

Water Use

in the St. Johns River Water Management District

1999

Water Use

This document reports water use for all water withdrawals from ground or surface water sources, expressed in million gallons per day (mgd). The water use reported in this document represents quantities of water withdrawn and is not intended to specifically refer to quantities of water consumed. Water withdrawal information is reported for seven categories of use: public supply, domestic self-supply, commercial/ industrial self-supply, agricultural irrigation, recreational irrigation, thermoelectric power generation, and abandoned artesian wells. The total

Category	Freshwater			Saline Water
	Ground	Surface	Total	Surface
Public supply	531.1	12.1	543.2	0.0
Domestic self-supply	92.0	0.0	92.0	0.0
Commercial/industrial use	93.9	33.9	127.8	1.1
Agricultural irrigation	228.3	116.3	344.6	0.0
Recreation/landscape irrigation	22.7	9.8	32.5	0.0
Thermoelectric power generation	8.0	17.8	25.8	2,087.6
Abandoned artesian wells	3.5	0.0	3.5	0.0
Total	979.5	189.9	1,169.4	2,088.7

Table 2. Total water use in SJRWMD, 1999 (in mgd). Fresh groundwater accounted for most of the freshwater used in SJRWMD.

amount of water used in the St. Johns River Water Management District (SJRWMD) in 1999, including fresh and saline water, was 3,258 mgd (Table 1).

Of that amount, 1,169 mgd was fresh, and 2,089 mgd was saline, used primarily for thermoelectric power generation (Table 2). Groundwater use totaled 980 mgd, and fresh surface water use totaled 190 mgd (Figure 1). The largest use of fresh groundwater in SJRWMD in 1999 was for public supply, which totaled 531 mgd, or 55% of the total groundwater use. This was followed by agricultural irrigation, which used 228 mgd, or 23% of the total groundwater use.

County	Freshwater			Saline Water	Total Water Use
	Ground	Surface	Total	Surface	
*Alachua (AL)	33.8	0.1	33.9	0.0	33.9
*Baker (BK)	4.8	0.4	5.2	0.0	5.2
*Bradford (BF)	0.4	0.0	0.4	0.0	0.4
Brevard (BV)	101.6	19.3	120.9	1,231.2	1,352.1
Clay (CL)	23.2	0.5	23.7	0.0	23.7
Duval (DU)	152.0	0.7	152.7	802.5	955.2
Flagler (FL)	18.3	1.2	19.5	0.0	19.5
Indian River (IR)	60.6	96.7	157.3	53.9	211.2
*Lake (LK)	78.2	6.0	84.2	0.0	84.2
*Marion (MR)	40.9	0.9	41.8	0.0	41.8
Nassau (NS)	45.3	0.2	45.5	1.1	46.6
*Okeechobee (OK)	7.9	0.0	7.9	0.0	7.9
*Orange (OR)	148.1	2.1	150.2	0.0	150.2
*Osceola (OS)	2.8	2.9	5.7	0.0	5.7
*Polk (PK)	3.5	0.1	3.6	0.0	3.6
Putnam (PT)	49.1	48.9	98.0	0.0	98.0
St. Johns (SJ)	52.3	0.8	53.1	0.0	53.1
Seminole (SM)	71.7	0.9	72.6	0.0	72.6
Volusia (VL)	85.0	8.2	93.2	0.0	93.2
Total	979.5	189.9	1,169.4	2,088.7	3,258.1

Table 1. Total water use by county, SJRWMD, 1999 (in mgd). Duval and Indian River counties used the most freshwater in SJRWMD.

*Counties partially in SJRWMD

The St. Johns River Water Management District water use program has published water use reports annually since 1978. The report is distributed to a wide variety of state and local government agencies and private organizations. Each report assesses the total quantities of water used arranged by source, category of use, and county. SJRWMD cooperates with the U.S. Geological Survey, which compiles national estimates of water use every five years.

Public Supply

The public supply category consists of water supplied to homes, commercial establishments, institutions, industries, etc., by privately owned and publicly owned water supply utilities. Utilities that serve 400 or more people or that withdraw more than 0.01 mgd from ground or



Physiographic Setting

The St. Johns River Water Management District, or SJRWMD, is one of five water management districts in Florida. SJRWMD encompasses 12,300 square miles in the northeastern part of the state.

