

## Water Use in Florida, 2005 and Trends 1950-2005



### Introduction

Water is among Florida's most valued resources. The State has more than 1,700 streams and rivers, 7,800 freshwater lakes, 700 springs, 11 million acres of wetlands, and underlying aquifers yielding quantities of freshwater necessary for both human and environmental needs (Fernald and Purdum, 1998). Although renewable, these water resources are finite, and continued growth in population, tourism, and agriculture will place increased demands on these water supplies.

The permanent population of Florida in 2005 totaled 17.9 million, ranking fourth in the Nation (University of Florida, 2006); nearly 86 million tourists visited the State (Orlando Business Journal, 2006). In 2005, Florida harvested two-thirds of the total citrus production in the United States and ranked fifth in the Nation net farm income (Florida Department of Agriculture and Consumer Services, 2006). Freshwater is vital for sustaining Florida's population, economy, and agricultural production.

Accurate estimates reflecting water use and trends in Florida are compiled in 5-year intervals by the U.S. Geological Survey (USGS) in cooperation with the Florida Department of Environmental Protection (FDEP) and the Northwest Florida, St. Johns River, South Florida, Southwest Florida, and Suwannee River Water Management Districts (Marella, 2004). This coordinated effort provides the necessary data and information for planning future water needs and resource management. The purpose of this fact sheet is to present the highlights

of water use in Florida for 2005 along with some significant trends in withdrawals since 1950.

### Total Water Use by Source — 2005

In 2005, the total amount of water withdrawn in Florida was estimated at 18,354 Mgal/d (million gallons per day), of which 37 percent was freshwater and 63 percent was saline water. Ground water accounted for nearly 62 percent of freshwater withdrawals, and surface water accounted for the remaining 38 percent of the freshwater (fig. 1). Surface water accounted for nearly all (99.9 percent) of the saline withdrawals. Water withdrawal highlights for 2005 include:

- Fresh ground-water withdrawals in 2005 totaled 4,242 Mgal/d and provided drinking water for 16.1 million people (90 percent of Florida's population).
- Fresh surface-water withdrawals in 2005 totaled 2,626 Mgal/d and provided drinking water for about 1.8 million people (10 percent of Florida's population).

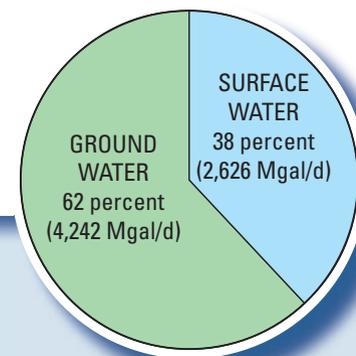


Figure 1. Fresh ground- and surface-water withdrawals in Florida, 2005.

- About 2,526 Mgal/d (nearly 60 percent) of the ground water withdrawn in 2005 was obtained from the Floridan aquifer system (fig. 2), while Lake Okeechobee and associated canals provided an estimated 1,140 Mgal/d (43 percent) of fresh surface water withdrawn in 2005.
- The amount of freshwater withdrawn monthly fluctuates because of variations in temperature, precipitation (rain-fall), crop production, and tourism. Nearly one-quarter (24 percent) of the freshwater withdrawn in 2005 occurred in April and May.
- Saline water withdrawn in 2005 totaled 11,486 Mgal/d and was used as cooling water that generated nearly 60 percent of the State's total electric power.
- The largest amount of freshwater was withdrawn in Palm Beach County (fig. 3; table 1) and the largest amount of saline water was withdrawn in Pasco County during 2005 (table 1).

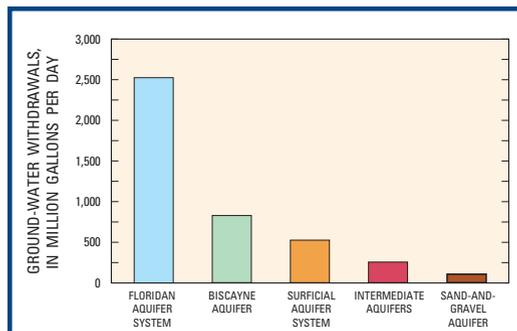
- Overall, agricultural irrigation accounted for 40 percent and was the largest of the total freshwater withdrawn (ground and surface), followed by public supply with 37 percent.
- Public supply (52 percent) and agricultural irrigation (31 percent) used the largest volumes of fresh ground water in 2005, followed by commercial-industrial-mining self-supplied (8.5 percent), domestic self-supplied (4 percent),

recreational irrigation (4 percent), and power generation (0.5 percent) (fig. 4).

