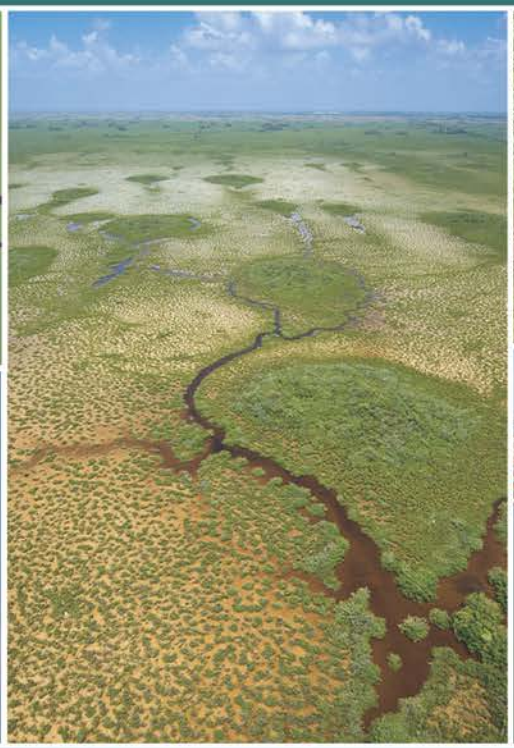
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Appendices


LOWER EAST COAST
WATER SUPPLY PLAN UPDATE

2013

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Acronyms and Abbreviations

$M	millions of dollars
2000 LEC Plan	*2000 Lower East Coast Regional Water Supply Plan*
2005–2006 LEC Plan Update	*2005–2006 Lower East Coast Water Supply Plan Update*
2008 LORS	2008 Lake Okeechobee Regulation Schedule
AFSIRS	Agricultural Field Scale Irrigation Requirements Simulation
AGR Self-Supply	Agricultural Self-Supply
ASR	aquifer storage and recovery
Basis of Review	*Basis of Review for Water Use Permit Applications within the South Florida Water Management District*
BEBR	University of Florida's Bureau of Economic and Business Research
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
cfs	cubic feet per second
DSS	Domestic Self-Supply
EAA	Everglades Agricultural Area
ET	evapotranspiration
F.A.C.	Florida Administrative Code
FAS	Floridan Aquifer System
FDEP	Florida Department of Environmental Protection
FKAA	Florida Keys Aqueduct Authority
FPL	Florida Power & Light
F.S.	Florida Statutes
FY	Fiscal Year
GIS	geographic information system
HET	high efficiency toilet
ICI Self-Supply	Industrial/Commercial/Institutional Self-Supply
LEC	Lower East Coast
MDWASD	Miami-Dade Water and Sewer Department
MFL	minimum flows and levels
MGD	million gallons per day
MGY	million gallons per year

NA	information not available or not applicable
NGVD	National Geodetic Vertical Datum of 1929
NIR	net irrigation requirement
PCUR	per capita use rate
PIR	project implementation report
PWR Self-Supply	Power Generation Self-Supply
PWS	Public Water Supply
REC Self-Supply	Recreational/Landscape Self-Supply
RO	reverse osmosis
SAS	surficial aquifer system
SAV	submerged aquatic vegetation
SFWMD	South Florida Water Management District
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
Water CHAMP	Water Conservation Hotel and Motel Program
WaterSIP	Water Savings Incentive Program
WCA	water conservation area
WRAC	Water Resources Advisory Commission
WRDA	Water Resources Development Act
WRF	water reclamation facility
WTP	water treatment plant
WWTF	wastewater treatment facility
WWTP	wastewater treatment plant

A

Demand Projections

The South Florida Water Management District (SFWMD) completes the complex process of water demand estimates and projection in coordination with staff from local governments, utilities, other agencies, and stakeholder groups. This appendix provides the methods and detailed water demand projections developed for this plan update.

NOTE

Perceived discrepancies in table totals are due to rounding.

This appendix presents water demand estimates and projections for the following six water use categories:

- Public Water Supply (PWS)
- Domestic Self-Supply (DSS)
- Agricultural (AGR) Self-Supply
- Industrial/Commercial/Institutional (ICI) Self-Supply
- Recreational/Landscape (REC) Self-Supply
- Power Generation (PWR) Self-Supply

The PWS category encompasses potable water supplied by water treatment facilities with average production rates greater than 0.1 million gallons per day (MGD). The PWS systems, both public and private, supply potable water to all types of customers for all types of land uses. Within the PWS category, net demand refers to finished water demand and is measured by the amount of water leaving a treatment facility.

In 2010, there were 52 PWS utilities in the Lower East Coast (LEC) Planning Area. By 2013, the number of PWS utilities declined to 50. In 2012, the state closed the AG Holley Hospital, which had its own PWS facility. In 2013, the Palm Beach County Water Utilities Department took over the Glades Utility Authority[1], which served the cities of South Bay, Belle Glade, and Pahokee.

[1] The Glades Utility Authority is listed as a separate utility for estimates and projections in this appendix.

The remaining five water use categories are self-supplied. DSS includes utilities whose average flow is less than 0.1 MGD and households whose source of potable water is a single private well. AGR Self-Supply includes water demand for supplemental crop irrigation. ICI Self-Supply refers to self-supplied business operations and institutional operations such as schools and hospitals. REC Self-Supply includes irrigation demand for landscaped areas such as community and homeowner association common grounds, ball fields, parks, cemeteries, and golf courses. The PWR Self-Supply category refers to water used at power plants, primarily for cooling purposes.

Demand for each water use category in this update is calculated in two ways: gross and net demand. Gross water demand, also known as raw water demand, is the volume of water withdrawn from the natural system that has been allocated in a water use permit. Gross demand includes the water needed for all water uses as well as the water lost to treatment transmission and system inefficiencies. Net water demand, commonly referred to as finished water demand, is the volume of water needed to meet the actual water demand of end users.

DATA SOURCES AND METHODS

In general, preparing water demand estimates and projections is highly dependent on population and land use activities information. For example, estimates of irrigated acreages are fundamental to projecting water supply demand for the AGR Self-Supply category, while information about existing and future projections of population are key to estimating and projecting reasonable PWS demand.

To meet the planning goal, the water supply needs of existing and future reasonable-beneficial uses are based on meeting those needs in a 1-in-10 year drought event (Paragraph 373.709(2)(a)1, Florida Statutes [F.S.]). Water demand estimates for 2010 and projections through 2030 in five-year increments for average rainfall conditions and 1-in-10 year drought conditions are provided in this appendix. Data sources for each category may include the *Florida 2010 Census of Population and Housing* (U.S. Census Bureau 2010), municipal planning documents, PWS utility information, water use permitting files, and federal and state agency reports. Specific data set sources, analysis methods, and applications for projections are provided within this appendix by use category.

PUBLIC WATER SUPPLY AND DOMESTIC SELF-SUPPLY

This section describes the methodology used to estimate and project population and PWS and DSS water use categories' raw and finished water demands for Palm Beach, Broward, Miami-Dade, Monroe, and Hendry counties. Monroe County's water supply needs are met solely by PWS, while the water needs of the portion of Hendry County within the LEC Planning Area are met solely by DSS.

Population Projection Methodology

Population projections form the initial, and key, step in developing demand projections, especially for the PWS and DSS water use categories.

2010 Population Estimates

The base year for this update is 2010. The 2010 census of total population as reported by the United States Census Bureau is the basis for the 2010 population estimates as reported by the University of Florida's Bureau of Economic and Business Research (BEBR). The 2010 BEBR estimates for permanent resident population (BEBR 2011) are the basis for estimating 2030 populations for each county in the LEC Planning Area. The 2010 population estimates for each of the LEC Planning Area counties are as follows:

- Palm Beach County: 1,320,134 residents
- Broward County: 1,748,066 residents
- Miami-Dade County: 2,496,435 residents
- Monroe County: 73,090 residents

Only a portion of Hendry County is included in the LEC Planning Area. Therefore, the BEBR projections for the entire county are not applicable. The 2010 population for Hendry County relies upon the estimate in the *2005–2006 Lower East Coast Water Supply Plan Update* (2005–2006 LEC Plan Update) (SFWMD 2007), which was 1,279 people.

2010 Public Water Supply Utility Service Areas

After county populations were established, maps of areas served by each PWS utility were developed using data from SFWMD's Water Use Regulatory Database, water supply facility work plans, the 2005–2006 LEC Plan Update, and maps from the counties and PWS utilities. These maps show the areas currently served by the utilities. Service area maps were then verified by the PWS utilities during follow-up meetings and correspondence with planning, operations, and geographic information system (GIS) staff. Information supplied by the PWS utilities was especially important to identify current and future areas served. In many instances, differences existed between areas actually served and franchised or legislated service areas. The focus on areas served by PWS utilities improves the accuracy of distributing county base populations into PWS and DSS populations. Maps of these service areas are provided in **Appendix E**. Expansion of service areas in the future were addressed in the population projections.

The populations residing outside of areas served by PWS utilities were included in DSS population estimates, because United States Census Bureau data no longer include the sources of water for households including those using individual wells. For this plan update, it was assumed that all populations outside PWS service areas had self-supplied potable water.

A few utilities, most notably the Town of Jupiter and Village of Tequesta in Palm Beach County, serve a small portion of Martin County's population, which is in the Upper East Coast Planning Area. To provide the best population served estimates, these populations are included in the populations served by utilities in Palm Beach County in this plan update. In addition, some residents in far western Palm Beach County and the portion of Hendry County within the LEC Planning Area are served by Clewiston Public Utilities (formerly served by U.S. Sugar) and are included in the *2012 Lower West Coast Water Supply Plan Update* (SFWMD 2012). Lastly, the remaining population in eastern Hendry County in the LEC Planning Area not served by the Clewiston Public Utility is self-supplied, therefore no demand for PWS will be reported for Hendry County in this plan.

Distribution of Census Block Data across 2010 PWS Utility Service Areas

The 2010 population reported by the United States Census Bureau (2010) was distributed into each PWS utility service area (**Table A-1**) by using census block data, which captures population in relatively small geographic areas (bounded by streets and prominent physical features) as the basic unit for analysis. Seasonal residents, prison inmates, migrant workers, and tourists were not included in permanent population estimates provided by the 2010 Census count.

To determine the census blocks within the area served by each PWS utility, the geographic areas represented by census blocks and PWS utility service areas were input as polygon layers into SFWMD's GIS and overlaid. The imagery or latest available one-foot natural color aerial photography was used as a background and assisted the geographer in allocating census blocks to appropriate PWS service areas. The latest photography available was from 2009 for Palm Beach, Broward, and Miami-Dade counties. Imagery from 2011 was available for portions of rural Palm Beach County. When more current photography was not available, the one-meter natural color aerial photography from the United States Geological Survey (USGS) 2004–2005 digital ortho quarter quads was used. After allocating census blocks, population was then calculated for each PWS area served and for DSS users.

Table A-1. 2010 LEC Planning Area permanent resident population estimates.

County	PWS Utility or DSS	2010 Population
Palm Beach	**Palm Beach County PWS Utilities**	
	A.G. Holley State Hospital	32
	Boca Raton, City of	107,224
	Boynton Beach, City of	102,512
	Delray Beach Water and Sewer Department, City of	63,341
	Glades Utility Authority	25,051
	Golf, Village of	2,755
	Highland Beach, Town of	3,631
	Jupiter, Town of	70,840
	Lake Worth Utilities, City of	45,137
	Lantana, Town of	10,348
	Manalapan, Town of	2,421
	Mangonia Park, Town of	1,888
	Maralago Cay	1,008
	Palm Beach County Water Utilities Department	458,839
	Palm Springs, Village of	45,204
	Riviera Beach, City of	37,757
	Seacoast Utility Authority	87,686
	Tequesta, Village of	11,581
	Wellington Public Utilities Department	55,408
	West Palm Beach Public Utilities, City of	109,958
	Palm Beach County PWS Total	**1,242,621**
	Palm Beach County DSS Total	**77,513**
	Palm Beach County Total	**1,320,134**
Broward	**Broward County PWS Utilities**	
	Broward County Water & Wastewater Services (District 1)	71,395
	Broward County Water & Wastewater Services (District 2A)	110,939
	Cooper City Utility Department, City of	28,543
	Coral Springs, City of	58,029
	Coral Springs Improvement District	36,969
	Dania Beach, City of	14,840
	Davie, Town of	27,548
	Deerfield Beach, City of	51,842
	Fort Lauderdale, City of	212,945
	Hallandale Beach, City of	37,113
	Hillsboro Beach, Town of	1,875
	Hollywood, City of	186,798
	Lauderhill, City of	58,114

Table A-1. Continued.

County	PWS Utility or DSS	2010 Population
Broward (continued)	Margate, City of	58,314
	Miramar, City of	116,715
	North Lauderdale, City of	32,994
	North Springs Improvement District	34,895
	Parkland Utilities, Inc.	2,161
	Pembroke Pines, City of	152,002
	Plantation, City of	91,812
	Pompano Beach, City of	79,917
	Royal Utility Corporation	3,234
	Seminole Tribe of Florida Utility	1,368
	Sunrise, City of	211,403
	Tamarac, City of	56,064
	Tindall Hammock Irrigation and Soil Conservation District	2,639
	Broward County PWS Total	**1,740,468**
	Broward County DSS	**7,598**
	Broward County Total	**1,748,066**
Miami-Dade	**Miami-Dade County PWS Utilities**	
	Americana Village	1,582
	Florida City Water and Sewer Department	11,230
	Homestead, City of	65,679
	Miami-Dade Water & Sewer Department	2,141,885
	North Miami, City of	90,397
	North Miami Beach, City of	161,968
	Miami-Dade County PWS Total	**2,472,741**
	Miami-Dade County DSS Total	**23,694**
	Miami-Dade County Total	**2,496,435**
Monroe	**Monroe County PWS Utility**	
	Florida Keys Aqueduct Authority	73,090
	Monroe County PWS Total	**73,090**
	Monroe County DSS Total	**N/A**
	Monroe County Total	**73,090**
Hendry	**Hendry County PWS**	**N/A**
	Hendry County DSS	**1,279**
	Hendry County Total	**1,279**
LEC Planning Area Total		**5,639,004**

2030 County Populations

An important element of water supply planning is to use the best available data to estimate future populations. The projections used in this plan update are believed to represent a reasonable balance of long- and short-term factors affecting the development of the LEC Planning Area. However, there is always uncertainty in twenty-year population projections as growth patterns within the area could change significantly. Factors such as global and local economic trends, housing demand, migration and immigration patterns, and cultural shifts all have an effect on populations within a county and state.

To prepare population projections, 2030 populations needed to be developed for each county within the LEC Planning Area. Paragraph 373.709(2)(a)1, F.S., prescribes the use of population projections in determining needs in regional water supply plans:

> Population projections used for determining public water supply needs must be based upon the best available data. In determining best available data, the district shall consider the University of Florida's Bureau of Economic and Business Research (BEBR) medium population projections and any population projection data and analysis submitted by a local government pursuant to the public workshop described in subsection (1) if the data and analysis support the local government's comprehensive plan. Any adjustment of or deviation from the BEBR projections must be fully described, and the original BEBR data must be presented along with the adjusted data.

Table A-2 provides BEBR population projections for the low, medium, and high ranges for 2015–2040 for the LEC Planning Area. To project population for 2030, the BEBR population medium growth forecasts reported for 2010 (BEBR 2011) for each county were used. Additional sources of population information from LEC county governments or PWS utilities not accounted for in the BEBR medium projections were identified. Where population projection data captured higher population counts for 2030 than medium BEBR, projections were adjusted upwards, if appropriate and consistent with local water supply planning programs.

Table A-2. 2010 United States census results and 2015–2040 BEBR population projections for the LEC Planning Area.

	2010 Census	Projections					
		2015	2020	2025	2030	2035	2040
	1,320,134	**Palm Beach County**					
Low		1,342,600	1,367,700	1,383,900	1,389,700	1,384,900	1,370,900
Medium		1,394,300	1,482,900	1,568,500	1,648,000	1,720,000	1,786,000
High		1,454,500	1,605,600	1,761,400	1,919,200	2,077,300	2,236,700
	1,748,066	**Broward County**					
Low		1,736,800	1,726,300	1,710,600	1,689,000	1,661,600	1,632,900
Medium		1,788,200	1,834,500	1,877,700	1,916,200	1,949,700	1,982,500
High		1,844,200	1,946,700	2,048,900	2,149,600	2,248,100	2,349,700
	2,496,435	**Miami-Dade County**					
Low		2,528,700	2,564,400	2,590,900	2,606,400	2,610,300	2,604,100
Medium		2,600,900	2,722,900	2,841,400	2,952,800	3,055,100	3,150,200
High		2,685,100	2,891,800	3,103,400	3,317,200	3,531,500	3,747,400
	73,090	**Monroe County**					
Medium		72,200	71,200	70,200	69,300	68,500	67,700

2030 PWS Utility Service Areas

The 2010 PWS utility service areas were updated to include proposed changes from 2010 to 2030. Sources of information included water use permits and discussions and correspondence with PWS utility staff. Very few utility service area boundaries are expected to change over the next 20 years.

Distribution of Census Block Data across 2030 PWS Utility Service Areas

To determine the 2030 permanent resident population estimates, the PWS utility service area portion (percentage) of the total county 2010 census population estimate (U.S. Census Bureau 2010) was multiplied by the 2030 medium population projection. Planned changes to utility service areas were compared to census blocks and adjusted as needed.

Five-Year Incremental Projections

For the required five-year incremental projections within the twenty-year planning horizon of this plan update, census block data from the 2010 Census count (U.S. Census Bureau 2010) were used as the principal means of distributing 2030 county control populations to the PWS future service areas within the LEC Planning Area counties. Five-year incremental population projections for each PWS utility are based upon a linear interpolation of the change in population from the 2010 estimates to 2030 adjusted projections.

For example, a PWS service area with a 2010 population estimate of 10,000 people and a projected growth rate of 25 percent would have a 2030 population projection of 12,500 people (**Table A-3**). The change in population is then linearly interpolated for the interim five-year increments. For the five-year incremental population numbers, see **Table A-7** later in this appendix.

Table A-3. Example of five-year incremental projections applied to a PWS service area.

Year	2010	2015	2020	2025	2030
Population	10,000	10,625	11,250	11,875	12,500

Water Demand Projection Methodology

Historical PWS Utility Raw Water Withdrawal and Finished Treated Water Data

Both raw water withdrawn for PWS and finished treated water produced for PWS are calculated. This approach captures situations when gross and net demands differ and independently verifies efficiency. For example, urban demand for finished treated water may be met with brackish water sources found in the Floridan aquifer. Because of losses incurred during treatment processes, raw water withdrawals from brackish water sources are typically 20–25 percent greater compared to the same volume of finished water from freshwater sources. To determine historical withdrawals by all PWS utilities in the LEC Planning Area, raw water withdrawal data were obtained from SFWMD's Water Use Regulatory Database for 2010. To gather the finished treated water produced by PWS, data were extracted from the 2010 Florida Department of Environmental Protection monthly operating reports (http://www.dep.state.fl.us/water/drinkingwater/flow.htm). Five years of data were analyzed to understand trends in water use. Factors reflected in this data include the economic downturn, water shortages, empty housing stock, and implementation of year-round irrigation rules. Analysis concluded that 2010 represents the historical use trend that is expected to continue into the future.

Finished and Raw Water Demand Projections

For each PWS utility, 2010 raw water withdrawals were compared to the 2010 Florida Department of Environmental Protection data for finished water production to calculate the raw to finished water ratio for each LEC Planning Area PWS utility (**Table A-4**). These factors give a basis to compare and contrast PWS utilities and can be applied for other types of analyses to convert from finished water production to raw water withdrawals. However, a more useful statistic is finished to raw, which describes the efficiency of the various treatment trains employed by the PWS (**Table A-5**). For DSS, the finished to raw ratio is assumed to be 0.96.

Per Capita Use Rate

The planning per capita use rate (PCUR) expresses the total annual finished water used in 2010 divided by the permanent population in 2010 for each PWS utility. This method incorporates the finished water supplied by the PWS utility and consumed by seasonal residents and tourists, PWS utility supplied for industrial, commercial, and institutional use, and the losses incurred in water delivery. Irrigation demand for PWS-served households that do not use PWS for irrigation was not assessed due to the lack of available data. The planning PCURs for DSS within each county were assumed to be the same as for the

countywide PWS weighted average, which are also shown. For Hendry County, the DSS PCUR is derived from the DSS demand and populations in the *2012 Lower West Coast Water Supply Plan Update* (SFWMD 2012). **Table A-6** provides PCURs for 2010.

Each utility may have specific demographics, seasonality, and distribution characteristics that may be analyzed in detail to better quantify PCURs of specific user categories. A more localized, in-depth analysis of use may be used to focus water conservation efforts and assist in determining water use permit allocations. Therefore, the PCURs were part of the information provided to utilities for review.

Table A-4. Raw to finished water ratio for each PWS utility.

County	PWS Utility/DSS	Raw:Finished
Palm Beach County	**Palm Beach County PWS Utilities**	
	A.G. Holley State Hospital	1.17
	Boca Raton, City of	1.23
	Boynton Beach, City of	1.06
	Delray Beach Water and Sewer Department, City of	1.04
	Glades Utility Authority	1.35
	Golf, Village of	1.28
	Highland Beach, Town of	1.37
	Jupiter, Town of	1.25
	Lake Worth Utilities, City of	1.07
	Lantana, Town of	1.04
	Manalapan, Town of	1.25
	Mangonia Park, Town of	1.04
	Maralago Cay	1.04
	Palm Beach County Water Utilities Department	1.14
	Palm Springs, Village of	1.05
	Riviera Beach, City of	1.02
	Seacoast Utility Authority	1.03
	Tequesta, Village of	1.23
	Wellington Public Utilities Department	1.16
	West Palm Beach Public Utilities, City of	1.04
	Palm Beach County DSS	1.04
Broward County	**Broward County PWS Utilities**	
	Broward County Water & Wastewater Services (District 1)	1.08
	Broward County Water & Wastewater Services (District 2A)	1.04
	Cooper City Utility Department, City of	1.27
	Coral Springs, City of	1.05
	Coral Springs Improvement District	1.04
	Dania Beach, City of	1.06
	Davie, Town of	1.02
	Deerfield Beach, City of	1.02

Table A-4. Continued.

County	PWS Utility	Raw:Finished
Broward County (continued)	Fort Lauderdale, City of	1.11
	Hallandale Beach, City of	1.02
	Hillsboro Beach, Town of	1.04
	Hollywood, City of	1.16
	Lauderhill, City of	1.04
	Margate, City of	1.04
	Miramar, City of	1.10
	North Lauderdale, City of	1.04
	North Springs Improvement District	1.04
	Parkland Utilities, Inc.	1.02
	Pembroke Pines, City of	1.02
	Plantation, City of	1.21
	Pompano Beach, City of	1.07
	Royal Utility Corporation	1.04
	Seminole Tribe of Florida	1.02
	Sunrise, City of	1.16
	Tamarac, City of	1.05
	Tindall Hammock Irrigation and Soil Conservation District	1.04
	Broward County DSS	1.04
Miami-Dade County	**Miami-Dade County PWS Utilities**	
	Americana Village	1.04
	Florida City Water and Sewer Department	1.01
	Homestead, City of	1.04
	Miami-Dade Water & Sewer Department	1.02
	North Miami, City of	1.04
	North Miami Beach, City of	1.12
	Miami-Dade DSS	1.04
Monroe County	**Monroe County PWS Utilities**	
	Florida Keys Aqueduct Authority	1.07
Hendry County	**Hendry County DSS**	1.04

Table A-5. Finished to raw water ratio for each PWS utility.

County	PWS Utility	Finished:Raw
Palm Beach County	**Palm Beach County PWS Utilities**	
	A.G. Holley State Hospital	0.85
	Boca Raton, City of	0.81
	Boynton Beach, City of	0.94
	Delray Beach Water and Sewer Department, City of	0.96
	Glades Utility Authority	0.74
	Golf, Village of	0.78
	Highland Beach, Town of	0.73
	Jupiter, Town of	0.80
	Lake Worth Utilities, City of	0.93
	Lantana, Town of	0.96
	Manalapan, Town of	0.80
	Mangonia Park, Town of	0.96
	Maralago Cay	0.97
	Palm Beach County Water Utilities Department	0.88
	Palm Springs, Village of	0.95
	Riviera Beach, City of	0.98
	Seacoast Utility Authority	0.97
	Tequesta, Village of	0.81
	Wellington Public Utilities Department	0.86
	West Palm Beach Public Utilities, City of	0.96
	Palm Beach County DSS	0.96
Broward County	**Broward County PWS Utilities**	
	Broward County Water & Wastewater Services (District 1)	0.92
	Broward County Water & Wastewater Services (District 2A)	0.96
	Cooper City Utility Department, City of	0.78
	Coral Springs, City of	0.95
	Coral Springs Improvement District	0.96
	Dania Beach, City of	0.95
	Davie, Town of	0.98
	Deerfield Beach, City of	0.98
	Fort Lauderdale, City of	0.90
	Hallandale Beach, City of	0.98
	Hillsboro Beach, Town of	0.96
	Hollywood, City of	0.86
	Lauderhill, City of	0.96

Table A-5. Continued.

County	PWS Utility	Finished:Raw
Broward County (continued)	Margate, City of	0.96
	Miramar, City of	0.91
	North Lauderdale, City of	0.96
	North Springs Improvement District	0.96
	Parkland Utilities, Inc.	0.98
	Pembroke Pines, City of	0.98
	Plantation, City of	0.82
	Pompano Beach, City of	0.93
	Royal Utility Corporation	0.96
	Seminole Tribe of Florida	0.98
	Sunrise, City of	0.86
	Tamarac, City of	0.95
	Tindall Hammock Irrigation and Soil Conservation District	0.96
	Broward County DSS	0.96
Miami-Dade County	**Miami-Dade County PWS Utilities**	
	Americana Village	0.96
	Florida City Water and Sewer Department	0.99
	Homestead, City of	0.96
	Miami-Dade Water & Sewer Department	0.98
	North Miami, City of	0.96
	North Miami Beach, City of	0.90
	Miami-Dade DSS	0.96
Monroe County	**Monroe County PWS Utilities**	
	Florida Keys Aqueduct Authority	0.93
Hendry County	**Hendry County DSS**	0.96

Table A-6. PCURs for 2010.

County	PWS Utility	2010 PCUR
Palm Beach County	**Palm Beach County PWS Utilities**	
	A.G. Holley State Hospital	
	Boca Raton, City of	320
	Boynton Beach, City of	131
	Delray Beach Water and Sewer Department, City of	232
	Glades Utility Authority	195
	Golf, Village of	145
	Highland Beach, Town of	372
	Jupiter, Town of	188
	Lake Worth Utilities, City of	98
	Lantana, Town of	171
	Manalapan, Town of	440
	Mangonia Park, Town of	168
	Maralago Cay	182
	Palm Beach County Water Utilities Department	115
	Palm Springs, Village of	84
	Riviera Beach, City of	173
	Seacoast Utility Authority	201
	Tequesta, Village of	235
	Wellington Public Utilities Department	105
	West Palm Beach Public Utilities, City of	253
	Palm Beach County PWS Weighted-Average	**166**
	Palm Beach County DSS	**166**
	Palm Beach County Average	**166**
Broward County	**Broward County PWS Utilities**	
	Broward County Water & Wastewater Services (District 1)	99
	Broward County Water & Wastewater Services (District 2A)	110
	Cooper City Utility Department, City of	95
	Coral Springs, City of	114
	Coral Springs Improvement District	103
	Dania Beach, City of	154
	Davie, Town of	146
	Deerfield Beach, City of	191
	Fort Lauderdale, City of	190
	Hallandale Beach, City of	146
	Hillsboro Beach, Town of	351
	Hollywood, City of	111
	Lauderhill, City of	95

Table A-6. Continued.

County	PWS Utility	2010 PCUR
Broward County (continued)	Margate, City of	98
	Miramar, City of	97
	North Lauderdale, City of	76
	North Springs Improvement District	124
	Parkland Utilities, Inc.	113
	Pembroke Pines, City of	78
	Plantation, City of	127
	Pompano Beach, City of	170
	Royal Utility Corporation	98
	Seminole Tribe of Florida	810
	Sunrise, City of	116
	Tamarac, City of	105
	Tindall Hammock Irrigation and Soil Conservation District	158
	Broward County PWS Weighted-Average	**123**
	Broward County DSS	**123**
	Broward County Average	**123**
Miami-Dade County	**Miami-Dade County PWS Utilities**	
	Americana Village	138
	Florida City Water and Sewer Department	156
	Homestead, City of	157
	Miami-Dade Water & Sewer Department	141
	North Miami, City of	117
	North Miami Beach, City of	125
	Miami-Dade PWS Weighted-Average	**140**
	Miami-Dade DSS	**140**
	Miami-Dade County Average	**140**
Monroe County	**Monroe County PWS Utilities**	
	Florida Keys Aqueduct Authority	**109**
	PWS Weighted-Average	**109**
	Monroe County Average	**109**
Hendry County	**Hendry County DSS**	**143**
	Hendry County Average	**143**
LEC Planning Area PWS Average		**142**

2030 Projected Raw and Finished Demand

For each PWS utility, 2030 finished (net) water demand was calculated by multiplying the 2030 permanent population for each PWS utility by the PCUR for 2010. This conservative assumption reflects the expectation that PCURs will remain constant over the next 20 years. Several utilities do expect declines in PCURs based on implementation of conservation and reuse projects replacing demand for treated finished water and requested lower future PCURs. To determine raw water demand for average conditions for each PWS utility, finished water projections were multiplied by the raw to finished percent in **Table A-4** to calculate raw (gross) water demand. This methodology assumes no changes in treatment

efficiency from plant changes (e.g., lime softening to membrane) or source shifting (e.g., fresh surficial aquifer system water to lower quality Floridan aquifer system water).

As with the PWS service area maps and populations, each utility and local government within the LEC Planning Area was provided with the 2010 estimates and 2030 projections for the PWS and DSS categories produced by the methods described. In several cases, the utilities were able to provide input on their respective demands and projections that resulted in adjustments to the estimated demand. Many of these data exchanges took place during follow-up meetings, telephone conferences, and email correspondence. Revisions resulting from this coordination comprise the 2010 estimates and 2030 projections published in this update.

Average Rainfall and 1–and–10 Year Drought Conditions

Finally, net and gross water projections for average rainfall conditions were modified to calculate 1-in-10 year drought condition demand. A 1-in-10 year drought is defined by diminished rain and increased evapotranspiration (ET) relative to the historical record for a particular location from Tables V-2-1, V-2-3, V-2-5, and V-2-7 in the *Districtwide Water Supply Assessment* (SFWMD 1998). The effect of 1-in-10 year drought conditions is expected to increase demand in each county as follows:

- Palm Beach County: 1.109
- Broward County: 1.101
- Miami-Dade County: 1.087
- Monroe County: 1.031
- Hendry County: 1.049

It should be noted that the potential effect of the Mandatory Year-Round Landscape Irrigation Conservation Measures Rule has not been explicitly incorporated.

Projection Results

Table A-7 provides PWS utility and DSS five-year incremental population projections for the LEC Planning Area. **Table A-8** presents finished (net) water demand under average rainfall conditions, while **Table A-9** provides the finished water needs under 1-in-10 year drought conditions. In the same manner, **Table A-10** presents estimated gross (raw) water demands under average rainfall conditions, while **Table A-11** provides estimated gross water demands under 1-in-10 year drought conditions.

Table A-7. PWS and DSS population projections for the LEC Planning Area.

County	PWS Utility or DSS	Population Projections				
		2010	2015	2020	2025	2030
Palm Beach	**Palm Beach County PWS Utilities**					
	A.G. Holley State Hospital	32	0	0	0	0
	Boca Raton, City of	107,224	113,882	120,539	127,197	133,854
	Boynton Beach, City of	102,512	108,877	115,242	121,607	127,972
	Delray Beach Water and Sewer Department, City of	63,341	67,274	71,207	75,139	79,072
	Glades Utility Authority	25,051	26,607	28,164	29,720	31,276
	Golf, Village of	2,755	2,926	3,097	3,268	3,439
	Highland Beach, Town of	3,631	3,857	4,082	4,308	4,533
	Jupiter, Town of	70,840	78,532	86,224	93,916	101,608
	Lake Worth Utilities, City of	45,137	47,940	50,742	53,545	56,347
	Lantana, Town of	10,348	10,991	11,633	12,276	12,918
	Manalapan, Town of	2,421	2,571	2,722	2,872	3,022
	Mangonia Park, Town of	1,888	2,005	2,122	2,240	2,357
	Maralago Cay	1,008	1,071	1,133	1,196	1,258
	Palm Beach County Water Utilities Department	458,839	487,328	515,412	544,306	572,795
	Palm Springs, Village of	45,204	48,011	50,817	53,624	56,431
	Riviera Beach, City of	37,757	40,101	42,446	44,790	47,134
	Seacoast Utility Authority	87,686	93,131	98,575	104,020	109,464
	Tequesta, Village of	11,581	12,463	13,345	14,226	15,108
	Wellington Public Utilities Department	55,408	58,848	62,289	65,729	69,169
	West Palm Beach Public Utilities, City of	109,958	118,252	123,853	134,840	143,134
	Palm Beach County PWS Total	**1,242,621**	**1,324,667**	**1,403,644**	**1,488,819**	**1,570,891**
	Palm Beach County DSS Total	**77,513**	**77,434**	**80,423**	**77,215**	**77,109**
	Palm Beach County Total	**1,320,134**	**1,402,101**	**1,484,067**	**1,566,034**	**1,648,000**
Broward	**Broward County PWS Utilities**					
	Broward County Water & Wastewater Services (District 1)	71,395	73,643	75,892	78,140	80,388
	Broward County Water & Wastewater Services (District 2A)	110,939	113,607	116,274	118,942	121,609
	Cooper City Utility Department, City of	28,543	29,804	33,335	32,325	33,585
	Coral Springs, City of	58,029	59,424	60,820	62,215	63,610
	Coral Springs Improvement District	36,969	37,858	38,747	39,636	40,525
	Dania Beach, City of	14,840	15,197	15,554	15,910	16,267
	Davie, Town of	27,548	43,434	59,320	75,205	91,091
	Deerfield Beach, City of	51,842	53,089	54,335	55,582	56,828
	Fort Lauderdale, City of	212,945	217,995	223,045	228,095	233,145
	Hallandale Beach, City of	37,113	38,006	38,898	39,791	40,683
	Hillsboro Beach, Town of	1,875	1,920	1,965	2,010	2,055
	Hollywood, City of	186,798	192,679	198,559	204,440	210,320
	Lauderhill, City of	58,114	59,512	60,909	62,307	63,704

Table A-7. Continued.

County	PWS Utility or DSS	Population Projections				
		2010	2015	2020	2025	2030
Broward (cont.)	Margate, City of	58,314	59,716	61,118	62,521	63,923
	Miramar, City of	116,715	120,970	125,225	129,479	133,734
	North Lauderdale, City of	32,994	33,787	34,581	35,374	36,167
	North Springs Improvement District	34,895	35,734	36,573	37,412	38,251
	Parkland Utilities, Inc.	2,161	2,213	2,265	2,317	2,369
	Pembroke Pines, City of	152,002	155,657	159,312	162,967	166,622
	Plantation, City of	91,812	94,703	97,595	100,486	103,377
	Pompano Beach, City of	79,917	81,841	83,765	85,689	87,613
	Royal Utility Corporation	3,234	3,312	3,390	3,467	3,545
	Seminole Tribe of Florida Utility	1,368	1,401	1,434	1,467	1,500
	Sunrise, City of	211,403	216,486	221,570	226,653	231,736
	Tamarac, City of	56,064	57,412	58,760	60,108	61,456
	Tindall Hammock Irrigation and Soil Conservation District	2,639	2,703	2,766	2,830	2,893
	Broward County PWS Total	**1,740,468**	**1,802,103**	**1,866,007**	**1,925,368**	**1,986,996**
	Broward County DSS Total	**7,598**	**7,778**	**5,689**	**8,142**	**8,329**
	Broward County Total	**1,748,066**	**1,809,881**	**1,871,696**	**1,933,510**	**1,995,325**
Miami-Dade	**Miami-Dade County PWS Utilities**					
	Americana Village	1,582	1,654	1,727	1,799	1,871
	Florida City Water and Sewer Department	11,230	11,743	12,256	12,770	13,283
	Homestead, City of	65,679	68,681	71,682	74,684	77,686
	Miami-Dade Water & Sewer Department	2,141,885	2,239,773	2,337,660	2,435,548	2,533,436
	North Miami, City of	90,397	94,528	98,660	102,791	106,922
	North Miami Beach, City of	161,968	169,370	176,772	184,175	191,577
	Miami-Dade County PWS Total	**2,472,741**	**2,585,749**	**2,698,757**	**2,811,767**	**2,924,775**
	Miami-Dade County DSS Total	**23,694**	**24,777**	**25,861**	**26,942**	**28,025**
	Miami-Dade County Total	**2,496,435**	**2,610,526**	**2,724,618**	**2,838,709**	**2,952,800**
Monroe	**Monroe County PWS Utility**					
	Florida Keys Aqueduct Authority	73,090	72,143	71,195	70,248	69,300
	Monroe County PWS Total	**73,090**	**72,143**	**71,195**	**70,248**	**69,300**
	Monroe County DSS Total	**0**	**0**	**0**	**0**	**0**
	Monroe County Total	**73,090**	**72,143**	**71,195**	**70,248**	**69,300**
Hendry	**Hendry County PWS Total**	**0**	**0**	**0**	**0**	**0**
	Hendry County DSS Total	**1,279**	**1,320**	**1,360**	**1,401**	**1,441**
	Hendry County Total	**1,279**	**1,320**	**1,360**	**1,401**	**1,441**
LEC Planning Area PWS Total		**5,528,920**	**5,784,662**	**6,039,603**	**6,296,202**	**6,551,962**
LEC Planning Area DSS Total		**110,084**	**111,309**	**113,333**	**113,700**	**114,904**
LEC Planning Area Total		**5,639,004**	**5,895,971**	**6,152,936**	**6,409,902**	**6,666,866**

Table A-8. Finished water demand projections for PWS and DSS under average rainfall conditions in the LEC Planning Area.

County	PWS Utility or DSS	Finished (Net) Water Demand Projections – Average Rainfall Conditions (MGD)				
		2010	2015	2020	2025	2030
Palm Beach	**Palm Beach County PWS Utilities**					
	A.G. Holley State Hospital	0.07	0.00	0.00	0.00	0.00
	Boca Raton, City of	34.31	36.44	38.57	40.70	42.83
	Boynton Beach, City of	13.43	14.26	15.10	15.93	16.76
	Delray Beach Water and Sewer Department, City of	14.70	15.61	16.52	17.43	18.34
	Glades Utility Authority	4.88	5.19	5.49	5.80	6.10
	Golf, Village of	0.40	0.42	0.45	0.47	0.50
	Highland Beach, Town of	1.35	1.43	1.52	1.60	1.69
	Jupiter, Town of	13.32	14.76	16.21	17.66	19.10
	Lake Worth Utilities, City of	4.42	4.70	4.97	5.25	5.52
	Lantana, Town of	1.77	1.88	1.99	2.10	2.21
	Manalapan, Town of	1.07	1.13	1.20	1.26	1.33
	Mangonia Park, Town of	0.32	0.34	0.36	0.38	0.40
	Maralago Cay	0.18	0.19	0.21	0.22	0.23
	Palm Beach County Water Utilities Department	52.77	56.04	59.27	62.60	65.87
	Palm Springs, Village of	3.80	4.03	4.27	4.50	4.74
	Riviera Beach, City of	6.53	6.94	7.34	7.75	8.15
	Seacoast Utility Authority	17.62	18.72	18.63	20.91	20.69
	Tequesta, Village of	2.72	2.93	3.14	3.34	3.55
	Wellington Public Utilities Department	5.82	6.18	6.54	6.90	7.26
	West Palm Beach Public Utilities, City of	27.87	29.92	31.33	34.11	36.21
	Palm Beach County PWS Total	**207.35**	**221.11**	**233.11**	**248.91**	**261.48**
	Palm Beach County DSS Total	**12.87**	**12.85**	**13.35**	**12.82**	**12.80**
	Palm Beach County Total	**220.22**	**233.96**	**246.46**	**261.73**	**274.28**
Broward	**Broward County PWS Utilities**					
	Broward County Water & Wastewater Services (District 1)	7.05	7.29	7.49	7.74	7.93
	Broward County Water & Wastewater Services (District 2A)	12.20	12.50	12.79	13.08	13.38
	Cooper City Utility Department, City of	2.71	2.83	3.17	3.07	3.19
	Coral Springs, City of	6.62	6.77	6.93	7.09	7.25
	Coral Springs Improvement District	3.81	3.90	3.99	4.08	4.17
	Dania Beach, City of	2.29	2.34	2.40	2.45	2.51
	Davie, Town of	4.02	6.34	8.66	10.98	13.30
	Deerfield Beach, City of	9.90	10.14	10.38	10.62	10.85
	Fort Lauderdale, City of	40.46	41.42	42.38	43.34	44.30
	Hallandale Beach, City of	5.42	5.55	5.68	5.81	5.94
	Hillsboro Beach, Town of	0.66	0.67	0.69	0.71	0.72
	Hollywood, City of	20.73	21.39	22.04	22.69	23.35
	Lauderhill, City of	5.52	5.65	5.79	5.92	6.05

Table A-8. Continued.

County	PWS Utility or DSS	Finished (Net) Water Demand Projections – Average Rainfall Conditions (MGD)				
		2010	2015	2020	2025	2030
Broward (cont.)	Margate, City of	5.71	5.85	5.99	6.13	6.26
	Miramar, City of	11.32	11.73	12.15	12.56	12.97
	North Lauderdale, City of	2.51	2.57	2.63	2.69	2.75
	North Springs Improvement District	4.33	4.43	4.54	4.64	4.74
	Parkland Utilities, Inc.	0.24	0.25	0.26	0.26	0.27
	Pembroke Pines, City of	11.86	12.14	12.43	12.71	13.00
	Plantation, City of	11.66	12.03	12.39	12.76	13.13
	Pompano Beach, City of	13.59	13.91	14.24	14.57	14.19
	Royal Utility Corporation	0.32	0.32	0.33	0.34	0.35
	Seminole Tribe of Florida Utility	1.11	1.13	1.16	1.19	1.22
	Sunrise, City of	24.52	25.11	25.70	26.29	26.88
	Tamarac, City of	5.89	6.03	6.17	6.31	6.45
	Tindall Hammock Irrigation and Soil Conservation District	0.42	0.43	0.44	0.45	0.46
	Broward County PWS Total	**214.87**	**222.72**	**230.82**	**238.48**	**245.61**
	Broward County DSS Total	**0.93**	**0.96**	**0.70**	**1.00**	**1.02**
	Broward County Total	**215.80**	**223.68**	**231.52**	**239.48**	**246.63**
Miami-Dade	**Miami-Dade County PWS Utilities**					
	Americana Village	0.22	0.23	0.24	0.25	0.26
	Florida City Water and Sewer Department	1.75	1.83	1.91	1.99	2.07
	Homestead, City of	10.31	10.78	11.25	11.73	12.20
	Miami-Dade Water & Sewer Department	302.01	315.81	329.61	343.41	357.21
	North Miami, City of	10.58	11.06	11.54	12.03	12.51
	North Miami Beach, City of	20.25	21.17	22.80	23.76	24.71
	Miami-Dade County PWS Total	**345.12**	**360.88**	**377.35**	**393.17**	**408.96**
	Miami-Dade County DSS Total	**3.32**	**3.47**	**3.62**	**3.77**	**3.92**
	Miami-Dade County Total	**348.44**	**364.35**	**380.97**	**396.94**	**412.88**
Monroe	**Monroe County PWS Utility**					
	Florida Keys Aqueduct Authority	16.45	17.72	19.00	20.35	21.70
	Monroe County PWS Total	**16.45**	**17.72**	**19.00**	**20.35**	**21.70**
	Monroe County DSS Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Monroe County Total	**16.45**	**17.72**	**19.00**	**20.35**	**21.70**
Hendry	**Hendry County PWS Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hendry County DSS Total	**0.18**	**0.19**	**0.19**	**0.20**	**0.21**
	Hendry County Total	**0.18**	**0.19**	**0.19**	**0.20**	**0.21**
LEC Planning Area PWS Total		**783.79**	**822.43**	**860.28**	**900.91**	**937.75**
LEC Planning Area DSS Total		**17.30**	**17.47**	**17.86**	**17.79**	**17.95**
LEC Planning Area Total		**801.09**	**839.90**	**878.14**	**918.70**	**955.70**

Table A-9. Finished water demand projections for PWS and DSS under 1-in-10 year drought conditions in the LEC Planning Area.

County	PWS Utility or DSS	Finished (Net) Water Demand Projections – 1-in-10 Year Drought Conditions (MGD)				
		2010	2015	2020	2025	2030
Palm Beach	**Palm Beach County PWS Utilities**					
	A.G. Holley State Hospital	0.08	0.00	0.00	0.00	0.00
	Boca Raton, City of	38.05	40.41	42.77	45.14	47.50
	Boynton Beach, City of	14.89	15.81	16.75	17.67	18.59
	Delray Beach Water and Sewer Department, City of	16.30	17.31	18.32	19.33	20.34
	Glades Utility Authority	5.41	5.76	6.09	6.43	6.76
	Golf, Village of	0.44	0.47	0.50	0.52	0.55
	Highland Beach, Town of	1.50	1.59	1.69	1.77	1.87
	Jupiter, Town of	14.77	16.37	17.98	19.58	21.18
	Lake Worth Utilities, City of	4.90	5.21	5.51	5.82	6.12
	Lantana, Town of	1.96	2.08	2.21	2.33	2.45
	Manalapan, Town of	1.19	1.25	1.33	1.40	1.47
	Mangonia Park, Town of	0.35	0.38	0.40	0.42	0.44
	Maralago Cay	0.20	0.21	0.23	0.24	0.26
	Palm Beach County Water Utilities Department	58.52	62.15	65.73	69.42	73.05
	Palm Springs, Village of	4.21	4.47	4.74	4.99	5.26
	Riviera Beach, City of	7.24	7.70	8.14	8.59	9.04
	Seacoast Utility Authority	19.54	20.76	20.66	23.19	22.95
	Tequesta, Village of	3.02	3.25	3.48	3.70	3.94
	Wellington Public Utilities Department	6.45	6.85	7.25	7.65	8.05
	West Palm Beach Public Utilities, City of	30.91	33.18	34.74	37.83	40.16
	Palm Beach County PWS Total	**229.93**	**245.21**	**258.52**	**276.02**	**289.98**
	Palm Beach County DSS Total	**14.27**	**14.25**	**14.81**	**14.22**	**14.20**
	Palm Beach County Total	**244.20**	**259.46**	**273.33**	**290.24**	**304.18**
Broward	**Broward County PWS Utilities**					
	Broward County Water & Wastewater Services (District 1)	7.76	8.03	8.25	8.52	8.73
	Broward County Water & Wastewater Services (District 2A)	13.43	13.76	14.08	14.40	14.73
	Cooper City Utility Department, City of	2.98	3.12	3.49	3.38	3.51
	Coral Springs, City of	7.29	7.45	7.63	7.81	7.98
	Coral Springs Improvement District	4.19	4.29	4.39	4.49	4.59
	Dania Beach, City of	2.52	2.58	2.64	2.70	2.76
	Davie, Town of	4.43	6.98	9.53	12.09	14.64
	Deerfield Beach, City of	10.90	11.16	11.43	11.69	11.95
	Fort Lauderdale, City of	44.55	45.60	46.66	47.72	48.77
	Hallandale Beach, City of	5.97	6.11	6.25	6.40	6.54
	Hillsboro Beach, Town of	0.73	0.74	0.76	0.78	0.79
	Hollywood, City of	22.82	23.55	24.27	24.98	25.71
	Lauderhill, City of	6.08	6.22	6.37	6.52	6.66

Table A-9. Continued.

County	PWS Utility or DSS	Finished (Net) Water Demand Projections – 1-in-10 Year Drought Conditions (MGD)				
		2010	2015	2020	2025	2030
Broward (cont.)	Margate, City of	6.29	6.44	6.59	6.75	6.89
	Miramar, City of	12.46	12.91	13.38	13.83	14.28
	North Lauderdale, City of	2.76	2.83	2.90	2.96	3.03
	North Springs Improvement District	4.77	4.88	5.00	5.11	5.22
	Parkland Utilities, Inc.	0.26	0.28	0.29	0.29	0.30
	Pembroke Pines, City of	13.06	13.37	13.69	13.99	14.31
	Plantation, City of	12.84	13.25	13.64	14.05	14.46
	Pompano Beach, City of	14.96	15.31	15.68	16.04	15.62
	Royal Utility Corporation	0.35	0.35	0.36	0.37	0.39
	Seminole Tribe of Florida Utility	1.11	1.14	1.16	1.19	1.21
	Sunrise, City of	27.00	27.65	28.30	28.95	29.59
	Tamarac, City of	6.48	6.64	6.79	6.95	7.10
	Tindall Hammock Irrigation and Soil Conservation District	0.46	0.47	0.48	0.50	0.51
	Broward County PWS Total	**236.45**	**245.21**	**245.01**	**262.58**	**270.27**
	Broward County DSS Total	**1.02**	**1.06**	**0.77**	**1.10**	**1.12**
	Broward County Total	**237.47**	**246.27**	**254.78**	**263.68**	**271.39**
Miami-Dade	**Miami-Dade County PWS Utilities**					
	Americana Village	0.24	0.25	0.26	0.27	0.28
	Florida City Water and Sewer Department	1.90	1.99	2.08	2.16	2.25
	Homestead, City of	11.21	11.72	12.23	12.75	13.26
	Miami-Dade Water & Sewer Department	328.28	343.29	358.29	373.29	388.29
	North Miami, City of	11.50	12.02	12.54	13.08	13.60
	North Miami Beach, City of	22.01	23.01	24.78	25.83	26.86
	Miami-Dade County PWS Total	**375.14**	**392.28**	**410.18**	**427.38**	**444.54**
	Miami-Dade County DSS Total	**3.61**	**3.77**	**3.93**	**4.10**	**4.26**
	Miami-Dade County Total	**378.75**	**396.05**	**414.11**	**431.48**	**448.80**
Monroe	**Monroe County PWS Utility**					
	Florida Keys Aqueduct Authority	16.96	18.27	19.59	20.98	22.37
	Monroe County PWS Total	**16.96**	**18.27**	**19.59**	**20.98**	**22.37**
	Monroe County DSS Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Monroe County Total	**16.96**	**18.27**	**19.59**	**20.98**	**22.37**
Hendry	**Hendry County PWS Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hendry County DSS Total	**0.19**	**0.20**	**0.20**	**0.21**	**0.22**
	Hendry County Total	**0.19**	**0.20**	**0.20**	**0.21**	**0.22**
LEC Planning Area PWS Total		**858.48**	**900.97**	**942.30**	**986.96**	**1027.16**
LEC Planning Area DSS Total		**19.09**	**19.28**	**19.71**	**19.63**	**19.80**
LEC Planning Area Total		**877.57**	**920.25**	**962.01**	**1,006.59**	**1,046.96**

Table A-10. Gross water demand projections for PWS and DSS under average rainfall conditions in the LEC Planning Area.

County	PWS Utility or DSS	Gross (Raw) Water Demand Projections – Average Rainfall Conditions (MGD)				
		2010	2015	2020	2025	2030
Palm Beach	**Palm Beach County PWS Utilities**					
	A.G. Holley State Hospital	0.08	0.00	0.00	0.00	0.00
	Boca Raton, City of	42.19	44.81	47.43	50.05	52.67
	Boynton Beach, City of	14.23	15.11	16.00	16.88	17.76
	Delray Beach Water and Sewer Department, City of	15.27	16.22	17.16	18.11	19.05
	Glades Utility Authority	6.61	7.03	7.43	7.85	8.26
	Golf, Village of	0.51	0.54	0.57	0.60	0.64
	Highland Beach, Town of	1.85	1.96	2.08	2.19	2.32
	Jupiter, Town of	16.61	18.40	20.21	22.02	23.81
	Lake Worth Utilities, City of	4.74	5.05	5.34	5.64	5.93
	Lantana, Town of	1.84	1.96	2.07	2.18	2.30
	Manalapan, Town of	1.34	1.42	1.51	1.58	1.67
	Mangonia Park, Town of	0.33	0.35	0.37	0.40	0.42
	Maralago Cay	0.19	0.20	0.22	0.23	0.24
	Palm Beach County Water Utilities Department	59.91	63.63	67.29	71.07	74.79
	Palm Springs, Village of	4.00	4.25	4.50	4.74	4.99
	Riviera Beach, City of	6.66	7.08	7.49	7.91	8.31
	Seacoast Utility Authority	18.09	19.22	19.13	21.47	21.25
	Tequesta, Village of	3.34	3.60	3.85	4.10	4.36
	Wellington Public Utilities Department	6.74	7.15	7.57	7.99	8.40
	West Palm Beach Public Utilities, City of	28.98	31.12	32.58	35.47	37.66
	Palm Beach County PWS Total	233.51	249.10	262.80	280.48	294.83
	Palm Beach County DSS Total	**13.41**	**13.39**	**13.91**	**13.35**	**13.33**
	Palm Beach County Total	246.92	262.49	276.71	293.83	308.16
Broward	**Broward County PWS Utilities**					
	Broward County Water & Wastewater Services (District 1)	7.63	7.89	8.11	8.38	8.58
	Broward County Water & Wastewater Services (District 2A)	12.69	13.00	13.30	13.60	13.92
	Cooper City Utility Department, City of	3.45	3.61	4.04	3.91	4.07
	Coral Springs, City of	6.96	7.12	7.29	7.46	7.63
	Coral Springs Improvement District	3.96	4.06	4.15	4.24	4.34
	Dania Beach, City of	2.42	2.48	2.54	2.59	2.66
	Davie, Town of	4.10	6.46	8.83	11.19	13.56
	Deerfield Beach, City of	10.10	10.34	10.59	10.83	11.07
	Fort Lauderdale, City of	44.95	46.02	47.08	48.15	49.22
	Hallandale Beach, City of	5.55	5.68	5.81	5.95	6.08
	Hillsboro Beach, Town of	0.69	0.70	0.72	0.74	0.75
	Hollywood, City of	23.99	24.76	25.51	26.26	27.02
	Lauderhill, City of	5.76	5.89	6.04	6.17	6.31

Table A-10. Continued.

County	PWS Utility or DSS	Gross (Raw) Water Demand Projections – Average Rainfall Conditions (MGD)				
		2010	2015	2020	2025	2030
Broward (cont.)	Margate, City of	5.94	6.08	6.23	6.38	6.51
	Miramar, City of	12.46	12.91	13.38	13.83	14.28
	North Lauderdale, City of	2.60	2.66	2.73	2.79	2.85
	North Springs Improvement District	4.50	4.61	4.72	4.83	4.93
	Parkland Utilities, Inc.	0.25	0.26	0.27	0.27	0.28
	Pembroke Pines, City of	12.14	12.42	12.72	13.01	13.30
	Plantation, City of	14.14	14.59	15.03	15.48	15.93
	Pompano Beach, City of	14.55	14.89	15.25	15.60	15.19
	Royal Utility Corporation	0.33	0.33	0.34	0.35	0.36
	Seminole Tribe of Florida Utility	1.13	1.15	1.18	1.21	1.24
	Sunrise, City of	28.39	29.07	29.75	30.44	31.12
	Tamarac, City of	6.21	6.36	6.50	6.65	6.80
	Tindall Hammock Irrigation and Soil Conservation District	0.44	0.45	0.46	0.47	0.48
	Broward County PWS Total	**235.33**	**243.79**	**252.57**	**260.78**	**268.48**
	Broward County DSS Total	**0.97**	**1.00**	**0.73**	**1.04**	**1.06**
	Broward County Total	**236.32**	**244.79**	**253.32**	**261.82**	**269.54**
Miami-Dade	**Miami-Dade County PWS Utilities**					
	Americana Village	0.23	0.24	0.25	0.26	0.27
	Florida City Water and Sewer Department	1.78	1.86	1.94	2.02	2.10
	Homestead, City of	10.72	11.21	11.70	12.20	12.69
	Miami-Dade Water & Sewer Department	308.67	322.77	336.87	350.98	365.08
	North Miami, City of	11.00	11.50	12.00	12.51	13.01
	North Miami Beach, City of	22.60	23.63	25.45	26.52	27.58
	Miami-Dade County PWS Total	**355.00**	**371.21**	**388.21**	**404.49**	**420.73**
	Miami-Dade County DSS Total	**3.46**	**3.61**	**3.77**	**3.93**	**4.08**
	Miami-Dade County Total	**358.46**	**374.82**	**391.98**	**408.42**	**424.81**
Monroe	**Monroe County PWS Utility**					
	Florida Keys Aqueduct Authority	17.68	19.04	20.42	21.87	23.32
	Monroe County PWS Total	**17.68**	**19.04**	**20.42**	**21.87**	**23.32**
	Monroe County DSS Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Monroe County Total	**17.68**	**19.04**	**20.42**	**21.87**	**23.32**
Hendry	**Hendry County PWS Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hendry County DSS Total	**0.19**	**0.20**	**0.20**	**0.21**	**0.22**
	Hendry County Total	**0.19**	**0.20**	**0.20**	**0.21**	**0.22**
LEC Planning Area PWS Total		841.52	883.14	924.00	967.62	1,007.36
LEC Planning Area DSS Total		**18.03**	**18.20**	**18.61**	**18.53**	**18.69**
LEC Planning Area Total		859.55	901.34	942.61	986.15	1,026.05

Table A-11. Gross water demand projections for PWS and DSS under 1-in-10 year drought conditions in the LEC Planning Area.

County	PWS Utility or DSS	Gross (Raw) Water Demand Projections – 1-in-10 Year Drought Conditions (MGD)				
		2010	2015	2020	2025	2030
Palm Beach	**Palm Beach County PWS Utilities**					
	A.G. Holley State Hospital	0.09	0.00	0.00	0.00	0.00
	Boca Raton, City of	46.79	49.69	52.60	55.51	58.41
	Boynton Beach, City of	15.78	16.76	17.74	18.72	19.70
	Delray Beach Water and Sewer Department, City of	16.93	17.99	19.03	20.08	21.13
	Glades Utility Authority	7.33	7.80	8.24	8.71	9.16
	Golf, Village of	0.57	0.60	0.63	0.67	0.71
	Highland Beach, Town of	2.05	2.17	2.31	2.43	2.57
	Jupiter, Town of	18.42	20.41	22.41	24.42	26.41
	Lake Worth Utilities, City of	5.26	5.60	5.92	6.25	6.58
	Lantana, Town of	2.04	2.17	2.30	2.42	2.55
	Manalapan, Town of	1.49	1.57	1.67	1.75	1.85
	Mangonia Park, Town of	0.37	0.39	0.41	0.44	0.47
	Maralago Cay	0.21	0.22	0.24	0.26	0.27
	Palm Beach County Water Utilities Department	66.44	70.57	74.62	78.82	82.94
	Palm Springs, Village of	4.44	4.71	4.99	5.26	5.53
	Riviera Beach, City of	7.39	7.85	8.31	8.77	9.22
	Seacoast Utility Authority	20.06	21.31	21.22	23.81	23.57
	Tequesta, Village of	3.70	3.99	4.27	4.55	4.84
	Wellington Public Utilities Department	7.47	7.93	8.40	8.86	9.32
	West Palm Beach Public Utilities, City of	32.34	34.51	36.13	39.34	41.76
	Palm Beach County PWS Total	258.97	276.24	291.44	311.07	326.99
	Palm Beach County DSS Total	**14.87**	**14.85**	**15.43**	**14.81**	**14.78**
	Palm Beach County Total	273.84	291.09	306.87	325.88	341.77
Broward	**Broward County PWS Utilities**					
	Broward County Water & Wastewater Services (District 1)	8.42	8.69	8.93	9.23	9.45
	Broward County Water & Wastewater Services (District 2A)	13.97	14.31	14.64	14.97	15.33
	Cooper City Utility Department, City of	3.80	3.97	4.45	4.30	4.48
	Coral Springs, City of	7.66	7.84	8.03	8.21	8.40
	Coral Springs Improvement District	4.36	4.47	4.57	4.67	4.78
	Dania Beach, City of	2.66	2.73	2.80	2.85	2.93
	Davie, Town of	4.51	7.11	9.72	12.32	14.93
	Deerfield Beach, City of	11.12	11.38	11.66	11.92	12.19
	Fort Lauderdale, City of	49.49	50.67	51.84	53.01	54.19
	Hallandale Beach, City of	6.11	6.25	6.40	6.55	6.69
	Hillsboro Beach, Town of	0.76	0.77	0.79	0.81	0.83
	Hollywood, City of	26.41	27.26	28.09	28.91	29.75
	Lauderhill, City of	6.34	6.48	6.65	6.79	6.95

Table A-11. Continued.

