRWMD had individual CUPs in effect during 2018. (Note: Water for use by the City of Cocoa, in Brevard County, is withdrawn from wells in Orange County.)

Domestic self-supply and small public supply systems. Domestic self-supply water use refers primarily to water use by individuals not served by a public supply water utility (e.g., a residence with a private well). The population associated with small public supply utility systems (permitted average daily flow under 0.10 mgd) is also included in this category. In most cases, small public supply utility systems need not report water use data to SJRWMD. However, many of these small public supply utility systems do report water use data to DEP via MORs.

Data Source/Methodology: Domestic self-supply water use is calculated from residential population and residential public supply (including small public supply systems) per capita water use rates at the county level. Residential water use for each public supply utility and small public supply system is calculated by multiplying the total public supply and small public supply system water use by the percent of the total water use allocated to residential use, as authorized in the SJRWMD-issued CUP. The resulting water use values for each public supply utility and small public supply system are then summed to the county level and divided by the total county permanent/residential public supply and small public supply population to obtain the county-level residential per capita value. The county residential per capita value is multiplied by the domestic self-supply population, resulting in the amount of water use for domestic self-supply. The domestic self-supply population for each county wholly within SJRWMD is obtained by subtracting the total number of people served by public supply utilities and small public supply systems in a county from the total number of permanent residents living in the county. The domestic self-supply population for each county partially within SJRWMD is obtained by multiplying the number of residential parcels within SJRWMD known to have domestic-self supply wells by the 2018 number of persons per household obtained from BEBR (BEBR 2018b). For counties with a population of less than 5% within the jurisdiction of SJRWMD or that have no public supply or small public supply system water use, SJRWMD's average residential public supply (including small public supply systems) per capita figure of 88 gallons per day (gpd) was used. For the purpose of reporting, all domestic self-supply water is assumed to be groundwater. Water use data for small public supply systems was obtained from SJRWMD EN-50 and/or DEP MORs.

Commercial/industrial/institutional and mining/dewatering self-supply. This is water withdrawn from groundwater and surface water sources for commercial, industrial, institutional, mining or dewatering purposes not provided by public supply systems. It includes businesses, government facilities, military installations, schools, prisons, hospitals, industrial uses such as processing and manufacturing and mining and long-term dewatering operations. (Note: For this report, surface water use by mining and long-term dewatering operations represents 5% of surface water use, to account for the loss of water entrained in mining products and evaporative losses. The remaining surface water is assumed to be recirculated in the mining process and, therefore, is considered nonconsumptive. Where nonconsumptive is defined by SJRWMD as any use of water that does not reduce the water supply from which it is withdrawn or diverted.)

Data Source/Methodology: Data in this category reflects water use information reported to SJRWMD by consumptive use permittees via SJRWMD EN-50 forms.

Thermoelectric power generation self-supply. This is water withdrawn from groundwater and surface water sources and used by power plants not supplied by public supply systems. (Note: For the first time in this report, surface water use for once-through cooling represents 2% of surface water use, to account for the loss of water through evaporation.)

Data Source/Methodology: Data in this category reflect water use information reported to SJRWMD by power plant operators via SJRWMD EN-50 forms or through a yearly SJRWMD survey. Monthly operating report data from DEP was used to cross-check EN-50 data and fill in any data gaps.

Agricultural self-supply. This is reported and calculated water from groundwater and surface water sources for use in supplemental crop irrigation. It also includes non-irrigation use such as draining an agricultural field after a large rain storm, as well as water use associated with aquaculture, livestock, etc.

Data Source/Methodology: Data in this category reflect water use information reported to SJRWMD by agricultural water users via SJRWMD EN-50 forms and water use amounts provided by the Florida Department of Agricultural and Consumer Services (FDACS) Florida Statewide Agricultural Irrigation Demand (FSAID IV). Individual CUPs report water use data via the EN-50 forms. For smaller CUPs and non-permitted agricultural fields, water use was obtained from the draft FSAID IV (Balmoral, 2018).

Landscape/recreational/aesthetic self-supply. This is water withdrawn from groundwater and surface water sources for use in golf course irrigation, irrigation of urban landscapes or athletic fields, water-based recreational areas, and ornamental or decorative purposes not supplied by public supply systems.

Data Source/Methodology: Data in this category reflect water use information reported to SJRWMD by consumptive use permittees via SJRWMD EN-50 forms.

2018 Water Use by Category. Water use is reported for water withdrawals from fresh, saline, and reuse water sources, expressed in average mgd unless otherwise noted. In this 2018 survey, the water use amounts are based on best available data as of April 2, 2019. As shown in Figure 1, 82% of the 2018 water use was reported to SJRWMD via EN-50 forms. Water withdrawal information is reported for six categories of use: (1) public supply, (2) domestic self-supply and small public supply systems, (3) commercial/industrial/institutional and mining/dewatering self-supply, (4) agricultural self-supply, (5) landscape/recreational/aesthetic irrigation self-supply, and (6) thermoelectric power generation self-supply. This report also includes information on beneficially reused wastewater flows. A reporting threshold of 0.10 mgd of permitted average daily flow by individual water users was used for all water use categories, excluding the agricultural self-supply and domestic self-supply and small public supply systems categories, in

the reporting of consumptive use for 2018. Consumptive use is defined by SJRWMD as any use of water that reduces the supply from which it is withdrawn or diverted.

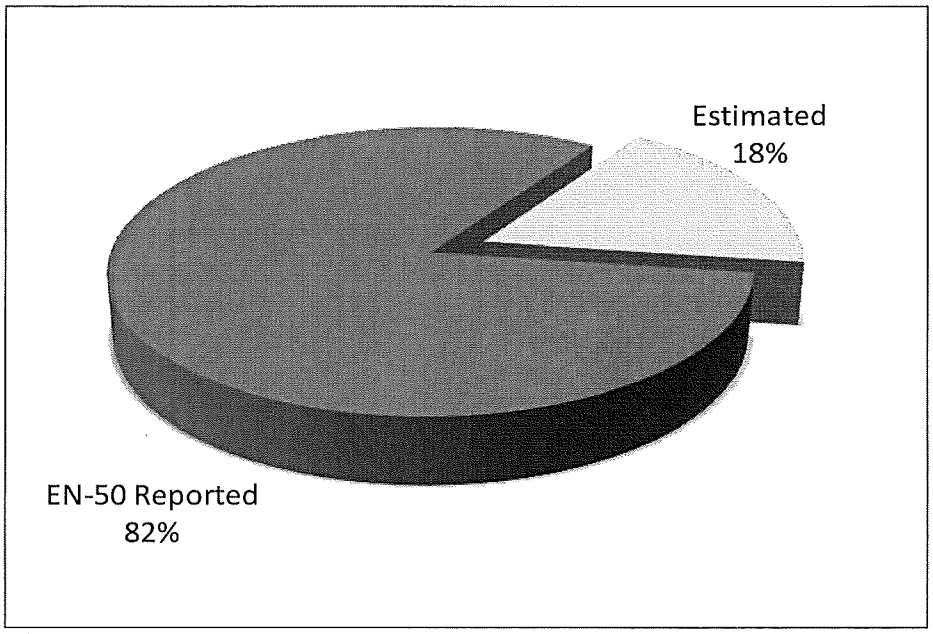


Figure 1. Reported and estimated water use (mgd) in SJRWMD, 2018

Rainfall and water use totals within SJRWMD are shown in Table 1, with figures tabulated by county. Table 2 shows total water use by category and Table 3 shows water use by county and category. The total consumptive use in SJRWMD for 2018, including fresh, saline and reuse (reclaimed) water, was 1,192.47 mgd. Of the total consumptive amount, 979.88 mgd was freshwater and 4.80 mgd was saline water (Tables 1–3). In 2018, the largest consumptive use of freshwater within SJRWMD was public supply, which totaled 568.19 mgd, or 58%, of total consumptive freshwater use (Tables 2 and 3, Figure 2). Next was agricultural water use, which used 189.98 mgd, or 19%, of total consumptive freshwater within SJRWMD (Tables 2 and 3, Figure 1). Beneficial use of reclaimed water accounted for 207.79 mgd and was reported under the agricultural, commercial/industrial/institutional and landscape/recreational/aesthetic categories of water use (Tables 2 and 3). An additional 9.73 mgd in Alachua County was used for recharge.

