Annual Assessment of Florida's Water Resources and Conservation Lands

2018 Edition

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Northwest Florida Water Management District

South Florida Water Management District

Southwest Florida Water Management District

St. Johns River Water Management District

Suwannee River Water Management District

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Executive Summary

The Office of Economic and Demographic Research (EDR) has completed the second annual assessment of Florida's water resources and conservation lands pursuant to section 403.928, Florida Statutes. Due to the magnitude of the assessment and the fundamental intent of EDR to produce accurate and methodologically sound results, the 2018 edition of this report is still an intermediate step to full compliance with section 403.928, Florida Statutes. However, this edition makes substantial progress over the previous edition and may allow some components of the timeline to be advanced.[1]

Lands can be acquired for conservation by public or private entities and can be obtained in fee or less-than-fee simple ownership.[2] Once acquired, the lands are typically managed to maintain their conservation purposes. As such, expenditures on conservation lands can be categorized into acquisition expenditures and management expenditures. In Fiscal Year 2016-17, the State of Florida expended $68.1 million on conservation land acquisition[3] and $192.6 million on conservation land management.[4] Regarding the impact on ad valorem taxation, roughly 3.12 percent of the statewide county tax base and 2.77 percent of the statewide school tax base were lost. As a result, on net, approximately $531 million in county taxes and $424 million in school taxes were shifted to other property owners or lost due to lands being held in conservation in 2017.[5] The analysis of any offsetting positive taxable value arising from public conservation land ownership is still inconclusive, but suggestive that the statewide impact is minimal at best.

Approximately 30 percent of all land in the State of Florida is currently managed for conservation purposes, with eight counties already over 50 percent.[6] If all lands identified in plans set forth by state agencies and water management districts are acquired, this share will jump to over 43 percent.[7] If federal, local, and private plans were accounted for, this share would be even greater. Adding the projected total acquisition costs for the additional conservation lands identified in the plans developed by the state and water management districts produces a preliminary cost estimate of just over $10.6 billion, of which the analysis suggests that nearly 75 percent would be a state responsibility. At the current rate of annual state conservation land acquisition expenditures, it would take about 163 years to generate the state's share. Any future conservation lands that are acquired will entail additional costs for management as well as the acquisition cost. Currently, a dedicated revenue source for managing the state's lands does not exist. Assuming the current level of expenditures per acre, the additional cost to the state to manage the planned land acquisitions is projected to be $112.2 million, annually.

[1] See section titled "1. Introduction and Purpose" for an expected timeline of future analyses.
[2] See subsection titled "Costs of Acquisition and Maintenance under Fee and Less-than-fee Simple Ownership" for further details on ownership types.
[3] See Tables 2.2.3, 2.2.4, and 2.2.5.
[4] See Table 2.2.6.
[5] See Table 2.1.2.
[6] See Tables 2.1.2 (Part 3) and 2.1.4 (Part 3). The eight counties are: Broward, Collier, Miami-Dade, Monroe, Okaloosa, Franklin, Liberty, and Wakulla.
[7] See Table 2.3.6. This projection does not include any additions to current federal, local, or private conservation lands.

With just under one-third of the land in the State of Florida already acquired for conservation purposes and nearly half identified for future conservation land acquisition, significant policy questions arise. For example, how much conservation land is needed and for what purpose? Where should it be located? At what point does the volume of conservation land acreage alter the pattern of economic growth as expanding metropolitan areas are forced upward instead of outward? Is this change acceptable to policy makers? Should there be a greater focus on selling non-essential conservation lands as surplus? Is primarily owning conservation land in fee simple the most efficient strategy for Florida? Would encouraging less-than-fee simple ownership help to alleviate economic concerns associated with government ownership of conservation land? Are adequate funds available for managing current and future acquisitions? It is EDR's objective that this ongoing report will assist policy makers in developing the answers to these types of questions.

Regarding water resources, according to the water management districts, water demand is projected to increase by 17 percent in the next 20 years and reach 7,515.9 millions of gallons daily by 2035 (assuming average annual rainfall and not accounting for potential new water conservation activities). The two largest drivers of water demand are and will continue to be population growth and agriculture. The projected water demand may grow even higher if drought conditions occur, with 1-in-10 year droughts potentially increasing demand by an additional 24 percent over the same 20-year period. On the other hand, the increases in demand can be partially offset if effective water conservation strategies are implemented. According to the districts' regional water supply plans and water supply assessments, the water needs of the state can be met through the 2035 planning horizon with a combination of traditional and alternative water sources, appropriate management, conservation, and implementation of the projects identified in the applicable regional water supply plans. Because no district can meet its future demand solely with existing source capacity,[8] these extra efforts (and the funding for them) are critical over the period from now through 2035.

In the 2016-17 fiscal year, the State of Florida expended approximately $57 million on water supply[9] projects and an additional $806 million on water quality and other water resource-related programs.[10] In the most recent three fiscal years, expenditures for water resources have increased steadily, leading to questions about financial sustainability. Based on the projected revenues from sources historically allocated to water resources, the recent levels of increases cannot be sustained into the future without supplementation from other revenue sources. These sources could include statutorily uncommitted Documentary Stamp Taxes, additional General Revenue funds, or the use of bonds. As a result, policy questions may arise. What are the most cost-efficient and effective programs, projects, and initiatives that are being funded? What are the appropriate levels of funding? Are adequate funds available to sustain these efforts? To what extent should land acquisition programs be required to identify quantifiable water resource benefits? It is EDR's objective that this ongoing report will assist policy makers in developing the answers to these types of questions.

Subsequent editions of this report will include an analysis of future expenditures necessary to comply with laws governing water supply and water quality as well as achieve the Legislature's

[8] See Table 3.2.2.
[9] See Table 4.1.1.
[10] See Table 4.1.7.

intent that sufficient water be available for all existing and future reasonable-beneficial uses and the natural systems, while avoiding the adverse effects of competition for water supplies. EDR is currently working to develop the integrated water supply and demand model necessary to address this analysis. EDR intends to rely primarily on the districts for water supply and water source data, focusing instead on the development of demand and the economic ramifications of the interaction between demand and supply.

1. Introduction and Purpose

Section 403.928, Florida Statutes, directs the Office of Economic and Demographic Research (EDR) to conduct an annual assessment of Florida's water resources and conservation lands. Florida's natural resources are abundant and include 825 miles of sandy beaches;[11] 27,561 miles of streams and rivers; more than 7,700 lakes larger than 10 acres in size covering a surface area of 1.6 million acres, 11.3 million acres of freshwater and tidal wetlands,[12] 33 first magnitude springs,[13] and habitat for 528 endangered or threatened plant species and 55 endangered or threatened animal species.[14] In addition, Florida has fresh groundwater in underlying aquifers which has provided drinking water through public supply or private residential wells to approximately 90 percent of Florida's population.[15] It is the intent of this report to assist policy makers with the information needed to effectively and efficiently manage Florida's natural resources.

Regarding water resources, EDR is required to:

A. Expenditure Forecasts
   - Compile historic and forecast future expenditures by federal, state, regional, and local forms of government as well as public and private utilities pertaining to water supply and demand and water quality protection and restoration.
   - Provide additional forecasts indicating the expenditures by said entities that are necessary to comply with federal and state laws and regulations governing water supply and demand and water quality protection and restoration.
   - Develop estimates and forecasts that enable an assessment of the Legislature's intent that sufficient water be available for all existing and future reasonable beneficial uses and the natural systems while avoiding any adverse effects of competition for water supplies. This assessment necessarily requires an in-depth exploration of water supply and demand.

B. Revenue Forecasts
   - Forecast revenues dedicated in current law or historically allocated to water supply and demand and water quality protection and restoration for federal, state, regional and local forms of government. Forecasts of public and private utility revenues must also be included.

C. Gap Analysis
   - Identify any gaps between projected revenues and projected expenditures.

[11] https://floridadep.gov/water/beaches. (Accessed December 2017).
[12] June 2016, *Integrated Water Quality Assessment for Florida: 2016 Sections 303(d), 305(b), and 314 Report and Listing Update*. Florida Department of Environmental Protection. (Integrated Report).
[13] *Id.*
[14] http://www.fnai.org/FieldGuide/plant_intro.cfm. (Accessed December 2017).
[15] Marella, R.L., 2015, *Water withdrawals in Florida*, 2012: U.S. Geological Survey Open-File Report 2015–1156, 10 p., http://dx.doi.org/10.3133/ofr20151156. (Accessed December 2017).

Among the various available data sources, EDR must analyze the projected water supply and demand data developed by each of the five water management districts pursuant to sections 373.036 and 373.709, Florida Statutes, with notations of any significant differences in methodology between the districts.

Regarding conservation lands, EDR is required to:

A. Expenditure Forecasts
    - Compile historic and forecast future expenditures by federal, state, regional, and local forms of government pertaining to real property interests eligible for funding under Florida Forever, section 259.105, Florida Statutes.
    - Provide additional forecasts indicating the expenditures by said entities that are necessary to purchase lands identified by plans of state agencies or water management districts.

B. Revenue Forecasts
    - Forecast revenues that are dedicated in current law to maintain conservation lands for federal, state, regional, and local forms of government.

C. Gap Analysis
    - Identify any gaps between projected revenues and projected expenditures related to maintaining conservation lands.

Moreover, the by-county ad valorem tax impacts resulting from public ownership must be identified, along with the total share of Florida real property that is publicly owned for conservation purposes. EDR must also compare the cost of acquiring and maintaining conservation lands under fee simple and less-than-fee simple ownership. Finally, any overlap in expenditures on water resources and conservation land must be identified.

Because this annual report may play a role in future law making regarding Florida's natural resources, EDR has focused on a structure that will facilitate the measurement of changes over time. By keeping the underlying methodologies consistent, the different editions can be directly compared. To accomplish this goal, EDR has chosen to exclude or delay any analysis that is indefensible in methodology or incomplete. As a result, some required components of the report are being deferred until future years to allow full development.

Taking all of this into consideration, the anticipated timeline for introducing the major components is shown below, with each subsequent report building on the prior reports.

- January 1, 2017 – Initial assessment of conservation land acquisition programs.

- January 1, 2018 – Assessment of projects and initiatives related to water supply and demand as well as quality protection and restoration, including a review of financial assistance programs for various water projects such as potable water, wastewater, and surface water projects, and an assessment of regulatory programs and initiatives designed to protect water resources.

- January 1, 2019 – Continuation of the assessment in the 2018 report with a status update and potentially preliminary results from the integrated water supply and demand model.

- January 1, 2020 – Deployment of an integrated water supply and demand model. This includes a review of regulatory and non-regulatory programs designed to ensure that sufficient water is available for the various consuming sectors while protecting natural systems.

Finally, some parts of this edition provided for background and context may not be included in future editions, although references may be made back to it. Other areas will be further developed and replacement tables and figures will be generated. In these cases, any significant differences will be noted.

2. Assessment of Florida's Conservation Lands

Florida has a long tradition of acquiring land and water areas to conserve and protect natural and cultural resources and to provide for resource-based recreation. Prior to the 1960s, Florida did not have any formal land acquisition programs and no dedicated funding sources for land acquisition for conservation and outdoor, resource-based recreation. Instead, land acquisition was ad hoc and the result of either specific appropriations to purchase particular parcels of land or donations from private landowners and the federal government.[16]

In 1963, the Land Acquisition Trust Fund (LATF) was created to fund the newly-established Outdoor Recreation and Conservation Program for the purchase of land for parks and recreation areas. The program was funded by a 5 percent tax collected on outdoor clothing and equipment. In 1968, the LATF was funded for the first time with bond proceeds: debt service on the $20 million bond issuance was paid from Documentary Stamp Tax receipts collected from deeds and notes. In the 1970s, Florida voters approved a ballot referendum authorizing a $200 million bond program to fund the Environmentally Endangered Lands (EEL) program and authorized an additional $40 million in recreation bonds. Debt service on these bonds continued to be paid from a portion of the Documentary Stamp Tax.[17]

In 1979, the Conservation and Recreation Lands (CARL) program was created to replace and expand the former EEL program. Under the CARL program, funds were allocated for the acquisition of lands to protect and conserve natural resources and, for the first time, archeological and historical resources. However, unlike its predecessor, the CARL program was initially funded by proceeds collected from taxes levied on the severance of phosphate and other minerals. Later on, it received funding from the Documentary Stamp Tax. From 1979 through 1990, the CARL program protected approximately 181,000 acres of conservation and recreation lands at a cost of nearly $356 million.[18]

In 1981, the Legislature authorized the sale of $275 million in bonds to purchase lands along Florida's coastline. Known as the Save Our Coast program, this coastal land acquisition program was implemented as part of the LATF-funded programs and resulted in the purchase of more than 73 miles of coast line or 73,000 acres of coastal land.[19]

Also, in 1981, the Save Our Rivers program was created for the acquisition and restoration of water resources by encouraging the acquisition of buffer areas alongside surface water bodies. The program was funded from Documentary Stamp Tax revenues, and the funds were distributed to the five water management districts roughly in proportion to the population within their districts. Through the Save Our Rivers program, the water management districts acquired more than 1.7 million acres of land, including land acquired by the South Florida Water Management District as part of the restoration efforts of the Florida Everglades.[20]

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[16] Farr, James A., *Florida's Landmark Programs for Conservation and Recreation Land Acquisition* (2006), available at: http://softlive.dep.state.fl.us/file/1299/download?token=NX1ec5U5. (Accessed December 2017).
[17] *Id.*
[18] *Id.*
[19] *Id.*
[20] *Id.*

The Preservation 2000 program (P2000) was created in 1990 as an aggressive public land acquisition program aimed at preserving the quality of life in Florida. Under the P2000 program, $3 billion in bonds was authorized over a ten-year period running from 1991 to 2000. The debt service was paid from Documentary Stamp Tax revenues. Each year, in an effort to counteract the alteration and development of natural areas resulting from Florida's rapidly growing population, bond proceeds were distributed to land acquisition programs such as the CARL program, the water management districts' Save Our Rivers programs, Florida Communities Trust, and the recreational trails program. Under the P2000 program, over 1.7 million acres of land was acquired at a cost of nearly $3.3 billion.[21]

Florida's current blueprint for public land acquisition is the Florida Forever program, which was created in 1999 as the successor to the P2000 program.[22] To date, the Florida Forever program has been responsible for the acquisition of 751,513 acres of land at a cost of nearly $3 billion dollars.[23] The Florida Forever program is discussed in greater detail in subsection 2.2 of this report.