County	PWS Utility or DSS	Gross (Raw) Water Demand Projections – 1-in-10 Year Drought Conditions (MGD)				
		2010	2015	2020	2025	2030
Broward (cont.)	Margate, City of	6.54	6.69	6.86	7.02	7.17
	Miramar, City of	13.72	14.21	14.73	15.23	15.72
	North Lauderdale, City of	2.86	2.93	3.01	3.07	3.14
	North Springs Improvement District	4.95	5.08	5.20	5.32	5.43
	Parkland Utilities, Inc.	0.28	0.29	0.30	0.30	0.31
	Pembroke Pines, City of	13.37	13.67	14.00	14.32	14.64
	Plantation, City of	15.57	16.06	16.55	17.04	17.54
	Pompano Beach, City of	16.02	16.39	16.79	17.18	16.72
	Royal Utility Corporation	0.36	0.36	0.37	0.39	0.40
	Seminole Tribe of Florida Utility	1.24	1.27	1.30	1.33	1.37
	Sunrise, City of	31.26	32.01	32.75	33.51	34.26
	Tamarac, City of	6.84	7.00	7.16	7.32	7.49
	Tindall Hammock Irrigation and Soil Conservation District	0.48	0.50	0.51	0.52	0.53
	Broward County PWS Total	**259.08**	**268.39**	**278.12**	**287.09**	**295.62**
	Broward County DSS Total	**1.07**	**1.10**	**0.80**	**1.15**	**1.17**
	Broward County Total	**260.15**	**269.49**	**278.92**	**288.24**	**296.79**
Miami-Dade	**Miami-Dade County PWS Utilities**					
	Americana Village	0.25	0.26	0.27	0.28	0.29
	Florida City Water and Sewer Department	1.93	2.02	2.11	2.20	2.28
	Homestead, City of	11.65	12.19	12.72	13.26	13.79
	Miami-Dade Water & Sewer Department	335.52	350.85	366.18	381.52	396.84
	North Miami, City of	11.96	12.50	13.04	13.60	14.14
	North Miami Beach, City of	24.57	25.69	27.66	28.83	29.98
	Miami-Dade County PWS Total	**385.88**	**403.51**	**421.98**	**439.69**	**457.32**
	Miami-Dade County DSS Total	**3.76**	**3.92**	**4.10**	**4.27**	**4.43**
	Miami-Dade County Total	**389.64**	**407.43**	**426.08**	**443.96**	**461.75**
Monroe	**Monroe County PWS Utility**					
	Florida Keys Aqueduct Authority	18.23	19.63	21.05	22.55	24.04
	Monroe County PWS Total	**18.23**	**19.63**	**21.05**	**22.55**	**24.04**
	Monroe County DSS Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Monroe County Total	**18.23**	**19.63**	**21.05**	**22.55**	**24.04**
Hendry	**Hendry County PWS Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hendry County DSS Total	**0.20**	**0.21**	**0.21**	**0.22**	**0.23**
	Hendry County Total	**0.20**	**0.21**	**0.21**	**0.22**	**0.23**
LEC Planning Area PWS Total		922.16	967.77	1,012.57	1,060.40	1,103.97
LEC Planning Area DSS Total		**19.90**	**20.08**	**20.54**	**20.45**	**20.61**
LEC Planning Area Total		942.06	987.85	1,033.11	1,080.85	1,124.58

AGRICULTURAL SELF-SUPPLY

Agriculture holds a unique place of importance in the LEC Planning Area's, the state of Florida's, and the United States' economy. The LEC Planning Area hosts the regions collectively known as the nation's "Winter Bread Basket" and "Salad Bowl." In addition, the region's nursery/ornamental industry is the largest in the state and second largest in the country. The southern Miami-Dade County portion of the LEC Planning Area has an ideal subtropical climate that is necessary for the production of numerous varieties of tropical fruits, some of which do not grow elsewhere in the country. These fruits include mangos, avocados, carambola, lychees, longan, mamey sapote, passion fruit, and other varietal farms that meet this specialized demand (DCFB 2012).

Background

The following facts from the *2007 Census of Agriculture for Florida* (USDA-NASS 2007) demonstrate the importance of agriculture to the LEC Planning Area:

- Palm Beach County ranked first in the United States in total sugarcane acres under cultivation and accounted for 77 percent of the total sugarcane acreage in Florida.
- Palm Beach County ranked first in Florida in the value of vegetables, melons, potatoes, and sweet potatoes produced ($409 million).
- Palm Beach County ranked first in Florida in combined vegetable acreage harvested for sale (79,792 acres).
- Miami-Dade County led the state and ranked second in the United States in the production of nursery and greenhouse/nursery products, producing $494 million in sales.
- Hendry County ranked first in terms of acres devoted to orange production and the value of fruits, tree nuts, and berries produced ($407.7 million).
- Hendry County ranked second in sugarcane acres under cultivation in Florida (note that only the eastern part of Hendry County falls within the LEC Planning Area).

Projection Methodology

The land use information used to develop the demand estimates includes irrigated agricultural acreage by crop type and by county or portions of a county. The projections assume option lands originally purchased and contemplated for Everglades restoration projects will, where applicable, continue to be used for agricultural purposes in the absence of detailed project restoration plans and schedules.

Agricultural water use includes water for irrigated, commercially grown crop categories including 1) citrus, 2) field crops – sugarcane, 3) field crops – other, 4) vegetables, melons,

and berries, 5) sod production, 6) greenhouse/nursery, 7) other fruits and nuts, and 8) improved pasture. **Figure A-1** shows these categories with some examples of the major crop types. Due to the complexity of developing agricultural projections and uncertainty as to the future demands on current citrus lands, two scenario ranges of acreage and water demand were used to estimate the agricultural projections for this update. However, under conservative water management planning principles, the acres and demands associated with the high range of the scenario are reported in this update.

Agricultural projections were based on best available data at the time this update was developed and the estimates of existing and projected irrigated acres. AGR Self-Supply projections were developed in coordination with staff from government agencies and agricultural stakeholders.

The AGR Self-Supply demand assessment uses acreage estimates developed as part of the overall GIS land use analysis. To estimate the demand associated with the acreage for each crop, information from SFWMD's water supply assessments and previous hydrologic modeling efforts were used to identify soil types, growing seasons, and irrigation system types and efficiencies. For areas partially within the LEC Planning Area, land use maps and acreage tallies in specific regions were used to apportion total county crop acreages to areas within the Everglades Agricultural Area (EAA) and Western Basins. Where appropriate, this was accomplished by assuming changes in acreage proportional to the most recently reported acreage ratios. Acreage ratios were developed with the use of SFWMD's land use maps.

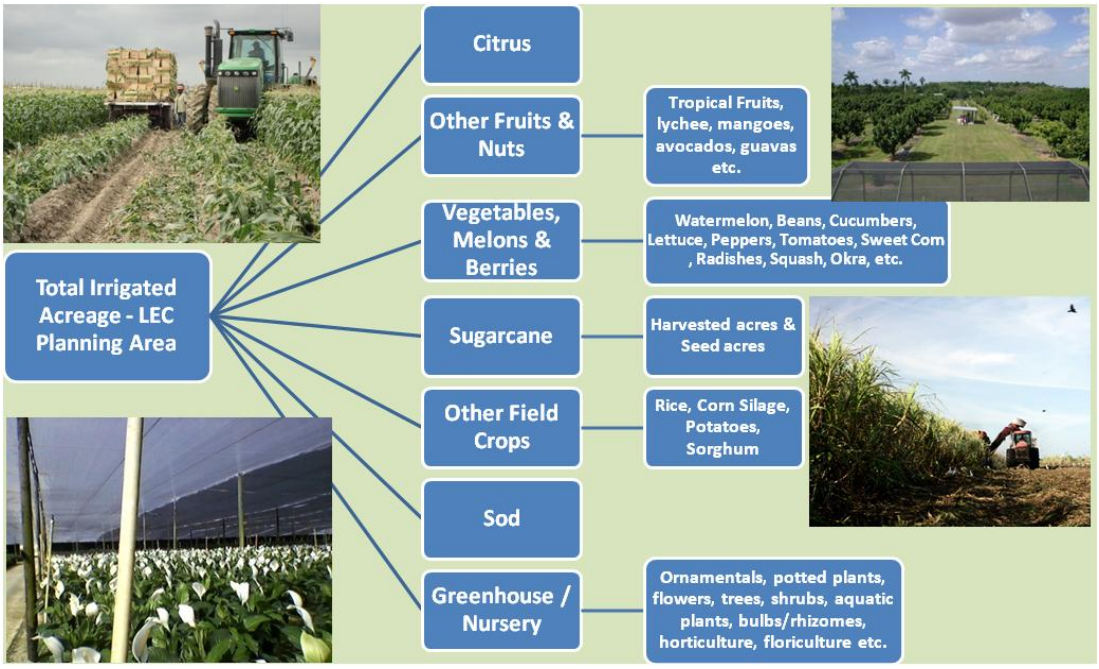

Figure A-1. Commercially grown crops in the LEC Planning Area.

The projection method involved systematically examining trends in land use and crop type distributions since the 2005–2006 LEC Plan Update was developed. The projections are first based on compiling historic agricultural census acres at five-year intervals (by county and crop type) and comparing these figures to longer-term irrigated acreage patterns compiled by USGS. For large crops such as sugarcane, the United States Department of Agriculture (USDA) also conducts annual surveys of irrigated acres by county. These surveys were combined with census data to create long-term time series and showed important trends revealing how irrigated acres have been affected over time by major noneconomic events such as hurricanes, droughts, and restoration and water management projects. Current acreage from regulatory permitting databases and property tax parcel databases are then compared to fill in recent years and reveal trends since the 2007 agricultural census (USDA–NASS 2007). Numerous factors and variables were considered that could potentially affect the future acreage projections. Among these factors were the following:

- County land use plans and future land use targets including comprehensive master development plans, official maps, stakeholder plans, and special area plans
- Regional specialization (i.e., subtropical climate and long-established fruit orchards)
- Macro- and microeconomic conditions
- Supply, demand, and commodity price trends
- Consumption trends (tastes and preferences), pounds consumed per person over time, and production patterns (yields per acre and imports)
- Crop special studies and future scenario outlooks from the University of Florida's Institute of Food and Agricultural Sciences including their Citrus Research and Education Center, USDA, Florida Department of Agriculture and Consumer Services, etc.
- Inputs on market conditions and trends from growers, cooperatives and participants
- SFWMD land management and permitting including acquisitions and projects completed since the last plan update, areas targeted for land acquisition, current leasing arrangements, permitted acreage, and permit expirations
- Comparisons of comprehensive development plan acreage to projected acres

The agricultural demand assessment developed acreage estimates from the following data sets, information, and sources:

- USGS time series of irrigated acres by county by crop type
- USDA five-year census and annual surveys for select crops
- County-level data and yearly commercial citrus inventories completed since the *2007 Census of Agriculture for Florida* (USDA-NASS 2007) were used or considered when available

- 2005–2006 LEC Plan Update (SFWMD 2007)
- SFWMD's Water Use Regulatory Database and permit expiration dates
- County land use appraiser/assessment files
- USDA Economic Research Service information, including market outlooks for select crops, agricultural projections to 2020, select yearbooks with historic information (i.e., vegetables and melons yearbook to assess consumption trends), and inputs and feedback from agricultural economists
- Local agricultural extension offices
- University of Florida's Institute of Food and Agricultural Sciences
- Florida Department of Agriculture and Consumer Services' *Florida Agriculture by the Numbers* annual publications
- County agricultural economic development coordinators
- Florida Farm Bureau and other agricultural stakeholders
- Other special reports produced by research groups (i.e., Florida Citrus Commission and Florida Department of Citrus) and topical reports on agricultural land use and market trends.
- Commodity price reports and trends (i.e., World Bank pink sheets)
- SFWMD's acreage estimates developed as part of GIS agricultural land use/crop type analysis (1999 and 2004)

A hierarchy of data preference was used for developing agricultural water use projections, starting with the *2007 Census of Agriculture for Florida* county-level data (USDA-NASS 2007). Census data at five-year intervals going back to 1997 reveal important trends by crop type for each county. Where available for select crops, census data were supplemented by annual surveys also prepared by USDA by county. In addition, longer-term irrigated acreage data compiled by USGS, going back to 1985, was also referenced. Where census data was not consistently available for each crop in each county for every year, the 2007 census data was supplemented by other above named sources to fill in and provide informative links to post-census years and more recent trends. Comparisons to SFWMD's permitted acreage and permit dates of expiration were also useful to compare acreage distributions for more recent years leading up to 2010. Recent permit renewals by crop type were also useful to signal market preferences and growers' future expectations. Land use acreage data obtained from county appraiser and assessment files was also referenced for post-census years. The data and reports were also supplemented by field research where possible. For example, the LEC Planning Area agricultural projections subteam toured the Redlands area of southern Miami-Dade County and noted operations that did not survive the 2008–2009 recession, but would have been included in the 2007 census. When data from the listed sources were insufficient for indicating trends and no empirical knowledge of likely future changes in a crop's acreage was available, the acreage for that crop category was projected to remain at its most recently reported level.

AGR Self-Supply demand calculations for this update applied results from the Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) model, which uses climatic data from 1965–2000. These same model data were also used in the 2005–2006 LEC Plan Update. The AFSIRS model calculates the net irrigation requirements for each crop category and irrigation system. As described in the **Recreational/Landscape Self-Supply** section of this appendix, the net irrigation requirement reflects an estimate of the amount of water, expressed in inches per year, that should be delivered to a plant's root zone to sustain yield. The gross irrigation requirement is the amount of water that must be withdrawn from the source in order to be delivered to the plant's root zone. It includes both the net irrigation requirement and the losses incurred irrigating the plant's root zone. Irrigation application efficiency, as a modeled factor, refers to the average percent of total water applied that is delivered to the plant's root zone.

This relationship is expressed as follows:

Gross Irrigation Requirement = Net Irrigation Requirement/Irrigation Efficiency

AFSIRS calculates irrigation requirements for an average rainfall year and a year with 1-in-10 year drought conditions. Historical weather data from rainfall stations that most accurately represent the average rainfall and 1-in-10 year drought conditions for each crop and county combination are used to calculate the irrigation requirements.

Projections of gross irrigation demand are based on an assumed or estimated irrigation system types obtained from SFWMD's Regulatory Permitting Database. The effect of the corresponding irrigation efficiency is based on the interpretation of current ratios and trends. There are three basic types of irrigation systems used in South Florida crop production: 1) seepage (generally described as gravity flow systems), 2) sprinklers, and 3) low volume micro irrigation systems. A weighted irrigation efficiency factor was calculated for each crop type category based on the percent use by acres for the three different irrigation systems, as reported in SFWMD's Water Use Permit Regulatory Database (**Table A-12**). The weighted irrigation efficiency factors reflect current land/crop management practices and new systems put in place for acres under management within the permitting database. The values shown in **Table A-12** are default average values from the AFSIRS system. For example, recycling water within the EAA results in higher irrigation efficiencies: with water reuse, the irrigation efficiency within the EAA is effectively 75 percent (for the applicable acres compared to the default value shown below) based on regulatory information and renewals. The final "weighted average" irrigation efficiency factor (weighted by acres that recover/recycle water) reflect the combined acres and irrigation efficiencies identified for all acres within the regions based on data within the regulatory permitting database.

Table A-12. Estimated irrigation efficiency for each type of irrigation system. [a]

Irrigation Category	Irrigation Efficiency
Low volume micro irrigation	0.85
Seepage (gravity flow)	0.50
Sprinkler	0.75

a. Reflects AFSIRS default values before weighting by crop acres per irrigation type.

Water use in the LEC Planning Area could also decline with expected gains in irrigation efficiency. Researchers noticed trends in application efficiencies over time generally creeping upward reflecting new technologies, practices, and equipment. It is anticipated that some efficiency gains will be made for select crops within the region as older equipment is retired and replaced since the projection covers a twenty-year planning horizon. Researchers working within the LEC Planning Area continue to experiment with practices, equipment, and techniques to improve irrigation efficiency (Migliaccio 2011, Schaible and Aillery 2012).

Available water capacity and depth of soil directly affect the effectiveness of rainfall infiltration, which is considered by the AFSIRS model. The default AFSIRS soil database includes a generic sandy soil. However, the user can modify input files to include the soil type existing within the region or area where the crop is grown. While the soils can vary considerably across a particular region, the main or predominant soil group type is chosen to reflect the type within that particular region.

Example of Water Demand Calculations

A detailed example of water demand calculation procedures is presented in this section. First, the acreage of each crop in each county within the LEC Planning Area was determined. Next, the area-weighted irrigation efficiency (**Table A-12**) for the crop type in a particular county was calculated from irrigation system information contained in SFWMD's Water Use Regulatory Database.

Water use permit data categorized as citrus for a given county show that 23 percent of permittees use low volume irrigation systems, 67 percent use sprinkler systems, and 9 percent use seepage systems. Using the permit data, the area-weighted irrigation efficiency is as follows:

IRR_EFF = (0.23 x 0.85) + (0.67 x 0.75) + (0.09 x 0.50) / (0.23 + 0.67 + 0.09) = 75 percent

Of the water withdrawn (gross demand) for citrus irrigation in the given county, 75 percent is available to the crop. Losses occur due to evaporation, drainage, and line system leakage.

Assuming 90 percent use low volume irrigation systems and 10 percent use seepage (gravity flow) systems, the area-weighted irrigation efficiency based on this data is as follows:

IRR_EFF = (0.9 x 0.85) + (0.1 x 0.5) = 81.5 percent

Based on this data, 81.5 percent of the water withdrawn (gross demand) from a surface water or groundwater source is available to the crop.

The AFSIRS runs were completed for both the 2005–2006 LEC Plan Update and this plan update. The AFSIRS output is given as the net irrigation requirement in inches per year, which is the amount of water the crop needs in addition to rainfall. The input to the model is daily rainfall and ET rates in inches. The model results for the 2005–2006 LEC Plan Update

used climatic input data for 1965 through 2000. Based on the rainfall and ET data and calculated irrigation requirements, the AFSIRS outputs include irrigation requirements for an average rainfall and 1-in-10 year drought conditions.

Continuing with the county citrus crop example, the average rainfall and 1-in-10 year drought conditions net irrigation requirements calculated by the AFSIRS model are 10.82 inches per year and 16.01 inches per year, respectively. The AFSIRS average irrigation requirement and 40,000 acres are used to estimate the gross irrigation demand for an average rainfall year for citrus in the county as follows:

Gross Irrigation Requirement (MGD) = Net Irrigation Requirement (MGD)/ Irrigation Efficiency

$$\textbf{Gross Irrigation Requirement (MGD)} = \frac{10.82\ in/yr \times 40{,}000\ acres \times [1\ yr/365\ days] \times [1ft/12\ in] \times [43{,}560 ft^2/acre] \times [7.4805\ gal/ft^3]}{0.815} \times 10^{-6} \approx 40 \text{ MGD}$$ [2]

Projection Results by Crop Type

Citrus

In the LEC Planning Area, most of the citrus acreage is located in Palm Beach County's Coastal Subbasin and the Western Basins located in Hendry County. Citrus acreage data were gathered from the *2007 Census of Agriculture for Florida* (USDA-NASS 2007). These data focus on citrus production and not on young groves not yet in production, inactive groves, or abandoned groves. The projections take into account the forthcoming C-139 Annex Restoration project. Accordingly, the acreage projections reduce 10,774 acres of cultivated citrus within the Western Basins by 2018 to accommodate this project. Because of the uncertainty of citrus recovery from greening and canker, two acreage projection scenarios (high and low growth rates) were developed (**Figure A-2**).

The scenarios were based on research communicated at a citrus industry research symposium[3]. The high acreage scenario growth rates applied in the projections assume that over the short term, the trend in productive acreage losses will continue. However, restoration of active bearing and nonbearing productive acreage is assumed to occur between 2015 and 2020 and rise throughout the projection period. Acreage in Palm Beach County's Coastal Subbasin is expected to rise by 240 acres over the twenty-year planning horizon. The Agricultural Reserve Area has been identified as a region that could accommodate more production in line with stakeholder preferences. With the exception of the C-139 Annex Restoration project, no significant increase or decrease in acreage is projected for the other subbasins.

[2] Key for equation: in – inch; yr – year; ft – foot; gal – gallon

[3] Future of the Global Orange Juice Industry – Citrus Research and Education Center, Lake Afred, Florida, April 8, 2010.

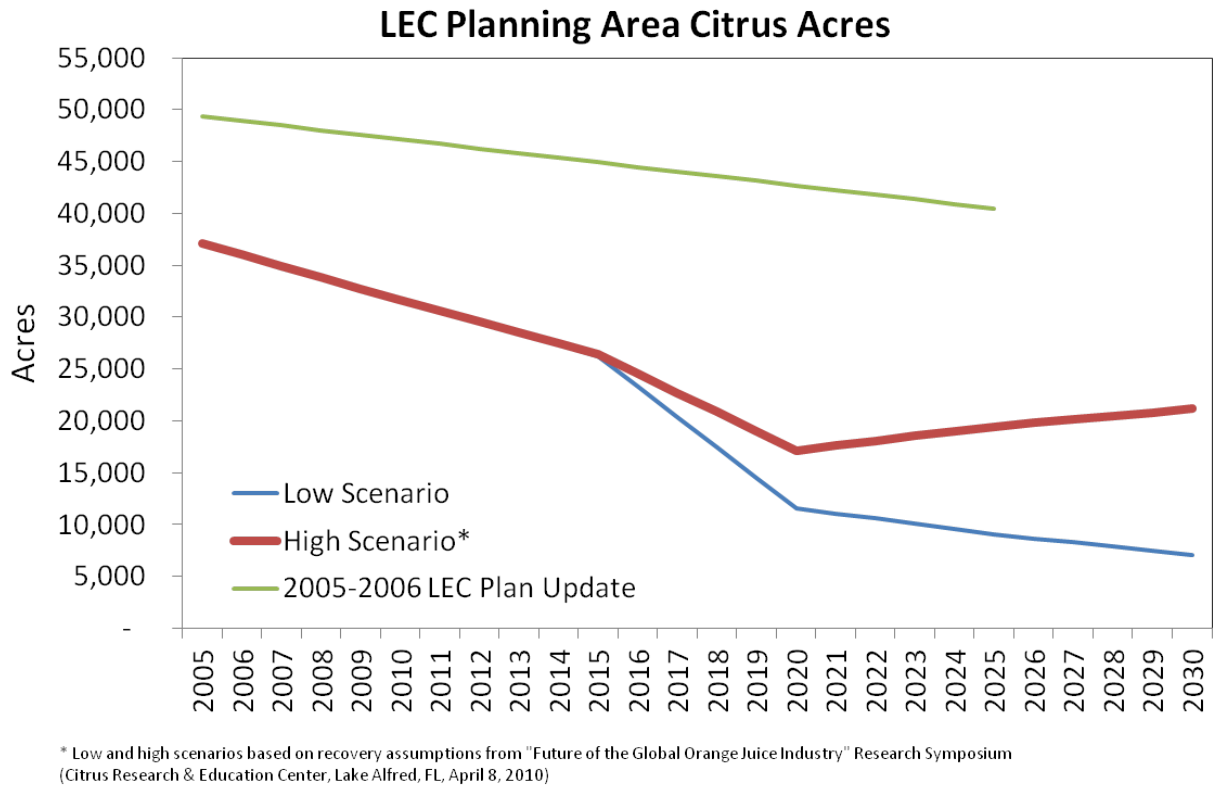

Figure A-2. Citrus acreage within the LEC Planning Area using low and high projection scenarios as well as citrus acreage projected in the 2005–2006 LEC Plan Update.

Table A-13 presents the acreage projections for the high growth scenario, the projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and the projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Table A-13. Gross irrigation requirements for citrus crop acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – Coastal						
	Irrigated Acreage	2,463 acres	2,055 acres	2,191 acres	2,484 acres	2,704 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	9.9 inches [a]	3.0	2.1	1.9	1.8	2.0
1-in-10 year drought	15.4 inches [a]	4.5	3.3	3.0	3.0	3.3
Palm Beach County – EAA						
	Irrigated Acreage	11 acres	11 acres	11 acres	11 acres	11 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	8.9 inches	0.01	0.01	0.01	0.01	0.01
1-in-10 year drought	16.3 inches	0.03	0.03	0.03	0.03	0.03
Miami-Dade County						
	Irrigated Acreage	717 acres	599 acres	639 acres	724 acres	788 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	11.7 inches	0.8	0.6	0.7	0.7	0.8
1-in-10 year drought	17.9 inches	1.2	1.0	1.0	1.1	1.2
Hendry County – Western Basins						
	Irrigated Acreage	28,437 acres	23,745 acres	14,321 acres	16,226 acres	17,654 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	15.5 inches	43.7	35.1	20.1	22.0	24.0
1-in-10 year drought	20.8 inches	64.6	53.9	32.5	36.9	40.1
LEC Planning Area Totals						
	Total Irrigated Acreage	31,628 acres	26,410 acres	17,162 acres	19,445 acres	21,157 acres
		Gross Demand (MGD)				
Total average rainfall year		**47.5**	**37.9**	**22.7**	**24.5**	**26.8**
Total 1-in-10 year drought		**70.3**	**58.2**	**36.6**	**41.1**	**44.6**

a. Efficiency improvements to the irrigation systems are the reason for the decrease in citrus projected gross demand while the acres in citrus production increased.

Field Crops – Sugarcane

Sugarcane is the principal field crop grown within the LEC Planning Area. Because of its dominance in terms of acreage, sugarcane is discussed separately from "other field crops." For background perspective, **Figure A-3** shows the percentage distribution of agricultural acres by crop type category within the LEC Planning Area.

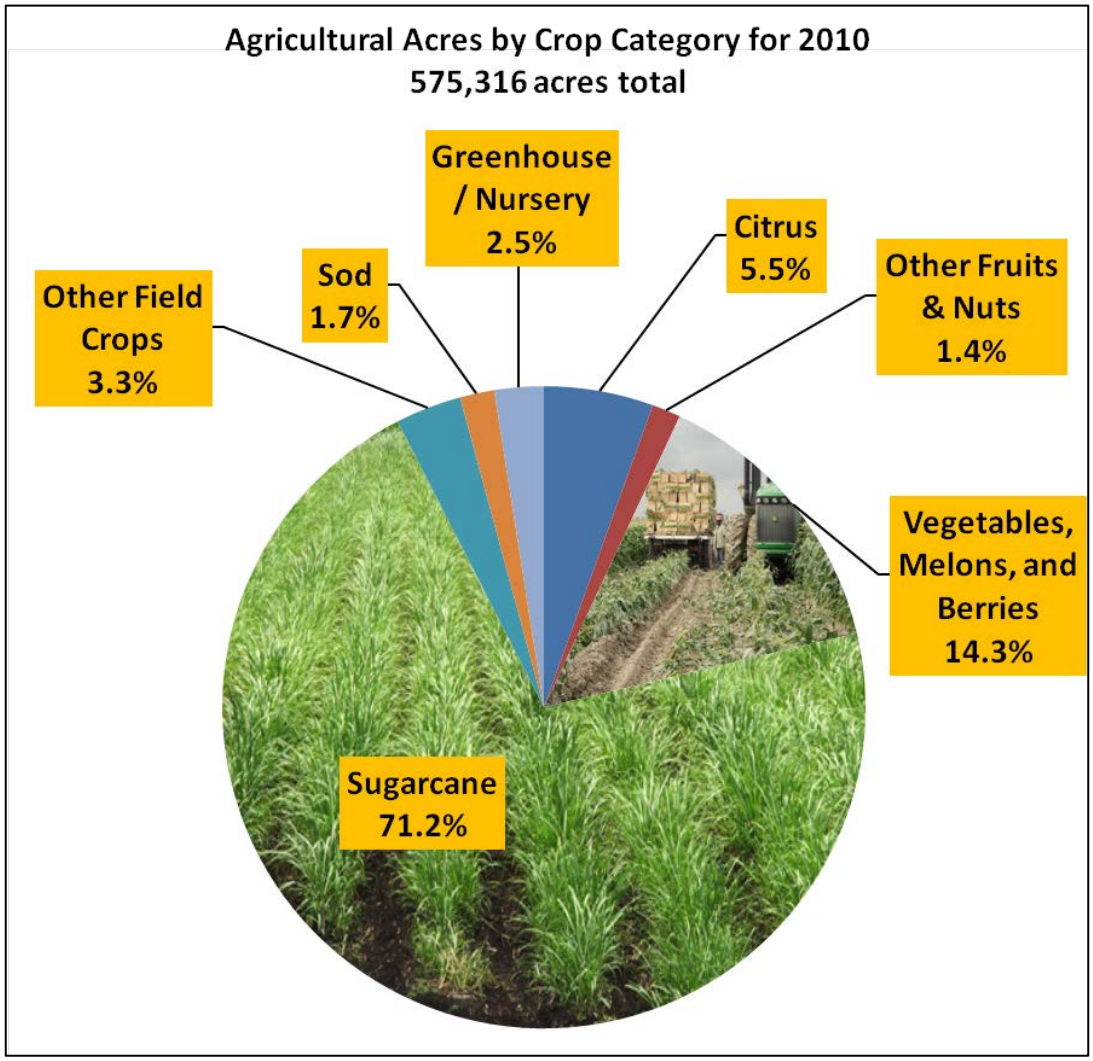

Figure A-3. Percentage distribution of agricultural acres by crop type within the LEC Planning Area.

In the 2005–2006 LEC Plan Update, historical sugarcane acreage data were gathered from annual volumes of the Florida Agricultural Statistics Service's *Field Crops Summary*. For this update, a historical time series of irrigated sugarcane acreage by county was obtained from USGS from 1985 to 2005. This time series was then compared to a time series of USDA – National Agriculture Statistic Service's sugarcane harvested acres from 1985 to 2009. These two data sources were then cross-referenced to 2011 acres obtained from SFWMD's Water Use Regulatory Database and acreage coverage from current county land use maps. The projections assume that SFWMD option lands will continue to be leased for cultivation over the twenty-year planning horizon in the absence of more defined project implementation

plans and schedules. Historically, productive agricultural acreage within the LEC Planning Area fluctuated based on commodity demands, growth, urban development, environmental and water management requirements for land, and variations in weather events (climate). The EAA accounts for the majority of the agricultural acreage within the LEC Planning Area. The EAA has been characterized by relatively more stable fluctuations in acres, within a narrower range compared to peripheral acres in the LEC Planning Area that, in past years, have been absorbed by urban development. For example, in Palm Beach County, sugarcane is the dominant crop within the EAA—USDA's agricultural census recorded irrigated acres fluctuating between 300,000 and 375,000 from 1985 to 2009 (**Figure A-4**). The 75,000-acre band defining the range boundaries equates to be a fluctuation of 3,125 acres per year on average over this twenty-four-year period.

The band also reflects implementation of an adaptive and more strategic cultivation practice to maintain and maximize crop yields over time. In the past, the practice was to keep all acres in cultivation. However, yields declined. As a result, many farmers took some fields out of production and kept them fallow over one to two growing seasons to increase yields. This evolved into the current practice of crop rotation in addition to fallowing, where varying crops are rotated from year to year and include sugarcane, rice, corn, and other vegetables over 10 to 15 percent of the land. This practice also minimizes soil subsidence and cost-effectively uses nutrients retained in the soil.

The current plan update expects that irrigated acres in the EAA will remain stable. Accordingly, the acre projections within the EAA are based on the currently permitted acres for 2030, approximately 458,210 acres.

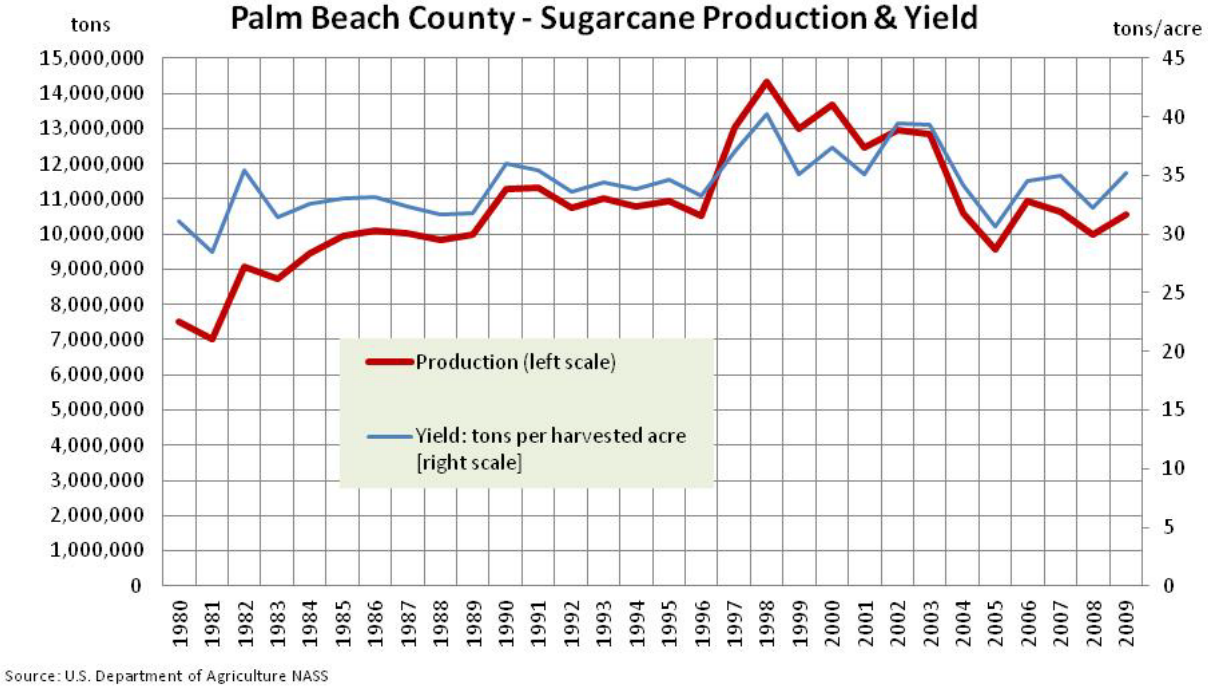

Figure A-4. Sugarcane production and yield history for Palm Beach County.

Sugarcane is initially propagated by planting stalk cuttings and four harvests can be obtained from a planting. The first harvest takes place approximately 13 months after planting and then three ratoons (shoots from the root of the plant after it has been cropped) provide the harvest during the next three years. Sugar production per unit of land surface declines gradually with each harvest. In approximately four years, the increased yields associated with replanting outweigh the lower costs of obtaining the crop from ratoons. Because land may lie fallow for several months between crop rotation cycles, approximately 20 percent of the land associated with sugarcane production will not be harvested in any given year. Additionally, about 1 in 10 acres of sugarcane is grown for seed production. USDA's surveys report acres allotted to "seed" production, which means acreage devoted to the replanting of stalk cuttings for plant propagation.

The largest percentage of sugarcane acreage in South Florida is grown in the muck soils of the EAA within Palm Beach and Hendry counties. In addition, significant acreage occurs on the "sand lands" in Hendry and Glades counties, primarily in the LEC Planning Area.

Flood and seepage irrigation is the predominant irrigation system for sugarcane. As a result of special water management and best management practices observed within the EAA, and in consultation with the industry, an effective irrigation efficiency greater than the typical 50 percent AFSIRS model default was applied. A weighted-average efficiency factor (weighted by acres with recycling/reuse irrigation practices obtained from permit files; with water reuse, the irrigation efficiency within the EAA is effectively 75 percent) was applied in the water demand projections. This adjustment was consistent with water use permit renewals for agricultural users within the EAA employing a flood irrigation system. Water use per acre within each basin also remains the same through the twenty-year planning horizon; therefore, water use parallels the change in acreage.

Irrigation requirements are based on the unique variables and properties of the EAA compared to other areas that are modeled by the AFSIRS model. Soil types and ET are the most sensitive variables within the AFSIRS model. The EAA muck soils result in a relatively smaller average annual net irrigation requirement (NIR) compared to sandier soils in other parts of the LEC Planning Area, because the muck retains more moisture and has less runoff than other more porous soil types. Consequently, if the average annual NIRs are compared between the EAA in Palm Beach County and the Hendry County Western Basins area (that was modeled with sandy soils) to the 1-in-10 NIR, the difference between these two values for Hendry will be smaller. Hendry starts from a higher NIR average because of the sandier soil compared to the EAA located in Palm Beach County (**Table A-14**).

Table A-14. Comparison of sugarcane NIR for average and 1-in-10 years.

County and Area	Average NIR (inches)	1-in-10 NIR (inches)	1-in-10 NIR/ Average NIR
Hendry County Western Basins	16.1	21.9	1.36
Palm Beach County EAA	6.0	15.4	2.57

Table A-15 presents the acreage projections, projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Biofuels

The portion of Hendry County within the LEC Planning Area, which is known for sugarcane, also hosts crops grown for use as biofuel feedstocks. These crops are used both to sustain cogeneration power requirements for sugarcane processing (i.e., residues are combined with bagasse and wood chips to fire boilers) and within integrated operations for ethanol production. Crops grown for use as biomass feedstocks (i.e., sweet sorghum) and for ethanol production are one of the emerging trends within this region of the planning area and the acreage falls under the "Field Crops – Sugarcane" and "Field Crops – Other" categories within this plan.

Table A-15. Gross irrigation requirements for sugarcane acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – Coastal						
	Irrigated Acreage	1,900 acres	1,900 acres	1,900 acres	1,900 acres	1,900 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	6.0 inches	0.8	0.8	0.8	0.8	0.8
1-in-10 year drought	15.4 inches	2.2	2.2	2.2	2.2	2.2
Palm Beach County – EAA						
	Irrigated Acreage	368,622 acres	368,622 acres	368,622 acres	368,622 acres	368,622 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	6.0 inches	329.0	329.0	329.0	329.0	329.0
1-in-10 year drought	15.4 inches	844.5	844.5	844.5	844.5	844.5
Hendry County – EAA						
	Irrigated Acreage	25,611 acres	25,611 acres	25,611 acres	25,611 acres	25,611 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	6.0 inches	22.9	22.9	22.9	22.9	22.9
1-in-10 year drought	15.4 inches	58.7	58.7	58.7	58.7	58.7
Hendry County – Western Basins						
	Irrigated Acreage	13,489 acres	15,801 acres	18,112 acres	20,424 acres	22,735 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	16.2 inches	32.5	38.1	43.7	49.2	54.8
1-in-10 year drought	21.9 inches	43.9	51.5	59.0	66.5	74.1
LEC Planning Area Totals						
	Total Irrigated Acreage	409,622 acres	411,934 acres	414,245 acres	416,557 acres	418,868 acres
		Gross Demand (MGD)				
Total average rainfall year		**385.2**	**390.8**	**396.4**	**401.9**	**407.5**
Total 1-in-10 year drought		**949.3**	**956.9**	**964.4**	**971.9**	**979.5**

Field Crops – Other

Other field crops in the LEC Planning Area primarily include rice, potatoes, and tropical field crops. Acreage and water use are projected to rise slightly through 2030. **Table A-16** presents the acreage projections, the projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and the projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Table A-16. Gross irrigation requirements for other field crop acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – EAA						
Irrigated Acreage		17,000 acres	17,000 acres	17,000 acres	17,000 acres	17,000 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	13.6 inches	34.4	34.4	34.4	34.4	34.4
1-in-10 year drought	19.5 inches	49.3	49.3	49.3	49.3	49.3
Broward County						
Irrigated Acreage		40 acres	40 acres	40 acres	40 acres	40 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	7.0 inches	0.0	0.0	0.0	0.0	0.0
1-in-10 year drought	12.4 inches	0.0	0.0	0.0	0.0	0.0
Miami-Dade County						
Irrigated Acreage		1,974 acres	2,142 acres	2,196 acres	2,196 acres	2,196 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	8.8 inches	1.7	1.9	1.9	1.9	1.9
1-in-10 year drought	14.0 inches	2.7	3.0	3.0	3.0	3.0
Hendry County – Western Basins						
Irrigated Acreage		65 acres	71 acres	73 acres	73 acres	73 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	18.4 inches	0.2	0.2	0.2	0.2	0.2
1-in-10 year drought	23.3 inches	0.2	0.2	0.3	0.2	0.3
LEC Planning Area Totals						
Total Irrigated Acreage		19,079 acres	19,253 acres	19,309 acres	19,309 acres	19,309 acres
		Gross Demand (MGD)				
Total average rainfall year		**36.3**	**36.5**	**36.5**	**36.5**	**36.5**
Total 1-in-10 year drought		**52.2**	**52.5**	**52.6**	**52.5**	**52.6**

Vegetables, Melons, and Berries

The agricultural regions comprising the LEC Planning Area are some of the most important winter producers of vegetables in the country. The favorable microclimate allows for multiple and varied crop rotational harvests on prime lands in close proximity to urban markets enabling producers to supply consumers throughout the year. It is estimated that over 90 percent of Miami-Dade County's vegetables are exported out of Florida. In addition, South Florida hospitality and restaurant industries are heavily dependent on vegetable crops produced in the LEC Planning Area.

The chief crops in this category include snap beans, tomatoes, cucumbers, lettuce, peppers, squash, radishes, sweet corn, and tropical vegetables. Vegetable acreage in the LEC Planning Area is concentrated in Palm Beach County, southern Miami-Dade County, and the Western Basins in Hendry County. Given favorable market conditions and future market outlooks, vegetable acreage throughout the projection period is expected to be sustained at near current levels in Palm Beach and Miami-Dade counties and to increase in Hendry County. Despite the competitive pressure from imports, the lack of urbanization pressure over the near term is favorable to producers seeking to increase production and take advantage of market windows of opportunity. In southern Miami-Dade County, SFWMD's operational management of the water table facilitates the ability of producers to sow fields at key times to get crops planted, enabling harvests to meet seasonal demands for two crops. Changes in water use parallel the changes in acreage.

Vegetable acreage projections were requested from agricultural stakeholders and agencies, including University of Florida's Institute for Food and Agricultural Sciences, the Florida Department of Agriculture and Consumer Services, and the Florida Farm Bureau. Some vegetable crops face continued pressure from imports from countries such as Mexico. But given the diversity of the crops and demand for unique and specialty exotic vegetables, these risks to potential loss of arable acres are low.

In Palm Beach County, flood irrigation is the primary irrigation type used for small vegetables. Based on the estimated usage of each type of irrigation system shown in water use permits, the irrigation efficiency was assumed to be 50 percent for these kinds of crops. In Miami-Dade County, vegetables are often irrigated with volume or traveling/overhead guns and sprinklers, and drip systems are also used. These systems have higher application efficiencies compared to flood or seepage methods and were represented by a weighted-average efficiency factor of 73 percent in the demand projections.

Table A-17 presents the acreage projections, the projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and the projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Table A-17. Gross irrigation requirements for vegetables, melons, and berries acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – Coastal						
	Irrigated Acreage	11,660 acres	11,410 acres	11,160 acres	10,910 acres	10,660 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	8.9 inches	10.3	10.1	9.9	9.6	9.4
1-in-10 year drought	13.1 inches	15.1	14.8	14.5	14.2	13.8
Palm Beach County – EAA						
	Irrigated Acreage	30,340 acres	30,340 acres	30,340 acres	30,340 acres	30,340 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	12.0 inches	54.2	54.2	54.2	54.2	54.2
1-in-10 year drought	16.9 inches	76.3	76.3	76.3	76.3	76.3
Broward County						
	Irrigated Acreage	819 acres	811 acres	801 acres	801 acres	801 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	9.3 inches	0.8	0.7	0.7	0.7	0.7
1-in-10 year drought	13.6 inches	1.1	1.1	1.1	1.1	1.1
Miami-Dade County						
	Irrigated Acreage	28,000 acres	27,750 acres	27,500 acres	27,250 acres	27,000 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	11.3 inches	32.2	32.0	31.7	31.4	31.1
1-in-10 year drought	15.2 inches	43.4	43.0	42.6	42.2	41.8
Hendry County – EAA						
	Irrigated Acreage	8,447 acres	8,447 acres	8,447 acres	8,447 acres	8,447 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	16.1 inches	20.2	20.2	20.2	20.2	20.2
1-in-10 year drought	20.3 inches	25.5	25.5	25.5	25.5	25.5
Hendry County – Western Basins						
	Irrigated Acreage	3,264 acres	3,615 acres	3,967 acres	4,318 acres	4,670 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	16.1 inches	7.8	8.7	9.5	10.3	11.2
1-in-10 year drought	20.3 inches	9.9	10.9	12.0	13.1	14.1
LEC Planning Area Totals						
	Total Irrigated Acreage	82,530 acres	82,373 acres	82,215 acres	82,066 acres	81,918 acres
		Gross Demand (MGD)				
Total average rainfall year		**125.5**	**125.9**	**126.2**	**126.4**	**126.8**
Total 1-in-10 year drought		**171.3**	**171.6**	**172.0**	**172.3**	**172.6**

Sod Production

Sod production projections presented in this appendix refer to irrigated sod. Some sod may be harvested from pastureland, which is not irrigated. Pasture supporting cow-calf operations is typically not irrigated because it is not economical. Some pasture in the coastal areas may include horse farms, ranchettes, etc., which may be irrigated and may have been included with sod production.

For this update, 2005 and 2010 sod production acreages were estimated based on data contained in SFWMD's Water Use Regulatory Database. Historic acreage trends obtained from USGS were also compared to building permit time series. Reports from growers indicate that sod production was hit hard by the 2008–2009 recession. Current acreage is down considerably from prerecession levels, and the demand from golf courses and urban landscaping remains depressed. Lead times necessary to prepare land for sod production in response to customer demand increased. The projections assume that sod acreage will continue to fall over the near-term planning period (through 2015), but eventually recover as the economy grows and urban development resumes a more rapid pace (between 2015 and 2020).

Because the population in the LEC Planning Area is expected to grow, sod demand is expected to rebound from low levels as community development resumes at a faster pace. Sod irrigation is provided by several methods, including low volume, sprinkler, and flood irrigation. Based on the irrigation systems indicated in water use permits, the average irrigation efficiency for sod was calculated to be 75 percent in the EAA within Palm Beach County, 75 percent in Broward County, and 50 percent in the Western Basins in Hendry County.

Sod production and associated water use is expected to remain constant in the EAA and Western Basins in Hendry County and increases in the Palm Beach Coastal Subbasin, which are the only basins with significant sod production. Irrigation requirements are similar to those for REC Self-Supply uses and, on a per acre basis, do not change over the projection period. **Table A-18** presents the acreage projections, the projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and the projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Table A-18. Gross irrigation requirements for sod acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – Coastal						
	Irrigated Acreage	1,900 acres	1,500 acres	2,000 acres	2,300 acres	2,790 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	17.2 inches	2.4	1.9	2.6	2.9	3.6
1-in-10 year drought	21.8 inches	3.1	2.4	3.2	3.7	4.5
Palm Beach County – EAA						
	Irrigated Acreage	7,210 acres	7,210 acres	7,210 acres	7,210 acres	7,210 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	10.5 inches	7.5	7.5	7.5	7.5	7.5
1-in-10 year drought	18.1 inches	12.9	12.9	12.9	12.9	12.9
Broward County						
	Irrigated Acreage	9 acres	9 acres	9 acres	9 acres	9 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	17.7 inches	0.02	0.02	0.02	0.02	0.02
1-in-10 year drought	23.1 inches	0.02	0.02	0.02	0.02	0.02
Miami-Dade County						
	Irrigated Acreage	114 acres	91 acres	110 acres	115 acres	120 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	20.2 inches	0.2	0.1	0.2	0.2	0.2
1-in-10 year drought	24.5 inches	0.2	0.2	0.2	0.2	0.2
Hendry County – Western Basins						
	Irrigated Acreage	652 acres	652 acres	652 acres	652 acres	652 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	20.5 inches	2.0	2.0	2.0	2.0	2.0
1-in-10 year drought	26.4 inches	2.6	2.6	2.6	2.6	2.6
LEC Planning Area Totals						
	Total Irrigated Acreage	9,885 acres	9,462 acres	9,981 acres	10,286 acres	10,781 acres
		Gross Demand (MGD)				
Total average rainfall year		**12.1**	**11.5**	**12.3**	**12.6**	**13.3**
Total 1-in-10 year drought		**18.8**	**18.1**	**18.9**	**19.4**	**20.2**

Greenhouse / Nursery

This category includes a wide variety of nursery, ornamental, and horticulture/floriculture operations. Crops in this category include palm trees and shrubs grown in the ground, container nurseries producing woody and herbaceous ornamentals in open fields, and greenhouse and shade house nurseries producing foliage plants, orchids, bromeliads, and woody ornamentals for interior spaces. Crops grown in greenhouses may also include vegetables, herbs, fruits, berries, garden plants for sale, cut flowers, and caladium bulbs/rhizomes. The same crops may be grown in the open in a nursery setting where the plants are the product for sale. Sales of these products fluctuate with economic cycles and conditions tied to the housing market (community development) and urban landscapes, both within and outside of South Florida.

For this update, information from SFWMD's Water Use Regulatory Database, the *2007 Census of Agriculture for Florida* county data (USDA–NASS 2007), USGS' historic acreage, and county assessor's office's land use data were used to estimate 2010 greenhouse/nursery acreage and project future acreage. The historic data were also compared to economic indicators to assess how the recession impacted greenhouse/nursery acres. The recession took a severe toll on this market segment. Producers in the LEC Planning Area region adapted to market conditions by carefully controlling costs and offering value added products and amenities to consumers.

Over the near-term, the projections are based on assuming a bottoming out in irrigated acres followed by a stabilization phase, and then an expansion as the economy recovers over the medium-term horizon. The so-called "U" pattern of projected acres described above is based on assuming an eventual recovery in the housing market and community developments boosting demand for landscaping and greenhouse/nursery products. Based on the data received, the projected 2010 acreage was assumed to fluctuate with economic cycles throughout the twenty-year planning horizon. The average irrigation efficiency for this crop category was calculated to be 72 percent in Miami-Dade County, 50 percent in Palm Beach County, 40 percent in Broward County, and 34 percent in the Western Basins in Hendry County.

Estimated greenhouse/nursery acreage and irrigation requirements in the LEC Planning Area are expected to initially decline until the economic expansion gains more momentum, and then to recover to higher levels later in the projection period (between 2015 and 2020), especially in Palm Beach and Broward counties, and remain fairly constant in Miami-Dade County. **Table A-19** presents the acreage projections, the projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and the projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Table A-19. Gross irrigation requirements for greenhouse/nursery acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – Coastal						
	Irrigated Acreage	3,642 acres	3,342 acres	3,776 acres	4,209 acres	4,642 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	21.2 inches	11.5	10.5	11.9	13.3	14.6
1-in-10 year drought	25.1 inches	13.6	12.5	14.1	15.7	14.6
Palm Beach County – EAA						
	Irrigated Acreage	858 acres	858 acres	858 acres	858 acres	858 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	10.5 inches	1.3	1.3	1.3	1.3	1.3
1-in-10 year drought	18.1 inches	2.3	2.3	2.3	2.3	2.3
Broward County						
	Irrigated Acreage	250 acres	172 acres	231 acres	291 acres	350 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	22.7 inches	1.1	0.7	1.0	1.2	1.5
1-in-10 year drought	26.4 inches	1.2	0.8	1.1	1.4	1.7
Miami-Dade County						
	Irrigated Acreage	9,000 acres	8,063 acres	8,375 acres	8,688 acres	9,000 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	23.3 inches	21.6	19.4	20.1	20.9	21.6
1-in-10 year drought	26.4 inches	24.5	22.0	22.8	23.7	24.5
Hendry County – Western Basins						
	Irrigated Acreage	500 acres	400 acres	600 acres	700 acres	800 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	22.7 inches	2.5	2.0	3.0	3.5	4.0
1-in-10 year drought	27.3 inches	3.0	2.4	3.6	4.2	4.8
Monroe County						
	Irrigated Acreage	20 acres	20 acres	20 acres	20 acres	20 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	23.3 inches	0.1	0.1	0.1	0.1	0.1
1-in-10 year drought	26.4 inches	0.1	0.1	0.1	0.1	0.1
LEC Planning Area Totals						
	Total Irrigated Acreage	14,270 acres	12,855 acres	13,860 acres	14,766 acres	15,670 acres
		Gross Demand (MGD)				
Total average rainfall year		**38.1**	**34.0**	**37.4**	**40.3**	**43.1**
Total 1-in-10 year drought		**44.7**	**40.1**	**44.0**	**47.4**	**48.0**

Other Fruits and Nuts

The major crops in this category are avocados, guavas, mangos, and lychees. Total acreage of other fruits and nuts in the LEC Planning Area is concentrated in Miami-Dade County. Various tropical and exotic fruits, such as such as mangos, carambola, longans, mamey sapote, sapodilla, jackfruit, and passion fruit, are grown in the Redlands area of southern Miami-Dade County. Miami-Dade County leads the state in the production of avocados.

Over the entire planning horizon, these crops are expected to be sustained near current levels given strong consumer demand and favorable farm economics and relative prices. Assessment of current acres supporting these crop types showed the recession resulted in only a slight loss of acres. Over the entire planning horizon, only a slight decline in acreage is expected (108 acres between 2010 and 2030), and this will most likely be attributable to urbanization pressures over the medium term. The projections assume that acreage devoted to the Other Fruits and Nuts category will be resilient over the planning horizon. Given the popularity of these crops, particularly among South Florida's diverse residents and tourists, and favorable trends in unit consumption demand, the projections assume that total acreage will only decline marginally from 2010 levels by 2030. Consumer demand continues to be strong for avocados and imports are rising to meet national demand. Water use is also expected to decline only slightly from 2010 levels given the importance of these unique crops to consumers and the economy over the planning horizon. **Table A-20** presents the acreage projections, the projected net irrigation requirement under average rainfall and 1-in-10 year drought conditions, and the projected gross irrigation demand (water withdrawal demand) under average rainfall and 1-in-10 year drought conditions.

Table A-20. Gross irrigation requirements for other fruits and nuts acreage in the LEC Planning Area.

Rainfall Year	Water to Sustain Crops (annual inches based on rainfall)	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
		2010	2015	2020	2025	2030
Palm Beach County – Coastal Subbasin						
	Irrigated Acreage	82 acres	136 acres	132 acres	129 acres	124 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	9.4 inches	0.08	0.13	0.12	0.12	0.11
1-in-10 year drought	15.0 inches	0.12	0.20	0.19	0.19	0.18
Palm Beach County – EAA						
	Irrigated Acreage	111 acres	111 acres	111 acres	111 acres	111 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	8.9 inches	0.15	0.15	0.15	0.15	0.15
1-in-10 year drought	16.3 inches	0.27	0.27	0.27	0.27	0.27
Broward County						
	Irrigated Acreage	80 acres	80 acres	80 acres	80 acres	80 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	9.8 inches	0.06	0.06	0.06	0.06	0.06
1-in-10 year drought	16.6 inches	0.10	0.10	0.10	0.10	0.10
Miami-Dade County						
	Irrigated Acreage	8,000 acres	7,965 acres	7,930 acres	7,895 acres	7,850 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	12.2 inches	9.7	9.7	9.7	9.6	9.5
1-in-10 year drought	18.3 inches	14.5	14.5	14.4	14.3	14.3
Hendry County – Western Basins						
	Irrigated Acreage	29 acres	29 acres	29 acres	29 acres	29 acres
	Net Irrigation Requirement	**Gross Demand (MGD)**				
Average	15.5 inches	0.04	0.04	0.04	0.04	0.04
1-in-10 year drought	20.8 inches	0.06	0.06	0.05	0.05	0.05
LEC Planning Area Totals						
	Total Irrigated Acreage	8,302 acres	8,321 acres	8,282 acres	8,244 acres	8,194 acres
		Gross Demand (MGD)				
Total average rainfall year		**10.0**	**10.0**	**10.0**	**9.9**	**9.9**
Total 1-in-10 year drought		**15.1**	**15.1**	**15.0**	**15.0**	**14.9**

Improved Pasture

SFWMD's definition of improved pasture is any pasture with existing or proposed facilities to deliver supplemental irrigation. Information from agricultural stakeholders indicates irrigation of improved pasture usually occurs during dry periods to keep grass alive for the nourishment of cattle because the economic returns associated with cattle production generally do not justify the expense of year-round pasture irrigation.

The 2005–2006 LEC Plan Update stated that irrigation demand was not estimated for improved pasture within the LEC Planning Area because they would only relate to some of the acres some of the time (SFWMD 2007). SFWMD does not project water demand for improved pasture because of the intermittent demand and the lack of data and information required to properly project this demand. However, interagency and agricultural stakeholders are currently addressing methods for determining intensity of water use in this category, as well as procedures for evaluating potential conversion of pasture lands to other agricultural crop categories.

Other Agricultural Uses

Cattle numbers were obtained from the most current Florida Agricultural Statistics Service *Livestock Summary* (USDA 2011). The land and water requirements were assessed for cattle and calves on ranchlands falling within the LEC Planning Area. This update does not present estimates for cattle watering because the volume is insignificant. However, SFWMD continues to recognize these water volumes as reasonable and beneficial needs for existing legal water uses. Aquaculture demand is also not presented because most of the use represents localized flow-through in which the water returns to the source from which it was taken.

Summary of Agricultural Results

Although estimates and projections for the agricultural subsections have been discussed in terms of crop use categories, it is also important to summarize the results in terms of total acreage and use by basin. On balance, agricultural acreage is expected to increase by 581 acres from 575,310 acres in 2010 to 575,897 acres in 2030. The EAA, the largest concentration of cropland in the LEC Planning Area, is a fully developed, stable agricultural area where cropping practices are not projected to change significantly. Consequently, the cultivated acres are expected to remain constant at their current permitted levels over the next 20 years.

The expectation for the loss of additional agricultural acres due to urbanization has been deferred to much later periods over the twenty-year planning horizon. The restrained housing market and a slow economic recovery in South Florida has diminished competition for agricultural land from developers compared to the 2005–2006 LEC Plan Update evaluation environment. More generally, the rapid loss of arable land over the last 10 years throughout the United States raised the relative value of existing agricultural lands and placed a renewed emphasis on sustainable land management and food security. Some small

declines expected in the Palm Beach County Coastal Subbasin and the loss of citrus acreage in the Western Basins portion of Hendry County will likely be offset by gains in other crops within the planning area (sod and nursery/greenhouse production in Palm Beach County and sugarcane in the Western Basins in Hendry County). Palm Beach County is expected to retain its agricultural acres over the twenty-year planning horizon and to slightly increase agricultural lands within Agricultural Reserve Areas. Little change in agricultural acreage and water use is expected in Broward and Miami-Dade counties. Agricultural acreage in the Western Basins in Hendry County is expected to rise slightly even though the C-139 Annex Restoration Project will reduce the cultivated acreage.

Total irrigated agricultural crop categories and acreage are listed in **Table A-21**. Acreage and gross irrigation demand (water withdrawal demand) by subbasin are presented in **Table A-22**. The acreages presented in the tables for this update do not include acreages that are historically part of the Lake Okeechobee Service Area that lies in the Lower West Coast, Upper East Coast, and Kissimmee Basin planning areas.

Table A-21. Crop category and irrigated acreage in the LEC Planning Area.

Crop Category	2010	2015	2020	2025	2030
Citrus	31,628	26,410	17,162	19,455	21,157
Field Crops – Sugarcane	409,622	411,934	414,245	416,557	418,868
Field Crops – Other	19,079	19,253	19,309	19,309	19,309
Vegetables, Melons, and Berries	82,530	82,373	82,215	82,066	81,918
Sod	9,885	9,462	9,981	10,286	10,781
Greenhouse/Nursery	14,270	12,855	13,860	14,766	15,670
Other Fruits & Nuts	8,302	8,321	8,282	8,244	8,194
LEC Planning Area Total Irrigated Acres	**575,316**	**570,608**	**565,054**	**570,673**	**575,897**

Table A-22. Gross irrigation requirements for all agricultural acreage in the LEC Planning Area.

	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
Rainfall Year	**2010**	**2015**	**2020**	**2025**	**2030**
Palm Beach County – Coastal					
Irrigated Acreage	21,647 acres	20,343 acres	21,159 acres	21,932 acres	22,820 acres
	Gross Demand (MGD)				
Average	28.1	25.5	27.2	28.5	30.5
1-in-10 year drought	38.6	35.4	37.2	39.0	38.6
Palm Beach County – EAA					
Irrigated Acreage	424,152 acres	424,152 acres	424,152 acres	424,152 acres	424,152 acres
	Gross Demand (MGD)				
Average	426.6	426.6	426.6	426.6	426.6
1-in-10 year drought	985.6	985.6	985.6	985.6	985.6

Table A-22. Continued.

Rainfall Year	Gross Demand (MGD) (total volume needed for withdrawal including net irrigation demand as well as accounting for system losses and inefficiencies)				
	2010	2015	2020	2025	2030
Broward County					
Irrigated Acreage	1,198 acres	1,112 acres	1,161 acres	1,221 acres	1,280 acres
	Gross Demand (MGD)				
Average	2.0	1.5	1.8	2.0	2.3
1-in-10 year drought	2.4	2.0	2.3	2.6	2.9
Miami-Dade County					
Irrigated Acreage	47,805 acres	46,610 acres	46,750 acres	46,868 acres	46,954 acres
	Gross Demand (MGD)				
Average	66.2	63.7	64.2	64.7	65.1
1-in-10 year drought	86.5	83.6	84.0	84.6	85.0
Hendry County – EAA					
Irrigated Acreage	34,058 acres	34,058 acres	34,058 acres	34,058 acres	34,058 acres
	Gross Demand (MGD)				
Average	43.1	43.1	43.1	43.1	43.1
1-in-10 year drought	84.2	84.2	84.2	84.2	84.2
Hendry County – Western Basins					
Irrigated Acreage	46,436 acres	44,313 acres	37,754 acres	42,422 acres	46,613 acres
	Gross Demand (MGD)				
Average	88.7	86.1	78.5	87.2	96.2
1-in-10 year drought	124.3	121.6	110.1	123.5	136.1
Monroe County					
Irrigated Acreage	20 acres	20 acres	20 acres	20 acres	20 acres
	Gross Demand (MGD)				
Average	0.05	0.05	0.05	0.05	0.05
1-in-10 year drought	0.10	0.10	0.10	0.10	0.10
EAA					
Irrigated Acreage	458,210 acres	458,210 acres	458,210 acres	458,210 acres	458,210 acres
	Gross Demand (MGD)				
Average	469.7	469.7	469.7	469.7	469.7
1-in-10 year drought	1,070.0	1,070.0	1,070.0	1,070.0	1,070.0
LEC Service Area (Coastal Areas)					
Irrigated Acreage	70,670 acres	68,085 acres	69,090 acres	70,041 acres	71,074 acres
	Gross Demand (MGD)				
Average	96.4	90.8	93.3	95.3	98.0
1-in-10 year drought	127.6	121.1	123.6	126.3	126.6
LEC Planning Area Totals					
Total Irrigated Acreage	575,316 acres	570,608 acres	565,054 acres	570,673 acres	575,897 acres
	Gross Demand (MGD)				
Total average rainfall year	**654.8**	**646.6**	**641.5**	**652.2**	**663.9**
Total 1-in-10 year drought	**1,321.7**	**1,312.5**	**1,303.5**	**1,319.6**	**1,332.5**

INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SELF-SUPPLY

This category includes industrial, commercial, and institutional demands not supported by a public utility. Water used for industrial, commercial, and institutional purposes supplied by utilities is included with PWS demand.

