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Demand Estimates and Projections

The water demands presented in this chapter include both the demands of the water users or customers and the withdrawal demands. The user/customer demands directly meet the water needs of the users. The water withdrawal demands reflect the amount of water that must be withdrawn from all sources to meet the user/customer demands. The withdrawal demands reflect the proposed selection of sources, treatment processes, storage options and reuse of reclaimed water that result from the projects identified in **Chapter 7**. Additional information about demand estimates can be found in **Appendix D**.

The planning period for this *2005–2006 Lower East Coast Water Supply Plan Update* (2005–2006 LEC Plan Update) is 2005 to 2025. Extensive baseline information was collected for 2000, including population, land use, cropping and irrigation systems, historical water use, climatic conditions, etc. This information was used to develop water use factors, such as per capita finished water demands by utility, which were then used along with projected variables, such as population, to develop the future water demands. Some data, such as population by county, were updated through 2005 since these estimates have recently become available.

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User/Customer Demand or Net Demand: The water demands of the end user, after accounting for treatment and process losses, and inefficiencies (e.g., irrigation inefficiency). When discussing Public Water Supply, the term “finished water demand” is commonly used.

Withdrawal Demand or Raw Water Demand: The amount of water that must be withdrawn from the groundwater or surface water system to meet a particular need. Withdrawal demands are nearly always higher than User/Customer Demands because of inherent treatment and process losses, and inefficiencies associated with delivering water from the source to the end user.

NAVIGATE

Appendix D provides a full description of the methods used to estimate water use for each major usage category and includes estimates of both the customer demands discussed here and the raw water withdrawals, which would result from implementation of the projects discussed in **Chapter 7**.

This chapter provides an overall perspective of the user/customer and water withdrawal demands and associated growth from 2005 to 2025. The water demand projections summarized in this chapter are presented in terms of average weather conditions.

Appendix D provides demand projections for 1-in-10 year drought conditions. It also provides additional information about water demand within each use category. In the case of agriculture, acreage and demands by crop type are included, and in the case of public water supplies, population and demands by utility are provided. Although not quantified in this chapter, environmental demands are addressed during the water supply planning process using resource protection criteria.

LAW / CODE 

A 1-in-10 year drought event is an event that results in an increase in water demand to a magnitude that would have a 10 percent probability of being exceeded during any given year. Subsection 373.0361(2)(a), Florida Statutes (F.S.), states the level of certainty planning goal associated with identifying demands shall be based on meeting demands during a 1-in-10 year drought event.

DEMANDS BY WATER USE CATEGORY

Water demand estimates for 2000 and projections through 2025 in five-year increments were made for each of the six water supply categories (defined to the right). Key results in terms of water withdrawals (see **Figure 3**) specific to the Lower East Coast (LEC) Planning Area for the planning period of 2005 to 2025 include:

- ◆ Regionwide, Public Water Supply withdrawal demands (raw water) are expected to increase by 375 million gallons per day (MGD) or 41 percent by 2025 to 1,286 MGD, at which time this water supply category will represent approximately 57 percent of the region’s total water demands.
- ◆ Agricultural water withdrawal demands (gross demands) are projected to modestly decline from 762 MGD in 2005 to 689 MGD, or about 10 percent, by 2025. Nevertheless, Agriculture will remain the second-largest use category in the LEC Planning Area.
- ◆ Thermoelectric Power Generation Self-Supply is a rapidly growing water use category. Future customer demand projections reflect the 103 MGD required to serve new power generation facilities planned by Florida Power & Light (FPL). During the 20-year planning period, water withdrawal demands will increase from 4.5 MGD to 103 MGD.
- ◆ The remaining water use categories—Domestic Self-Supply, Commercial and Industrial, Recreational and Landscape—will also experience increased water withdrawal demands, reaching a total of 195 MGD by 2025.