Except as otherwise provided in law, the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), comprised of the Governor, Attorney General, Chief Financial Officer, and Commissioner of Agriculture, holds title to state-owned lands and is charged with "acquisition, administration, management, control, supervision, conservation, protection, and disposition" of state lands.[24] Lands vested in the Board of Trustees are:

- All swamp and overflow lands held by the state or which may hereafter inure to the state;
- All lands owned by the state by right of its sovereignty;
- All tidal lands;
- All lands covered by shallow waters of the ocean or gulf, or bays or lagoons thereof, and all lands owned by the state covered by fresh water;
- All parks, reservations, or lands or bottoms set aside in the name of the state, excluding lands held for transportation facilities and transportation corridors and canal rights-of-way;
- All lands which have accrued, or which may hereafter accrue, to the state from any source excluding lands held for transportation facilities and transportation corridors and canal rights-of-way, spoil areas, or borrow pits or any land, the title to which is vested or may become vested in any port authority, flood control district, water management district, or navigation district or agency created by any general or special act.[25]

[21] Source: Florida Department of Environmental Protection, Statistical Abstract of Land Conservation as of September 30, 2016. This data excludes payments for debt service.
[22] Ch. 99-247, Laws of Fla. (codified as amended at § 259.105, Fla. Stat.).
[23] Florida Department of Environmental Protection, Florida Forever webpage available at https://floridadep.gov/lands/environmental-services/content/florida-forever. (Accessed December 2017).
[24] § 253.03(1), Fla. Stat.
[25] *Id*.

Accordingly, under the Florida Forever program and the previous acquisition programs, title to state land acquired for conservation purposes is held by the Board of Trustees.[26] Lands acquired by the water management districts and local governments with funding from the Florida Forever program are held in the name of the acquiring governmental entity.[27]

2.1 Percentage of Publicly-owned Real Property for Conservation Purposes

EDR is directed to analyze the percentage of Florida real property that is publicly owned for conservation purposes. The share of conservation lands can be measured and analyzed in various ways, and this report provides analyses in terms of shares of land acreage, land values, market values, and property values represented by conservation lands. While lands held in conservation by public entities provide no ad valorem taxes, they protect valuable natural resources and may induce tourism as an integral portion of the state's brand.

The Florida Natural Areas Inventory (FNAI), a nonprofit organization administered by the Florida State University, is one of the most complete repositories for geo-information on conservation land areas in Florida.[28] FNAI's primary contract is with the Florida Department of Environmental Protection (DEP) through which FNAI provides various services such as natural resource assessments in aid of assessing and setting priorities for the Florida Forever program.[29] Through its funding from DEP, FNAI also compiles the "Summary of Florida Conservation Lands," which provides a summary of conservation land acreages managed by federal, state, local, and private entities in Florida.[30] In order to be considered conservation lands for the purpose of FNAI's database:

> "...a significant portion of the property must be undeveloped and retain most of the attributes one could expect it to have in its natural condition. In addition, the managing agency or organization must demonstrate a formal commitment to the conservation of the land in its natural condition."[31]

For this report, EDR used FNAI data to identify conservation lands in Florida, as it appeared to provide the most comprehensive information on lands managed for conservation purposes by federal, state, local, and private entities.[32] While the FNAI data does provide rich data in terms of

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[26] § 259.105(7)(c), Fla. Stat.
[27] § 253.025, Fla. Stat.
[28] http://www.fnai.org/conservationlands.cfm. (Accessed December 2017).
[29] http://www.fnai.org/partnerships.cfm. (Accessed December 2017).
[30] Florida Natural Areas Inventory, *Summary of Florida Conservation Lands Including Less-than-Fee Conservation Lands* (February 2017), available at: http://www.fnai.org/PDF/Maacres_201702_FCL_plus_LTF.pdf.
[31] http://www.fnai.org/conlands_faq.cfm. (Accessed December 2017).
[32] It is important to note that with regard to state-owned lands, section 253.034, Florida Statutes, broadly defines the term "conservation lands" to mean: "[L]ands that are currently managed for conservation, outdoor resource-based recreation, or archaeological or historic preservation, except those lands that were acquired solely to facilitate the acquisition of other conservation lands. Lands acquired for uses other than conservation, outdoor resource-based recreation, or archaeological or historic preservation may not be designated conservation lands except as otherwise authorized under this section." The most notable differences in the definition of conservation lands observed thus far are with respect to historical or archaeological sites and certain less-than-fee interests. While the state's definition

boundaries and statistics, the data does not provide any economic information regarding the conservation lands. To acquire this information, EDR used the parcel-based ad valorem dataset. In order to conduct this analysis, EDR, with the assistance of both FNAI and the Department of Revenue (DOR), has continued to build a dataset that translates conservation land areas into their associated parcel IDs, with the relevant ad valorem tax information provided by the property appraisers for the state's 67 counties.

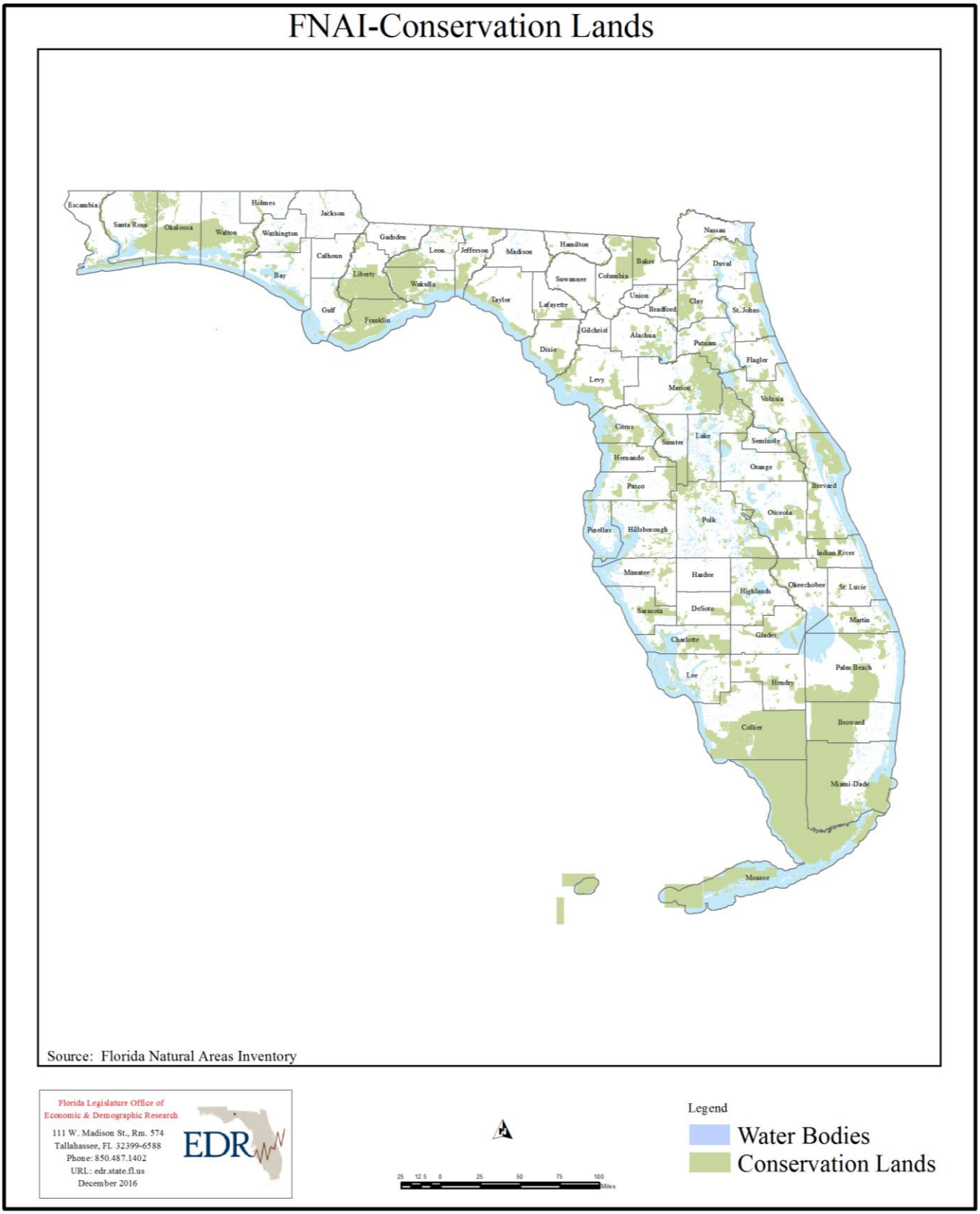
As of February 2017, all non-submerged conservation lands in Florida cover 10.66 million acres, comprising 30.26 percent of the total state land area (35.22 million acres).[33] Figure 2.1.1 provides a map of all conservation lands in Florida. The information in Tables 2.1.1 through 2.1.4 has been updated and refined since the 2017 edition. The tables have also been recast to focus exclusively on public ownership. These changes will be used in future editions of this report as the baseline.

[See map on the following page]

includes lands managed for historical or archaeological preservation (e.g., lands managed by the Florida Department of State's Division of Historical Resources), according to FNAI, such lands would only be included in the FNAI database if the property is preserved in its natural state, and not for the purpose of preserving or restoring historic buildings or other land improvements. However, the FNAI data does include less-than-fee interests, such as conservation easements as defined in section 704.06, Florida Statutes, which are conveyed in perpetuity and are regularly monitored by an agency or other organization. This may include, for example, conservation easements that are held by the state or water management districts for the purpose of mitigating adverse impacts to wetlands and other surface waters caused by a permitted activity under part IV of chapter 373, Florida Statutes.

[33] Florida's total land area has diminished over time. This may be the result of better measurement techniques, including GIS and aerial photography; land loss through erosion, natural disasters, hurricanes, climate change and global warming; or varying definitions that delineate land versus water areas. After reviewing different data sources, the study employs land area measured through the intersection of FNAI conservation land areas and parcel-based GIS polys (excluding subsurface rights, submerged lands, rivers and lakes, as much as possible).

Figure 2.1.1 Map of All Conservation Lands in Florida



Conservation lands in Florida are owned[34] by federal, state, and local governments, or by private entities.[35] Of the total 10.66 million acres of conservation lands in Florida in 2017, 97.18 percent is publicly-owned (10.36 million acres). Among the publicly-owned conservation lands, 53.37 percent is owned by the state government, 41.76 percent is owned by the federal government, and 4.87 percent is owned by local governments. At this time, every Florida county has publicly-owned lands dedicated to conservation purposes; the smallest public share occurs in Union County where it is just 0.11 percent of its county land.

Florida's 67 counties are divided into two groups—coastal and inland—to facilitate the presentation of conservation land ownership shares in Table 2.1.1 (Part 1 and Part 2). The distribution of the conservation land ownership type is uneven across the state. More than 90 percent of conservation lands in Florida are owned by the federal and state governments, and their respective ownership shares are highly concentrated in a few counties. Sixty-seven percent of the 4.33 million acres of conservation lands owned by the federal government are located in seven counties: Collier, Miami-Dade, Monroe, Okaloosa, and Wakulla in the coastal areas, and Liberty and Marion in the inland areas. Each of these counties has more than 200,000 federal acres. For instance, in Monroe County, 96 percent of the county land is used for conservation purposes, and the federal government owns 97 percent of its total conservation acreage. Similarly, uneven patterns across counties can be found in Table 2.1.1 for conservation lands owned by the state or regional governments. Fifty-eight percent of the 5.53 million acres of conservation lands owned by the state or regional governments is located in seventeen counties: Brevard, Broward, Charlotte, Citrus, Collier, Miami-Dade, Franklin, Levy, Palm Beach, Santa Rosa, and Volusia in the coastal areas, and Clay, Hendry, Lake, Osceola, Polk, and Sumter in the inland areas. Each of these counties has more than 100,000 state or regionally owned acres. In Broward, more than 60 percent of the land is used for conservation purposes, and 99 percent of its conservation acreage is owned by state or regional governments.[36]

[See table on following page]

[34] Due to the lack of ownership data at the county level, the FNAI managed area data is used as a proxy to calculate ownership shares. For the purposes of this report, ownership reflects the primary managing entity.