Projection Methodology

In the LEC Planning Area, the water use projection for ICI Self-Supply assumes that growth in self-supply for this region is proportional to the underlying economic activity that generates water demand in population in the area. This ICI Self-Supply use category consists of large facilities for production processing with the largest uses being mining (i.e., aggregates industry) and food processing (dominated by the sugar industry). Because of the importance of these large users within the LEC Planning Area, the projection methodology is based on isolating and assessing the relationship between water use and expected future growth for these sectors.

Permitted water use in this category determined the current ICI Self-Supply demand. SFWMD's historic pumpage data were assessed for each county within the LEC Planning Area. For Palm Beach County, the analysis was based on separating historic pumpage between the sugar industry and "other" ICI Self-Supply users since the sugar industry accounts for a large share of total ICI Self-Supply water use (approximately 50 percent of the county total in 2010). The pumpage reports related to the Palm Beach County sugar industry permittees were isolated and summed. Water use was then plotted against trends in annual sugar production (in tons) and evaluated. The trend showed that the sugar industry's unit water use fell per ton of sugar produced since 2000 because of improved process efficiencies.

Over the projected forecast horizon, the trend in more efficient water use was extrapolated forward such that ICI Self-Supply for Palm Beach County is expected to fall from 5.4 MGD to 3.5 MGD by 2020 and remain at that rate. Nonsugar ICI Self-Supply users are also expected to use less water per unit of output given the adoption of more sustainable practices. The amount of the use was assumed to continue until the permit expiration date for each ICI Self-Supply permit in SFWMD's Water Use Regulatory Database. After that time, the growth in this sector is projected to increase at the rate of population growth.

For Miami-Dade County, the ICI Self-Supply demand analysis was based on first segregating the historic water pumpage for the aggregates industry (i.e., mining, quarrying, and rock washing) and "other" uses. The aggregates industry dominates ICI Self-Supply water use, which accounted for 94 percent of the county total in 2011. The projection method compared the aggregates industry production to the aggregates industry historic water pumpage inputs. The *Federal Reserve Index of Industrial Production-Nonmetallic Mineral Mining and Quarrying* was used for this purpose (FRS 2012). **Figure A-5** shows the historic relationship between these two measures.

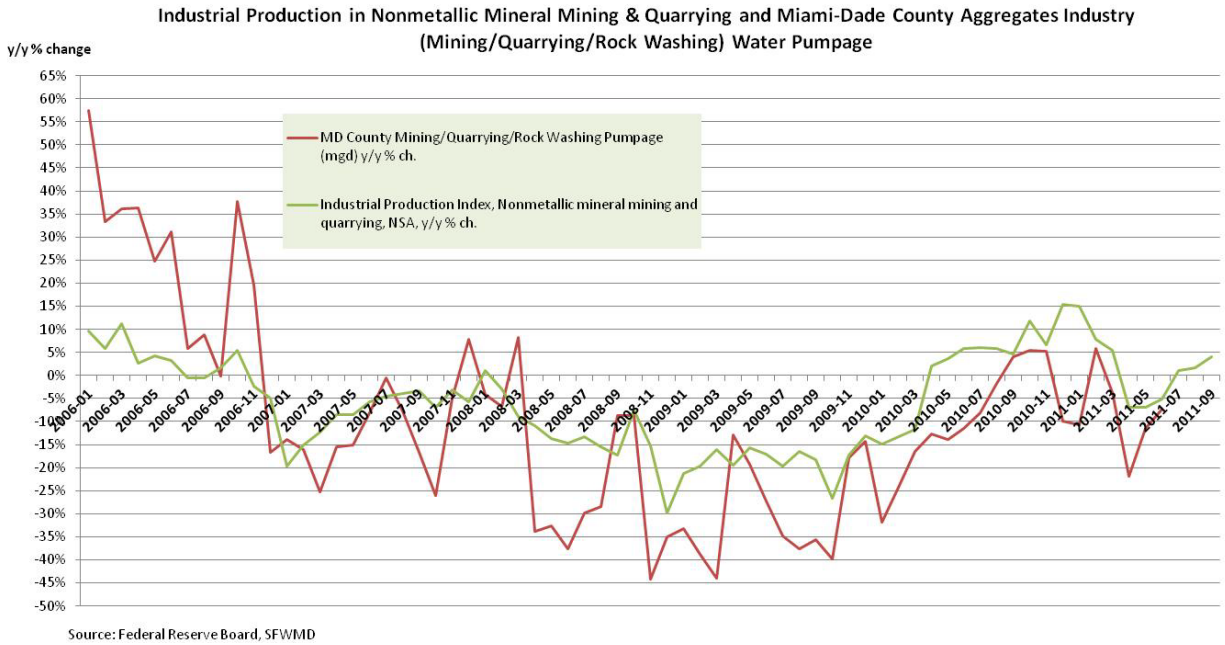

Figure A-5. Industrial production and water pumpage in nonmetallic mineral mining and quarrying for the Miami-Dade (MD) County aggregates industry.

Figure A-5 shows that water pumpage for the aggregates ICI Self-Supply segment was correlated with industrial production and the business cycle. To project the future water demand for the ICI Self-Supply segment, an annual water demand equation, based on a fitted statistical function relating water demand to industrial production was applied. Future annual industrial production for the aggregates industry was projected using official forecasts of United States economic growth (gross domestic product) and evaluating the growth rate relationship between mineral mining industrial production and the gross domestic product. The projections assume that projected water demand will follow the recurring boom and bust patterns of economic growth to 2030. For Broward County, the projections assume continued stable water demand for ICI Self-Supply over the twenty-year planning horizon.

Current and future demand calculations include information from SFWMD's Water Use Regulatory Database along with population growth rates for each county. All population numbers are based on the projections for each individual county shown earlier in this appendix. ICI Self-Supply projections assume demand under average rainfall and 1-in-10 year drought conditions remains the same, and that withdrawals are equal to user demand so no distinction is made between net (finished) and gross (raw) water amounts. It should be noted that, depending on the type of ICI Self-Supply user, a large share of water demanded is quickly returned to the system for reuse (i.e., rock washing in the aggregates industry) within the ICI Self-Supply group.

Projection Results

Table A-23 summarizes the ICI Self-Supply demand estimates and projections in the LEC Planning Area in five-year increments during the twenty-year planning horizon. The estimates and projections are the same for average and 1-in-10 year drought conditions. Since no distinction is needed between net and gross water, only one set of demands is shown.

Table A-23. ICI Self-Supply demand projections for 2010–2030.

County	Demand Projections (MGD)				
	2010	2015	2020	2025	2030
Palm Beach	5.4	4.8	3.5	3.5	3.5
Broward	1.6	1.1	1.2	1.3	1.3
Miami-Dade	37.3	34.6	54.0	51.8	51.8
Hendry	0.0	0.0	0.0	0.0	0.0
Monroe	0.0	0.0	0.0	0.0	0.0
LEC Planning Area Total	**44.3**	**40.5**	**58.7**	**56.6**	**56.6**

RECREATIONAL/LANDSCAPE SELF-SUPPLY

The REC Self-Supply category includes self-supplied irrigation demand for landscaped recreational areas and golf courses. Landscape irrigation includes water demand for all parks (small and large), communities and homeowner associations with common areas or a master irrigation system, and areas with green space such as ball fields, stadiums, and cemeteries. These REC Self-Supply uses are identified through water use permits. With the exception of private home landscape irrigation conducted by homeowner associations, private home landscape irrigation demand is not included in this water use category.

A significant portion (approximately 30 percent) of REC Self-Supply water demand will be met by the use of reclaimed water throughout the planning horizon, which will reduce withdrawals from the water resources.

Projection Methodology

Landscape and golf course acres were identified using SFWMD's Water Use Regulatory Database. Time series trends of irrigated golf course acreage within the LEC Planning Area by county were reviewed from 1985 through the present and compared to macroeconomic historic indicators for the region. Macro or development history was depicted by a time series of annual, new, privately-owned residential building permits within each LEC Planning Area county. For example, Palm Beach County's building permit activity showed a steady increase from 1990 to 2003, when they peaked. Permits fell rapidly after this period and bottomed out during the 2008–2009 recession at 10 percent of their peak 2003 level and 18 percent of the 1990 level. Given the recession and housing crisis, followed by a weak economic recovery that has been restrained by a structurally troubled and weak

housing market, the demand for new golf courses and existing course expansion has been stagnant. These recent trends are confirmed by reductions in golf rounds played within the service area (**Figure A-6**). In light of the slowdown in community development that could sustain new courses or course expansions, and the pace of economic recovery over the near- to medium-term period, golf course acreage projection is based on a U-shaped economic recovery pattern that anticipates continued weakness or lack of development capable of supporting golf patronage followed by a slow recovery.

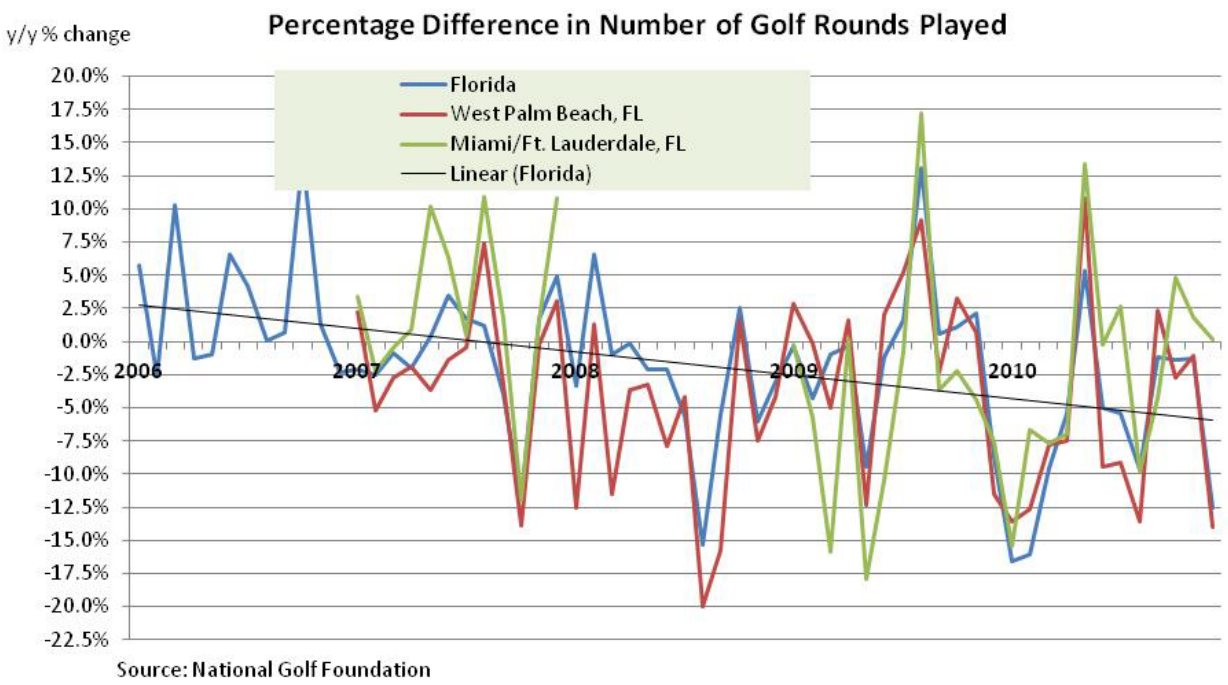

Figure A-6. Percentage difference in number of golf rounds played.

Future demand projections also considered county population growth rates, information provided by local planning officials, and golf course publications. Golf course demand by county are projected separately and added to the other landscape and recreation demands. A slower growth rate was assumed for golf courses than the population growth rate based on industry and local planning estimates of new courses during the twenty-year planning horizon.

Historic patterns of growth in acreage for non-golf course landscaping and recreational water use were also evaluated since the 2005–2006 LEC Plan Update. Between 2000 and 2011, these intervening years witnessed a rapid community development expansion that increased the landscape acreage requiring irrigation. This trend was visible in homeowners' association permit applications to irrigate common areas. This period also corresponded to the housing asset price bubble and a development phase characterized by unprecedented urban sprawl with community expansion moving westward within the LEC Planning Area. As a consequence, SFWMD's Water Use Regulatory Database expanded significantly for the REC Self-Supply water use category. Once this acreage was committed to communities, it requires future irrigation and this explains the large increase in water demand since the last plan update for the landscape component of the REC Self-Supply water use category. With

changes to the housing market, the projections assume some marginal declines in the landscape irrigated acreage category followed by a slight recovery to a plateau over the remainder of the planning horizon. Non-golf course landscaping and recreational water use was assumed to increase at the same rate as the county population, with 2010 used as the base year estimate for the projections, and the 2005 projection from the previous plan update included for comparison.

REC Self-Supply gross and net irrigation demand calculations for this update applied results from the AFSIRS model, which uses data from 1965–2000 (Smajstrla 1990). These model results were used in the 2005–2006 LEC Plan Update and are used to calculate AGR Self-Supply irrigation demand. The AFSIRS model calculates both gross and net irrigation requirements according to the following relationship:

Gross Irrigation Requirement = Net Irrigation Requirement / Irrigation Efficiency

Demand was calculated using 36 years of rainfall and potential ET climatic data from appropriate meteorological stations. The analyses also consider soil types, irrigation methods, and strategies. The irrigation system assumed for REC Self-Supply is sprinkler irrigation with 75 percent efficiency, and rainfall and potential ET data for the respective region. The model uses assumed crop coefficients of sod to represent turf and landscape plants, and calculates demand for average rainfall and 1-in-10 year drought conditions for each county.

Projection Results

REC Self-Supply acreage projections are shown in **Table A-24**. The projected net irrigation (user) demand for each area under average rainfall conditions are shown in **Table A-25**, while **Table A-26** shows net irrigation demand under 1-in-10 year drought conditions. Gross irrigation demand (withdrawal demand) under average rainfall conditions is shown in **Table A-27**, while **Table A-28** presents gross demand under 1-in-10 year drought conditions. During the twenty-year planning horizon, REC Self-Supply demand will increasingly be met by use of reclaimed water. This will reduce withdrawal demand on the water resources and provide additional recharge of the surficial aquifer system. It is estimated that for 2010, total golf course acreage consists of 25,253 acres in the LEC Planning Area, approximately 30 percent of this total acreage was irrigated in part using reclaimed water (personal communication with R. Nevulis, Reuse Specialist, SFWMD).

Table A-24. Acreage for REC Self-Supply in the LEC Planning Area.

Area	Acreage (acres)				
	2010	2015	2020	2025	2030
Palm Beach County – Coastal	45,924	44,924	45,731	46,616	47,500
Palm Beach County – EAA	0.0	0.0	0.0	0.0	0.0
Broward County	27,700	28,100	28,100	28,100	28,100
Miami-Dade County	8,325	8,375	8,418	8,471	8,525
Hendry County – EAA	0.0	0.0	0.0	0.0	0.0
Hendry County – Western Basins	0.0	0.0	0.0	0.0	0.0
Monroe County	428	428	428	428	428
LEC Planning Area Total	**82,377**	**81,827**	**82,677**	**83,615**	**84,553**

Table A-25. Net irrigation demand under average rainfall conditions for REC Self-Supply in the LEC Planning Area.

Area	Net Irrigation Demand – Average Rainfall Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County – Coastal	60.5	59.1	60.2	61.4	62.5
Palm Beach County – EAA	0.0	0.0	0.0	0.0	0.0
Broward County	37.7	38.3	38.3	38.3	38.3
Miami-Dade County	12.8	12.9	13.0	13.0	13.1
Hendry County – EAA	0.0	0.0	0.0	0.0	0.0
Hendry County – Western Basins	0.0	0.0	0.0	0.0	0.0
Monroe County	0.7	0.7	0.7	0.7	0.7
LEC Planning Area Total	**111.7**	**111.0**	**112.2**	**113.4**	**114.6**

Table A-26. Net irrigation demand under 1-in-10 year drought conditions for REC Self-Supply in the LEC Planning Area.

Area	Net Irrigation Demand – 1-in-10 Year Drought Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County – Coastal	74.8	73.2	74.5	75.9	77.4
Palm Beach County – EAA	0.0	0.0	0.0	0.0	0.0
Broward County	47.2	47.9	47.9	47.9	47.9
Miami-Dade County	15.3	15.4	15.5	15.6	15.7
Hendry County – EAA	0.0	0.0	0.0	0.0	0.0
Hendry County – Western Basins	0.0	0.0	0.0	0.0	0.0
Monroe County	0.8	0.8	0.8	0.8	0.8
LEC Planning Area Total	**138.1**	**137.3**	**138.7**	**140.2**	**141.8**

Table A-27. Gross irrigation demand under average rainfall conditions for REC Self-Supply in the LEC Planning Area.

Area	Gross Irrigation Demand – Average Rainfall Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County – Coastal	80.6	78.9	80.3	81.8	83.4
Palm Beach County – EAA	0.0	0.0	0.0	0.0	0.0
Broward County	50.3	51.0	51.0	51.0	51.0
Miami-Dade County	17.1	17.2	17.3	17.4	17.5
Hendry County – EAA	0.0	0.0	0.0	0.0	0.0
Hendry County – Western Basins	0.0	0.0	0.0	0.0	0.0
Monroe County	0.9	0.9	0.9	0.9	0.9
LEC Planning Area Total	**148.9**	**148.0**	**149.5**	**151.1**	**152.8**

Table A-28. Gross irrigation demand under 1-in-10 year drought conditions for REC Self-Supply in the LEC Planning Area.

Area	Gross Irrigation Demand – 1-in-10 Year Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County – Coastal	99.7	97.6	99.3	101.2	103.2
Palm Beach County – EAA	0.0	0.0	0.0	0.0	0.0
Broward County	62.9	63.8	63.8	63.8	63.8
Miami-Dade County	20.4	20.5	20.6	20.8	20.9
Hendry County – EAA	0.0	0.0	0.0	0.0	0.0
Hendry County – Western Basins	0.0	0.0	0.0	0.0	0.0
Monroe County	1.0	1.0	1.0	1.0	1.0
LEC Planning Area Total	**184.0**	**182.9**	**184.7**	**186.8**	**188.9**

POWER GENERATION SELF-SUPPLY

The primary use of water at thermoelectric power plants is for cooling purposes. Additional water uses at power plants include boiler make-up water and ancillary uses, such as domestic-type use by employees.

In the LEC Planning Area, and in most of South Florida, PWR Self-Supply demand has been met by flow-through cooling using tidal water—not fresh water or brackish groundwater. However, this pattern is changing as new generation or expansion of existing facilities is being evaluated. These plants may utilize different cooling technologies based on environmental, economical, and technically feasible components most appropriate to site-specific conditions. The different process and cooling technologies may require and utilize traditional and alternative water supply sources.

Florida Power & Light (FPL) is a major electrical power supplier serving South Florida. FPL uses a diverse mix of fuels at their power plants to generate electricity. FPL currently generates most of its electricity from natural gas. In 2010, three power generation facilities were located within the LEC Planning Area and permitted to withdraw water: FPL West County Energy Center in Palm Beach County, FPL Turkey Point Plant in Miami-Dade County, and Homestead Municipal Power Plant in Miami-Dade County. The Homestead Municipal Power Plant is owned by the City of Homestead.

In the West County Energy Center and Turkey Point Plant, FPL uses natural gas combined cycle technology, which produces electricity from two sources of energy instead of one. In a combined cycle power plant, a gas turbine generator produces electricity, and heat in the exhaust is also used to make steam, which in turn drives a turbine to generate additional electricity. This technology is about 30 percent more efficient than a traditional steam plant. The FPL West County Energy Center started serving customers in 2009. After the initial startup period, brackish water and surface water were utilized for the cooling system. However, in 2010, Palm Beach County began providing reclaimed water (approximately 22 to 27 MGD contracted) to this facility for cooling purposes.

FPL increased its power generation capacity at the existing Turkey Point plant by adding combined cycle generating technology to respond to significant population growth in South Florida. Unit 5 is a natural gas-fired combined-cycle unit that uses groundwater drawn from the Floridan aquifer while the other four units, Units 1–4, use water from the closed cycle recirculation canal system. FPL proposed to use up to 90 MGD of reclaimed water from Miami-Dade Water and Sewer Department to cool a planned expansion of nuclear generation at Turkey Point (Units 6 and 7) as well.

The Homestead Municipal Power Plant is a municipally owned peaking plant. A peaking plant generally runs only when there is a high demand for electricity. The plant utilizes a once-through cooling system and water is withdrawn from the Biscayne aquifer via 10 existing facilities as needed depending on which generating unit is online. The cooling water discharge point is approximately three miles upstream of SFWMD's salinity control structure S-179 and therefore, the effluent is generally returned to the aquifer locally and not discharged to tide.

The Cutler and Lauderdale FPL plants use seawater, which is not addressed in water supply plans. FPL removed the 1960s era units at the Riviera Plant in 2012 and will replace them with new, state-of-the-art high efficiency units. The plant will begin serving customers again in 2014 when it will return to service as a "next generation clean energy center." The Riviera Plant will use water from the Intracoastal Waterway for once-through cooling water. FPL removed the Port Everglades Plant in 2013 and plans to repower it. Once complete, the rebuilt facility will be known as the Port Everglades Energy Center. The Port Everglades Plant may also use water from the Intracoastal Waterway for once-through cooling purposes as it does currently; however, reclaimed water is also an option.

Projection Methodology

Water demand projections were made in conjunction with FPL to reflect expectations for power demand growth; strategies for obtaining the electricity to meet demand, which leads to estimation of power plant construction; capacity, types, and locations of power plants; types of cooling facilities; and ability to achieve efficiencies in water use. Most of these factors are subject to considerable uncertainty. The efficacy of meeting demand from freshwater and saltwater sources needs further consideration, as does the cost-effectiveness of design and operational strategies that could significantly reduce water use.

Projection Results

Projected PWR Self-Supply water demand is presented in **Table A-29**. These projections are based on current usage and are assumed to remain the same between average rainfall and 1-in-10 year drought conditions. Because no distinction is needed between net and gross water in this use category, demand is the same. The estimates presented in **Table A-29** include only the generating capacity expected to be located in the LEC Planning Area. Additional capacity has been proposed for areas within the Lake Okeechobee Service Area. This demand was included in the *2011 Upper East Coast Water Supply Plan Update* (SFWMD 2011), *2012 Lower West Coast Water Supply Plan Update* (SFWMD 2012), and upcoming Lower Kissimmee Basin Water Supply Plan Update.

Table A-29. PWR Self-Supply water demand projections.

County	Facility Name	Water Demand Projections (MGD)				
		2010	2015	2020	2025	2030
Palm Beach	FPL West County Energy Center (existing) [a]	5.2	0.0	0.0	0.0	0.0
Miami-Dade	FPL Turkey Point – Unit 5 (existing)	5.0	6.0	7.0	8.0	9.0
	Homestead Municipal (existing)	1.5	1.5	1.5	1.5	1.5
	Miami-Dade Total	**6.5**	**7.5**	**8.5**	**9.5**	**10.5**
LEC [b]	FPL Proposed	0.0	0.0	7.6	15.2	22.8
LEC Planning Area Total		**11.7**	**7.5**	**16.1**	**24.7**	**33.3**

a. This plant started receiving reclaimed water from Palm Beach County in 2010.
b. Location to be determined.

Another potential plant may be sited in the LEC Planning Area, possibly in Hendry County where FPL has purchased land. The demand associated with this future plant is 22.8 MGD in 2030. Net PWR Self-Supply is projected to increase from 12 MGD in 2010 to 33 MGD by 2030 (**Table A-29**) in the LEC Planning Area. The projections also account for potential power generation growth and proposed expansion, which may utilize different cooling technologies. The different process and cooling technologies may require and utilize traditional and alternative water supply sources including captured excess storm water, groundwater from the Floridan aquifer, and reclaimed water when feasible. However. the

projections do not include saltwater withdrawals or demand met by reclaimed water at the FPL power plants because saltwater and reclaimed sources do not require a SFWMD permit.

In the 2005–2006 LEC Plan Update, the estimated PWR Self-Supply freshwater demand for 2005 was only 4.5 MGD, but was expected to grow to 102.9 MGD by 2025 to support proposed new power generating facilities (SFWMD 2007). However, FPL's use of seawater, modernization of plants, and use of reclaimed water when available, contributed to the decrease in PWR Self-Supply water demand.

TOTAL PLANNING AREA DEMAND AND PLAN COMPARISONS

Total Planning Area Demand

This section summarizes both the total net (finished) demand and total gross (raw) demand for each county as well as the entire LEC Planning Area for both average rainfall and 1-in-10 year drought conditions. Net water demands by county are provided in **Table A-30** for average rainfall conditions and **Table A-31** for 1-in-10 drought conditions. Gross water demands by county are provided in **Table A-32** for average rainfall conditions and **Table A-33** for 1-in-10 year drought conditions. **Table A-34** shows net demand and **Table A-35** presents estimated gross water demand from 2010 to 2030 for the entire LEC Planning Area under average rainfall and 1-in-10 year drought conditions.

Table A-30. Summary of finished water demand for average rainfall conditions by county for each five-year increment.

Water Use Category	Net Water Demand – Average Rainfall Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County					
Public Water Supply	207.4	221.1	233.1	248.9	261.5
Domestic Self-Supply	12.9	12.9	13.4	12.8	12.8
Agricultural Self-Supply	233.9	232.5	233.6	234.4	235.8
Industrial/Commercial/Institutional Self-Supply	5.4	4.8	3.5	3.5	3.5
Recreational/Landscape Self-Supply	60.5	59.1	60.2	61.4	62.5
Power Generation Self-Supply	5.2	0.0	0.0	0.0	0.0
Palm Beach County Total	**525.3**	**530.4**	**543.8**	**561.0**	**576.1**
Broward County					
Public Water Supply	214.9	222.7	230.8	238.5	245.6
Domestic Self-Supply	0.9	1.0	0.7	1.0	1.0
Agricultural Self-Supply	1.1	1.0	1.1	1.2	1.3
Industrial/Commercial/Institutional Self-Supply	1.6	1.1	1.2	1.3	1.3
Recreational/Landscape Self-Supply	37.7	38.3	38.3	38.3	38.3
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Broward County Total	**256.2**	**264.1**	**272.1**	**280.3**	**287.5**
Miami-Dade County					
Public Water Supply	345.1	360.9	377.4	393.2	409.0
Domestic Self-Supply	3.3	3.5	3.6	3.8	3.9
Agricultural Self-Supply	48.5	46.5	47.0	47.3	47.7
Industrial/Commercial/Institutional Self-Supply	37.3	34.6	54.0	51.8	51.8
Recreational/Landscape Self-Supply	12.8	12.9	13.0	13.0	13.1
Power Generation Self-Supply	6.5	7.5	8.5	9.5	10.5
Miami-Dade County Total	**453.5**	**465.9**	**503.5**	**518.6**	**536.0**
Monroe County					
Public Water Supply	16.5	17.7	19.0	20.4	21.7
Domestic Self-Supply	0.0	0.0	0.0	0.0	0.0
Agricultural Self-Supply	0.03	0.03	0.03	0.03	0.03
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.7	0.7	0.7	0.7	0.7
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Monroe County Total	**17.2**	**18.4**	**19.7**	**21.1**	**22.4**
Hendry County					
Public Water Supply	0.0	0.0	0.0	0.0	0.0
Domestic Self-Supply	0.2	0.2	0.2	0.2	0.2
Agricultural Self-Supply	76.5	74.0	66.7	72.3	77.4
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.0	0.0	0.0	0.0	0.0
Power Generation Self-Supply	0.0	0.0	7.6	15.2	22.8
Hendry County Total	**76.7**	**74.2**	**74.5**	**87.7**	**100.4**
LEC Planning Area Total					
Public Water Supply	783.8	822.4	860.3	900.9	937.8
Domestic Self-Supply	17.3	17.5	17.9	17.8	17.9
Agricultural Self-Supply	360.0	354.0	348.4	355.2	362.2
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	111.7	111.0	112.2	113.4	114.6
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	**1,328.8**	**1,352.9**	**1,413.6**	**1,468.6**	**1,522.4**

Table A-31. Summary of finished water demand for 1-in-10 year drought conditions by county for each five-year increment.

Water Use Category	Net Water Demand – 1-in-10 Year Drought Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County					
Public Water Supply	233.5	249.1	262.8	280.5	294.8
Domestic Self-Supply	14.3	14.3	14.8	14.2	14.2
Agricultural Self-Supply	522.8	520.6	522.1	523.2	524.8
Industrial/Commercial/Institutional Self-Supply	5.4	4.8	3.5	3.5	3.5
Recreational/Landscape Self-Supply	74.8	73.2	74.5	75.9	77.4
Power Generation Self-Supply	5.2	0.0	0.0	0.0	0.0
Palm Beach County Total	792.8	798.3	814.3	834.3	852.1
Broward County					
Public Water Supply	236.5	245.2	254.0	262.6	270.3
Domestic Self-Supply	1.0	1.1	0.8	1.1	1.1
Agricultural Self-Supply	1.4	1.2	1.4	1.5	1.6
Industrial/Commercial/Institutional Self-Supply	1.6	1.1	1.2	1.3	1.3
Recreational/Landscape Self-Supply	47.2	47.9	47.9	47.9	47.9
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Broward County	**287.7**	**296.5**	**305.3**	**314.4**	**322.2**
Miami-Dade County					
Public Water Supply	375.1	392.3	410.2	427.4	444.5
Domestic Self-Supply	3.6	3.8	3.9	4.1	4.3
Agricultural Self-Supply	64.6	62.2	62.6	63.0	63.4
Industrial/Commercial/Institutional Self-Supply	37.3	34.6	54.0	51.8	51.8
Recreational/Landscape Self-Supply	15.3	15.4	15.5	15.6	15.7
Power Generation Self-Supply	6.5	7.5	8.5	9.5	10.5
Miami-Dade County	**502.4**	**515.8**	**554.7**	**571.4**	**590.2**
Monroe County					
Public Water Supply	17.0	18.3	19.6	21.0	22.4
Domestic Self-Supply	0.0	0.0	0.0	0.0	0.0
Agricultural Self-Supply	0.04	0.04	0.04	0.04	0.04
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.8	0.8	0.8	0.8	0.8
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Monroe County	**17.8**	**19.1**	**20.4**	**21.8**	**23.2**
Hendry County					
Public Water Supply	0.0	0.0	0.0	0.0	0.0
Domestic Self-Supply	0.2	0.2	0.2	0.2	0.2
Agricultural Self-Supply	114.3	111.0	101.1	108.5	115.0
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.0	0.0	0.0	0.0	0.0
Power Generation Self-Supply	0.0	0.0	7.6	15.2	22.8
Hendry County	**114.5**	**111.2**	**108.9**	**123.9**	**138.0**
LEC Planning Area Total					
Public Water Supply	841.5	883.1	924.0	967.6	1,007.4
Domestic Self-Supply	19.1	19.3	19.7	19.6	19.8
Agricultural Self-Supply	703.1	695.0	687.2	696.2	704.8
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	138.1	137.3	138.7	140.2	141.8
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	1,719.2	1,743.9	1,808.4	1,870.7	1,932.7

Table A-32. Summary of gross demand for average rainfall conditions by county for each five-year increment.

Water Use Category	Gross Water Demand – Average Rainfall Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County					
Public Water Supply	233.5	249.1	262.8	280.5	294.8
Domestic Self-Supply	13.4	13.4	13.9	13.4	13.3
Agricultural Self-Supply	454.7	452.1	453.8	455.1	457.1
Industrial/Commercial/Institutional Self-Supply	5.4	4.8	3.5	3.5	3.5
Recreational/Landscape Self-Supply	80.6	78.9	80.3	81.8	83.4
Power Generation Self-Supply	5.2	0.0	0.0	0.0	0.0
Palm Beach County	792.8	798.3	814.3	834.3	852.1
Broward County					
Public Water Supply	235.3	243.8	252.6	260.8	268.5
Domestic Self-Supply	1.0	1.0	0.7	1.0	1.1
Agricultural Self-Supply	2.0	1.5	1.8	2.0	2.3
Industrial/Commercial/Institutional Self-Supply	1.6	1.1	1.2	1.3	1.3
Recreational/Landscape Self-Supply	50.3	51.0	51.0	51.0	51.0
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Broward County	**290.2**	**298.4**	**307.3**	**316.1**	**324.2**
Miami-Dade County					
Public Water Supply	355.0	371.2	388.2	404.5	420.7
Domestic Self-Supply	3.5	3.6	3.8	3.9	4.1
Agricultural Self-Supply	66.2	63.7	64.2	64.7	65.1
Industrial/Commercial/Institutional Self-Supply	37.3	34.6	54.0	51.8	51.8
Recreational/Landscape Self-Supply	17.1	17.2	17.3	17.4	17.5
Power Generation Self-Supply	6.5	7.5	8.5	9.5	10.5
Miami-Dade County	**485.6**	**497.8**	**536.0**	**551.8**	**569.7**
Monroe County					
Public Water Supply	17.7	19.0	20.4	21.9	23.3
Domestic Self-Supply	0.0	0.0	0.0	0.0	0.0
Agricultural Self-Supply	0.1	0.1	0.1	0.1	0.1
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.9	0.9	0.9	0.9	0.9
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Monroe County	**18.7**	**20.0**	**21.4**	**22.9**	**24.3**
Hendry County					
Public Water Supply	0.0	0.0	0.0	0.0	0.0
Domestic Self-Supply	0.2	0.2	0.2	0.2	0.2
Agricultural Self-Supply	131.8	129.2	121.6	130.3	139.3
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.0	0.0	0.0	0.0	0.0
Power Generation Self-Supply	0.0	0.0	7.6	15.2	22.8
Hendry County	**132.0**	**129.4**	**129.4**	**145.7**	**162.3**
LEC Planning Area Total					
Public Water Supply	841.5	883.1	924.0	967.6	1007.4
Domestic Self-Supply	18.0	18.2	18.6	18.5	18.7
Agricultural Self-Supply	654.8	646.6	641.5	652.2	663.9
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	148.9	148.0	149.5	151.1	152.8
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	1719.2	1743.9	1808.4	1870.7	1932.7

Table A-33. Summary of gross demands for 1-in-10 year drought conditions by county for each five-year increment.

Water Use Category	Gross Water Demand – 1-in-10 Year Drought Conditions (MGD)				
	2010	2015	2020	2025	2030
Palm Beach County					
Public Water Supply	259.0	276.2	291.4	311.1	327.0
Domestic Self-Supply	14.9	14.9	15.4	14.8	14.8
Agricultural Self-Supply	1,024.2	1,021.0	1,022.8	1,024.6	1,024.2
Industrial/Commercial/Institutional Self-Supply	5.4	4.8	3.5	3.5	3.5
Recreational/Landscape Self-Supply	99.7	97.6	99.3	101.2	103.2
Power Generation Self-Supply	5.2	0.0	0.0	0.0	0.0
Palm Beach County Total	**1,408.4**	**1,414.5**	**1,432.4**	**1,455.2**	**1,472.7**
Broward County					
Public Water Supply	259.1	268.4	278.1	287.1	295.6
Domestic Self-Supply	1.1	1.1	0.8	1.2	1.2
Agricultural Self-Supply	2.4	2.0	2.3	2.6	2.9
Industrial/Commercial/Institutional Self-Supply	1.6	1.1	1.2	1.3	1.3
Recreational/Landscape Self-Supply	62.9	63.8	63.8	63.8	63.8
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Broward County Total	**327.1**	**336.4**	**346.2**	**356.0**	**364.8**
Miami-Dade County					
Public Water Supply	385.9	403.5	422.0	439.7	457.3
Domestic Self-Supply	3.8	3.9	4.1	4.3	4.4
Agricultural Self-Supply	86.5	83.6	84.0	84.6	85.0
Industrial/Commercial/Institutional Self-Supply	37.3	34.6	54.0	51.8	51.8
Recreational/Landscape Self-Supply	20.4	20.5	20.6	20.8	20.9
Power Generation Self-Supply	6.5	7.5	8.5	9.5	10.5
Miami-Dade County Total	**540.4**	**553.6**	**593.2**	**610.7**	**629.9**
Monroe County					
Public Water Supply	18.2	19.6	21.1	22.6	24.0
Domestic Self-Supply	0.0	0.0	0.0	0.0	0.0
Agricultural Self-Supply	0.1	0.1	0.1	0.1	0.1
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	1.0	1.0	1.0	1.0	1.0
Power Generation Self-Supply	0.0	0.0	0.0	0.0	0.0
Monroe County Total	**19.3**	**20.7**	**22.2**	**23.7**	**25.1**
Hendry County					
Public Water Supply	0.0	0.0	0.0	0.0	0.0
Domestic Self-Supply	0.2	0.2	0.2	0.2	0.2
Agricultural Self-Supply	208.5	205.8	194.3	207.7	220.3
Industrial/Commercial/Institutional Self-Supply	0.0	0.0	0.0	0.0	0.0
Recreational/Landscape Self-Supply	0.0	0.0	0.0	0.0	0.0
Power Generation Self-Supply	0.0	0.0	7.6	15.2	22.8
Hendry County	**208.7**	**206.0**	**202.1**	**223.1**	**243.3**
LEC Planning Area Total					
Public Water Supply	922.2	967.8	1,012.6	1,060.4	1,104.0
Domestic Self-Supply	19.9	20.1	20.5	20.5	20.6
Agricultural Self-Supply	1,321.7	1,312.5	1,303.5	1,319.6	1,332.5
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	184.0	182.9	184.7	186.8	188.9
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	**2,503.8**	**2,531.3**	**2,596.1**	**2,668.6**	**2,735.9**

Table A-34. Finished water demand by water use category for the entire LEC Planning Area.

Water Use Category	Finished (Net) Water Demand (MGD)				
	2010	2015	2020	2025	2030
Average Rainfall Conditions					
Public Water Supply	783.8	822.4	860.3	900.9	937.8
Domestic Self-Supply	17.3	17.5	17.9	17.8	17.9
Agricultural Self-Supply	360.0	354.0	348.4	355.2	362.2
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	111.7	111.0	112.2	113.4	114.6
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	**1,328.8**	**1,352.9**	**1,431.6**	**1,468.6**	**1,522.4**
1-in-10 Year Drought Conditions					
Public Water Supply	858.5	901.0	942.3	987.0	1,027.2
Domestic Self-Supply	19.1	19.3	19.7	19.6	19.8
Agricultural Self-Supply	703.1	695.0	687.2	696.2	704.8
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	138.1	137.3	138.7	140.2	141.8
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	**1,774.8**	**1,800.6**	**1,862.7**	**1,924.3**	**1,983.5**

Table A-35. Gross water demand by water use category for the entire LEC Planning Area.

Water Use Category	Gross Water Demand (MGD)				
	2010	2015	2020	2025	2030
Average Rainfall Conditions					
Public Water Supply	841.5	883.1	924.0	967.6	1,007.4
Domestic Self-Supply	18.0	18.2	18.6	18.5	18.7
Agricultural Self-Supply	654.8	646.6	641.5	652.2	663.9
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	148.9	148.0	149.5	151.1	152.8
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	**1,719.2**	**1,743.9**	**1,808.4**	**1,870.7**	**1,932.7**
1-in-10 Year Drought Conditions					
Public Water Supply	922.2	967.8	1,012.6	1,060.4	1,104.0.
Domestic Self-Supply	19.9	20.1	20.5	20.5	20.6
Agricultural Self-Supply	1,321.7	1,312.5	1,303.5	1,319.6	1,332.5
Industrial/Commercial/Institutional Self-Supply	44.3	40.5	58.7	56.6	56.6
Recreational/Landscape Self-Supply	184.0	182.9	184.7	186.8	188.9
Power Generation Self-Supply	11.7	7.5	16.1	24.7	33.3
LEC Planning Area Total	**2,503.8**	**2,531.3**	**2,596.1**	**2,668.6**	**2,735.9**

Comparison of 2005–2006 LEC Plan Update Amendment and Current Update Projected Water Demands

The top part of **Table A-36** compares the projected average rainfall condition gross water demand estimated in the 2005–2006 LEC Plan Update with those estimated for this update. The bottom half of **Table A-36** shows the same for the projected 1-in-10 year drought conditions water demand. The most significant differences between the demand estimates in the 2005–2006 LEC Plan Update and this update relate to the following developments:

- Subsequent to approval of the 2005–2006 LEC Plan Update in February 2007, the nation's economy fell into a long recession that had significant impacts on regional water supply planning, lowering population and demand forecasts. The dramatic slowdown in population growth occurred at the same time that consumption of potable water declined as measured in gallons per person per day. Reasons for this decrease in PWS consumption likely include short-term water shortage restrictions in response to droughts, long-term water conservation projects including SFWMD's Year-Round Landscape Irrigation Conservation Measures, and increased use of reclaimed water.
- The rise in the total REC Self-Supply total demand is attributed to the landscape component, not golf courses. The landscape component grew rapidly in response to community development and common areas requiring self-supply irrigation between the two plan evaluation periods.
- The decline in PWR Self-Supply relates to the continued increase in use of alternative sources such as reclaimed water, seawater, and coastal brackish water for thermo-cooling purposes and improvements in process efficiencies (less water demanded per kilowatt hour of energy produced).

Table A-36. End point projections of gross water demand under average rainfall and 1-in-10 year drought conditions in the 2005–2006 LEC Plan Update and this update.

Water Use Category	2005–2006 LEC Plan Update Demand for 2025 (MGD)	2013 LEC Plan Update Demand for 2030 (MGD)
Average Conditions		
Public Water Supply	1,286.5	1,007.4
Domestic Self-Supply	48.9	18.7
Agricultural Self-Supply	689.1	663.9
Industrial/Commercial/Institutional Self-Supply	61.3	56.6
Recreational/Landscape Self-Supply	84.8	152.8
Power Generation Self-Supply	102.6	33.3
LEC Planning Area Total	**2,273.2**	**1,932.7**
1-in-10 Year Drought Conditions		
Public Water Supply	1,363.7	1,104.0
Domestic Self-Supply	51.8	20.6
Agricultural Self-Supply	1,396.4	1,332.5
Industrial/Commercial/Institutional Self-Supply	61.3	56.6
Recreational/Landscape Self-Supply	104.4	188.9
Power Generation Self-Supply	102.6	33.3
LEC Planning Area Total	**3,080.2**	**2,735.9**

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B

Minimum Flows and Levels Criteria and Recovery and Prevention Strategies

Section 373.709, Florida Statutes (F.S.), requires each regional water supply plan to be based on at least a twenty-year planning period and include, among other items, the minimum flows and levels (MFL) criteria and associated recovery or prevention strategies adopted within the planning region. The plan must also identify any surface water or aquifers for which MFLs are scheduled to be adopted. This appendix provides additional and updated information since the *2000 Lower East Coast Regional Water Supply Plan* (2000 LEC Plan) (SFWMD 2000b) and the *2005–2006 Lower East Cost Water Supply Plan Update* (2005–2006 LEC Plan Update) (SFWMD 2007), as amended in 2008. The previous report on MFL prevention and recovery strategies was included in Appendix H of the 2005–2006 LEC Plan Update.

MINIMUM FLOWS AND LEVELS CRITERIA

The overall goal of Chapter 373, F.S. is to ensure the sustainability of water resources of the state (Section 373.016, F.S.). Chapter 373, F.S. provides the South Florida Water Management District (SFWMD) with several tools to carry out this responsibility, including MFL criteria. MFL criteria are the point at which further withdrawals would cause significant harm to water resources. Significant harm is defined as the level of harm that requires multiple years for the water resource to recover. This is considered more severe than the harm standard imposed in the water use permitting process, which relates to impacts that would occur during a 1-in-10 year drought. Therefore, MFLs in a recovered natural system would not be exceeded until conditions had already exceeded the 1-in-10 year drought level of certainty criteria. Serious harm, the ultimate harm to the water resources contemplated under Chapter 373, F.S., is defined as long-term, irreversible, or permanent loss to water resource functions. MFL water bodies approaching their MFL criteria are a factor the District's Governing Board considers when contemplating water shortage restrictions. The MFL criteria are not utilized to trigger water shortage restrictions during climatic conditions less severe than a 1-in-10 year level of drought. Rather, the District's Governing Board may impose water shortage restrictions if an MFL exceedance

occurs or is projected to occur during climatic conditions more severe than a 1-in-10 year drought, to the extent consumptive uses contribute to such exceedance.

The levels of impacts—harm, significant harm, and serious harm—are relative resource protection terms. Each plays a role toward achieving a sustainable water resource. The role of MFL criteria is shown conceptually in **Figure B-1**.

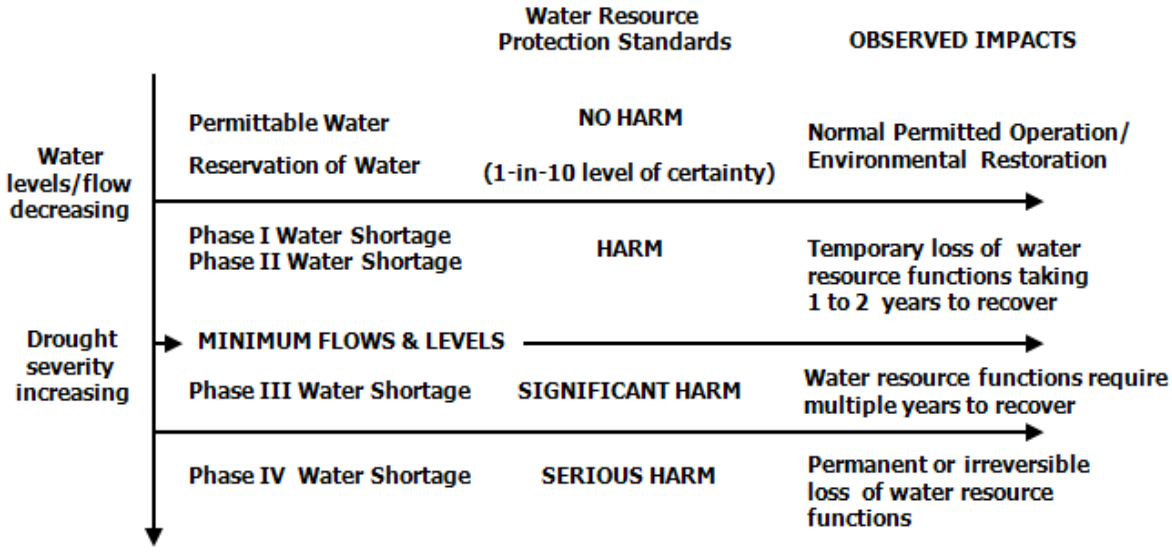

Figure B-1. Conceptual relationship among the harm, significant harm, and serious harm water resource protection standards.

Water use permitting protects the water resources from harm by ensuring water use is reasonable-beneficial, does not interfere with existing legal users, and is consistent with the public interest. As one of the tools for plan implementation, the 2000 LEC Plan recommended rulemaking to incorporate additional resource protection criteria, level of certainty, special designations, and permit durations into water use permitting criteria. A series of rulemaking efforts was completed in September 2003, resulting in amendments to Chapters 40E-1, 40E-2, 40E-5, 40E-8, 40E-20, and 40E-21, Florida Administrative Code (F.A.C.) and the *Basis of Review for Water Use Permit Applications within the South Florida Water Management District*, referred to as the Basis of Review (SFWMD 2012). Among the most significant changes were the amendments to permit duration, permit renewal, wetland protection, supplemental irrigation requirements, saltwater intrusion, aquifer storage and recovery, and model evaluation criteria.

The 2000 LEC Plan recommended that rulemaking should proceed when sufficient information was available and evaluated in the planning process. As a result, additional rules were adopted as technical information to establish MFL criteria became available. Within the Lower East Coast (LEC) Planning Area, between 2001 and 2006, MFL criteria were adopted for five water bodies. MFL rules have been established for Lake Okeechobee, the Everglades, the Biscayne aquifer (SFWMD 2000a), the Northwest Fork of the Loxahatchee River (SFWMD 2002a), and Florida Bay (SFWMD 2006a). Two additional MFL

rules were established during the same period for the Caloosahatchee River (SFWMD 2000c) and St. Lucie Estuary (SFWMD 2002b) located in the Lower West Coast and Upper East Coast planning areas, respectively. The priority water body schedule submitted to the Florida Department of Environmental Protection in 2013 includes evaluation of the existing MFL criteria for the Caloosahatchee River and Estuary and Florida Bay (Medellin 2013).

Lake Okeechobee

MFL criteria for Lake Okeechobee were established in 2001. Significant harm criteria were based on the relationship between water levels in the lake and the ability to 1) protect the coastal aquifer against saltwater intrusion, 2) supply water to Everglades National Park, 3) provide littoral zone habitat for fish and wildlife, and 4) ensure navigational and recreational access (SFWMD 2000a). Consideration was also given to the lake's function as a storage area for supplying water to adjacent areas, such as the Everglades Agricultural Area (EAA), the Seminole Tribe of Florida reservations, and the Lake Okeechobee Service Area. An MFL violation occurs in Lake Okeechobee when an exceedance occurs more than once every six years. An exceedance is a decline in lake level elevation below 11 feet related to the National Geodetic Vertical Datum of 1929 (NGVD) for more than 80, nonconsecutive or consecutive, days during an eighteen-month period. The eighteen-month period is initiated following the first day Lake Okeechobee falls below 11 feet NGVD, and does not include more than one wet season, defined as May 31 through October 31 of any given calendar year (Rule 40E-8.221, F.A.C.).

Revised Lake Okeechobee Regulation Schedule Effects

In 2000, with the transition to the Water Supply and Environment regulation schedule, an analysis was conducted to determine whether the proposed Lake Okeechobee MFL criteria could be expected to be violated over the next 20 years. This information was needed to assess whether a prevention or recovery strategy would be needed for Lake Okeechobee. The South Florida Water Management Model was used to evaluate the proposed MFL criteria in five-year increments through 2020. The analysis considered projected growth in water use demands on the lake, the scheduled delivery and performance of the Central and Southern Florida Flood Control Project Comprehensive Review Study project components (USACE and SFWMD 1999), and the Water Supply and Environment regulation schedule proposed for the lake. Details regarding the modeling analysis are available in the 2000 LEC Plan.

Under these assumptions, SFWMD found the proposed Lake Okeechobee MFL criteria would not be violated, and existing, as well as projected, users would have a 1-in-10 level of certainty providing the water shortage trigger line for Lake Okeechobee that existed in 2000 (Chapter 40E-22, F.A.C.) was lowered 0.5 feet. The proposed Water Supply and Environment regulation schedule was adopted by the United States Army Corps of Engineers (USACE) in July 2000. SFWMD conducted rulemaking to modify the water shortage trigger line and adopted the Lake Okeechobee MFL criteria with the associated prevention strategy in 2001.

However, in response to a series of hurricanes, high lake stage events, and the resulting harmful discharges to the Caloosahatchee and St. Lucie estuaries during 2004 and 2005, USACE initiated a process to revise the Water Supply and Environment regulation schedule to improve management of Lake Okeechobee during high water conditions. The goals of the regulation schedule modification process—known as the Lake Okeechobee Regulation Schedule Study—were later amended to address public health and safety concerns related to the structural competency of the Herbert Hoover Dike. In July 2007, after extensive public participation, USACE published the *Final Environmental Impact Statement Including Appendices A through G – Lake Okeechobee Regulation Schedule* (USACE 2007). The revised lake regulation schedule would effectively reduce lake stages until the completion of Herbert Hoover Dike repairs for Reaches 1, 2, and 3.

In developing the environmental impact statement, SFWMD, working with USACE, conducted modeling to evaluate the effects of the proposed regulation schedule in terms of frequency, duration, and severity of water shortage cutbacks, and the lake's MFL performance. Results of the modeling indicated that while the regulation schedule would effectively provide protection for public health and safety, the Lake Okeechobee MFL criteria was projected to be violated and existing legal uses were projected to experience significantly greater water shortage cutbacks. Attempts to mitigate the impacts to existing legal users of Lake Okeechobee water were evaluated, including the use of portable water supply pumps (to access lake water at lower stages) and dropping the water shortage trigger line an additional foot. While lowering the water shortage trigger line would reduce the duration and severity of water shortage cutbacks associated with the proposed schedule, it was found that lowering it was inconsistent with the MFL criteria and, therefore, SFWMD rejected it as an option. Despite the increased water shortage impacts to existing legal users, the protection of public safety as related to the structural integrity of the Herbert Hoover Dike was the overarching factor. USACE issued its record of decision approving the revised lake regulation schedule, referred to as the 2008 Lake Okeechobee Regulation Schedule (2008 LORS), on April 28, 2008.

While 2008 LORS is temporary, it is unclear when a revision can be made to the regulation schedule or what the schedule will entail. As a result, the original MFL prevention strategy included in the 2000 LEC Plan and Chapter 40E-8, F.A.C. was revised to a recovery strategy. The recovery strategy is discussed later in this appendix.

Everglades

MFL criteria were adopted for the Everglades in 2001. Technical relationships considered for developing these MFL criteria included the effects of water levels on hydric soils, plant and wildlife communities, and the frequency and severity of fires (SFWMD 2000a). Impacts associated with significant harm include increased peat oxidation, frequency of severe fires, soil subsidence, loss of aquatic refugia, loss of tree islands, and long-term changes in vegetation or wildlife habitat. The MFL criteria for the Everglades were based on protecting the two dominant soil types, peat-forming and marl-forming wetlands, found within the ecosystem.

Wetlands overlying organic peat soils (i.e., peatlands) are found within the Water Conservation Areas (WCAs), Rotenberger and Holey Land wildlife management areas, and Shark River Slough, which is within Everglades National Park. The minimum water levels within wetlands overlying organic peat soils shall not fall below ground surface for more than 30 days and shall not fall below 1.0 foot below ground for one day or more of that thirty-day period, at specific return frequencies for different areas. Paragraph 40E-8.221(3), F.A.C. identifies specific water levels for different areas within the Everglades (**Table B-1**).

Marl-forming wetlands are located east and west of Shark River Slough, the Rocky Glades, and Taylor Slough, which are within Everglades National Park. The minimum water levels within marl-forming wetlands shall not fall below ground surface for more than 90 days and shall not fall below 1.5 feet belowground for one day or more of that ninety-day period at specific return frequencies for different areas, as identified in **Table B-1**.

Table B-1. Minimum water level, duration, and return frequency for selected water management gauges located within the Everglades (Rule 40E-8.221(3), F.A.C.).

Area	Key Gauge	Soil Type	Minimum Depth and Duration	Return Frequency
Arthur R. Marshall Loxahatchee National Wildlife Refuge	1-7	Peat	-1.0 foot > 30 days	1-in-4 years
WCA 2A	2A-17	Peat	-1.0 foot > 30 days	1-in-4 years
WCA 2B	SITE_99 [a]	Peat	-1.0 foot > 30 days	1-in-3 years
Holey Land Wildlife Management Area	HoleyG	Peat	-1.0 foot > 30 days	1-in-3 years
Rotenberger Wildlife Management Area	Rotts	Peat	-1.0 foot > 30 days	1-in-2 years
Northwestern corner of WCA 3A	3A-NW	Peat	-1.0 foot > 30 days	1-in-4 years
Northwestern WCA 3A	3A-2	Peat	-1.0 foot > 30 days	1-in-4 years
Northeastern corner of WCA 3A	3A-3	Peat	-1.0 foot > 30 days	1-in-3 years
Northeastern WCA 3A	3A-NE	Peat	-1.0 foot > 30 days	1-in-2 years
Central WCA 3A	3A-4	Peat	-1.0 foot > 30 days	1-in-4 years
Southern WCA 3A	3A-28	Peat	-1.0 foot > 30 days	1-in-4 years
WCA 3B	3BS1W1 [a]	Peat	-1.0 foot > 30 days	1-in-7 years
Northeastern Shark River Slough	NESRS-2	Peat	-1.0 foot > 30 days	1-in-10 years
Central Shark River Slough	NP-33	Peat	-1.0 foot > 30 days	1-in-10 years
Southwestern Shark River Slough	NP 36	Peat	-1.0 foot > 30 days	1-in-7 years
Marl wetlands east of Shark River Slough	NP-38	Marl	-1.5 foot > 90 days	1-in-3 years
Marl wetlands west of Shark River Slough	NP-201 G-620	Marl	-1.5 foot > 90 days	1-in-5 years
Rockland Marl Marsh	RG1 [a]	Marl	-1.5 foot > 90 days	1-in-2 years
Taylor Slough	NP-67	Marl	-1.5 foot > 90 days	1-in-2 years

a. Monitoring locations have been updated to alternative sites since rule adoption.

Since inception, three of the monitoring locations have been updated to alternative monitoring locations. In WCA 2B, the SITE_99 gauge replaced the nearby 2B-21 gauge that became inoperable following hurricane damage. In WCA 3B, the 3BS1W1 gauge is used as a surrogate to the 3B-SE gauge due to availability of real-time data from 3BS1W1 via telemetry that is not available at the original 3B-SE site. Likewise, in Everglades National

Park, the telemetered, real-time RG1 gauge is used as a surrogate to the G-1502 gauge, which has a several month lag. Only short distance shifts (approximately 1 mile) in monitoring locations were made and no changes were made to the MFL criteria for these sites.

Northwest Fork of the Loxahatchee River

The MFL criteria for Northwest Fork of the Loxahatchee River were adopted in 2002 (40E-8.221(1), F.A.C.). The Loxahatchee River and Estuary watershed is located on the southeastern coast of Florida in Martin and Palm Beach counties. It includes the Northwest, Southwest, and North Forks of the Loxahatchee River, a major drainage canal (C-18), the surrounding watershed, and the estuary. This system is of particular importance because the Northwest Fork was designated as Florida's first National Wild and Scenic River in 1985.

Minimum flow criteria for the Northwest Fork are linked to the concept of protecting valued ecosystem components from significant harm. The value ecosystem component identified for the Northwest Fork is the river's freshwater floodplain swamp. The designation of the Northwest Fork as a National Wild and Scenic River identified the floodplain swamp and its associated cypress forest as a resource of outstanding value that needs to be protected. Since cypress trees tolerate a wide range of salinity conditions and are slow to show a response to salinity stress, an assemblage of six freshwater tree species that, as a group, are a more sensitive indicator of adverse salinity condition were identified as characterizing the floodplain swamp. Protection of these species will assure the floodplain swamp and their associated communities of freshwater species are protected from significant harm. This is described in the *Final Draft Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River* (SFWMD 2002a).

Pursuant to paragraph 40E-8.221(1), F.A.C., an MFL violation occurs in the Northwest Fork of the Loxahatchee River when an MFL exceedance occurs more than once in a six-year period. An MFL exceedance occurs when flows over the Lainhart Dam decline below 35 cubic feet per second (cfs) for more than 20 consecutive days, or the average daily salinity concentration expressed as a twenty-day rolling average exceeds 2 parts per thousand[4] within any given calendar year. The average daily salinity will be representative of mid-depth in the water column at River Mile 9.2 (SFWMD 2002a).

Flow at Lainhart Dam is estimated using headwater and tailwater elevations, the width of the flow, and estimated elevation of the logs that comprise the dam, also known as the sill elevation. The effective sill elevation changes over time because of debris accumulation (e.g., vegetation, trees branches, etc.) or damage to the logs, leading to the need to regularly measure flows at this site to recalibrate the flow rating equations. Additionally, the earthen banks of the Loxahatchee River at Lainhart Dam have scoured over time, particularly during the last four years. This scouring induces leakage that affects the estimated flows. To ensure that reliable estimates of flow are available for compliance with the 35-cfs minimum flow

[4] While common practice is to no longer use units with salinity measurements, the rule uses the units parts per thousand and were used in this section for consistency with the rule.

criteria at the Lainhart Dam, SFWMD made over twenty discharge measurements in the last two years to verify, and when necessary, recalibrate the rating. To ensure that the rating remains valid to assess MFL compliance, new field flow measurements must be collected regularly for flow rating validation and recalibration. The United States Geological Survey is taking over the site and intends to regularly measure flow to recalibrate the rating equations until the dam can be structurally stabilized.