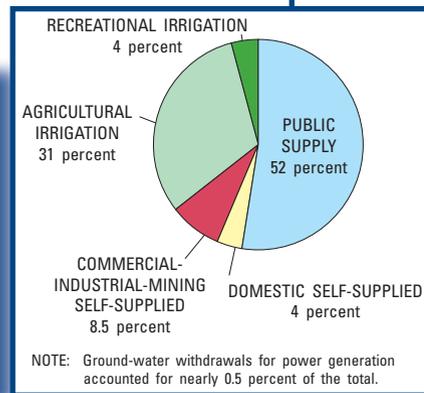
- Agricultural irrigation (56 percent) used the largest volume of fresh surface water in 2005, followed by power generation (20.5 percent), public supply (13 percent), recreational irrigation (6 percent), and commercial-industrial-mining self-supplied (4.5 percent) (fig. 5).

### Total Water Use by Category — 2005

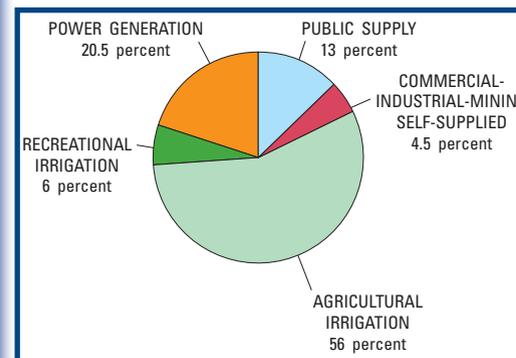
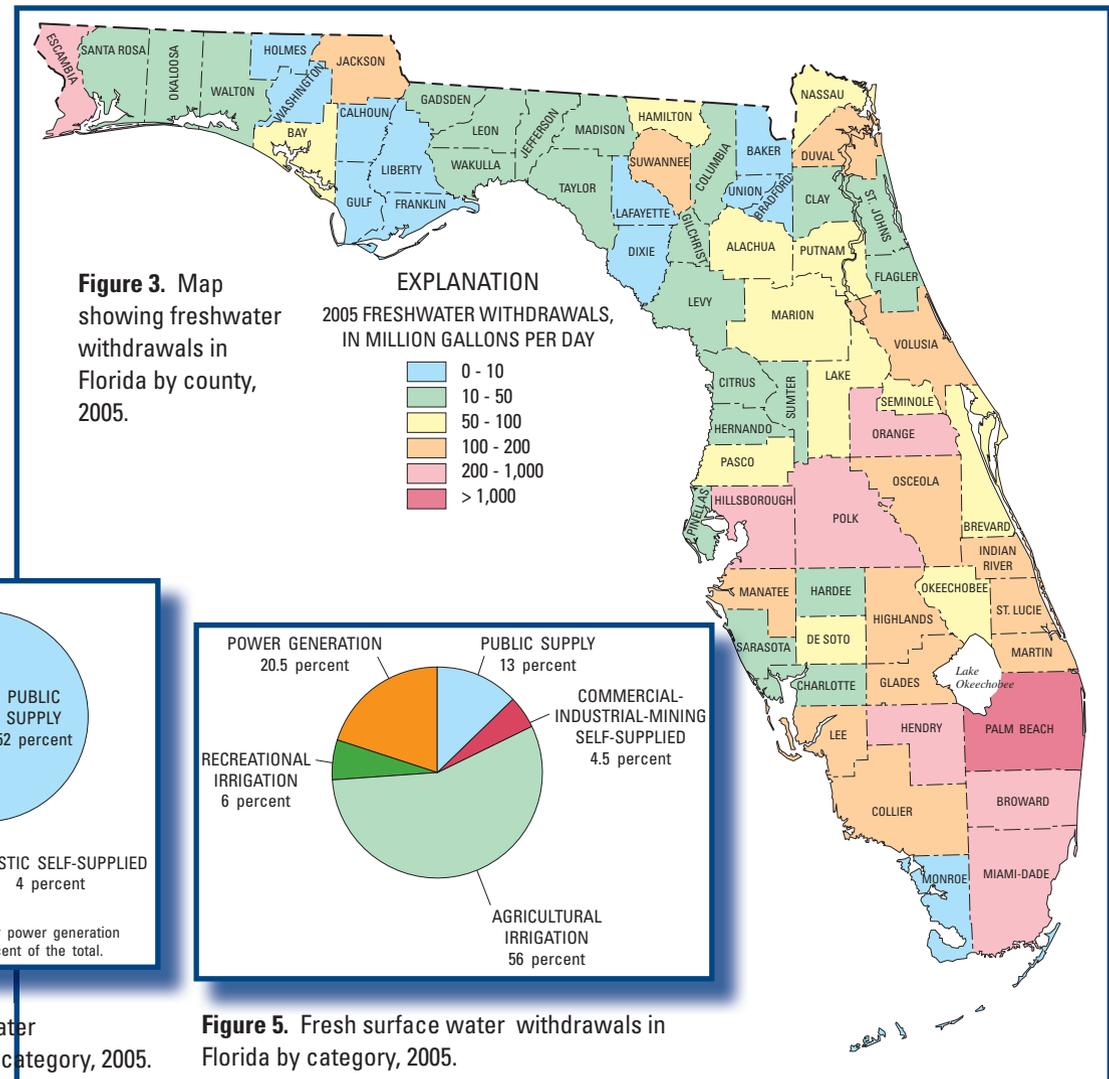
Water withdrawal data in Florida are collected or estimated for each of the following water-use categories: public supply, domestic self-supplied, commercial-industrial-mining self-supplied, agricultural irrigation, recreational irrigation, and power generation. Information was not collected for instream (nonwithdrawal) water use such as hydroelectric power generation, navigation, water-based recreation, and propagation of fish and wildlife.