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Water Use Categories

Public Water Supply refers to all potable (drinking quality) water supplied by water treatment facilities with projected average pumpages for 2025 greater than 100,000 gallons per day (GPD) for all types of customers. The remaining water use categories are all self-supplied.

Domestic Self-Supply reflects households served by small utilities (less than 100,000 GPD) and/or private wells.

Agricultural water is used for crop irrigation, livestock watering and aquaculture.

Commercial and Industrial water uses are business operations using a minimum water quantity of 100,000 GPD.

Thermoelectric Power Generation water is consumed by power plants in the production of electricity.

Recreational water use includes golf course irrigation demand. The Landscape subcategory includes water used for parks, cemeteries and other self-supplied irrigation uses with demands greater than 100,000 GPD.

REGIONWIDE, PUBLIC WATER SUPPLY WITHDRAWAL DEMANDS ARE EXPECTED TO INCREASE BY 375 MGD... TO 1,286 MGD BY 2025, ...REPRESENTING ABOUT 57 PERCENT OF THE REGION’S TOTAL WATER DEMANDS.

Providing for these increased demands requires a commitment to a coordinated water planning effort. **Figure 2** shows the user/customer water or net demands by use category.

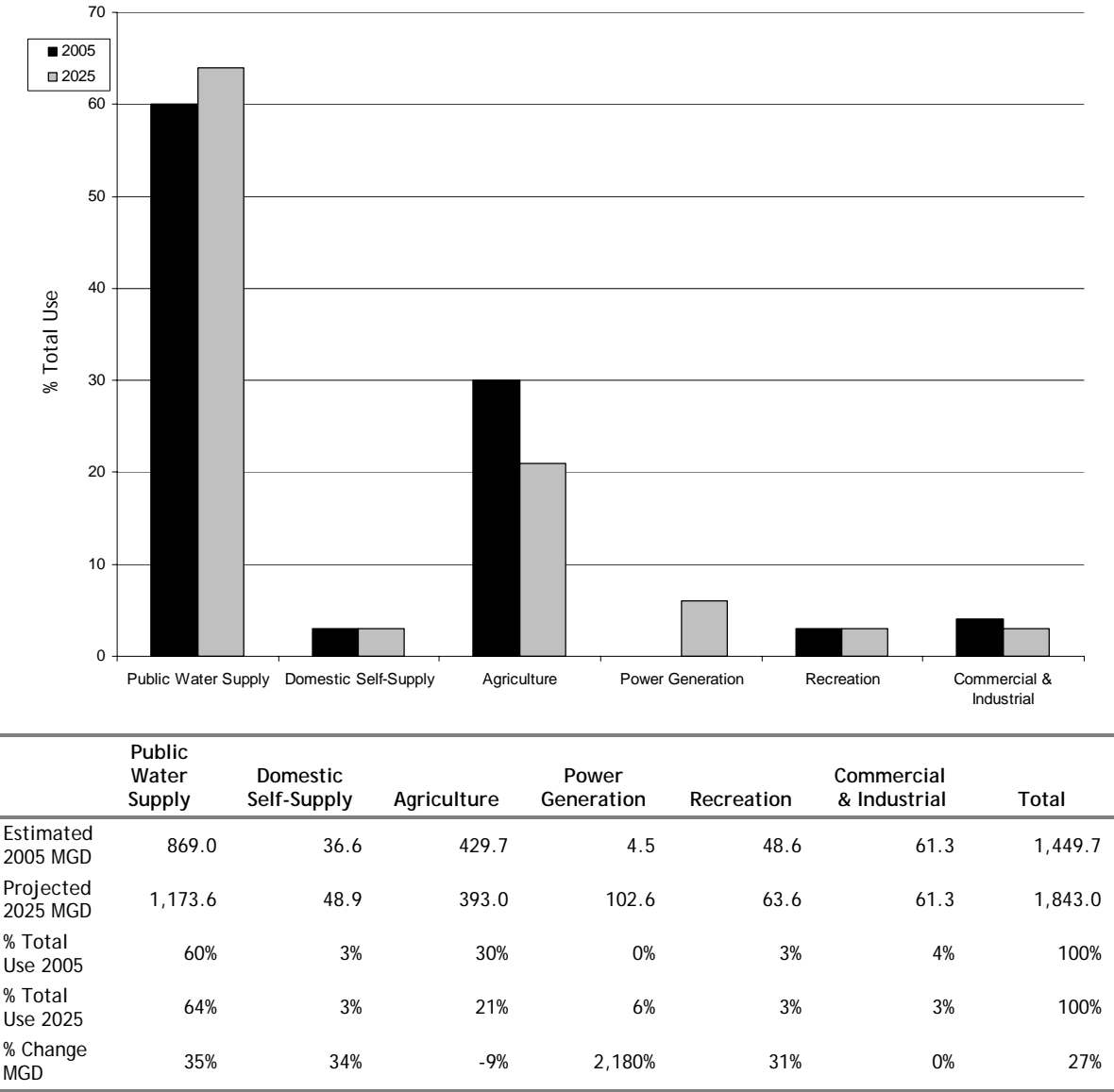
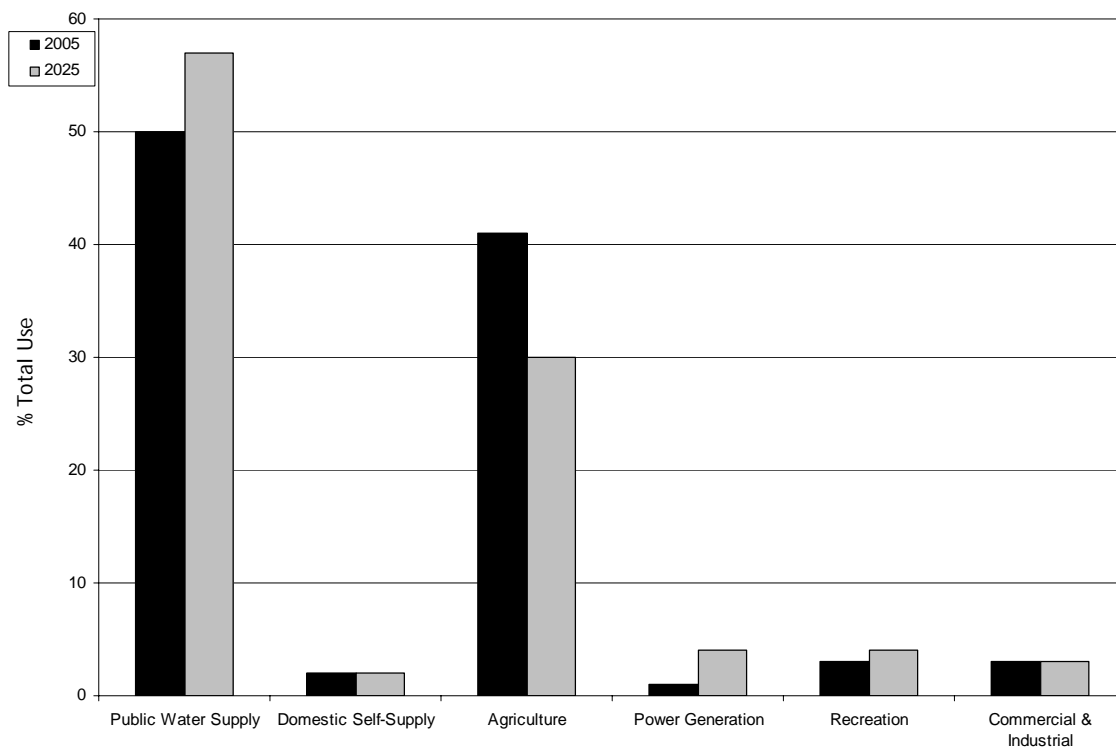


Figure 2. User/Customer (Finished Water) Demands - Water Categories as a Percentage of Total Demand in Bar Chart and Average Year Demands and Percentage of Growth in Tabular Chart.