Public Supply. In 2018, 204 public supply utilities (or systems) served approximately 4,442,419 people, or 85%, of the SJRWMD total population (Table 4 note). Total water use, from both groundwater and surface water sources, was 9% above the average annual use for the preceding 5-year period (Tables 2 and 3, Figures 2 and 3). Average gross per capita use, based on the population served by a public supply system, was 128 gallons per capita per day (gpcd). As seen in Table 5, gross per capita ranges from 90 gpd (Flagler) to 229 gpd (Bradford). Average residential per capita (with the inclusion of Bradford and Okeechobee counties) for SJRWMD is 84 gpd. It ranges from 45 gpd (Indian River) to 174 (Baker). Bradford County is excluded for comparison as only a small population is served by Clay County Utility Authority. Public supply water use typically fluctuates during the year in response to seasonal rainfall and temperature variations. Water use tends to increase during the warm season (April–October), when outdoor use is highest.

In 2018, water use ranged from a low of 531.06 mgd in December to a high of 615.95 mgd in October (Figure 3). Of the total water withdrawn for public supply use, 96% was groundwater.

A utility generator at a reverse osmosis plant, Palm Coast Utilities, left. Reclaimed water facility in Daytona Beach, right.

Counties with the largest public supply water use during 2018 were Orange County[1] (119.19 mgd, serving 858,977 people; 139 gpcd) and Duval County (114.31 mgd, serving 802,615 people; 142 gpcd) (Table 3, Figures 4 and 5). These counties combined represented 41% of total public supply water use and 37% of the public supply population. (Note: There is no public supply water use in the portions of Okeechobee and Osceola counties within SJRWMD.)

Domestic Self-Supply and Small Public Supply Systems. In 2018, approximately 787,289 people used 66.01 mgd of domestic self-supply water (including small public supply systems), or 7%, of total freshwater used in SJRWMD (Tables 1–3, Figure 2). Duval County had the largest self-supplied population, with 163,254 people (15.28 mgd). Marion County had the second-largest population, 111,383 (7.57 mgd), followed by Clay County, 76,686 (5.21 mgd) (Table 4).

Domestic self-supply water use (including small public supply systems) has fluctuated over the 10-year period, reaching a low of 53.84 mgd in 2013 to a high of 67.76 mgd in 2010. The average for the 10-year period was 63.73 mgd; water use in 2018 was 4% above average. Fluctuations in water use are mainly attributed to changes in methodologies since the initial publication of the AWUS in 1978. In 2018, average domestic self-supply and small public supply system water use per capita within SJRWMD was 84 gpcd (Table 5).

Commercial/Industrial/Institutional and Mining/Dewatering Self-Supply. In 2018, a total of 222 commercial/industrial/institutional and mining/dewatering individual permit holders reported water use. Total freshwater use in the commercial/industrial/institutional and mining/dewatering category was 90.06 mgd, or 9%, of total freshwater use (Tables 2

[1] Orange County (Orange County Utilities / Orlando Utilities Commission) totals only include the water consumed and population served in SJRWMD.

and 3, Figure 2). Of this freshwater total, 66.71 mgd was groundwater and 23.35 mgd was surface water. Additional reclaimed water use totaled 29.20 mgd (Tables 2 and 3).

Most of the freshwater withdrawn for commercial/industrial/institutional and mining/dewatering purposes supplied the pulp and paper industries in Duval, Nassau, and Putnam counties. Water use for pulp and paper production in 2018 totaled 60.05 mgd. It included 20.68 mgd of fresh groundwater, 38.09 mgd of fresh surface water, and 1.28 mgd of saline surface water. The second-largest water user in this category was the mining industry, which accounted for 22.66 mgd of fresh groundwater and 7.66 mgd of fresh surface water. Pulp/paper production and mining accounted for a combined total of 89.09 mgd of freshwater, or 99%, of the commercial/industrial/institutional and mining/dewatering freshwater use.

Commercial/industrial/institutional and mining/dewatering self-supply water use was highest in 2017 (111.77 mgd) and lowest in 2012 (84.91 mgd). The average for the 10-year period was 98.22 mgd; water use in 2018 was 8% below this average. Commercial/industrial/institutional and mining/dewatering freshwater use in 2018 varied from a low of 82.81 mgd in February to a high of 102.16 mgd in May (Figure 6).

Agricultural Self-Supply. Total consumptive use of freshwater for agricultural water use was 189.98 mgd, which is 19% of total freshwater use in SJRWMD during 2018 (Tables 2 and 3, Figure 2). Reuse water accounted for 2.71 mgd of agricultural water use. Agricultural permittees used 149.72 mgd of groundwater (79%) and 40.26 mgd of surface water (21%). There are currently 675,693 agricultural acres in SJRWMD. Seventy-six percent of these acres (512,881) are covered by a consumptive use permit. Agricultural water use in 2018 had the largest seasonal fluctuation of any other water use category, reaching a low of 77.34 mgd in August to a high of 247.06 mgd in March (Figure 7). These fluctuations are typical of irrigation water use and are related to rainfall patterns and planting / harvesting times.

By county, the largest water use for agriculture occurred in Brevard County, with 45.16 mgd of freshwater, accounting for 24% of total SJRWMD agricultural water use (Table 3). Eighty-six percent of the freshwater used in this county was withdrawn from groundwater sources.

During 2018 in SJRWMD, the largest agricultural water use was for hay and pasture, which accounted for 40.36 mgd, 21.24% of total agricultural water use. Potatoes, cut foliage and ornamentals, and citrus were the three other largest categories; accounting for 11.72–18.12% of total agricultural water use (Figure 8).

Landscape/Recreational/Aesthetic Irrigation Self-Supply. The landscape/recreational/aesthetic (L/R/A) irrigation self-supply category includes water used to irrigate turf grass for golf courses, urban landscapes, athletic fields, water-based recreational areas, or for ornamental or decorative purposes. Use of freshwater in the L/R/A irrigation category totaled 57.58 mgd, about 6% of total freshwater use in 2018. Nearly 72% (41.42 mgd) of the quantities were withdrawn from surface water sources. The remaining 16.16 mgd (28%) came from groundwater sources. Reuse water under this category totaled 175.88 mgd. By county (Table 3), the largest freshwater use for L/R/A irrigation occurred in

Indian River County (13.80 mgd), followed by Lake County (10.17 mgd), and Brevard County (6.18 mgd). In terms of reuse, the four counties with the largest reclaimed water used for L/R/A are Orange (64.17 mgd), Seminole (25.81 mgd), Volusia (23.62 mgd), and Brevard (21.34 mgd).

During the past 10 years (2009–2018), L/R/A irrigation freshwater use was highest in 2016 (77.03 mgd) and lowest in 2009 (43.14 mgd). Average water use over the 10-year period was 63.86 mgd. Landscape/recreational/aesthetic irrigation water use in 2018 was 10% below the 10-year average. Landscape/recreational/aesthetic irrigation freshwater use in 2018 varied from a low of 28.67 mgd in January to a high of 70.06 mgd in July (Figure 9).

Thermoelectric Power Generation Self-Supply. The thermoelectric power generation self-supply category consists of water withdrawn from groundwater and surface water sources by power plants, excluding reuse water or water used for once-through cooling. Water use amounts for 2018 reflect consumptive use data for 15 self-supplied thermoelectric power plants, totaling 8.06 mgd (Tables 2 and 3, Figure 2). The largest amount of consumptive freshwater use within this category (Table 3) occurred in Duval County (3.26 mgd).

Starting with the 2017 report, consumptive water use also includes 2% of surface water use by power generation facilities. This is to account for the loss of water due to evaporation. Previously, once-through cooling with surface water was considered nonconsumptive because the water is returned to the resource. This change in methodology coincides with current regional water supply planning methods and input from stakeholders.

Thermoelectric power generation freshwater use in 2018 fluctuated from a low of 6.30 mgd in February to a high of 10.57 mgd in October (Figure 10). Fluctuations in water use are related to power plant shutdowns for maintenance or increased power demands during periods of high or low temperatures.

Beneficial Reuse (Reclaimed Water). As explained on Page 10, beneficially reused wastewater has received at least secondary treatment and basic disinfection. It is currently used by permittees to help meet agricultural, commercial/industrial/institutional and recreation/aesthetic demands. In 2018, 207.79 mgd of reclaimed water was used for beneficial purposes. In terms of utilization rates, the top four counties were Alachua (96%), Flagler, Indian River, and Lake (all at 81%) (Figures 13 and 14). Eighty-five percent of the reclaimed water is applied to landscape, fields and golf courses (Figure 15). Of note, 9.73 mgd in Alachua County was used for recharge.