**Figure 2.** Ground-water withdrawals by principal aquifer in Florida, 2005.



**Figure 4.** Fresh ground-water withdrawals in Florida by category, 2005.



**Figure 5.** Fresh surface water withdrawals in Florida by category, 2005.

**Table 1. Fresh and saline water withdrawals by category in Florida by county, 2005.**

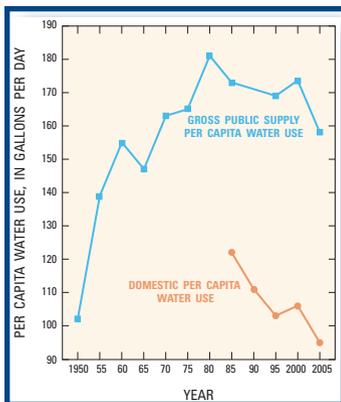
[Values in million gallons per day. Industrial includes commercial and mining withdrawals. Agricultural irrigation includes aquaculture and livestock withdrawals]

County	Public Supply		Domestic		Industrial		Agricultural Irrigation		Recreational Irrigation		Thermoelectric		Fresh Ground		Fresh Surface		Saline Total		All water
	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Saline	Fresh	Fresh	Surface	Total	Saline	Total		
Alachua	27.43	5.69	0.67	23.45	0.67	0.67	2.65	0.00	0.00	59.89	0.67	0.67	0.00	60.56					
Baker	0.86	3.53	0.60	2.54	0.01	0.00	0.00	0.00	6.62	0.92	0.00	0.00	7.54						
Bay	47.12	1.48	0.51	0.90	1.15	0.84	0.84	240.06	6.89	45.11	240.06	292.06							
Bradford	1.69	2.62	2.07	1.02	0.46	0.00	0.00	0.00	7.80	0.06	0.00	7.86							
Brevard	32.90	1.01	4.58	48.47	5.35	0.14	868.02	69.83	22.62	868.02	960.47								
Broward	263.57	0.43	0.25	7.66	36.99	0.00	1,529.21	277.86	31.04	1,529.21	1,838.11								
Calhoun	0.63	0.92	0.00	1.88	0.00	0.00	0.00	3.00	0.43	0.00	3.43								
Charlotte	6.37	3.09	1.59	26.19	2.89	0.00	0.00	16.18	23.95	0.00	40.13								
Citrus	15.64	6.89	1.02	1.52	3.90	1.59	1,676.58	30.14	0.42	1,676.58	1,707.14								
Clay	13.96	3.57	2.73	2.32	0.52	0.00	0.00	22.71	0.39	0.00	23.10								
Collier	67.16	4.30	4.80	92.55	24.59	0.00	0.00	166.05	27.35	0.00	193.40								
Columbia	3.58	3.69	0.23	4.49	0.50	0.00	0.00	12.28	0.21	0.00	12.49								
DeSoto	23.88	2.09	0.19	40.01	0.57	0.00	0.00	45.41	21.33	0.00	66.74								
Dixie	0.88	1.01	0.00	1.86	0.00	0.00	0.00	3.72	0.03	0.00	3.75								
Duval	137.92	7.54	18.26	2.12	5.16	0.50	604.81	165.11	6.39	604.81	776.31								
Escambia	40.45	1.36	56.17	3.30	5.18	225.39	0.00	83.12	248.73	0.00	331.85								
Flagler	8.92	0.29	0.01	9.30	0.74	0.00	0.00	15.51	3.75	0.00	19.26								
Franklin	2.13	0.06	0.00	0.09	0.31	0.00	0.00	2.30	0.29	0.00	2.59								
Gadsden	4.04	1.60	0.78	10.96	0.22	0.00	0.00	10.31	7.29	0.00	17.60								
Glachrist	0.22	1.39	0.40	12.88	0.00	0.00	0.00	14.60	0.29	0.00	14.89								
Glades	1.01	0.48	0.21	93.34	0.39	0.00	0.00	22.26	82.17	0.00	104.43								
Gulf	1.82	0.12	0.70	0.30	0.11	0.00	0.00	3.03	0.02	0.00	3.05								
Hamilton	0.94	0.79	33.79	19.34	0.00	0.00	0.00	54.49	0.01	0.00	54.86								
Hardee	1.49	1.60	2.10	26.21	0.19	0.87	0.00	32.45	0.37	0.00	32.46								
Hendry	6.22	1.23	0.70	385.99	1.94	0.00	0.00	158.65	237.43	0.00	396.08								
Hernando	22.53	2.38	17.31	2.00	4.37	0.00	0.00	47.82	0.77	0.00	48.59								
Highlands	8.86	0.79	0.65	105.52	2.52	0.08	0.00	106.97	11.45	0.00	118.42								
Hillsborough	226.96	1.18	15.21	48.39	14.07	0.00	1,709.50	131.76	174.05	1,709.50	2,015.31								
Holmes	1.20	1.25	0.00	1.12	0.20	0.00	0.00	3.59	0.18	0.00	3.77								