Figure 3 shows the associated withdrawal demands as developed in **Appendix D**. The withdrawal demands are comparable to the demand estimates presented in previous LEC Planning Area water supply plans. The water withdrawal demands differ from the user/customer demands for Public Water Supply, Recreational Self-Supply and Agricultural uses. The differences are caused by inefficiencies in delivery or treatments that prevent all the water being withdrawn from being available to meet the user/customer demands.



	Public Water Supply ^a	Domestic Self-Supply	Agriculture	Power Generation	Recreation	Commercial & Industrial	Total
Estimated 2005 MGD	911.8	36.6	761.7	4.5	64.7	61.3	1,840.6
Projected 2025 MGD	1,286.5	48.9	689.1	102.6	84.8	61.3	2,273.2
% Total Use 2005	50%	2%	41%	1%	3%	3%	100%
% Total Use 2025	57%	2%	30%	4%	4%	3%	100%
% Change MGD	41%	34%	-10%	2,180%	31%	0%	24%

Figure 3. Water Withdrawal (Raw or Gross) Demands - Water Categories as a Percentage of Total Demand in Bar Chart and Average Year Demands and Percentage of Growth in Tabular Chart.

POPULATION AND WATER USE TRENDS

The region’s population is expected to increase by 31 percent from 2005 to 2025, with Palm Beach, Broward and Miami-Dade counties experiencing the greatest growth. **Table 1** provides a summary of the population estimates for the counties or portions of counties located in the LEC Planning Area. In Palm Beach County, utilities in the cities of Jupiter and Tequesta also serve a small population in Martin County, which is included in Palm Beach County’s total population. The distribution of population estimates to individual utilities is based on historical data and

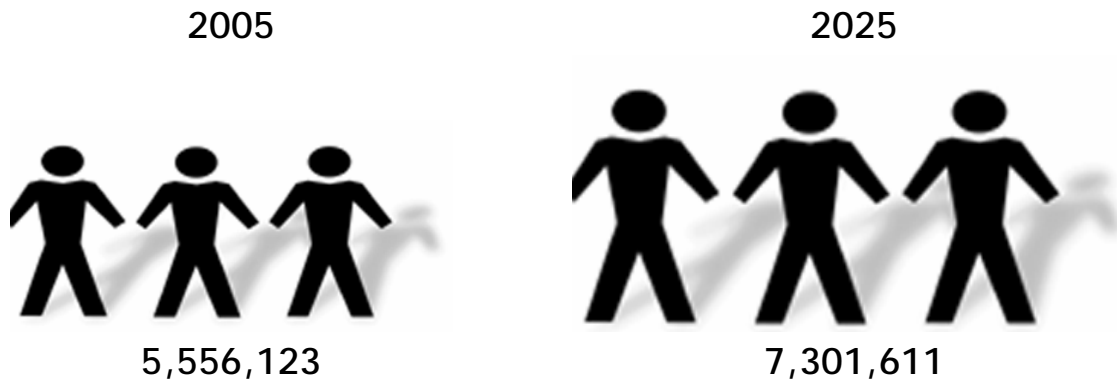
projected distributions of population to traffic analysis zones (TAZ) and then to utility service areas. **Figure 2** provides a summary of the projected water demands under average year conditions for 2005 and 2025 for all water use categories.

Table 1. Population in the LEC Planning Area, 2005-2025.