[35] Some of the state-owned conservation lands are managed across regions in the state (e.g., the conservation lands managed by the five water management districts). In Table 2.1.1, such regional conservation lands are included in the State/Regional category.

[36] Conservation lands owned by local governments and private entities in Florida are dominated by their federal and state counterparts in most counties, although exceptions can be found in Bradford, Hillsborough, Pinellas, and Union counties. Overall, the share of privately held conservation lands is higher in the inland counties than in the coastal counties, and the local share is lower.

Table 2.1.1 Part 1 – Conservation Lands by Public Ownership in Coastal Counties

County	Local		State/Regional		Federal		Total
	Acres	%	Acres	%	Acres	%	Acres
Bay	2,940	4.74%	30,760	49.54%	28,394	45.73%	62,095
Brevard	19,938	7.65%	160,952	61.73%	79,841	30.62%	260,731
Broward	5,375	1.13%	470,523	98.85%	88	0.02%	475,986
Charlotte	4,930	2.76%	172,745	96.87%	660	0.37%	178,335
Citrus	303	0.21%	124,690	87.50%	17,506	12.29%	142,499
Collier	4,386	0.49%	239,277	26.77%	650,118	72.74%	893,781
Miami-Dade	10,587	1.29%	249,936	30.43%	560,798	68.28%	821,322
Dixie	-	0.00%	90,656	75.62%	29,227	24.38%	119,883
Duval	21,709	25.02%	29,571	34.07%	35,503	40.91%	86,783
Escambia	1,773	4.13%	28,540	66.56%	12,569	29.31%	42,882
Flagler	6,979	18.04%	31,699	81.96%	-	0.00%	38,678
Franklin	53	0.02%	245,208	88.03%	33,288	11.95%	278,550
Gulf	116	0.21%	53,736	98.28%	823	1.51%	54,675
Hernando	937	1.02%	81,175	88.81%	9,292	10.17%	91,404
Hillsborough	62,359	56.57%	42,239	38.32%	5,637	5.11%	110,235
Indian River	5,028	5.02%	94,061	93.97%	1,011	1.01%	100,100
Jefferson	32	0.04%	64,510	87.68%	9,033	12.28%	73,575
Lee	36,326	38.12%	53,469	56.11%	5,497	5.77%	95,292
Levy	3,682	2.11%	145,763	83.47%	25,190	14.42%	174,635
Manatee	26,185	45.05%	31,031	53.39%	903	1.55%	58,120
Martin	2,714	2.89%	86,826	92.47%	4,353	4.64%	93,893
Monroe	1,866	0.27%	16,824	2.42%	676,627	97.31%	695,317
Nassau	318	1.40%	22,390	98.58%	5	0.02%	22,713
Okaloosa	321	0.10%	72,385	22.85%	244,081	77.05%	316,787
Palm Beach	48,912	10.34%	280,308	59.27%	143,701	30.39%	472,921
Pasco	16,603	14.85%	95,204	85.15%	-	0.00%	111,807
Pinellas	16,030	80.97%	3,680	18.59%	87	0.44%	19,796
St. Johns	4,332	5.94%	68,296	93.64%	307	0.42%	72,936
St. Lucie	14,431	41.69%	20,097	58.06%	84	0.24%	34,613
Santa Rosa	246	0.10%	182,942	71.36%	73,174	28.54%	256,363
Sarasota	47,540	43.34%	62,144	56.65%	6	0.01%	109,690
Taylor	-	0.00%	91,415	98.60%	1,299	1.40%	92,714
Volusia	51,752	22.58%	128,784	56.18%	48,680	21.24%	229,216
Wakulla	371	0.15%	12,182	5.04%	229,111	94.81%	241,664
Walton	233	0.09%	94,867	38.01%	154,458	61.89%	249,558
Group	419,307	5.84%	3,678,889	51.24%	3,081,353	42.92%	7,179,549
State	504,386	4.87%	5,527,618	53.37%	4,325,021	41.76%	10,357,025

Table 2.1.1 Part 2 – Conservation Lands by Public Ownership in Inland Counties

County	Local		State/Regional		Federal		Total
	Acres	%	Acres	%	Acres	%	Acres
Alachua	20,431	18.46%	90,064	81.37%	195	0.18%	110,689
Baker	2,590	1.58%	38,348	23.32%	123,494	75.10%	164,433
Bradford	138	1.33%	10,211	98.43%	24	0.23%	10,374
Calhoun	-	0.00%	5,057	84.74%	911	15.26%	5,968
Clay	1,165	0.90%	128,608	99.10%	-	0.00%	129,773
Columbia	1,127	0.77%	28,773	19.67%	116,365	79.56%	146,265
DeSoto	211	0.43%	46,007	93.41%	3,034	6.16%	49,252
Gadsden	229	1.37%	16,490	98.63%	-	0.00%	16,719
Gilchrist	259	3.31%	7,561	96.69%	-	0.00%	7,820
Glades	206	0.26%	72,892	93.57%	4,804	6.17%	77,902
Hamilton	4	0.02%	23,856	98.03%	476	1.96%	24,336
Hardee	-	0.00%	3,533	81.08%	824	18.92%	4,357
Hendry	-	0.00%	112,188	75.13%	37,134	24.87%	149,322
Highlands	1,282	0.76%	53,662	32.02%	112,645	67.22%	167,589
Holmes	-	0.00%	12,937	100.00%	-	0.00%	12,937
Jackson	851	4.39%	18,556	95.61%	-	0.00%	19,408
Lafayette	-	0.00%	60,212	100.00%	-	0.00%	60,212
Lake	9,645	4.68%	111,939	54.29%	84,603	41.03%	206,187
Leon	4,487	3.58%	15,672	12.49%	105,280	83.93%	125,440
Liberty	-	0.00%	58,875	17.75%	272,753	82.25%	331,628
Madison	-	0.00%	15,210	99.53%	72	0.47%	15,282
Marion	1,406	0.39%	86,285	23.88%	273,590	75.73%	361,281
Okeechobee	-	0.00%	80,672	81.12%	18,776	18.88%	99,447
Orange	9,382	9.84%	85,964	90.16%	-	0.00%	95,346
Osceola	5,930	3.41%	165,916	95.46%	1,961	1.13%	173,806
Polk	17,166	6.35%	194,366	71.91%	58,745	21.74%	270,277
Putnam	1,446	1.23%	88,482	75.36%	27,490	23.41%	117,418
Seminole	7,069	18.44%	30,786	80.28%	491	1.28%	38,347
Sumter	-	0.00%	112,292	100.00%	-	0.00%	112,292
Suwannee	47	0.23%	20,881	99.77%	-	0.00%	20,928
Union	8	4.93%	158	95.07%	-	0.00%	166
Washington	-	0.00%	52,276	100.00%	-	0.00%	52,276
Group	85,079	2.68%	1,848,729	58.18%	1,243,668	39.14%	3,177,476
State	504,386	4.87%	5,527,618	53.37%	4,325,021	41.76%	10,357,025

The acreage land share of conservation lands can also be considered in terms of its share of land value and other metrics from the property tax rolls. In this part of the analysis, the just value (JV) reported on the property tax rolls is used as a rough proxy for the market value of real properties designated as conservation lands. Since the property tax rolls include separate value breakouts for improvements and land, EDR was able to isolate just the land values when important to the analysis to do so. However, unless specifically indicated otherwise, the values reported in this report are inclusive of any improvements.

The diagram below provides a tool to facilitate this discussion. Very broadly speaking, the essential operation of Florida's property tax system (ad valorem taxes) takes on the following form; however, the mechanics of implementation vary slightly:[37]

Figure 2.1.2 Property Tax System Diagram

As shown in the state totals at the bottom of Part 3 of Tables 2.1.2, 2.1.3, and 2.1.4,[38] the 30.26 percent land share in acres only translates into 5.51 percent of the land value and 2.77 percent of total JV reported in the statewide property tax roll for 2017. In part, this is because a significant portion of the conservation land in Florida is relatively remote from the state's major economic development centers or otherwise not conducive to development. Those lands—at least temporarily—are restricted to conservation purposes and hence are valued for tax purposes at far

[37] For additional discussion, see the section on Property Taxes in Florida included in the 2007 report by EDR at the following link: http://edr.state.fl.us/Content/special-research-projects/property-tax-study/Ad%20Valorem-iterim-report.pdf.

[38] Acronyms in the table are the ones commonly used in ad valorem tax: JV – Just Value, CAV – County Assessed Value, SAV – School-district Assessed Value, CTV – County Taxable Value, STV – School-district Taxable Value, and LND_V – Land Value. These values are contained in the Name-Address-Legal (NAL) database of ad-valorem tax provided by DOR.

less than their counterparts in urban or residential areas. This treatment has more to do with the tax structure than societal or economic value.

Shares can be similarly calculated for conservation lands in terms of assessed value (AV) or taxable value (TV). In terms of the AV share, 30.26 percent of the land share in acres contributes only 2.77 percent to the county assessed value (CAV) and 2.84 percent to the school-district assessed value (SAV). Taxable value is even more skewed. Section 196.26, Florida Statutes, provides that if certain privately-held land is dedicated in perpetuity for conservation purposes and used exclusively for those purposes, it is fully exempted from ad valorem taxes; if it is dedicated in perpetuity for conservation purposes but also used for commercial purposes, it is 50 percent exempted from ad valorem taxes.[39] More importantly, there is a total exemption for property owned by governmental units, which serves a public purpose.[40] Because of special classified use assessments, the exemptions described above, and other possible ad valorem tax exemptions that are available to these properties,[41] the 30.26 percent land share contributes only 0.9 percent to the state's total ad valorem taxable value (TV) in 2017 (either based on county taxable value (CTV) or school taxable value (STV)).[42] Further, virtually all of the 0.9 percent of taxable value is attributable to the 2.82 percent of conservation acres that is privately owned.

When the acreage land share is examined at the county level, the differences among counties are significant. Conservation lands are distributed from a high of 96.30 percent of land acreage in Monroe County to a low of 1.20 percent of the acres in Hardee County. To further demonstrate the differences across the state, the 67 counties are divided into three groups: fiscally constrained counties (FCC),[43] non-FCC coastal counties, and non-FCC inland counties. This is done in order to tease out any variances between the three groups. Parts 1 to 3 of Table 2.1.2 provide county-level tax impacts,[44] develop metrics for conservation lands, and calculate shares for the 28 non-FCC coastal counties of statewide metrics. Parts 1 to 3 of Table 2.1.3 do the same for the 10 non-FCC inland counties and Parts 1 to 3 of Table 2.1.4 for the 29 FCCs (with the state averages listed at the bottom of each table for ease of comparison).

As shown on Part 3 of Tables 2.1.2, 2.1.3, and 2.1.4, most counties have sizable conservation land shares: eight counties have conservation land shares greater than one half of their total acreage. Five of these are in the non-FCC coastal counties (Broward—61.98 percent, Collier—66.99 percent, Miami-Dade—70.00 percent; Monroe—90.30 percent, and Okaloosa—54.11 percent) and three are in the FCCs (Franklin—55.03 percent, Liberty—63.24 percent, and Wakulla—63.07

[39] Section 218.125, Florida Statutes, directs the Legislature to appropriate funds to offset the reduction in ad valorem tax revenue experienced by fiscally constrained counties as a result of the ad valorem tax exemption for real property dedicated in perpetuity for conservation purposes, as provided in amendments in article VII, section 3(f) of the Florida Constitution. To participate in the distribution of funds, each fiscally constrained county is required to apply annually to the Department of Revenue and provide documentation to support the county's estimated reduction in ad valorem taxes as a result of the constitutional amendment. The county's ad valorem tax revenue is calculated as 95% of the estimated reduction in taxable value multiplied by the lesser of the 2010 applicable millage rate or the applicable millage rate for each county taxing jurisdiction in the current year. For Fiscal Year 2017-18, the estimated distribution is $496,027.

[40] § 196.199, Fla. Stat.

[41] There are more than 40 ad valorem tax exemptions and uniquely tracked property tax treatments in Florida.

[42] The TV share is a critical component in determining the impact of conservation lands on the ad valorem tax roll.

[43] For a definition of fiscally constrained counties, see section 218.67, Fla. Stat.

[44] For the purpose of Part 1 of these tables, "County Tax" does not include municipal or special district taxes.

percent). At the opposite extreme, only eleven counties have shares of less than ten percent (Calhoun, Gadsden, Gilchrist, Hamilton, Hardee, Holmes, Jackson, Madison, Nassau, Suwannee, and Union), and ten of the eleven are located in FCCs.