SJRWMD includes all or part of 19 counties, with more than 3.7 million people, or 25% of the state's population. Within SJRWMD's boundaries are the entire St. Johns and Nassau river basins, the Indian River Lagoon and Northern Coastal basins, and Florida's portion of the St. Marys River Basin. SJRWMD's average annual rainfall for the period 1961–90 was 52 inches. The driest year of the period was 1990, with an average of 38.85 inches, or 25% below normal. Nearly 70% of rainfall is returned to the atmosphere through evapotranspiration, while the remaining 30% is run off to surface waters or recharged to aquifers (Water Resources Atlas of Florida 1998).

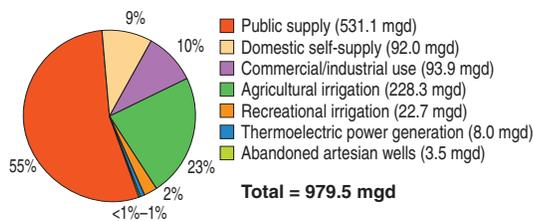


surface water sources are included in this category. Water use data come from utility records and are estimated to the nearest 0.01 mgd.

In 1999, 300 public supply utilities served an estimated 3,249,994 people, or 86% of the total population in SJRWMD. Total water use from both ground and surface water sources was 543 mgd, nearly 16% above the average annual use of 467 mgd for the 10-year period from 1990 to 1999. The average per capita use, based on the population

served by public supply, was 167 gallons per day (gpd) compared to the average per capita use of 158 gpd for the same 10-year period. Public supply water use typically fluctuates during the year in response to seasonal rainfall and temperature variation. Water use tends to increase during the warm season (April through October) when outdoor use is highest. In 1999, water use ranged from a low of 474 mgd (146 gallons/person/day) in January to a high of 624 mgd (192 gallons/person/day) in April. Of the water withdrawn for public supply, 98% was groundwater.

Fresh Groundwater



Fresh Surface Water

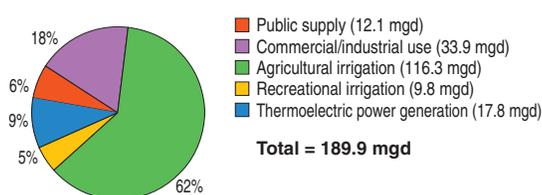


Figure 1. Total freshwater use, 1999. Most of the freshwater used in SJRWMD came from groundwater sources. Fresh surface water is used primarily for agricultural irrigation and commercial/industrial use.



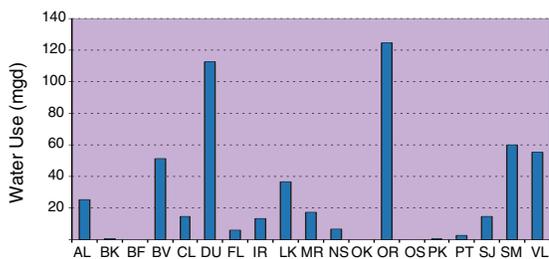


Figure 2. Freshwater use for public supply in SJRWMD 1999. Duval and Orange counties were the largest water users in SJRWMD.

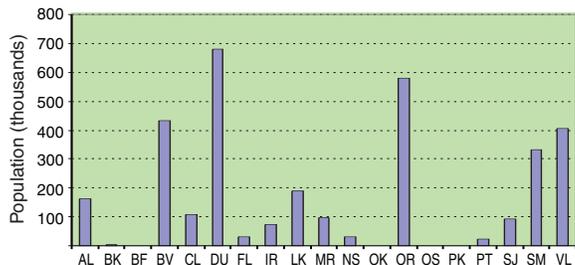


Figure 3. Population served by public supply in SJRWMD, 1999. Duval and Orange counties were the largest in population in SJRWMD.

The counties with the largest public supply water use in SJRWMD were Orange County (124 mgd serving 579,541 people) and Duval County (112 mgd serving 679,243 people). Together, these counties represented about 43% of the public supply water use and about 39% of the public supply water use population (Figures 2 and 3). There is no public supply water use in the portions of Osceola and Okeechobee counties within SJRWMD.



