Demand Estimates and Projections

This chapter summarizes the water demand estimates and projections for the Lower Kissimmee Basin (LKB) Planning Area of the South Florida Water Management District (SFWMD or District) through the planning horizon of 2022 to 2045. Estimates and projections are presented by water use category and were developed in coordination with various stakeholder groups, including agriculture, utilities, industry, local and tribal governments, and other interested groups. A detailed discussion of data collection and analyses methods is provided in **Appendix A**.

Demands associated with the LKB Planning Area are different from other planning areas because 95% of the total demand (2022) is attributable to crop irrigation and other agricultural water needs. In more urbanized planning areas within the District, potable water supply for residential uses accounts for a much larger portion of total demand.

TOPICS 🗳

- Water Demand
- Water Use Categories
- Population Estimates and **Projections**
- **Public Supply**
- **Domestic Self-Supply**
- Agriculture
- Commercial/Industrial/Institutional
- Landscape/Recreational
- **Power Generation**
- **Summary of Demand Estimates** and Projections
- **Demand Projections in Perspective**

WATER DEMAND

Water demands can be described and analyzed in two ways: gross demand and net demand. Gross demand is the volume of water withdrawn or diverted from a groundwater or surface water source. This definition serves as the basis for water allocations established through water use permits issued by the SFWMD. Further information on water use permitting is provided in the 2021-2024 Support Document for Water Supply Plan Updates (2021-2024 Support Document; SFWMD 2021). Net demand refers to the volume of water delivered to end users after accounting for treatment losses and delivery system inefficiencies. For Public Supply (PS) and Domestic Self-Supply (DSS), demands commonly are referred to as raw and finished demands rather than gross and net demands, respectively.

In this 2024 Lower Kissimmee Basin Water Supply Plan Update (2024 LKB Plan Update), gross demand is equal to net demand for all water use categories except PS.

This 2024 LKB Plan Update presents demands for average rainfall and 1-in-10-year drought conditions (Appendix A). Section 373.709, Florida Statutes (F.S.), states level-of-certainty planning goal associated with identifying water demands contained in water supply plans shall be based on meeting demands during 1-in-10-year drought conditions. Environmental demands are addressed through resource protection criteria (Chapter 4).

INFO 🚠

Average Rainfall and 1-in-10-Year Drought

An average rainfall year is defined as a year having rainfall with a 50% probability of being exceeded in any other year.

A 1-in-10-year drought is defined as a year in which below normal rainfall occurs with a 90% probability of being exceeded in any other year. It has an expected return frequency of once in 10 years.

WATER USE CATEGORIES

Water demands for this 2024 LKB Plan Update are estimated in 5-year increments for the following six water use categories established by the Florida Department of Environmental Protection (FDEP) in coordination with the state's water management districts:

- **Public Supply (PS)** Potable water supplied by water treatment plants with a current allocation of 0.10 million gallons per day (mgd) or greater.
- **Domestic Self-Supply (DSS)** Potable water used by households served by small utilities (less than 0.10 mgd) or self-supplied by private wells.
- Agriculture (AG) Self-supplied water used for commercial crop irrigation, greenhouses, nurseries, livestock watering, pasture, and aquaculture.
- Commercial/Industrial/Institutional (CII) Self-supplied water associated with the production of goods or provision of services by commercial, industrial, or institutional establishments.
- Landscape/Recreational Irrigation (L/R) Self-supplied and reclaimed water used to irrigate golf courses, sports fields, parks, cemeteries, and large common areas, such as land managed by homeowners' associations and commercial developments.
- **Power Generation (PG)** Self-supplied and reclaimed water used for cooling, processing, and potable water by power generation facilities.

Table 2-1 presents a comparison of the estimated (2022) and projected (2045) average gross water demands, by category, in the LKB Planning Area. The largest water use category is AG, followed by PS, CII, DSS, and L/R. Modest growth is projected for all water use categories except for AG, which is projected to decline through the planning horizon.

Table 2-1. Estimated (2022) and projected (2045) average gross water demands (in mgd) for the LKB Planning Area by use category.