Viewing each of the three groupings as a whole, the natural beauty of the beaches located in the 28 non-FCC coastal counties constitutes one of the most important attributes of Florida's brand. Further, coastal counties have proportionately more conservation lands than inland counties. The average conservation land share of non-FCC coastal counties is 38.82 percent, which is greater than the state average of 30.26 percent. This share is 26.92 percent for the non-FCC inland counties and 21.20 percent for the FCC group.[45]

The non-FCC coastal counties occupy 45.58 percent of the total land in the state and have 58.48 percent of the state's total conservation land acreage (6.23 million acres out of the state's total of 10.66 million acres in conservation lands). This compares to the 10 non-FCC inland counties that have only 17.99 percent of the state's total land and 16.01 percent of the state's total conservation land acreage (1.7 million acres of conservation lands). While the 29 FCCs occupy 36.42 percent of the total state land, their 2.72 million acres of conservation lands contribute only 25.51 percent to the state's total conservation land acreage (most of the FCCs are located in inland areas).

In Part 1 of Tables 2.1.2, 2.1.3, and 2.1.4, EDR used the JV associated with conservation lands and local millage rates to project potential tax losses by county. The task is challenging because a counterfactual situation has to be considered: if the lands were not conservation lands, what would be the taxable value for each individual parcel? While more work in this area can be done in the future, for now, EDR used the simplifying assumption that the lands are largely vacant and would otherwise be ineligible for any exemptions or special classified use assessments. Effectively, this means that their highest and best use is in conservation. As a result, no assumptions are made regarding alternative development patterns, producing a snapshot of the current situation rather than a probable future outcome. Similarly, it is unknown how local governments would respond if the taxable value were restored to the rolls. Would they retain the same millage rates and raise more taxes, would they reduce the millage rates commensurate with the increase in taxes made possible by the higher level of taxable value, or a combination of both? The possible answers to this latter question produce different characterizations of what is happening today. If the millage rates were retained after restoration, the current tax treatment of conservation lands results in lost taxes. If the millage rate were lowered in this situation, the current tax treatment causes a shift of taxes to other property owners—effectively causing them to pay higher taxes than they otherwise would have.

Using the millage rates for 2017, the potential tax shifts or losses for all counties would be nearly $420 million. For school taxes, the potential tax shifts or losses would be nearly $326 million. At the county level, the greatest loss in taxable value would occur in the non-FCC coastal counties, which would collectively lose or shift $276.7 million in county taxes and $222.4 million in school taxes. This stands to reason given both the large number of coastal conservation lands and the higher property values seen in these areas. The greatest dollar shifts or losses in potential county taxes would occur in twelve counties, nine of which are non-FCC coastal counties: Brevard—

[45] Conservation land acreage data in this report are somewhat different from those provided by FNAI, due to the possibility of different technical tolerance levels used in the GIS computation.

$11.6 million, Broward—$15.7 million, Miami-Dade—$25.0 million, Duval—$25.5 million, Escambia—$26.4 million, Hillsborough—$13.4 million, Martin—$10.5 million, Monroe—$15.9 million, and Palm Beach—$26.6 million. The other three counties are: Alachua at $30.5 million, Osceola at $12.1 million, and Hendry at $12.6 million. At the opposite extreme, 14 counties would have county tax shifts or losses of less than $1 million. All 14 are FCCs, and four of them would have losses of less than $500,000 (Calhoun, Hardee, Holmes, and Madison).

Finally, it is worth noting that the 14 counties with the lowest tax shifts or losses described above may still experience significant fiscal burdens because of the magnitude of those losses (albeit low dollar value) relative to their total levy. To analyze this, EDR developed an implied share of the tax base that is lost due to the presence of conservation lands. Statewide, 3.12 percent of the county tax base and 2.77 percent of the school tax base are lost to conservation. While both the non-FCC coastal land grouping and the non-FCC inland land grouping roughly match the statewide percentages, the FCC grouping has 17.82 percent of its county tax base and 16.16 percent of its school tax base lost to conservation purposes. Not only are these percentages much higher than the statewide averages, 18 of the 29 FCC counties have implied shares of lost tax bases that exceed 10 percent—the highest is Liberty County at 69.88 percent. The non-FCC inland land grouping had only one county greater than 10 percent (Alachua at 17.84 percent) and the non-FCC coastal land grouping had only four counties (Citrus at 10.89 percent, Escambia at 19.83 percent, Monroe at 13.14 percent, and Santa Rosa at 10.94 percent).

[See table on following page]

Table 2.1.2 Part 1 – 2017 Tax Impact of Conservation Lands in Coastal Non-FCCs

	Potential Tax Collection from All Cons. Land		Actual Tax Collection on Cons. Land		Impact on Tax Collection from Cons. Land		Implied Share of Tax Base Lost	
County	**County Tax**	**School Tax**	**County Tax**	**School Tax**	**County Tax**	**School Tax**	**County Base**	**School Base**
Bay	$5,627,349	$6,723,385	$270,199	$340,607	$5,357,151	$6,382,778	6.59%	6.14%
Brevard	$13,125,614	$12,259,881	$1,493,191	$1,514,542	$11,632,423	$10,745,339	4.97%	4.37%
Broward	$20,096,016	$17,574,373	$4,404,965	$4,130,923	$15,691,051	$13,443,449	1.23%	1.10%
Charlotte	$3,835,926	$2,726,529	$452,115	$349,025	$3,383,811	$2,377,504	2.43%	2.15%
Citrus	$9,581,776	$7,126,288	$1,970,410	$1,550,939	$7,611,366	$5,575,349	10.89%	9.74%
Collier	$20,041,550	$18,931,950	$10,256,040	$10,710,286	$9,785,511	$8,221,665	2.16%	1.81%
Dade	$29,391,022	$25,586,996	$4,423,054	$4,207,212	$24,967,968	$21,379,784	1.19%	1.04%
Duval	$32,023,606	$18,180,735	$6,563,429	$4,070,744	$25,460,177	$14,109,991	4.00%	3.56%
Escambia	$28,602,461	$25,330,269	$2,222,630	$2,061,507	$26,379,831	$23,268,762	19.83%	18.09%
Flagler	$1,853,502	$1,345,588	$715,037	$556,416	$1,138,465	$789,172	1.63%	1.37%
Hernando	$5,177,130	$3,691,695	$865,463	$713,128	$4,311,667	$2,978,568	6.26%	5.27%
Hillsborough	$16,881,690	$10,720,391	$3,471,476	$2,287,837	$13,410,214	$8,432,554	1.64%	1.47%
Indian River	$6,109,364	$5,552,035	$1,165,221	$1,158,523	$4,944,144	$4,393,512	3.91%	3.53%
Lee	$12,119,926	$10,738,218	$2,901,110	$3,122,952	$9,218,816	$7,615,267	1.72%	1.44%
Manatee	$3,287,539	$2,777,977	$834,220	$736,402	$2,453,319	$2,041,575	1.02%	0.92%
Martin	$13,453,995	$9,204,885	$2,925,564	$2,151,787	$10,528,432	$7,053,098	5.78%	5.22%
Monroe	$24,672,463	$19,192,617	$8,799,086	$7,557,675	$15,873,377	$11,634,942	13.14%	11.43%
Nassau	$2,793,893	$2,257,892	$795,903	$715,490	$1,997,990	$1,542,402	3.27%	2.88%
Okaloosa	$8,515,479	$10,886,435	$1,709,262	$2,256,072	$6,806,217	$8,630,362	7.82%	7.28%
Palm Beach	$32,630,786	$25,461,123	$6,061,801	$5,053,683	$26,568,985	$20,407,440	1.80%	1.64%
Pasco	$6,489,339	$4,337,060	$2,496,230	$1,760,033	$3,993,109	$2,577,027	1.77%	1.53%
Pinellas	$12,165,877	$9,172,041	$5,867,410	$4,653,165	$6,298,467	$4,518,876	0.98%	0.85%
St. Johns	$8,581,087	$7,178,426	$3,444,455	$3,047,352	$5,136,632	$4,131,074	2.81%	2.50%
St. Lucie	$8,681,645	$4,484,273	$2,842,747	$1,556,239	$5,838,898	$2,928,034	2.88%	2.43%
Santa Rosa	$8,526,075	$8,554,403	$1,979,149	$2,096,656	$6,546,926	$6,457,747	10.94%	9.67%
Sarasota	$10,853,788	$14,558,826	$3,296,057	$4,731,334	$7,557,731	$9,827,493	2.59%	2.33%
Volusia	$10,404,566	$6,742,513	$1,552,726	$1,113,185	$8,851,840	$5,629,328	3.01%	2.62%
Walton	$6,062,337	$6,532,298	$1,063,683	$1,254,013	$4,998,654	$5,278,285	5.96%	5.43%
CNF	$361,585,803	$297,829,102	$84,842,632	$75,457,727	$276,743,170	$222,371,374	2.70%	2.39%
State	$531,476,688	$424,451,428	$111,076,328	$98,642,568	$420,400,360	$325,808,861	3.12%	2.77%

Table 2.1.2 Part 2 – 2017 Real Property Values of Conservation Lands in Coastal Non-FCCs (in $millions)

County	JV	CAV	SAV	CTV	STV	LND_V	ACRES
Bay	$1,060.30	$1,024.55	$1,032.32	$50.91	$53.72	$560.83	68,332
Brevard	$1,866.61	$1,727.60	$1,755.71	$212.35	$230.59	$1,479.67	262,818
Broward	$2,687.46	$2,451.10	$2,606.81	$589.08	$631.70	$1,780.81	476,021
Charlotte	$408.74	$362.50	$367.70	$48.18	$52.32	$284.39	178,394
Citrus	$1,082.86	$900.33	$999.77	$222.68	$235.67	$809.31	142,654
Collier	$3,696.20	$3,301.42	$3,458.57	$1,891.49	$2,091.04	$2,024.85	906,239
Dade	$3,658.42	$3,069.62	$3,552.01	$550.56	$601.55	$2,572.62	834,760
Duval	$2,803.51	$2,443.41	$2,516.34	$574.60	$627.72	$1,660.34	95,587
Escambia	$3,819.98	$3,717.82	$3,775.17	$296.84	$310.89	$2,505.45	45,331
Flagler	$202.68	$136.53	$149.71	$78.19	$83.81	$92.84	42,236
Hernando	$557.74	$488.29	$506.14	$93.24	$107.74	$419.96	91,680
Hillsborough	$1,625.29	$1,499.40	$1,536.19	$334.22	$346.85	$928.21	110,621
Indian River	$787.19	$628.86	$635.19	$150.14	$164.26	$502.21	103,155
Lee	$1,607.76	$1,295.60	$1,457.77	$384.84	$467.58	$805.58	99,195
Manatee	$420.40	$312.94	$331.23	$106.68	$111.44	$267.44	59,773
Martin	$1,404.90	$835.64	$1,062.63	$305.49	$328.42	$820.25	95,543
Monroe	$5,718.90	$5,334.40	$5,568.36	$2,039.56	$2,251.99	$3,741.09	696,198
Nassau	$342.21	$224.15	$310.47	$97.49	$108.44	$219.15	28,456
Okaloosa	$1,652.46	$1,570.77	$1,584.52	$331.69	$342.45	$995.81	316,787
Palm Beach	$3,761.43	$3,014.79	$3,305.66	$698.76	$746.59	$2,152.55	472,934
Pasco	$660.63	$504.34	$506.85	$254.12	$268.09	$309.35	113,135
Pinellas	$1,308.61	$1,221.11	$1,249.81	$631.12	$663.88	$666.21	19,800
St. Johns	$1,097.12	$882.43	$904.80	$440.38	$465.74	$660.93	79,372
St. Lucie	$682.12	$550.01	$572.23	$223.36	$236.73	$345.15	37,122
Santa Rosa	$1,299.47	$1,221.43	$1,231.59	$301.64	$318.50	$867.61	257,887
Sarasota	$2,019.53	$1,080.49	$1,638.37	$613.29	$656.31	$1,219.47	110,580
Volusia	$1,034.13	$836.73	$887.82	$154.33	$170.73	$691.18	231,947
Walton	$1,281.60	$1,099.32	$1,262.71	$224.87	$246.03	$1,087.45	255,535
Group	$48,548.23	$41,735.60	$44,766.45	$11,900.08	$12,920.77	$30,470.68	6,232,093
State	$67,019.19	$56,042.92	$59,812.69	$15,024.34	$16,277.83	$40,017.51	10,657,205