Biscayne Aquifer

In 2001, MFL criteria for the Biscayne aquifer were developed and adopted by rule based on analysis of relationships among groundwater levels and canal water levels, and the potential for saltwater intrusion (SFWMD 2000a). Harm occurs when the saltwater interface moves farther inland than occurred historically due to seasonal water level fluctuations, up to and including a 1-in-10 year drought. Significant harm occurs when saline groundwater moves inland to an extent that it limits the ability of users to obtain fresh groundwater and several years are required for the freshwater source to recover. The MFL criteria do not address the groundwater base flows to Biscayne Bay.

The minimum level for the Biscayne aquifer is the water level associated with movement of the saltwater interface landward to the extent that groundwater quality at the withdrawal point is insufficient to serve as a water supply source. **Table B-2** provides the minimum canal operational levels for 11 primary water management structures that SFWMD maintains. To meet the operational criteria, the canal stage cannot fall below the levels for more than 180 days, and the average annual stage must be sufficient to allow levels and chloride concentrations in the aquifer to recover to levels that existed before a drought or discharge event occurred.

Table B-2. Minimum canal operation levels of coastal canals associated with the Biscayne aquifer MFL (SFWMD 2000a).

Canal	Structure	Minimum Canal Operation Levels to Protect Against MFL Violations (feet NGVD)
C-51	S-155	7.80
C-16	S-41	7.80
C-15	S-40	7.80
Hillsboro	G-56	6.75
C-14	S-37B	6.50
C-13	S-36	4.00
North New River	G-54	3.50
C-9	S-29	2.00
C-6	S-26	2.50
C-4	S-25B	2.50
C-2	S-22	2.50

Florida Bay

MFL criteria for Florida Bay were adopted in 2006 (40E-8.221(5), F.A.C.). The rule is supported by analyses documented in the *Technical Documentation to Support Development of Minimum Flows and Levels for Florida Bay* (SFWMD 2006a). An MFL violation occurs in northeastern Florida Bay when an MFL exceedance occurs during two successive years, more than once in a ten-year period. An exceedance of the MFL criteria will be deemed to occur when the average salinity over 30 or more consecutive days exceeds 30 parts per thousand[5] at the Taylor River salinity monitoring station, located at 25° 13' 29" north and 80° 39' 10" west (SFWMD 2006b). Multiple events of 30 or more day periods with salinity greater than 30 parts per thousand, occurring within a single calendar year, are considered a single exceedance.

The criteria are based on the needs of submerged aquatic vegetation (SAV) habitat within the Taylor River/Little Madeira Bay/Eagle Key gradient. SAV is a critical component of the Florida Bay ecosystem. Freshwater discharges from the regional water management system have a direct effect on salinity conditions in the Everglades–Florida Bay Transition Zone and influence adjacent waters of northeastern Florida Bay. Widgeon grass (*Ruppia maritima)* is an indicator of SAV habitat and ecosystem status. Widgeon grass is responsive to salinity change in the transition zone and, compared to other SAV species in this zone, is tolerant of high salinity. When widgeon grass is eliminated by high salinity, SAV habitat is lost. A threshold condition averaging above 30 parts per thousand for 30 days during two consecutive years is identified as a condition that causes a long-term (requiring at least two years for recovery) impact on widgeon grass and the ecosystem. High salinity conditions that cause loss of SAV in the transition zone result in loss of other resources and functions including loss of habitat; decreased productivity and food for waterfowl, forage fishes, and invertebrates; destabilization of sediments; and reduced nutrient retention and degraded water quality throughout the transition zone.

RECOVERY AND PREVENTION STRATEGIES

Section 373.0421, F.S. requires that once the MFL technical criteria have been established, the water management districts must develop and expeditiously implement a recovery or prevention strategy for those water bodies currently exceeding, or expected to exceed, the MFL criteria. Analyses of current and future conditions were conducted for each of the water bodies for which MFL criteria had been defined. When the evaluation showed MFL criteria were not being achieved or will not be met in the future, MFL recovery strategies were developed. When evaluations demonstrated the MFL criteria would not be expected to be violated for the next 20 years, an MFL prevention strategy was developed. The recovery or prevention strategy must include a list of projects that develop additional water supplies and other actions. The phasing or timetable for each project must be included within the strategy.

[5] While common practice is to no longer use units with salinity measurements, the rule uses the units parts per thousand and were used in this section for consistency with the rule.

Section 373.0421(2), F.S. provides the following in part:

> The recovery or prevention strategy shall include phasing or a timetable which will allow for the provision of sufficient water supplies for all existing and projected reasonable-beneficial uses, including development of additional water supplies and implementation of conservation and other efficiency measures concurrent with, to the extent practical, and to offset, reductions in permitted withdrawals, consistent with the provisions of this chapter.

Section 373.709, F.S., requires regional water supply plans to contain recovery and prevention strategies needed to achieve compliance with MFLs during the planning period. The implementation of such projects will allow for the orderly replacement or enhancement of existing water sources with alternative supplies to provide sufficient water for all existing and projected reasonable-beneficial uses, consistent with Section 373.0421, F.S. Due to extreme variations in water resource conditions, climatic conditions, hydrologic conditions, and economic considerations that will be faced when implementing the MFL rules, it is critical for flexibility to apply such criteria and to reserve for the Governing Board the ability to implement water resource protection and allocation programs considering all of the District's missions under Chapter 373, F.S., and to balance water supply, flood protection, resource protection, and water quality protection needs. Additional information concerning the MFL prevention and recovery strategies can be found in Rule 40E-8.421, F.A.C.

The following sections discuss the MFL recovery and prevention strategies developed for LEC Planning Area water bodies. These include recovery strategies for Lake Okeechobee, the Everglades, and the Northwest Fork of the Loxahatchee River, and prevention strategies for the Biscayne aquifer and Florida Bay. Recovery strategies consist of three elements: 1) capital projects, 2) regulatory, and 3) water shortage.

Capital Projects Element

Projects have been identified that will provide water to meet MFL criteria, some of which have been completed and are operational. The scale of these projects ranges from relatively simple water control structures to over 14,000 acre aboveground impoundments. Multiple agencies support the projects including Comprehensive Everglades Restoration Plan (CERP) projects, USACE projects, and SFWMD initiatives and programs, such as implementing CERP components prior to congressional authorization. Details and the status of projects and programs identified can be found in **Chapter 4.**

CERP provides a framework and guide to restore, protect, and preserve the water resources of central and southern Florida, including the Everglades. It covers 16 counties over an 18,000-square-mile area and centers on an update of the Central & Southern Florida (C&SF) Project also known as the Restudy. The Plan was approved in the Water Resources Development Act (WRDA) of 2000. It includes more than 60 elements, will take more than 30 years to construct, and the current estimate in October 2009 dollars is $12.3 billion for

projects (see **Table B-3** for some of the CERP projects from the MFL Prevention and Recovery Strategies). The CERP project development process (**Figure B-2**) includes:

Planning – A project Implementation Report (PIR) is developed for each project that includes all of the engineering and environmental studies, project alternative, evaluation and testing results, and summaries of public input. A recommended project plan is identified as the alternative that best meets the goals and objectives of the project and the CERP.

Authorization and Appropriation – The PIR is sent for multiple state and federal agency and U.S. Congressional approvals, authorizations, and funding.

Design – During design, investigations are conducted to provide the information needed to develop detailed final plans and specifications for building the final project. In some cases, a pilot project (test) is conducted.

Construction – The construction period extends from the awarding of construction contract through completion, including supervision and inspection.

Operation and Maintenance – Each project has an Operations Plan that outlines operating schedules and criteria designed to achieve optimum results. Based on routine review and analyses, operations may be fine-tuned for improved performance.

Real Estate Acquisition – Many restoration projects require the acquisition of land. As of September 2012, a total of 243,147 acres, or 60 percent of lands needed to implement CERP were acquired.

Adaptive Assessment and Monitoring – This ongoing process measures the effect of restoration efforts on the greater Everglades ecosystem so, if needed, changes can be made to ensure CERP projects meet their intended objectives.

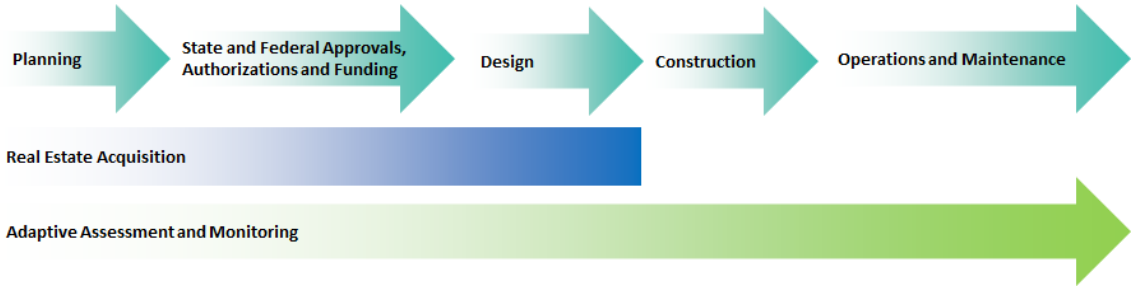

Figure B-2. Schematic of the CERP project development process.

To help achieve ecosystem benefits early, SFWMD is fast tracking various Everglades restoration projects. SFWMD continues to move forward with the design and construction of selected projects or portions of the projects identified in CERP. This includes projects listed on **Table B-3**.

Now under way, the Central Everglades Planning Project (CEPP) combines a series of CERP components into one project implementation report. The purpose of CEPP is to improve the quantity, quality, timing, and distribution of water flows to the central Everglades, which includes WCA 3 and Everglades National Park. Implementation of CEPP should achieve more natural flows by redirecting current regulatory/flood control releases of water from Lake Okeechobee that are discharged to the St. Lucie and Caloosahatchee estuaries and lost to tide. The opportunity to redirect this water south will improve the quality, quantity, timing, and distribution of flows to the Everglades and for other water-related needs in the region.

CEPP's scope includes integrated formulation of the following components envisioned in CERP: EAA Storage Reservoir, Flow to Northwest and Central WCA 3A, WCA 3 Decompartmentalization and Sheetflow Enhancement, Dade-Broward Levee/Pennsuco Wetlands, Bird Drive Recharge Area, L-31N Improvements and S-356 Structure for Seepage Management, and Everglades Rain-Driven Operations. The components under consideration and their benefits are evolving in the CERP planning process. SFWMD Governing Board support will precede the completion of the project implementation report, which will then be followed by the series of required federal approvals. These are needed prior to consideration by the United States Congress for authorization. Approval of federal and state funding for CEPP will then be necessary.

Regulatory Element

Where a recovery strategy has been established for an MFL water body, existing permitted allocations will not be modified or revoked prior to permit expiration unless a new or alternative source is in place and operating to supply the water provided from the MFL water body. When existing permits are renewed, the permittees are required to comply with all conditions of issuance. The rules implementing water resource protection tools, including Chapters 40E-2, 40E-8, 40E-20, 40E-21, 40E-22, F.A.C., and the *Applicant's Handbook Basis of Review for Water Consumptive Use Permits Within the South Florida Water Management District*, incorporated by reference in Rules 40E-2.091 and 40E-20.091, F.A.C., identify the specific factors and conditions will be applied to consumptive use direct and indirect withdrawals form MFL water bodies. Factors considered specific to compliance with the MFL are 1) the extent of MFL shortfall directly caused by existing legal uses and 2) the practicality of avoiding the need for reductions in permitted supplies, including structural and operational measures, by maximizing the beneficial uses of the existing water source.

Table B-3. Capital projects that provide water supplies for MFL recovery and prevention strategies. [a]

MFL Water Body	Capital Projects	Program	Status
Everglades (including WCAs and Everglades National Park) – projects needed for MFL recovery	Modified Water Deliveries to Everglades National Park	Department of Interior/USACE	Substantially complete
	C-111 Spreader Canal Western	CERP/SFWMD	Operational testing
	C-111 South Dade	SFWMD/USACE	Substantially complete
	Broward County Water Preserve Area – WCA 3A/3B Seepage Management	CERP	Planning and design complete. Waiting for congressional authorization
	Environmental Preserve at Marjory Stoneman Douglas Everglades Habitat [d]	CERP/SFWMD	Operational
	Fran Reich Preserve Reservoir	CERP	Under construction by USACE
	Broward County Water Preserve Area – C-11 Impoundment	CERP	Planning and design complete. Waiting for congressional authorization
	Broward County Water Preserve Area – C-9 Impoundment	CERP	Planning and design complete. Waiting for congressional authorization
	WCA 3 Decompartmentalization and Sheetflow Enhancement	CERP	Draft PIR complete [b]
	EAA Storage Reservoir on EAA A2 Site	CERP	Draft PIR complete [b]
	WCA 3B/Everglades National Park Seepage Management	CERP	Draft PIR complete [b]
Lake Okeechobee – projects needed for MFL recovery	Lake Okeechobee Watershed	CERP	To be determined
	Lake Okeechobee Watershed – Lakeside Ranch STA [d]	SFWMD	Phase I operational
	USACE Herbert Hoover Dike Major Rehabilitation	USACE	2022 [c]
Loxahatchee River - projects needed for MFL recovery	Loxahatchee River Watershed Restoration	CERP	Planning initiated
	Loxahatchee River Watershed Restoration – G-160 and G-161 Structures [d]	CERP/SFWMD	Operational
	Interim Use of L-8 Site	SFWMD	Operational
Florida Bay – projects needed for MFL prevention	Everglades National Park Seepage Management	CERP	Draft PIR complete [b]
	WCA 3 Decompartmentalization and Sheetflow Enhancement	CERP	Draft PIR complete [b]
	C-111 Spreader Canal Western [d]	CERP/SFWMD	Operational testing

a. MFL rules identify the general programs that will be used to develop and implement prevention or recovery, rather than specific projects. The potential role of specific projects to address MFL water needs is generally considered in the respective MFL technical supporting documentation.

b. Component of Central Everglades Planning Project.

c. Time shown is for rehabilitation of Reaches 1, 2, and 3, which may be sufficient to allow additional storage in Lake Okeechobee necessary to prevent MFL violations.

d. CERP project initiated by SFWMD.

Water Shortage Element

Water use cutbacks during drought conditions can also be implemented (e.g., phased water shortage restrictions to prevent significant or serious harm), if necessary, to minimize or avoid MFL criteria being exceeded, to the extent consumptive uses contribute to such exceedance. SFWMD may impose water shortage declarations to curb water use withdrawals pursuant to Sections 373.175 and 373.246, F.S. SFWMD implemented its water shortage authority by restricting water uses based on the concept of shared adversity between users and the water resources (Chapters 40E-21 and 40E-22, F.A.C.). Under this program, different levels or phases of water shortage restrictions with varying levels of severity are imposed relative to drought conditions. The four phases of current water shortage restrictions are based on progressively increasing resource impacts leading up to serious harm. Under the current program, Phase I and II water shortages primarily reduce water use through conservation techniques and minor use restrictions, such as limits on car washing and lawn watering. Phases III and IV require use cutbacks associated with some level of economic impact to the users, such as the potential for crop damage due to agricultural irrigation restrictions.

Established MFLs are considered in the evaluation of current water conditions (Paragraph 40E-21.221(3)(d), F.A.C.), and as one of the criteria for establishing water use restrictions (Paragraph 40E-21-271(3)(d), F.A.C.). This plan update does not propose use of Chapter 40E-21, F.A.C., as an MFL recovery strategy nor do Chapters 40E-8, F.A.C. and 40E-21, F.A.C. contemplate such action. However, when a drought occurs, SFWMD will rely on this water shortage plan, as needed, to address regional system water availability.

To the extent practicable, SFWMD attempts to implement water deliveries to reduce or prevent the MFL criteria from being exceeded. In the example of Lake Okeechobee, operational guidelines needed for implementation of water supply deliveries to avoid MFL exceedances, in concert with meeting other required water demands, are identified in the *Final Adaptive Protocols for Lake Okeechobee Operations* (SFWMD 2010).

SPECIFIC MFL RECOVERY AND PREVENTION STRATEGIES

Lake Okeechobee Recovery Strategy

As previously discussed, implementation of 2008 LORS is projected to result in MFL violations. As a result, the MFL recovery strategy is used to moderate impacts of an MFL violation during drought conditions, mitigate impacts of MFL violations during drought conditions, and depending upon USACE's lake regulation schedule in effect, minimize or avoid MFL violations. To achieve these goals, the Lake Okeechobee MFL recovery strategy consists of three elements: 1) capital project construction, 2) regulatory strategies (permit and water shortage criteria), and 3) habitat enhancements implemented during an MFL exceedance or violation.

Capital Project Element

The capital projects are presented in **Table B-3**. USACE has started the rehabilitation of the Herbert Hoover Dike. The initial step—construction of a 21.4-mile cutoff wall component in Reach 1—is scheduled for completion in 2013, and satisfies the majority of the risk reduction goals. As part of this risk reduction approach, the 32 water control structures (culverts) operated by USACE will be replaced, removed, or abandoned by 2018. Rehabilitation to Reaches 2 and 3 is scheduled for completion by 2022. USACE has indicated it will consider revisions to the lake regulation schedule at that time. Any increase in the lake's regulation schedule as a result of the repairs will likely be evaluated by USACE through a National Environmental Policy Act analysis of multiple objectives including flood protection, water supply, and the ecological health of the lake and downstream ecosystems. SFWMD anticipates any additional water resulting from a revised regulation schedule could return the lake to MFL prevention status, enhance the level of certainty to existing permitted users, and support other environmental objectives.

Additional capital projects include the construction of reservoirs north of Lake Okeechobee, which will store wet season flows that would otherwise be discharged to tide under 2008 LORS.

Regulatory Element

SFWMD implemented regulatory strategies for water uses of the lake that are expected to remain in effect until the Herbert Hoover Dike repairs and structural projects provide sufficient storage and adoption of an associated revised regulation schedule that minimizes or avoids Lake Okeechobee MFL violations. Since 2008 LORS effectively reduces water availability for existing users to less than the 1-in-10 level of certainty and is projected to contribute to MFL violations, modifications to the water use permit application rules affecting users of Lake Okeechobee water were necessary.

Restricted allocation areas are designated areas within SFWMD boundaries for which allocation limitations are applied to the use of specific sources of water. The water resource limitations in these areas are implemented when there is a lack of water available to meet the projected needs of the region from that specific source of water (SFWMD 2012).

A restricted allocation area rule was adopted for Lake Okeechobee in 2008. This interim rule protects existing legal users of Lake Okeechobee water and prevents increases in total allocations. Increased demands over the base condition water use within the Lake Okeechobee Service Area may be accommodated through reallocation of retired permits, use of alternative sources (such as groundwater), and implementation of offsets to recharge volumes equal to increased withdrawals in accordance with the rule's provisions. The rule also prevents expansion of Public Water Supply uses that exceed a specified threshold as these uses are determined incompatible with the operations, reliability, and limited availability of lake water. Temporary increases in a Public Water Supply user's base condition water use are allowable for limited periods as related to development of alternative water supply projects. Compliance with these rules will also assure that such uses are consistent with Everglades restoration implementation.

Water Shortage Element

Implementation of 2008 LORS will also result in more frequent and severe lake-based water shortages. To address this, SFWMD changed the water shortage rules pertaining to Lake Okeechobee—Lake Okeechobee Water Shortage Management (Chapter 40E-21, F.A.C.)—in November 2007 to clarify how water restrictions would be calculated and applied to agricultural uses within the Lake Okeechobee Basin. The MFL recovery strategy also includes water shortage restrictions as described in Chapter 40E-22, F.A.C.

Habitat Enhancement Element

Several lake management options can be implemented to improve Lake Okeechobee habitat and mitigate impacts from extreme low lake levels associated with droughts. Periods of low water conditions will allow SFWMD to conduct native aquatic and tree plantings, as well as sediment scraping and other habitat enhancements, and potentially include efforts to supplement natural apple snail populations. **Table B-4** identifies some of the stage-dependent initiatives that will be undertaken by SFWMD and other agencies to offset the significant harm that would otherwise be caused by low Lake Okeechobee water levels that exceed MFL criteria.

Table B-4. Habitat enhancement components of the Lake Okeechobee recovery strategy.

Lake Level	Recovery Component	Benefits
At 11 feet NGVD and stage is falling	Sediment scraping and other habitat enhancements, including removal of tussocks and other aggregations of organic material, such as the western berm.	Promote natural compaction, removal, and/or oxidation of accumulated organic muck sediments. Remove barriers to fish migration in and out of the western littoral zone.
At or below 11 feet NGVD	Conduct controlled burns if fuel load and weather conditions permit.	Facilitate the removal of exotic species, such as torpedograss (*Panicum repens*).
Below 11 feet NGVD	Allow maintenance and repair work on public boat ramps, and docking and marina facilities.	Restore original design depth of the waterways and provide navigable access.
At 10.5 feet NGVD and stage is falling	Plant native terrestrial and emergent vegetation, such as bulrush (*Scirpus* spp.) (if a method for reestablishment proves to be feasible), native pond apples (*Annona glabra*), and cypress trees (*Taxodium distichum*) on the southern shore islands and on rim canal spoil islands.	Reestablish native trees on the islands to help prevent expansion of exotic and invasive vegetation and provide essential habitat for wading birds, raptors, and endangered species, such as the Everglade snail kite (*Rostrhamus sociabilis plumbeus*) and Okeechobee gourd (*Cucurbita okeechobeensis*).
Between 10 and 11 feet NGVD and stage is rising	Plant native vegetation species, such as SAV and emergent vegetation, such as bulrush.	Reestablish native plant species, which can prevent the expansion of exotic and invasive vegetation, assist in restoring fish and wildlife habitats, prevent uprooting of emergent and submerged plants, and reduce turbidity, which, in turn, promotes and maintains SAV growth.
At 11 feet NGVD and stage is rising	Assess the feasibility of introducing apple snail (*Pomacea paludosa*) populations via an apple snail hatchery or other techniques.	Supplement native apple snail populations for the endangered Everglade snail kite.
Nonlake stage dependent components	Investigate sediment management strategies in the tributaries and the pelagic zone of the lake.	Remove phosphorus-laden sediment that has the potential to resuspend, and thus, reduce light transparency, which discourages growth of SAV and encourages phytoplankton bloom activity.

Everglades and Northwest Fork of Loxahatchee River Recovery Strategy

Everglades Capital Element

As described in **Chapter 3**, the Everglades were naturally interconnected by sloughs and rivers prior to creation of drainage and other features. The ecosystem components are still connected, but by water management facilities. Extensive efforts are under way to restore more natural water movement to and between the areas, while addressing the needs of a growing population. The largest of these efforts is CERP. The status of CERP projects included in the recovery strategies was already presented **Table B-3**.

Northwest Fork of the Loxahatchee River Capital Element

The MFL study indicated that the Loxahatchee River criteria will be exceeded on a regular and continuing basis. Therefore, a recovery strategy was needed to protect water resources in the river from significant harm. In addition, analysis of historical information showed that over a ten-year period, starting in the early 1990s, the MFL of 35 cfs was exceeded approximately 25 percent of the time (SFWMD 2002a). The criteria could not be met because of the lack of sufficient water conveyance infrastructure and regional storage facilities. To address these issues, an MFL study identified specific projects needed to provide additional water to supplement the river and recommended continuing monitoring efforts to track effects of these changes on water resources.

The structural and operational features of the recovery strategy are implemented through ongoing SFWMD water resource development projects included in **Chapter 4**, projects identified in the 2000 LEC Plan, features of the CERP Loxahatchee River Watershed Restoration Project (formerly known as the Northern Palm Beach County Project – Part 1) (SFWMD 2002c) and CERP (USACE and SFWMD 1999). When implemented, CERP projects will provide the additional water needed to achieve restoration of the river (USACE and SFWMD 2005).

Although sufficient water needed to meet the MFL criteria was provided by projects recommended within the 2000 LEC Plan, the additional water needed to meet the restoration goals will be provided by the CERP Loxahatchee River Watershed Restoration Project. This CERP project includes features that will increase storage in the L-8 Basin (USACE and SFWMD 1999). Modeling studies using discharge scenarios, which included CERP and 2000 LEC Plan projects, indicate that MFL criteria and restoration targets will be met when these facilities are completed and fully operational.

The L-8 site was originally acquired to provide water storage as a component of the CERP Loxahatchee River Watershed Restoration Project and was an element of the MFL recovery strategy for the Loxahatchee River. Recently, the Restoration Strategies Regional Water Quality Plan incorporated the L-8 Site as one of its features. It is now under construction for use as a flow equalization basin for the eastern flow-way, and will provide storage to allow

for the delivery of consistent flows that are needed to optimize performance of stormwater treatment areas.

While interim operations for the L-8 flow equalization basin may provide for the delivery of dry season flows to the Loxahatchee River, a permanent replacement storage feature for the Loxahatchee River is needed. In 2013, SFWMD and Palm Beach County conceptually agreed to the acquisition of approximately 1,800 acres owned by the county that could be used to store and deliver water to the Loxahatchee River. The Restoration Strategies Regional Water Quality Plan includes the cost to acquire property and to construct a storage facility on an alternative site, such as this one. Acquisition of the site is expected to be complete in 2014 and design of the storage facility is expected to proceed in 2018.

Northwest Fork of the Loxahatchee River Operation Element

A key component for the river's management is to continuously monitor salinity at River Mile 9.2, measure flow across Lainhart Dam, and periodically assess vegetation communities in the floodplain. This information will be used as a basis to operate water control facilities to deliver a flow of 50 cfs to the river whenever sufficient water is available from the regional system as a means to reduce the upstream migration of salt water in the Northwest Fork. SFWMD experimented with operations in an effort to convey more water from the L-8 Site to the Northwest Fork of the Loxahatchee River during the 2011 drought and will do so in the future when sufficient water is available. More information can be found in **Chapter 3**.

Everglades and Northwest Fork of the Loxahatchee River Regulatory Element

When the MFL criteria for the Everglades was adopted in 2001, significant harm was found to be occurring to the ecosystem, and a recovery strategy for achieving the MFL was adopted. This recovery strategy did not propose to place limits on projected increased withdrawals from the regional system. However, the recovery strategy assumed that if growth occurred in the projected time frames and CERP was implemented as scheduled, increases in allocations dependent on the Everglades for recharge could continue at a measured pace. This approach was implemented during the next several years.

A permit duration rule was adopted in 2003 that identified the Central and Southern Florida Project for Flood Control and Other Purposes and dependent groundwater sources as a "source of limited availability." This meant that only historically used demands would receive a twenty-year duration at permit renewal, and increases over that amount would only be authorized for a five-year period.

Two general types of withdrawals—direct and indirect—occur within the Everglades that can be attributed to consumptive uses (Section 40E-8.431, F.A.C.). Direct impacts result from pumping of adjacent wellfields that lower the water table along the eastern edge of the Everglades, affecting wetlands along the western side of the north-south perimeter levee. Indirect withdrawals occur due to making regional water deliveries to areas other than the

Everglades. SFWMD's water use permitting criteria prohibit the issuance of permits that would cause harm to water resources. As a result, in areas where the MFL criteria are being exceeded (significant harm occurring), no water use permits can be issued that would cause an additional drawdown under the 1-in-10 year level of certainty, unless such withdrawal is consistent with the recovery strategy.

Regulatory implications of the Everglades MFL evolved in the early 2000s as SFWMD addressed water use permit applications and the need to assure water availability for Everglades restoration and CERP implementation. Eventually, the restricted allocation area criteria for the Everglades and North Palm Beach/Loxahatchee River Watershed water bodies in 2007 were adopted. The criteria are the regulatory element of the MFL recovery strategy for the Everglades and the Northwest Fork of the Loxahatchee River.

These criteria limit allocations for permit renewal or modification to conditions or withdrawals, depending on the specific use class, that existed as of April 1, 2006. This is referred to as the "base condition water use." The criteria only allow allocations over the "base condition water use" if additional impacts to the Everglades are 1) avoided through identification of certified project waters and alternative water source development, 2) eliminated through the implementation of offsets (e.g., recharge barriers and recharge trenches), or 3) utilizes wet season water or water made available through the termination or reduction of base condition water uses. Wet season water can also be allocated if the permit applicant demonstrates such flows are not needed for restoration of the Everglades pursuant to CERP, or the *Northern Palm Beach County Water Management Plan* (for the Loxahatchee River Watershed) (SFWMD 2002c).

Biscayne Aquifer Prevention Strategy

Measures to prevent the MFL criteria from being exceeded for the Biscayne aquifer are as follows: 1) maintain coastal canal stages at the minimum operation levels specified in the MFL rule, 2) implement water use permitting conditions for issuance to prevent saltwater intrusion up to a 1-in-10 year level of certainty, 3) maintain a groundwater monitoring network and use data to initiate water shortage cutbacks should the threat of saltwater movement become imminent, and 4) conduct research in high risk areas to identify where the position of the saltwater interface is adjacent to existing and future potable water sources (SFWMD 2000a). In addition, SFWMD is conducting studies and providing incentives to local governments to use reclaimed water to provide aquifer recharge, combat saltwater intrusion, reduce the potential for MFL exceedances in the Biscayne aquifer, and reduce conflicts between urban water uses and water needed for protection of natural systems.

Florida Bay Prevention Strategy

The technical document supporting the criteria contained in the Florida Bay MFL rule, (Subsection 40E-8.221(5), F.A.C.) is the *Draft Technical Documentation to Support Development of Minimum Flows and Levels for Florida Bay* (SFWMD 2006a). This technical document demonstrated that, under current operational procedures, violations to the MFL criteria were not expected. A prevention strategy was adopted simultaneously with the MFL rule (Subsection 40E-8.421(8), F.A.C.). The prevention strategy was implemented to minimize the likelihood that a violation of the MFL criteria will occur in the future.

The prevention strategy for Florida Bay involves two different components. First, modifications to operations for improved management of freshwater discharges to the headwaters of Taylor Slough and the southeastern Everglades will consider the MFL criteria in coordination with the following projects: 1) Modified Water Deliveries to Everglades National Park Project, C-111 Canal Project, and any associated operational and construction plans pursuant to these projects, 2) CERP C-111 Spreader Canal Western Project, and 3) C-111 South Dade Project. Portions of each of these projects are operational. Second, SFWMD, in cooperation with other agencies, will continue field monitoring and research to assess salinity, water levels, and flow conditions, and biological resource response in the region.

SFWMD is currently reevaluating MFL criteria for Florida Bay. The technical assessment, scheduled to be complete in 2013, will consider the ecological and hydrologic components and include the research data collected since 2006. In addition, the MFL prevention strategy will be reevaluated concurrently, including whether to retain or modify the prevention strategy or develop a recovery strategy.

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C

Potable Water and Wastewater Treatment Facilities

POTABLE WATER TREATMENT FACILITIES

In the Lower East Coast (LEC) Planning Area, potable water is produced by large water treatment facilities, smaller "package" water treatment facilities, and private wells supplying individual users. This appendix focuses on large facilities with average withdrawals of water equal to or greater than 100,000 gallons per day or 0.1 million gallons per day (MGD).

Descriptions of Existing Facilities

Table C-1 presents summary descriptions for each of the potable water treatment facilities and their withdrawal (water) sources located in the LEC Planning Area. The table lists the name of the utility or supply entity, the South Florida Water Management District (SFWMD) water use permit number, annual water allocation in MGD, raw water withdrawal sources, volume withdrawn in 2010, and the Florida Department of Environmental Protection (FDEP) water treatment facility permit numbers and rated (design) capacity. **Figures C-1** through **C-3** show the locations of potable water treatment facilities in Palm Beach, Broward, and Miami-Dade counties, respectively. Additional information about the water sources identified in the water use permits—surficial aquifer system (SAS), Floridan aquifer system (FAS), upper Floridan aquifer, and surface water—is available from SFWMD's Water Use Regulatory Database, which is accessible online from the following link: http://www.sfwmd.gov/ePermitting/MainPage.do. More information regarding the potable water treatment plants permitted by FDEP can be found at the following site: http://www.dep.state.fl.us/water/drinkingwater/bfr.htm.

Table C-1. Potable water treatment facilities in the LEC Planning Area.

Utility or Supply Entity	Water Use			Withdrawal Sources (MGD)		Water Treatment	
	SFWMD Permit Number	Permitted Annual Allocation (MGD raw)	Actual 2010 Daily Average (MGD raw)	SAS	FAS	FDEP Permit Number	Rated Capacity (MGD)
Palm Beach County							
A.G. Holley State Hospital [a]	50-01092-W	0.09	0.08	0.08	0.00	4500006	0.36
Boca Raton, City of	50-00367-W	51.54	42.19	42.19	0.00	4500130	70.00
Boynton Beach, City of	50-00499-W	20.86	14.23	13.72	0.51	4500145	29.64
Delray Beach Water and Sewer Department, City of	50-00177-W	19.10	15.27	15.04	0.22	4500351	26.00
Glades Utility Authority [b,c]	50-06857-W	9.43	6.61	0.00	6.61		10.00
Golf, Village of	50-00612-W	0.60	0.51	0.51	0.00	4501528	0.86
Highland Beach, Town of	50-00346-W	3.15	2.05	0.00	2.05	4500609	3.00
Jupiter, Town of	50-00010-W	24.41	16.61	8.15	8.45	4501491	30.00
Lake Worth Utilities, City of	50-00234-W	13.07	4.74	4.74	0.00	4500773	17.40
Lantana, Town of	50-00575-W	2.48	1.84	1.84	0.00	4500784	3.84
Manalapan, Town of	50-00506-W	1.91	1.34	1.34	0.00	4500840	2.35
Mangonia Park, Town of	50-00030-W	0.58	0.33	0.33	0.00	4500841	1.08
Maralago Cay	50-01283-W	0.27	0.19	0.19	0.00	4500062	0.42
Palm Beach County Water Utilities Department	50-00135-W	86.99	59.91	59.91	0.00	4504393	101.38
Palm Springs, Village of	50-00036-W	4.74	4.00	4.00	0.00	4501058	10.00
Riviera Beach, City of	50-00460-W	9.08	6.60	6.60	0.00	4501229	17.50
Seacoast Utility Authority	50-00365-W	19.31	18.09	18.09	0.00	4501124	30.50
Tequesta, Village of	50-00046-W	4.84	3.34	1.51	1.83	4501438	6.33
Wellington Public Utilities Department	50-00464-W	8.02	6.74	6.74	0.00	4500014	12.80
West Palm Beach Public Utilities, City of [d]	50-00615-W	39.30	28.98	28.98	0.00	4501559	47.00
Palm Beach County Total		**319.77**	**233.65**	**213.96**	**19.67**		**420.46**
Broward County							
Broward County Water and Wastewater Services (1A)	06-00146-W	13.90	7.63	7.63	0.00	4060167	16.00
Broward County Water and Wastewater Services (2A/North Regional)	06-01634-W	22.06	12.69	12.69	0.72	4060163	40.00
Cooper City Utility Department, City of	06-00365-W	4.55	3.45	3.45	0.00	4060282	7.00
Coral Springs, City of	06-00102-W	9.44	6.96	6.96	0.00	4060290	16.00
Coral Springs Improvement District	06-00100-W	5.42	3.96	3.96	0.00	4060291	7.20
Dania Beach, City of	06-00187-W	3.10	2.42	2.42	0.00	4060253	5.02
Davie, Town of	06-00134-W	5.53	4.10	4.10	0.00	4060344	7.40
Deerfield Beach, City of	06-00082-W	14.74	10.10	10.10	0.00	4060254	34.80
Fort Lauderdale, City of	06-00123-W	61.19	41.70	41.70	0.00	4060486	82.00
Hallandale Beach, City of	06-00138-W	9.70	5.55	5.55	0.00	4060573	16.00
Hillsboro Beach, Town of	06-00101-W	0.88	0.69	0.69	0.00	4060615	2.25

a. The state closed the AG Holley State Hospital, which had its own PWS facility, in 2012.

b. Glades Utility Authority was absorbed into the Palm Beach County Water Utility Department effective April 2013.

c. As of April 2013, an FDEP permit number for this facility was not available on FDEP's website.

d. Withdrawal source is surface water from Clear Lake, Grassy Waters Preserve, and the M Canal.

Table C-1. Continued.

Utility or Supply Entity	Water Use			Withdrawal Sources (MGD)		Water Treatment	
	SFWMD Permit Number	Permitted Annual Allocation (MGD raw)	Actual 2010 Daily Average (MGD raw)	SAS	FAS	FDEP Permit Number	Rated Capacity (MGD)
Broward County (Continued)							
Hollywood, City of	06-00038-W	39.38	23.99	22.24	1.75	4060642	59.50
Lauderhill, City of	06-00129-W	8.72	5.76	5.76	0.00	4060787	16.00
Margate, City of	06-00121-W	9.30	5.94	5.94	0.00	4060845	18.00
Miramar, City of	06-00054-W	16.00	12.46	12.46	0.00	4060925	17.75
North Lauderdale, City of	06-00004-W	3.64	2.60	2.60	0.00	4060976	7.50
North Springs Improvement District	06-00274-W	5.18	4.50	4.50	0.00	4064390	6.80
Parkland Utilities, Inc.	06-00242-W	0.35	0.25	0.25	0.00	4061957	0.58
Pembroke Pines, City of	06-00135-W	15.60	12.14	12.14	0.00	4061083	18.00
Plantation, City of	06-00103-W	17.24	14.14	14.14	0.00	4061121	24.00
Pompano Beach, City of	06-00070-W	17.75	14.55	14.55	0.00	4061129	50.00
Royal Utility Corporation	06-00003-W	0.48	0.33	0.33	0.00	4061517	1.00
Seminole Tribe of Florida Utility	NA [a]	2.40	1.13	1.13	0.00	NA	NA
Sunrise, City of	06-00120-W	36.15	28.39	28.39	0.00	4061408 [b]	50.00
Tamarac, City of	06-00071-W	7.19	6.21	6.21	0.00	4061429	16.00
Tindall Hammock Irrigation and Soil Conservation District	06-00170-W	0.74	0.44	0.44	0.00	4060419	1.00
Broward County Total		**330.63**	**235.33**	**233.58**	**2.47**		**519.80**
Miami-Dade County							
Americana Village	13-02004-W	0.26	0.23	0.23	0.00	4131403	0.50
Florida City Water and Sewer Department	13-00029-W	2.44	1.78	1.78	0.00	4130255	4.00
Homestead, City of	13-00046-W	13.55	10.72	10.72	0.00	4130645	16.90
Miami-Dade Water and Sewer Department	13-00017-W	408.51	308.67	308.67	1.09	4130871 [c]	453.93
North Miami, City of	13-00059-W	20.47	11.00	11.00	0.00	4130977	9.30
North Miami Beach, City of	13-00060-W	38.38	22.60	17.00	5.60	4131618	32.00
Miami-Dade County Total		**483.61**	**355.00**	**349.40**	**6.69**		**516.63**
Monroe County							
Florida Keys Aqueduct Authority [d]	13-00005-W	23.97	17.68	16.66	1.01	4134357	29.80
Monroe County Total		**23.97**	**17.68**	**16.66**	**1.01**		**29.80**

a. NA – not applicable.

b. This system has multiple permit numbers, including 4061410.

c. This system has multiple permit numbers, including 4131202.

d. Withdrawals located in Miami-Dade County.

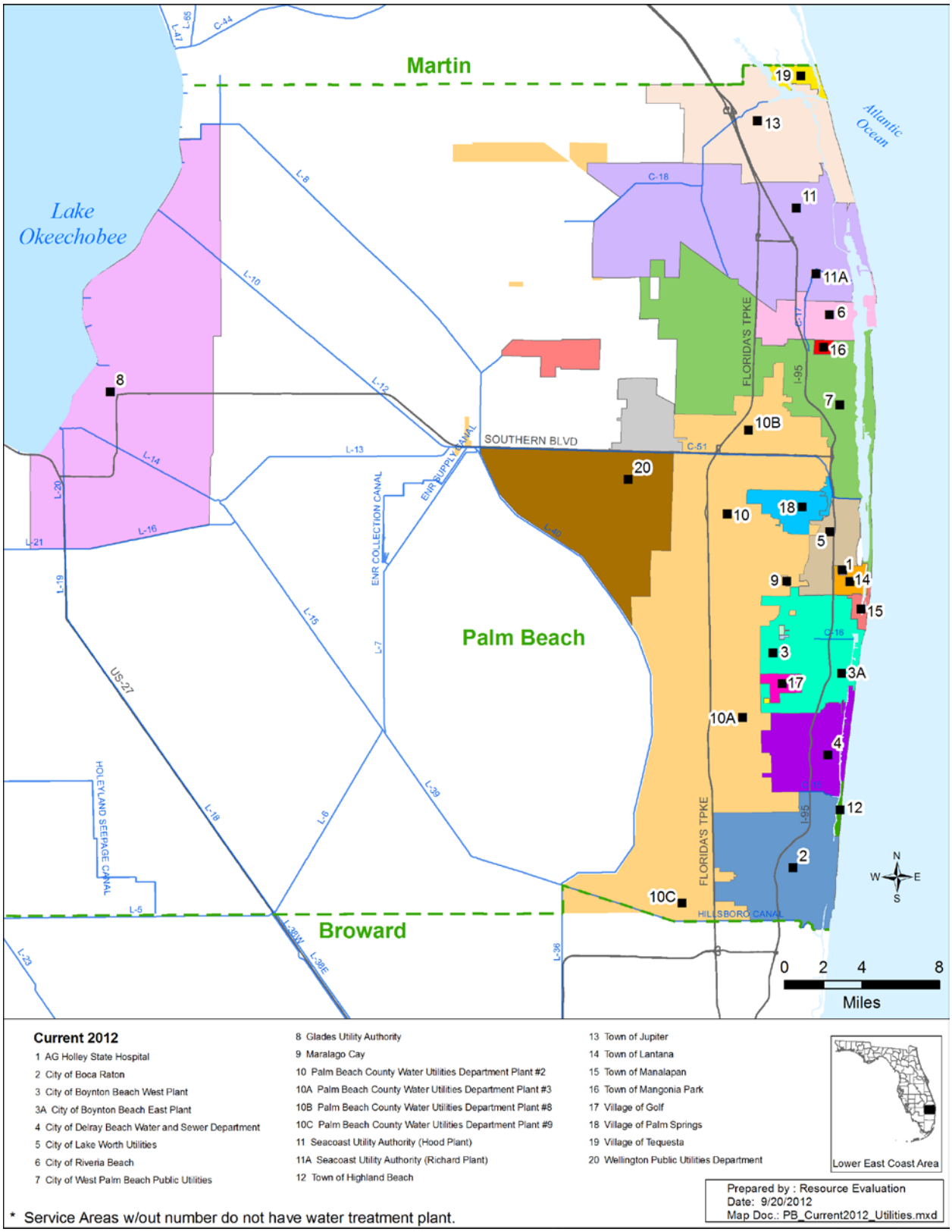

Figure C-1. Potable water treatment facilities in Palm Beach County.

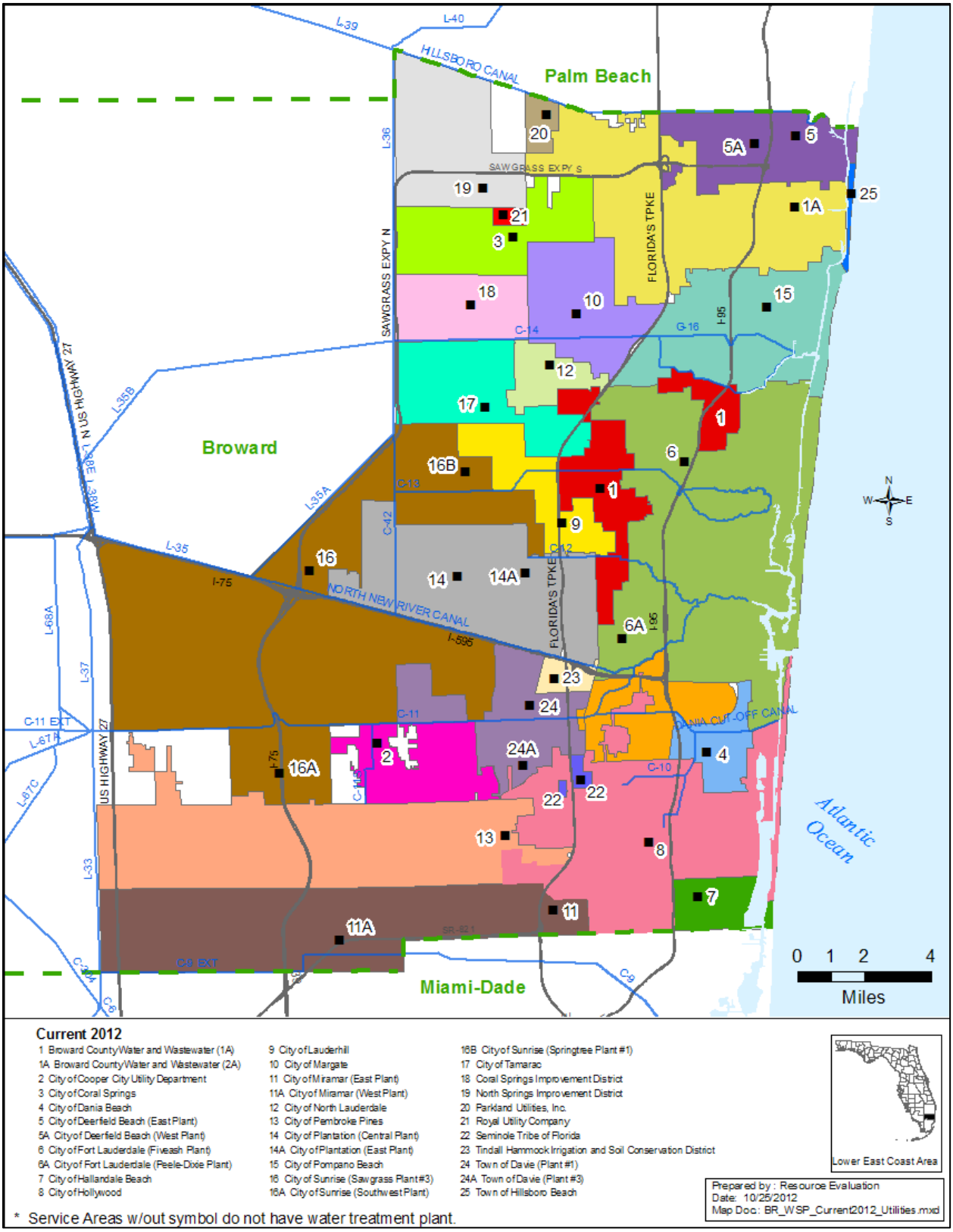

Figure C-2. Potable water treatment facilities in Broward County.

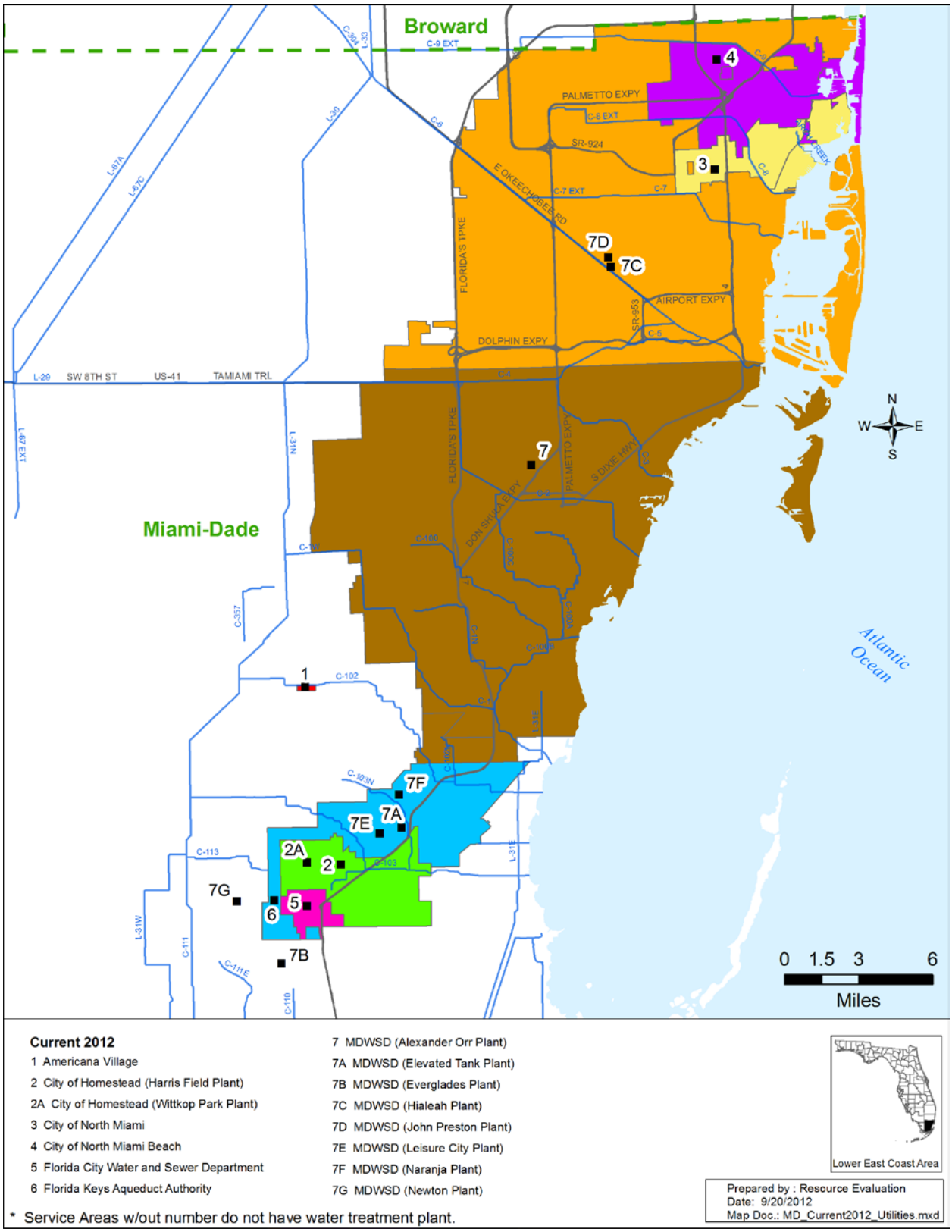

Figure C-3. Potable water treatment facilities in Miami-Dade County.

[Note: MDWSD – Miami-Dade Water and Sewer Department.]

WASTEWATER TREATMENT FACILITIES

Wastewater treatment is accomplished through regional wastewater treatment facilities (WWTFs), smaller "package plants," and septic tanks. The focus of this appendix is on the larger system facilities with a capacity of 0.1 MGD or greater. These WWTFs allow economy of operation and have sufficient flows to positively impact water resources through reuse of reclaimed water and support a regional reuse program. In the LEC Planning Area, many of these facilities are located close to potential reclaimed water users and/or distribution pipelines.

In 2010, there were 44 WWTFs in the LEC Planning Area, with 25 reusing at least part of their wastewater (FDEP 2011). The locations of WWTFs in the LEC Planning Area and the reclaimed water distribution pipelines are shown in **Figures C-4** through **C-6**.

Tables C-2 through **C-5** show 2010 and 2030 projected data from the 44 WWTFs. The primary source of information for these tables is the *2010 Reuse Inventory* (FDEP 2011). This inventory is a compilation of wastewater and reuse information based on fiscal year data contained in the annual reuse reports submitted by each wastewater utility or system. Secondary sources of information include communications with the utilities and planning documents, such as ten-year water supply facilities work plans, which are prepared by local governments.

Significant increases in both wastewater effluent and water reuse flows are expected by 2030. The term "reuse percentage" is frequently used when describing reuse facilities and is intended to reflect the amount of water reused when compared to the amount of wastewater treated. The annual FDEP reuse inventories use the term "flow ratio," which is defined as "total reuse flow divided by total wastewater flow." The definition continues by clarifying that flow ratios greater than 1.0 (i.e., greater than 100 percent) indicate that reuse may include supplemental water supplies. Any supplemental water supplies (e.g., groundwater or surface water) are included in the "reuse flows." If supplemental flows cause the reuse percentage to exceed 100 percent, the reuse percentage will show 100 percent. This has not occurred with any of the data reported in this appendix.

Tables C-6 through **C-9** show each facility's flows for the different disposal methods and reuse types. The tables demonstrate that public access irrigation (e.g., golf courses, parks, and schools) is currently the primary means of water reuse in the region. By 2030, cooling water for power plants or groundwater recharge could be just as significant in terms of water reuse. For treated wastewater that is not reused, the primary means of disposal has been discharge through ocean outfalls.

In 2008, amendments to Section 403.086, Florida Statues (F.S.), were passed, commonly referred to as the Ocean Outfall Legislation, requiring the elimination of the use of six ocean outfalls in southeastern Florida as a primary means for disposal of treated domestic wastewater and the reuse of at least 60 percent of the outfall flows by 2025. The objectives of this statute were to reduce nutrient loadings to the environment and to achieve the more efficient use of water to meet water supply needs. The profiles provided at the end of this

appendix indicate if a facility is affected by these amendments. By 2030, deep well injection is expected to replace ocean outfall discharge as the primary means of disposal for wastewater that is not reused.

Although the regionwide capacity of the WWTFs in the LEC Planning Area totals 860 MGD, an average daily flow of 639 MGD of wastewater was treated in 2010. Excess treatment capacity is necessary to ensure a margin of safety in meeting daily peak flows. Regionally, 71 MGD (11 percent) of average daily treated wastewater was reused. Most of the treated wastewater was reused for public access irrigation, primarily in Palm Beach County. Public access irrigation accounted for 41 MGD, groundwater recharge through percolation ponds used 6 MGD, and other miscellaneous uses, such as processes at the WWTF and wetland hydration, used 24 MGD. Treated effluent not reused was disposed of through deep well injection (353 MGD), ocean outfall (240 MGD), or shallow injection wells (1 MGD).

By 2030, it is projected that average daily wastewater flows will increase by 28 percent over the 2010 average daily flows in the LEC Planning Area. Average daily reuse flows are projected to increase from about 71 MGD in 2010 to over 420 MGD by 2030. The significant increase in projected water reuse is primarily due to the ocean outfall utilities meeting the 60 percent reuse requirement by 2025.

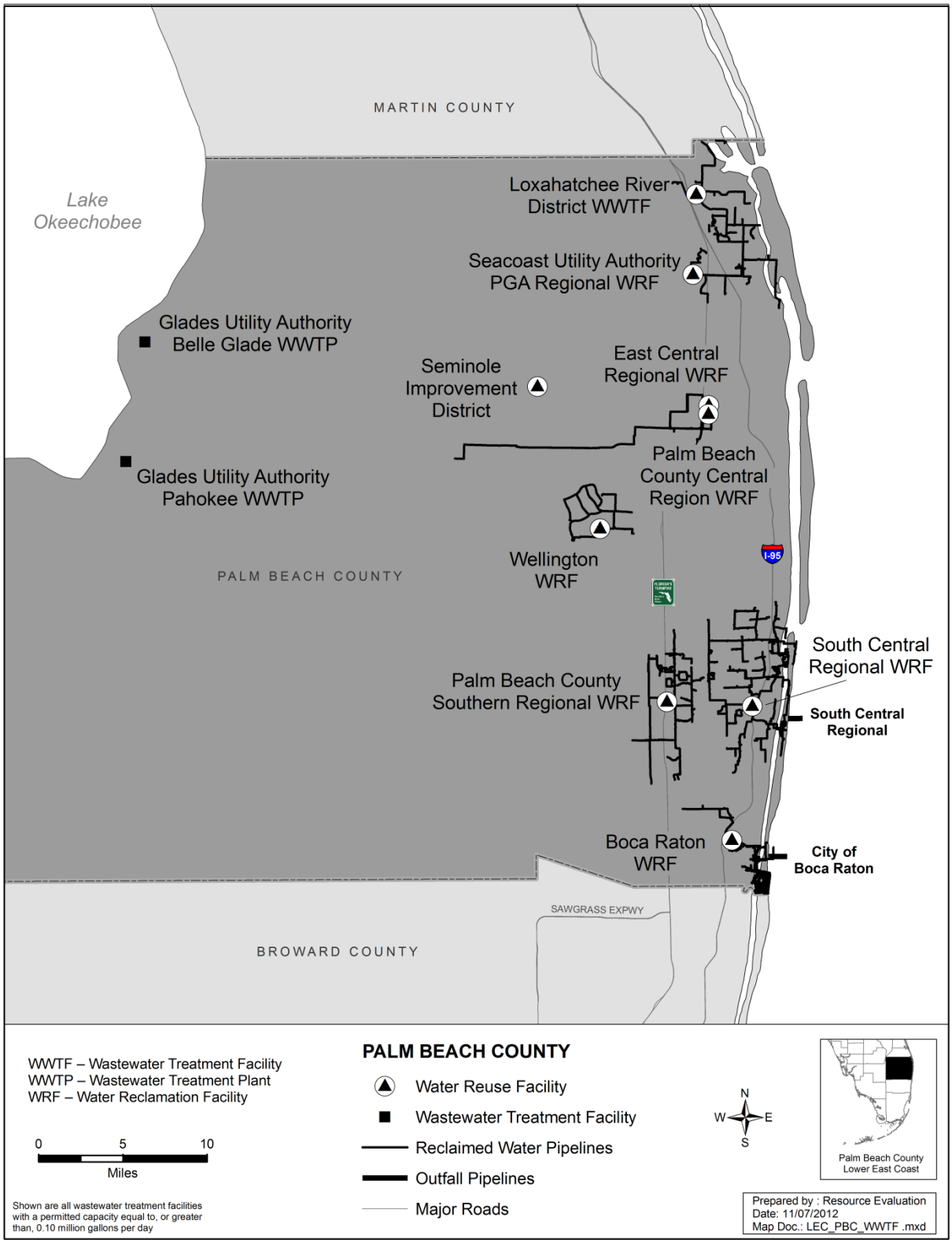

Figure C-4. Wastewater and reuse systems in Palm Beach County.

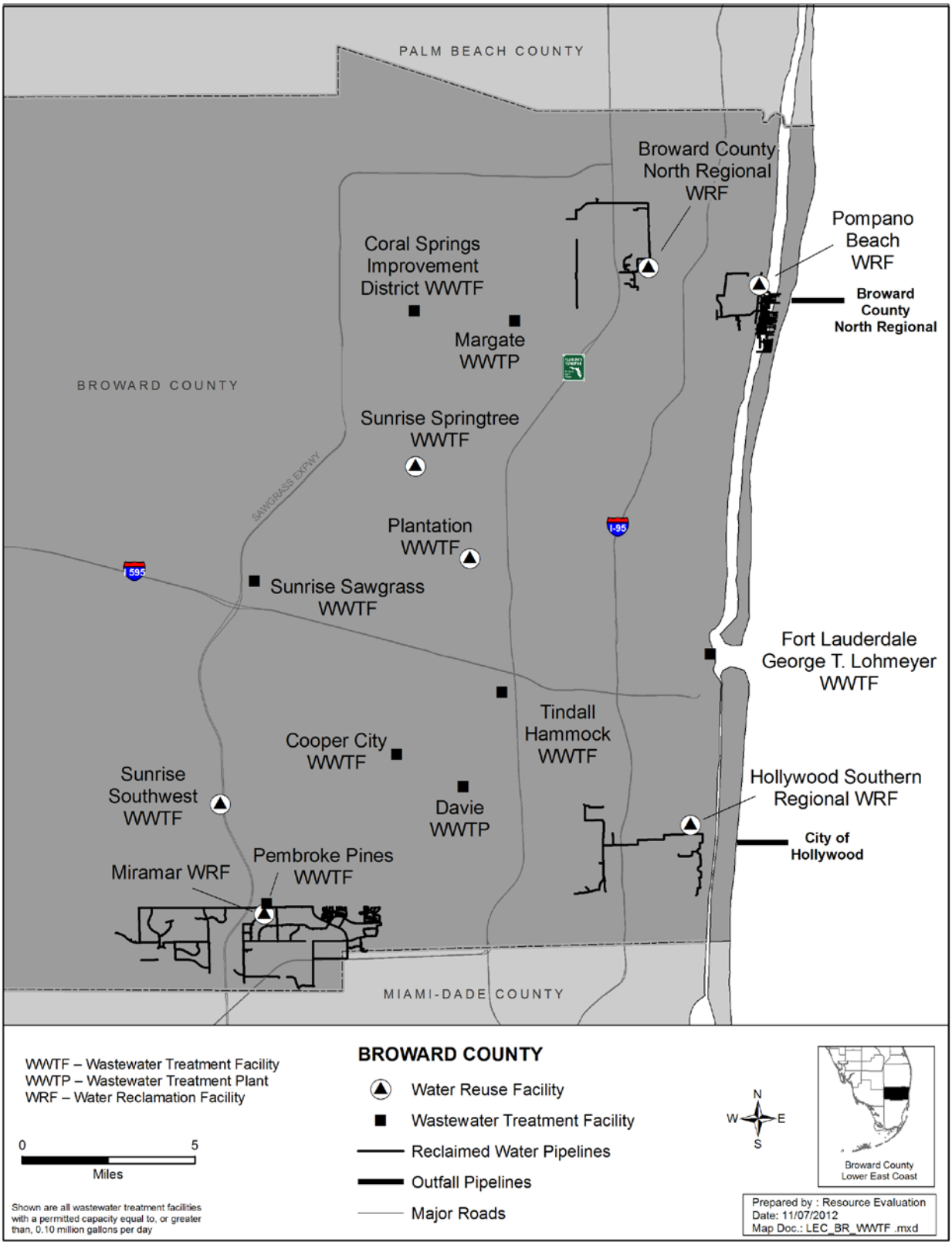

Figure C-5. Wastewater and reuse facilities in Broward County.