Water Use Category	2022	2045
Public Supply	4.14	5.03
Domestic Self-Supply	1.80	1.84
Agriculture	211.31	202.76
Commercial/Industrial/Institutional	2.34	2.88
Landscape/Recreational	1.87	1.92
Power Generation	0.00	0.00
LKB Planning Area Total	221.46	214.43

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

POPULATION ESTIMATES AND PROJECTIONS

Population estimates and projections for the LKB Planning Area are used to develop demands for all water use categories except PG and AG. Developing population estimates and projections required multiple sources of information, including county-level data from the University of Florida's Bureau of Economic and Business Research (BEBR) pursuant to Section 373.709(2)(a), F.S., data from the 2020 Decennial Census (United States Census Bureau 2020), and data from local government Comprehensive Plans and utilities. Appendix A provides further details on the development of population estimates and projections.



All population estimates and projections are for permanent residents, as defined by the United States Census Bureau. However, the per capita use rate, which is used to calculate water demands, reflects use by seasonal residents as well.

In 2022, the total estimated population within the LKB Planning Area was 52,434 permanent residents (Table 2-2). BEBR projections indicate the LKB Planning Area population will grow approximately 9% from 2022 to 2045. Approximately 76% of the permanent resident population lives in Okeechobee County, particularly in the southern portion of the county. As explained in **Appendix A**, BEBR medium projections were used for all counties to develop detailed population projections for PS utilities and county DSS areas (Rayer 2023).

Table 2-2. Permanent resident population served by PS and DSS in the LKB Planning Area in 2022 and 2045.

County ^a	2	2022 Population	n	2045 Population			
County	PS	DSS	Total	PS	DSS	Total	
Glades ^b	3,823	391	4,214	7,232	289	7,521	
Highlands	3,140	5,421	8,562	3,388	5,620	9,008	
Okeechobee	25,981	13,677	39,658	26,646	14,054	40,700	
LKB Planning Area Total	32,945	19,489	52,434	37,265	19,964	57,229	

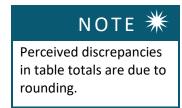
DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; PS = Public Supply.

^a Values listed are only for the areas within the LKB Planning Area boundaries.

b The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida Brighton Reservation is included in the calculations for Glades County.

PUBLIC SUPPLY

The PS category includes potable water supplied by water treatment plants with a current allocation of 0.10 mgd or greater. Developing PS demand projections in the LKB Planning Area was a multistep process that included determining utility service area and DSS populations, calculating per capita use rates (PCURs), and projecting future water needs.



Per Capita Use Rates

For each PS utility, a net (finished) water PCUR was developed using past population and finished water data reported to the FDEP. The PCUR for each utility is a 5-year (2018 through 2022) average, calculated by dividing annual net (finished) water volumes by the corresponding service area populations for each year. For PS demand projections, PCURs were assumed to remain constant through 2045. To calculate gross (raw) demands, the treatment efficiency for each utility, based on treatment process type(s) expected in 2045, was applied as a raw-to-finished ratio. Any demand reductions due to historical conservation practices are implicitly factored into the projections by using the 5-year average PCUR. Future water conservation savings (Chapter 3) were not factored into the demand projections used in this plan update due to water savings uncertainties. PS service area and water treatment plant maps are provided in Appendix A. Utility profiles containing population and finished water use data and projections as well as permitted allocations are provided in Appendix B.

PS Demand Estimates and Projections

Tables 2-3 and 2-4 present PS gross (raw) and net (finished) water demands, respectively, in 5-year increments by county. The results indicate PS gross (raw) water demands will increase 22%, from 4.14 mgd in 2022 to 5.03 mgd in 2045 under average rainfall conditions. Calculation of 1-in-10-year demand is based only on the outdoor portion of PS use, and the methodology is explained in **Appendix A**.

Table 2-3.	PS gross (raw)	water der	nands in th	e LKB Plaı	nning Area by	county.
	_					

County ^a		2045 1-in-10 Year						
County	2020	2022	2025	2030	2035	2040	2045	Demand
Glades ^b	0.75	0.88	1.19	1.45	1.61	1.64	1.68	1.78
Highlands	0.30	0.32	0.32	0.33	0.33	0.33	0.33	0.35
Okeechobee	2.94	2.94	2.97	2.98	3.00	3.01	3.02	3.20
LKB Planning Area Total	3.99	4.14	4.48	4.76	4.94	4.98	5.03	5.33

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply.

^a Values listed are only for the areas within the LKB Planning Area boundaries.

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Table 2-4. PS net (finished) water demands in the LKB Planning Area by county.