Indian River	16.76	1.68	0.00	157.64	7.50	0.00	102.08	71.59	111.99	102.08	285.66								
Jackson	2.34	3.10	1.40	11.05	0.30	0.30	102.71	17.43	103.47	0.00	120.90								
Jefferson	0.78	0.87	0.26	11.28	0.30	0.00	0.00	13.20	0.29	0.00	13.49								
Lafayette	0.20	0.64	0.32	7.01	0.00	0.00	0.00	8.02	0.15	0.00	8.17								
Lake	40.54	6.49	9.54	19.93	9.67	0.00	0.00	75.79	10.38	0.00	86.17								
Lee	64.53	5.59	20.97	33.37	25.85	0.28	556.16	110.30	40.29	556.16	706.75								
Leon	33.66	4.08	0.03	1.37	1.46	2.47	0.00	42.55	0.52	0.00	43.07								
Levy	1.79	2.85	2.49	21.23	0.46	0.00	0.00	25.86	2.96	0.00	28.82								
Liberty	0.41	0.43	0.25	0.14	0.00	0.00	0.00	1.22	0.00	0.00	1.23								
Madison	1.44	1.14	0.07	11.34	0.30	0.00	0.00	13.96	0.33	0.00	14.29								
Manatee	50.98	0.16	4.24	73.55	6.55	5.92	0.00	96.06	45.34	0.00	141.40								
Marion	27.17	15.34	2.97	6.35	5.16	0.00	0.00	55.63	1.36	0.00	56.99								
Martin	19.30	2.37	2.84	90.12	10.27	14.00	0.00	37.72	101.18	0.00	138.90								
Miami-Dade	400.01	2.78	40.08	58.06	13.40	0.42	87.64	486.45	28.30	87.64	602.39								
Miami	0.00	0.00	0.04	0.05	1.63	0.00	0.00	0.88	0.84	0.00	1.72								
Monroe	6.50	8.20	36.30	0.02	2.83	0.00	0.00	52.01	1.84	1.19	55.04								
Nassau	22.07	0.73	3.08	0.96	2.65	0.00	0.00	29.35	0.14	0.00	29.49								
Okaloosa	2.04	1.44	0.43	50.03	1.00	0.00	0.00	46.51	8.43	0.00	54.94								
Orange	204.22	10.55	22.99	29.82	10.49	0.44	0.00	267.49	11.02	0.00	278.51								
Osceola	31.42	4.72	0.36	100.25	10.32	0.10	0.00	138.72	8.45	0.00	147.17								
Palm Beach	246.67	9.22	6.36	792.51	50.71	0.00	424.93	284.75	820.72	424.93	1,530.40								
Pasco	74.65	4.75	2.09	9.54	5.66	0.16	2,071.37	94.96	1.89	2,071.37	2,168.22								
Pinellas	23.06	1.09	0.15	0.26	5.35	0.00	453.92	27.44	2.47	453.92	483.83								
Polk	74.59	1.22	62.12	67.86	9.94	4.20	0.00	212.13	7.80	0.00	219.93								
Putnam	2.98	10.34	28.58	8.86	0.16	23.04	0.00	23.98	49.98	0.00	73.96								
St. Johns	14.34	2.05	0.93	15.02	3.21	0.00	0.00	32.34	3.21	0.00	35.55								
St. Lucie	24.85	4.43	7.22	147.21	8.51	0.00	1,160.08	71.46	120.76	1,160.08	1,352.30								
Santa Rosa	15.90	0.44	3.05	2.96	6.90	0.00	0.00	27.47	1.78	0.00	29.25								
Sarasota	26.35	0.81	1.08	3.48	9.29	0.00	0.00	35.04	5.97	0.00	41.01								
Seminole	56.14	2.70	0.39	8.39	1.60	0.00	0.00	68.28	0.94	0.00	69.22								
Sumter	10.33	2.12	4.08	6.33	1.85	0.00	0.00	19.94	4.77	0.00	24.71								
Suwannee	1.49	2.72	1.58	20.73	0.10	76.53	0.00	26.28	76.87	0.00	103.15								
Taylor	2.02	0.92	45.06	1.14	0.10	0.00	0.00	46.75	2.49	0.00	49.24								
Union	0.40	1.25	0.40	1.73	0.00	0.00	0.00	3.63	0.04	0.00	3.67								
Volusia	58.55	2.75	0.72	17.72	2.12	89.38	0.00	76.62	94.62	0.00	171.24								
Wakulla	1.81	1.49	0.93	0.27	0.20	6.37	0.00	4.70	6.37	0.00	11.07								
Walton	8.92	0.19	0.12	1.93	0.60	0.00	0.00	11.67	0.09	0.00	11.76								
Washington	1.04	1.42	0.28	0.95	0.20	0.00	0.00	3.89	0.00	0.00	3.89								
<b>State Totals</b>	<b>2,540.52</b>	<b>185.45</b>	<b>488.33</b>	<b>2,766.18</b>	<b>329.64</b>	<b>558.08</b>	<b>11,484.36</b>	<b>4,242.43</b>	<b>2,625.77</b>	<b>11,485.55</b>	<b>18,353.75</b>								