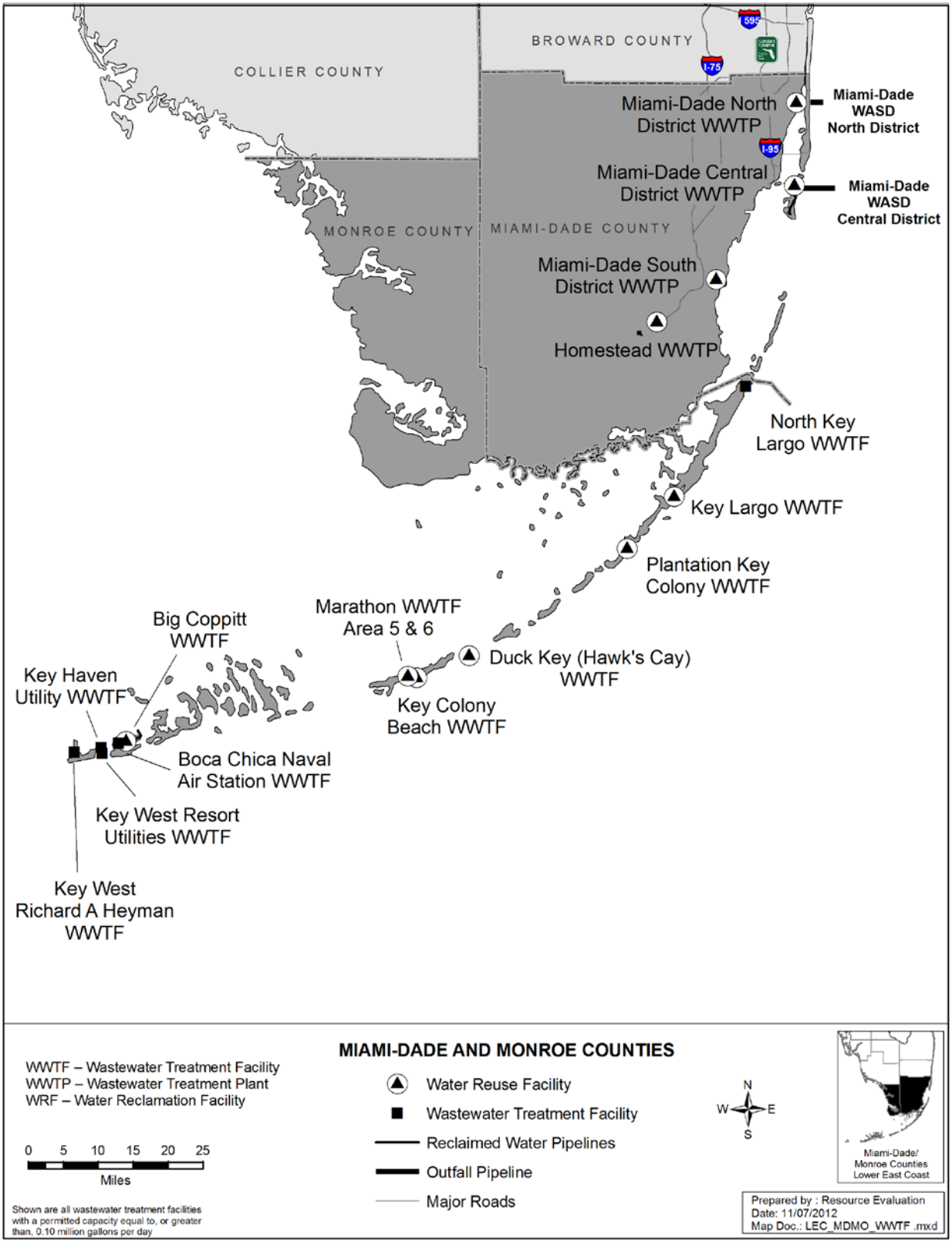

Figure C-6. Wastewater and reuse facilities in Miami-Dade County and the portion of Monroe County within the LEC Planning Area. [Note: WASD – Water and Sewer Department.]

Table C-2. Summary of capacities and flows for WWTFs with flow greater than 0.1 MGD in Palm Beach County. [a]

Wastewater Treatment Facility	FDEP Permit Number	2010				2030			
		FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)	FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)
Boca Raton	FL0026344	17.50	14.65 [c]	6.62	45%	17.50	14.80	14.80	100%
East Central Regional	FL0041360	64.00	40.94	1.77	4%	64.00 [d]	51.11 [e]	22.00 [f]	43%
Glades Utility Authority – Belle Glade	FLA027740	3.90	2.43	0.13	5%	3.90 [d]	3.04 [e]	0.13 [g]	4%
Glades Utility Authority – Pahokee	FLA136778	1.20	0.83	0.01	1%	1.20 [d]	1.04 [e]	0.01 [g]	1%
Loxahatchee River District	FL0034649	11.00	6.73	6.39	95%	11.00	11.00	8.40	76%
Palm Beach County – Central Region	FL0471275	3.00	0.51	0.51	100%	6.00	6.00	6.00	100%
Palm Beach County – Southern Regional	FL0041424	35.00	22.90	14.20	62%	50.00	30.00	25.00	83%
Seacoast Utility Authority PGA Regional	FL0038768	12.00	7.51	6.11	81%	12.00	10.00	10.00	100%
Seminole Improvement District	FL0170224	0.32	0.04	0.04	100%	0.32 [d]	0.05[e]	0.05 [h]	100%
South Central Regional	FL0035980	24.00	16.76	5.98	36%	24.00	22.63	19.94	88%
Wellington	FLA042595	4.75	4.06	0.10	2%	5.06 [d]	5.06[e]	4.50 [i]	89%
Palm Beach County Total		**176.67**	**117.36**	**41.86**	**36%**	**194.98**	**154.73**	**110.83**	**72%**

a. Historic (2010) data is from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Reuse percentage is calculated by dividing "Average Daily Reuse Flow" by "Average Daily WWTF Flow".

c. Reported 2010 wastewater flow at the Boca Raton Water Reclamation Facility includes reverse osmosis concentrate from the water treatment facility.

d. The utility did not provide the projected 2030 capacity. SFWMD assumes it will remain at the current level unless the projected flow exceeded capacity. In that case, capacity is increased to equal projected flow.

e. The utility did not provide the projected 2030 flow. It is estimated based on the percentage change in potable water flow for the utility from 2010 to 2030.

f. The utility did not provide the projected 2030 reuse flow. It is determined by adding the 2010 flow (1.77 MGD) and an estimated 20 MGD provided to the Florida Power & Light West County Energy Center.

g. The utility did not provide the projected 2030 reuse flow. SFWMD assumes it will remain constant from 2010 to 2030.

h. The utility did not provide the projected 2030 reuse flow. SFWMD assumes it will remain at 100 percent.

i. The utility did not provide the projected 2030 reuse flow. It is based on a projection in the *Village of Wellington Water Supply Facilities Work Plan and Related Comprehensive Plan Amendments* (Village of Wellington 2009).

Table C-3. Summary of capacities and flows for WWTFs with flow greater than 0.1 MGD in Broward County. [a]

Wastewater Treatment Facility	Permit Number	2010				2030			
		FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)	FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)
Broward County North Regional	FL0031771	84.00	71.00	4.40	6%	100.00	87.00	22.50	26%
Cooper City	FL0040398	3.10	2.24 [c]	0.00	0%	3.10	2.70	0.90	33%
Coral Springs Improvement District	FLA041301	5.72	5.06	0.00	0%	7.72	5.40	0.00	0%
Davie	FL0040541	4.85	0.98	0.00	0%	12.00	12.00	6.30	53%
Fort Lauderdale – George T. Lohmeyer	FLA041378	55.70	37.60	0.00	0%	56.60	45.60	4.00	9%
Hollywood Southern Regional	FL0026255	55.50	45.90	1.79	4%	65.00	64.10	20.40	32%
Margate	FL0041289	10.10	7.21	0.00	0%	10.10	7.20	1.50	21%
Miramar	FLA017025	10.10	7.64	2.09	27%	12.60	11.80	6.00	51%
North Springs Improvement District (proposed)	--	--	--	--	--	5.00	4.00	4.00	100%
Pembroke Pines	FLA013575	9.50	7.07	0.00	0%	9.50	7.70	5.30	69%
Plantation	FL0040401	18.90	13.80	0.41	3%	18.90 [d]	15.54 [e]	1.77 [f]	11%
Pompano Beach	FLA013581	7.50	1.35	1.35	100%	12.50	4.50	4.50	100%
Sunrise – Southwest	FLA013580	0.45	0.37	0.37	100%	0.99	0.99	0.99	100%
Sunrise – Sawgrass	FLA042641	20.00	18.26	0.00	0%	25.00	22.00	8.00	36%
Sunrise – Springtree	FLA041947	10.00	7.19	0.00	0%	16.00	12.00	7.00	58%
Tindall Hammock	FLA013583	0.60	0.27	0.27	100%	0.60	0.40	0.40	100%
Broward County Total		**296.02**	**225.94**	**10.68**	**5%**	**355.61**	**302.93**	**93.56**	**31%**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Reuse percentage is calculated by dividing "Average Daily Reuse Flow" by "Average Daily WWTF Flow."

c. The Cooper City WWTF reports 2010 wastewater flow does not include concentrate from the city's water treatment plant.

d. The utility did not provide the projected 2030 capacity. SFWMD assumes the capacity will remain at the current level unless the projected flow exceeds capacity. In that case, capacity is increased to equal projected flow.

e. The utility did not provide the projected 2030 flow. It is estimated based on the percentage change in potable water flow for the utility from 2010 to 2030.

f. The utility did not provide the projected reuse flow. It is based on the assumption that two golf courses will be provided reclaimed water at their permitted allocations: Jacaranda Golf Course (0.87 MGD) and Plantation Preserve Golf Course (0.90 MGD).

Table C-4. Summary of capacities and flows for WWTFs with flow greater than 0.1 MGD in Miami-Dade County. [a]

Wastewater Treatment Facility	Permit Number	2010				2030			
		FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)	FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)
Americana Village Condominium	FLA013641	0.20	0.15	0.00	0%	0.20 [c]	0.18 [d]	0.00	0%
Cricket Club Condominium	FLA013637	0.11	0.07	0.00	0%	0.11 [c]	0.08 [d]	0.00	0%
Homestead	FLA013609	6.00	5.30	5.30	100%	10.00	10.00	10.00	100%
Miami-Dade Central District (MDWASD [e])	FLA024805	143.00	101.00	6.22	6%	80.00	69.00	5.00	7%
Miami-Dade North District (MDWASD)	FL0032182	120.00	87.15	2.08	2%	80.00	60.00	1.61	3%
Miami-Dade Northwest District (proposed) (MDWASD)	--	--	--	--	--	62.00	56.00	56.00	100%
Miami-Dade South District (MDWASD)	FLA042137	112.50	93.18	4.54	5%	120.00	120.00	90.00	75%
Miami-Dade West District (proposed) (MDWASD)	--	--	--	--	--	50.00	50.00	50.00	100%
Miami-Dade County Total		**381.81**	**286.85**	**18.14**	**6%**	**402.31**	**365.26**	**212.61**	**58%**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Reuse percentage is calculated by dividing "Average Daily Reuse Flow" by "Average Daily WWTF Flow."

c. The utility did not provide the projected 2030 capacity. SFWMD assumes it will remain at the current level unless the projected flow exceeded capacity. In that case, capacity is increased to equal projected flow.

d. The utility did not provide the projected 2030 flow. It is estimated based on the percentage change in potable water flow for the utility from 2010 to 2030.

e. MDWASD – Miami-Dade Water and Sewer Department

Table C-5. Summary of capacities and flows for WWTFs with flow greater than 0.1 MGD in Monroe County. [a]

Wastewater Treatment Facility	Permit Number	2010				2030			
		FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)	FDEP-Rated WWTF Capacity (MGD)	Average Daily WWTF Flow (MGD)	Average Daily Reuse Flow (MGD)	Reuse Percentage [b] (%)
Big Coppitt Regional	FLA567591	0.32	0.08	0.00	0%	0.40	0.40	0.35	88%
Boca Chica Naval Air Station	FLA147117	0.44	0.09	0.00	0%	0.44 [c]	0.09 [c]	0.00 [c]	0%
Duck Key (Hawk's Cay)	FLA014772	0.10	0.05	0.03	60%	0.30	0.30	0.20	67%
Key Colony Beach	FLA014720	0.34	0.18	0.03	17%	0.34 [c]	0.18 [d]	0.18	100%
Key Haven Utility	FLA014867	0.20	0.09	0.00	0%	--	-- [e]	--	--
Key Largo	FLA370967	0.18	0.07	0.00	0%	0.18 [f]	0.13 [f]	0.00	0%
Key West – Richard A. Heyman	FLA147222	10.00	4.41	0.00	0%	10.00	6.20	0.20	3%
Key West Resort Utilities	FLA014951	0.50	0.29	0.17	59%	0.50 [c]	0.38 [e]	0.38 [e]	100%
Marathon – Service Area 3 [g]	FLA642851	--	--	--	--	0.15 [h]	0.05 [h]	0.03 [i]	60%
Marathon – Service Area 4 [g]	FLA550973	--	--	--	--	0.15 [h]	0.05 [h]	0.03 [i]	60%
Marathon – Service Area 5	FLA187364	0.16	0.07	0.00	0%	0.15 [h]	0.07 [h]	0.04 [i]	57%
Marathon – Service Area 6	FLA579033	0.20	0.02	0.00	0%	0.15 [h]	0.02 [h]	0.00 [i]	0%
Marathon – Service Area 7 [j]	FLA705250	--	--	--	--	0.15 [h]	0.05 [h]	0.03 [i]	60%
North Key Largo (Ocean Reef)	FLA015009	0.55	0.25	0.00	0%	0.50	0.28	0.10	36%
Plantation Key Colony [k]	FLA351849	0.36	0.06	0.00	0%	--	--	--	--
Monroe County Total		**13.35**	**5.66**	**0.23**	**4%**	**13.41**	**8.20**	**1.54**	**19%**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Reuse percentage is calculated by dividing "Average Daily Reuse Flow" by "Average Daily WWTF Flow."

c. The utility did not provide the projected 2030 capacity and flow. SFWMD assumes both will remain at current levels unless the projected flow exceeded capacity. In that case, capacity is increased to equal projected flow.

d. The utility did not provide the projected 2030 flow. It remains the same as 2010, given no expected increase in potable water use in the Florida Keys.

e. The Key Haven Utility WWTF is expected to be decommissioned by 2016. Flows are projected to be diverted to the Key West Resort Utilities WWTF.

f. The utility did not provide the projected 2030 capacity and flow. SFWMD assumes capacity will remain the same as in 2010. The projected flow is based on no increases from the 2010 flow at the Key Largo WWTF (0.07 MGD) plus flow at the Plantation Key Colony WWTF (0.06 MGD). It is projected that, by 2030, wastewater flow from Plantation Key Colony WWTF will be sent to the Key Largo WWTF for treatment.

g. The system is now complete but was not in operation in 2010.

h. The utility did not provide the projected 2030 capacity and flow. Both are based on the size of other WWTFs in Marathon.

i. The utility did not provide the projected 2030 reuse flow. It is estimated based on a 60 percent reuse at the facility that is documented with the capability to produce reclaimed water.

j. The system is under construction.

k. Islamorada, including Plantation Key Colony, is expecting to begin sending wastewater to the Key Largo WWTF for treatment sometime in the near future.

Table C-6. Disposal and reuse methods of WWTFs with flow greater than 0.1 MGD in Palm Beach County. [a]

Wastewater Treatment Facility	2010					2030				
	Disposal		Reuse			Disposal		Reuse		
	Ocean Outfall (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)	Ocean Outfall (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)
Boca Raton	13.24	0.00	5.75	0.00	0.87	0.00	0.00	12.80	0.00	2.00
East Central Regional [e]	0.00	39.17	0.00	0.00	1.77	0.00	29.11	2.00	0.00	20.00
Glades Utility Authority – Belle Glade [e]	0.00	2.30	0.00	0.00	0.13	0.00	2.91	0.00	0.00	0.13
Glades Utility Authority – Pahokee [e]	0.00	0.82	0.00	0.01	0.00	0.00	1.03	0.00	0.01	0.00
Loxahatchee River District [f]	0.00	1.61	5.60	0.00	0.79	0.00	2.60	8.40	0.00	0.00
Palm Beach County – Central Region	0.00	0.00	0.51	0.00	0.00	0.00	0.00	6.00	0.00	0.00
Palm Beach County – Southern Regional	0.00	8.70	12.70	0.00	1.50	0.00	8.00	22.00	0.00	3.00
Seacoast Utility Authority PGA Regional	0.00	1.25	6.09	0.00	0.02	0.00	0.00	10.00	0.00	0.00
Seminole Improvement District	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.05
South Central Regional	0.04	10.74	5.87	0.00	0.11	0.00	2.69	19.94	0.00	0.00
Wellington [e]	0.00	3.96	0.03	0.07	0.00	0.00	0.56	4.43	0.07	0.00
Palm Beach County Total	**13.28**	**68.55**	**36.55**	**0.08**	**5.23**	**0.00**	**46.90**	**85.57**	**0.08**	**25.18**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Public access irrigation includes golf courses, parks, schools, common areas, etc.

c. Groundwater recharge includes percolation ponds/pits.

d. Other reuse types include other permitted uses, such as for cooling water, processes at the treatment plant, toilet flushing, etc.

e. The utility did not provide the projected (2030) information. Disposal and reuse is based on projected flows from **Table C-2.** .

f. The Loxahatchee River District WWTF blends concentrate from the Town of Jupiter's water treatment plant into their reuse system, some of which is disposed.

Table C-7. Disposal and reuse methods of WWTFs with flow greater than 0.1 MGD in Broward County. [a]

Wastewater Treatment Facility	2010					2030				
	Disposal		Reuse			Disposal		Reuse		
	Ocean Outfall (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)	Ocean Outfall (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)
Broward County North Regional	28.00	38.00	0.20	0.00	4.20	0.00	77.50	10.00	0.00	12.50
Cooper City [e]	0.00	0.63	0.00	0.00	0.00	0.00	0.10	0.90	0.00	0.00
Coral Springs Improvement District	0.00	5.06	0.00	0.00	0.00	0.00	5.40	0.00	0.00	0.00
Davie [f]	0.00	0.00	0.00	0.00	0.00	0.00	5.70	1.90	3.00	1.40
Fort Lauderdale – George T. Lohmeyer	0.00	37.60	0.00	0.00	0.00	0.00	45.60	0.00	0.00	4.00
Hollywood Southern Regional	19.60	26.30	1.79	0.00	0.00	0.00	40.70	3.00	20.40	0.00
Margate	0.00	7.21	0.00	0.00	0.00	0.00	5.70	1.00	0.00	0.50
Miramar	0.00	5.55	0.78	0.00	1.31	0.00	5.80	6.00	0.00	0.00
North Springs Improvement District (proposed)	--	--	--	--	--	0.00	0.00	4.00	0.00	0.00
Pembroke Pines	0.00	7.07	0.00	0.00	0.00	0.00	2.40	0.00	5.30	0.00
Plantation	0.00	13.39	0.00	0.00	0.41	0.00	13.77 [g]	1.77 [g]	0.00	0.00
Pompano Beach	0.00	0.00	1.35	0.00	0.00	0.00	0.00	4.50	0.00	0.00
Sunrise – Southwest	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.99	0.00
Sunrise – Sawgrass	0.00	18.26	0.00	0.00	0.00	0.00	14.00	8.00	0.00	0.00
Sunrise – Springtree	0.00	7.19	0.00	0.00	0.00	0.00	0.00	7.00	0.00	0.00
Tindall Hammock	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.40	0.00
Broward County Total	**47.60**	**166.26**	**4.12**	**0.64**	**5.92**	**0.00**	**216.67**	**48.07**	**30.09**	**18.40**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Public access irrigation includes golf courses, parks, schools, common areas, etc.

c. Groundwater recharge includes percolation ponds/pits.

d. Other reuse types include other permitted uses, such as for cooling water, processes at the treatment plant, toilet flushing, etc.

e. The Cooper City WWTF pumps most of its treated water (1.61 MGD in 2010) to the Hollywood Southern Regional Water Reclamation Facility (WRF), and that is expected to continue to 2030 (1.70 MGD). The 2010 deep injection well flow includes concentrate from the city's water treatment plant.

f. Effluent from the Davie WWTP is pumped to the Hollywood Southern Regional WRF for reuse/disposal (3.38 MGD in 2010).

g. The utility did not provide this information. It is based on 1.77 MGD of water reuse (**Table C-3**) and the remaining flow being disposed using deep well injection.

Table C-8. Disposal and reuse methods of WWTFs with flow greater than 0.1 MGD in Miami-Dade County. [a]

Wastewater Treatment Facility	2010					2030				
	Disposal		Reuse			Disposal		Reuse		
	Ocean Outfall (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)	Ocean Outfall (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)
Americana Village Condominium [e]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cricket Club Condominium [e]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Homestead	0.00	0.00	0.00	5.30	0.00	0.00	0.00	0.00	10.00	0.00
Miami-Dade Central District (MDWASD) [f]	114.10	0.00	0.00	0.00	6.22	0.00	69.00	0.00	0.00	5.00
Miami-Dade North District (MDWASD)	64.58	19.29	0.11	0.00	1.97	0.00	58.39	0.11	0.00	1.50
Miami-Dade Northwest District (proposed) (MDWASD)	--	--	--	--	--	0.00	0.00	0.00	56.00	0.00
Miami-Dade South District (MDWASD)	0.00	94.82	0.00	0.00	4.54	0.00	30.00	0.00	0.00	90.00 [g]
Miami-Dade West District (proposed) (MDWASD)	--	--	--	--	--	0.00	0.00	0.00	50.00	0.00
Miami-Dade County Total	**178.68**	**114.11**	**0.11**	**5.30**	**12.73**	**0.00**	**157.39**	**0.11**	**116.00**	**96.50**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Public access irrigation includes golf courses, parks, schools, common areas, etc.

c. Groundwater recharge includes percolation ponds/pits.

d. Other reuse types include other permitted uses, such as for cooling water, processes at the treatment plant, toilet flushing, etc.

e. Treated wastewater from this facility is disposed to on-site soakage pits.

f. MDWASD – Miami-Dade Water and Sewer Department.

g. This water is used as cooling water for the Florida Power & Light Turkey Point Energy Facility.

Table C-9. Disposal and reuse methods of WWTFs with flow greater than 0.1 MGD in Monroe County. [a]

Wastewater Treatment Facility	2010					2030				
	Disposal		Reuse			Disposal		Reuse		
	Shallow Injection Well (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)	Shallow Injection Well (MGD)	Deep Injection Well (MGD)	Public Access Irrigation [b] (MGD)	Groundwater Recharge [c] (MGD)	Other Reuse Types [d] (MGD)
Big Coppitt Regional	0.08	0.00	0.00	0.00	0.00	0.05	0.00	0.30	0.00	0.05
Boca Chica Naval Air Station [e]	0.09	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
Duck Key (Hawk's Cay)	0.02	0.00	0.03	0.00	0.00	0.10	0.00	0.20	0.00	0.00
Key Colony Beach [e]	0.15	0.00	0.03	0.00	0.00	0.15	0.00	0.03	0.00	0.00
Key Haven Utility [f]	0.09	0.00	0.00	0.00	0.00	--	--	--	--	--
Key Largo [g]	0.07	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00
Key West – Richard A. Heyman	0.00	4.41	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.20
Key West Resort Utilities	0.12	0.00	0.14	0.00	0.03	0.00	0.00	0.38	0.00	0.00
Marathon – Service Area 3 [h]	--	--	--	--	--	0.02	0.00	0.03	0.00	0.00
Marathon – Service Area 4 [h]	--	--	--	--	--	0.02	0.00	0.03	0.00	0.00
Marathon – Service Area 5	0.07	0.00	0.00	0.00	0.00	0.03	0.00	0.04	0.00	0.00
Marathon – Service Area 6	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Marathon – Service Area 7 [i]	--	--	--	--	--	0.02	0.00	0.03	0.00	0.00
North Key Largo (Ocean Reef)	0.25	0.00	0.00	0.00	0.00	0.18	0.00	0.10	0.00	0.00
Plantation Key Colony [g]	0.06	0.00	0.00	0.00	0.00	--	--	--	--	--
Monroe County Total	**1.02**	**4.41**	**0.20**	**0.00**	**0.03**	**0.81**	**6.00**	**1.14**	**0.00**	**0.25**

a. Historic (2010) data are from the *2010 Reuse Inventory* (FDEP 2011). Projected (2030) data are provided by the utilities unless otherwise noted.

b. Public access irrigation includes golf courses, parks, schools, common areas, etc.

c. Groundwater recharge includes percolation ponds/pits.

d. Other reuse types include other permitted uses, such as for cooling water, processes at the treatment plant, toilet flushing, etc.

e. The utility did not provide the projected (2030) information. SFWMD assumes disposal and reuse remain constant from 2010 to 2030.

f. The Key Haven Utility WWTF is expected to be decommissioned by 2016.

g. Islamorada, including Plantation Key Colony, is expecting to begin sending wastewater to the Key Largo WWTF for treatment sometime in the near future.

h. The system is now complete but was not in operation in 2010.

i. The system is under construction.

Wastewater/Reuse Utility Profiles

The remainder of this appendix contains profiles for each of the wastewater/reuse facilities with a treatment capacity of 0.1 MGD or greater within the LEC Planning Area. The profiles are organized by county then alphabetically by utility. Each profile contains the following:

- **Existing Treatment, Disposal, and Reuse** – This section presents the FDEP-rated treatment capacity and average daily flows of wastewater and reclaimed water. If applicable, the average daily flow of effluent disposal is presented. Current capacity and flow information is gathered from the *2010 Reuse Inventory* (FDEP 2011).
- **Future Treatment, Disposal, and Reuse** – This section provides a summary of any proposed/future plans for the utility, which may include increased capacities, flows, or reclaimed water customers.

Profiles of Palm Beach County Facilities

Boca Raton Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The City of Boca Raton's Utility Services Department operates the Boca Raton Water Reclamation Facility (WRF). The facility, which has an FDEP-permitted capacity of 17.50 MGD, provides wastewater services for the City of Boca Raton. Since the early 1990s, the city has been reclaiming water at the Glades Road Utility Services Complex. The treatment facility uses a multistage treatment process.

In 2010, the annual average daily effluent flow from the facility was 14.65 MGD. The effluent from the facility is either further treated and reused, or combined with demineralized concentrate from the city's reverse osmosis (RO) system at their water treatment facility and discharged. In 2010, the city reused 6.62 MGD of reclaimed water. Most reuse occurred through public access irrigation, such as parks, schools, golf courses, and residences. The remaining wastewater effluent (8.03 MGD) was combined with the RO concentrate (5.21 MGD) and discharged through the ocean outfall.

The city's reclaimed water supply was also supplemented with groundwater. In 2010, 0.62 MGD of groundwater was used for supplementation on an annual average daily basis. The city is moving toward becoming a 100 percent annual average daily flow facility for reuse activities as authorized by FDEP.

The city is using reclaimed water to meet projected population demands, negate potential impact to wetlands, and meet restricted allocation area criteria. As such, SFWMD included conditions in the city's permit for connecting a number of customers to their reclaimed water system.

The Boca Raton WRF provides reclaimed water to three universities, six golf courses, three churches, four schools, and four parks. The system also provides reclaimed water to approximately 52 multiple family, 700 single family, and 85 business units. It also includes the irrigation of medians and other public areas.

Primary End Users
Parks, universities, and recreational areas.

Future Treatment, Disposal, and Reuse

In an effort to meet the 2008 Ocean Outfall (Subsection 403.086(9), F.S.) requirements, the City of Boca Raton expanded its reclaimed water production capacity to 17.50 MGD and extended the reclaimed distribution system's capacity to over 17.50 MGD. By 2015, the city is expecting to reclaim and reuse 100 percent of the available treated effluent.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The 2030 information was provided by the City of Boca Raton in March 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**17.50 MGD**	**FDEP-Permitted Treatment Capacity**	**17.50 MGD**
Total Wastewater Effluent	**14.65 MGD**	**Total Wastewater Effluent**	**14.80 MGD**
Disposal		Disposal	
Ocean outfall total	13.24 MGD	Ocean outfall total	0.0 MGD
Wastewater effluent	8.03 MGD		
RO concentrate	5.21 MGD		
Reuse		Reuse	
Total	6.62 MGD	Total	14.80 MGD
Irrigation	5.75 MGD	Irrigation	12.80 MGD
At the facility	0.87 MGD	Industrial	2.00 MGD
Reuse Percentage	**45%**	**Reuse Percentage**	**100%**

East Central Regional Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The East Central Regional WRF is funded and governed by a board of representatives from the entities served by that facility: the cities of West Palm Beach, Lake Worth, and Riviera Beach; the Town of Palm Beach; and Palm Beach County. Each entity is responsible for its wastewater collection and transmission systems. The facility, which has an FDEP-permitted capacity of 64.00 MGD, treated an annual average daily flow of 40.94 MGD in 2010. Approximately 1.77 MGD of the treated wastewater was reused in 2010, while 39.17 MGD was disposed of through deep well injection.

Some secondary treated effluent from the this facility is sent to the adjacent Palm Beach County Central Region WRF, at which it is further treated to reclaimed water standards and reused for irrigation. Palm Beach County's Central Region WRF is summarized in a separate profile.

There are two reclaimed water treatment systems at the East Central Regional WRF. One of the treatment trains provides reclaimed water to the City of West Palm Beach's Wetlands-Based Water Reclamation Project. In 2006, the city completed construction on the project that involves the discharge of highly treated effluent to an adjacent wetland area to restore and recharge the wetland and the SAS. Withdrawals from the city's SAS wellfield are dependent on the reclaimed water application rate at the wetlands. The city encountered problems with the advanced wastewater treatment process at the facility, resulting in lower than planned recharge volumes to the Wetlands-Based Water Reclamation Project.

The second reclaimed water treatment system at the East Central Regional WRF is rated for 26 MGD and primarily provides advanced secondary reclaimed water to the Florida Power & Light (FPL) West County Energy Center for cooling. The distribution pipeline between the East Central Regional WRF and the FPL facility was constructed and is maintained by the Palm Beach County Water Utilities Department. Reclaimed water deliveries to the FPL center started in 2011.

Primary End Users
City of West Palm Beach Wetlands-Based Water Reclamation Project
FPL West County Energy Center

Future Treatment, Disposal, and Reuse

The agreement between the Palm Beach County Water Utilities Department and FPL is for delivery of up to 27 MGD of reclaimed water. Additional reclaimed water users located along the length of the pipeline between the East Central Regional WRF and the FPL center will depend on future demands and supplies.

The City of West Palm Beach may make changes to the advanced wetland treatment system at the East Central Regional WRF to increase the output of reclaimed water and its deliveries to the Wetlands-Based Water Reclamation Project. The facility will continue to

provide secondary-treated wastewater to the Palm Beach County's Central Regional WRF for the benefit of water reuse customers in their service area.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of West Palm Beach did not provide 2030 projections. SFWMD assumes the 2030 treatment capacity will remain at the current level. The increase in wastewater flow is estimated to increase in proportion to the increase in potable water supply in the City of West Palm Beach from 2010 to 2030. The projected reuse flow is a combination of an estimated 2.0 MGD through the city and 20.0 MGD from the Palm Beach County Water Utilities Department to the FPL West County Energy Center.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**64.00 MGD**	**FDEP-Permitted Treatment Capacity**	**64.00 MGD**
Total Wastewater Effluent	**40.94 MGD**	**Total Wastewater Effluent**	**51.11 MGD**
Disposal		Disposal	
Deep well injection	39.17 MGD	Deep well injection	29.11 MGD
Reuse		Reuse	
Total	1.77 MGD	Total	22.0 MGD
Wetlands	1.77 MGD	Cooling	20.0 MGD
		Irrigation	2.0 MGD
Reuse Percentage	**4%**	**Reuse Percentage**	**43%**

Glades Utility Authority – Belle Glade Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The 2009 partnership agreement between Palm Beach County and the cities of Belle Glade, Pahokee, and South Bay created and formed the Glades Utility Authority. The authority is responsible for developing a regional water and wastewater infrastructure system, and providing a regional solution for sustainable water and wastewater utilities in the tri-city area.

The City of Belle Glade operates and maintains its own wastewater collection and treatment system. The Belle Glade Wastewater Treatment Plant (WWTP) has an FDEP-permitted capacity of 3.90 MGD. It provides wastewater services for Belle Glade and, on a contract basis, for the City of South Bay. In 2010, the annual average daily flow from the plant was 2.43 MGD. Most of the treated effluent (2.30 MGD) was disposed of through deep well injection. A small amount (0.13 MGD) of water was reused for agricultural irrigation.

Future Treatment, Disposal, and Reuse

The Glades Utility Authority does not currently have plans to implement a reclaimed water system. Previously, the City of Belle Glade determined a water reuse system was not feasible. In the future, the Glades Utility Authority may determine such an initiative would enhance water availability.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Glades Utility Authority did not provide the 2030 information. SFWMD assumes the 2030 treatment capacity will remain at the current level. The increase in wastewater flow is anticipated to increase in proportion to the increase in potable water supply from 2010 to 2030. The projected reuse flow is assumed to remain constant.

FACILITY SUMMARY

2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**3.90 MGD**	**FDEP-Permitted Treatment Capacity**	**3.90 MGD**
Total Wastewater Effluent	**2.43 MGD**	**Total Wastewater Effluent**	**3.04 MGD**
Disposal		Disposal	
Deep well injection	2.30 MGD	Deep well injection	2.91 MGD
Reuse		Reuse	
Agricultural irrigation	0.13 MGD	Agricultural irrigation	0.13 MGD
Reuse Percentage	**5%**	**Reuse Percentage**	**4%**

Glades Utility Authority – Pahokee Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The 2009 partnership agreement between Palm Beach County and the cities of Belle Glade, Pahokee, and South Bay created and formed the Glades Utility Authority. The authority is responsible for developing a regional water and wastewater infrastructure system, and providing a regional solution for sustainable water and wastewater utilities in the tri-city area.

The City of Pahokee operates and maintains its own wastewater collection and treatment system. The Pahokee WWTP has an FDEP-permitted capacity of 1.20 MGD. In 2010, the annual average daily flow from the plant was 0.83 MGD, with a small amount (0.01 MGD) of reuse through on-site percolation ponds. Most of the treated effluent (0.82 MGD) is disposed of through deep well injection.

Future Treatment, Disposal, and Reuse

The Glades Utility Authority does not currently have plans to implement a reclaimed water system. Previously, the City of Pahokee determined a water reuse system was not feasible. In the future, the Glades Utility Authority may determine such an initiative would enhance water availability.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Glades Utility Authority did not provide the 2030 projections. SFWMD assumes the 2030 treatment capacity will remain at the current level. The increase in wastewater flow is anticipated to increase in proportion to the increase in potable water supply from 2010 to 2030. The projected reuse is assumed to remain constant between 2010 and 2030.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**1.20 MGD**	**FDEP-Permitted Treatment Capacity**	**1.20 MGD**
Total Wastewater Effluent	**0.83 MGD**	**Total Wastewater Effluent**	**1.04 MGD**
Disposal		Disposal	
Deep well injection	0.82 MGD	Deep well injection	1.03 MGD
Reuse		Reuse	
Percolation ponds	0.01 MGD	Groundwater recharge	0.01 MGD
Reuse Percentage	**1%**	**Reuse Percentage**	**1%**

Loxahatchee River District Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

In 1971, the state legislature created the Loxahatchee River Environmental Control District, now referred to as the Loxahatchee River District. The district owns, operates, and maintains a WWTF in the Town of Jupiter. The facility serves the municipalities of Jupiter, Tequesta, and Juno Beach, along with the unincorporated areas of northern Palm Beach and southern Martin counties. The facility has an FDEP-permitted capacity of 11.00 MGD, with an annual average daily wastewater flow of 6.73 MGD in 2010. Approximately 6.39 MGD of the treated wastewater was reused in 2010, while 1.61 MGD was disposed through deep well injection. The reclaimed water is used primarily for irrigation of residences, golf courses, parks, and schools.

Concentrate from the Town of Jupiter's water treatment plant is blended with reclaimed water from the Loxahatchee River District. The blended concentrate increases Loxahatchee River District's reclaimed water supply and reduces the need for supplemented supplies from traditional sources of water. In 2010, Loxahatchee River District provided reclaimed water to 14 golf courses, 14 parks, 3 schools, and over 4,400 residences for irrigation.

Primary End Users
Abacoa Golf Club
Abacoa Development
Admiral's Cove East
Admiral's Cove West
Bear's Club
Frenchman's Creek North
Golf Club of Jupiter
Indian Creek Golf Club
Jonathan's Landing Golf Club
Jupiter Country Club
Jupiter Hills Club Numbers 1 and 2
Loxahatchee Club (Maplewood)
Riverbend Country Club
Riverbend Golf Club
Turtle Creek Golf Club
Tequesta Country Club

Future Treatment, Disposal, and Reuse

Although the Loxahatchee River District reuses most of its reclaimed water, some expansion of the system is expected in the future as the wastewater treatment flow increases. The goal is to optimize the overall water reuse efficiency, and correspondingly reduce disposal through deep well injection.

Future reclaimed water uses for the Loxahatchee River District WWTF depend upon an existing agreement with Seacoast Utility Authority. Under the agreement, Seacoast Utility

Authority sends reclaimed water to the Abacoa development for irrigation. If the agreement is renewed, the Loxahatchee River District will likely use their increased reclaimed water to meet the water needs of additional users. If it is not renewed, much of the additional reclaimed water produced by Loxahatchee River District may be used at Abacoa.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The 2030 information was provided by the Loxahatchee River District in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**11.00 MGD**	**FDEP-Permitted Treatment Capacity**	**11.00 MGD**
Total Wastewater Effluent	**6.73 MGD**	**Total Wastewater Effluent**	**11.00 MGD**
Disposal		Disposal	
Deep well injection [a]	1.61 MGD	Deep well injection	2.6 MGD
Reuse		Reuse	
Total	6.39 MGD	Total	8.4 MGD
Irrigation	5.60 MGD	Irrigation	8.4 MGD
At the facility	0.79 MGD		
Reuse Percentage	**95%**	**Reuse Percentage**	**76%**

a. Disposal includes concentrate water from the Town of Jupiter's water treatment plant.

Palm Beach County – Central Region Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The Palm Beach County Water Utilities Department constructed the Central Region WRF on the site of the former Century Village WWTP. The facility, which began operation in 2008, receives secondary-treated effluent from the adjacent East Central Regional WRF and treats it to reclaimed water quality for irrigation. The Central Region WRF has an FDEP-permitted capacity of 3.00 MGD and treated an annual average daily flow of 0.51 MGD in 2010. All of the reclaimed water from the facility was reused in 2010.

Reclaimed water from this facility is used to irrigate a golf course and various landscaped areas. The Central Region WRF provides reclaimed water for irrigation and eliminates competition for groundwater withdrawn by the nearby Palm Beach County System Number 8 Wellfield and the City of West Palm Beach's wellfield.

Primary End Users
Century Village
Cypress Lakes
Emerald Dunes Golf Course
Vista Center

Future Treatment, Disposal, and Reuse

Although all of the reclaimed water from the Central Region WRF is reused, some expansion and optimization of the system may be planned. Potential future reclaimed water end users will be determined in the near future.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Palm Beach County Water Utilities Department provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**3.00 MGD**	**FDEP-Permitted Treatment Capacity**	**6.0 MGD**
Total Wastewater Effluent	**0.51 MGD**	**Total Wastewater Effluent**	**6.0 MGD**
Reuse		Reuse	
Irrigation	0.51 MGD	Irrigation	6.0 MGD
Reuse Percentage	**100%**	**Reuse Percentage**	**100%**

Palm Beach County – Southern Regional Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The Palm Beach County Water Utilities Department operates and maintains the Southern Regional WRF located in unincorporated Boynton Beach. The facility treats wastewater and provides reclaimed water for unincorporated areas of Boynton Beach and Delray Beach. The facility had an FDEP-permitted capacity of 35.00 MGD, with an annual average daily flow of 22.90 MGD in 2010. Approximately 14.20 MGD of the treated wastewater was reused in 2010, while 8.70 MGD was disposed through deep well injection. The reclaimed water is primarily used for irrigation. However, a portion of the reclaimed water hydrates the Wakodahatchee and Green Cay wetlands.

The Wakodahatchee Wetlands were constructed from former percolation ponds and act as a natural filter for nutrients before recharging the shallow aquifer. The 114-acre Green Cay Wetlands, located on former agricultural land, are used to recharge the local aquifer system, create ecologically significant wildlife habitat, and extend the function of the nearby Wakodahatchee Wetlands.

The facility provides reclaimed water to nine golf courses, two parks, one school, and more than 6,000 residences for irrigation.

Primary End Users
Aberdeen
Addison Reserve Country Club
Amherst Partners
Avalon Estates of Boynton Beach
Boynton Beach Medical Center
Briella Townhomes
Bruce Stumpf, Inc.
Canyon Lakes
Casa Bella
Cascades Association
Cypress Lakes Master Homeowner's Association
Enclave at Westchester
GL Homes of Boynton Beach
Gleneagles Country Club
Green Cay Wetlands
Greystone at Boynton Beach Homeowner's Association
Hagen Ranch Road median
Indian Springs East and West
Indian Springs Golf Course
Karl Corporation
Lake Lexington Club
Lakeridge Falls Homeowner's Association
Lexington Club Community
Monterey Estates
Palm Isles West Association

Polo Trace Golf Course
Polo Trace West
Ponte Vecchio Homeowner's Association
Reform Temple at Shaarei Shalom
San Marco Homeowner's Association
Sawgrass Lakes Homeowner's Association
Seacrest Services
Shops at San Marco
Southern Golf Partners
St. Andrews Country Club
Tivoli Reserve of Palm Beach County Homeowner's Association
Tivoli Lakes of Palm Beach County Homeowner's Association
United Civic Association
Valencia Falls Homeowner's Association
Valencia Isles Homeowner's Association
Valencia Lakes Homeowner's Association
Valencia Palms
Valencia Pointe Master Homeowner's Association
Valencia Reserve
Villa Borghese Homeowner's Association
Water Treatment Plant System 3
Wakodahatchee Wetlands
Westchester Golf Course
Woolbright Jog Limited Liability Company

Future Treatment, Disposal, and Reuse

Palm Beach County has a mandatory reuse zone ordinance for new developments within a section of its service area. The Palm Beach County Water Utilities Department continues to pursue additional water reuse opportunities in this zone and surrounding areas. The goal is to increase the overall water reuse percentage and reduce disposal through deep well injection.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Palm Beach County Water Utilities Department provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**35.00 MGD**	**FDEP-Permitted Treatment Capacity**	**50.00 MGD**
Total Wastewater Effluent	**22.90 MGD**	**Total Wastewater Effluent**	**30.00 MGD**
Disposal		Disposal	
Deep well injection	8.70 MGD	Deep well injection	8.00 MGD
Reuse		Reuse	
Total	14.20 MGD	Total	25.00 MGD
Irrigation	12.70 MGD	Irrigation	22.00 MGD
Wetlands	1.50 MGD	Wetlands	3.00 MGD
Reuse Percentage	**62%**	**Reuse Percentage**	**83%**

Seacoast Utility Authority PGA Regional Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The Seacoast Utility Authority owns, operates, and maintains the PGA Regional WRF. The facility services some unincorporated areas of northern Palm Beach County, the incorporated areas of the City of Palm Beach Gardens, the Village of North Palm Beach, the Town of Lake Park, and portions of the Town of Juno Beach. The PGA Regional WRF has an FDEP-permitted capacity of 12.00 MGD, with an annual average daily flow of 7.51 MGD in 2010, which includes a transfer of 1.27 MGD to the Loxahatchee River District.

In 2010, 0.20 MGD of groundwater, 0.72 MGD of water from the C-17 Canal, and 0.21 MGD of potable water on an annual average basis supplemented the Seacoast Utility Authority's reclaimed water supply. Approximately 6.11 MGD of reclaimed water was reused in 2010, while 1.25 MGD was disposed through deep well injection. The reclaimed water is primarily used for irrigation of golf courses, residences, parks, and streetscapes.

In 2010, Seacoast Utility Authority provided reclaimed water to ten golf courses, roadway medians, and two parks, among other users, for irrigation.

Primary End Users
Abacoa
Ballen Isles East Golf Course
Ballen Isles West Golf Course
Central Park
Crystal Pointe
Eastpointe Country Club
Eastpointe Golf and Racquet
Eastpointe Briar Lake
Everglades Condominium
FPL Administrative Complex
FPL Monet Substation
Frenchman's Creek Golf Course
Frenchman's Reserve
Gardens Mall
Gemini Condominium
Governor's Pointe
Lost Tree Village Golf Course
Mariners Cove
McArthur (Regional) Center
Mirasol
Mirasol Walk
Hibiscus
Oak Harbour
Old Palm Golf Course
Old Port Cove
North Palm Beach Country Club
Paloma

Palm Beach Gardens Regional Park
PGA Boulevard streetscape
Royale Harbour Condominium
Seamark Condominium
Seacoast Utility Authority Water Treatment Plant
Seasons 52 Restaurant
Shady Lakes Homeowner's Association
Southampton
The Bears Club
The Isles
Waterway Terrace Condominium
Seacoast Utility Authority administration building

Future Treatment, Disposal, and Reuse

Although most of the treated effluent from the PGA Regional WRF is reused, the Seacoast Utility Authority will continue its efforts to promote the use of reclaimed water as an alternative water supply. The goal is to increase the overall water reuse percentage and reduce disposal through deep well injection. Seacoast Utility Authority projects use of deep well injection only during wet weather conditions and periodic testing of the well.

Potential End Users
Bent Tree
Cimarron

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Seacoast Utility Authority provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**12.00 MGD**	**FDEP-Permitted Treatment Capacity**	**12.00 MGD**
Total Wastewater Effluent [a]	**7.51 MGD**	**Total Wastewater Effluent**	**10.00 MGD**
Disposal		Disposal	
Deep well injection	1.25 MGD	Deep well injection	0.0 MGD
Reuse		Reuse	
Total	6.11 MGD	Total	10.00 MGD
Irrigation	6.09 MGD	Irrigation	10.00 MGD
At the facility	0.02 MGD		
Reuse Percentage	**81%**	**Reuse Percentage**	**100%**

a. 1.27 MGD of reclaimed water from the facility was transferred to the Loxahatchee River District.

Seminole Improvement District Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The Seminole Improvement District is an independent Chapter 298 special district that provides potable water, sewer, and reclaimed water service to the central-western communities of Palm Beach County. In 2006, an agreement was executed between the county and Seminole Improvement District to define its service area and to work cooperatively on regional wastewater treatment and water reuse. The Seminole Improvement District WRF has an FDEP-permitted capacity of 0.32 MGD, with an annual average daily flow of 0.04 MGD in 2010. All of the reclaimed water is land applied for agricultural irrigation.

Future Treatment, Disposal, and Reuse

The Seminole Improvement District does not have plans to modify their existing water reuse system. However, the Seminole Improvement District and the county may determine in the future that modifications may provide enhanced water availability.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). Neither the Seminole Improvement District nor Palm Beach County provided the 2030 information. SFWMD assumes the 2030 treatment capacity remains at the current level. The increase in wastewater flow is anticipated to increase in proportion to the increase in potable water. Reuse is anticipated to remain at 100 percent.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.32 MGD**	**FDEP-Permitted Treatment Capacity**	**0.32 MGD**
Total Wastewater Effluent	**0.04 MGD**	**Total Wastewater Effluent**	**0.05 MGD**
Reuse		Reuse	
Agricultural irrigation	0.04 MGD	Agricultural irrigation	0.05 MGD
Reuse Percentage	**100 %**	**Reuse Percentage**	**100%**

South Central Regional Wastewater Reclamation Facility

Existing Treatment, Disposal, and Reuse

The South Central Regional Wastewater and Disposal Board, formed in 1974 as a special district, treats wastewater from the cities of Boynton Beach and Delray Beach at the South Central Regional Wastewater Reclamation Facility. Each city operates and maintains wastewater collection systems in their respective service areas. Older contracts with end users were directly with the South Central Regional Wastewater and Disposal Board. The more recent contracts for reclaimed water are between the end users and the cities of Boynton Beach and Delray Beach.

The South Central Regional Wastewater Reclamation Facility has an FDEP-permitted capacity of 24.00 MGD, with an annual average daily flow of 16.76 MGD in 2010. Approximately 5.98 MGD of the treated wastewater was reused in 2010. About 10.74 MGD of treated wastewater was disposed through deep well injection and 0.04 MGD through an ocean outfall. Among other uses, the facility distributes the reclaimed water to both the cities of Boynton Beach and Delray Beach for their customers to irrigate 9 golf courses, 1 school, and 500 residences. The facility directly contracts with several customers for an allotment of 4.00 MGD, which is used for irrigation.

The 2008 Ocean Outfall statute (Subsection 403.086(9), F.S.) mandated the elimination of ocean outfalls by 2025 with the additional requirement that 60 percent of facility flow be beneficially reused. The South Central Regional Wastewater Reclamation Facility utilizes one of these outfalls. Based on historic flows to the ocean outfall, the facility is required to reuse 7.7 MGD of treated wastewater by 2025. The South Central Regional Wastewater and Disposal Board plans to meet the requirements of the statute by increasing the capacity of water reuse in the cities of Boynton Beach and Delray Beach. A deep injection well was installed, thereby nearly eliminating discharge through the ocean outfall. The ocean outfall will remain in place for emergency discharges.

City of Boynton Beach

The City of Boynton Beach's Utilities Department operates and maintains the city's wastewater and reclaimed water systems. The city receives reclaimed water from the South Central Regional Wastewater Reclamation Facility and reuses it, primarily for irrigation purposes. The city's permitted allocation is conditioned on the provision of reclaimed water to various identified entities.

Primary End Users
Bethesda Hospital
Bethesda Service Center
Boynton Ball Park
Boynton Beach Cemetery
Boynton Beach Children's Museum
Boynton Beach Water Treatment Plant
Boynton Library

Boynton Senior Center
City Tennis Courts
Congress Avenue Park and Tennis Center
Country Club of Florida*
Delray Dunes*
East Water Plant
Entrance to Chapel Hill
Forest Park Elementary
Hunters Run Golf and Racquet Club
Hunters Run*
Las Ventanas
Little League Ball Park
Pence Park
Pine Tree Golf Club*
Quail Ridge*
Sterling Village
Village of Golf*

* Customer of the South Central Regional Wastewater and Disposal Board within the City of Boynton Beach service area.

City of Delray Beach

The City of Delray Beach's Public Utilities Division operates and maintains the city's wastewater and reclaimed water systems. The city receives reclaimed water from the South Central Regional WRF and uses it, primarily for irrigation purposes. The reclaimed water has largely replaced potable use and permitted withdrawals from the SAS. The city's water use permit contains limiting conditions requiring the provision of reclaimed water to four irrigation users (Delray Beach Municipal Golf Course, Hamlet Country Club, Del-Aire Country Club, and Lakeview Golf Club).

Primary End Users
Barrier island residential (north of Atlantic Avenue)
Clearbrook Homeowner's Association
Crosswinds of Delray
Del-Aire Golf Club
Delray Beach Municipal Golf Course
Delray Business Center
Fairways of Delray
Hamlet Golf Course
Lakeview Golf Club
Medians
New Atlantic High School
North Water Storage Tank/Pump Station (200 Northwest First Avenue)
Northwest Second Street corridor (Martin Luther King, Jr. Drive)
Pines of Delray Association, East and West
Pompey Park
St. Mary's Church (Atlantic Avenue/Homewood Boulevard)
Verona Woods Homeowner's Association
Wahoo Properties

Future Treatment, Disposal, and Reuse

City of Boynton Beach

As the City of Boynton Beach's reclaimed water system expands, it is expected that reclaimed water will replace both current groundwater withdrawals from the SAS and potable demand on the system. The ultimate build-out capacity of the city's reclaimed water system is estimated at 11.0 MGD. The city proposes irrigation as the primary use for the future expansion of the reclaimed system.

Potential End Users
Banyan Springs
Barrier Island residential
Barton Memorial Park
Bent Tree
Boynton Beach Civic Center
Caloosa Park
Cascade Lakes
Colonial Club
Colonial Estates
Congress Avenue Park
Congress Middle School
Crosspointe Elementary School
Cypress Creek Golf Course
Greentree Villas
Hampshire Gardens
Highpoint residential
Holiday Inn
Hunters Run Residential Homeowner's Association
Indian Hills at Indian Spring
Jaycees Park
Leisureville Golf Course
Limetree
Little Club
Los Mangos
Oakwood Lakes
Palm Chase
Palmetto Greens Park
Santa Cruz
Snug Harbor
St. Andrews Golf Club
St. Vincent de Paul Seminary
Tuscany Bay (Military Trail)
Tuscany on the Intracoastal
WXEL

City of Delray Beach

The City of Delray Beach has an ordinance requiring customers to connect to the reclaimed water system based on proximity to reclaimed water pipelines. As the city's reclaimed water system expands, it is expected that the reclaimed water will replace both current groundwater withdrawals from the SAS and potable demand on the system. The ultimate build-out capacity of the city's reclaimed water system is estimated at approximately 8.0 MGD. Water produced by expansion of the reclaimed system is primarily expected to be for irrigation along the barrier island.

Potential End Users
Banyan Creek Elementary
Carver Middle School
Carver Recreation Center
City Hall
Country Manors
Delray Beach City Cemetery
Environmental Services Department Complex
Gulf Stream Country Club
High Point
Lavers
Little Club
Miller Park
Old Atlantic High School
Old School Square
Orchardview Park
Pine Grove Elementary
Plumosa Elementary
Police station/courthouse
Rainberry Bay Homeowner's Association
Barrier island residential (south of Atlantic Avenue)
Sherwood Park Golf Course

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). South Central Regional Wastewater Disposal Board provided the City of Delray Beach 2030 information in April 2012. The City of Boynton Beach provided 2030 information in April 2012. These 2030 projections are dependent on the cities of Boynton Beach and Delray Beach reusing a total of 15.94 MGD (7.97 MGD for each city).

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**24.00 MGD**	**FDEP-Permitted Treatment Capacity**	**24.00 MGD**
Total Wastewater Effluent	**16.76 MGD**	**Total Wastewater Effluent**	**22.63 MGD**
Disposal		Disposal	
Total	10.78 MGD	Total	2.69 MGD
Deep well injection	10.74 MGD	Deep well injection	2.69 MGD
Ocean outfall	0.04 MGD		
Reuse		Reuse	
Total	5.98 MGD	Total	19.94 MGD
Irrigation	5.87 MGD	Irrigation – Boynton Beach	7.97 MGD
At the facility	0.11 MGD	Irrigation – Delray Beach	7.97 MGD
		Irrigation – Contracts	4.00 MGD
Reuse Percentage	**36%**	**Reuse Percentage**	**88%**

Wellington Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The Village of Wellington's Utilities Department owns, operates, and maintains the Wellington WRF. The facility serves the village with wastewater collection services, treatment, and water reuse. The facility has an FDEP-permitted capacity of 4.75 MGD, with an annual average daily flow of 4.06 MGD in 2010. Approximately 0.10 MGD of the treated wastewater was reused in 2010, while 3.96 MGD was disposed through deep well injection. Construction to upgrade the treatment system slightly reduced reclaimed water flows from the facility in 2010, down from 0.25 MGD in 2009.

Reclaimed water from the Wellington WRF is primarily used for irrigation of local parks and for groundwater recharge at Wetland Park, which was constructed to provide wildlife habitat and public access.

Primary End Users
Boys and Girls Club Park
K-Park
Olympia Park
Tigershark Cove Park
Town Center
Village Park

Future Treatment, Disposal, and Reuse

Construction to upgrade the treatment system temporarily reduced reclaimed water flows; however, it will increase the reclaimed capacity to 4.5 MGD. With the increased capacity, the village intends to provide reclaimed water to the past/current users and evaluate the feasibility of future expansion.

Potential End Users
Big Blue Trace
Forest Hill Boulevard
Greenview Shores Boulevard
International Polo
Old Polo (a and b)
Pierson Polo
Polo Golf Course
Polo South
Southshore Boulevard (north)
Southshore Boulevard (south)
Wellington Trace West
Wellington Trace East

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The utility did not provide the 2030 information. The increase in wastewater flow is anticipated to increase in proportion to the increase in potable water supply in the village from 2010 to 2030. The projected capacity is assumed to increase to match the estimated flow. The projected reuse flow is from the *Village of Wellington Water Supply Facilities Work Plan and Related Comprehensive Plan Amendments* (Village of Wellington 2009). All reuse is assumed to be for irrigation purposes, except the groundwater recharge was kept constant from 2010 to 2030.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**4.75 MGD**	**FDEP-Permitted Treatment Capacity**	**5.06 MGD**
Total Wastewater Effluent	**4.06 MGD**	**Total Wastewater Effluent**	**5.06 MGD**
Disposal		Disposal	
Deep well injection	3.96 MGD	Deep well injection	0.56 MGD
Reuse		Reuse	
Total	0.10 MGD	Total	4.50 MGD
Irrigation	0.03 MGD	Irrigation	4.43 MGD
Groundwater recharge	0.07 MGD	Groundwater recharge	0.07 MGD
Reuse Percentage	**2%**	**Reuse Percentage**	**89%**

Profiles of Broward County Facilities

Broward County North Regional Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

Broward County Water and Wastewater Services operates the Broward County North Regional WRF located in the City of Pompano Beach. The facility has an FDEP-permitted capacity of 95.00 MGD. It provides wastewater services for northern Broward County. In 2010, the annual average daily wastewater flow at the facility was 71.00 MGD. Approximately 4.40 MGD of the treated wastewater is reused at the facility or at adjacent facilities for irrigation, process, or cooling water.

In 2010, most of the treated wastewater was disposed of via deep injection wells (38.0 MGD) and ocean outfall (28.0 MGD). Of the water sent to the ocean outfall, an average 1.35 MGD was captured by the City of Pompano Beach in 2010 for further treatment and reuse. Overall, water reuse at the facility was approximately 6 percent of the wastewater treated at the facility.

Primary End Users
Broward County Septage Receiving Facility
Broward County North Regional WRF
Pompano Beach Park of Commerce
Wheelabrator Environmental Services

Future Treatment, Disposal, and Reuse

Based on historic flows to the ocean outfall, the facility is required to reuse 21.45 MGD of treated wastewater by 2025 to comply with the 2008 Ocean Outfall statute (Subsection 403.086(9), F.S.). The county is promoting collaborative regional water supply strategies to meet the required 60 percent water reuse by 2025. The county also intends to develop a regional reuse master plan along with a new or amended county ordinance(s) for the establishment of mandatory reuse zones.

Broward County Water and Wastewater Services continues to investigate means to increase its reclaimed water usage, both as a method to meet future water needs and the requirements of the 2008 Ocean Outfall requirements. The county is partnering with Palm Beach County Water Utilities Department to send reclaimed water into southern Palm Beach County for irrigation. Some irrigation customers will be included in northern Broward County as the reclaimed water is sent northward. The county is also in the process of extending reclaimed water to the Pompano Highlands neighborhood for irrigation. The City of Coconut Creek, which is within the North Regional WRF's service area, installed infrastructure to accept reclaimed water from the facility, primarily for irrigation. The first phase of the City of Coconut Creek reclaimed water system is planned to be operational in 2013. The City of Pompano Beach, which takes treated wastewater from the county's ocean outfall pipeline, is expected to continue expanding its reclaimed system.

Potential End Users
City of Coconut Creek
Pompano Highlands
Potential larger users (e.g., golf courses, parks, and schools)

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). Broward County Wastewater Services provided the 2030 information in May 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**84.00 MGD**	**FDEP-Permitted Treatment Capacity**	**100.00 MGD**
Total Wastewater Effluent	**71.00 MGD**	**Total Wastewater Effluent**	**87.00 MGD**
Disposal		Disposal	
Total	66.00 MGD	Total	77.50 MGD
Deep well injection	38.00 MGD	Deep well injection	77.50 MGD
Ocean outfall	28.00 MGD		
Reuse		Reuse	
Total	4.40 MGD	Total	23.60 MGD
At the facility	2.90 MGD	Industrial or other	4.20 MGD
Cooling water	1.30 MGD	Irrigation	19.40 MGD
Irrigation	0.20 MGD		
Reuse Percentage	**6%**	**Reuse Percentage**	**27%**

Cooper City Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The City of Cooper City Utility Department operates the Cooper City WWTF, which has an FDEP-permitted capacity of 3.10 MGD. The facility provides wastewater services to its customers in the city and small sections of Davie and Southwest Ranches. In 2010, the annual average daily flow from the facility was 2.24 MGD. Treated effluent is disposed of through deep well injection or pumped to the Hollywood Southern Regional WRF. A contract between Cooper City and the City of Hollywood requires a minimum of 1.7 MGD of treated effluent be sent to the Hollywood facility. The salinity of treated effluent from Cooper City is lower than from the Hollywood facility and, therefore, is preferable for reuse applications.

Future Treatment, Disposal, and Reuse

Cooper City has a National Pollutant Discharge Elimination System permit with FDEP for its discharges through the Hollywood ocean outfall. Therefore, Cooper City is obligated to meet the reuse requirements. Based on historic flows to the ocean outfall, the Cooper City WWTF is required to reuse 0.9 MGD of treated wastewater by 2025.