SJRWMD Executive Director Dr. Ann B. Shortelle (center) joined the city of Daytona Beach in August 2018 to celebrate the completion of a 2 .5-million-gallon reclaimed water storage tank, a district cost-share project serving the people of Daytona Beach.

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2018 Survey of Annual Water Use for St. Johns River Water Management District

Table 1. Total water use (mgd) and rainfall by county in SJRWMD, 2018

County	Freshwater (mgd)	Saline Water (mgd)	Reuse (mgd)	Total Water Use (mgd)	Rainfall (inches)
Alachua	29.41	0.00	9.68	39.09	61.66
Baker	5.87	0.00	0.08	5.95	54.29
Bradford	0.93	0.00	0.00	0.93	57.74
Brevard	114.25	0.00	21.34	135.59	44.49
Clay	19.20	0.00	5.31	24.51	54.28
Duval	151.87	0.00	17.35	169.22	53.75
Flagler	21.11	3.14	9.34	33.59	59.15
Indian River	77.54	0.00	7.36	84.90	42.18
Lake	88.29	0.00	13.53	101.82	56.80
Marion	38.02	0.00	3.51	41.53	63.36
Nassau	50.54	1.66	1.48	53.68	50.55
Okeechobee	1.82	0.00	0.00	1.82	43.18
Orange	132.73	0.00	64.17	196.90	55.36
Osceola	5.17	0.00	0.00	5.17	47.15
Putnam	48.37	0.00	1.80	50.17	62.47
St. Johns	54.08	0.00	3.41	57.49	58.24
Seminole	64.41	0.00	25.81	90.22	55.53
Volusia	76.27	0.00	23.62	99.89	59.27
Total	**979.88**	**4.80**	**207.79**	**1,192.47**	**54.74**

Note: Total water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.
Source of domestic self-supply is assumed to be groundwater.
Orange County (Orange County Utilities / Orlando Utilities Commission) totals only include the water consumed and population served in SJRWMD.

Table 2. Total water use (mgd) by category in SJRWMD, 2018

Category	Freshwater (mgd)	Saline Water (mgd)	Reuse (mgd)	Total Water Use (mgd)
Public supply	568.19	0.00	0.00	568.19
Domestic self-supply and small public supply systems	66.01	0.00	0.00	66.01
Commercial / Industrial / Institutional and Mining / Dewatering self-supply	90.06	4.80	29.20	124.06
Agricultural irrigation self-supply	189.98	0.00	2.71	192.69
Landscape / Recreational / Aesthetic self-supply	57.58	0.00	175.88	233.46
Thermoelectric power generation self-supply	8.06	0.00	0.00	8.06
Total	**979.88**	**4.80**	**207.79**	**1,192.47**

Note: Water use is in million gallons per day (mgd).
Source of domestic self-supply is assumed to be groundwater.
Amounts are based on best available data as of April 2, 2019.

Table 3. Total water use (mgd) by county and category in SJRWMD, 2018

County	Freshwater							Saline Water	Reuse	All Water Use
	Public Supply	Domestic Self-Supply	Commercial/ Industrial/ Institutional	Agricultural Self-Supply	Landscape/ Recreational /Aesthetic Self-Supply	Thermoelectric Power Generation Self-Supply	Total Freshwater	Commercial/ Industrial/ Institutional		
Alachua	23.58	0.95	0.76	3.38	0.17	0.57	29.41	0.00	9.68	39.09
Baker	1.56	3.47	0.35	0.49	0.00	0.00	5.87	0.00	0.08	5.95
Bradford	0.21	0.72	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.93
Brevard	55.98	2.89	4.02	45.16	6.18	0.02	114.25	0.00	21.34	135.59
Clay	12.50	5.21	0.25	0.58	0.66	0.00	19.20	0.00	5.31	24.51
Duval	114.31	15.28	13.75	0.66	4.61	3.26	151.87	0.00	17.35	169.22
Flagler	9.54	0.34	0.00	9.75	1.48	0.00	21.11	3.14	9.34	33.59
Indian River	19.36	0.28	0.20	43.90	13.80	0.00	77.54	0.00	7.36	84.90
Lake	49.61	6.04	6.16	16.08	10.17	0.23	88.29	0.00	13.53	101.82
Marion	18.61	7.57	2.39	5.56	3.89	0.00	38.02	0.00	3.51	41.53
Nassau	10.08	5.04	32.49	0.71	2.22	0.00	50.54	1.66	1.48	53.68
Okeechobee	0.00	0.13	0.00	1.69	0.00	0.00	1.82	0.00	0.00	1.82
Orange	119.19	4.03	2.20	3.89	2.31	1.11	132.73	0.00	64.17	196.90
Osceola	0.00	0.06	0.01	5.10	0.00	0.00	5.17	0.00	0.00	5.17
Putnam	2.37	2.82	24.30	17.05	1.11	0.72	48.37	0.00	1.80	50.17
St. Johns	21.16	3.73	0.58	23.54	5.07	0.00	54.08	0.00	3.41	57.49
Seminole	57.89	2.83	0.05	2.06	1.58	0.00	64.41	0.00	25.81	90.22
Volusia	52.24	4.62	2.55	10.38	4.33	2.15	76.27	0.00	23.62	99.89
Total	**568.19**	**66.01**	**90.06**	**189.98**	**57.58**	**8.06**	**979.88**	**4.80**	**207.79**	**1,192.47**

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.
Source of domestic self-supply is assumed to be groundwater.
Small public supply systems are included in the domestic self-supply category.
Mining and dewatering are included in the commercial/industrial/institutional category.
Orange County (Orange County Utilities / Orlando Utilities Commission) totals only include the water consumed and population served in SJRWMD.

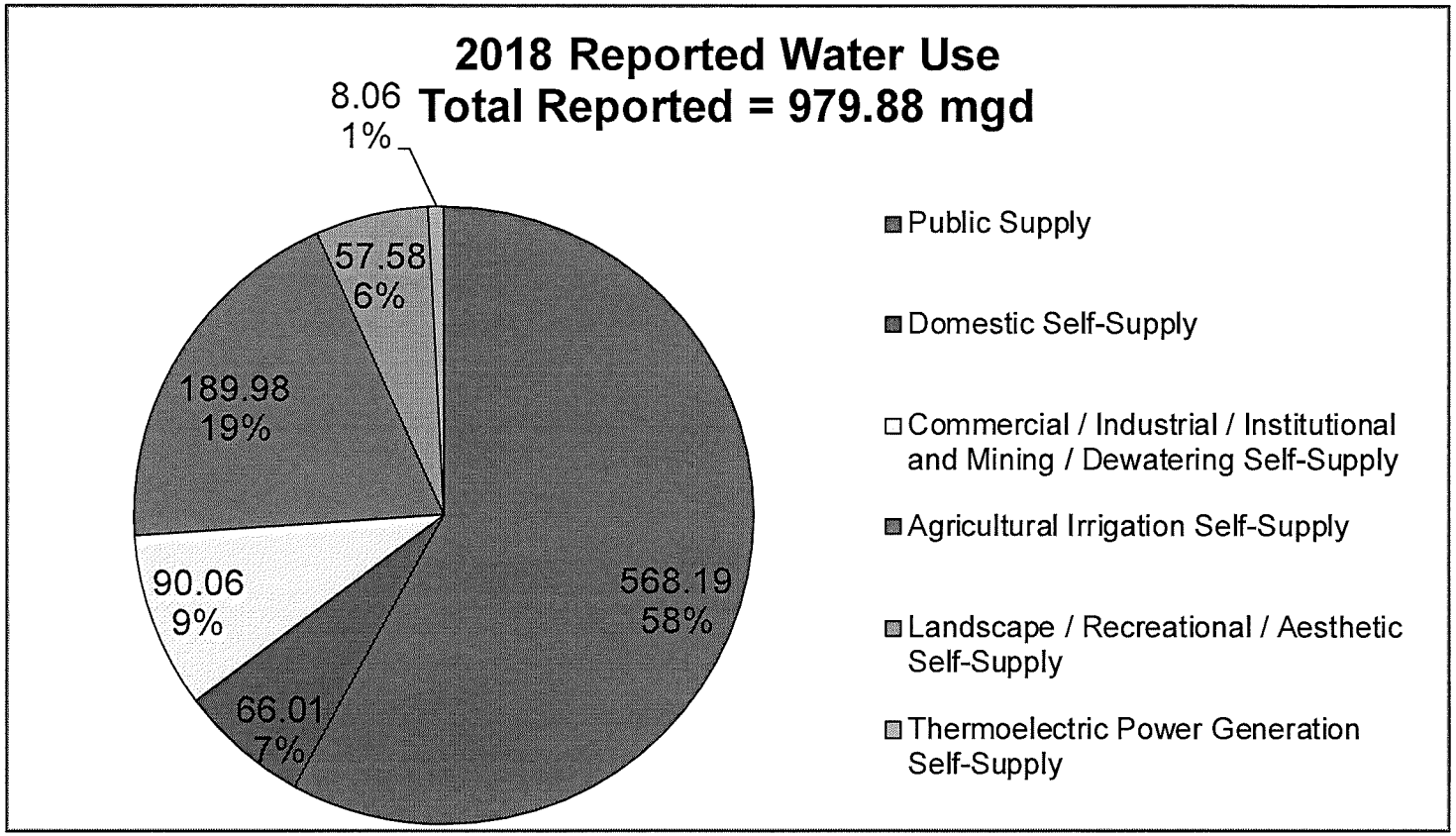

Figure 2. Total freshwater use (mgd), 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.
Source of domestic self-supply is assumed to be groundwater.