## Public-Supply Water Use

The public-supply category refers to water withdrawn for public use and distributed by a publicly- or privately-owned community water system.

- Water withdrawals for public supply in Florida in 2005 totaled 2,541 Mgal/d. Ground water supplied 2,201 Mgal/d (87 percent) and surface water supplied nearly 340 Mgal/d (13 percent).
- Nearly 16.1 million people (90 percent) of the State's 17.9 million residents obtained their drinking water from a public-supply water system. Ground-water sources supplied 14.3 million residents (89 percent) and surface-water sources supplied the remaining 1.8 million residents (11 percent).
- The Floridan aquifer system supplied nearly 53 percent of the total public-supply withdrawals and served an estimated 8.1 million people. The Biscayne aquifer supplied 33 percent of the total public-supply withdrawals and served 4.5 million people.
- Florida's estimated gross statewide public-supply per capita water use for 2005 was 158 gal/d (gallons per day) while Florida's statewide domestic (residential) per capita water use for 2005 was 95 gal/d. The statewide gross public-supply per capita for 2000 was 174 gal/d while the domestic per capita was 106 gal/d (Marella, 2004).



**Figure 6.** Historical gross public supply and domestic per capita water use in Florida, 1950-2005.

• Both the gross statewide per capita water use and the domestic per capita water use have shown a decline since 1980, with the exception of 2000, which was a drought year (fig. 6). This trend can be attributed to the effects of water conservation and restrictions imposed during this period, as well as the use of reclaimed wastewater for lawn irrigation in conjunction with other Florida-Friendly Landscaping techniques.

## Domestic Self-Supplied Water Use

The domestic self-supplied category includes ground water withdrawn in Florida by individual domestic or private wells for the purpose of providing drinking water.

- Ground-water withdrawals for the domestic self-supplied use category in 2005 totaled 185 Mgal/d. About 1.8 million people (10 percent) of the State's residents obtained their drinking water from an estimated 940,000 domestic or private wells.
- Most of the ground-water withdrawals for the domestic self-supplied water-use category in 2005 were obtained from the Floridan aquifer system (64 percent); the remaining was obtained from the shallow sources of the surficial aquifer system; the Biscayne aquifer, the intermediate aquifer; and the sand-and-gravel aquifer (a total of 36 percent). In many areas throughout Florida, these shallow aquifers yield sufficient water for domestic purposes, especially in areas where the top of the Floridan aquifer system is relatively deep or where the water quality is poor.

## Commercial-Industrial-Mining Self-Supplied Water Use

The commercial-industrial-mining self-supplied category is water withdrawn at commercial, industrial, and mining facilities in Florida.

- Water withdrawals for commercial-industrial-mining self-supplied uses in Florida in 2005 totaled 488 Mgal/d. Ground water supplied 366 Mgal/d (75 percent) and surface water supplied 122 Mgal/d (25 percent). Public-supply water systems delivered an additional 591 Mgal/d to commercial (504 Mgal/d) and industrial (87 Mgal/d) users in 2005.
- Mining accounted for the largest amount of water used in this category (40 percent) followed by pulp and paper manufacturing (28 percent).
- Water withdrawals from the 70 inventoried mining facilities totaled 194 Mgal/d, of which 60 percent was for mining limestone and sand, 36 percent was for phosphate mining, and 4 percent was for mineral or other mining.