The Cooper City WWTF currently does not have plans to implement a water reuse system within the city. The city will continue to evaluate reclaimed water as an alternative water supply source. SFWMD anticipates the city will work with neighboring utilities to leverage resources and take advantage of economies of scale to meet the 2008 Ocean Outfall requirements (Subsection 403.086(9), F.S.). Costs and potential increases for allocation based on terminated base condition water use and offsets are components of future considerations for water reuse in the city.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Cooper City Utility Department provided the 2030 information.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**3.10 MGD**	**FDEP-Permitted Treatment Capacity**	**3.10 MGD**
Total Wastewater Effluent [a]	**2.24 MGD**	**Total Wastewater Effluent [a]**	**2.70 MGD**
Disposal		Disposal	
Total	2.24MGD	Total	1.80 MGD
Deep well injection	0.63 MGD	Deep well injection	0.10 MGD
Pumped to Hollywood	1.61 MGD	Pumped to Hollywood	1.70 MGD
Reuse		Reuse	
In Cooper City [b]	0.00 MGD	In Cooper City [b]	0.90 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**33%**

a. Treated effluent from the WWTF is combined with concentrate from the water treatment plant before it is sent to the City of Hollywood or deep well injected.

b. Some reuse using wastewater from Cooper City occurs through the City of Hollywood's system.

Coral Springs Improvement District Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The Coral Springs Improvement District WWTF has an FDEP-permitted capacity of 5.72 MGD and provides wastewater services to customers within its service area. In 2010, the annual average daily flow from the facility was 5.06 MGD. Treated effluent from the district's facility is disposed through two deep injection wells. The facility also has a 0.01-MGD on-site rapid infiltration basin for short-term, emergency backup disposal. Coral Springs Improvement District determined water reuse is not feasible at this time.

Future Treatment, Disposal, and Reuse

Coral Springs Improvement District will upgrade the WWTF and continue to evaluate the potential of producing reclaimed water.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Coral Springs Improvement District provided the 2030 information in May 2012. Additional data is from the Coral Springs Improvement District FDEP permit (FLA041301).

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**5.72 MGD**	**FDEP-Permitted Treatment Capacity**	**7.72 MGD**
Total Wastewater Effluent	**5.06 MGD**	**Total Wastewater Effluent**	**5.40 MGD**
Disposal		Disposal	
Deep well injection	5.06 MGD	Deep well injection	5.40 MGD
Reuse		Reuse	
Total	0.00 MGD	Total	0.00 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**0%**

Davie Wastewater Treatment Plant/Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The Town of Davie Utilities Department operates the Davie WWTP. The facility has an FDEP-permitted capacity of 4.85 MGD and provides wastewater services to the majority of eastern Davie and the Seminole Tribe of Florida Hard Rock Hotel complex. The Cooper City and Tindall Hammock WWTFs also provide service to a small portion of the town. The remaining sections of the Town of Davie (predominantly the western portions) are served by Broward County, and the cities of Hollywood, Fort Lauderdale, and Sunrise. A WRF is under construction at the facility.

In 2010, the annual average daily flow at the Davie WWTP was 0.98 MGD. The town pumps treated effluent to the Hollywood Southern Regional WRF, which also receives effluent from the Cooper City WWTF. Through a large user agreement, the Davie facility is required to send treated effluent to the Hollywood facility until 2037. The salinity of treated effluent from the Davie facility is lower than that from the Hollywood facility and, therefore, is preferable for reuse applications. Currently, the Town of Davie's facility does not yet produce reclaimed water.

Future Treatment, Disposal, and Reuse

The Town of Davie has a National Pollutant Discharge Elimination System permit with FDEP for its discharges through the City of Hollywood's ocean outfall and is obligated to meet the 2008 Ocean Outfall requirements (Subsection 403.086(9), F.S.). Based on historic flows to the ocean outfall, the Town of Davie Utility Department must reuse 1.2 MGD of treated wastewater by 2025.

The Town of Davie is in the process of constructing a WRF. The facility is expected to provide up to 2.0 MGD of reclaimed water for irrigation and industrial uses in 2013. It is anticipated the volume will double by 2023. When the new WRF becomes operational, the town will divert flows from their existing WWTP to the WRF, reducing the amount of wastewater effluent sent to the Hollywood Southern Regional WRF.

Potential End Users
Arrowhead Country Club
Broward College
Broward County schools
Davie Bamford Pine Island Park Sports Complex
Grand Oaks Country Club
McFatter Technical Center
Nova Southeastern University Main Campus
Sunforest Complex
University of Florida Research Center

As part of the town's reuse program, aquifer recharge and indirect potable reuse is planned for the existing Davie WWTP (System II). Future System II expansions and upgrades include

high-level disinfection and two Biscayne aquifer recharge wells. The existing WWTP will have the capacity to recharge up to 3.0 MGD into the aquifer.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Town of Davie Reclaimed Water Distribution System and Davie Utilities Department provided the 2030 information in October 2011 and April 2012, respectively.

FACILITY SUMMARY			
2010		**Projected 2030[b]**	
FDEP-Permitted Treatment Capacity	**4.85 MGD**	**FDEP-Permitted Treatment Capacity**	**12.00 MGD**
Total Wastewater Effluent	**0.98 MGD**	**Total Wastewater Effluent**	**12.00 MGD**
Disposal/Reuse [a]		Disposal	
Pumped to Hollywood	3.38 MGD	Deep well injection	5.7 MGD
Reuse		Reuse	
Total	0.00 MGD	Total	6.30 MGD
		Irrigation	1.90 MGD
		Groundwater recharge	3.00 MGD
		Other types of reuse	1.40 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**53%**

a. Some reuse using wastewater occurs through the Hollywood Southern Regional WRF.

b. Includes both the existing WWTP and the WRF now under construction.

Fort Lauderdale George T. Lohmeyer Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The City of Fort Lauderdale's George T. Lohmeyer WWTF is designed as a central regional facility and is used to treat all wastewater generated in a region encompassing Port Everglades, the cities of Fort Lauderdale, Wilton Manors and Oakland Park, and parts of the City of Tamarac, Town of Davie, and unincorporated Broward County. The facility has an FDEP-permitted capacity of 55.70 MGD and a 2010 annual average daily flow of 37.60 MGD. Treated effluent from the facility is disposed through five deep injection wells.

The facility does not currently provide reclaimed water for reuse. The facility is located far from any traditional users of reclaimed water and space to construct the necessary treatment facilities is limited at the plant site or vicinity. In addition, the treated effluent has elevated chloride concentrations limiting its viability as reuse water. Therefore, the city determined that water reuse alternatives are not feasible at this time.

Future Treatment, Disposal, and Reuse

The City of Fort Lauderdale continues to consider water reuse, particularly options that can be used to help develop alternative water supplies. Indirect potable reuse systems are under consideration because of the dual benefits of providing more disposal capacity and augmenting local water supplies.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Fort Lauderdale provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**55.70 MGD**	**FDEP-Permitted Treatment Capacity**	**56.60 MGD**
Total Wastewater Effluent	**37.60 MGD**	**Total Wastewater Effluent**	**45.60 MGD**
Disposal		Disposal	
Deep well injection	37.60 MGD	Deep well injection	41.60 MGD
Reuse		Reuse	
Total	0.00 MGD	At the facility	4.00 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**9%**

Hollywood Southern Regional Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The City of Hollywood Department of Public Utilities operates the city-owned Hollywood Southern Regional WRF. The facility, which has an FDEP-permitted capacity of 55.50 MGD, provides wastewater services for the City of Hollywood and southern Broward County. In 2010, the annual average daily flow of treated wastewater from the facility was 45.90 MGD. The facility received additional treated wastewater from the Town of Davie and Cooper City. Approximately 45.90 MGD of the treated wastewater was disposed through deep well injection and an ocean outfall, while 1.79 MGD was reused. Most of the reclaimed water reuse was for public access irrigation. Overall, the facility reused approximately 4 percent of the wastewater treated at the facility in 2010.

Influent to the facility is relatively high in salinity making it unusable for typical irrigation purposes. However, the city implemented a reclaimed water reuse system making use of lower salinity effluent from the Town of Davie and Cooper City.

Primary End Users
Diplomat Country Club
Eco Grande Golf Course
Emerald Hills Golf Course
City nursery (from tanker truck)
David Park
Dowdy Field
Hillcrest Country Club
Hollywood Beach Golf Course
Hollywood Boulevard median
Lincoln Park Elementary School
Memorial Regional Hospital East Campus
Orangebrook Country Club
Rotary Park
Townhomes of Emerald Hills
U.S. Highway 1 median

Future Treatment, Disposal, and Reuse

The Hollywood Southern Regional WRF is one of the two ocean outfalls in Broward County utilized by regional wastewater service providers to dispose of treated wastewater. Based on historic flows to the ocean outfall, the facility is required to reuse 20.4 MGD of treated wastewater by 2025 to fulfill the requirements of the 2008 Ocean Outfall statute (Subsection 403.086(9), F.S.).

The City of Hollywood Department of Public Utilities is expected to meet the 60 percent reuse requirement of the 2008 Ocean Outfall amendments (Subsection 403.086(9), F.S.) primarily through recharge of the upper Floridan aquifer, with some additional irrigation.

Potential End Users
City of Dania Beach
City of Hallandale Beach
City of Hollywood remaining green areas
Topeekeegee Yugnee Park, Sheridan Street, and Park Road
West Lake Village

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The 2030 information is from the *City of Hollywood Wastewater Master Plan* (Hazen & Sawyer, P.C. 2007). This master plan went to 2025. Therefore, the 2030 flow projections were estimated from the 2025 projections.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**55.50 MGD**	**FDEP-Permitted Treatment Capacity**	**65.00 MGD**
Total Wastewater Effluent	**45.90 MGD**	**Total Wastewater Effluent**	**64.10 MGD**
Disposal		Disposal	
Total	45.90 MGD	Total	43.70 MGD
Deep well injection	26.30 MGD	Deep well injection	43.70 MGD
Ocean outfall	19.60 MGD		
Reuse [a]		Reuse	
Total	1.79 MGD	Total	21.61 MGD
Irrigation	1.79 MGD	Irrigation	3.00 MGD
		Aquifer recharge	18.61 MGD
Reuse Percentage	**4%**	**Reuse Percentage**	**34%**

a. Due to elevated salinity in the City of Hollywood's wastewater, most reuse occurs using treated wastewater received from the Cooper City WWTF and Town of Davie WWTP.

Margate Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The City of Margate's Department of Environmental and Engineering Services operates the Margate WWTP. The WWTP has an FDEP-permitted capacity of 10.10 MGD and provides wastewater services to the entire developed area within city limits and a section of southern Coconut Creek. In 2010, the annual average daily flow from the facility was 7.21 MGD. As of 2010, all treated wastewater was disposed of through deep well injection.

Future Treatment, Disposal, and Reuse

The City of Margate is planning for the design and construction of a 1.5-MGD reclaimed water treatment plant, along with the associated transmission and distribution system piping. The West Water Treatment Plant will be located within the city's West WWTP and will produce reclaimed water primarily for irrigation of nearby golf courses and roadway medians and for in-plant processes. Completion is expected in 2015. In the future, the city hopes to expand reclaimed water use to city parks and residential neighborhoods.

Primary End Users
Carolina Golf Club
Coral Cay (Colonies of Margate I, II, and III)
In-plant process water and spray irrigation
Margate Executive Golf Course
Oriole Golf and Tennis Club of Margate
Palm Springs III

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The 2030 information was provided by the City of Margate and the University of Florida's Bureau of Economic and Business Research 2030 medium population projections (BEBR 2011).

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**10.10 MGD**	**FDEP-Permitted Treatment Capacity**	**10.10 MGD**
Total Wastewater Effluent	**7.21 MGD**	**Total Wastewater Effluent**	**7.20 MGD**
Disposal		Disposal	
Deep well injection	7.21 MGD	Deep well injection	5.7 MGD
Reuse		Reuse	
Total	0.00 MGD	Total	1.50 MGD
		Irrigation	1.00 MGD
		Plant process water	0.50 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**21%**

Miramar Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The City of Miramar's Utilities Department operates a WRF that serves the western section of the city. Wastewater collected from the eastern part of the city is sent to the Hollywood Southern Regional WRF for treatment. The Miramar WRF has an FDEP-permitted capacity of 10.10 MGD, and in 2010, the annual average daily flow from the facility was 7.64 MGD. Approximately 5.55 MGD of the treated wastewater was disposed through deep well injection, while 2.09 MGD was reused. Most of the water reuse was for public access irrigation.

Primary End Users
Ansin Sport Complex Avalon
City hall
GSA-ICE building
Hiatus Road, Miramar Parkway, Southwest 130th Avenue, and Southwest 145th Avenue medians
Miramar Park of Commerce (north only)
Monarch Lakes (common areas)
Renaissance Middle School
Villages of Renaissance

Future Treatment, Disposal, and Reuse

The City of Miramar will continue evaluating options for increasing the amount of water reuse, both to help meet the 2008 Ocean Outfall statute requirements (Subsection 403.086(9), F.S.) for the City of Hollywood outfall and increase water supplies. The city recently completed a 2.0-MGD reclaimed water system expansion and is in the process of connecting more irrigation users to the distribution system. The city is anticipating that the increased use of reclaimed water within the vicinity of its western wellfield will decrease the stress on traditional sources of water and might yield substitution credits (or terminated base condition water use) or offsets to the city's western wells.

Potential End Users
Huntington Park
Miramar Park of Commerce – Phase V
Silver Falls
Trammel Crow Industrial Center
Vizcaya Park and common area

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Miramar provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**10.10 MGD**	**FDEP-Permitted Treatment Capacity**	**12.60 MGD**
Total Wastewater Effluent	**7.64 MGD**	**Total Wastewater Effluent**	**11.80 MGD**
Disposal		Disposal	
Deep well injection	5.55 MGD	Deep well injection	5.80 MGD
Reuse		Reuse	
Total	2.09 MGD	Total	6.0 MGD
Irrigation	0.78 MGD	Irrigation	6.0 MGD
At the treatment facility	1.31 MGD		
Reuse Percentage	**27%**	**Reuse Percentage**	**51%**

North Springs Improvement District Water Reclamation Facility (proposed)

Existing Treatment, Disposal, and Reuse

The North Springs Improvement District funds, operates, and maintains a wastewater collection system in northeastern Broward County. This system provides wastewater services to businesses and residents in the cities of Coral Springs and Parkland. Broward County North Regional Water Reclamation Facility receives, treats, and disposes of the wastewater collected by North Springs Improvement District.

Future Treatment, Disposal, and Reuse

North Springs Improvement District intends to expand its service area to capture the properties in a section of Broward County known as "the wedge" by constructing a WRF. (The state legislature approved the transfer of the 1,949-acre wedge shaped property from Palm Beach County to Broward County. The transfer became official in 2009). The reuse facility will treat wastewater and produce irrigation quality water for distribution to properties within the North Springs Improvement District boundaries and new development within the wedge. Potentially, users beyond the North Springs Improvement District boundaries could also be supplied.

Currently, four major developers have been identified for reclaimed water reuse within the wedge area: Lenar Homes, Standard Pacific, WCI, and Triple H. North Springs Improvement District met with each of the developers to obtain site plans and to calculate irrigation demands. The irrigation end users within this area will be 90 percent residential and 10 percent commercial.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The North Springs Improvement District provided the 2030 information in March 2012.

FACILITY SUMMARY			
2010 [a]		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.00 MGD**	**FDEP-Permitted Treatment Capacity**	**5.00 MGD**
Total Wastewater Effluent	**0.00 MGD**	**Total Wastewater Effluent**	**4.00 MGD**
Disposal		Disposal	
Total	0.00 MGD	Deep well injection [b]	0.00 MGD
Reuse		Reuse	
Total	0.00 MGD	Total	4.00 MGD
		Irrigation	4.00 MGD
		Wetland recharge [c]	0.00 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**100%**

a. The facility was not built in 2010.
b. Deep well injection will only be used for emergencies.
c. Reuse water will only be used for wetland recharge if irrigation demand is met.

Pembroke Pines Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The City of Pembroke Pines Division of Environmental Services operates the Pembroke Pines WWTF. The facility has an FDEP-permitted capacity of 9.50 MGD and serves the western section of the city. The Hollywood Southern Regional Water Reclamation Plant receives and treats wastewater from the eastern portion of the city. In 2010, the annual average daily treated wastewater flow from the Pembroke Pines WWTF was 7.07 MGD. Currently, the city does not treat wastewater for reuse. Treated wastewater from the city's facility is disposed of through deep well injection.

Future Treatment, Disposal, and Reuse

The City of Pembroke Pines evaluated two options for water reuse: irrigation reuse and aquifer recharge. In 2011, the city completed a pilot project to evaluate the feasibility of recharging the SAS with reclaimed water. Based on the results of the pilot project, the concept was deemed technically feasible, but no further progress was made toward evaluating and implementing aquifer recharge. Additionally, the city is concerned about the potential cost to meet the county's nutrient limitations for phosphorous and nitrogen.

Potential End Users
Biscayne aquifer
City of Pembroke Pines

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Pembroke Pines provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**9.50 MGD**	**FDEP-Permitted Treatment Capacity**	**9.50 MGD**
Total Wastewater Effluent	**7.07 MGD**	**Total Wastewater Effluent**	**7.70 MGD**
Disposal		Disposal	
Deep well injection	7.07 MGD	Deep well injection	2.40 MGD
Reuse		Reuse	
Total	0.00 MGD	Aquifer recharge	5.3 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**69%**

Plantation Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The City of Plantation Utilities Department operates and maintains the Plantation WWTF, which serves the entire incorporated area. The facility has an FDEP-permitted capacity of 18.90 MGD. In 2010, the annual average daily flow through the facility was 13.80 MGD. Approximately 13.39 MGD of the treated wastewater was disposed by deep well injection, while 0.41 MGD was reused for treatment processes including irrigation at the facility.

In 2008, the City of Plantation completed a pilot project to evaluate potential treatment options to use reclaimed water to recharge the SAS. The project indirectly recharged the aquifer through surface water discharge into a local canal. Although the concept is technically feasible from a treatment perspective, costs and regulatory constraints stalled its progress.

Future Treatment, Disposal, and Reuse

The City of Plantation Utilities Department will continue to evaluate options to increase the amount of water reuse. It is considering using reclaimed water for irrigation at the Plantation Preserve and Jacaranda golf courses within the city. The increased use of reclaimed water within the city is anticipated to decrease stress on traditional sources of water and yield substitution credits or offsets, in compliance with the LEC regional water availability criteria, to increase the city's allocation from the SAS. The offset and substitution credits need to be identified for their cost-effectiveness.

Flat population levels and conservation efforts delayed the immediate need for alternative water supply capacity. These factors, as well as current funding limitations, delayed implementation of reclaimed water projects. However, the city purchased 6.6 acres of adjacent property for future plant expansions, as needed. The projected flow for the facility in 2030 is yet to be determined.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The utility did not provide the 2030 information. The capacity was assumed to remain the same as in 2010. Flows were projected based on the percentage change in potable water flow for the utility from 2010 to 2030. SFWMD assumed reclaimed water for irrigation is to be used at the Jacaranda and Plantation Preserve golf courses.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**18.90 MGD**	**FDEP-Permitted Treatment Capacity**	**18.90 MGD**
Total Wastewater Effluent	**13.80 MGD**	**Total Wastewater Effluent**	**15.54 MGD**
Disposal		Disposal	
Deep well injection	13.39 MGD	Deep well injection	13.77 MGD
Reuse		Reuse	
Facility Processes	0.41 MGD	Irrigation	1.77 MGD
Reuse Percentage	**3%**	**Reuse Percentage**	**11%**

Pompano Beach Water Reclamation Facility

Existing Treatment, Disposal, and Reuse

The City of Pompano Beach Utilities Department operates and maintains a reclaimed water treatment and distribution system named "Our Alternative Supply Irrigation System" referred to as OASIS. The city does not have its own WWTP. The Broward County North Regional Water Reclamation Facility collects wastewater within the city. Pompano Beach diverts a portion of the effluent from the Broward County North Regional WRF ocean outfall pipeline. The diverted effluent undergoes further treatment with filtration and high-level disinfection at the Pompano Beach facility before being reused within the city. The city's water reuse system has an FDEP-permitted capacity of 7.50 MGD. In 2010, the annual average daily flow from the reuse system was 1.35 MGD.

The Pompano Beach WRF provides reclaimed water for irrigation of the Municipal Golf Course, Pompano Community Park, landscaping along Federal Highway and Copans Road, city medians, and residential areas east of Dixie Highway. Water reuse produced by the City of Pompano Beach will contribute towards the Broward County North Regional WRF's goal of achieving 60 percent water reuse by 2025.

Primary End Users
Citi Centre Mall
City cemetery
City Municipal Golf Course
City nursery
City parks
Medians
Residential areas
Sand and Spurs Stables
Schools

Future Treatment, Disposal, and Reuse

The city intends to continue expanding its water reuse system by adding customers, including residential customers in the eastern section of the city. In 2011, the city, with Broward County as a partner, implemented a program to complete and pay for the upfront connection costs for single family residential properties. Pompano Beach has a reclaimed water large user agreement with the City of Lighthouse Point that could result in additional users in the future. The city will also negotiate an agreement with Broward County to provide reuse water through a master meter to customers of Pompano Highlands, located in Broward County's service area.

Potential End Users
Additional Pompano Beach residential irrigation and other public access irrigation
Broward County (Pompano Highlands)
Lighthouse Point residences and other public access irrigation

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Pompano Beach provided the 2030 information in March 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**7.50 MGD**	**FDEP-Permitted Treatment Capacity**	**12.50 MGD**
Reuse Effluent Flow	**1.35 MGD**	**Total Wastewater Effluent**	**4.50 MGD**
Reuse		Reuse	
Irrigation	1.35 MGD	Irrigation	4.50 MGD
Reuse Percentage	**100%**	**Reuse Percentage**	**100%**

Sunrise Wastewater Treatment Facilities

Existing Treatment, Disposal, and Reuse

The City of Sunrise Utilities Department operates and maintains three WWTFs, serving the cities of Sunrise and Weston, the Town of Southwest Ranches, and about 60 percent of the Town of Davie. The Sawgrass and Springtree WWTFs do not currently provide reclaimed water for reuse. These facilities dispose of treated effluent using deep well injection. The Sawgrass WWTP has an FDEP-permitted capacity of 20.00 MGD and had an average daily flow of 18.26 MGD in 2010. The Springtree WWTP has an FDEP-permitted capacity of 10.00 MGD and had an average daily flow of 7.19 MGD in 2010. The Southwest WWTF treats effluent through four percolation ponds. The Southwest WWTF has an FDEP-permitted capacity of 0.45 MGD, and in 2010, the annual average daily wastewater flow was 0.37 MGD.

Future Treatment, Disposal, and Reuse

The City of Sunrise intends to pursue additional water reuse opportunities at the Southwest and Sawgrass WWTFs in an effort to reduce irrigation demands from potable water. Irrigation will be the primary focus of reclaimed water reuse in the future at both locations. At the Southwest WWTF, irrigation of the facility's grounds will be the initial focus followed by expansion to surrounding tracts. The Sawgrass WWTF is expected to expand to provide reclaimed water for irrigation to offset withdrawals from the Biscayne aquifer.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Sunrise provided the 2030 information in April 2012.

FACILITY SUMMARY – SOUTHWEST WWTF			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.45 MGD**	**FDEP-Permitted Treatment Capacity**	**0.99 MGD**
Total Wastewater Effluent	**0.37 MGD**	**Total Wastewater Effluent**	**0.99 MGD**
Reuse		Reuse	
Percolation Ponds	0.37 MGD	Groundwater recharge	0.99 MGD
Reuse Percentage	**100%**	**Reuse Percentage**	**100%**

FACILITY SUMMARY – SAWGRASS WWTF			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**20.00 MGD**	**FDEP-Permitted Treatment Capacity**	**25.00 MGD**
Total Wastewater Effluent	**18.26 MGD**	**Total Wastewater Effluent**	**22.00 MGD**
Disposal		Disposal	
Deep well injection [a]	25.45 MGD	Deep well injection	18.00 MGD
Reuse		Reuse	
Total	0.00 MGD	Irrigation	8.0 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**36%**

a. Effluent from the Springtree WWTF is transferred to the Sawgrass WWTF for disposal through deep injection wells.

FACILITY SUMMARY – SPRINGTREE WWTF			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**10.00 MGD**	**FDEP-Permitted Treatment Capacity**	**16.00 MGD**
Total Wastewater Effluent	**7.19 MGD**	**Total Wastewater Effluent**	**12.00 MGD**
Disposal		Disposal	
Deep well injection [a]	0.00 MGD	Deep well injection [a]	0.00 MGD
Reuse		Reuse	
Total	0.00 MGD	Irrigation	7.00 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**58%**

a. Effluent from the Springtree WWTF is transferred to the Sawgrass WWTF for disposal through deep injection wells.

Tindall Hammock Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The Tindall Hammock Irrigation and Soil Conservation District operates and maintains a wastewater collection and treatment system that serves a small area within the Town of Davie. The WWTF, which has an FDEP-permitted capacity of 0.60 MGD, had an annual average daily flow of 0.27 MGD in 2010. The treated effluent is discharged to an on-site borrow pit lake, which recharges the SAS.

Future Treatment, Disposal, and Reuse

No changes are proposed for the Tindall Hammock WWTF water reuse system. The small facility will continue to use the on-site borrow pit lake for recharge of the shallow aquifer.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Tindall Hammock Irrigation and Soil Conservation District provided the 2030 information.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.60 MGD**	**FDEP-Permitted Treatment Capacity**	**0.60 MGD**
Total Wastewater Effluent	**0.27 MGD**	**Total Wastewater Effluent**	**0.40 MGD**
Reuse		Reuse	
Rapid infiltration basin	0.27 MGD	Borrow-pit lake	0.40 MGD
Reuse Percentage	**100%**	**Reuse Percentage**	**100%**

Profiles of Miami-Dade County Facilities

Homestead Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The City of Homestead Public Works and Engineering Department operates and maintains the Homestead WWTP, which has an FDEP-permitted capacity of 6.00 MGD. The annual average daily flow from the Homestead WWTP was 5.30 MGD in 2010. Excess wastewater flows are pumped to the Miami-Dade South District WWTP. All of the treated water is discharged to a series of rapid infiltration trenches that recharge the Biscayne aquifer. The Homestead WWTP reused 100 percent of the wastewater treated at the facility in 2010.

Future Treatment, Disposal, and Reuse

The City of Homestead evaluated various alternative water supply projects to meet future growth demands. The city determined it could provide reclaimed water from its WWTP to the city-owned electric generating plant for cooling water purposes. The electric generating plant would then discharge to rapid infiltration basins, recharging the Biscayne aquifer. Currently, the electric generating plant utilizes the Biscayne aquifer for its cooling towers. The city will continue evaluating options for increasing reclaimed water reuse. It anticipates that increased use of reclaimed water within the city might decrease stress on traditional sources of water and might yield substitution credits or offsets to the city's allocation from the Biscayne aquifer, provided such use meets the LEC regional water availability criteria.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Homestead provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**6.00 MGD**	**FDEP-Permitted Treatment Capacity**	**10.00 MGD**
Total Wastewater Effluent	**5.30 MGD**	**Total Wastewater Effluent**	**10.00 MGD**
Reuse		Reuse	
On-site rapid infiltration trenches	5.30 MGD	Rapid infiltration basin	10.00 MGD
Reuse Percentage	**100%**	**Reuse Percentage**	**100%**

Miami-Dade Water and Sewer Department Wastewater Treatment Plants

The Miami-Dade Water and Sewer Department (MDWASD) collects and treats most of the wastewater generated in Miami-Dade County. MDWASD wastewater service area is divided into three regional districts. The North District, Central District, and South District WWTPs are located in the eastern portion of the county. MDWASD is considering a new West District Water Reclamation Plant.

MDWASD currently uses two ocean outfalls and 21 deep injection wells to dispose of treated wastewater. The North District WWTP uses a combination of ocean outfall and deep injection for disposal, the Central District WWTP uses solely ocean outfall, and the South District WWTP uses solely deep well injection. Each facility reuses a small amount of treated wastewater, mostly for processes at the facilities.

Two factors are driving the commitment to increased water reuse in Miami-Dade County. First, the utility's water use permit stipulates that 170 MGD of water reuse must be in place before volumes over its base condition water use are withdrawn from the Alexander Orr and South Dade subarea wellfields. The intent of the requirement is to comply with the LEC restricted allocation area criteria and implement projects that recharge the aquifer with highly treated reclaimed water, thereby offsetting impacts to the regional system.

Secondly, the 2008 Ocean Outfall amendments mandate significant reuse (Subsection 403.086(9), F.S.). Because all of MDWASD's WWTPs are interconnected, the three plants are considered one system. Therefore, MDWASD may meet the reuse requirement on a systemwide basis. MDWASD will be required to beneficially reuse 117.5 MGD of treated wastewater by 2025. MDWASD's intent is to reuse most of the water at their South District WWTP, diverting flows from the North and Central District WWTPs to the South District WWTP. It also proposed the construction of the West District Water Reclamation Plant to support reuse projects located near that site.

Miami-Dade Central District Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The Miami-Dade Central District WWTP services the area from Northwest 79th Street to the Tamiami Canal and includes a portion of the City of Coral Gables to Southwest 156th Street. This district services the unincorporated areas inside its boundary and the municipalities of Doral, Miami, Miami Beach, Miami Springs, Medley, Coral Gables, South Miami, Bal Harbor, and Key Biscayne. The facility has an FDEP-permitted capacity of 143 MGD, and in 2010 had an annual average flow of 101 MGD. In 2010, an average rate of 114.1 MGD of treated wastewater was discharged through the Central District ocean outfall, and 6.22 MGD was reused. The water reuse was for in-plant processes at the facility.

Primary End User
In-plant processes at the Central District WWTP (e.g., flushing, wash downs, and pump seal lubrication)

MDWASD installed reclaimed water piping in the Village of Key Biscayne. However, the connection to the Central District WWTP has not been made. The purpose of the project was to replace potable water irrigation at Crandon Park and areas of Key Biscayne. The future of this project is uncertain at this time.

Future Treatment, Disposal, and Reuse

To meet the 2018 deadline for reducing nutrients from the ocean outfall, MDWASD is considering installing deep injection wells at the Central District WWTP and/or recharge wells on Virginia Key. Wastewater not disposed through the Central District ocean outfall could be sent south and/or west for reuse at other locations. MDWASD is currently evaluating the options to meet the reuse requirements. MDWASD, as part of the ocean outfall implementation plan submitted on July 1, 2013, more fully describes the scope of its reclaimed water plan for its system, including the Central District WWTP. The plan for this facility is to recharge the upper Floridan aquifer at about 9.2 MGD.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). MDWASD provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**143.00 MGD**	**FDEP-Permitted Treatment Capacity**	**80.00 MGD**
Total Wastewater Effluent	**101.00 MGD**	**Total Wastewater Effluent**	**69.00 MGD**
Disposal		Disposal	
Ocean outfall	114.10 MGD	Deep well injection	69.00 MGD
Reuse		Reuse	
At the facility	6.22 MGD	At the facility	5.00 MGD
		Aquifer recharge	9.2 MGD
Reuse Percentage	**6%**	**Reuse Percentage**	**21%**

Miami-Dade North District Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The Miami-Dade North District WWTP services from the north county boundary line to near Northwest 79th Street and includes unincorporated areas, and the municipalities of Hialeah, Hialeah Gardens, North Miami, Miami Gardens, Miami Lakes, Miami Shores, Opa-Locka, and North Miami Beach. The facility has three independent process trains: one to treat lower-chlorides wastewater from the western part of the district and two to treat high chlorides from a mixture of wastewaters from the western and coastal areas. The facility has an FDEP-permitted capacity of 112.50 MGD, and had an annual average daily flow of 87.15 MGD in 2010. In 2010, a total of 64.58 MGD of treated wastewater was discharged through ocean outfall, 19.29 MGD was disposed through four deep injection wells, and 3.25 MGD of sludge was transferred to the Miami-Dade Central District WWTP. On average, in 2010, approximately 2.08 MGD of water was reused.

Primary End Users
Florida International University – Biscayne Bay
Miami-Dade North District WWTP (in-plant processes)

MDWASD was considering water reuse opportunities with the cities of North Miami and North Miami Beach, but those cities have been unable to provide the needed reclaimed water distribution facilities. Those opportunities are currently on hold.

Future Treatment, Disposal, and Reuse

To meet the 2018 deadline for reducing nutrients from the ocean outfall, MDWASD is considering installing additional deep injection wells at the North District WWTP. Wastewater not disposed at the North District WWTP could be sent south or west for reuse at other locations. MDWASD is evaluating options, such as groundwater recharge at the other facilities, to meet reuse requirements. MDWASD is currently diverting flows from the ocean outfall to four injections wells to meet the advanced wastewater treatment equivalent requirement.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011) and MDWASD in April 2012. MDWASD provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**120.00 MGD**	**FDEP-Permitted Treatment Capacity**	**80.00 MGD**
Total Wastewater Effluent	**87.15 MGD**	**Total Wastewater Effluent**	**60.00 MGD**
Disposal		Disposal	
Total	87.12 MGD	Total	58.39 MGD
Ocean outfall	64.58 MGD	Deep well injection	58.39 MGD
Deep well injection	19.29 MGD		
Sludge transfer to Central District WWTP	3.25 MGD		
Reuse		Reuse	
Total	2.08 MGD	Total	1.61 MGD
At the facility	1.97 MGD	Irrigation	0.11 MGD
Irrigation	0.11 MGD	At the facility	1.50 MGD
Reuse Percentage	**2%**	**Reuse Percentage**	**3%**

Miami-Dade South District Wastewater Treatment Plant

Existing Treatment, Disposal, and Reuse

The Miami-Dade South District WWTP services unincorporated areas located between the Tamiami Canal and Southwest 360th Street, the municipalities of Pinecrest, Palmetto Bay and Florida City, and Homestead Air Force Base. The facility has an FDEP-permitted capacity of 112.50 MGD, and in 2010 had an annual average daily flow of 93.18 MGD. In 2010, treated wastewater was disposed through deep well injection an average rate of 94.82 MGD, while 4.54 MGD was reused. The water reuse was for in-plant processes at the facility.

Primary End User
In-plant processes at South District WWTP (e.g., flushing, wash downs, and pump seal lubrication)

Future Treatment, Disposal, and Reuse

The South District WWTP does not include an ocean outfall. Wastewater is disposed of through deep well injection. MDWASD is currently evaluating options, including groundwater recharge, to meet the reuse requirements of the ocean outfall amendments. The scope of water reuse at the South District WWTP was part of the ocean outfall implementation plan delivered to FDEP on July 1, 2013.

The implementation plan includes the reuse of reclaimed water by FPL. To ensure their commitment to reclaimed water supplies, MDWASD and FPL signed a joint participation agreement for the delivery of reclaimed water from the South District Water Reclamation Plant to the FPL Turkey Point Energy Facility. This project would provide up to 90 MGD of reclaimed water for FPL use. The construction of the treated water pipeline is scheduled to be completed in 2021.

In addition to the cooling water, MDWASD is planning to include about 9.2 MGD of upper Floridan aquifer recharge at this facility.

Miami-Dade County approved the design of the new South District Water Reclamation Plant in 2007. In February 2011, the project was put on hold. Due to lower demands and updated population projections, along with additional reuse opportunities, MDWASD is reevaluating its water supply demands before proceeding with construction.

Miami-Dade County had committed to reclaimed water reuse as part of the Comprehensive Everglades Restoration Plan. MDWASD conducted a pilot project to test different treatment technologies and gain insights into the biological and ecological response of typical wetlands to highly treated effluent. The results of the pilot project will help to optimize the treatment system and the preferred areas for rehydration to maximize the benefits to wetlands and Biscayne Bay. FDEP, SFWMD, and Biscayne National Park are currently evaluating the final report's results and conclusions.

Potential End User
FPL Turkey Point Energy Facility

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). MDWASD provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**112.50 MGD**	**FDEP-Permitted Treatment Capacity**	**120.00 MGD**
Total Wastewater Effluent	**93.18 MGD**	**Total Wastewater Effluent**	**120.00 MGD**
Disposal		Disposal	
Deep well injection	94.82 MGD	Deep well injection	30.00 MGD
Reuse		Reuse	
At the facility	4.54 MGD	Cooling water for FPL Turkey Point Energy Facility	90.00 MGD
		Aquifer recharge	9.2 MGD
Reuse Percentage	**5%**	**Reuse Percentage**	**83%**

Miami-Dade West District Water Reclamation Plant (Proposed)

Proposed Treatment, Disposal, and Reuse

The *Miami-Dade Water and Sewer Department Reuse Feasibility Update* (MDWASD 2007) recommended the addition of the West District Water Reclamation Plant. The facility would include wastewater treatment with storage facilities for peak wet weather conditions in the central-west area of the county. MDWASD evaluated potential sites for the proposed plant. Various alternatives, including plant capacity associated with reclaimed water opportunities, are being developed in conjunction with systemwide wastewater transmission and treatment facilities. Reclaimed water produced at this plant could be used as an offset to avoid impacts created by additional groundwater withdrawals at MDWASD's Southwest Wellfield and comply with the LEC regional water availability criteria. MDWASD tentatively scheduled this plant to come on line by 2026.

Reclaimed water from the proposed plant could be used to meet the ocean outfall requirements. MDWASD is currently planning to include about 9.2 MGD of upper Floridan aquifer recharge at this facility.

Information Source

MDWASD provided this information in April 2012.

FACILITY SUMMARY			
2010 [a]		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.00 MGD**	**FDEP-Permitted Treatment Capacity**	**50.00 MGD**
Total Wastewater Effluent	**0.00 MGD**	**Total Wastewater Effluent**	**50.00 MGD**
Reuse		Reuse	
Total	0.00 MGD	Aquifer recharge	9.2 MGD
Reuse Percentage		**Reuse Percentage**	**18%**

a. The facility was not built in 2010.

Profile of Monroe County Facilities

Big Coppitt Regional Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The Florida Keys Aqueduct Authority (FKAA) operates and maintains the Big Coppitt Regional WWTF. The facility, located on Rockland Key, provides service to Big Coppitt, Rockland, Geiger, and Shark keys. The facility has an FDEP-permitted capacity of 0.32 MGD, with an annual average daily flow of 0.08 MGD in 2010. Currently, treated wastewater is disposed through shallow injection wells.

Future Treatment, Disposal, and Reuse

Although the *Monroe County Sanitary Wastewater Master Plan* (CH2MHILL 2000) concluded that reclaimed water was not feasible to install, operate, and maintain in the Florida Keys/Monroe County, FKAA plans to evaluate each of its wastewater service areas to determine ways to implement and feasibly provide reclaimed water for its customers. FKAA is installing a reclaimed water distribution system. The reclaimed water will be utilized for nonpotable water uses to reduce disposal through shallow injection wells. Potential nonpotable uses include irrigation and boat washing.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). FKAA provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.32 MGD**	**FDEP-Permitted Treatment Capacity**	**0.40 MGD**
Total Wastewater Effluent	**0.08 MGD**	**Total Wastewater Effluent**	**0.40 MGD**
Disposal		Disposal	
Shallow well injection	0.08 MGD	Shallow well injection	0.05 MGD
Reuse		Reuse	
Total	0.00 MGD	Total	0.35 MGD
		Irrigation	0.30 MGD
		Other (e.g., concrete mix, equipment wash down	0.05 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**88%**

Boca Chica Naval Air Station Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The United States Navy owns and operates a wastewater collection system and treatment plant at Boca Chica Field. The Boca Chica WWTF has an FDEP-permitted capacity of 0.44 MGD, with an annual average daily flow of 0.09 MGD in 2010. Currently, treated wastewater is disposed of through six shallow injection wells.

Future Treatment, Disposal, and Reuse

Currently, Boca Chica WWTP has no plans to reuse treated wastewater.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The United States Navy did not provide the 2030 information. SFWMD assumes the projected capacity and flows will remain the same as in 2010.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.44 MGD**	**FDEP-Permitted Treatment Capacity**	**0.44 MGD**
Total Wastewater Effluent	**0.09 MGD**	**Total Wastewater Effluent**	**0.09 MGD**
Disposal		Disposal	
Shallow well injection	0.09 MGD	Shallow well injection	0.09 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**0%**

Duck Key (Hawk's Cay) Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

Duck Key is a small island community consisting of five islands located east of the City of Marathon in unincorporated Monroe County. FKAA acquired the Duck Key Utility Service Area, which includes Hawk's Cay Resort, Conch Key, and a residential area. The Duck Key WWTF provides service to the area, and has an FDEP-permitted capacity of 0.10 MGD and has an annual average daily flow of 0.05 MGD in 2010. The Duck Key facility, as of 2010, is reusing 0.03 MGD of the treated wastewater, while 0.02 MGD is disposed of through shallow injection wells. The Duck Key WWTF was upgraded to advanced wastewater treatment standards.

Future Treatment, Disposal, and Reuse

A reclaimed water distribution system and service connections are being installed, which is expected to provide irrigation for approximately 230 residential and commercial properties. The use of reclaimed water will assist in offsetting the use of potable water for outdoor use. Residential customers on Duck Key are being given the opportunity to tie into the reuse system.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). FKAA provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.10 MGD**	**FDEP-Permitted Treatment Capacity**	**0.30 MGD**
Total Wastewater Effluent	**0.05 MGD**	**Total Wastewater Effluent**	**0.30 MGD**
Disposal		Disposal	
Shallow well injection	0.02 MGD	Shallow well injection	0.10 MGD
Reuse		Reuse	
Irrigation	0.03 MGD	Irrigation	0.20 MGD
Reuse Percentage	**60%**	**Reuse Percentage**	**67%**

Key Colony Beach Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The City of Key Colony Beach operates and maintains a wastewater collection and treatment system to serve the city. The Key Colony Beach WWTF has an FDEP-permitted capacity of 0.34 MGD, with an annual average daily flow of 0.18 MGD in 2010. In 2010, 0.03 MGD of the treated wastewater was reused. The remainder was disposed of through a series of shallow injection wells.

Although the wastewater is relatively high in salinity, the water is treated using RO and is cheaper to produce than buying potable water from FKAA.

Primary End Users
City parks (delivered by truck)
Key Colony Beach Golf Course

Future Treatment, Disposal, and Reuse

The Key Colony Beach WWTF plans to upgrade the RO system to allow for the production of additional reuse water to irrigate the Key Colony Beach Golf Course and city parks. Because the irrigation demands of these users exceed the projected capacity of the facility, no additional reclaimed water customers are expected in the future.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The city did not provide information for 2030. SFWMD assumes the capacity and flows will remain the same as in 2010. Projected reuse is 100 percent based on utility input.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.34 MGD**	**FDEP-Permitted Treatment Capacity**	**0.34 MGD**
Total Wastewater Effluent	**0.18 MGD**	**Total Wastewater Effluent**	**0.18 MGD**
Disposal		Disposal	
Shallow well injection	0.15 MGD		0.00 MGD
Reuse		Reuse	
Golf course irrigation	0.03 MGD	Irrigation	0.18 MGD
Reuse Percentage	**17%**	**Reuse Percentage**	**100%**

Key Haven Utility Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

Key Haven Utility operated and maintained a wastewater collection and treatment system serving the Key Haven development. In 2009, FKAA acquired the wastewater utility. The facility has an FDEP-permitted capacity of 0.20 MGD, with an annual average daily flow of 0.09 MGD in 2010. Currently, treated wastewater is disposed through shallow injection wells.

Future Treatment, Disposal, and Reuse

FKAA may decommission the Key Haven WWTP. If decommissioned, the target date would be December 31, 2015, and the flow from the service area will be routed to the Key West or Stock Island WWTFs (Key West Resort Utilities) for treatment.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011).

FACILITY SUMMARY			
2010		**Projected 2030[a]**	
FDEP-Permitted Treatment Capacity	**0.20 MGD**	**FDEP-Permitted Treatment Capacity**	**0.00 MGD**
Total Wastewater Effluent	**0.09 MGD**	**Total Wastewater Effluent**	**0.00 MGD**
Disposal		Disposal	
Shallow well injection	0.09 MGD	Total	0.00 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**0%**

a. The Key Haven WWTF may be decommissioned prior to December 31, 2015. The decision to decommission has not yet been made.

Key Largo Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The State of Florida created the Key Largo Wastewater Treatment District in 2002. The district operates and maintains a wastewater collection and treatment system that serves an area generally from the north end of the Florida Keys at the Miami-Dade County line extending south and westward to Tavernier Creek, excluding the community of Ocean Reef. The Key Largo WWTF has an FDEP-permitted capacity of 0.18 MGD, with an annual average daily flow of 0.07 MGD in 2010. Currently, all of the treated wastewater is disposed through shallow injection wells.

Future Treatment, Disposal, and Reuse

The Key Largo Wastewater Treatment District is considering expanding its service to Islamorada. The district is negotiating with portions of Islamorada to treat its wastewater at the Key Largo WWTF instead of Islamorada building its own treatment plant. This is expected to occur prior to 2030. Presently, the Key Largo Wastewater Treatment District does not plan to reuse treated wastewater.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Key Largo Wastewater Treatment District did not provide the 2030 information. SFWMD assumes the projected 2030 capacity will remain the same. The projected flow is based on no increase from the 2010 flow at the Key Largo WWTF (0.07 MGD) plus 2010 flow at the Plantation Key Colony WWTF (0.06 MGD) since it is projected that, by 2030, wastewater flow from Plantation Key Colony will be sent to the Key Largo WWTF for treatment.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.18 MGD**	**FDEP-Permitted Treatment Capacity**	**0.18 MGD**
Total Wastewater Effluent	**0.07 MGD**	**Total Wastewater Effluent**	**0.13 MGD**
Disposal		Disposal	
Shallow well injection	0.07 MGD	Shallow well injection	0.13 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**0%**

Key West – Richard A. Heyman Environmental Protection Facility

Existing Treatment, Disposal, and Reuse

The City of Key West Utilities Department owns a wastewater collection and treatment system known as the Richard A. Heyman Environmental Protection Facility. The facility serves the city and is located on Flemming Key just off the island of Key West. It has an FDEP-permitted capacity of 10.00 MGD and an annual average flow of 4.41 MGD in 2010. Currently, the treated effluent is disposed through two deep injection wells.

Future Treatment, Disposal, and Reuse

The City of Key West does not have current plans to reuse wastewater. Although the WWTF treats water to advanced water treatment standards, the relatively high salinity of the wastewater/effluent make it a challenge to reuse, especially for irrigation.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The City of Key West provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**10.00 MGD**	**FDEP-Permitted Treatment Capacity**	**10.00 MGD**
Total Wastewater Effluent	**4.41 MGD**	**Total Wastewater Effluent**	**6.20 MGD**
Disposal		Disposal	
Deep well injection	4.41 MGD	Deep well injection	6.00 MGD
Reuse		Reuse	
Total	0.00 MGD	Facility processes	0.20 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**3%**

Key West Resort Utilities Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

Key West Resort Utilities operates and maintains a wastewater collection and treatment system that serves southern Stock Island. The facility uses a vacuum collection system and has an FDEP-permitted capacity of 0.50 MGD. The average flow in 2010 was 0.29 MGD. In 2010, 0.17 MGD of the treated wastewater was reused. The remainder was disposed of via three shallow injection wells. The facility pumps reclaimed water to a percolation pond for irrigation at the Key West Country Club. Reclaimed water is also provided to the Monroe County Detention Center for nonpotable purposes (e.g., toilet flushing).

Primary End Users
Key West Country Club
Monroe County Detention Center

Future Treatment, Disposal, and Reuse

Key West Resort Utilities expanded distribution capabilities to provide reclaimed water to a school, a hospital, and a college. However, these potential users have not yet agreed to accept the reclaimed water.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The Key West Resort Utilities provided the 2030 information in April 2012. The plan assumes flows include those from the Key Haven Utility facility, which is scheduled for decommissioning by December 31, 2015.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.50 MGD**	**FDEP-Permitted Treatment Capacity**	**0.50 MGD**
Total Wastewater Effluent	**0.29 MGD**	**Total Wastewater Effluent**	**0.38 MGD**
Disposal		Disposal	
Shallow well injection	0.12 MGD	Shallow well injection	0.00 MGD
Reuse		Reuse	
Total	0.17 MGD	Total	0.38 MGD
Golf course irrigation	0.14 MGD	Irrigation	0.38 MGD
Toilet flushing	0.03 MGD		
Reuse Percentage	**59%**	**Reuse Percentage**	**100%**

Marathon Wastewater Treatment Facilities

Existing Treatment, Disposal, and Reuse

The City of Marathon Utility Department oversees a series of wastewater collection and treatment systems. The area serviced by the Marathon WWTFs is defined as the east end of the Seven Mile Bridge extending eastward to Tom's Harbor Bridge and includes Knight's Key, Vaca Key, Boot Key, the Sombrero area, Fat Deer Key, Coco Plum, Long Point Key, Little Crawl Key, Crawl Key, Valhalla Island, and Grassy Key. The facilities have a combined capacity of 0.36 MGD and treated 0.09 MGD in 2010. Since incorporating in 1999, Marathon pursued a citywide sewer system and determined that a system of force mains combined with vacuum collection systems is best suited for the area.

Wastewater services are divided into seven service areas:

- **Service Area 1:** Knight's Key (entire island) – Wastewater collection system has been completed.
- **Service Area 2:** Boot Key (entire island) – Plans for wastewater service for Boot Key were suspended following the closure of the Boot Key Drawbridge.
- **Service Area 3:** Vaca Key West (11th Street to 39th Street) – The wastewater collection systems and the WWTP are complete but were not operating in 2010.
- **Service Area 4:** Vaca Key Central (39th Street to 60th Street) – The wastewater collection systems and the WWTF were completed in March 2010. FDEP approved a reclaimed system. Although initial elevated chloride levels inhibited the distribution of the reclaimed water, it is used for park facility irrigation.
- **Service Area 5:** Vaca Key East (60th Street to Vaca Cut) – The wastewater collection systems are complete. The WWTF expansion is also complete and property owners have been notified to connect to the system.
- **Service Area 6:** Fat Deer Key West–Coco Plum (Vaca Cut to Coco Plum) – The wastewater collection system is complete. The WWTF is operating and connections continue.
- **Service Area 7:** Grassy Key (Fat Deer Key East through Grassy Key) – Most of the collection system has been installed. Construction on the WWTF continues. A portion of the collection system has been cleared for use. The city notified more than half of the properties to connect to the system.

Future Treatment, Disposal, and Reuse

The City of Marathon is considering water reuse in the future. However, the city must complete upgrades to the treatment systems and resolve issues with elevated salinity. The city has the capability of producing reclaimed water at wastewater treatment facilities within service areas 3, 4, 5, and 7.

Potential End Users
Marathon High School (Service Area 4)
Parks and event fields (Service Area 3)
Sombrero Beach (Service Area 4)
Sombrero Country Club (Service Area 4)

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The utility did not provide the 2030 information. The projected capacity and flow are based on 2010 numbers. These are a combination of all the existing and proposed treatment facilities in service areas 3, 4, 5, 6, and 7. The plan update assumes all facilities, except Service Area 6, have reuse capabilities.

FACILITY SUMMARY			
2010[a]		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.36 MGD**	**FDEP-Permitted Treatment Capacity**	**0.75 MGD**
Total Wastewater Effluent	**0.09 MGD**	**Total Wastewater Effluent**	**0.24 MGD**
Disposal		Disposal	
Shallow well injection	0.09 MGD	Shallow well injection	0.11 MGD
Reuse		Reuse	
Total	0.00 MGD	Irrigation	0.13 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**54%**

a. WWTFs in service areas 3, 4, and 7 were not operating in 2010.

North Key Largo (Ocean Reef) Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The North Key Largo Utility Corporation operates and maintains a wastewater collection and treatment system serving the Ocean Reef community in North Key Largo. The North Key Largo WWTF facility has an FDEP-permitted capacity of 0.55 MGD, with an annual average daily flow of 0.25 MGD in 2010. Currently, all of the treated wastewater is disposed of through shallow injection wells. Recent facility upgrades enabled the production of reclaimed water.

Future Treatment, Disposal, and Reuse

A portion of the effluent treated by the North Key Largo WWTF will be reused for golf course irrigation.

Primary End User
Ocean Reef Golf Club (Card Sound Golf Course)

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The North Key Largo Utility Corporation provided the 2030 information in April 2012.

FACILITY SUMMARY			
2010		**Projected 2030**	
FDEP-Permitted Treatment Capacity	**0.55 MGD**	**FDEP-Permitted Treatment Capacity**	**0.50 MGD**
Total Wastewater Effluent	**0.25 MGD**	**Total Wastewater Effluent**	**0.28 MGD**
Disposal		Disposal	
Shallow well injection	0.25 MGD	Shallow well injection	0.18 MGD
Reuse		Reuse	
Total	0.00 MGD	Irrigation	0.10 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	**36%**

Plantation Key Colony Wastewater Treatment Facility

Existing Treatment, Disposal, and Reuse

The four-island Village of Islamorada operates and maintains a wastewater collection and treatment system within Plantation Key. The Plantation Key Colony WWTF has an FDEP-permitted capacity of 0.36 MGD, with an annual average daily flow of 0.06 MGD in 2010. Currently, the treated wastewater is disposed through shallow injection wells.

Future Treatment, Disposal, and Reuse

The Village of Islamorada, excluding Plantation Key Colony, is considering centralizing its wastewater services with the Key Largo Wastewater Treatment District. Islamorada is negotiating with Key Largo to treat its wastewater at the Key Largo WWTF instead of building its own treatment facility.

Currently, there are no plans within the Village of Islamorada, or the Key Largo WWTF, to reuse treated wastewater.

Information Sources

The 2010 information is from the *2010 Reuse Inventory* (FDEP 2011). The 2030 information was provided by Plantation Key Colony in May 2012.

FACILITY SUMMARY			
2010		**Projected 2030[a]**	
FDEP-Permitted Treatment Capacity	**0.36 MGD**	**FDEP-Permitted Treatment Capacity**	**0.00 MGD**
Total Wastewater Effluent	**0.06 MGD**	**Total Wastewater Effluent**	**0.00 MGD**
Disposal		Disposal	
Shallow well injection	0.06 MGD	Shallow well injection	0.00 MGD
Reuse Percentage	**0%**	**Reuse Percentage**	

a. At the time of this writing, wastewater flows from Plantation Key Colony are expected to be sent to the Key Largo WWTF by 2030.

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D

Water Conservation

INTRODUCTION

Water conservation, covered in **Chapter 5** of the Planning Document of this update, is essential for water supply planning and water resource management. Water conservation is considered a water source option because it reduces or delays the need for future expansion of the water supply infrastructure.

This appendix provides further detail about water conservation in the Lower East Coast (LEC) Planning Area and includes the following:

- Water Savings Incentive Program (WaterSIP) projects funded for Fiscal Year (FY) 2005–FY 2012
- Fixture and appliance retrofits
- Water Conservation Hotel and Motel Program (Water CHAMP)
- Potential savings for the Industrial/Commercial/Institutional (ICI) Self-Supply use class
- Status of Public Water Supply (PWS) water conservation implementation
- Water conservation rate structures
- Water conservation versus development of alternative water supplies
- Miami-Dade Goal-Based Water Conservation Plan

WATERSIP

WaterSIP is the South Florida Water Management District's (SFWMD's) funding assistance program. Local governments, businesses, and nonprofit organizations may apply for WaterSIP funding annually during an open application period. Since its inception in 2003, SFWMD allocated $4.6 million in funding to support 161 local water conservation projects within SFWMD's boundaries, representing a total estimated water savings of approximately 2.7 billion gallons of water per year, or 7.3 million gallons of water per day. **Table D-1** lists the LEC Planning Area projects supported by the WaterSIP from FY 2005–2012. Additional information regarding Water SIP can be found in the *2011–2013 Water Supply Plan Support Document* (SFWMD 2013).

Table D-1. WaterSIP projects funded in the LEC Planning Area FY 2005–FY 2012.

County	Entity Name	Project Title	Total Project Cost	Approved Funding	Proposed Water Savings (MGY) [a]
FY 2012					
Palm Beach	West Palm Beach, City of	Community Water Conservation Strategies – Phase II	$50,000	$20,000	4.67
Broward	Broward County Natural Resources Planning and Management Division on behalf of Broward Water Partnership	High Efficiency Toilet (HET) Rebate Program	$200,000	$50,000	7.85
	Coral Springs, City of	Automatic Flushers for Distribution System	$81,000	$35,000	7.00
Miami-Dade	Miami-Dade Water and Sewer Department (MDWASD)	Residential HET Rebate Project 2011–2012	$81,500	$30,000	12.70
Monroe	Florida Keys Aqueduct Authority (FKAA)	HET Retrofit Rebate Program	$20,000	$10,000	2.30
FY 2011					
Palm Beach	West Palm Beach, City of	Community Water Conservation Strategies – Phase I (residential indoor retrofit/ commercial prerinse spray valves)	$61,868	$24,200	68.96
	Glades Utility Authority	Water Meter Change Out (automated meter reading)	$154,470	$50,000	24.00
Broward	Pompano Beach, City of	Restaurant Spray Valves	$17,300	$5,500	11.30
	Margate, City of	Prerinse Spray Valve Replacement Program	$17,300	$6,600	10.10
	Sunrise, City of	Automatic Flushing Devices	$59,800	$29,900	10.26
	Tamarac, City of	Indoor Plumbing Retrofit Project	$90,750	$13,437	8.22
Miami-Dade	MDWASD	Residential HET Rebate Program	$122,000	$25,000	21.17
Monroe	FKAA	HET Retrofit Rebate Program	$20,000	$7,925	2.30
FY 2010					
Palm Beach	Palm Beach Parks and Recreation Department	Irrigation System Improvement Program	$74,240	$37,120	21.44
Broward	Fort Lauderdale, City of	Automatic Line Flushing Devices	$30,049	$15,000	18.70
	Lighthouse Point, City of	Water Conservation to Irrigation Systems on All City-Owned Properties	$66,000	$33,000	9.70
	Pompano Beach, City of	Showerhead, Bath, & Kitchen Aerators Kit Distribution	$29,900	$14,950	56.21
	Broward County	United States Environmental Protection Agency WaterSense® HET Replacement/ Credit Program	$300,000	$75,000	15.20
	Plantation, City of	HET Retrofit	$100,000	$50,000	10.22
Miami-Dade	North Miami Beach, City of	Rain Sensor Controller Retrofit Program	$16,000	$8,000	3.36
	MDWASD	Senior and Low Income Full Plumbing Retrofit Project – Phase IV	$315,000	$75,000	23.40
		Homeowner Association Landscape Irrigation Evaluations – Phase IV	$230,750	$38,875	15.70
		Residential HET Rebate Program	$125,000	$50,000	10.50
Monroe	FKAA	HET Rebate Program	$60,000	$30,000	4.38

a. MGY – million gallons per year.

Table D-1. Continued.

County	Entity Name	Project Title	Total Project Cost	Approved Funding	Proposed Water Savings (MGY) [a]
FY 2009					
Palm Beach	Pahokee, City of	Water Meter Change Out	$226,500	$50,000	8.76
	West Palm Beach, City of	Landscape Irrigation Technology Retrofit Project – Phase II	$100,000	$50,000	3.00
	Florida Atlantic University Division of Research	Water Conservation Landscaping Project	$37,500	$18,750	0.30
	School District of Palm Beach County	Waterless Urinal Installation Project	$23,040	$11,520	0.10
Broward	Fort Lauderdale, City of Parks & Recreation	Rain Sensor and Irrigation System Technology Installation	$37,247	$18,360	60.00
	Oakland Park, City of	Water Conservation Measures – Indoor Plumbing Fixture Retrofit Project	$17,500	$8,750	103.00
	Tamarac, City of	Indoor Plumbing Retrofit Project	$57,000	$27,000	13.60
	Plantation, City of	Dual Flush/HET Retrofit Rebate Program	$100,000	$50,000	10.00
	Miramar, City of	Residential Plumbing Fixture Replacement Program	$19,500	$9,750	6.60
	Coconut Creek, City of	Residential Dual Flush Valve Installation	$100,000	$50,000	5.50
	Miramar, City of	Flush Valve Replacement Program	$2,600	$1,300	1.12
	Hallandale Beach, City of	Selective Volume Flush Toilet Retrofit Program	$50,000	$25,000	10.00
	Hollywood, City of	Automatic Water Line Flushing Program	$59,840	$29,920	4.16
	14th Street Townhomes Association	Indoor Plumbing Retrofit and Rain Shut-Off Device Program	$30,574	$15,286	2.27
	Plantation, City of	Distribution System Automatic Flushing Devices	$103,218	$50,000	0.54
Miami-Dade	North Miami Beach, City of	Showerhead Exchange Program	$50,000	$25,000	36.80
	MDWASD	Senior and Low Income Full Plumbing Retrofit Project Phase III	$308,000	$25,000	23.40
		Industrial, Commercial, and Institutional Plumbing Fixture Retrofit Rebate Project	$113,800	$25,000	15.33
		Water Loss Reduction Plan – Automatic Meter Reading with Leak Detection Monitoring Project	$241,000	$25,000	24.00
		Industrial, Commercial, and Institutional Water Use Evaluations Project	$250,000	$25,000	18.20
		Urban Conservation Unit Project Water Irrigation Evaluation with Soil Moisture Sensor	$224,500	$17,875	22.80
		Multiple Family High Efficiency Full Retrofit Project	$129,000	$25,000	9.80
		Single Family HET Rebate Project	$125,000	$25,000	10.50
	Miami Springs, City of	Rain Sensors for Miami Springs	$2,220	$1,110	2.45
	Opa Locka, City of	Automatic Hydrant Flushing	$100,000	$50,000	8.40
	North Miami Beach, City of	Rain Harvesting Irrigation Program	$14,000	$7,000	0.54
Monroe	FKAA	HET Retrofit Rebate in Paradise	$100,000	$25,000	7.00
		Cisterns in Paradise: Florida Keys Rain Catchment Initiative	$100,000	$25,000	0.90

a. MGY – million gallons per year.