Table 2.1.2 Part 3 – 2017 Shares of Conservation Lands in Coastal Non-FCCs

County	JV	CAV	SAV	CTV	STV	LND_V	ACRES
Bay	5.43%	5.52%	5.49%	0.36%	0.35%	9.28%	14.43%
Brevard	3.45%	3.91%	3.85%	0.67%	0.64%	10.61%	42.04%
Broward	1.07%	1.18%	1.20%	0.35%	0.34%	3.18%	61.98%
Charlotte	1.89%	2.01%	1.95%	0.33%	0.32%	5.03%	35.52%
Citrus	9.37%	8.84%	9.61%	3.16%	3.00%	24.50%	37.41%
Collier	3.48%	3.63%	3.68%	2.32%	2.41%	5.68%	66.99%
Dade	0.95%	1.00%	1.07%	0.21%	0.21%	1.80%	70.00%
Duval	3.43%	3.42%	3.42%	1.07%	1.07%	6.70%	21.20%
Escambia	15.11%	16.20%	16.24%	2.08%	1.96%	31.31%	11.30%
Flagler	1.79%	1.38%	1.49%	1.04%	0.98%	3.35%	13.99%
Hernando	4.60%	4.67%	4.79%	1.34%	1.33%	13.75%	28.65%
Hillsborough	1.37%	1.48%	1.48%	0.43%	0.41%	2.81%	17.24%
Indian River	3.33%	3.29%	3.23%	0.96%	0.96%	7.06%	33.52%
Lee	1.60%	1.56%	1.64%	0.55%	0.60%	3.24%	21.01%
Manatee	0.98%	0.86%	0.88%	0.35%	0.34%	2.44%	12.95%
Martin	5.20%	3.85%	4.69%	1.71%	1.68%	6.31%	17.56%
Monroe	16.23%	17.74%	17.25%	8.39%	8.38%	18.16%	96.30%
Nassau	3.23%	2.52%	3.38%	1.35%	1.38%	6.27%	7.12%
Okaloosa	7.61%	7.85%	7.87%	2.13%	2.05%	13.93%	54.11%
Palm Beach	1.57%	1.53%	1.62%	0.42%	0.41%	3.04%	34.55%
Pasco	1.86%	1.65%	1.64%	1.12%	1.06%	3.52%	22.95%
Pinellas	1.25%	1.40%	1.39%	0.92%	0.88%	1.85%	12.76%
St. Johns	3.43%	3.19%	3.21%	1.94%	1.89%	6.45%	19.67%
St. Lucie	2.61%	2.67%	2.64%	1.45%	1.32%	5.00%	10.70%
Santa Rosa	9.96%	10.29%	10.31%	3.71%	3.47%	20.49%	40.35%
Sarasota	2.71%	1.71%	2.50%	1.16%	1.15%	4.85%	45.37%
Volusia	2.23%	2.15%	2.23%	0.55%	0.53%	6.34%	30.42%
Walton	6.22%	5.92%	6.38%	1.35%	1.36%	13.48%	34.76%
Group	2.49%	2.56%	2.63%	0.90%	0.89%	5.05%	38.82%
State	2.77%	2.77%	2.84%	0.93%	0.91%	5.51%	30.26%

Table 2.1.3 Part 1 – 2017 Tax Impact of Conservation Lands in Inland Non-FCCs

	Potential Tax Collection from All Cons. Land		Actual Tax Collection on Cons. Land		Impact on Tax Collection from Cons. Land		Implied Share of Tax Base Lost	
County	County Tax	School Tax	County Tax	School Tax	County Tax	School Tax	County Base	School Base
Alachua	$34,171,824	$22,517,600	$3,682,798	$2,747,644	$30,489,026	$19,769,957	17.84%	15.81%
Clay	$3,595,080	$2,848,876	$638,412	$549,331	$2,956,668	$2,299,544	3.82%	3.33%
Lake	$4,733,353	$4,099,143	$1,147,219	$1,068,977	$3,586,134	$3,030,167	2.63%	2.28%
Leon	$7,968,261	$5,918,323	$977,155	$780,374	$6,991,106	$5,137,948	5.20%	4.73%
Marion	$9,650,914	$9,824,136	$1,061,893	$1,188,995	$8,589,021	$8,635,141	7.16%	6.41%
Orange	$14,132,636	$14,423,027	$5,823,907	$6,300,662	$8,308,728	$8,122,365	1.02%	0.88%
Osceola	$12,771,094	$10,283,737	$655,023	$556,772	$12,116,071	$9,726,965	6.30%	5.86%
Polk	$5,473,665	$4,557,131	$1,949,478	$1,781,927	$3,524,187	$2,775,204	1.71%	1.43%
Seminole	$4,516,481	$4,121,921	$2,506,530	$2,401,370	$2,009,952	$1,720,551	0.97%	0.82%
Sumter	$1,377,687	$1,344,154	$106,211	$112,162	$1,271,476	$1,231,991	2.11%	1.90%
Group	$98,390,994	$79,938,049	$18,548,626	$17,488,216	$79,842,368	$62,449,833	3.27%	2.90%
State	$531,476,688	$424,451,428	$111,076,328	$98,642,568	$420,400,360	$325,808,861	3.12%	2.77%

Table 2.1.3 Part 2 – 2017 Real Property Values of Conservation Lands in Inland Non-FCCs (in $millions)

County	JV	CAV	SAV	CTV	STV	LND_V	ACRES
Alachua	$2,953.13	$2,800.77	$2,838.32	$318.27	$360.35	$352.51	114,394
Clay	$442.51	$357.30	$391.95	$78.58	$85.33	$299.74	139,576
Lake	$620.80	$584.45	$586.05	$150.46	$161.89	$500.36	209,677
Leon	$900.40	$728.29	$757.24	$110.42	$118.72	$446.28	154,422
Marion	$1,299.49	$1,106.09	$1,154.37	$142.98	$157.27	$974.00	361,519
Orange	$1,930.79	$1,672.20	$1,806.59	$795.66	$843.46	$605.13	99,609
Osceola	$1,523.74	$961.35	$969.30	$78.15	$82.50	$927.64	185,386
Polk	$699.59	$522.95	$539.53	$249.16	$273.55	$284.97	290,144
Seminole	$627.48	$517.04	$566.42	$348.24	$365.56	$254.97	39,001
Sumter	$236.15	$163.17	$163.67	$18.21	$19.71	$148.48	112,292
Group	$11,234.08	$9,413.59	$9,773.45	$2,290.13	$2,468.34	$4,794.07	1,706,020
State	$67,019.19	$56,042.92	$59,812.69	$15,024.34	$16,277.83	$40,017.51	10,657,205

Table 2.1.3 Part 3 – 2017 Shares of Conservation Lands in Inland Non-FCCs

County	JV	CAV	SAV	CTV	STV	LND_V	ACRES
Alachua	12.56%	13.68%	13.33%	2.62%	2.61%	7.77%	19.68%
Clay	2.97%	2.77%	3.01%	0.86%	0.82%	7.28%	36.34%
Lake	2.43%	2.51%	2.48%	0.87%	0.82%	6.47%	30.21%
Leon	3.67%	3.24%	3.32%	0.77%	0.75%	7.38%	35.63%
Marion	5.10%	5.18%	5.33%	0.95%	0.94%	16.31%	35.78%
Orange	1.22%	1.22%	1.25%	0.72%	0.69%	1.36%	16.86%
Osceola	4.68%	3.58%	3.56%	0.36%	0.36%	13.90%	20.02%
Polk	1.69%	1.49%	1.50%	0.96%	0.93%	2.92%	24.76%
Seminole	1.54%	1.47%	1.56%	1.22%	1.16%	2.39%	20.93%
Sumter	1.61%	1.28%	1.27%	0.18%	0.18%	6.05%	31.25%
Group	2.80%	2.71%	2.72%	0.87%	0.84%	4.69%	26.92%
State	2.77%	2.77%	2.84%	0.93%	0.91%	5.51%	30.26%

Table 2.1.4 Part 1 – 2017 Tax Impact of Conservation Lands in FCCs

	Potential Tax Collection from All Cons. Land		Actual Tax Collection on Cons. Land		Impact on Tax Collection from Cons. Land		Implied Share of Tax Base Lost	
COUNTY	**County Tax**	**School Tax**	**County Tax**	**School Tax**	**County Tax**	**School Tax**	**County Base**	**School Base**
Baker	$1,441,512	$1,059,405	$117,777	$94,091	$1,323,735	$965,314	17.49%	15.40%
Bradford	$1,108,273	$762,582	$258,291	$183,994	$849,982	$578,588	11.30%	9.99%
Calhoun	$174,170	$113,562	$21,477	$14,484	$152,693	$99,078	4.73%	4.17%
Columbia	$2,197,305	$1,538,631	$238,529	$174,105	$1,958,776	$1,364,526	9.01%	7.86%
DeSoto	$2,216,498	$1,426,726	$158,088	$103,767	$2,058,410	$1,322,959	15.40%	14.19%
Dixie	$3,351,813	$1,631,304	$261,912	$130,046	$3,089,901	$1,501,257	34.33%	33.08%
Franklin	$4,107,365	$3,621,327	$942,290	$891,803	$3,165,075	$2,729,525	21.35%	19.92%
Gadsden	$743,269	$543,381	$143,847	$111,719	$599,422	$431,662	5.95%	5.23%
Gilchrist	$693,770	$413,094	$152,701	$100,042	$541,068	$313,052	9.36%	8.08%
Glades	$7,395,888	$3,752,009	$284,688	$148,217	$7,111,200	$3,603,792	52.99%	51.04%
Gulf	$3,389,431	$2,788,019	$143,620	$130,533	$3,245,812	$2,657,487	21.17%	19.08%
Hamilton	$801,620	$524,848	$114,418	$78,519	$687,202	$446,328	15.15%	13.99%
Hardee	$519,712	$359,046	$228,722	$159,526	$290,990	$199,519	3.67%	3.38%
Hendry	$13,291,477	$6,656,679	$718,882	$364,121	$12,572,595	$6,292,558	41.27%	39.44%
Highlands	$3,358,028	$2,478,168	$1,271,983	$978,936	$2,086,045	$1,499,232	5.30%	4.67%
Holmes	$254,601	$174,437	$20,880	$16,553	$233,721	$157,884	6.12%	5.19%
Jackson	$1,075,482	$788,561	$111,129	$86,935	$964,353	$701,626	8.57%	7.76%
Jefferson	$1,653,901	$1,339,089	$207,760	$181,658	$1,446,141	$1,157,432	29.21%	26.46%
Lafayette	$829,449	$531,527	$81,958	$54,176	$747,491	$477,351	26.82%	24.65%
Levy	$3,454,450	$2,390,579	$406,036	$300,116	$3,048,414	$2,090,463	18.38%	16.60%
Liberty	$3,442,318	$2,305,142	$80,532	$58,401	$3,361,786	$2,246,740	69.88%	67.28%
Madison	$428,101	$271,239	$63,016	$40,684	$365,085	$230,555	6.35%	5.75%
Okeechobee	$3,994,486	$3,075,869	$348,492	$277,506	$3,645,995	$2,798,363	23.59%	21.76%
Putnam	$3,952,762	$2,255,800	$518,357	$331,800	$3,434,405	$1,924,001	10.69%	9.50%
Suwannee	$738,942	$503,830	$151,811	$111,703	$587,131	$392,127	4.96%	4.33%
Taylor	$929,303	$732,167	$120,404	$99,173	$808,899	$632,994	10.99%	10.12%
Union	$663,197	$403,355	$56,220	$36,668	$606,977	$366,687	22.28%	19.68%
Wakulla	$4,569,990	$3,723,763	$336,817	$339,406	$4,233,173	$3,384,356	35.25%	31.36%
Washington	$722,778	$520,139	$124,431	$97,943	$598,346	$422,197	9.47%	8.33%
Group	$71,499,891	$46,684,278	$7,685,069	$5,696,625	$63,814,822	$40,987,653	17.82%	16.16%
State Total	$531,476,688	$424,451,428	$111,076,328	$98,642,568	$420,400,360	$325,808,861	3.12%	2.77%

Table 2.1.4 Part 2 – 2017 Real Property Values of Conservation Lands in FCCs (in $millions)