County ^a		2045 1-in-10 Year						
County	2020	2022	2025	2030	2035	2040	2045	Demand
Glades ^b	0.59	0.69	0.94	1.15	1.29	1.31	1.34	1.43
Highlands	0.29	0.31	0.31	0.32	0.32	0.32	0.32	0.35
Okeechobee	2.63	2.63	2.65	2.66	2.68	2.69	2.70	2.86
LKB Planning Area Total	3.51	3.63	3.90	4.13	4.29	4.32	4.36	4.64

LKB = Lower Kissimmee Basin; mgd = million gallons per day; PS = Public Supply.

DOMESTIC SELF-SUPPLY

The DSS category includes potable water used by households that are served by small utilities with current allocations less than 0.10 mgd or that are self-supplied by private wells. Permanent resident populations within DSS areas were developed simultaneously with the PS population estimates and projections. All permanent residents outside of PS utility service area boundaries were considered DSS population. Population projection methodology and results are provided in the previous section and further described in **Appendix A**.

Table 2-5 contains the LKB Planning Area's DSS demand estimates and projections under average rainfall conditions. The average gross (raw) demands in 2022 were 1.80 mgd for 19,489 permanent residents (**Table 2-2**). DSS average demands are expected to increase 2%, to 1.84 mgd in 2045 for 19,964 residents.

DSS gross (raw) water demands in the LKB Planning Area by county. Table 2-5.

County ^a		2045 1-in-10 Year						
County	2020	2022	2025	2030	2035	2040	2045	Demand
Glades ^b	0.03	0.03	0.04	0.03	0.03	0.03	0.02	0.02
Highlands	0.38	0.37	0.36	0.37	0.38	0.38	0.39	0.41
Okeechobee	1.40	1.40	1.39	1.40	1.42	1.43	1.43	1.52
LKB Planning Area Total	1.81	1.80	1.79	1.80	1.83	1.84	1.84	1.95

DSS = Domestic Self-Supply; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

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AGRICULTURE

The AG category includes self-supplied water used for commercial crop irrigation, nurseries, greenhouses, livestock watering, pasture, and aquaculture. AG is the largest water use category in the LKB Planning Area, accounting for 211.31 mgd (95%) of the region's total estimated water demand in 2022. Agricultural production in the LKB Planning Area is of regional significance, with more than 103,812 acres under irrigation (Figure 2-1). The value of all agricultural commodities produced in Glades, Highlands, and Okeechobee counties was \$653 million in 2022 (United States Department of Agriculture 2024). Of all cattle and calves raised in the State of Florida in 2022, 19% were in these three counties.

Agricultural acreage data published by the Florida Department of Agriculture and Consumer Services (FDACS 2023) were used to determine AG water demands for this 2024 LKB Plan Update. Pursuant to Section 373.709(2)(a), F.S., water management districts are required to consider FDACS water demand projections. Any adjustments or deviations from the projections published by FDACS, "...must be fully described, and the original data must be presented along with the adjusted data." A detailed description of the analyses and adjustments is provided in Appendix A.

Agricultural water demand was determined using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model (Smajstrla 1990). No distinction is made between gross and net water demands. The FDACS irrigated crop acres, soil types, growing seasons, and irrigation methods were used as input data for the AFSIRS model. AG demand estimates and projections are based on the commercially grown crop categories in **Table 2-6**.

Hay and pasture are the predominant agricultural irrigated land use in the LKB Planning Area, encompassing more than 39,000 acres and 74.54 mgd in 2022 (**Table 2-6**). Irrigated hay and pasture are followed by citrus, with more than 26,000 acres and 44.24 mgd of irrigation demand in 2022. Together, these two main crop categories account for 63% of the irrigated acreage and 56% of water demands under average rainfall conditions.