Table D-1. Continued.

County	Entity Name	Project Title	Total Project Cost	Approved Funding	Proposed Water Savings (MGY) [a]
FY 2008					
Palm Beach	Palm Healthcare Foundation	Rainwater Collection & Irrigation System	$75,000	$20,588	0.33
Broward	Hollywood, City of	Restaurant Prerinse Spray Valve Replacement Program	$13,974	$6,987	9.20
	Tamarac, City of	Indoor Plumbing Retrofit	$92,100	$42,000	17.90
	Coral Springs, City of	Automatic Flushers for Distribution	$99,950	$49,975	20.52
	Coconut Creek, City of	Prerinse Spray Valve Retrofit	$4,500	$2,250	1.97
	Hallandale Beach, City of	Rain Sensor Retrofit Program	$100,000	$25,000	23.00
Miami-Dade	North Miami Beach, City of	Advanced Automated Flushing Technology	$20,000	$10,000	34.00
		Showerhead Exchange Program	$50,000	$25,000	36.80
		Water Demand Management Using Fixed-Ratio Network Meter Reading Technology	$300,000	$25,000	48.00
	MDWASD	Single Family Plumbing Fixture Retrofit Kit Exchange	$36,790	$12,000	0.70
		Multiple Family Plumbing Retrofit Kit Exchange	$31,400	$9,200	0.70
Monroe	FKAA	Low Flow Retrofit Program	$64,000	$32,000	4.48
FY 2007					
Palm Beach	West Palm Beach, City of	Landscape Irrigation Efficiency Project	$100,000	$50,000	27.00
Broward	Hollywood, City of	Showerhead Exchange Program	$16,435	$8,218	36.00
Miami-Dade	North Miami Beach, City of	Fixed Radio Network Meter Reading Technology	$300,000	$50,000	48.00
	MDWASD	Plumbing Fixture Retrofit Seniors' Pilot	$212,500	$50,000	15.60
		Water Use Evaluations	$250,000	$50,000	18.25
		Landscape Irrigation Efficiency Project	$64,000	$32,000	7.40
		Low Flow Toilet Rebate Project	$120,500	$50,000	6.00
	Virginia Gardens	Sports Field Irrigation Project	$56,000	$28,000	6.50
Monroe	FKAA	Prerinse Spray Valve Retrofit	$100,000	$25,000	53.40
FY 2006					
Palm Beach	Pompano Beach, City of	Automatic Flushing Devices	$20,000	$7,500	0.14
Broward	Tamarac, City of	Plumbing and Irrigation Retrofit	$58,200	$30,000	25.00
	Plantation, City of	Water Savings Grass Installation	$312,280	$50,000	78.00
	Coconut Creek, City of	Sabal Pines Park Wash Station	$95,000	$40,000	0.50
Miami-Dade	Town of Medley	Water Consumption Awareness, Leak Detection	$100,595	$50,000	21.20
	Roots in the City, Inc.	Water Reclamation	$72,000	$36,000	0.30
	Plaza Del Prado Condominium	Water Conservation	$159,800	$50,000	7.90
	City of Miami Springs	"Save Your Water – Save Your Dollars"	$15,155	$5,000	14.60
	Miami-Dade Cooperative Extension Service Division	Residential Irrigation Efficiency Project	$100,000	$25,000	7.00
	Town of Medley	Public Restrooms Water Use Reduction Program	$30,000	$7,500	0.45
FY 2005					
Palm Beach	United Civic Organization of Century Village, Inc.	Convert Irrigation System to Reclaimed	$115,000	$25,000	74.70
	City of Boynton Beach Utilities	Turf Replacement	$100,000	$50,000	7.60
Monroe	FKAA	Showerhead Retrofit for Hotels	$100,000	$50,000	15.00
		Totals	**$8,430,145**	**$2,480,346**	**1,457.00**

a. MGY – million gallons per year.

FIXTURE AND APPLIANCE RETROFITS

Newer water fixtures and appliances provide significant water savings compared with older appliances and fixtures. For example, a more efficient washing machine generates a potential estimated savings of 20 gallons of water per use. A family washing five loads of laundry each week could save more than 5,000 gallons of water per year. **Table D-2** shows water consumption for common indoor fixtures and appliances.

SFWMD recommends several online resources for consumers, building managers, utilities, and municipalities for research and comparison of indoor retrofit program devices:

- ENERGY STAR Program (www.energystar.gov)
- Consortium for Energy Efficiency (www.cee1.org)
- Food Service Technology Center (www.fishnick.com)
- United States Environmental Protection Agency WaterSense Program (www.epa.gov/WaterSense/)
- Alliance for Water Efficiency (www.allianceforwaterefficiency.org)
- California Urban Water Conservation Council (www.cuwcc.org)
- Conserve Florida Water Clearinghouse (http://www.conservefloridawater.org/overview.asp)

Table D-2. Gallons of water consumed for common indoor water fixtures and appliances.

	Water Consumption					
	Toilets (gallons per flush)	Showerheads (gallons per minute)	Faucets (gallons per minute)	Urinals (gallons per flush)	Dishwashers (gallons per load)	Clothes Washers (gallons per load)
Pre-1984	5.0–7.0	5.0–8.0	4.0–7.0	5.0	14.0	56.0
1984–1994	3.5–4.5	2.8-4.0	2.8–3.0	1.5–4.5	10.5–12.0	39.0–51.0
Post-1994	1.6	2.5 [a]	2.5 [a]	1.0	10.5	27.0 [b]
WaterSense Max	1.3	2.0	1.5	0.5	--	--
Highest Efficiency	0.8–1.0	1.2–1.5	0.5–1.0	0.0–0.125 [c]	4.5–6.5	16.0–22.0

a. At 80 pounds per square inch or 2.2 gallons per minute at 60 pounds per square inch.

b. Post-1998.

c. Waterless urinals are only recommended under specific conditions.

WATER CHAMP

Water CHAMP recognizes lodging facilities that have taken steps to increase water use efficiency. Specifically, participating properties conduct voluntary linen and towel reuse programs and install high efficiency (1 gallon per minute) faucet aerators in guest bathrooms. Participation in Water CHAMP supports the water conservation criteria needed to join the Florida Green Lodging Program, which was recently approved by the Florida Department of Environmental Protection. **Table D-3** summarizes the Water CHAMP water conservation potential for the LEC Planning Area.

Table D-3. Potential water savings of the Water CHAMP in the LEC Planning Area. [a]

County	Number of Hotel and Motel Units [b]	Number of Rooms in Florida Green Lodging Program	Potential Water CHAMP Rooms	Potential Water Savings [c] (MGY) [d]
Palm Beach	16,822	9,077	7,745	33.9
Broward	30,500	10,786	19,714	86.3
Miami-Dade	48,490	13,679	34,811	152.5
Monroe	7,957	2,912	3,515 [e]	15.4
LEC Planning Area Totals	103,769	36,454	62,270	288.1

a. Source: Florida Department of Business and Professional Regulation (http://www.myfloridalicense.com/dbpr/)
b. Accounts for hotels, motels, and bed-and-breakfast properties.
c. Potential savings over nonconserving hotels built to current plumbing standards.
d. MGY – million gallons per year.
e. Excludes 1,530 rooms currently enrolled in the program.

POTENTIAL WATER SAVINGS

SFWMD advocates the adoption of local building ordinances that incorporate the WaterSense and ENERGY STAR fixture and appliance standards and/or follow Florida Water Star, Leadership in Energy and Environmental Design, or Florida Green Building Coalition building criteria. Potential water savings resulting from residential indoor retrofits were estimated for Palm Beach, Broward, Miami-Dade, and Monroe counties using county parcel and population data, and a methodology similar to that used in the *EZ Guide* by the Conserve Florida Water Clearinghouse (2009). **Table D-4** summarizes potential water use savings in the LEC Planning Area based on the following assumptions:

- High efficiency fixtures are installed in both single and multiple family residential units.
- Measures to realize a 15–35 percent reduction in water use are implemented by all ICI Self-Supply equivalent square footage.

The estimated water use reductions in **Table D-4** assume 100 percent participation in conservation activities for the ICI Self-Supply water use category and residential indoor water use. These numbers illustrate maximum potential water savings based on a particular set of assumptions and are not intended to serve as a realistic objective. As a utility implements options such as plumbing retrofits, rebates, and rate structures, the utility's potential to reduce future use declines.

Table D-4. Summary of potential savings in millions of gallons per year (MGY) of the ICI Self-Supply water use category and residential indoor water use through water conservation in Palm Beach, Broward, Miami-Dade, and Monroe counties. [a]

Indoor Water Use	Savings (MGY)							
	Palm Beach County		Broward County		Miami-Dade County		Monroe County	
Single Family Residential								
Pre-1984	4,204.6		7,149.2		9,536.1		464.9	
1984–1994	1,995.9		1,773.6		1,519.4		147.9	
Post-1994	1,096.8		983.7		904.1		55.2	
Multiple Family Residential								
Pre-1984	1,301.1		2,566.2		5,747.5		152.7	
1984–1994	451.4		616.4		599.9		17.5	
Post-1994	215.9		259.2		356.0		4.6	
Total Residential Savings	9,265.7		13,348.3		18,662.9		842.8	
Indoor Water Use	**Efficiency Increase (MGY)**							
	15%	**35%**	**15%**	**35%**	**15%**	**35%**	**15%**	**35%**
Industrial	130.2	303.8	287.4	670.7	473.6	1,105.1	3.1	7.3
Commercial	1,042.4	2,432.2	1,382.0	3,224.8	2,255.5	5,267.7	92.4	215.7
Institutional	398.5	929.9	492.5	1,149.1	844.1	1,969.5	29.1	68.0
Total ICI Savings	1,571.1	3,665.9	2,162.0	5,044.6	3,573.2	8,337.4	124.7	290.9
Total Savings	**10,836.8**	**12,931.6**	**15,510.3**	**18,392.9**	**22,236.0**	**27,000.2**	**967.4**	**1,133.6**

a. Replacement with high efficiency features.

STATUS OF PUBLIC WATER SUPPLY WATER CONSERVATION IMPLEMENTATION

Tables D-5 through **D-8** provide the status of PWS water conservation implementation for Palm Beach, Broward, Miami-Dade, and Monroe counties, respectively.

Table D-5. Palm Beach County PWS water conservation implementation status.

PWS Utility	Irrigation Hours Ordinance	Florida-Friendly Landscape Ordinance [a]	Ultralow Volume Fixtures Ordinance [b]	Rain Sensor Ordinance	Water Conservation Rate Structure	Leak Detect & Repair Program [c]	Public Education Program [d]	Water Use Permit Number
A.G. Holley State Hospital [e]	NA [f]	NA	NA	NA	NA	yes	yes	50-01092-W
Boca Raton, City of	yes [g]	yes	yes	yes	yes	yes	yes	50-00367-W
Boynton Beach, City of	yes	yes	yes	yes	yes	yes	yes	50-00499-W
Delray Beach Water and Sewer Department, City of	yes	yes [h]	yes	yes	yes	yes	yes	50-00177-W
Glades Utility Authority [i]	no	no	no	no	yes	yes	yes	50-06857-W
Golf, Village of	yes	yes	yes	no	yes	yes	yes	50-00612-W
Highland Beach, Town of	yes	yes	yes	yes	yes	yes	yes	50-00346-W
Jupiter, Town of	yes	yes	yes	yes	yes	yes	yes	50-00010-W
Lake Worth Utilities, City of	yes [j]	yes	yes	no	yes	yes	yes	50-00234-W
Lantana, Town of	yes	yes	yes	yes	yes	yes	yes	50-00575-W
Manalapan, Town of	yes	yes	yes	yes	no	yes	yes	50-00506-W
Mangonia Park, Town of	yes	no	yes	yes	no	yes	yes	50-00030-W
Maralago Cay	NA	NA	NA	NA	no [k]	yes	yes	50-01283-W
Palm Beach County Water Utilities Department	yes	yes	yes	yes	yes	yes	yes	50-00135-W 50-00444-W 50-06857-W
Palm Springs, Village of	yes [g]	yes [g]	yes	no	yes	yes	yes	50-00036-W
Riviera Beach, City of	yes	yes [h]	yes	yes	yes	yes	yes [h]	50-00460-W
Seacoast Utility Authority	yes	yes	yes	yes	yes	yes	yes	50-00365-W
Seminole Improvement District [l]	NA	NA	NA	NA	yes	yes	yes	50-03711-W
Tequesta, Village of	yes	yes [h]	yes	yes [h]	yes	yes	yes	50-00046-W
Wellington Public Utilities Department	yes	no	yes	yes	yes	yes	yes	50-00464-W
West Palm Beach Public Utilities, City of	yes	yes	yes	yes	yes	no [m]	yes	50-00615-W

a. Includes Xeriscape ordinances that have not been updated to reflect Florida-Friendly Landscaping principles.
b. Utility either adopts its own ordinance or follows the Florida Building Code.
c. Program initiated when unaccounted for water is greater than 10 percent.
d. Program can vary depending on permit requirements and other factors.
e. A.G. Holley State Hospital closed in 2012.
f. NA – not applicable.
g. Adheres to Palm Beach County code of ordinances.
h. Ordinance in development as part of the water use permit renewal process.
i. Glades Utility Authority was absorbed into the Palm Beach County Water Utility Department effective April 2013.
j. One-day-per-week irrigation ordinance, which is more restrictive than SFWMD year-round restrictions.
k. Per conversation with George McDonald, P.E., of McDonald Group International, Inc., consultant to Maralago Cay.
l. This utility does not have the authority to enact ordinances. It complies with local government ordinances.
m. Per David Hanks, Utility Director, City of West Palm Beach, a leak detection program will be implemented upon the purchase of leak detection equipment.

Table D-6. Broward County PWS water conservation implementation status.

PWS Utility	Irrigation Hours Ordinance	Florida-Friendly Landscape Ordinance [a]	Ultralow Volume Fixtures Ordinance [b]	Rain Sensor Ordinance	Water Conservation Rate Structure	Leak Detect & Repair Program [c]	Public Education Program [d]	Water Use Permit Number
Broward County Water & Wastewater Services	yes	yes	yes	yes	yes	yes	yes	06-00146-W
Cooper City Utility Department, City of	yes [e]	no [f]	yes	yes [e]	yes	yes	yes	06-00365-W
Coral Springs, City of	yes [f]	yes [f]	yes	yes [f]	yes	yes	yes	06-00102-W
Coral Springs Improvement District [g]	NA [h]	NA	NA	NA	yes	yes	yes	06-00100-W
Dania Beach, City of	yes	yes [f]	yes	yes [f]	yes	yes	yes	06-00187-W
Davie, Town of	yes [e]	yes	yes	yes	yes	yes	yes	06-00134-W
Deerfield Beach, City of	yes	yes	yes	yes	yes	yes	yes	06-00082-W
Fort Lauderdale, City of	yes [i]	yes	yes [e]	yes	yes	yes	yes	06-00123-W
Hallandale Beach, City of	yes	yes	yes	yes	yes	yes	yes	06-00138-W
Hillsboro Beach, Town of	yes	yes	yes	yes	yes	yes	yes	06-00101-W
Hollywood, City of	yes	no	yes	no	yes	yes	yes	06-00038-W
Lauderhill, City of	yes	yes	yes	yes	yes	yes	yes	06-00129-W
Margate, City of	yes	yes	yes	yes	yes	yes	yes	06-00121-W
Miramar, City of	yes	yes	yes	yes	yes	yes	yes	06-00054-W
North Lauderdale, City of	yes	yes	yes	yes	yes	yes	yes	06-00004-W
North Springs Improvement District [g]	NA	NA	NA	NA	yes	yes	yes	06-00274-W
Parkland Utilities, Inc.	yes [e]	yes [e]	yes [e]	yes [e]	no	yes	yes	06-00242-W
Pembroke Pines, City of	yes	yes	yes	yes	yes	yes	yes	06-00135-W
Plantation, City of	yes	yes	yes	yes	yes	yes	yes	06-00103-W
Pompano Beach, City of	yes	yes	yes	yes	yes	yes	yes	06-00070-W
Royal Utility Corporation [g]	NA	NA	NA	NA	no	yes	yes	06-00003-W
Seminole Tribe of Florida Utility [j]	NA	NA	NA	NA	NA	NA	NA	06-02088-W
Sunrise, City of	yes	yes	yes	yes	yes	yes	yes	06-00120-W
Tamarac, City of	yes	yes	yes	yes	yes	yes	yes	06-00071-W
Tindall Hammock Irrigation and Soil Conservation District [g, k]	NA	NA	NA	NA	no	no	yes	06-00170-W

a. Includes Xeriscape ordinances that have not been updated to reflect Florida-Friendly Landscaping principles.
b. Utility either adopts its own ordinance or follows the Florida Building Code.
c. Program initiated when unaccounted for water is greater than 10 percent.
d. Program can vary depending on permit requirements and other factors.
e. Adheres to Broward County code of ordinances.
f. Ordinance in development as part of the water use permit renewal process.
g. This utility does not have the authority to enact ordinances. It complies with local government ordinances.
h. NA – not applicable
i. City of Fort Lauderdale ordinance allows three-day-per-week landscape irrigation.
j. The Seminole Tribe of Florida is not required to comply with SFWMD *Basis of Review for Water Use Permit Application within the South Florida Water Management District* (SFWMD 2012) water conservation measures.
k. Previously Ferncrest Utilities, Inc.

Table D-7. Miami-Dade County PWS water conservation implementation status.

PWS Utility	Irrigation Hours Ordinance	Florida-Friendly Landscape Ordinance [a]	Ultralow Volume Fixtures Ordinance [b]	Rain Sensor Ordinance	Water Conservation Rate Structure	Leak Detect & Repair Program [c]	Public Education Program [d]	Water Use Permit Number
Americana Village	yes	yes	yes	yes	yes [e]	yes [e]	yes [e]	13-02004-W
Florida City Water and Sewer Department	no	no	no	no	no	no	no	13-00029-W
Homestead, City of	yes	yes	yes	yes	yes	yes	yes	13-00046-W
Miami-Dade Water and Sewer Department	yes	yes	yes	yes	yes	yes	yes	13-00017-W
North Miami, City of	no	no	yes	no	no	yes	yes	13-00059-W
North Miami Beach, City of	yes	yes	yes	yes	yes	yes	yes	13-00060-W

a. Includes Xeriscape ordinances that have not been updated to reflect Florida-Friendly Landscaping principles.
b. Utility either adopts its own ordinance or follows the Florida Building Code.
c. Program initiated when unaccounted for water is greater than 10 percent.
d. Program can vary depending on permit requirements and other factors.
e. Adheres to Miami-Dade Water and Sewer Department water rates.

Table D-8. Monroe County PWS water conservation implementation status.

PWS Utility	Irrigation Hours Ordinance	Florida-Friendly Landscape Ordinance [a]	Ultra Low Volume Fixtures Ordinance [b]	Rain Sensor Ordinance	Water Conservation Rate Structure	Leak Detect & Repair Program [c]	Public Education Program [d]	Water Use Permit Number
Florida Keys Aqueduct Authority	yes	yes	yes	yes	yes	yes	yes	13-00005-W

a. Includes Xeriscape ordinances that have not been updated to reflect Florida-Friendly Landscaping principles.
b. Utility either adopts its own ordinance or follows the Florida Building Code.
c. Program initiated when unaccounted for water is greater than 10 percent.
d. Program can vary depending on permit requirements and other factors.

WATER CONSERVATION RATE STRUCTURES

Table D-9 provides information on single family residential water rates for each utility. Some PWS utilities listed in **Table D-9** provide water to municipalities for a fee who then resell it to their residents. These entities often create water rate structures that anticipate the cost of the purchased water plus an added handling fee. These rate structures, in turn, have an impact on conservation measures that residents employ, which influences the per capita use rate of the utility.

Table D-9. Single family residential water rates in the LEC Planning Area by dollars per each 1,000 gallons.

Utility Name	Effective Date	Utility Tax	Base Charge	Single Family Residential Water Rates Cost per 1,000 gallons						Cost per 3,000 Gallons	Cost per 7,000 Gallons	Cost per 10,000 Gallons
				Block 1	Block 2	Block 3	Block 4	Block 5	Block 6			
Palm Beach County												
Boca Raton, City of (inside city)	October 2010	-	**$12.13**	**$0.713** 0–25,000	**$1.717** 25,001–50,000	**$2.189** >50,000	-	-	-	**$14.27**	**$17.12**	**$19.26**
Boca Raton, City of (outside city)	October 2010	-	**$15.16**	**$0.891** 0–25,000	**$2.146** 25,001–50,000	**$2.736** >50,000	-	-	-	**$17.83**	**$20.51**	**$23.18**
Boynton Beach, City of (inside city)	October 2010	-	**$10.76**	**$1.44** 0–9,000	**$2.58** 9,001–30,000	**$3.44** 30,001–50,000	**$4.24** >50,000	-	-	**$15.08**	**$20.84**	**$26.30**
Boynton Beach, City of (outside city)	October 2010	-	**$13.45**	**$1.80** 0–9,000	**$3.23** 9,001–30,000	**$4.30** 30,001–50,000	**$5.30** >50,000	-	-	**$18.85**	**$26.05**	**$32.88**
Delray Beach Water and Sewer Department, City of (inside city)	October 2010	-	**$15.72**	**$0.00** 0–3,000	**$1.25** 3,001–12,000	**$2.00** 12,001–25,000	**$3.50** 25,001–50,000	**$4.50** >50,000	-	**$15.72**	**$20.72**	**$24.47**
Delray Beach, Water and Sewer Department, City of (outside city)	October 2010	-	**$19.65**	**$0.00** 0–3,000	**$1.56** 3,001–12,000	**$2.50** 12,001–25,000	**$4.38** 25,001–50,000	**$5.63** >50,000	-	**$19.65**	**$25.89**	**$30.57**
Glades Utility Authority	October 2012	-	**$16.75**	**$1.50** 0–3,000	**$4.67** 3,001–6,000	**$5.80** 6,001–15,000	**$7.50** >15,000	-	-	**$21.25**	**$41.06**	**$58.46**
Golf, Village of (inside city)	-	-	**$29.58**	**$0.00** 0–10,000	**$0.95** >10,000	-	-	-	-	**$29.58**	**$29.58**	**$29.58**
Golf, Village of (outside city)	-	-	**$36.98**	**$0.00** 0–10,000	**$1.18** >10,000	-	-	-	-	**$36.98**	**$36.98**	**$36.98**
Highland Beach, Town of	December 2009	-	**$15.00**	**$2.15** 0–9,500	**$3.74** 9,501–24,500	**$4.60** >24,501	-	-	-	**$21.45**	**$30.05**	**$37.30**
Hypoluxo, Town of [a]	July 2008	-	**$40.39**	**$2.22**	-	-	-	-	-	**$47.05**	**$55.93**	**$62.59**

a. Water provided by the City of Boynton Beach and resold by this utility.

Table D-9. Continued.

Utility Name	Effective Date	Utility Tax	Base Charge	Single Family Residential Water Rates Cost per 1,000 gallons						Cost per 3,000 Gallons	Cost per 7,000 Gallons	Cost per 10,000 Gallons
				Block 1	Block 2	Block 3	Block 4	Block 5	Block 6			
Palm Beach County (Continued)												
Jupiter, Town of (inside city)	November 2009	-	**$18.28**	**$1.14** 0–6,000	**$1.55** 6,001–14,000	**$2.74** 14,001–30,000	**$3.62** >30,000	-	-	**$21.70**	**$26.67**	**$31.32**
Jupiter, Town of (outside city)	November 2009	-	**$22.85**	**$1.43** 0–6,000	**$1.94** 6,001–14,000	**$3.43** 14,001–30,000	**$4.53** >30,000	-	-	**$27.14**	**$33.37**	**$39.19**
Lake Worth Utilities, City of	October 2010	-	**$12.50**	**$2.69** 0–4,000	**$4.15** 4,001–8,000	**$5.60** 8,001–12,000	**$9.81** 12,001–20,000	**$12.26** >20,000	-	**$20.57**	**$35.71**	**$51.06**
Lantana, Town of	July 2009	-	**$19.06**	**$1.18** 0–5,000	**$1.79** 5,001–10,000	**$2.52** 10,001–20,000	**$3.06** 20,001–40,000	**$3.15** >40,000	-	**$22.60**	**$28.54**	**$33.91**
Manalapan, Town of	July 2008	-	**$33.66**	**$1.85**	-	-	-	-	-	**$39.21**	**$46.61**	**$52.16**
Mangonia Park, Town of	-	-	**$11.58**	**$1.95**	-	-	-	-	-	**$17.43**	**$25.23**	
Maralago Cay	NA [a]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Palm Beach County Water Utilities Department	November 2010	-	**$10.95**	**$1.09** 0–4,000	**$2.45** 4,001–10,000	**$6.15** 10,001–25,000	**$7.64** >25,000	-	-	**$14.22**	**$22.66**	**$30.01**
Palm Springs, Village of (inside city)	October 2010	-	**$8.90**	**$2.34** 0–6,000	**$3.04** 6,001–20,000	**$3.74** >21,000	-	-	-	**$15.92**	**$25.98**	**$35.10**
Palm Springs, Village of (outside city)	October 2010	-	**$11.12**	**$2.93** 0–6,000	**$3.79** 6,001–20,000	**$4.68** >21,000	-	-	-	**$19.91**	**$32.49**	**$43.86**
Riviera Beach, City of	-	-	**$12.22**	**$2.51** 0–9,000	**$3.14** 9,001–14,000	**$3.77** 14,001–19,000	**$4.40** >19,000	-	-	**$19.75**	**$29.79**	**$37.95**
Seacoast Utility Authority	December 2010	-	**$17.27**	**$0.88** 0–6,000	**$3.45** 6,001–30,000	**$5.19** >30,000	-	-	-	**$19.91**	**$26.00**	**$36.35**
Seminole Improvement District [b]	NA	-	**$0.00**	**$2.00**	-	-	-	-	-	**$6.00**	**$14.00**	**$20.00**

a. NA – not available.
b. No rate structure.

Table D-9. Continued.

Utility Name	Effective Date	Utility Tax	Base Charge	Single Family Residential Water Rates Cost per 1,000 gallons						Cost per 3,000 Gallons	Cost per 7,000 Gallons	Cost per 10,000 Gallons
				Block 1	Block 2	Block 3	Block 4	Block 5	Block 6			
Palm Beach County (Continued)												
Tequesta, Village of (inside city)	October 2010	9%	**$13.27**	**$2.11** 0–12,000	**$3.54** 12,001–25,000	**$4.81** 25,001–40,000	**$6.17** >40,000	-	-	**$21.36**	**$32.49**	**$42.31**
Tequesta, Village of (outside city)	October 2010	-	**$16.59**	**$2.64** 0–12,000	**$4.43** 12,001–25,000	**$6.01** 25,001–40,000	**$7.71** >40,000	-	-	**$24.51**	**$35.07**	**$42.99**
Wellington Public Utilities Department (inside city)	October 2010	-	**$16.46**	**$1.86** 0–6,000	**$2.77** 6,001–15,000	**$3.72** 15,001–25,000	**$6.11** >25,000	-	-	**$22.04**	**$30.39**	**$38.70**
Wellington Public Utilities Department (outside city)	October 2010	-	**$20.56**	**$2.32** 0–6,000	**$3.46** 6,001–15,000	**$4.64** 15,001–25,000	**$7.63** >25,000	-	-	**$27.52**	**$37.94**	**$48.32**
West Palm Beach Public Utilities, City of (inside city)	October 2010	-	**$17.70**	**$2.05** 0–6,000	**$2.57** 6,001–12,000	**$3.02** 12,000–26,900	**$3.54** 26,901–56,850	**$4.08** 56,851–149,600	**$4.58** >149,600	**$23.85**	**$32.57**	**$40.28**
West Palm Beach Public Utilities, City of (outside city)	October 2010	-	**$22.13**	**$2.56** 0–6,000	**$3.21** 6,001–12,000	**$3.78** 12,001–26,900	**$4.43** 26,901–56,850	**$5.10** 56,851–149,600	**$5.73** >149,600	**$29.81**	**$40.70**	**$50.33**
Broward County												
Broward County Water & Wastewater Services	October 2010	-	**$14.20**	**$1.32** 0–3,000	**$2.31** 3,001–6,000	**$4.79** 6,001–12,000	**$6.43** >12,000	-	-	**$18.16**	**$29.88**	**$44.25**
Coconut Creek [a]	April 2011	8%	**$14.96**	**$3.50** 0–3,000	**$4.99** 3,001–7,000	**$6.24** 7,001–10,000	**$8.41** 10,001–20,000	**$11.77** >20,000	-	**$27.50**	**$49.05**	**$69.27**
Cooper City Utility Department, City of	NA [b]	-	**$10.91**	**$2.70** 0–5,000	**$3.12** 5,001–10,000	**$3.96** 10,001–20,000	**$5.20** >20,000	-	-	**$19.01**	**$30.65**	**$40.01**
Coral Springs, City of	NA	-	**$12.55**	**$1.47** 0–4,000	**$2.10** 4,001–8,000	**$2.63** 8,001–12,000	**$3.53** 12,001–20,000	**$5.33** >20,000	-	**$16.96**	**$24.73**	**$32.09**
Coral Springs Improvement District	October 2010		**$15.69**	**$0.00** 0–3,000	**$2.98** 3,001–12,600	**$4.72** 12,601–25,200	**$6.47** >25,200	-	-	**$15.69**	**$27.61**	**$36.55**

a. Water provided by Broward County Water and Wastewater Services and resold by this utility.
b. NA – not available.

Table D-9. Continued.

Utility Name	Effective Date	Utility Tax	Base Charge	Single Family Residential Water Rates Cost per 1,000 gallons						Cost per 3,000 Gallons	Cost per 7,000 Gallons	Cost per 10,000 Gallons
				Block 1	Block 2	Block 3	Block 4	Block 5	Block 6			
Broward County (continued)												
Dania Beach, City of	January 2011	-	**$12.50**	**$3.54** 0–5,000	**$5.67** 5,001–14,000	**$7.09** >14,000	-	-	-	**$23.12**	**$41.54**	**$58.55**
Davie, Town of	October 2010	-	**$17.40**	**$2.87** 0–5,000	**$4.28** 5,001–10,000	**$5.72** 10,001–20,000	**$7.15** 20,001–30,000	**$8.60** 30,001–50,000	**$10.03** >50,000	**$26.01**	**$40.31**	**$53.15**
Deerfield Beach, City of	March 2008	-	**$15.00**	**$2.65** 0–6,000	**$3.67** 6,001–12,000	**$4.03** >12,000	-	-	-	**$22.95**	**$34.57**	**$45.58**
Fort Lauderdale, City of	August 2010	-	**$5.46**	**$1.72** 0–3,000	**$3.83** 4,000–8,000	**$4.78** 9,000–12,000	**$6.45** 13,000–20,000	**$9.35** >20,000	-	**$10.80**	**$26.12**	**40.46**
Hallandale Beach, City of	October 2009	10%	**$21.00**	**$1.03** 0–2,000	**$1.10** 2,001–5,000	**$1.43** 5,001–10,000	**$2.25** 10,001–25,000	**$2.45** >25,000	-	**$26.58**	**$32.14**	**$36.86**
Hillsboro Beach, Town of	January 2011	-	**$24.00**	**$0.00** 0–2,000	**$3.40** 2,001–9,000	**$4.19** 9,001–17,000	**$4.87** >17,000	-	-	**$27.40**	**$41.00**	**$51.99**
Hollywood, City of	October 2010	-	**$4.76**	**$2.70** 0–3,740	**$5.39** 3,741–7,480	**$6.72** 7,481–11,220	**$8.07** 11,221–14,960	**$9.41** >14,960	-	**$12.86**	**$32.43**	**$51.95**
Lauderhill, City of [a]	October 2010	10%	**$10.74**	**$1.73**	-	-	-	-	-	**$17.52**	**$25.14**	**$30.84**
Lighthouse Point [b]	October 2010	-	**$14.20**	**$1.32** 0–3,000	**$2.31** 3,001–6,000	**$4.79** 6,001–12,000	**$6.43** >12,000	-	-	**$18.16**	**$29.88**	**$44.25**
Margate, City of (inside city)	October 2010	-	**$10.72**	**$3.21** 0–6,000	**$4.01** 6,001–15,000	**$4.82** 15,001–25,000	**$5.61** >25,000	-	-	**$20.35**	**$33.99**	**$46.02**
Margate, City of (outside city)	October 2010	-	**$13.40**	**$4.01** 0–6,000	**$5.01** 6,001–15,000	**$6.03** 15,001–25,000	**$7.01** >25,000	-	-	**$25.43**	**$42.47**	**$57.50**
Miramar, City of	May 2011	10%	**$10.73**	**$2.13** 0–5,000	**$2.61** 5,001–15,000	**$3.27** >15,000	-	-	-	**$18.83**	**$29.26**	**$37.87**

a. No rate structure.
b. Water provided by Broward County Water & Wastewater Services and resold by this utility.

Table D-9. Continued.

Utility Name	Effective Date	Utility Tax	Base Charge	Single Family Residential Water Rates Cost per 1,000 gallons						Cost per 3,000 Gallons	Cost per 7,000 Gallons	Cost per 10,000 Gallons
				Block 1	Block 2	Block 3	Block 4	Block 5	Block 6			
Broward County (continued)												
North Lauderdale, City of	May 2009	-	**$11.44**	**$2.77** 0–10,000	**$4.71** >10,000	-	-	-	-	**$19.75**	**$30.83**	**$39.14**
North Springs Improvement District	NA [a]	-	**$17.85**	**$1.73** 0–12,600	**$3.45** 12,601–25,200	**$5.18** >25,200	-	-	-	**$23.04**	**$29.96**	**$35.15**
Parkland Utilities, Inc. [b]	April 2011	-	**$18.70**	**$4.38** 0–3,000	**$6.24** 3,001–7,000	**$7.80** 7,001–10,000	**$10.51** 10,001–20,000	**$14.71** >20,000	-	**$31.84**	**$56.80**	**$80.20**
Pembroke Park [c]	October 2010	-	**$14.20**	**$1.32** 0–3,000	**$2.31** 3,001–6,000	**$4.79** 6,001–12,000	**$6.43** >12,000	-	-	**$18.16**	**$29.88**	**$44.25**
Pembroke Pines, City of	October 2010	-	**$11.93**	**$0.00** 0–3,000	**$4.64** >3,000	-	-	-	-	**$11.93**	**$30.49**	**$44.41**
Plantation, City of	October 2010	-	**$11.06**	**$1.57** 0–6,000	**$3.14** 6,001–12,000	**$4.72** 12,001–20,000	**$6.29** 20,001–30,000	**$7.86** 30,001–50,000	**$9.43** >50,000	**$15.77**	**$23.62**	**$33.04**
Pompano Beach, City of (inside city)	January 2011	-	**$12.88**	**$2.24** 0–10,000	**$3.07** 10,001–15,000	**$4.27** 15,001–25,000	**$6.00** >25,000	-	-	**$19.60**	**$28.56**	**$35.28**
Pompano Beach, City of (outside city)	January 2011	-	**$16.10**	**$2.80** 0–10,000	**$3.84** 10,001–15,000	**$5.34** 15,001–25,000	**$7.50** >25,000	-	-	**$24.50**	**$35.70**	**$44.10**
Oakland Park, City of [c]	October 2010	-	**$12.54**	**$4.19** 0–3,000	**$4.86** 3,001–8,000	**$5.75** 8,001–14,000	**$6.64** >14,000	-	-	**$25.11**	**$44.55**	**$60.91**
Royal Utility Corporation [d]	August 2010	-	**$11.19**	**$2.87**	-	-	-	-	-	**$19.80**	**$31.28**	**$39.89**
Seminole Tribe of Florida Utility [e]	NA	-	-	**$3.39**	-	-	-	-	-	**$10.17**	**$23.73**	**$33.90**

a. NA – not available.
b. Water provided by Coconut Creek and resold by this utility.
c. Water provided by Broward County Water & Wastewater Services and resold by this utility.
d. No rate structure.
e. Service provided by the Town of Davie.

Table D-9. Continued.

Utility Name	Effective Date	Utility Tax	Base Charge	Single Family Residential Water Rates Cost per 1,000 gallons						Cost per 3,000 Gallons	Cost per 7,000 Gallons	Cost per 10,000 Gallons
				Block 1	Block 2	Block 3	Block 4	Block 5	Block 6			
Broward County (continued)												
Sunrise, City of (inside city)	October 2010	10%	**$14.35**	**$2.81** 0–30,000	**$3.57** >30,000	-	-	-	-	**$25.06**	**$37.42**	**$46.70**
Sunrise, City of (outside city)	October 2010	-	**$17.94**	**$3.51** 0–30,000	**$4.46** >30,000	-	-	-	-	**$28.47**	**$42.51**	**$53.04**
Sunrise, City of (Southwest Plant)	October 2010	-	**$15.15**	**$3.74**						**$25.68**	**$40.64**	**$51.86**
Tamarac, City of	NA [a]	-	**$9.57**	**$1.80** 0–6,000	**$2.24** 6,001–15,000	**$2.64** >15,000	-	-	-	**$14.97**	**$22.61**	NA
Tindall Hammock Irrigation and Soil Conservation District [b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wilton Manors [c]	NA	10%	**$28.36**	**$3.47** 0–15,000	**$4.34** 15,001–30,000	**$5.42** >30,000	-	-	-	**$42.65**	**$57.92**	**$69.37**
Miami-Dade County												
Americana Village	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Florida City Water and Sewer Department	NA	-	**$6.10**	**$0.00** 0–2,000	**$2.00** >2,000	-	-	-	-	**$8.10**	**$16.10**	**$22.10**
Homestead, City of	April 2010	-	**$7.01**	**$0.80** 0–3,000	**$1.11** 3,001–9,000	**$1.30** 9,001–14,000	**$1.75** >14,000	**-**	-	**$9.41**	**$13.85**	**$17.37**
MDWASD	October 2011	-	**$3.20**	**$0.50** 0–3,740	**$3.00** 3,741–6,750	**$3.90** 6,751–12,716	**$5.16** >12,717	-	-	**$4.70**	**$15.08**	**$26.78**
North Miami, City of	July 2012	25%	**$11.40**	**$1.73** 0–5,000	**$2.42** 5,001–12,000	**$3.11** 12,001–20,000	**$3.46** >20,000	-	-	**$20.74**	**$31.11**	**$42.78**
North Miami Beach, City of	October 2011	-	**$11.94**	**$2.94** 0–7,000	**$3.28** 7,001–12,000	**$4.08** >12,000	-	-	-	**$20.76**	**$32.52**	**$42.36**
Monroe County												
Florida Keys Aqueduct Authority	May 2011	-	**$13.04**	**$5.47** 0–6,000	**$8.00** 6,001–12,000	**$8.96** 12,001–30,000	**$9.99** 30,001–50,000	**$10.97** >50,000	-	**$29.45**	**$56.39**	**$80.39**

a. NA – not available.
b. Previously Ferncrest Utilities, Inc.
c. Water provided by the City of Fort Lauderdale and resold by this utility.

WATER CONSERVATION VERSUS DEVELOPMENT OF ALTERNATIVE WATER SUPPLIES

For many utilities, water conservation can be more cost-effective than developing alternative water supply solutions. The costs associated with three alternative water supply development scenarios were evaluated:

- Full facility construction, between 1 and 5 million gallons per day (MGD), using fresh water from the surficial aquifer system or brackish water from the upper Floridan aquifer as the water source.
- Expansion of current facility production through the addition of a low pressure reverse osmosis (RO) train.
- Expansion of current facility production using a nanofiltration train.

Alternative Water Supply Options

Full Facility Construction

Costs for full facility construction to provide 1 to 5 MGD capacity range from $3.42 per 1,000 gallons for a nanofiltration facility using fresh groundwater, to $11.33 per 1,000 gallons for a low pressure RO facility using brackish groundwater (CDM 2007a, 2007b). Costs include expenses for raw water supply, pretreatment, nanofiltration, or RO process train(s), and post-treatment. Costs such as annual operations and maintenance expenses, and renewal and replacement fund deposits that are not part of the operations and maintenance expense, are also included. The cost estimates presented in this appendix are considered to be order-of-magnitude estimates as defined by the American Association of Cost Engineers and accurate within +50 percent or -30 percent.

Low Pressure Reverse Osmosis Facility Expansion

Facility expansion costs through the purchase and operation of 1 to 5 MGD capacity low pressure RO trains range from $3.69 to $10.38 per 1,000 gallons (CDM 2007a, 2007b). Facility expansion costs include expenses for cartridge filters, membrane feed pumps, pretreatment chemicals, RO membrane units, piping inside the membrane building, cleaning system, instruments and controls, and electrical equipment.

Nanofiltration Facility Expansion

Facility expansion costs for the purchase and operation of 1 to 5 MGD nanofiltration process trains range from $3.13 to $9.07 per 1,000 gallons of finished water (CDM 2007a, 2007b). Facility expansion costs include expenses for cartridge filters, membrane feed pumps, pretreatment chemicals, nanofiltration membrane units, piping inside the membrane building, cleaning system, instruments and controls, and electrical equipment.

MIAMI-DADE GOAL-BASED WATER CONSERVATION PLAN

A good example of a goal-based water conservation plan is the *Miami-Dade County Water Use Efficiency 20-Year Plan* (Miami-Dade County 2007), which is expected to generate an estimated 20 MGD in water savings by 2026. Since 2006, the Miami-Dade Water and Sewer Department spent $3 million implementing its water conservation plan and estimates that each dollar spent deferred or eliminated between $5 and $9 in capital project costs. This calculation is based on the initial cost estimates of water supply development and quantified water conservation savings observed through 2012.

The actual reduction in per capita water demand (from 154 gallons per capita per day in 2005 to 134 gallons per capita per day in 2012) enabled MDWASD to reschedule its water supply development plan and extend its water use permit. **Figures D-1** and **D-2** show the original and revised water supply project schedules, and the pre- and post-conservation finished water demand curves.

Projects 1 and 2 on **Figure D-1** were initially halted due to water quality issues and were not replaced. Water savings achieved through conservation efforts is credited as one reason why the county's projects were not replaced. Miami-Dade is currently experiencing actual finished water demands 44 MGD lower than anticipated population growth, along with the implementation of the county's irrigation restrictions, Water Loss Reduction Program, and Water Use Efficiency Program. Miami-Dade County's new water supply development schedule postpones the construction of four of its remaining six projects.

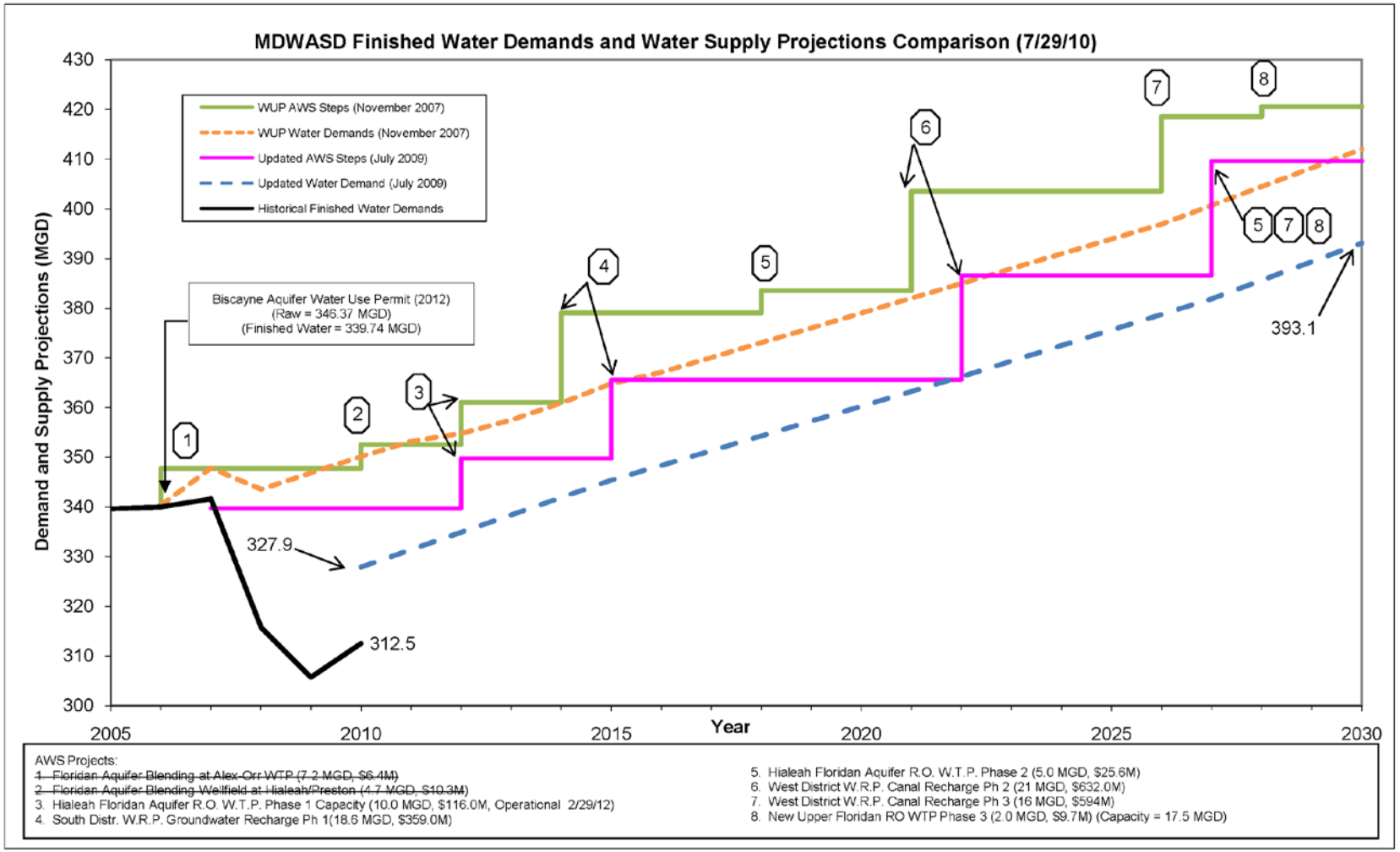

Figure D-1. MDWASD finished water demands and water supply projections comparison as of July 29, 2010.
The green line shows the original work plan schedule. The pink line shows the adjusted work plan resulting from conservation success.

Key: AWS – alternative water supply; Distr. – district; M – million; MDWASD – Miami-Dade Water and Sewer Department; MGD – million gallons per day; Ph – phase; RO and R.O. – reverse osmosis; WRP and W.R.P. – water reclamation plant; WTP and W.T.P. – water treatment plant; WUP – water use permit.

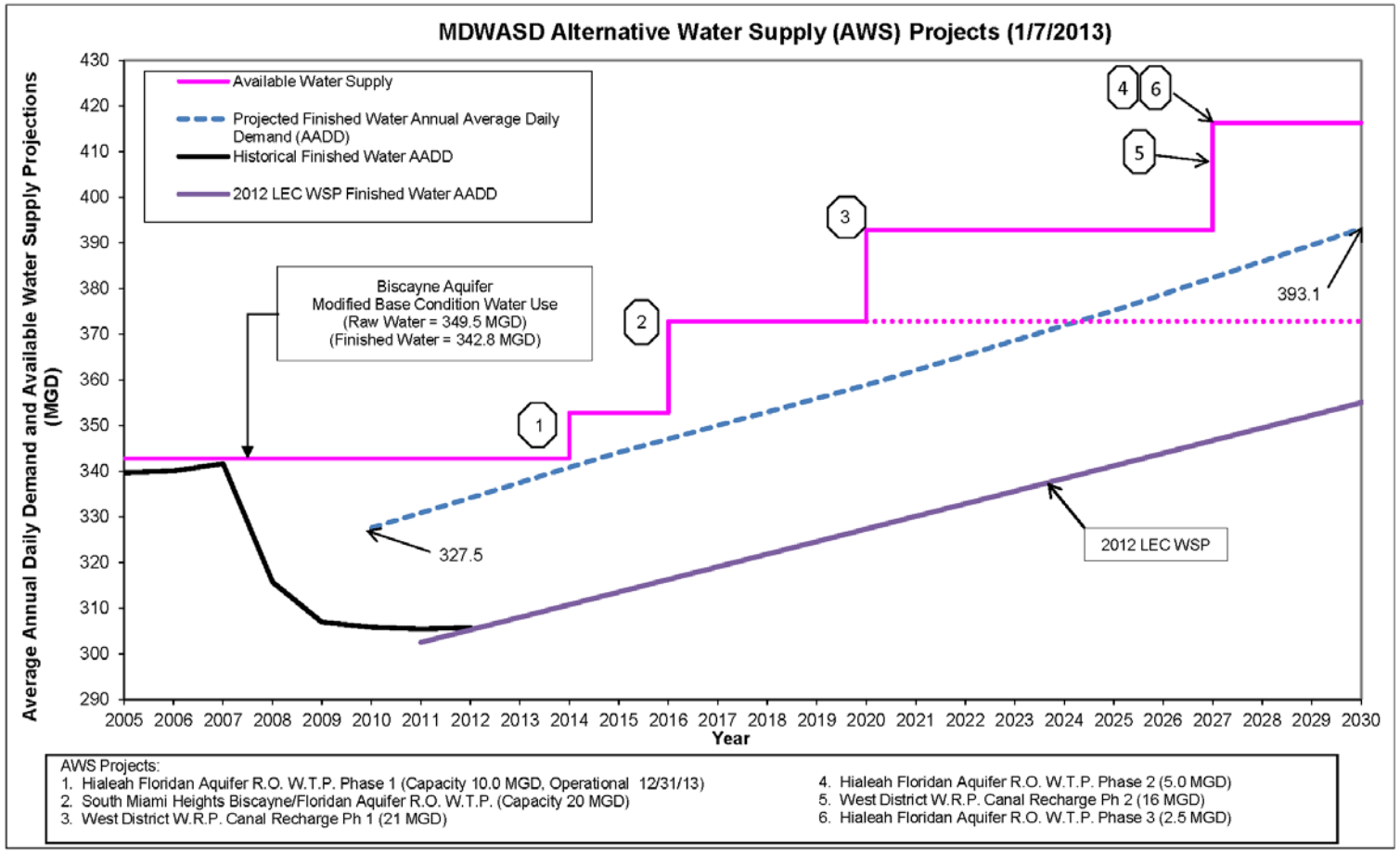

Figure D-2. MDWASD finished water demands and water supply projections comparison as of January 7, 2013.

Key: AADD – annual average daily demand; MGD – million gallons per day; Ph – phase; RO and R.O. – reverse osmosis; W.R.P. – water reclamation plant; WSP – water supply plan; W.T.P. – water treatment plant.

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CDM. 2007a. *Water Supply Cost Estimation Study*. Prepared by Camp Dresser & McKee, Inc., Naples, FL, for South Florida Water Management District, West Palm Beach, FL.

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SFWMD. 2012. *Basis of Review for Water Use Permit Application within the South Florida Water Management District*. South Florida Water Management District, West Palm Beach, FL.

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E

Information for Local Government Comprehensive Plans

The South Florida Water Management District (SFWMD) prepares water supply plans for each of its four planning areas to effectively support planning initiatives and address local issues. The regional water supply plans encompass a twenty-year future planning horizon and are updated every five years. All local governments are required by statute to update their water supply facilities work plan and adopt revisions to their comprehensive plan within 18 months following the approval of this plan update.

This appendix contains water supply planning information useful to local governments for preparing and amending comprehensive plans. In addition to this appendix, the following chapters and appendices are particularly relevant for local governments:

Water Sources	Chapter 5
Utility Service Areas (2010 and 2030)	Chapter 6; Appendices C and E
Population Projections (2010–2030)	Chapter 2; Appendix A
Demand Projections (2010–2030)	Chapter 2; Appendix A
Water Supply Projects (2010–2030)	Chapter 6; Appendix F

This appendix includes the following information useful for the review and revision of local government comprehensive plans:

1. SFWMD's Checklist of Needed Comprehensive Plan Data
2. Relevant portions of cited statutory provisions
3. Tables identifying which utilities serve each Lower East Coast (LEC) Planning Area jurisdiction
4. Maps of utility areas currently served (2010) and future utility service areas expected to be served (2030)

1. COMPREHENSIVE PLAN DATA CHECKLIST

Local governments are required to plan for their water and wastewater needs along with other infrastructure and public service elements in their comprehensive plans. This section provides a general checklist of the types of data and information SFWMD water supply planning staff look for during their review of the water supply element, policies, and other topics in local government comprehensive plans. This checklist is not all inclusive but provides a broad, general framework for use with the more detailed Florida Department of Economic Opportunity related guidelines and SFWMD comments on specific water supply topics.

Checklist guidance is given for three water supply-related aspects of comprehensive plans:

A. Work plans and other potable water sub-element revisions

B. Evaluation and appraisal of comprehensive plan requirements

C. Plan amendments (future land use change)

A. Work Plan and Other Potable Water Sub-Element Revisions

(To be completed within 18 months following final publication of this plan update.)

Overall Guidance

For consistency in the water supply planning process, SFWMD, local governments, and utilities work closely with the Florida Department of Economic Opportunity projecting demands and proposing water supply projects for the future. This plan update provides water demand estimates, water source options, and water supply development projects to ensure adequate water supplies to support the region. Local governments should demonstrate consistency with the regional water supply plan and updates when developing or updating their work plans. The following guidance is provided to local governments for updating their work plans.

Confirm Major PWS Entities Providing Service within Local Government's Jurisdiction

To be consistent with the regional water supply plan and updates, the local government's work plan should be in agreement with the major Public Water Supply (PWS) entities serving most of the urban population. This plan update identifies PWS entities with projected average pumpage greater than 0.1 million gallons per day (MGD) serving most of the urban population. Smaller communities or municipalities may not be identified. The Florida Department of Economic Opportunity guidance for work plans recommends including all small community systems and Domestic Self-Supply (DSS) users on private wells. Information on these small in-community systems and DSS can be found on the Florida Department of Environmental Protection website at http://www.dep.state.fl.us/water/drinkingwater/flow.htm.

This plan update provides information about PWS entities and urban water use by PWS service area. To be consistent with the regional water supply plan and updates, at a minimum, the work plan should identify the urban water demand and adequacy of PWS sources within the municipal boundary to meet such water demand. If appropriate, the sale or purchase of water from PWS entities with service areas outside of the municipal boundary should also be identified. Municipal boundaries and land use are not primary determinants of water use.

Review PWS Utility Summaries Provided in Chapter 6

SFWMD worked with staff from PWS entities to identify water supply development projects for this plan update. Utility summaries were compiled using information from various sources, including input from PWS entities. These utility summaries are provided in **Chapter 6**. The utility summaries provide baseline information about finished water demands, existing permitted sources and allocations, and recently constructed and proposed projects that create water capacity, as well as other related information. Multiple sources of water supply may be needed to accommodate projected water demand. PWS entity staff should confirm the information provided in the utility summaries in this plan update. Subsequent to adoption of the plan update, PWS entities must respond within 12 months to SFWMD with their intentions to develop and implement the projects identified by this plan update, or provide a list of other projects or methods to meet water demands.

To be consistent with the regional water supply plan, the local government's work plan should be in general agreement with this plan update's utility summaries' water sources and schedule of water sources to be made available to meet projected water demands. However, it is not necessary to use the same population projections or per capita use rates used by the regional water supply plan to project water demand. Generally accepted professional planning methods and more recent sources of data may be used as input to the local planning process. This may result in differences between the population and demand estimates provided in this plan update's utility summaries. In such cases, the work plan should identify and explain the basis for any differences.

Furthermore, consistency between a work plan and regional water supply plan does not require the same planning periods. The minimum planning period for regional water supply plans is 20 years (referred to as the twenty-year planning horizon). However, a minimum ten-year planning period is required for local government work plans (Subsection 163.3177(6)(c)3, Florida Statutes [F.S.]) and a twenty-year planning period is preferred.

Additional information about developing a work plan including guidelines is available on the Florida Department of Economic Opportunity website at the following link: http://www.floridajobs.org/community-planning-and-development/programs/technical-assistance/planning-initiatives/natural-resource-planning/water-supply-planning.

Checklist of Key Considerations

Water Supply Demand Projections

- Review this plan update and revise the local government's adopted work plan to be consistent with the water demand estimates and population projections cited in this plan update. The objective is to provide the best available data. If the local government can provide data that improves the information in this plan, then the local government data should be used in the work plan. All differences in water demand estimates and population projections used in the work plan should be identified and explained.
    - Plan for both gross and net water supply demands within the city or county jurisdiction for each supplier.
    - The projections should cover at least a ten-year planning period, but projections for the entire established local government comprehensive plan's planning period are preferred.
    - The projections should plan for the building of all public, private, and regional water supply facilities and bulk sales of water that will be necessary to provide water supply service within the local government's jurisdiction.

Water Source Identification

- Review the water supply sources identified by the local government or its water suppliers as necessary to meet and achieve the existing and projected water use demand for the established planning period.
    - Compare this information with the available sources in this plan update.
- Provide separate projections for existing and future DSS.
    - Identify the general areas served by DSS.

Water Supply Project Identification

- Either incorporate water supply project(s) selected by the local government's utility or utilities providing PWS to the local government, as identified in the regional water supply plan, or propose alternatives for inclusion in the work plan.
    - All other public and private water supply capital improvements, including wells, treatment plants, distribution systems, etc., necessary to maintain level-of-service standards within the jurisdiction should also be included in the work plan.
- Coordinate the work plan water supply projects with this plan update and the water supplier(s) annual progress reports.
    - Update the work plan accordingly.

- Identify sufficient water conservation, reclaimed water, and water supply projects necessary to meet projected demands.
- Update the capital improvements element as required.

Water Supply Intergovernmental Coordination

- The work plan should address ongoing and future coordination with existing and future water supply and reclaimed water providers for meeting future demands. This should occur before, during, and after the water supply plan update process.
- Review existing and future utility service areas for each provider within the jurisdiction. Refer to the maps provided in this appendix. Compare and update the work plan as needed.
    - Identify existing or potential service area conflicts and solutions. Include a conflict resolution policy.
    - Ensure all areas of the local government are accounted for by the local government's own utility or other providers.
- Review and update the work plan language concerning needed coordination with water supplier(s), other local governments and entities, and others.
    - Include updates to agreements (e.g., bulk service agreements and interconnect agreements).

Related Comprehensive Plan Amendments

- If additional revisions are needed for coordination with this plan update, but are not listed here, incorporate changes into the comprehensive plan and work plan, as appropriate.
- This plan update will require changes to the work plan and possibly other elements within the comprehensive plan. Revisions may include population projections, established planning period, existing and future water resource projects, intergovernmental coordination activities, conservation and reclaimed water measures, and the capital improvements element.
    - Review the comprehensive plan for consistency between all elements of the work plan and other comprehensive plan elements in consideration of all proposed modifications to the comprehensive plan. Other comprehensive plan elements include, but may not be limited to, future land use, potable water, sanitary sewer, conservation, intergovernmental coordination, and capital improvements.

B. Evaluation and Appraisal of Comprehensive Plans Paragraphs 163.3191(1) – (3), F.S.

(Evaluation of the comprehensive plan after the adoption of a work plan.)

Water Supply Project Identification and Selection

At least every seven years, local governments must evaluate whether the need exists to amend their comprehensive plan since the last comprehensive plan update. The evaluation should address changes in state requirements since the last comprehensive plan update.

While an evaluation and appraisal report is not required, local governments are encouraged to comprehensively evaluate, and as necessary, update comprehensive plans to reflect changes in local conditions. The evaluation could address the issues below related to their work plans.

- Identify the extent to which the local government has been successful in identifying water supply projects, including water conservation and reclaimed water, necessary to meet projected demands.
- Evaluate the degree to which the work plan has been implemented for building all public, private, and regional water supply facilities within the jurisdiction necessary to meet projected demands.
- Include recommendations for revising the work plan and the applicable comprehensive plan elements to address the conclusions of the evaluation, as necessary.

C. Plan Amendments (Future Land Use Change)

Water Supply Demand Projections

- Address both gross (raw) and finished (i.e., after any losses due to water treatment) water supply needs for both potable and nonpotable (i.e., irrigation) demands, using professionally acceptable methodologies for population projections and per use capita rates.
- Address existing and future water conservation and reclaimed water commitments, and levels of service (i.e., per capita use rates), for both the proposed future land use change and the comprehensive plan.
- Address both the build-out time frame for a proposed future land use change, and the established planning time frame for the comprehensive plan.

Water Source Identification

- For existing demands, reflect water source(s) from supplier's water use permit.
- For future demands covered by a supplier's commitment to provide service under remaining available capacity of an existing water use permit, reflect the source(s) from the supplier's water use permit, including bulk supply contracted quantities, duration, and provider.
- For future demands not covered by an existing water use permit, provide sufficient planning-level data and analysis to demonstrate the availability of a sustainable water source as identified in this plan update.