Table 4. Population by county, 2018

County	SJRWMD Population	Public Supply Population	Domestic Self-Supply and Small Public Supply Systems Population
Alachua	202,732	189,176	13,557
Baker	27,188	7,031	20,158
Bradford	5,601	919	4,682
Brevard	601,615	557,196	44,419
Clay	212,034	135,348	76,686
Duval	965,869	802,615	163,254
Flagler	112,694	105,836	6,858
Indian River	151,825	145,571	6,254
Lake	365,797	304,698	61,099
Marion	241,338	129,955	111,383
Nassau	82,748	50,519	32,229
Okeechobee	1,579	0	1,579
Orange	903,171	858,977	44,194
Osceola	1,167	0	1,167
Putnam	72,981	21,051	51,930
St. Johns	238,742	189,261	49,481
Seminole	463,560	429,062	34,498
Volusia	579,065	515,204	63,861
Total	**5,229,706**	**4,442,419**	**787,289**

Note: 2018 county population is from BEBR, Florida Estimates of Population (BEBR 2018a)
Total population for the state of Florida in 2018 = 20,840,568
Percent of total state of Florida population that lives within SJRWMD = 25%
Percent of SJRWMD population served by public supply = 85%
Orange County (Orange County Utilities / Orlando Utilities Commission) totals only include the population served in SJRWMD.

The SJRWMD population is derived from the county population multiplied by the percentage of county population in SJRWMD. The percentage of county population, as represented, is rounded to the nearest tenth. Thus, in some cases, the presented SJRWMD population is slightly different than the product of the county population multiplied by the percentage of county population in SJRWMD.

Table 5. Gross and residential public supply per capita water use in gallons per day

County	PS Gross Per Capita (gpcd)	PS Residential Per Capita (gpcd)
Alachua	125	70
Baker	222	172
Bradford	229	154
Brevard	100	65
Clay	92	68
Duval	142	94
Flagler	90	50
Indian River	133	45
Lake	163	99
Marion	143	68
Nassau	200	156
Okeechobee	N/A	82
Orange	139	91
Osceola	N/A	51
Putnam	113	54
St. Johns	112	75
Seminole	135	82
Volusia	101	72
Total	**128**	**84**

Note: As of December 2018, there were no significant permitted public supply uses in SJRWMD's portion of Okeechobee and Osceola counties. The population residing therein rely on domestic wells for their potable needs.

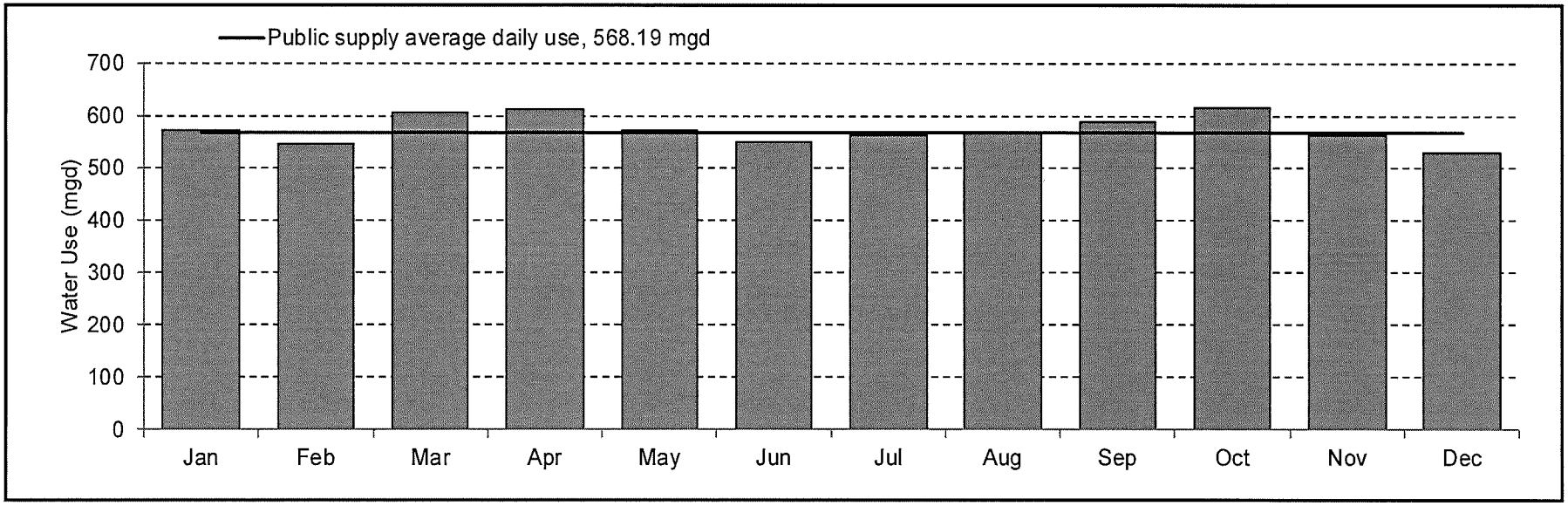

Figure 3. Average daily public supply water use (mgd) by month, 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.