COUNTY	JV	CAV	SAV	CTV	STV	LND_V	ACRES
Baker	$165.30	$148.15	$148.35	$13.51	$14.68	$139.17	164,434
Bradford	$116.57	$84.98	$86.04	$27.17	$28.13	$47.47	21,237
Calhoun	$17.53	$7.01	$7.01	$2.16	$2.24	$6.20	6,021
Columbia	$234.26	$187.32	$189.19	$25.43	$26.51	$175.88	148,259
DeSoto	$218.19	$111.21	$119.33	$15.56	$15.87	$111.38	49,655
Dixie	$250.08	$133.07	$133.91	$19.54	$19.94	$128.57	119,883
Franklin	$618.29	$564.80	$582.04	$141.84	$152.26	$518.71	279,888
Gadsden	$83.12	$42.15	$42.46	$16.09	$17.09	$30.60	20,625
Gilchrist	$63.27	$45.77	$45.97	$13.93	$15.32	$28.77	7,938
Glades	$586.07	$181.07	$181.23	$22.56	$23.15	$173.67	107,228
Gulf	$426.56	$396.18	$419.10	$18.07	$19.97	$408.97	54,675
Hamilton	$77.06	$50.12	$54.45	$11.00	$11.53	$43.20	24,472
Hardee	$54.33	$31.76	$31.76	$23.91	$24.14	$28.12	4,840
Hendry	$1,027.27	$699.65	$699.72	$55.56	$56.19	$682.05	153,044
Highlands	$378.81	$304.08	$313.22	$143.49	$149.64	$253.84	182,642
Holmes	$26.70	$20.70	$20.71	$2.19	$2.53	$17.17	12,937
Jackson	$132.33	$108.24	$108.42	$13.67	$14.59	$89.17	20,731
Jefferson	$202.65	$126.65	$133.49	$25.46	$27.49	$112.69	110,148
Lafayette	$82.10	$61.57	$61.57	$8.11	$8.37	$56.31	60,212
Levy	$364.14	$246.10	$247.38	$42.80	$45.71	$227.91	174,646
Liberty	$358.83	$322.38	$328.80	$8.39	$9.09	$322.96	338,051
Madison	$41.15	$26.02	$26.94	$6.06	$6.17	$24.55	15,746
Okeechobee	$465.62	$171.27	$255.12	$40.62	$42.01	$240.16	102,050
Putnam	$355.02	$277.52	$281.05	$46.56	$52.22	$237.54	117,840
Suwannee	$78.59	$58.09	$58.17	$16.15	$17.42	$41.86	21,025
Taylor	$107.88	$77.66	$81.29	$13.98	$14.61	$76.17	97,618
Union	$60.83	$53.99	$54.00	$5.16	$5.53	$25.37	7,227
Wakulla	$566.27	$296.23	$501.83	$41.73	$51.61	$453.83	243,031
Washington	$78.06	$60.02	$60.23	$13.44	$14.70	$50.48	52,989
Group	$7,236.88	$4,893.74	$5,272.80	$834.13	$888.72	$4,752.76	2,719,093
State	$67,019.19	$56,042.92	$59,812.69	$15,024.34	$16,277.83	$40,017.51	10,657,205

Table 2.1.4 Part 3 – 2017 Shares of Conservation Lands in FCCs

COUNTY	JV	CAV	SAV	CTV	STV	LND_V	ACRES
Baker	10.57%	11.66%	11.66%	1.89%	1.77%	29.78%	44.34%
Bradford	8.08%	7.73%	7.80%	3.87%	3.53%	11.83%	11.58%
Calhoun	2.18%	1.44%	1.44%	0.70%	0.64%	3.21%	1.66%
Columbia	5.94%	5.64%	5.68%	1.21%	1.09%	16.57%	29.69%
DeSoto	7.35%	6.74%	7.12%	1.40%	1.30%	17.53%	12.33%
Dixie	19.49%	17.80%	17.81%	4.43%	4.28%	30.03%	26.57%
Franklin	23.07%	23.02%	22.90%	8.08%	8.13%	30.92%	55.03%
Gadsden	3.63%	2.47%	2.47%	1.52%	1.43%	6.70%	6.30%
Gilchrist	5.39%	5.96%	5.97%	2.91%	2.81%	9.56%	3.51%
Glades	17.58%	13.24%	13.05%	4.51%	4.29%	17.85%	16.88%
Gulf	15.42%	18.00%	17.65%	1.19%	1.16%	27.43%	15.40%
Hamilton	9.09%	8.59%	9.20%	2.97%	2.86%	16.27%	7.40%
Hardee	2.20%	2.61%	2.58%	2.99%	2.79%	6.10%	1.20%
Hendry	20.74%	25.58%	25.36%	4.02%	3.77%	39.89%	20.39%
Highlands	5.53%	4.98%	5.05%	3.41%	3.20%	14.28%	28.60%
Holmes	2.51%	3.08%	3.08%	0.58%	0.57%	9.65%	4.59%
Jackson	4.93%	5.06%	5.04%	1.08%	1.04%	12.10%	3.50%
Jefferson	16.04%	17.64%	18.26%	5.93%	5.65%	39.26%	28.09%
Lafayette	12.24%	16.54%	16.48%	4.02%	3.71%	35.32%	17.36%
Levy	11.50%	11.04%	10.97%	3.00%	2.86%	22.27%	24.58%
Liberty	41.84%	56.58%	55.83%	5.56%	5.34%	80.76%	63.24%
Madison	3.32%	3.32%	3.42%	1.17%	1.08%	9.43%	3.51%
Okeechobee	13.59%	8.49%	11.88%	2.95%	2.76%	25.71%	18.16%
Putnam	7.24%	6.90%	6.89%	1.81%	1.81%	13.69%	24.25%
Suwannee	3.23%	3.24%	3.22%	1.35%	1.29%	8.14%	4.91%
Taylor	6.79%	6.67%	6.87%	1.84%	1.76%	16.04%	14.53%
Union	7.88%	13.28%	13.23%	2.65%	2.45%	19.38%	4.59%
Wakulla	24.97%	18.12%	26.88%	4.33%	4.58%	53.36%	63.07%
Washington	6.24%	6.20%	6.20%	2.17%	2.11%	14.75%	13.85%
Group	10.81%	10.37%	10.93%	2.83%	2.70%	23.38%	21.20%
State	2.77%	2.77%	2.84%	0.93%	0.91%	5.51%	30.26%

2.2 Historical, Current, and Projected Future Conservation Land Expenditures

Funding for the acquisition and management of conservation lands in Florida is provided by a variety of institutions, including the federal and state governments, regional governments, local governments, and private non-governmental entities. This part of the analysis focuses on governmental expenditures. To the extent that private non-governmental entities award contracts or grants to governmental agencies, those funds are also included. A variety of available data sources were reviewed and analyzed for historical and current information on conservation land

appropriations and expenditures.[46] This report summarizes the most relevant information culled from these wide-ranging data sources.[47]

Expenditures of State and Federal Funds

Several state agencies receive legislative appropriations for programs related to conservation lands, including the Department of Environmental Protection, the Department of Agriculture and Consumer Services, the Fish and Wildlife Conservation Commission, and the Department of State. For this report, a review and analysis was completed of the historical appropriations and expenditures associated with the state's land acquisition and land management programs.[48]

Land Acquisition

Florida Forever

The state's most widely known land conservation program is the Florida Forever program. The Florida Constitution authorizes the issuance of tax-supported bonds to finance or refinance the acquisition and improvement of land, water areas, and resources for the purposes of conservation, restoration of natural systems, water resource development, outdoor recreation, and historic preservation.[49] The state's environmental bonds, including Florida Forever bonds as well as Everglades restoration bonds, are secured by Documentary Stamp Tax revenues, and are not backed by the full faith and credit of the state.[50]

The Florida Forever program was initially authorized in 1999 in response to a voter-approved constitutional amendment to acquire land for conservation purposes.[51] Under the Florida Forever program, $3 billion of bonds were authorized to be issued over ten years. The Florida Forever program was extended for another ten years in 2008, increasing the total amount of Florida Forever bonds authorized to be issued to $5.3 billion. To date, the state has issued approximately $2.0 billion of Florida Forever bonds. In 2017, the Legislature authorized $800 million in new Florida Forever bonds, subject to the existing $5.3 billion overall bonding limit, to pay for costs related to land acquisition, planning, and construction of water storage reservoirs.[52] At the time of this report, the additional bond issuance and authorized spending for water storage reservoir projects had not yet been approved. As of October 2017, the aggregate principal amount of outstanding bonds is

[46] Sources include the annual General Appropriations Acts, the Florida Accounting Information Resource (FLAIR) System, the Legislative Appropriations/Planning and Budgeting System (LAS/PBS), periodic agency reports, Water Management District annual financial reports, and local government annual financial reports.

[47] It should be noted that the structure of federal, state, and local funding often results in the duplicative reporting of the same dollars. Attempting to sum the reported expenditures across the various sectors may lead to erroneous conclusions.

[48] The 2018 report includes appropriations and expenditures beginning in Fiscal Year 2007-08, which provides a ten-year history in addition to the current year (Fiscal Year 2017-18). For a longer history, please see the 2017 Report. http://edr.state.fl.us/Content/natural-resources/LandandWaterAnnualAssessment_2017Edition.pdf at p. 24.

[49] Art. VII, §11, Fla. Const.

[50] Subsection 4.1 of this report provides additional information on Everglades restoration bonds.

[51] Ch. 99-247, § 21, Laws of Fla. (codified as amended at § 259.105, Fla. Stat.).

[52] See Ch. 2017-10, § 3, Laws of Fla. (codified at § 373.4598, Fla. Stat.).

$907.8 million, with debt service of approximately $142.1 million due in Fiscal Year 2017-18.[53] If no new bonds are sold, the estimated debt service is expected to decline through Fiscal Year 2028-29, at which time the Florida Forever bonds would be retired. Table 2.2.1 shows the estimated debt service that will be due each fiscal year.

Table 2.2.1 Florida Forever Bonds Outstanding Debt Service

Fiscal Year	Outstanding Debt Service	Expected Interest Subsidy	Net Debt Service Owed*
FY17-18	$145.81	($3.68)	$142.13
FY18-19	$143.20	($3.46)	$139.73
FY19-20	$142.94	($3.23)	$139.70
FY20-21	$142.69	($2.99)	$139.71
FY21-22	$120.88	($2.72)	$118.16
FY22-23	$109.54	($2.43)	$107.11
FY23-24	$89.04	($2.12)	$86.92
FY24-25	$88.70	($1.92)	$86.78
FY25-26	$71.63	($1.77)	$69.86
FY26-27	$50.81	($1.36)	$49.45
FY27-28	$40.57	($0.93)	$39.64
FY28-29	$20.56	($0.47)	$20.09
TOTAL	**$1,166.36**	**($27.07)**	**$1,139.29**

*as of October 2017.

Funding for the Florida Forever program, including bond proceeds and cash transfers, is held in the Florida Forever Trust Fund and administered by the Department of Environmental Protection (DEP). Section 259.105, Florida Statutes, provides for the distribution of any cash or bond proceeds from the Florida Forever Trust Fund to various agencies and programs. The statutory distributions under the original authorization and under the 2008 reauthorization are displayed in Table 2.2.2. Detailed descriptions of the programs receiving distributions under the Florida Forever program were provided in the 2017 edition of this report.[54] Any expenditures from the trust fund are subject to annual evaluation and appropriation by the Legislature.

[See table on following page]

[53] The debt service has been reduced by the expected interest subsidy, which reflects the estimated federal subsidy payments to be received for Build America Bonds.

[54] *See* http://edr.state.fl.us/Content/natural-resources/LandandWaterAnnualAssessment_2017Edition.pdf at page 29.

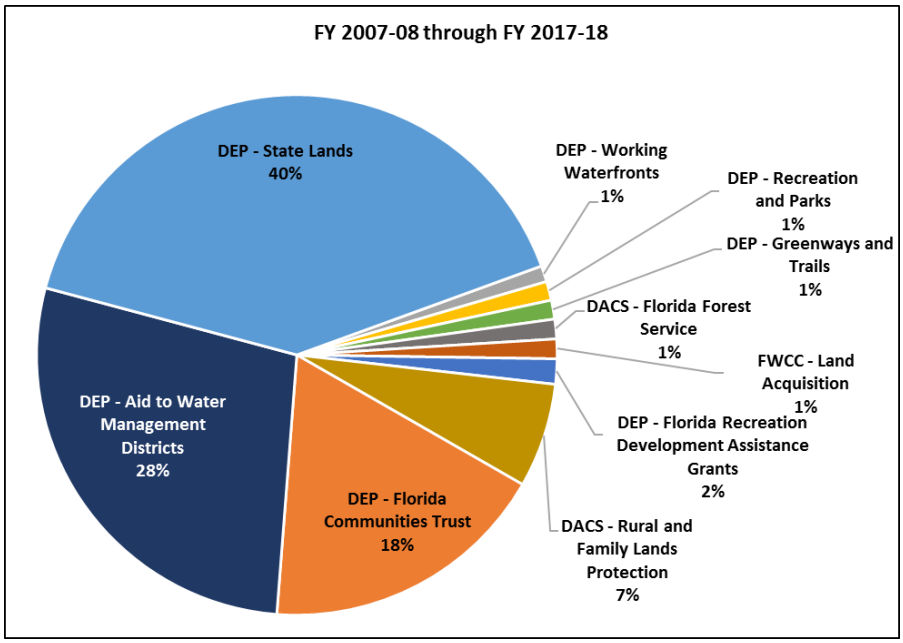
Table 2.2.2 Statutory Distribution of Florida Forever Funds

Florida Forever Statutory Distribution	FY 2000-01 Through FY 2007-08	FY 2008-09 Through Present
Dep. Environmental Protection - State Lands	35.0%	35.0%
Dep. Environmental Protection - Water Management Districts	35.0%	30.0%
Dep. Environmental Protection - Florida Communities Trust	22.0%	21.0%
Dep. Agriculture & Consumer Services - Rural & Family Lands Protection	0.0%	3.5%
Dep. Environmental Protection - Working Waterfronts	0.0%	2.5%
Dep. Environmental Protection - Fla Recreation Development Assistance Grants	2.0%	2.0%
Dep. Environmental Protection - Recreation & Parks	1.5%	1.5%
Dep. Environmental Protection - Greenways & Trails	1.5%	1.5%
Fish & Wildlife Conservation Commission - Land Acquisition	1.5%	1.5%
Dep. Agriculture & Consumer Services - Florida Forest Service	1.5%	1.5%

Since the inception of the program in Fiscal Year 2000-01, the Legislature has appropriated more than $3.1 billion to support Florida Forever. The majority of the appropriations ($2.3 billion) occurred prior to Fiscal Year 2007-08. In the most recent ten-year period, appropriations have totaled approximately $786.0 million, with no appropriations made for Fiscal Year 2017-18.