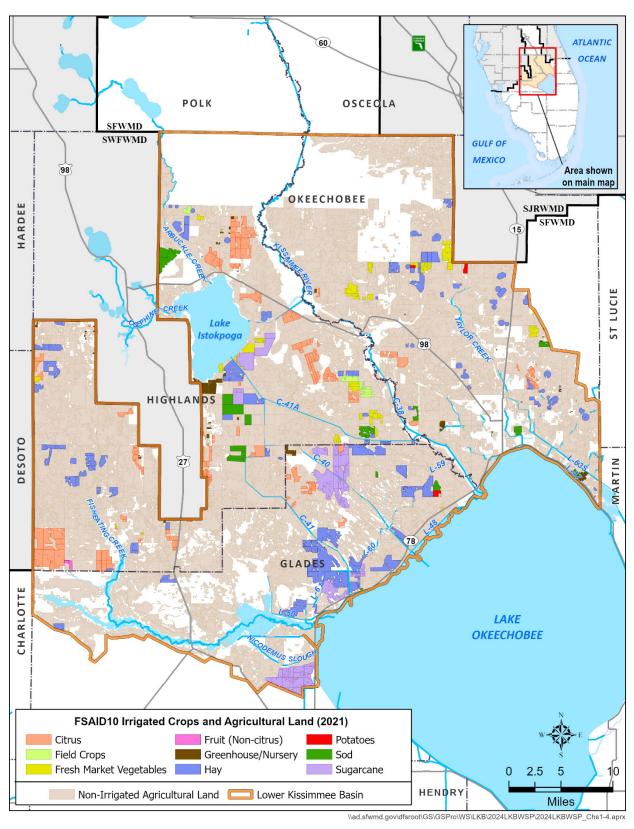


Figure 2-1. Agricultural irrigated land in the LKB Planning Area (Data from FDACS 2023).

Table 2-6. Summary of average and 1-in-10-year water demands (in mgd) for all agricultural acreage, livestock, and aquaculture in the LKB Planning Area.

		2022			2045	
Crop	Acres	Average Demand	1-in-10-Year Demand	Acres	Average Demand	1-in-10-Year Demand
Hay/Pasture	39,062	74.54	88.37	36,175	69.55	82.35
Citrus	26,393	44.24	54.62	24,649	41.00	50.66
Sugarcane	17,589	38.44	45.13	17,589	38.44	45.13
Sod	7,754	18.71	21.71	7,349	17.65	20.46
Fresh Market Vegetables	7,960	16.25	18.94	7,847	16.09	18.75
Greenhouse/Nursery	2,773	6.62	7.41	2,504	5.99	6.73
Field Crops	1,484	2.88	3.45	2,059	4.27	5.05
Potatoes	552	1.26	1.47	565	1.29	1.50
Fruit (excluding citrus)	245	0.59	0.65	315	0.70	0.78
Livestock	N/A	7.02	7.02	N/A	7.02	7.02
Aquaculture	N/A	0.76	0.76	N/A	0.76	0.76
LKB Planning Area Total	103,812	211.31	249.53	99,052	202.76	239.19

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

Total irrigated AG acres in the LKB Planning Area are projected to remain relatively stable, decreasing approximately 5% by 2045. Irrigated hay and pasture along with citrus are projected to lose acreage over the planning horizon, likely due to crop conversions. The largest change in irrigated acreage and demands is expected to occur in the hay and pasture crop category. By 2045, hay and pasture acreage is expected to decline to 36,175 acres, a decrease of 2,887 acres. Water demands for the hay and pasture crop category are projected to decline slightly as well, reaching 69.55 mgd by 2045.

Overall, total AG gross water demands under average rainfall conditions in the LKB Planning Area are projected to decrease 4%, from 211.31 mgd in 2022 to

INFO (i)

Examples of crop categories used in this report include the following:

Fresh Market Vegetables:

- **Tomatoes**
- Green beans
- Sweet corn
- **Peppers**
- Melons

Fruits (excluding citrus):

- Blueberries
- Strawberries

202.76 mgd in 2045 (Table 2-7). These totals include demands from livestock and aquaculture in addition to the demands from crop irrigation shown in **Table 2-6**. Demands for livestock and aquaculture in the LKB Planning Area are estimated to be 7.02 mgd and 0.76 mgd, respectively, in 2022 and are projected to remain steady over the planning horizon.

Table 2-7. AG gross water demands for all agricultural acreage, livestock, and aquaculture in the LKB Planning Area by county.

Countrie		2045 1-in-10 Year						
County ^a	2020	2022	2025	2030	2035	2040	2045	Demand
Glades ^b	74.16	70.49	70.53	71.56	72.43	73.93	74.72	88.22
Highlands	106.51	105.79	104.69	101.76	100.81	100.23	99.40	117.78
Okeechobee	34.40	35.03	33.49	32.51	31.65	30.24	28.64	33.19
LKB Planning Area Total	215.07	211.31	208.71	205.83	204.89	204.40	202.76	239.19

AG = Agriculture; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

COMMERCIAL/INDUSTRIAL/INSTITUTIONAL

The CII water use category includes water demands at industrial and commercial facilities. CII demands only include self-supplied users and do not include industrial or commercial users that receive water from PS utilities; those users are included in the PS category. CII projections assume demands for average rainfall and 1-in-10-year drought conditions are the same and withdrawal demand is equal to user demand. Therefore, no distinction is made between gross and net water demands. Growth within the CII category is expected to be driven by regional population growth. Estimated CII demands for 2022 were 2.34 mgd, with projected growth resulting in demands of 2.88 mgd in 2045 (**Table 2-8**).