Domestic Self-Supply

The domestic self-supply category includes water withdrawn from individual domestic wells or provided by utilities that serve less than 400 people. Water use from these

facilities is not inventoried, so water use in this category is estimated from population and per capita water use figures.

In 1999, an estimated 542,517 people used 92 mgd of domestic self-supply water, or 9% of the total fresh groundwater use in SJRWMD. All of the domestic self-supply water was assumed to be groundwater. Marion County had the largest self-supplied population with 98,692 people; Duval County had the second largest with 83,603 people, followed by Orange County with 55,205 people.

Domestic self-supply water use has fluctuated over the 10-year period between 82 mgd in 1993 and 93 mgd in 1995. The average for this 10-year period is 87 mgd; water use in 1999 was about 6% above the average.

Commercial/Industrial Self-Supply

The commercial/industrial self-supply use category consists of the larger (more than 0.01 mgd) commercial and industrial users not served by public supply utilities. The commercial category includes businesses and institutions, such as government facilities, military installations, schools, prisons, and hospitals. The industrial category includes mining, processing, and manufacturing facilities; it does not include water used for power generation by thermoelectric power plants. Water used for transporting materials from mine pits to mineral processing plants and for dewatering mine pits is considered conveyance and also is not included in estimates of water use. Sixty-four commercial users, including 59 institutions, and 54 industrial users are included in this report of 1999 water use.

The total freshwater use in the commercial/industrial category was 128 mgd, or 11% of the total freshwater use in SJRWMD. Of this total, 94 mgd was groundwater and 34 mgd was fresh surface water. In addition, more than 1 mgd of saline water was used.

Most of the water withdrawn for commercial/industrial purposes supplied the pulp and paper industries in Putnam, Nassau, and Duval counties. In 1999, water use for pulp

and paper production included 62 mgd of fresh groundwater, 32 mgd of fresh surface water, and 1 mgd of saline surface water. The second largest water user in this category was the mining industry, which accounted for 9 mgd of fresh groundwater and 2 mgd of fresh surface water. Together, pulp and paper production and mining accounted for 105 mgd of freshwater, or 84% of the commercial/industrial freshwater use.

For the 10-year period 1990–99, commercial/industrial self-supply water use was highest in 1992 (148 mgd) and lowest in 1997 (119 mgd). The average for the 10-year period is 133 mgd; water use in 1999 was 4% below the average. Commercial/ industrial freshwater use in 1999 varied from a low of 115 mgd in February to a high of 142 mgd in August.

Agricultural Irrigation

The agricultural irrigation category consists of estimated water withdrawals from ground and surface water sources for supplemental crop irrigation. Estimates of the acreage planted in various crops are multiplied by estimates of the quantity of water per acre necessary to irrigate those crops. Water use for irrigation is assessed by crop, because different crops have different consumptive use requirements.

Total freshwater use for agricultural irrigation was estimated at 345 mgd, or 29% of the total freshwater use in SJRWMD in 1999. Of this total, 228 mgd, or 66% of the total water used for agricultural irrigation, was groundwater. It was assumed that most

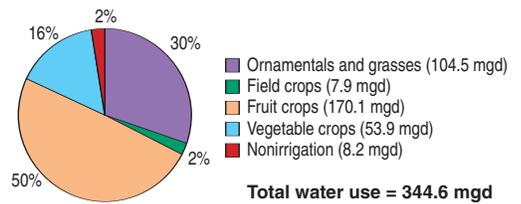


Figure 4. Agricultural irrigation water use in SJRWMD for five crop types, 1999. Fruit crops accounted for half of the agricultural irrigation water use in 1999.

groundwater used for agricultural irrigation came from the Upper and Lower Floridan aquifers.

An estimated 857,107 acres were farmed in SJRWMD in 1999, of which 306,971 acres were irrigated. Of the total acreage irrigated, 210,997 acres were irrigated by flood systems, 56,919 acres were irrigated by low-pressure/ low-volume systems, and 39,055 acres were irrigated by sprinkler systems.