Figure 2.2.1 shows that the Division of State Lands has been the largest recipient of Florida Forever funding, receiving approximately 40 percent of all appropriations since Fiscal Year 2007-08. The next two highest funded recipients are the water management districts (28 percent) and the Florida Communities Trust (18 percent).

Figure 2.2.1 Share of Florida Forever Appropriations



Current law allows agencies up to three fiscal years to expend funds received under the Florida Forever program. Consequently, the annual cash expenditures vary from the appropriation levels for that fiscal year. Table 2.2.3 shows the annual cash expenditures since Fiscal Year 2007-08.[55]

Table 2.2.3 Florida Forever Program Expenditures by Fiscal Year (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
DEP - State Lands	$126.90	$42.08	$30.52	$4.06	$10.08
DEP - Florida Communities Trust	$50.36	$72.82	$24.46	$17.59	$4.74
DEP - Working Waterfronts	$0.00	$0.00	$5.23	$0.01	$0.00
DEP - Recreation and Parks	$0.08	$0.14	$3.01	$3.23	$0.89
DEP - Florida Recreation Development Assistance Grants	$10.37	$6.11	$5.01	$3.67	$0.00
DEP - Greenways and Trails	$21.31	$1.26	$0.70	$3.07	$0.02
FWCC - Land Acquisition	$12.09	$1.00	$5.32	$0.05	$0.74
DACS - Florida Forest Service	$4.39	$6.06	$6.18	$0.63	$1.72
DACS - Rural and Family Lands Protection	$0.00	$0.00	$1.42	$7.51	$0.01
DEP - Aid to Water Management Districts	$159.07	$110.36	$25.62	$59.74	$9.12
TOTAL	**$384.57**	**$239.83**	**$107.47**	**$99.55**	**$27.34**

CASH EXPENDITURES BY FISCAL YEAR*	FY12-13	FY13-14	FY14-15	FY15-16	FY16-17
DEP - State Lands	$6.77	$14.53	$18.65	$4.61	$18.27
DEP - Florida Communities Trust	$7.12	$2.79	$1.25	$0.00	$2.34
DEP - Working Waterfronts	$0.00	$0.01	$0.32	$0.00	$0.02
DEP - Recreation and Parks	$0.06	$0.02	$0.51	$0.77	$2.52
DEP - Florida Recreation Development Assistance Grants	$0.30	$0.00	$0.00	$0.00	$0.00
DEP - Greenways and Trails	$0.01	$0.00	$0.64	$0.03	$0.14
FWCC - Land Acquisition	$0.01	$0.00	$0.00	$0.01	$0.00
DACS - Florida Forest Service	$0.02	$0.16	$0.19	$0.06	$0.00
DACS - Rural and Family Lands Protection	$0.00	$0.08	$1.53	$0.47	$7.92
DEP - Aid to Water Management Districts	$2.31	$0.34	$22.34	$0.44	$5.75
TOTAL	**$16.60**	**$17.94**	**$45.43**	**$6.38**	**$36.96**

*Through June 30, 2017.

To supplement distributions provided through the Florida Forever program, the Legislature has appropriated additional funds for the following land acquisition programs: the Florida Recreation Development Assistance Program, the Rural and Family Lands Protection Program, Water Management Districts, and State Parks.[56] These additional appropriations total approximately $320 million since Fiscal Year 2007-08. Table 2.2.4 shows the annual cash expenditures for these programs since Fiscal Year 2007-08 that were in addition to their Florida Forever distributions. The agencies have more than one fiscal year to spend these appropriations.

[55] Detailed expenditures for each program are available at https://floridadep.gov/lands/environmental-services/content/florida-forever-0. (Accessed December 2017).

[56] For Fiscal Year 2017-18, the Legislature appropriated $10.0 million for the Rural and Family Lands Protection Program and $2.0 million for State Parks; however, only expenditures through the end of Fiscal Year 2016-17 are shown.

Table 2.2.4 Annual Cash Expenditures Outside of Florida Forever (in $millions)

	ANNUAL CASH EXPENDITURES*			
Fiscal Year	**FRDAP**	**RFLPP**	**WMD**	**TOTAL**
FY07-08	$31.28		$65.82	$97.11
FY08-09	$23.83		$59.65	$83.49
FY09-10	$18.48		$43.30	$61.78
FY10-11	$8.96		$32.70	$41.66
FY11-12	$0.00		$29.21	$29.21
FY12-13	$0.00		$29.64	$29.64
FY13-14	$0.10		$19.52	$19.62
FY14-15	$0.32	$0.45	$8.76	$9.53
FY15-16	$0.94	$11.01	$5.64	$17.59
FY16-17	$2.83	$14.63	$1.45	$18.91
TOTAL	**$86.74**	**$26.09**	**$295.69**	**$408.52**

*Through June 30, 2017.

Other Land Acquisition Programs

In addition to the land acquisition programs funded through the Florida Forever program, the Legislature has appropriated over $64.7 million for other types of land acquisition programs. In the most recent ten years, these programs have included the Off-Highway Vehicle program, statewide forestry land acquisition, the Mitigation Park program, and the acquisition of historic properties throughout the state. Table 2.2.5 shows the annual cash expenditures for these programs during this period. Historic properties is the only program that has received new appropriations in the most recent five fiscal years, however, this funding includes dollars for stand-alone restoration projects as well as land acquisition. For the current fiscal year (2017-18), $6.5 million was appropriated to support historic properties.

Table 2.2.5 Expenditures for Other Land Acquisition Programs (in $millions)

	ANNUAL CASH EXPENDITURES*				
Fiscal Year	**DACS Off Highway Vehicle**	**DACS Forestry**	**FWCC Mitigation Park**	**DOS Historic Properties**	**TOTAL**
FY07-08	$0.00	$0.00	$11.80	$12.16	$23.96
FY08-09	$0.00	$0.09	$2.08	$10.85	$13.02
FY09-10	$1.21	$0.10	$0.00	$2.13	$3.44
FY10-11	$0.07	$0.14	$0.00	$0.67	$0.88
FY11-12	$0.01	$0.00	$0.00	$0.00	$0.02
FY12-13	$0.02	$0.00	$0.00	$0.00	$0.02
FY13-14	$0.07	$0.01	$0.00	$0.13	$0.21
FY14-15	$0.03	$0.00	$0.00	$1.78	$1.81
FY15-16	$0.00	$0.00	$0.00	$5.72	$5.72
FY16-17	$0.00	$0.00	$0.00	$12.27	$12.27
TOTAL	**$1.40**	**$0.35**	**$13.88**	**$45.72**	**$61.35**

*Through June 30, 2017.

Land Management

The agencies responsible for management of Florida's public lands include DEP (State Lands, Recreation and Parks, Coastal and Aquatic Managed Areas, and Greenways and Trails); DACS (Florida Forest Service); the FWC; and the Department of State (Historical Resources). Pursuant to section 259.037, Florida Statutes, there is a Land Management Uniform Accounting Council (Council) which comprises representatives from each of the involved agencies/divisions. The Council has established specific cost accounting categories in order to provide consistent data for purposes of policy making. To that end, the Council publishes an annual report detailing the prior year's land management activities and expenditures.[57]

As reported by the Council, land management expenditures across the agencies have totaled nearly $1.7 billion since Fiscal Year 2007-08. The reports include expenditures from all appropriated funds, including both state and federal sources. Table 2.2.6 shows the annual amounts spent for the major cost categories, which were described in detail in the 2017 edition of this report.[58] For information, the shares have been provided for the major cost categories at the bottom of the table. On average during this period, nearly 28 percent of land management expenditures have been for Recreation/Visitor Services, 22 percent for Capital Improvements, and 20 percent for Resource Management.

Table 2.2.6 Land Management Expenditures by Cost Category (in $millions)

Fiscal Year	Resource Management	Administration	Support	Capital Improvements	Recreation/ Visitor Services	Law Enforcement	TOTAL
FY07-08	$46.36	$36.09	$21.78	$45.40	$37.87	$14.24	$201.74
FY08-09	$37.44	$34.88	$14.06	$56.86	$45.23	$9.84	$198.30
FY09-10	$33.33	$26.16	$12.99	$56.00	$41.96	$12.81	$183.24
FY10-11	$29.62	$23.40	$12.83	$34.77	$43.57	$12.28	$156.47
FY11-12	$30.62	$20.75	$14.01	$16.15	$40.14	$12.65	$134.31
FY12-13	$30.92	$21.70	$14.81	$22.07	$38.78	$13.63	$141.91
FY13-14	$26.47	$12.29	$18.96	$26.52	$50.26	$6.05	$140.55
FY14-15	$29.32	$14.57	$20.86	$30.46	$54.44	$6.06	$155.71
FY15-16	$34.55	$13.25	$24.64	$38.39	$55.37	$7.16	$173.36
FY16-17	$36.52	$14.65	$30.48	$42.03	$61.40	$7.49	$192.56
TOTAL	**$335.16**	**$217.72**	**$185.41**	**$368.65**	**$469.00**	**$102.22**	**$1,678.16**
Shares	**20.0%**	**13.0%**	**11.0%**	**22.0%**	**27.9%**	**6.1%**	

There are additional land management costs that are not captured in the Council's annual reports. First, DEP's Office of Coastal and Aquatic Managed Areas makes expenditures related to the management of four million acres of submerged lands. Most of the expenses are associated with Resource Management and Recreation/Visitor Services activities and totaled approximately $5.8 million in Fiscal Year 2015-16. Second, the Florida Forest Service makes expenditures related to

[57] State of Florida Land Management Uniform Accounting Council 2017 Annual Report (LMUAC Report). Copies are available from the Florida Department of Environmental Protection, Division of State Lands, Office of Environmental Services.

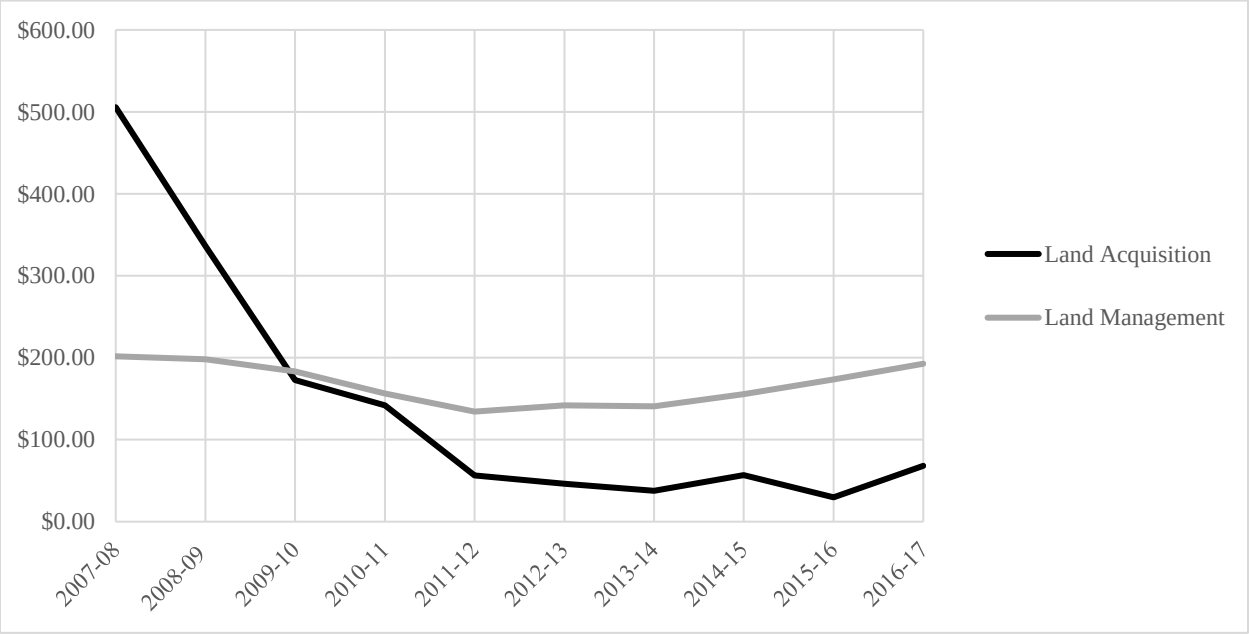
[58] *See* http://edr.state.fl.us/Content/natural-resources/LandandWaterAnnualAssessment_2017Edition.pdf at page 39.

the suppression of wildfires throughout the state. These expenses were approximately $7.1 million in Fiscal Year 2016-17 and supported various programs, software, specialized equipment, and highly-trained personnel who protected more than 26.3 million acres of public and privately-owned forest land from wildfire. Finally, the Fish and Wildlife Conservation Commission makes expenditures for invasive plant control on public lands. Expenses of approximately $39 million in Fiscal Year 2016-17 covered costs related to controlling and eradicating terrestrial invasive exotic plants on lands managed by other public agencies as well managing aquatic plants in public water bodies.