Table 2-8. CII gross water demands in the LKB Planning Area by county.

County ^a	Demand – Average Rainfall Conditions (mgd)									
County	2020	2022	2025	2030	2035	2040	2045			
Glades ^b	0.53	0.58	0.74	0.89	1.04	1.04	1.04			
Highlands	1.47	1.59	1.56	1.60	1.63	1.65	1.67			
Okeechobee	0.15	0.17	0.17	0.17	0.17	0.17	0.17			
LKB Planning Area Total	2.15	2.34	2.47	2.66	2.84	2.86	2.88			

CII = Commercial/Industrial/Institutional; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

LANDSCAPE/RECREATIONAL

Aside from PG, L/R is the smallest water use category in the LKB Planning Area, encompassing irrigation of golf courses and other landscaped areas, such as parks, sports fields, and homeowners' association common areas. Less than one-third of current L/R demands are met with surface water, and the remainder is met with groundwater. Reclaimed water is a major source for the irrigation of landscaped areas that are permitted and not permitted in other planning areas; however, reclaimed water currently is not used or projected to be used for these purposes within the LKB Planning Area. For L/R, acreage and

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b The Seminole Tribe of Florida is a sovereign Indian Tribe and an independent Tribal Government separate from Glades County. However, for discussion purposes, information relating to the Seminole Tribe of Florida Brighton Reservation is included in the calculations for Glades County.

demands are disaggregated into landscape and golf course irrigation subcategories. Details regarding development of the L/R demands are provided in **Appendix A**.

Within the L/R category in 2022, 610 permitted acres of land were attributed to landscape irrigation. These landscaped areas are expected to grow at the same rate as the local population through 2045. In 2022, there were 5 golf courses irrigating 298 acres under water use permits in the LKB Planning Area (SFWMD 2024). Under average rainfall conditions, this land use required an estimated 0.53 mgd in 2022. Golf course acreage and associated water demands are projected to remain steady through 2045. Under average rainfall conditions, total estimated L/R gross water demands are projected to increase 3%, from 1.87 mgd in 2022 to 1.92 mgd in 2045 (**Table 2-9**). More than half of L/R demands are attributed to sites in Okeechobee County, and the county's majority share is expected to continue through 2045.

L/R gross water demands (in mgd) in the LKB Planning Area. Table 2-9.

Landlica		Demand	d – Averag	e Rainfall	Conditio	ns (mgd)		2045 1-in-10-Year	
Land Use	2020	2022	2025	2030	2035	2040	2045	Demand	
			Glades	County					
Landscape	0.00	0.03	0.04	0.04	0.05	0.05	0.05	0.05	
Golf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Glades County Total	0.00	0.03	0.04	0.04	0.05	0.05	0.05	0.05	
Highlands County									
Landscape	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	
Golf	0.41	0.48	0.48	0.48	0.48	0.48	0.48	0.51	
Highlands County Total	0.47	0.55	0.55	0.55	0.55	0.55	0.55	0.58	
			Okeechob	ee Count	У				
Landscape	0.95	1.24	1.24	1.25	1.26	1.26	1.27	1.35	
Golf	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Okeechobee County Total	0.96	1.29	1.29	1.30	1.31	1.31	1.32	1.40	
LKB Planning Area Total									
Landscape	1.01	1.34	1.35	1.36	1.38	1.38	1.39	1.47	
Golf	0.42	0.53	0.53	0.53	0.53	0.53	0.53	0.56	
LKB Planning Area Total	1.43	1.87	1.88	1.89	1.91	1.91	1.92	2.03	

L/R = Landscape Recreational; LKB = Lower Kissimmee Basin; mgd = million gallons per day.