Availability of Water Supply and Public Facilities

- Demonstrate an availability of gross water supply from the proposed source(s) of gross demand for the future land use change, given all other approved land use commitments within the local government's jurisdiction over both the proposed amendment's build-out and the established planning period of the comprehensive plan (see Subsections 163.3167(9) and 163.3177(6)(a), F.S.).
- Demonstrate an availability of both treatment facility capacity and permitted, available, finished water supply for the future land use change, given all other commitments for that capacity and supply over the proposed build-out period.
- If the availability of either water supply and/or public facilities is not currently demonstrable, then either phasing of the future land use (see Subsections 163.3177(6)(h)1, F.S.) and/or the appropriate amendments to the capital improvements element/potable water sub-element is required to ensure the necessary capital planning and timely availability of the needed infrastructure and water supply (see Subsections 163.3177(3)(a), 163.3177(6)(c), and 163.3177(6)(h)3.b., F.S.).
- If the water provider is an entity other than the local government responsible for the comprehensive plan amendment, then demonstrate that coordination of the plan amendment occurred between the water provider and the local government (see Subsection 163.3177(6)(h)3.b., F.S.).

Related Comprehensive Plan Amendments

- A future land use change may also require amendments to other specific elements within the comprehensive plan if it requires an adjustment to either the plan's future population or demand projections, the comprehensive plan's established planning period, the water supply sources, or water providers required to be addressed in the comprehensive plan (see Subsections 163.3167(9), 163.3177(4)(a), 163.3177(5)(a), 163.3177(6)(a), 163.3177(6)(c), and 163.3177(6)(d), F.S., and Section 163.3180, F.S.).

2. CITED FLORIDA STATUTE PROVISIONS (RELEVANT PORTIONS ONLY)

163.3167(9): Each local government shall address in its comprehensive plan, as enumerated in this chapter, the water supply sources necessary to meet and achieve the existing and projected water use demand for the established planning period, considering the applicable plan developed pursuant to s. 373.709.

163.3177(3)(a): The comprehensive plan shall contain a capital improvements element designed to consider the need for and the location of public facilities in order to encourage the efficient use of such facilities and set forth:

1. A component that outlines principles for construction, extension, or increase in capacity of public facilities, as well as a component that outlines principles for correcting existing public facility deficiencies, which are necessary to implement the comprehensive plan. The components shall cover at least a 5-year period.
2. Estimated public facility costs, including a delineation of when facilities will be needed, the general location of the facilities, and projected revenue sources to fund the facilities.
3. Standards to ensure the availability of public facilities and the adequacy of those facilities including acceptable levels of service.
4. A schedule of capital improvements which includes any publicly funded project of federal, state or local government, and which may include privately funded projects for which the local government has no fiscal responsibility. Projects necessary to ensure that any adopted level-of-service standards are achieved and maintained for the 5-year period must be identified as either funded or unfunded and given a level of priority for funding.

163.3177(4)(a): Coordination of the local comprehensive plan with the comprehensive plans of adjacent municipalities, the county, adjacent counties, or the region; with the appropriate water management district's regional water supply plans approved pursuant to s. 373.709; and with adopted rules pertaining to designated areas of critical state concern shall be a major objective of the local comprehensive planning process. To that end, in the preparation of a comprehensive plan or element thereof, and in the comprehensive plan or element as adopted, the governing body shall include a specific policy statement indicating the relationship of the proposed development of the area to the comprehensive plans of adjacent municipalities, the county, adjacent counties, or the region, as the case may require and as such adopted plans or plans in preparation may exist.

163.3177(5)(a): Each local government comprehensive plan must include at least two planning periods, one covering at least the first 5-year period occurring after the plan's adoption and one covering at least a 10-year period. Additional planning periods for specific components, elements, land use amendments, or projects shall be permissible and accepted as part of the planning process.

163.3177(6)(a): A future land use plan element designating proposed future general distribution, location, and extent of the uses of land for residential uses, commercial uses, industry, agriculture, recreation, conservation, education public facilities, and other categories of the public and private uses of land. The approximate acreage and the general range of density or intensity of use shall be provided for the gross land area included in each existing land use category. The element shall establish the long-term end toward which land use programs and activities are ultimately directed.

163.3177(6)(a)2.: The future land use plan and plan amendments shall be based upon surveys, studies, and data regarding the area, as applicable including:

a. The amount of land required to accommodate anticipated growth.

b. The projected permanent and seasonal population of the area.

c. The character of undeveloped land.

d. The availability of water supplies, public facilities, and services.

e. The need for redevelopment, including the renewal of blighted areas and the elimination of nonconforming uses which are inconsistent with the character of the community.

163.3177(6)(c): A general sanitary sewer, solid waste, drainage, potable water, and natural groundwater aquifer recharge element correlated to principles and guidelines for future land use, indicating ways to provide for future potable water, drainage, sanitary sewer, solid waste, and aquifer recharge protection requirements for the area. The element may be a detailed engineering plan including a topographic map depicting areas of prime groundwater recharge.

1. Each local government shall address in the data and analyses required by this section those facilities that provide service within the local government's jurisdiction. Local governments that provide facilities to serve areas within other local government jurisdictions shall also address those facilities in the data and analyses required by this section, using data from the comprehensive plan for those areas for the purpose of projecting facility needs as required in this subsection. For shared facilities, each local government shall indicate the proportional capacity of the systems allocated to serve its jurisdiction.

2. The element shall describe the problems and needs and the general facilities that will be required for solution of the problems and needs including correcting existing facility deficiencies. The element shall address coordinating the extension of, or increase in the capacity of,

facilities to meet future needs while maximizing the use of existing facilities and discouraging urban sprawl; conserving potable water resources; and protecting the functions of natural groundwater recharge areas and natural drainage features.

3. Within 18 months after the governing board approves an updated regional water supply plan, the element must incorporate the alternative water supply project or projects selected by the local government from those identified in the regional water supply plan pursuant to s. 373.709(2)(a) or proposed by the local government under s. 373.709(8)(b). If a local government is located within two water management districts, the local government shall adopt its comprehensive plan amendment within 18 months after the later updated regional water supply plan. The element must identify such alternative water supply projects and traditional water supply projects and conservation and reuse necessary to meet the water needs identified in s. 373.709(2)(a) within the local government's jurisdiction and include a work plan, covering at least a 10-year planning period, for building public, private, and regional water supply facilities, including development of alternative water supplies, which are identified in the element as necessary to serve existing and new development. The work plan shall be updated, at a minimum, every five years within 18 months after the governing board of a water management district approves an updated regional water supply plan. Local governments, public and private utilities, regional water supply authorities, special districts, and water management districts are encouraged to cooperatively plan for the development of multijurisdictional water supply facilities that are sufficient to meet projected demands for established planning periods, including the development of alternative water sources to supplement traditional sources of groundwater and surface water supplies.

163.3177(6)(d): A conservation element for the conservation, use, and protection of natural resources in the area, including air, water, water recharge areas, wetlands, water wells, estuarine marshes, soils, beaches, shores, flood plains, rivers, bays, lakes, harbors, forests, fisheries and wildlife, marine habitat, minerals, and other natural and environmental resources, including factors that affect energy conservation.

1. The following natural resources, where present within the local government’s boundaries, shall be identified and analyzed and existing recreational or conservation uses, known pollution problems, including hazardous wastes, and the potential for conservation, recreation, use, or protection shall also be identified:

    a. Rivers, bays, lakes, wetlands including estuarine marshes, groundwaters, and springs, including information on quality of the resource available.

    b. Floodplains.

2. The element must contain principles, guidelines, and standards for conservation that provide long-term goals and which:

    b. Conserves, appropriately uses, and protects the quality and quantity of current and projected water sources and waters that flow into estuarine waters or oceanic waters and protect from activities and land uses known to affect adversely the quality and quantity of identified water sources, including natural groundwater recharge areas, wellhead protection areas, and surface waters used as a source of public water supply.

    c. Provides for the emergency conservation of water sources in accordance with the plans of the regional water management district.

3. Current and projected needs and sources for at least a 10-year period based on the demands for industrial, agricultural, and potable water use and the quality and quantity of water available to meet these demands shall be analyzed. The analysis shall consider the existing levels of water conservation, use, and protection and applicable policies of the regional water management district and further must consider the appropriate regional water supply plan approved pursuant to s. 373.709, or, in the absence of an approved regional water supply plan, the district water management plan approved pursuant to s. 373.036(2). This information shall be submitted to the appropriate agencies…

163.3177(6)(h)1.: An intergovernmental coordination element showing relationships and stating principles and guidelines to be used in coordinating the adopted comprehensive plan with the plans of school boards, regional water supply authorities, and other units of local government providing services but not having regulatory authority over the use of land, with the comprehensive plans of adjacent municipalities, the county, adjacent counties, or the region, with the state comprehensive plan and with the applicable regional water supply plan approved pursuant to s. 373.709, as the case may require and as such adopted plans or plans in preparation may exist…

a. The intergovernmental coordination element must provide procedures for identifying and implementing joint planning areas, especially for the purpose of annexation, municipal incorporation, and joint infrastructure service areas.

163.3177(6)(h)3.b.: Ensure coordination in establishing level of service standards for public facilities with any state, regional, or local entity having operational and maintenance responsibility for such facilities.

163.3180: Concurrency.—

163.3180(1)(a): Sanitary sewer, solid waste, drainage, and potable water are the only public facilities and services subject to the concurrency requirement on a statewide basis…

163.3180(1)(b): The local government comprehensive plan must demonstrate, for required or optional concurrency requirements, that the levels of service adopted can be reasonably met. Infrastructure needed to ensure that adopted level-of-service standards are achieved and maintained for the 5-year period of the capital improvement schedule must be identified pursuant to the requirements of s. 163.3177(3). The comprehensive plan must include principles, guidelines, standards, and strategies for the establishment of a concurrency management system.

163.3180(2): Consistent with public health and safety, sanitary sewer, solid waste, drainage, adequate water supplies, and potable water facilities shall be in place and available to serve new development no later than the issuance by the local government of a certificate of occupancy or its functional equivalent. Prior to approval of a building permit or its functional equivalent, the local government shall consult with the applicable water supplier to determine whether adequate water supplies to serve the new development will be available no later than the anticipated date of issuance by the local government of a certificate of occupancy or its functional equivalent…

163.3180(3): Governmental entities that are not responsible for providing, financing, operating, or regulating public facilities needed to serve development may not establish binding level-of-service standards on governmental entities that do bear those responsibilities.

163.3191: **Evaluation and appraisal of comprehensive plan.—**

163.3191(1): At least once every 7 years, each local government shall evaluate its comprehensive plan to determine if plan amendments are necessary to reflect changes in state requirements in this part since the last update of the comprehensive plan, and notify the state land planning agency as to its determination.

163.3191(2): If the local government determines amendments to its comprehensive plan are necessary to reflect changes in state requirements, the local government shall prepare and transmit within 1 year such plan amendment or amendments for review pursuant to s. 163.3184.

163.3191(3): Local governments are encouraged to comprehensively evaluate and, as necessary, update comprehensive plans to reflect changes in local conditions.

3. UTILITIES AND JURISDICTIONS SERVED

This section contains two tables showing local government jurisdictions and utilities that provide gross (raw) or finished water to local governments. The utilities listed have treatment capacity and water use greater than 0.1 MGD.

Table E-1 identifies the local governments within the jurisdiction of the LEC Planning Area and the PWS utilities or entities serving those local governments. The first column in **Table E-1** lists the name of the local government. The second column identifies the local government, private PWS utility, or utilities providing raw or finished water to the local government.

Table E-1. Utilities and local governments serving local governments in the LEC Planning Area.

Local Government	Utility/Entity Serving Local Government
Palm Beach County	
Palm Beach County (unincorporated)	Palm Beach County Water Utilities Department, City of Boynton Beach, Village of Golf, Town of Jupiter, Maralago Cay, Village of Palm Springs, Seacoast Utility Authority, Seminole Improvement District, Tropical Breeze Estates, and Village of Wellington
Atlantis, City of	Palm Beach County Water Utilities Department
Belle Glade, City of	Glades Utility Authority [a]
Boca Raton, City of	City of Boca Raton
Boynton Beach, City of	City of Boynton Beach and Palm Beach County Water Utilities Department
Briny Breezes, Town of	City of Boynton Beach
Cloud Lake, Town of	Palm Beach County Water Utilities Department
Delray Beach, City of	City of Delray Beach
Glen Ridge, Town of	Palm Beach County Water Utilities Department
Golf, Village of	Village of Golf
Greenacres, City of	Palm Beach County Water Utilities Department
Gulf Stream, Town of	City of Delray Beach
Haverhill, Town of	Palm Beach County Water Utilities Department
Highland Beach, Town of	Town of Highland Beach
Hypoluxo, Town of	City of Boynton Beach and Town of Manalapan
Juno Beach, Town of	Town of Jupiter and Seacoast Utility Authority
Jupiter, Town of	Town of Jupiter
Jupiter Inlet Colony, Town of	Village of Tequesta
Lake Clarke Shores, Town of	Palm Beach County Water Utilities Department, Town of Lake Worth, and Village of Palm Springs
Lake Park, Town of	Seacoast Utility Authority
Lake Worth, City of	City of Lake Worth and Palm Beach County Water Utilities Department
Lantana, Town of	Town of Lantana
Loxahatchee Groves, Town of	Unincorporated Palm Beach County
Manalapan, Town of	Town of Manalapan
Mangonia Park, Town of	Town of Mangonia Park
North Palm Beach, Village of	Seacoast Utility Authority
Ocean Ridge, Town of	City of Boynton Beach
Pahokee, City of	Glades Utility Authority [a]

a. Glades Utility Authority was absorbed into the Palm Beach County Water Utility Department effective May 2013.

Table E-1. Continued.

Local Government	Utility/Entity Serving Local Government
Palm Beach, Town of	City of West Palm Beach Public Utilities
Palm Beach Gardens, City of	Seacoast Utility Authority
Palm Beach Shores, Town of	City of Riviera Beach
Palm Springs, Village of	Village of Palm Springs
Riviera Beach, City of	City of Riviera Beach
Royal Palm Beach, Village of	Palm Beach County Water Utilities Department and Wellington Public Utilities Department
South Bay, City of	Glades Utility Authority [a]
South Palm Beach, Town of	City of West Palm Beach Public Utilities
Tequesta, Village of	Village of Tequesta
Wellington, Village of	Village of Wellington and Palm Beach County Water Utilities Department
West Palm Beach, City of	City of West Palm Beach Public Utilities and Palm Beach County Water Utilities Department
Broward County	
Broward County (unincorporated)	Broward County Water & Wastewater Services, City of Hollywood, and Sunrise Utilities Department
Coconut Creek, City of	Broward County Water & Wastewater Services and City of Margate
Cooper City, City of	Cooper City Utilities Department
Coral Springs, City of	City of Coral Springs, Coral Springs Improvement District, North Springs Improvement District, and Royal Utility Corporation
Dania Beach, City of	City of Dania Beach, City of Hollywood, and Broward County Water & Wastewater Services
Davie, Town of	City of Hollywood, Town of Davie, City of Fort Lauderdale, Sunrise Utilities Department, Tindell Hammock, and Broward County Water & Wastewater Services
Deerfield Beach, City of	City of Deerfield Beach and Broward County Water & Wastewater Services
Fort Lauderdale, City of	City of Fort Lauderdale
Hallandale Beach, City of	City of Hallandale Beach and Broward County Water & Wastewater Services
Hillsboro Beach, Town of	Town of Hillsboro Beach
Hollywood, City of	City of Fort Lauderdale, City of Hollywood, and Broward County Water & Wastewater Services
Lauderdale-by-the-Sea, Town of	City of Fort Lauderdale and City of Pompano Beach Utilities Department
Lauderdale Lakes, City of	Broward County Water & Wastewater Services
Lauderhill, City of	City of Lauderhill
Lazy Lake, Village of	City of Fort Lauderdale
Lighthouse Point, City of	City of Pompano Beach Utilities Department and Broward County Water & Wastewater Services
Margate, City of	City of Margate
Miramar, City of	City of Miramar
North Lauderdale, City of	City of North Lauderdale and Broward County Water & Wastewater Services
Oakland Park, City of	City of Fort Lauderdale and Broward County Water & Wastewater Services
Parkland, City of	Parkland Utilities, Inc., North Springs Improvement District, and Broward County Water & Wastewater Services
Pembroke Park, Town of	Broward County Water & Wastewater Services
Pembroke Pines, City of	City of Pembroke Pines and Broward County Water & Wastewater Services
Plantation, City of	City of Plantation
Pompano Beach, City of	City of Pompano Beach Utilities Department and Broward County Water & Wastewater Services
Sea Ranch Lakes, Village of	City of Fort Lauderdale
Seminole Tribe of Florida	Seminole Hollywood Reservation
Southwest Ranches, Town of	City of Pembroke Pines and Sunrise Utilities Department
Sunrise, City of	Sunrise Utilities Department

a. Glades Utility Authority was absorbed into the Palm Beach County Water Utility Department effective April 2013.

Table E-1. Continued.

Local Government	Utility/Entity Serving Local Government
Tamarac, City of	City of Tamarac, City of Fort Lauderdale, and Broward County Water & Wastewater Services
Weston, City of	Sunrise Utilities Department
West Park, City of	Broward County Water & Wastewater Services
Wilton Manors, City of	City of Fort Lauderdale
Miami-Dade County	
Miami-Dade County (unincorporated)	City of Homestead, City of North Miami Beach, City of North Miami, and Miami-Dade Water & Sewer Department
Aventura, City of	City of North Miami Beach and Miami-Dade Water & Sewer Department
Bal Harbour Village, City of	Miami-Dade Water & Sewer Department
Bay Harbor Islands, Town of	Miami-Dade Water & Sewer Department
Biscayne Park, Village of	City of North Miami
Coral Gables, City of	Miami-Dade Water & Sewer Department
Cutler Bay, Town of	Miami-Dade Water & Sewer Department
Doral, City of	Miami-Dade Water & Sewer Department
El Portal, Village of	Miami-Dade Water & Sewer Department
Florida City, City of	Florida City Water and Sewer Department and City of Homestead
Golden Beach, Town of	City of North Miami Beach
Hialeah, City of	Miami-Dade Water & Sewer Department
Hialeah Gardens, City of	Miami-Dade Water & Sewer Department
Homestead, City of	City of Homestead and Miami-Dade Water & Sewer Department
Indian Creek, Village of	Miami-Dade Water & Sewer Department
Key Biscayne, Village of	Miami-Dade Water & Sewer Department
Medley, Town of	Miami-Dade Water & Sewer Department
Miami, City of	Miami-Dade Water & Sewer Department
Miami Beach, City of	Miami-Dade Water & Sewer Department
Miami Gardens, City of	City of North Miami Beach and Miami-Dade Water & Sewer Department
Miami Lakes, Town of	Miami-Dade Water & Sewer Department
Miami Shores, Village of	City of North Miami and Miami-Dade Water & Sewer Department
Miami Springs, City of	Miami-Dade Water & Sewer Department
North Bay Village, City of	Miami-Dade Water & Sewer Department
North Miami, City of	City of North Miami and Miami-Dade Water & Sewer Department
North Miami Beach, City of	City of North Miami Beach
Opa-Locka, City of	Miami-Dade Water & Sewer Department
Palmetto Bay, Village of	Miami-Dade Water & Sewer Department
Pinecrest, Village of	Miami-Dade Water & Sewer Department
South Miami, City of	Miami-Dade Water & Sewer Department
Sunny Isles Beach, City of	City of North Miami Beach
Surfside, Town of	Miami-Dade Water & Sewer Department
Sweetwater, City of	Miami-Dade Water & Sewer Department
Virginia Gardens, Village of	Miami-Dade Water & Sewer Department
West Miami, City of	Miami-Dade Water & Sewer Department
Monroe County	
Monroe County (unincorporated)	Florida Keys Aqueduct Authority
Islamorada, Village of	Florida Keys Aqueduct Authority
Key Colony Beach, City of	Florida Keys Aqueduct Authority
Key West, City of	Florida Keys Aqueduct Authority
Layton, City of	Florida Keys Aqueduct Authority
Marathon, City of	Florida Keys Aqueduct Authority

Table E-2 identifies the utilities providing raw or finished water. The first column of **Table E-2** lists the name of the utility or entity. The second column identifies whether the utility is part of a special district such as 298, privately owned, or part of the local government. The third column identifies the incorporated and unincorporated areas of the LEC Planning Area served by the utility or entity. In addition to the PWS utilities that serve communities, the AG Holley State Hospital in the Town of Lantana in Palm Beach County has its own utility; however, the hospital closed in July 2012.

Table E-2. Utilities and local governments that serve the LEC Planning Area.

Utility/Entity Name	Utility Type	Local Governments Served (Raw or Finished)
Palm Beach County		
Boca Raton, City of	local government	City of Boca Raton and unincorporated Palm Beach County
Boynton Beach, City of	local government	City of Boynton Beach, Town of Briny Breezes, Town of Hypoluxo, Town of Ocean Ridge, and unincorporated Palm Beach County
Delray Beach, City of	local government	City of Delray Beach, Town of Gulf Stream, and unincorporated Palm Beach County
Glades Utility Authority [a]	local government	City of Belle Glade, City of Pahokee, and City of South Bay
Golf, Village of	local government	Village of Golf and unincorporated Palm Beach County
Highland Beach, Town of	local government	Town of Highland Beach
Jupiter, Town of	local government	Town of Jupiter, Town of Juno Beach, and unincorporated Martin [b] and Palm Beach counties
Lake Worth, City of	local government	City of Lake Worth, Town of Lake Clarke Shores, and unincorporated Palm Beach County
Lantana, Town of	local government	Town of Lantana
Manalapan, Town of	local government	Town of Manalapan and Town of Hypoluxo
Mangonia Park, Town of	local government	Town of Mangonia Park
Maralago Cay	privately owned	Unincorporated Palm Beach County
Palm Beach County Water Utilities Department	local government	City of Atlantis, City of Boynton Beach, Town of Cloud Lake, Town of Glen Ridge, City of Greenacres, Town of Haverhill, Town of Lake Clarke Shores, City of Lake Worth, Town of Loxahatchee Groves, Village of Palm Springs, City of Parkland, Village of Royal Palm Beach, Seminole Improvement District, Village of Wellington, City of West Palm Beach, and unincorporated Palm Beach County
Palm Springs, Village of	local government	Village of Palm Springs, Town of Lake Clarke Shores, and unincorporated Palm Beach County
Riviera Beach, City of	local government	City of Riviera Beach and Town of Palm Beach Shores
Seacoast Utility Authority	special district	Town of Juno Beach, Town of Lake Park, Village of North Palm Beach, City of Palm Beach Gardens, and unincorporated Palm Beach County
Seminole Improvement District	special district	Unincorporated Palm Beach County
Tequesta, Village of	local government	Village of Tequesta and Town of Jupiter Inlet Colony
Tropical Breeze Estates	privately owned	Unincorporated Palm Beach County
Wellington, Village of	local government	Village of Royal Palm Beach, Village of Wellington, and unincorporated Palm Beach County
West Palm Beach Public Utilities, City of	local government	City of West Palm Beach, Town of Palm Beach, and Town of South Palm Beach

a. Glades Utility Authority was absorbed into the Palm Beach County Water Utility Department effective April 2013.

b. Unincorporated Martin County is outside of the LEC Planning Area.

Table E-2. Continued.

Utility/Entity Name	Utility Type	Local Governments Served (raw & finished)
Broward County		
Broward County Water and Wastewater Services	local government	City of Coconut Creek (Coconut Creek distributes to the City of Parkland and Seminole Tribe Coconut Creek Reservation), City of Dania Beach, Town of Davie, City of Deerfield Beach, City of Hallandale Beach, City of Hollywood, City of Lauderdale Lakes, City of Lighthouse Point, City of North Lauderdale, City of Oakland Park, City of Parkland, City of Pembroke Park, City of Pembroke Pines, City of Pompano Beach, City of Tamarac, City of West Park, and unincorporated Broward County
Cooper City Utilities Department	local government	City of Cooper City
Coral Springs, City of	local government	City of Coral Springs
Coral Springs Improvement District	special district	City of Coral Springs
Dania Beach, City of	local government	City of Dania Beach
Davie, Town of	local government	Town of Davie and Seminole Reservation (Hard Rock Casino)
Deerfield Beach, City of	local government	City of Deerfield Beach
Fort Lauderdale, City of	local government	Town of Davie, City of Fort Lauderdale, City of Hollywood, Town of Lauderdale-by-the-Sea, Village of Lazy Lake, City of Oakland Park, Village of Sea Ranch Lakes, City of Tamarac, and City of Wilton Manors
Hallandale Beach, City of	local government	City of Hallandale Beach
Hillsboro Beach, Town of	local government	Town of Hillsboro Beach
Hollywood, City of	local government	City of Hollywood, City of Dania Beach, Seminole Hollywood Reservation, City of West Park, and unincorporated Broward County
Lauderhill, City of	local government	City of Lauderhill
Margate, City of	local government	City of Margate and City of Coconut Creek
Miramar, City of	local government	City of Miramar
North Lauderdale, City of	local government	City of North Lauderdale
North Springs Improvement District	special district	City of Parkland and City of Coral Springs
Parkland Utilities, Inc.	privately owned	City of Parkland
Pembroke Pines, City of	local government	City of Pembroke Pines and Town of Southwest Ranches
Plantation, City of	local government	City of Plantation
Pompano Beach Utilities Department, City of	local government	City of Pompano Beach, City of Lighthouse Point, and Town of Lauderdale-By-The-Sea
Royal Utility Corporation	privately owned	City of Coral Springs
Seminole Tribe of Florida Utility	not applicable	Seminole Hollywood Reservation
Sunrise Utilities Department	local government	City of Sunrise, Town of Davie, Town of Southwest Ranches, City of Weston, and unincorporated Broward County
Tamarac, City of	local government	City of Tamarac
Tindall Hammock	special district	Town of Davie
Miami-Dade County		
Americana Village	privately owned	Unincorporated Miami-Dade County
Florida City Water & Sewer Department	local government	City of Florida City
Homestead, City of	local government	City of Florida City, City of Homestead, and unincorporated Miami-Dade County

Table E-2. Continued.

Utility/Entity Name	Utility Type	Local Governments Served (raw & finished)
Miami-Dade Water and Sewer Department	local government	City of Aventura, Village of Bal Harbour, Town of Bay Harbour Islands, City of Coral Gables, Town of Cutler Bay, City of Doral, Village of El Portal, City of Hialeah Gardens, City of Hialeah, City of Homestead, Village of Indian Creek, Village of Key Biscayne, Town of Medley, City of Miami Beach, City of Miami Gardens, Town of Miami Lakes, Village of Miami Shores, City of Miami, City of Miami Springs, City of North Bay Village, City of North Miami, City of Opa-Locka, Village of Palmetto Bay, Village of Pinecrest, City of South Miami, Town of Surfside, City of Sweetwater, Village of Virginia Gardens, City of West Miami, and unincorporated Miami-Dade County
North Miami, City of	local government	City of North Miami, Village of Biscayne Park, Village of Miami Shores, and unincorporated Miami-Dade County
North Miami Beach, City of	local government	City of North Miami Beach, City of Aventura, Town of Golden Beach, City of Miami Gardens, City of Sunny Isles Beach, and unincorporated Miami-Dade County
Monroe County		
Florida Keys Aqueduct Authority	special district	Village of Islamorada, City of Key Colony Beach, City of Key West, City of Layton, City of Marathon, and unincorporated Monroe County

4. MAPS OF UTILITY AREAS CURRENTLY SERVED (2010) AND FUTURE UTILITY AREA SERVICE (2030)

Figure E-1 is a map of the 2010 utility service areas in Palm Beach County. **Figure E-2** is a map of the projected 2030 utility service area maps in Palm Beach County. **Figures E-3** and **E-4** provide this same information for Broward County and **Figures E-5** and **E-6** provide this information for Miami-Dade County. The portion of Monroe County within the LEC Planning Area has only one PWS utility, Florida Keys Aqueduct Authority; therefore, no service area map is provided. The portion of Hendry County within the LEC Planning Area is not served by any PWS utility.

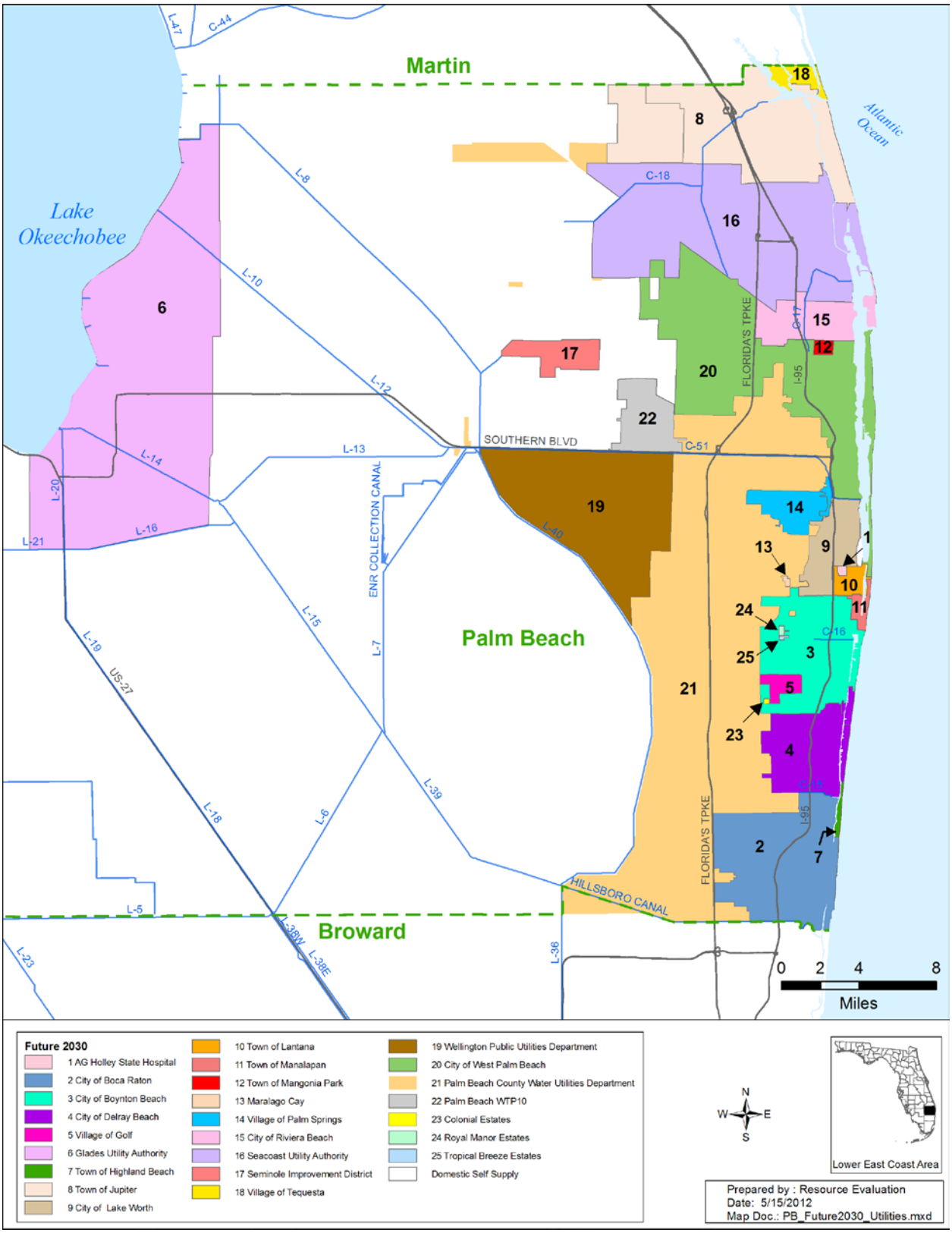

Figure E-1. 2010 utility service areas in Palm Beach County.

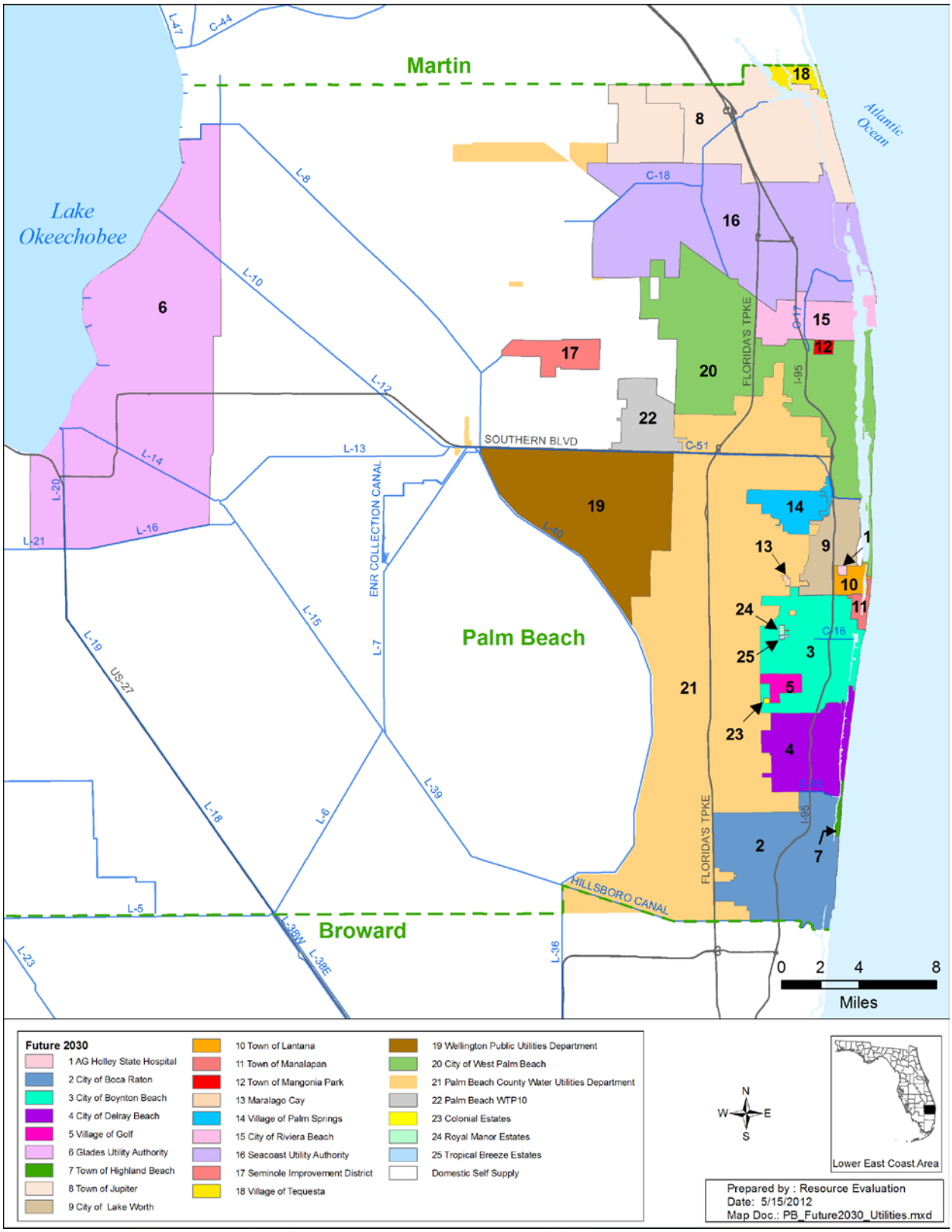

Figure E-2. Projected 2030 utility service areas in Palm Beach County.

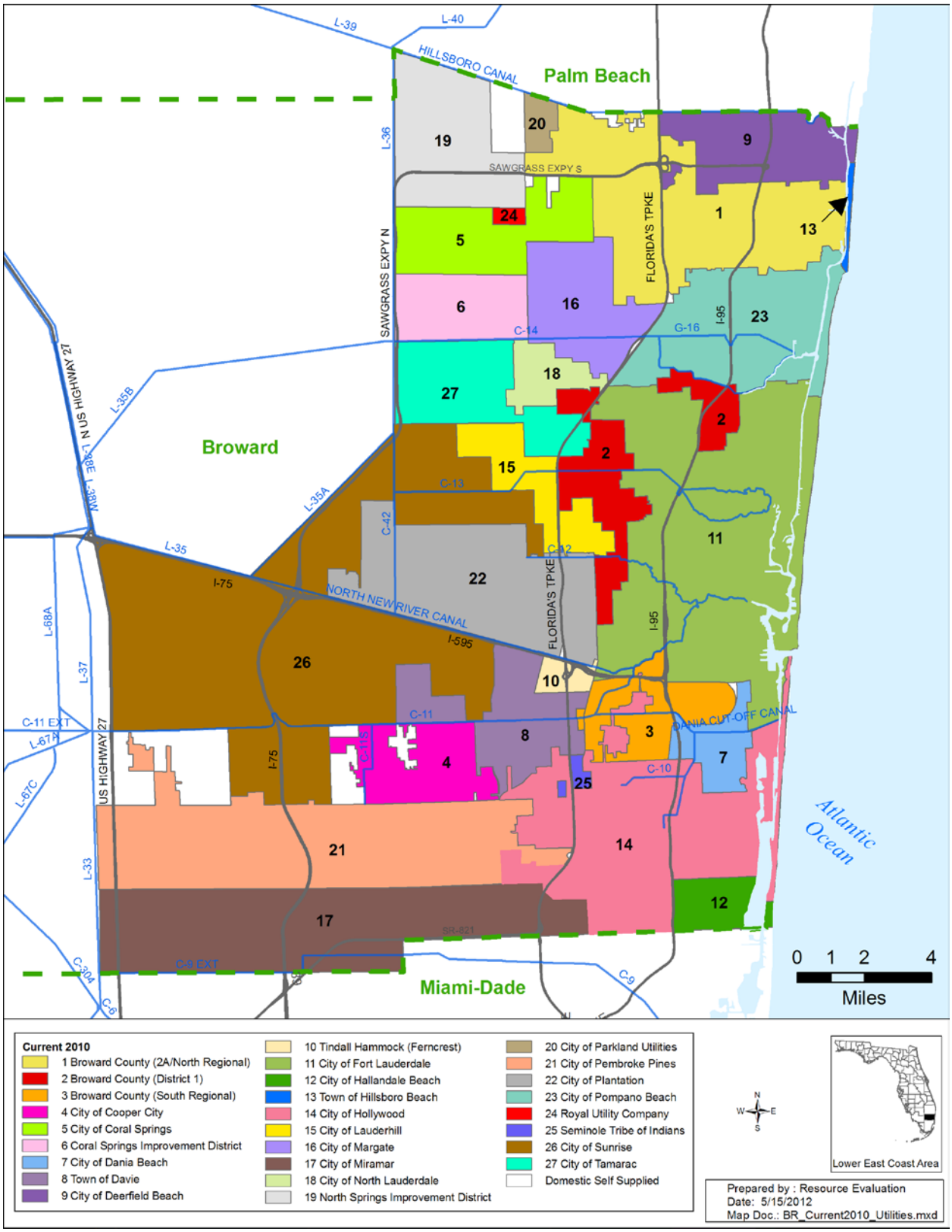

Figure E-3. 2010 utility service areas in Broward County.

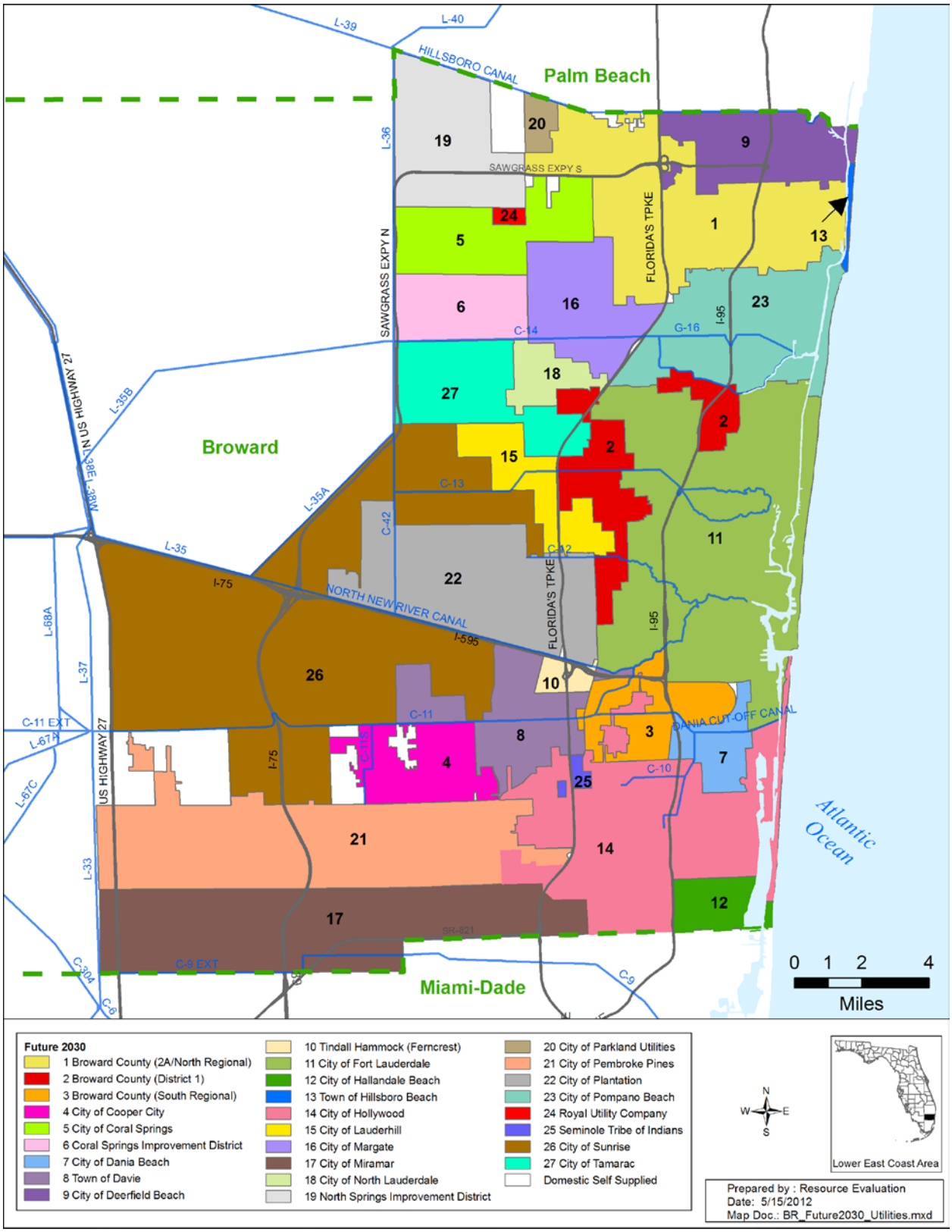

Figure E-4. Projected 2030 utility service areas in Broward County.

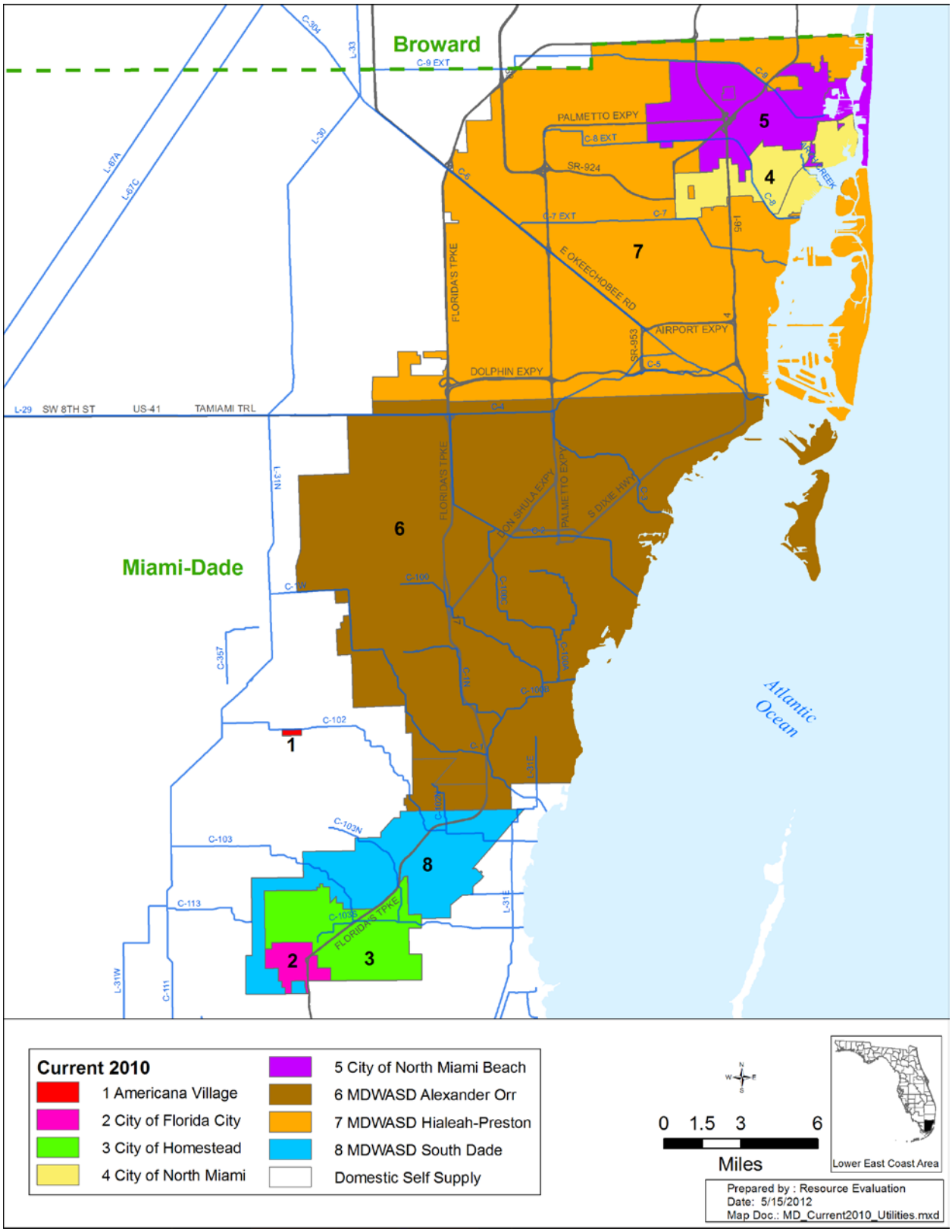

Figure E-5. 2010 utility service areas in Miami-Dade County.

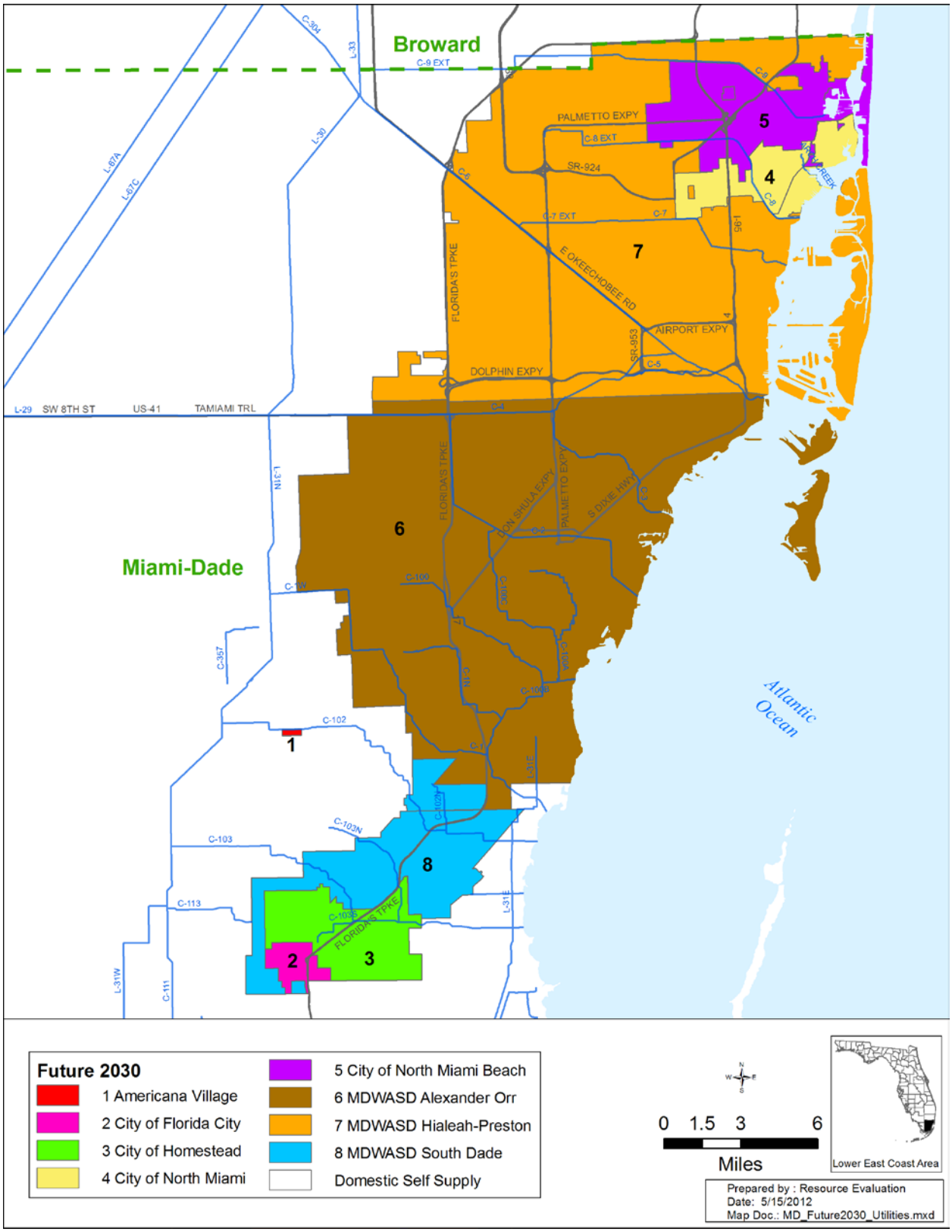

Figure E-6. Projected 2030 utility service areas in Miami-Dade County.

F

Water Supply Development Projects

This plan update promotes the diversification of sources for the water supply projects need223ed to meet future demands. Projects proposed for inclusion in this update were evaluated based on the level of detail provided by the utilities (i.e., project scope, cost, and schedule), and whether the project is expected to contribute to new water supply, resulting in a potentially permittable increase in their allocations or a treatment system's rated capacity.

Summary tables of all water supply development projects that are proposed to be complete by 2030 for the Lower East Coast Planning Area are provided in this appendix. Projects with a freshwater source are shown in **Table F-1**. Proposed projects supplied from a brackish water source are provided in **Table F-2**. Stormwater and surface water capture projects are shown in **Table F-3**. Reclaimed water projects are shown in **Table F-4**. Conservation projects are shown in **Table F-5**. A summary of all water supply development projects that provide new capacity to treat potable and nonpotable water by source is shown in **Table F-6**. A summary of all proposed potable, nonpotable, and conservation projects is shown in **Table F-7**.

A project identified for inclusion in this plan update may not necessarily be selected for development by the utility. In accordance with Section 373.709(6), Florida Statutes, nothing contained in the water supply component of a regional water supply plan should be construed to require local governments, public or privately owned utilities, special districts, self-suppliers, multi-jurisdictional entities, and other water suppliers to select that identified project. If the projects identified in this plan update are not selected by an utility, the utility will need to identify another method to meet its needs and advise the South Florida Water Management District of the alternative projects(s), and a local government will need to include such information in its water supply facilities work plan.

One reason a project may not be selected for implementation is need. Several utilities have proposed projects that exceed the projected demands for 2030 (see **Chapter 6**). As happened with the previous plan update, utilities may replace or eliminate projects that are not needed, or defer projects beyond the twenty-year planning horizon of this update.

Table F-1. Proposed water supply development projects utilizing a freshwater source. [a]

County	Utility/Entity	Project Count	Project	Completion Date	Total Capital Costs ($M)	Cumulative Treatment Capacity (MGD)	
						2020	2030
Palm Beach	Palm Beach County Water Utilities Department	1.	WTP 2 Expansion	2025	$15.00	0.00	8.50
	Wellington Public Utilities Department	2.	WTP Low Pressure RO Expansion – Phase 1 and 2 (efficiency improvements)	2025	$0.80	0.50	1.40
				Totals	**$15.80**	**0.50**	**9.90**

a. Key to abbreviations: $M – millions of dollars; MGD – million gallons per day; RO – reverse osmosis; WTP – Water Treatment Plant

Table F-2. Proposed water supply development projects utilizing a brackish water source. [a]

County	Utility/Entity	Project Count	Project	Completion Date	Total Capital Costs ($M)	Cumulative Treatment Capacity (MGD)	
						2020	2030
Broward	Broward County Water & Wastewater Services	1.	District 1A Treatment Plant Expansion (RO WTP, Floridan wells, and a disposal well)	2017	$41.10	1.50	2.50
	Davie, Town of	2.	RO Addition to WTP	2030	$16.00	0.00	6.00
	Fort Lauderdale, City of	3.	Dixie Floridan Water Supply/WTP	2030	$22.90	0.00	6.00
	Hollywood, City of	4.	RO Expansion (one train and two Floridan wells)	2027	$7.10	0.00	2.00
	Lauderhill, City of	5.	Floridan Well and RO WTP Phase I (disposal well and RO WTP)	2017	$27.50	1.00	1.00
		6.	Floridan Well and RO WTP Phase 2 (expansion of RO WTP)	2018	$5.50	0.00	2.00
	Tamarac, City of	7.	RO WTP	2022	$19.00	0.00	2.00
Miami-Dade	Miami-Dade Water & Sewer Department	8.	South Miami Heights RO WTP	2015	$194.70	20.00	20.00
		9.	Hialeah Floridan Aquifer RO WTP Phase 2 and 3 (including concentrate disposal)	2026	$37.80	0.00	7.50
	North Miami Beach, City of	10.	Floridan Wells, Lines, Mains, and RO WTP Phases 2 and 3	planned	$8.21	12.50	12.50
		11.	Floridan Wells, Lines, Mains, and RO WTP Phase 4	planned	$37.50	0.00	5.00
				Totals	**$417.31**	**35.00**	**66.50**

a. Key to abbreviations: $M – millions of dollars; MGD – million gallons per day; RO – reverse osmosis; WTP – water treatment plant.

Table F-3. Proposed stormwater and surface water capture projects. [a]

County	Utility/Entity	Project Count	Project	Water Source Type	Completion Date	Total Capital Costs ($M)	Cumulative Project Capacity (MGD)	
							2020	2030
Palm Beach	West Palm Beach Public Utilities, City of	1.	ASR Well Reactivation at Clear Lake	surface water	2013	$10.00	8.00	8.00
		2.	C-17 Pump Station	stormwater	2020	$2.50	8.00	8.00
Miami-Dade	Florida City Water and Sewer Department, City of	3.	Stormwater Reuse Program	stormwater	planned	$13.50	0.35	0.35
		4.	Friedland Manor Stormwater for Indirect Potable Use	stormwater	planned	$30.30	0.65	0.65
					Totals	**$56.30**	**17.00**	**17.00**

a. Key to abbreviations: ASR – aquifer storage and recovery; $M – millions of dollars; MGD – million gallons per day.

Table F-4. Reclaimed water development projects. [a]

County	Utility/Entity	Project Count	Project	Completion Date	Total Capital Costs ($M)		Cumulative Distribution Capacity [b] (MGD)		Cumulative Treatment Capacity (MGD)	
					Distribution Project	Treatment Project	2020	2030	2020	2030
Palm Beach	Boca Raton, City of	1.	Recycling of Membrane Concentrate for Reuse Water	2013	$2.00	-	4.25	4.25	-	-
	Boynton Beach, City of	2.	Reclaimed Water Transmission Phase 2 (US 1 Corridor & Cypress Creek)	2014	$2.00	-	1.00	1.00	-	-
		3.	Leisureville Golf Course	2014	$2.00	-	0.65	0.65	-	-
		4.	Seacrest Boulevard Water Line	2013	$0.26	-	0.10	0.10	-	-
	Delray Beach Water & Sewer Department, City of	5.	Reclaimed Water (Area 12A Phase 1 – Barrier Island South, Atlantic Avenue to Casuarina Road, and Gleason Street trunk line)	2013	$1.70	-	0.25	0.25	-	-
		6.	Reclaimed Water (Area 12A Phase 2 and Area 12B Barrier Island South)	2014	$1.20	-	0.25	0.25	-	-
	Palm Beach County Water Utilities Department	7.	Morikami Reclaimed Pump Station	2013	$0.05	-	2.00	2.00	-	-
	Seacoast Utility Authority	8.	Nanofiltration Concentrate Blending for Reuse Water	2013	-	$4.50	-	-	3.00	3.00
	Wellington Public Utilities Department	9.	Phased Reclaimed System Expansions	2011-2030	$0.01	-	1.30	2.90	-	-
Broward	Broward County Water & Wastewater Services	10.	Reclaimed Water Highlands Pompano Beach	2013	$6.50	-	0.30	0.30	-	-
	Davie, Town of	11.	Reclaimed Water Facility	under way	-	$7.50	-	-	3.50	3.50
	Margate, City of	12.	WWTP Effluent Reuse System	2015		$9.50			1.50	1.50
	North Springs Improvement District	13.	Water Reuse Plant	2017	-	NA	-	-	4.00	4.00
	Pompano Beach, City of	14.	Reuse Distribution Expansion Program through Fiscal Year 2025	under way	$5.70	-	1.40	2.20	-	-
		15.	Broward County Reuse Distribution	under way	NA	-	0.10	0.10	-	-
	Sunrise, City of	16.	Irrigation Reuse at the Sawgrass WWTP	2018	-	NA	-	-	2.00	4.00
Miami-Dade	Miami-Dade Water & Sewer Department	17.	North District WWTP Reuse	2025	-	$13.50	-	-	0.00	7.00
		18.	Central District WWTP Reuse – Floridan Aquifer Recharge [c]	2025	-	NA	-	-	0.00	0.00
		19.	West District Canal Water Reclamation Plant Recharge Phase 2	2021	-	$665.00	-	-	0.00	21.00
		20.	West District Canal Water Reclamation Plant Recharge Phase 3	2021	-	$593.00	-	-	0.00	16.00
		21.	Biscayne Coastal Wetlands Rehydration	2022	-	$1,120.00	-	-	0.00	89.00
		22.	South District WWTP – FPL Distribution (72-inch pipeline)	2021	$95.00	-	0.00	90.00	-	-
Monroe	FKAA	23.	Reclaimed Water Systems in Unincorporated Monroe County	2015	-	$12.00	-	-	1.00	2.10
Totals					$116.42	$2,425.00	11.60	104.00	15.00	151.10

a. Key to abbreviations: $M – millions of dollars; FKAA – Florida Keys Aqueduct Authority; FPL – Florida Power & Light; MGD – million gallons per day; NA – information not available; WWTP – wastewater treatment plant.

b. The 11 projects of distribution capacity are not included in **Tables F-6** and **F-7** to avoid double counting of overall reuse capacity.

c. Central District Wastewater Treatment Plant Reuse – Floridan Aquifer Recharge 27.10 MGD was not included in capacity totals.

Table F-5. Proposed water conservation projects. [a]

County	Utility/Entity	Project Count	Project	Completion Date	Total Capital Costs ($M)	Cumulative Project Capacity (MGD)	
						2020	2030
Broward	Broward County Water Partnership (includes municipalities of Coconut Creek, Cooper City, Coral Springs, Broward County, Dania Beach, Davie, Deerfield Beach, Fort Lauderdale, Hallandale Beach, Hollywood, Hillsboro Beach, Lauderhill, Margate, Miramar, Pembroke Pines, Plantation, and Sunrise)	1.	High Efficiency Toilet Replacement and Conservation Devices/Credit Program	under way	NA	0.00	30.00
	Pompano Beach, City of	2.	Conservation and Irrigation Restrictions	2025	NA	0.10	0.10
Miami-Dade	Miami-Dade Water & Sewer Department	3.	Conservation Program	2030	$20.00	12.01	15.19
Monroe	Florida Keys Aqueduct Authority	4.	Low Flow Fixture Distribution	under way	$0.25	0.10	0.15
				Totals	**$20.25**	**12.21**	**45.44**

a. Key to abbreviations: $M – millions of dollars; MGD – million gallons per day; NA – information not applicable.

Table F-6. Summary of proposed new water supply development projects by source. [a]

Potable/Nonpotable	Project Type	Number of Projects	Total Capital Costs ($M)	Cumulative Project Capacity (MGD)	
				2020	2030
Potable	Freshwater Source	2	$15.80	0.50	9.90
	Brackish Water Source	11	$417.31	35.00	66.50
Nonpotable	Stormwater and Surface Water Capture	4	$56.30	17.00	17.00
	Reclaimed Treatment Capacity	11	$2,425.00	15.00	151.10
	Totals	**28**	**$2,914.41**	**67.50**	**244.50**

a. Key to abbreviations: $M – millions of dollars; MGD – million gallons per day.

Table F-7. Summary of all proposed potable, nonpotable, and conservation projects. [a]

Project Type	Number of Projects/Programs	Total Capital Costs ($M)	Cumulative Project Capacity (MGD)	
			2020	2030
Potable	13	$433.11	35.50	76.40
Nonpotable	15	$2,481.30	32.00	168.10
Conservation	4	$20.25	12.21	45.44
Totals	**32**	**$2,934.66**	**79.71**	**289.94**

a. Key to abbreviations: $M – millions of dollars; MGD – million gallons per day.





Meeting South Florida's water supply needs while safeguarding its natural systems requires innovative solutions, cohesive planning, and a shared vision.

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South Florida Water Management District
3301 Gun Club Road • West Palm Beach, Florida 33406
561-686-8800 • FL WATS 1-800-432-2045 • www.sfwmd.gov
MAILING ADDRESS: P.O. Box 24680 • West Palm Beach, FL 33416-4680

sfwmd.gov