County Area	2005			2025		
	Public Water Supply	Domestic Self-Supply	Total ^a Population	Public Water Supply	Domestic Self-Supply	Total Projected Population
Broward	1,763,613	4,281	1,767,894	2,334,643	6,151	2,340,794
Hendry (LEC portion)	0	1,279	1,279	0	1,279	1,279
Miami-Dade	2,392,533	31,966	2,424,499	3,015,089	51,661	3,066,750
Monroe (LEC portion)	82,413	0	82,413	88,600	0	88,600
Palm Beach ^b	1,148,974	131,064	1,280,038	1,631,571	172,617	1,804,188
Total	5,387,533	168,590	5,556,123	7,069,903	231,708	7,301,611

a. Source: U.S. Bureau of the Census, 2001, University of Florida Bureau of Economic and Business Research, 2006.

b. Includes population in Martin County served by Jupiter and Tequesta utilities.



THE REGION'S POPULATION IS EXPECTED TO INCREASE BY 31 PERCENT FROM 2005 TO 2025, WITH PALM BEACH, BROWARD AND MIAMI-DADE COUNTIES EXPERIENCING THE GREATEST GROWTH.

Public Water Supply and Domestic Self-Supply

The LEC Planning Area includes all of Miami-Dade, Broward and Palm Beach counties, most of urban Monroe County, and the eastern portion of Hendry County. Miami-Dade, Broward and Palm Beach counties are among the state's five most populated counties. Public Water Supply customer demands grow significantly through the projection period, primarily due to the expected increase in population served by public water supply utilities, which is expected to grow from 5.4 million in 2005 to 7.1 million in 2025. Domestic Self-Supply population, which is much smaller, is also expected to grow during the next 20 years, resulting in increased demand in this use category. Together, Public Water Supply and Domestic Self-Supply represent two-thirds of the LEC Planning Area's total user/customer (finished water) demands and 59 percent of the total water withdrawal (raw water) demands by 2025.

The permanent resident populations used in this plan update are consistent with the 2000 Census of population and closely track the medium county



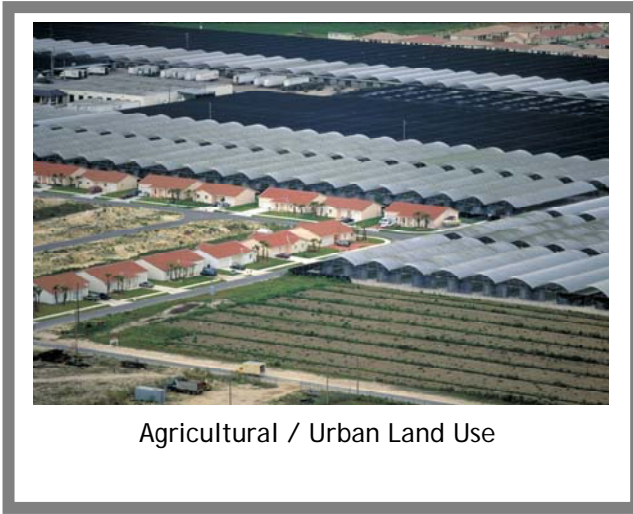
LEC Urban Development

population estimates and projections from the University of Florida, Bureau of Economic and Business Research (BEBR 2006). The distribution of the population to utilities within each county is subject to considerable uncertainty. There are, for instance, many recent development proposals throughout the LEC Planning Area that could significantly change growth patterns within the area.

Water conservation measures were not factored into the demand projections used in this chapter. Rather, water conservation is considered a water source option and discussed in **Chapter 5**.

TOGETHER, PUBLIC WATER SUPPLY AND DOMESTIC SELF-SUPPLY REPRESENT TWO-THIRDS OF THE LEC PLANNING AREA'S TOTAL USER/CUSTOMER (FINISHED WATER) DEMANDS BY 2025.

Agricultural Water Use



Agricultural / Urban Land Use

Agricultural acreage in the LEC Planning Area is expected to decline by almost 10 percent between 2005 and 2025. Declines in irrigated agricultural acreage will primarily be due to increased demand for land for urban development and environmental restoration.

Agricultural water demand reflects projected irrigated acreage, crop and soil types, growing seasons, irrigation system types, and irrigation strategies. The Agricultural land use projections reflect the land use projections incorporated into the South Florida Water Management

District's (SFWMD or District) planning and hydrologic modeling efforts, especially the South Florida Water Management Model (SFWMM).