## Agricultural Irrigation Water Use

The agricultural irrigation category consists of freshwater withdrawn for the irrigation of crops, aquaculture and

livestock operations, and all other nonirrigation uses associated with farming.

- Water withdrawals for agricultural irrigation totaled 2,766 Mgal/d in 2005. Surface water supplied 1,465 Mgal/d (53 percent) and ground water supplied 1,301 Mgal/d (47 percent).
- Agricultural irrigation withdrawals were greatest during March, April, and May (accounting for 42 percent of the water used) and were lowest during June, July, August, and September. A seasonal fluctuation of more than 4,300 Mgal/d in 2005 resulted from intense crop production and normal dry conditions during the spring months as well as a decrease in crop production and the normal rainfall patterns during the summer months.
- An estimated 3.864 million acres of land was used for agricultural crop production in Florida during 2005 (U.S. Department of Agriculture, 2004), with about 1.783 million irrigated acres. Improved pasture accounted for about one-half of the agricultural crop acres (48 percent); however, only 6 percent of the improved pasture was irrigated in 2005 (U.S. Department of Agriculture, 2004). Excluding improved pasture acreage, an estimated 2.024 million acres were farmed in Florida with 1.671 million acres (82.5 percent) of the non-pasture acreage irrigated.
- Fruit crops (including citrus) and field crops (including sugarcane) were the largest users of water for agricultural irrigation, accounting for 74 percent (37 percent each) of the agricultural irrigation water withdrawn in 2005. Specifically, citrus (996 Mgal/d) and sugarcane (875 Mgal/d) accounted for more than two-thirds (67.6 percent) of the total water withdrawn for this category.

## Recreational Irrigation Water Use

The recreational irrigation category includes the application of water on Florida lands to promote growth of turf grass (golf courses), landscape vegetation for lawns or recreation purposes, and water used for aesthetic purposes.

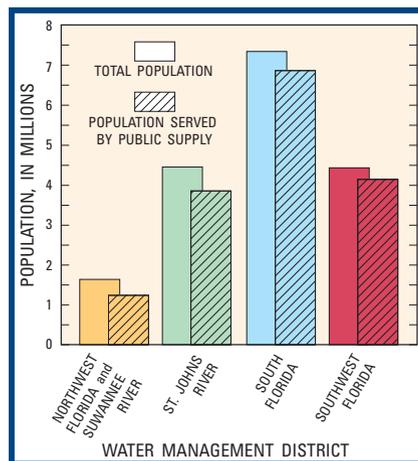
- Water withdrawals for recreational irrigation totaled 330 Mgal/d of freshwater in 2005. Ground water supplied 171 Mgal/d (52 percent) and surface water supplied 159 Mgal/d (48 percent). Reclaimed water obtained from treated domestic wastewater facilities supplied an additional 321 Mgal/d of water used for recreational irrigation purposes in 2005.

- Golf course irrigation was the largest user of water for this category in 2005, accounting for 225 Mgal/d (69 percent) of the water withdrawn and 110 Mgal/d (34 percent) of the reclaimed wastewater used.

### Power Generation Water Use

The power generation category includes water withdrawn in Florida at thermoelectric power generation facilities for cooling, boiler make-up, and domestic purposes.

- Nearly 12,042 Mgal/d of water was withdrawn for power generation purposes in 2005. Saline water was the source of 11,484 Mgal/d (95 percent) and freshwater was the source of 558 Mgal/d (5 percent) of the water withdrawn for power generation. Overall, power generation accounted for two-thirds of the total water withdrawn in Florida during 2005.
- Almost 99 percent of the saline water and 88 percent of the freshwater withdrawn for power generation was used for once-through cooling, and most of this water was returned to its source immediately after use. Nearly 11,838 Mgal/d (98 percent) of the total fresh and saline water was withdrawn for power generation and was used for once-through cooling purposes in 2005.

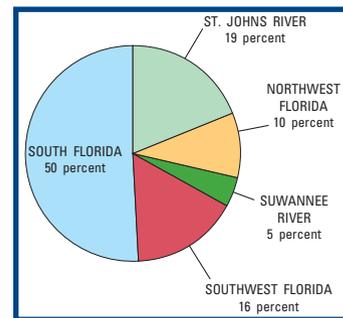


**Figure 7.** Population and population served by public supply in Florida by water management district, 2005.

### Water Management Districts

The Florida Water Resource Act of 1972 established authority for management of the State's water resources through five water management districts that operate under the general supervision of the Florida Department of Environmental Protection. These five water management districts are the Northwest Florida (NFWMD), the St. Johns River (SJRWMD), the South Florida (SFWMD), the Southwest Florida (SWFWMD), and the Suwannee River (SRWMD).