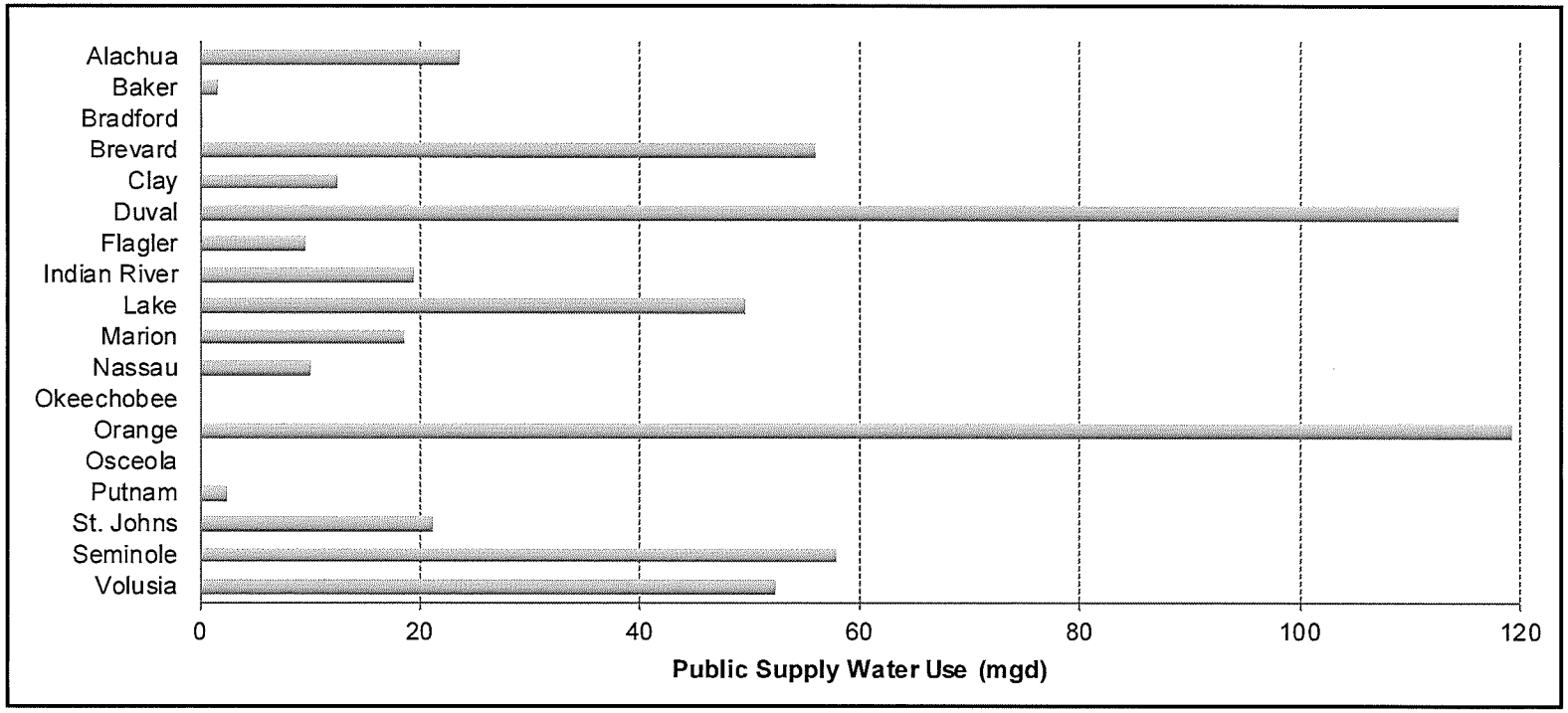

Figure 4. Freshwater use (mgd) for public supply in SJRWMD, 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.
Total public supply water use in SJRWMD for 2018 was 568.19 mgd.
Orange County (Orange County Utilities / Orlando Utilities Commission) totals only include the water consumed in SJRWMD.

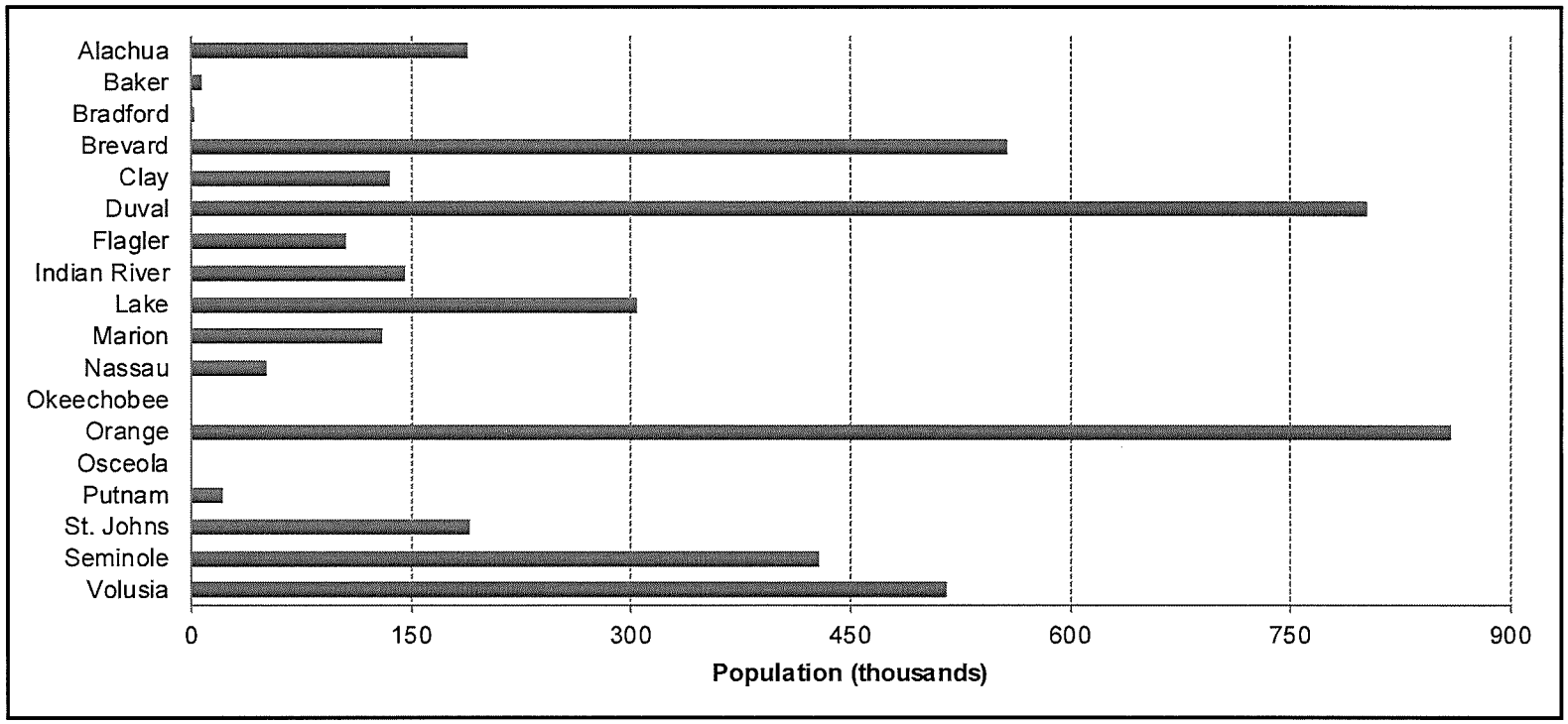

Figure 5. Population served by public supply in SJRWMD, 2018

Note: Population estimates are based on best available data as of April 2, 2019.
Total public supply population in SJRWMD for 2018 was 4,442,419.
Orange County (Orange County Utilities / Orlando Utilities Commission) totals only include the population served in SJRWMD.

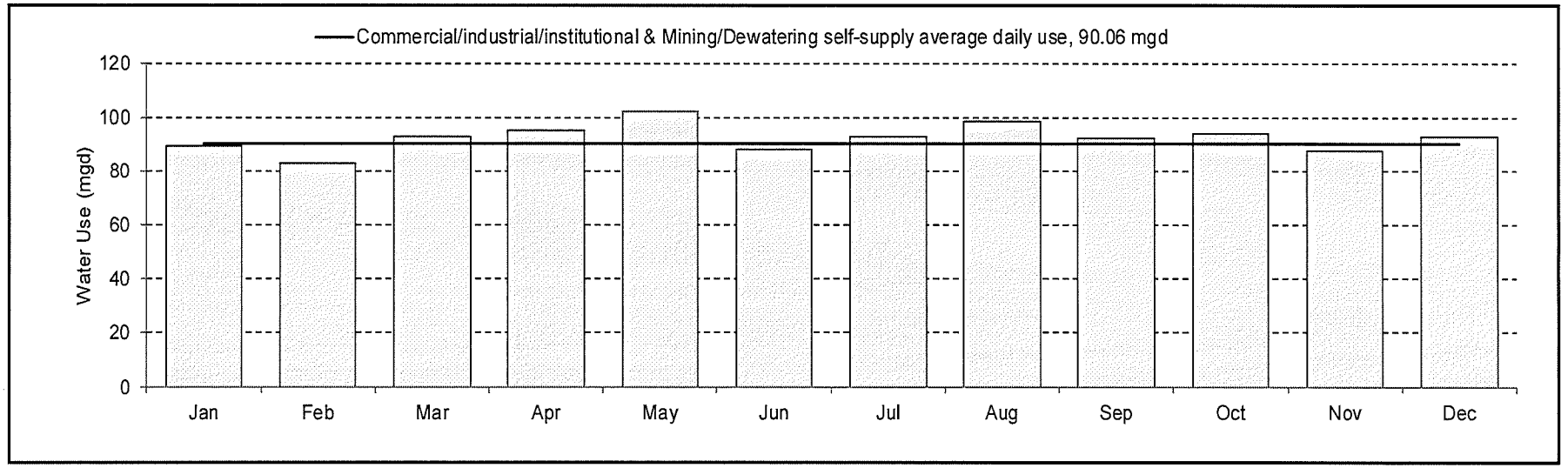

Figure 6. Average daily commercial/industrial/institutional and mining/dewatering self-supply freshwater use (mgd) by month, 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.