Agricultural Self-Supply demand calculations for this 2005–2006 LEC Plan Update were made using the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) Model. This is a change from the *2000 Lower East Coast Regional Water Supply Plan* (2000 LEC Plan), which used a modified Blaney-Criddle Model to estimate supplemental requirements for irrigation. Use of the Blaney-Criddle Model generally results in a higher per acre irrigation estimate than the AFSIRS Model. This chapter presents the net irrigation demands for Agriculture because the net demands estimate the amount of water farmers need to place into the root zone of crops. Gross irrigation requirements reflect the efficiency of delivery of that water and may be affected by the alternative projects if proposed in the future. Both net and gross irrigation demands by crop type are presented in **Appendix D**.

Thermoelectric Power Generation Self-Supply

The need for additional power supplies is expected to grow as the population in the LEC Planning Area and other portions of south Florida grows. In addition, the major power supplier, Florida Power & Light (FPL), expects that much of the additional generating capacity to be installed will use fresh or brackish water sources and cooling tower technology as a heat rejection method. To date, most of the generating capacity has used flow-through cooling, and much of this has been ocean water, the use of which is not covered by the water supply plans.

Florida Power & Light's West County Energy Center proposal to add two new, natural gas-fired combined cycle electric generating units of approximately 1,200 megawatts each exemplifies the kind of facilities expected to be constructed during

the planning period. The power plant, to be located on a 220-acre site in western Palm Beach County, is undergoing site certification.

As shown in **Figure 2** and **Figure 3**, power generation water use and withdrawal demand are both expected to increase to 103 MGD by 2025. These estimates represent the water needed to support power generating capacity proposed to be located in the LEC Planning Area.

Recreational Self-Supply

Recreational Self-Supply demand is projected to exceed 63 MGD by 2025, a 31 percent increase over the 2005 estimated use of 49 MGD. Recreational Self-Supply water use projections primarily include water demands for golf course irrigation. Acreage for this use category was identified as part of the overall land use analysis supporting the District’s hydrologic modeling and planning efforts. Landscape irrigation demand projections are included in this Recreational category.



Commercial and Industrial Self-Supply

Demands for Commercial and Industrial Self-Supply are based on 2000 demands developed and reported by the U.S. Geological Survey (USGS). The estimates do not include users that have an overwhelming percentage of localized return flow to the same source, such as construction and mining dewatering. Because this demand category is small and historical data fail to support any trends in use, the levels are held constant through the projection period.

DEMAND PROJECTIONS IN PERSPECTIVE

The demand projections presented in this *2005–2006 Lower East Coast Water Supply Plan Update* (2005–2006 LEC Plan Update) are based on the best information available at this time. However, these projections reflect trends, circumstances and industry intentions that change over time. For example, this plan update expects much greater Thermoelectric Self-Supply demands than the 2000 LEC Plan anticipated. In addition, this plan update expects higher growth in Broward and Palm Beach counties and lower growth in Miami-Dade County than the 2000 LEC Plan anticipated. The growth is large enough that accommodating this population will require infill and redevelopment of existing urban areas, as well as expansion of the urbanized area. Where this new development will occur and how it will affect neighboring communities are important, but as yet unsettled issues for growth management and water concurrency.

In summary, the major driving force behind the significant growth in water demands reflected in this 2005–2006 LEC Plan Update is the region’s anticipated population growth of about 1.7 million residents for the 20-year period from 2005 to 2025.

THE MAJOR DRIVING FORCE BEHIND THE SIGNIFICANT GROWTH IN WATER DEMANDS REFLECTED IN THIS 2005-2006 LEC PLAN UPDATE IS THE REGION’S ANTICIPATED POPULATION GROWTH OF ABOUT 1.7 MILLION RESIDENTS FOR THE 20-YEAR PERIOD FROM 2005 TO 2025.