- The largest number of people in Florida (7.36 million people) resided in the SFWMD as did the largest number of people served by public supply (6.88 million people) (fig. 7).
- The largest amount of freshwater withdrawn was from the SFWMD, which was about one-half (50 percent) of the State's total freshwater withdrawn (fig. 8), while the SWFWMD accounted for the largest amount of saline water withdrawn (51 percent).
- The SFWMD accounted for the largest amount of freshwater withdrawn for public-supply use (47 percent), commercial-industrial-mining self-supplied use (23 percent), agricultural irrigation use (69 percent), and recreational irrigation use (59 percent). The NFWMD accounted for the largest amount of freshwater withdrawn for power generation use (61 percent) and the SWFWMD



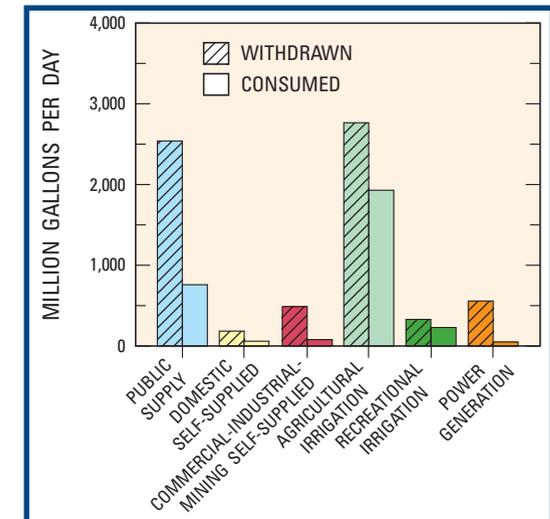
**Figure 8.** Freshwater withdrawals in Florida by water management district, 2005.

accounted for the largest amount of saline water withdrawn for power generation use (49 percent).

### Water Consumption and Discharges

An estimated 3,110 Mgal/d (45 percent) of the freshwater withdrawn in Florida in 2005 was consumed (evaporated, transpired, incorporated into products or crops, or removed from the immediate water environment). The remaining 3,758 Mgal/d (55 percent) was returned to the hydrologic system as wastewater or runoff. Less than 1 percent of the saline water was consumed.

- The greatest consumption of freshwater in Florida was in agricultural irrigation (fig. 9), primarily due to high evapotranspiration during hot and dry periods.
- The estimated percentage of freshwater consumed has varied during the past 25 years, ranging from 33 percent in 1975 and 1980; 43 percent in 1985; 42 percent in 1990; 39 percent in 1995, and 52 percent in 2000. Estimates for 2000 are higher than previous years because prolonged drought conditions throughout the State led to increased water demands for all irrigation purposes (agriculture, recreational, and residential lawns) and greater evaporation losses. All consumption values are estimated from irrigation coefficients, industry standards, or published sources.

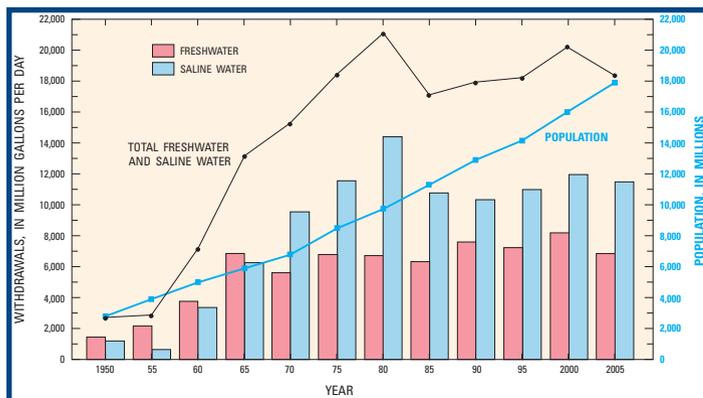


**Figure 9.** Freshwater withdrawals and estimated water consumption in Florida by category, 2005.

## Water Withdrawal Trends, 1950-2005

Statewide withdrawal and water-use estimates have been compiled for Florida every 5 years since 1950; however, variations in historical water-use values are sometimes difficult to assess because of differences in data-collection techniques, sources of information, and changes in methods used during this 55-year period. In addition, when water-use data are only compiled on 5-year intervals, any unique circumstance can influence the values for that year and make comparing trends difficult (Marella, 2004).