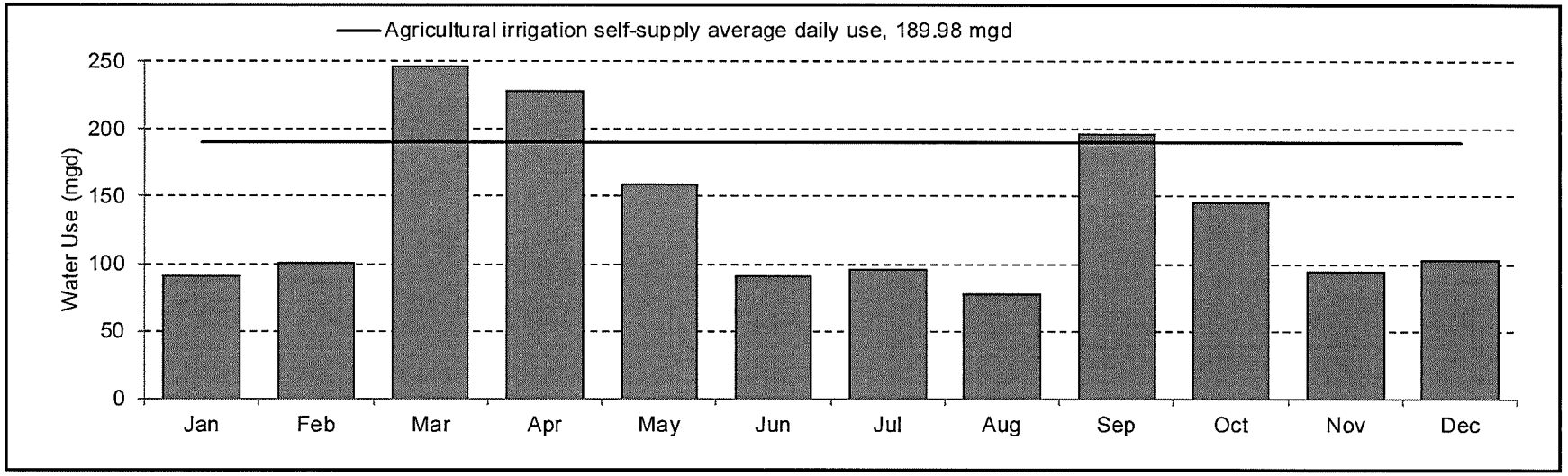

Figure 7. Average daily agricultural self-supply freshwater use (mgd) by month, 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.

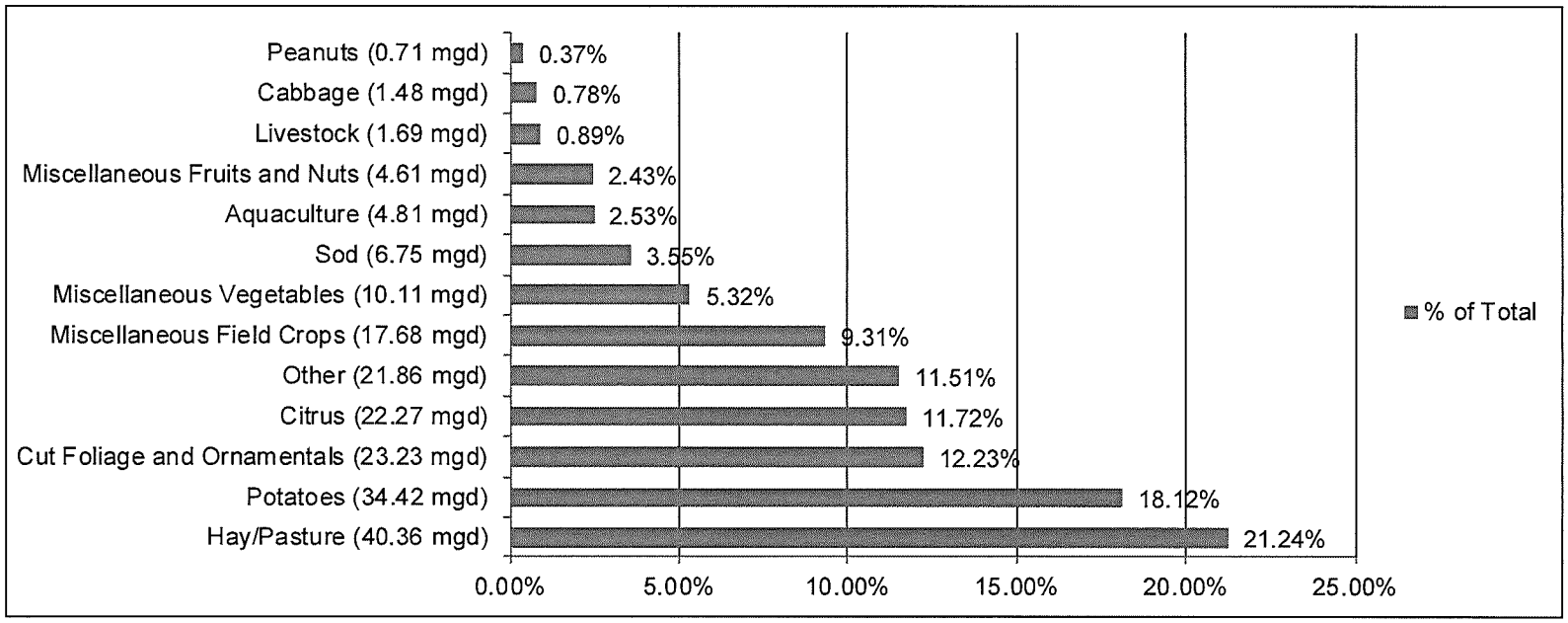

Figure 8. Agricultural water use by crop, 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.
Calculation anomalies due to rounding account for nominal discrepancies.
Total agricultural water use in SJRWMD for 2018 was 189.98 mgd.

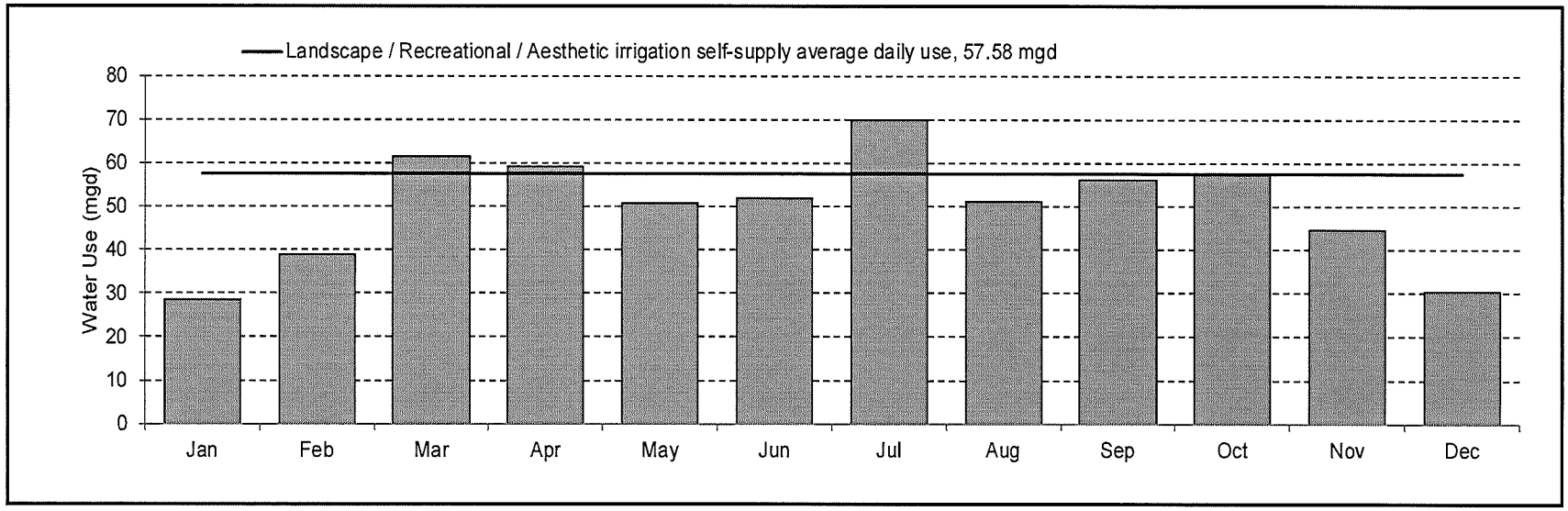

Figure 9. Average daily landscape/recreational/aesthetic irrigation self-supply freshwater use by month, 2018

Note: Water use is in million gallons per day (mgd).
Amounts are based on best available data as of April 2, 2019.