The largest water use for agricultural irrigation by county occurred in Indian River County—134 mgd of freshwater, or 39% of the agricultural irrigation by county. Most of this amount was fresh surface water. The second largest water use for agricultural irrigation by county was in Brevard County—56 mgd, most of which was groundwater. The combined water use in these two counties was 190 mgd, or 55% of the total agricultural irrigation water use.

The largest water use for a crop type was for fruit, which accounted for 170 mgd, or 49% of the agricultural irrigation water use (Figure 4). The largest water use for a single crop was for citrus irrigation, which accounted for 167 mgd, or 48% of the agricultural irrigation water use.





Recreational Irrigation

The recreational irrigation category includes water used to irrigate turf grass for golf courses. An estimated 15,682 acres of a total of 25,556 acres of turf grass were irrigated using sprinkler systems. Water used in the recreational irrigation category totaled 32 mgd, or about 3% of the total freshwater use in 1999. Of this amount, 23 mgd was groundwater. The largest water uses by county for recreational irrigation occurred in Volusia County (5 mgd) and Brevard County (4 mgd).

Between 1990 and 1999, combined agricultural and recreational irrigation water use was highest in 1998 (661 mgd) and lowest in 1995 (365 mgd). The average for this 10-year period was 537 mgd; water use in 1999 for this category was 30% below the average.

Agricultural and recreational combined irrigation water use in 1999 had a greater seasonal fluctuation than any other water use category, from a low of 43 mgd in September to a high of 1,415 mgd in April. These fluctuations are typical of irrigation water use and are inversely correlated to rainfall.

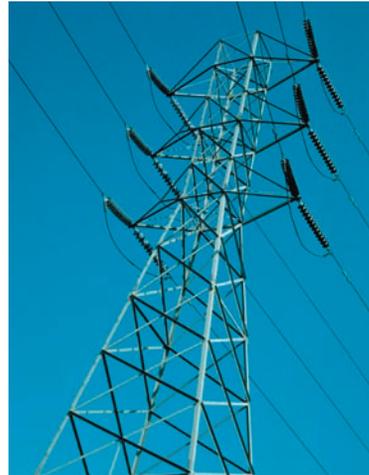
Thermoelectric Power Generation

The thermoelectric power generation category consists of water used by power plants primarily for cooling. In 1999, water use data were collected for 12 self-supplied thermoelectric power plants. Total water use accounted for 2,087 mgd of saline surface water, 18 mgd of fresh surface water, and 8 mgd of fresh groundwater. The largest

amount of saline water used by county for thermoelectric power generation was in Brevard County (1,231 mgd), while the largest amount of freshwater used was in Putnam County (15 mgd).

Thermoelectric power generation freshwater use was highest in 1990 (213 mgd) and lowest in 1999 (26 mgd). The average for this 10-year period is 101 mgd; water use in 1999 was

74% below the average. Thermoelectric power generation freshwater use in 1999 fluctuated from a low of 20 mgd in February to a high of 35 mgd in August. Fluctuations in water use are related to power plant shutdowns for maintenance or increased power demands during periods of extremely high or low temperatures.



Abandoned Artesian Wells

The abandoned artesian wells category consists of water flowing from abandoned artesian wells. According to available data, all abandoned artesian wells are supplied by the Floridan aquifer system. In 1999, there were 310 wells on the SJRWMD inventory of wells under investigation for permanent abandonment. The overwhelming majority of these wells have valves or temporary plugs,

which effectively stop or greatly reduce the flow from the wells. The estimated actual total flow from these wells (districtwide) was approximately 4 mgd.

SUMMARY Increases in population, development and tourism have played a significant role in changes in water use in SJRWMD. The trend in freshwater use since 1978, when SJRWMD first published the annual water use survey, has been a gradual increase in demand. Both the public supply population and water use for public supply within SJRWMD have more than doubled since 1978. Improved irrigation management by growers, as

well as a decrease in acres farmed, has brought about a decrease in agricultural irrigation water use.



Water Management

The primary goal of Florida's water management districts is the protection of water resources. Their mission is to manage water resources to ensure the continued availability of those resources while maximizing environmental and economic benefits. This is accomplished through regulation of consumptive uses; providing assistance to federal, state and local governments; operation and maintenance of control works; land acquisition and management; and applied research.

For additional information or specific water use data, contact the following:

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