- Total water (fresh and saline) withdrawn in Florida increased 15,700 Mgal/d (600 percent) between 1950 and 2005 (fig. 10), while the population of Florida increased by 15.15 million (550 percent) during this 55-year period.
- Between 1990 and 2005, total withdrawals increased 400 Mgal/d (2 percent) while the population increased 4.98 million (38 percent). Between 2000 and 2005, total withdrawals decreased 1,794 Mgal/d (9 percent) while the total population increased by 1.94 million (12 percent).
- Ground water withdrawn in 1950 was 614 Mgal/d compared to 2005 when ground water withdrawn was 4,242 Mgal/d. Ground water has been the primary source of freshwater in Florida between 1980 and 2005, supplying between 55 and 62 percent of the total freshwater withdrawn during the period.
- Surface water withdrawn in 1950 was 840 Mgal/d compared to 2005 when surface water withdrawn was 2,626 Mgal/d.



**Figure 10.** Historical population, total fresh, and saline water withdrawals in Florida, 1950-2005 (left).

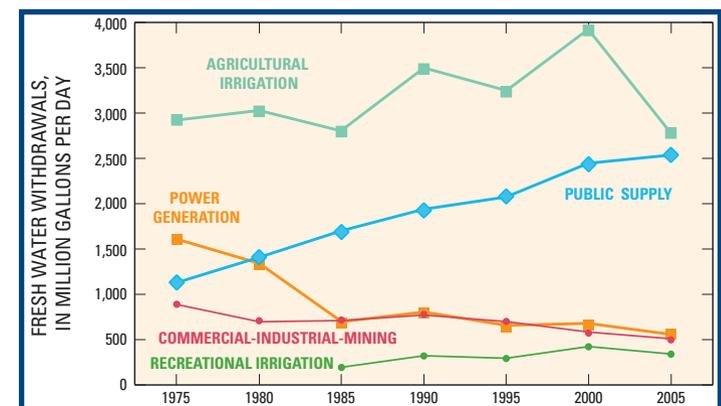
**Figure 11.** Historical freshwater withdrawals in Florida by category, 1975-2005 (right).

Between 1950 and 1975, surface water was the primary source of freshwater in Florida, supplying between 52 and 68 percent of the total freshwater withdrawn during this period.

- Total public-supply withdrawals increased 32 percent in the period between 1990 and 2005, and increased 4 percent in the 5 years between 2000 and 2005 (fig. 11). The population served by public supply increased by 4.9 million (44 percent) between 1990 and 2005 and 2.1 million (15 percent) between 2000 and 2005.
- Domestic self-supplied withdrawals decreased nearly 40 percent between 1990 and 2005 primarily as a result of a change in the methods used to calculate withdrawals between 1990 and 2005. The domestic self-supplied population has remained just under 2 million during this period.
- Freshwater withdrawals for commercial-industrial-mining self-supplied use in Florida decreased 36 percent between 1990 and 2005, and decreased 18 percent between 2000 and 2005 (fig. 11), while deliveries of public-supply water to commercial-industrial users increased 27 percent between 1990 and 2005.
- Freshwater withdrawals for agricultural irrigation decreased 21 percent between 1990 and 2005, and nearly 30 percent between 2000 and 2005 (fig. 11). Agricultural withdrawals vary due to rainfall during any year, but long-term withdrawals have decreased during the period between 1990 and 2005. This decrease is due to losses in irrigated acreage attributed to diseases, weather, urbanization, improved

conservation methods, better management practices, and long-term water restrictions. In addition, the methods used to calculate agricultural withdrawals have changed somewhat over this time period. Annual average rainfall in Florida totaled about 62 inches in 1995 and 2005, compared to 43 inches in 1990 and 2000. Average annual rainfall for Florida for the 55 years between 1950 and 2005 was 55 inches (U.S. Department of Commerce, 2008).

- Freshwater withdrawals for recreational irrigation increased 17 percent between 1990 and 2005 (fig. 11), while golf course acreage increased 60 percent. Withdrawals for recreational irrigation decreased 20 percent between 2000 and 2005, while irrigated golf course acreage increased 6 percent.
- Freshwater withdrawals for power generation decreased 29 percent between 1990 and 2005 (fig. 11), and 15 percent between 2000 and 2005. This decrease was due to the improved water efficiency in new or modernized facilities and increased recycling of cooling water after routing the water to cooling ponds or cooling towers.
- The use of reclaimed wastewater increased from 206 Mgal/d in 1986 to nearly 660 Mgal/d in 2005 (Florida Department of Environmental Protection, 2006). Approximately one-half of the reclaimed wastewater flow in 2005 was used to reduce potable quality water withdrawals for urban irrigation, agricultural irrigation, and industrial use, while one-third of the reclaimed wastewater was returned to available water supplies as aquifer recharge.



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