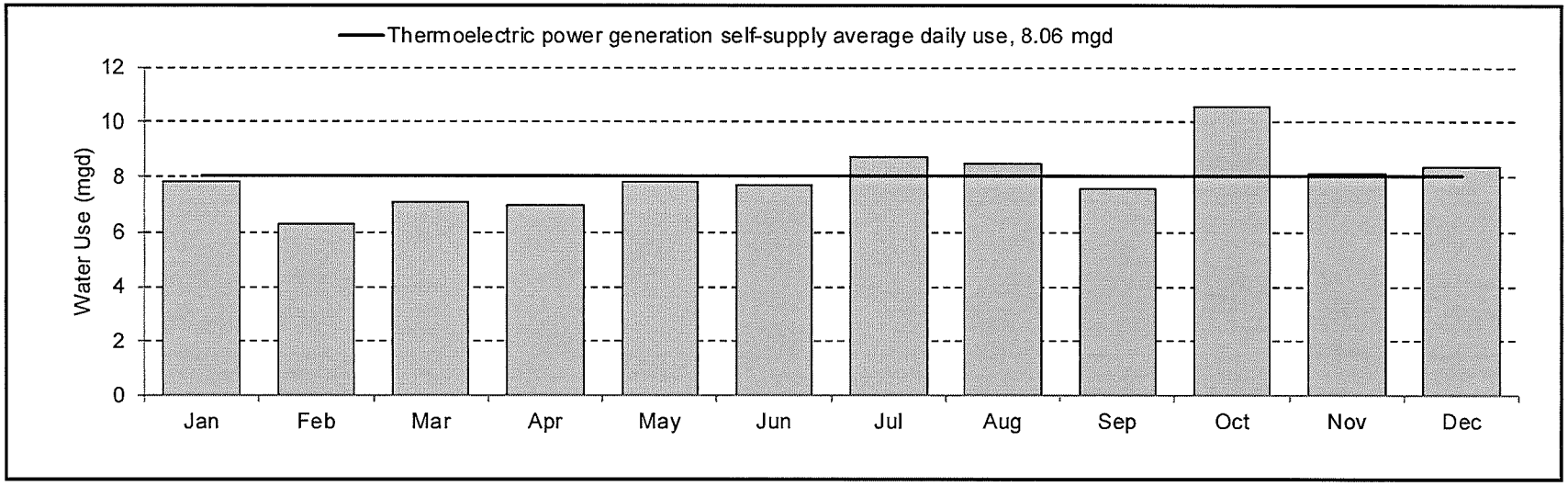

Figure 10. Average daily thermoelectric power generation self-supply freshwater use by month, 2018

Note: Water use is in million gallons per day (mgd).
Amounts of consumptive freshwater use are based on best available data as of April 2, 2019.

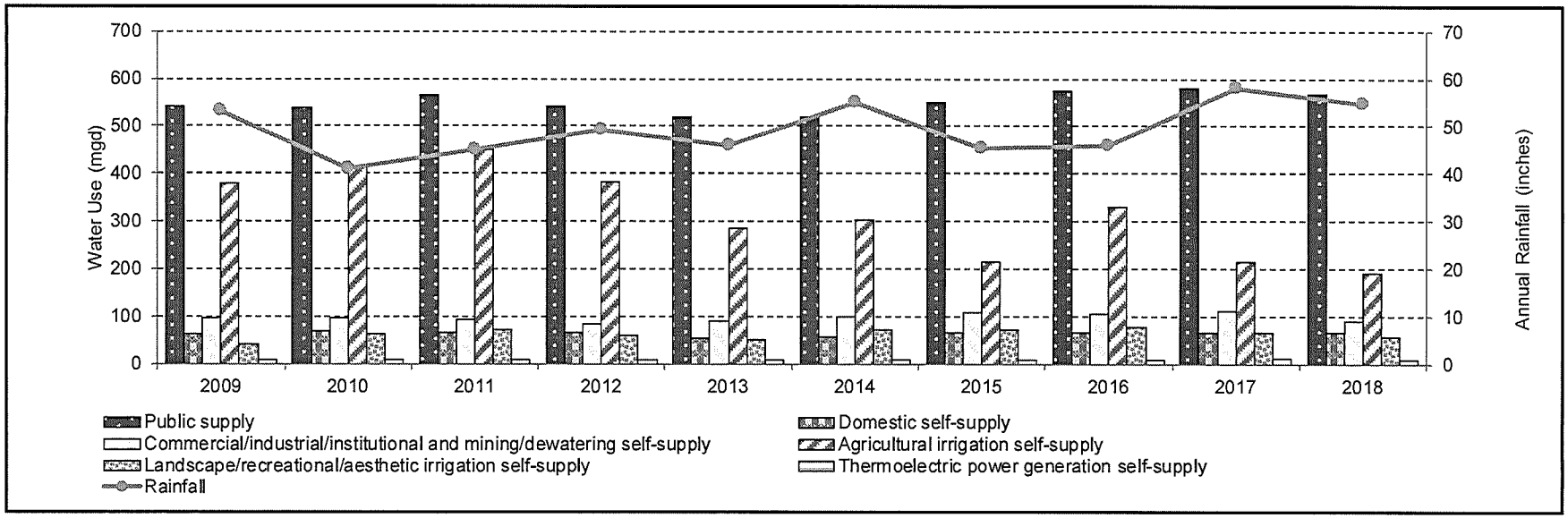

Figure 11. Annual rainfall and freshwater use by category, 2009–2018

Note: Water use is in million gallons per day (mgd); rainfall is measured in inches.
Amounts are based on best available data as of April 2, 2019.
Source of domestic self-supply is assumed to be groundwater.

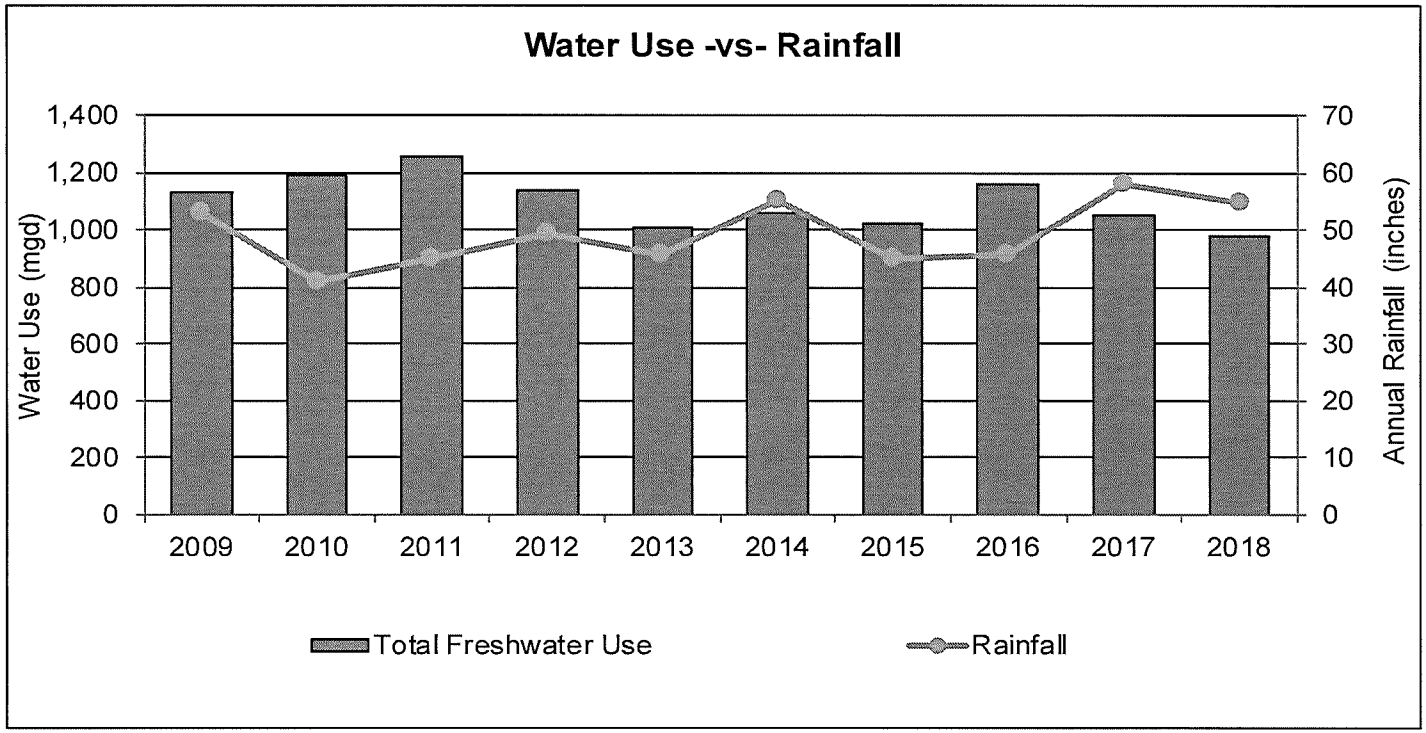

Figure 12. Annual rainfall and total freshwater use, 2009–2018

Note: Water use is in million gallons per day (mgd); rainfall is measured in inches.
Amounts are based on best available data as of April 2, 2019.
Source of domestic self-supply is assumed to be groundwater.