POWER GENERATION

Demands under the PG category include use of groundwater, fresh surface water, or reclaimed water by thermoelectric power generation facilities. PG demands do not include the use of surface water returned to its withdrawal source, harvested rainfall, city water, or seawater. Demands under average rainfall and 1-in-10-year drought conditions are assumed to be equal in the PG category; no distinction is made between gross and net water demands.

The are no power demands estimated for 2022. The power needs of the LKB Planning Area currently are met by facilities located outside of the planning area. There are no new power generation facilities planned. Therefore, PG demands are projected to remain at 0.00 mgd through 2045.

SUMMARY OF DEMAND ESTIMATES AND PROJECTIONS

Total gross water demands under average rainfall conditions in the LKB Planning Area are projected to be 214.43 mgd by 2045, a 3% decrease from 2022 demands (221.46 mgd). Table 2-10 provides 5-year incremental summaries of gross demands for all water use categories under average rainfall and 1-in-10-year drought conditions, respectively. Gross demands under average rainfall conditions are used to demonstrate projected trends, including the following key highlights:

- AG demands account for 95% of demands in the LKB Planning Area.
- The combined PS and DSS demands are expected to increase 16%, to 6.87 mgd, by 2045 with the projected population growth of 4,795 permanent residents.
- The demands for all remaining categories (L/R, CII, and PG) are small and projected to be 4.80 mgd, combined, in 2045.

Table 2-10. Summary of gross water demands under average rainfall and 1-in-10-year drought conditions in the LKB Planning Area by water use category.

Water Use Category	2020	2022	2025	2030	2035	2040	2045
	Demar	nd – Average	Rainfall Cor	ditions (mga	d)		
PS	3.99	4.14	4.48	4.76	4.94	4.98	5.03
DSS	1.81	1.80	1.79	1.80	1.83	1.84	1.84
AG	215.07	211.31	208.71	205.83	204.89	204.40	202.76
CII	2.15	2.34	2.47	2.66	2.84	2.86	2.88
L/R	1.43	1.87	1.88	1.89	1.91	1.91	1.92
PG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LKB Planning Area Total	224.45	221.46	219.33	216.94	216.41	215.99	214.43
	Demand -	– 1-in-10-Yea	ar Drought C	onditions (m	ngd)		
PS	4.23	4.39	4.75	5.04	5.24	5.28	5.33
DSS	1.91	1.90	1.89	1.90	1.94	1.95	1.95
AG	254.89	249.53	246.48	243.09	241.93	241.24	239.19
CII	2.15	2.34	2.47	2.66	2.84	2.86	2.88
L/R	1.51	1.97	1.98	2.00	2.02	2.02	2.03
PG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LKB Planning Area Total	264.69	260.13	257.57	254.69	253.97	253.35	251.38

AG = Agriculture; CII = Commercial/Industrial/Institutional; DSS = Domestic Self-Supply; L/R = Landscape Recreational; LKB = Lower Kissimmee Basin; mgd = million gallons per day; PG = Power Generation; PS = Public Supply.

DEMAND PROJECTIONS IN PERSPECTIVE

Demand projections presented in this 2024 LKB Plan Update are based on the best available information. **Table 2-11** shows the 2040 average gross demands projected in the 2019 Lower Kissimmee Basin Water Supply Plan Update (2019 LKB Plan Update; SFWMD 2019) compared to the 2045 demands projected in this 2024 LKB Plan Update. The projection for 2045 in this 2024 LKB Plan Update is 17% lower than the estimated 2040 demand projected in the 2019 LKB Plan (SFWMD 2019). The projections reflect trends, economic circumstances, and industry intentions that will change over time. Like any predictive tool based on past assumptions, there is uncertainty and a margin for error.

Table 2-11. Comparison of gross water demands under average rainfall conditions at the end of the respective planning horizons in the 2019 LKB Plan and this 2024 LKB Plan Update.

Water Hea Category	2019 LKB Plan	2024 LKB Plan Update	Percent Difference
Water Use Category	2040 Demand (mgd)	2045 Demand (mgd)	Percent Difference
Public Supply	3.39	5.03	48%
Domestic Self-Supply	2.28	1.84	-19%
Agriculture	248.14	202.76	-18%
Commercial/Industrial/Institutional	1.95	2.88	48%
Landscape/Recreational	1.73	1.92	11%
Power Generation	0.00	0.00	0%
LKB Planning Area Total	257.49	214.43	-17%

LKB = Lower Kissimmee Basin; mgd = million gallons per day.

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