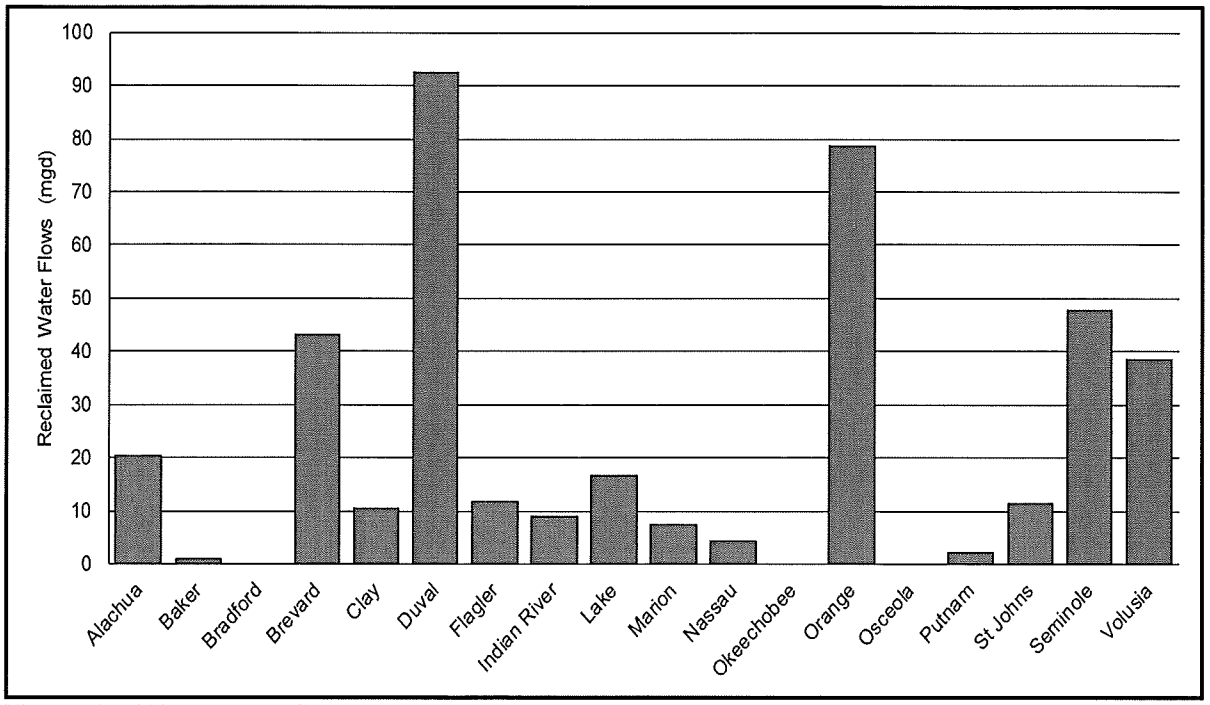

Figure 13. Wastewater flows reused beneficially, 2018

Note: Reclaimed water flows in million gallons per day (mgd).
Data obtained from the Draft 2018 DEP Reuse Inventory.

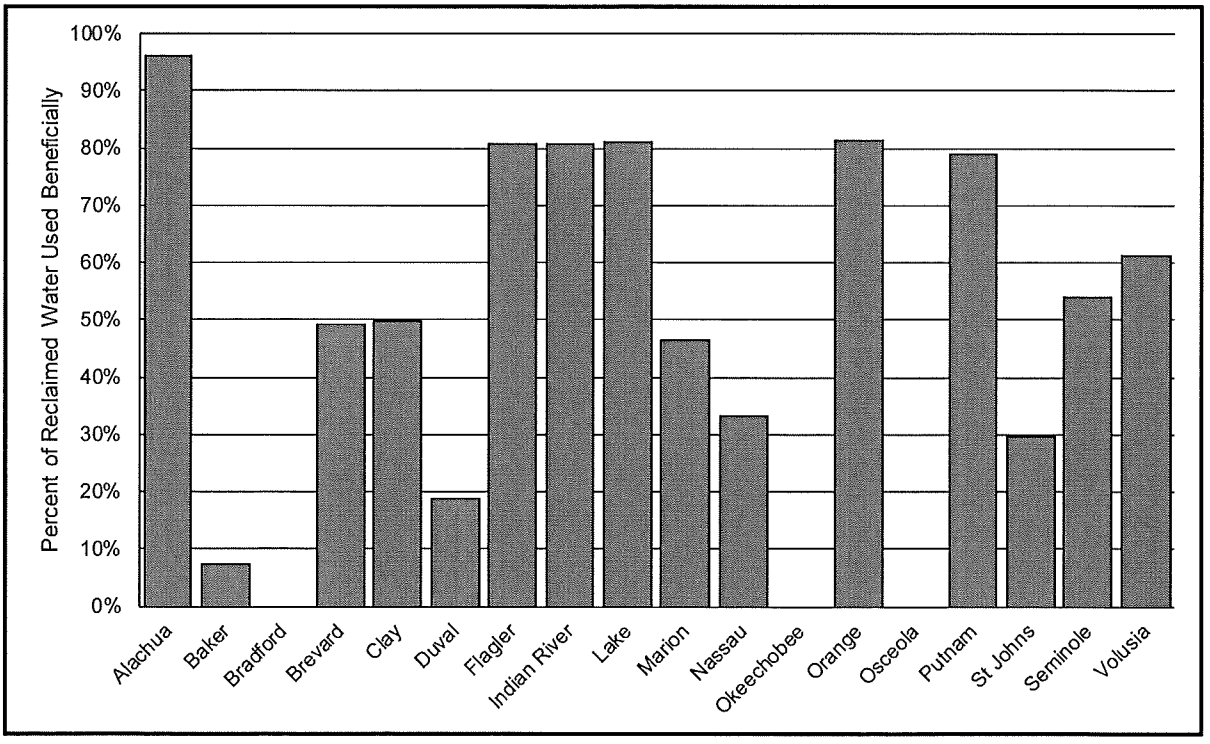

Figure 14. Percent of wastewater flows reused beneficially, 2018

Note: Data obtained from the Draft 2018 DEP Reuse Inventory.

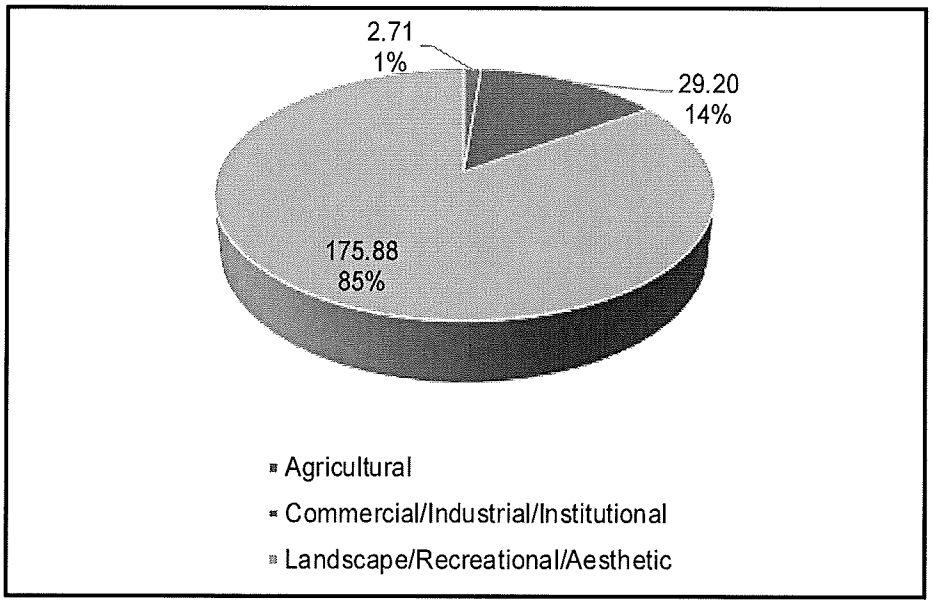

Figure 15. Beneficially used reclaimed water by use type, 2018

Note: Water use is in million gallons per day (mgd).
Data obtained from the Draft 2018 DEP Reuse Inventory.