Forecast of State Expenditures on Conservation Land

Forecasting state conservation land acquisition expenditures is a difficult task because the level varies greatly based on what is available for purchase, the use of bonding to fund acquisitions, and the particular set of circumstances facing changing sets of policy makers. For example, overall funding for environmental programs in the last decade has been significantly affected by the end of the state's housing boom, the subsequent collapse of the housing market, and the commencement of the Great Recession. In this regard, the three sources of state acquisition expenditures from Tables 2.2.3, 2.2.4, and 2.2.5 above along with the land management expenditures from Table 2.2.6 are compiled in Figure 2.2.2. There has been a clear decline in acquisition expenditures over the most recent ten years that mimics the state's economic condition; however, funding in recent years appears to have stabilized. Alternatively, land management expenditures have remained relatively stable over the most recent ten year period, with strong growth of approximately 11 percent annually in the most recent three year period.

Figure 2.2.2 Historic State Expenditures on Conservation Land (in $millions)



Both the acquisition and management forecasts rely on expenditure trends since Fiscal Year 2011-12. Expenditures for acquisition both increase and decrease in this timeframe and, as such, the acquisition forecast uses a six-year moving average expenditure level. Land management expenditures have annually increased by approximately four percent on average in this timeframe. The management forecast uses this four percent growth rate for all future years. The forecast for all state conservation land expenditures can be seen in Table 2.2.7.

Table 2.2.7 Forecast of State Conservation Land Expenditures (in $millions)

	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
Acquisition	$49.20	$47.97	$48.26	$50.01	$48.88
Management	$200.18	$208.10	$216.33	$224.89	$233.79
Total	$249.38	$256.07	$264.59	$274.89	$282.66
Forecast	**FY 22-23**	**FY 23-24**	**FY 24-25**	**FY 25-26**	**FY 26-27**
Acquisition	$52.08	$49.40	$49.43	$49.67	$49.91
Management	$243.03	$252.65	$262.64	$273.03	$283.83
Total	$295.11	$302.05	$312.07	$322.71	$333.74

Federally Funded Program Expenditures

In addition to appropriations from General Revenue and state trust funds, the Legislature also provides appropriations from federal trust funds. During the most recent ten years, a variety of federal grant programs have been appropriated on a regular basis through the state budget. Most of the programs, which were described in detail in the 2017 edition of this report,[59] are matching grant programs administered by a state agency. Table 2.2.8 shows ongoing programs and their annual expenditures, along with a forecast for future years. Over the previous ten years, expenditures have totaled nearly $138 million with approximately $13.8 million being spent annually, on average. However, there has been a sharp decline in the most recent three-year period. Using a three-year moving average to forecast expenditures, as was done in the 2017 edition of this report, would result in expenditures falling below $1 million by the tenth year. Because this result appears to be inconsistent with the historical funding levels, the forecast provided in this edition is based on Florida population growth rates. Since funding for specific programs is contingent on federal actions, only the total is estimated.

[See table on following page]

[59] *See* http://edr.state.fl.us/Content/natural-resources/LandandWaterAnnualAssessment_2017Edition.pdf at page 41.

Table 2.2.8 Federally Funded Conservation Land Programs – Expenditures and Forecast (in $millions)

Fiscal Year	America the Beautiful	Ameri Corps	Recreational Trails	Land and Water Conservation Fund	Coastal Partnership Initiative	Endangered Species Conservation Fund	Land Acquisition Grants	Historic Pres. Grants	Total
FY07-08	$1.51	$0.50	$0.00	$2.00	$2.00	$0.36	$8.00	$0.09	$14.46
FY08-09	$1.59	$0.55	$1.90	$1.20	$2.20	$1.03	$0.00	$0.34	$8.80
FY09-10	$1.60	$0.56	$3.60	$1.00	$2.20	$0.95	$0.00	$0.12	$10.03
FY10-11	$1.63	$0.55	$9.00	$1.20	$2.20	$0.78	$0.00	$0.13	$15.48
FY11-12	$1.48	$0.63	$9.50	$2.10	$2.20	$2.97	$0.00	$0.30	$19.18
FY12-13	$1.59	$0.57	$3.50	$2.88	$1.09	$1.01	$6.00	$0.12	$16.76
FY13-14	$1.25	$0.44	$3.50	$3.00	$0.96	$3.67	$2.58	$0.13	$15.52
FY14-15	$1.17	$0.36	$5.00	$4.00	$0.96	$1.20	$5.00	$0.12	$17.80
FY15-16	$1.45	$0.41	$3.00	$4.00	$0.96	$1.12	$0.00	$0.19	$11.13
FY16-17	$0.71	$0.55	$2.50	$3.00	$0.96	$1.05	$0.00	$0.00	$8.77
Forecast									
FY17-18									$8.91
FY18-19									$9.05
FY19-20									$9.18
FY20-21									$9.32
FY21-22									$9.45
FY22-23									$9.58
FY23-24									$9.71
FY24-25									$9.83
FY25-26									$9.95
FY26-27									$10.07

Regional Expenditures

The Florida Water Resources Act of 1972, chapter 373, Florida Statutes ("Water Resources Act"), was enacted to provide the legal framework to conserve, protect, manage, and control waters and related land resources in the state. Recognizing that water constitutes a public resource benefiting the entire state and that water resource issues vary throughout the state from region to region, the Water Resources Act provides for water management at the state and regional level.[60] While state-level administration is vested in DEP, to the greatest extent possible, the department is encouraged to delegate its powers to the governing boards of the five regional water management districts: Northwest Florida, Suwannee River, St. Johns River, Southwest Florida, and South Florida.[61]

Among the enumerated powers vested in the water management districts (WMDs) is the authority to acquire lands for the purpose of conservation and protection of water and water-related resources.[62] The governing boards of the WMDs are authorized to acquire fee or less-than-fee interests in real property for purposes of "flood control, water storage, water management,

[60] § 373.016(4)(a), Fla. Stat.
[61] § 373.069, Fla. Stat. (dividing the state into five water management districts).
[62] § 373.139(1), Fla. Stat.

conservation and protection of water resources, aquifer recharge, water resource and water supply development, and preservation of wetlands, streams, and lakes."[63]

In order to identify expenditures of the WMDs related to conservation land acquisition and land management, EDR reviewed the WMDs' preliminary budgets and tentative budgets developed in accordance with sections 373.535 and 373.536, Florida Statutes, respectively. These budget documents included actual-audited expenditures by program area. With respect to conservation land acquisition and management, EDR reviewed the actual-audited expenditures for the following activities: 2.1 Land Acquisition,[64] and 3.1 Land Management.[65]

Table 2.2.9 provides expenditure data for conservation land acquisitions by each of the water management districts. As explained above, these actual-audited numbers are presented in the budgets[66] of the districts. Ideally, these would only include acquisition of conservation lands and not lands that were acquired for other lawful purposes. In practice, these numbers cannot be categorized that cleanly and will include some land expenditures for other purposes. Similarly, some conservation land acquisition expenditures may not have been categorized in the "2.1 Land Acquisition" category and will not be accounted for here. Note that the historic data is in local fiscal years, which begin October 1 and end September 30. Forecasts rely on a three-year moving average as it best fits the nature of the data and are then converted to state fiscal years.

Table 2.2.9 Water Management District Land Acquisition Expenditures (in $millions)

History	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$0.02	$0.04	$0.03	$0.03	$0.09
SJRWMD	$8.43	$11.70	$11.37	$15.53	$12.68
SFWMD	$0	$0	$0	$0	$0
SWFWMD	$0.35	$0.84	$0.50	$3.09	$0.50
SRWMD	$0.40	$0.19	$0.65	$5.41	$0.07
Total	$9.21	$12.77	$12.56	$24.06	$13.34
Forecast	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Total	$16.61	$17.94	$16.85	$17.13	$17.31

Source: Annual Budgets of the Water Management Districts.

While these expenditures may at times seem lower than one would expect, they represent the actual-audited budgets of the districts. To evaluate each district's conservation land expenditures, the previous version of this report used the district's Comprehensive Annual Financial Report along with historical documents attained from the districts. All three sources provide significantly different expenditures for the districts. Actual-audited budgets were chosen for this edition because

[63] § 373.139(2), Fla. Stat.
[64] The 2.1 Land Acquisition activity is part of the overall program area entitled: 2.0 Land Acquisition, Restoration and Public works.
[65] The 3.1 Land Management activity is part of the overall program area entitled: 3.0 Operation and Maintenance of Lands and Works.
[66] WMD actual audited budgets for a fiscal year are available in the tentative budgets two fiscal years later. This is required by section 373.536, Florida Statutes.

they are the only source with consistent expenditures categories across all districts and years. It would be beneficial to future editions of this report for the water management districts to report their conservation land expenditures independently in their budgets, annual financial reports, or as part of their Florida Forever work plans.

Table 2.2.10 provides expenditure data for conservation land management by each of the water management districts. Similar to the acquisition number above, these numbers are presented in the actual-audited budgets of the districts. Again, it would be ideal if these expenditures excluded lands that are managed for non-conservation purposes. In practice, these numbers cannot be categorized that cleanly and will include some management expenditures for other purposes. Similarly, some conservation land management expenditures may not have been categorized in the "3.1 Land management" category and will not be accounted for here. Note that the historic data is in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average as it best fits the nature of the data.

Table 2.2.10 Water Management District Land Management Expenditures (in $millions)

History	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$2.51	$2.38	$2.15	$2.49	$2.32
SJRWMD	$4.60	$4.12	$3.95	$4.35	$4.10
SFWMD	$20	$13	$15	$14	$27
SWFWMD	$4.24	$2.93	$2.70	$3.75	$3.62
SRWMD	$2.92	$1.82	$1.69	$1.60	$1.68
Total	$33.99	$24.61	$25.27	$26.39	$38.81
Forecast	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Total	$28.98	$30.26	$31.65	$30.30	$30.74

Source: Annual Budgets of the Water Management Districts.

Table 2.2.11 provides a forecast and details a history of expenditures[67] by special districts that are located in multiple counties for conservation land. Note that the historic data is in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average growth rate as it best fits the nature of the data.

[See table on following page]

[67] For further details on the source and methodology of this data, see the "Local Expenditures" section.

Table 2.2.11 Conservation Land Expenditures by Regional Special Districts (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Total	$2.73	$1.00	$1.38	$1.35	$1.75
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$1.75	$1.94	$2.19	$2.40	$2.68

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Account 537 in coordination with survey data.

Local Expenditures

Section 218.32, Florida Statutes, requires each local government entity that is determined to be a reporting entity, as defined by generally accepted accounting principles, and each independent special district as defined in section 189.012, Florida Statutes, to submit to the Florida Department of Financial Services (DFS) a copy of its Annual Financial Report (AFR) for the previous fiscal year no later than nine months after the end of the fiscal year. The AFR is not an audit but rather a unique financial document that is completed using a format prescribed by the department.

Furthermore, section 218.33, Florida Statutes, states "Each local governmental entity shall follow uniform accounting practices and procedures as promulgated by rule of the department to assure the use of proper accounting and fiscal management by such units. Such rules shall include a uniform classification of accounts." Assisted by representatives of various local governments, the DFS developed the Uniform Accounting System Chart of Accounts to be used as the standard for recording and reporting financial information to the State of Florida. Implementation of the standard Chart of Accounts and Standard Annual Reporting Form began in 1978, and since then, there have been minor changes and updates to both. As mandated by section 218.33, Florida Statutes, reporting entities should use this Chart of Accounts as an integral part of their accounting system so that the preparation of their AFRs will be consistent with other local reporting entities.

AFR account code 537.00[68] is used to itemize conservation and resource management expenditures. This can include land, water, or any other natural resource. In an effort to narrow this expenditure to conservation land, EDR conducted a survey of all local and regional governments that had listed an expenditure in this category in the last ten years asking them to indicate by-year shares of this expenditure that were specifically for conservation land acquisition. While not all entities responded, a large enough sample was provided to create average shares on county-wide, municipality-wide, and special district-wide level. Actual shares were applied to the account 537.00 data when given and average shares were applied to the non-responsive governments. Table 2.2.12 provides a forecast and details a history of expenditures by local governments on conservation land. Note that the historic data is in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average as it best fits the nature of the data.

[68] It is possible that some local government expenditures on conservation land acquisition may be reported in other AFR account codes. EDR will continue to explore this topic.

Table 2.2.12 Conservation Land Expenditures by Local Governments (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$44.58	$53.87	$46.46	$34.71	$43.11
Municipalities	$1.21	$2.05	$2.52	$2.07	$1.72
Special Districts	$2.94	$3.00	$5.17	$4.11	$20.45
Total	$48.73	$58.91	$54.16	$40.89	$65.29
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$52.91	$52.10	$54.74	$53.25	$53.36

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Account 537 in coordination with survey data.

2.3 Projecting Expenditures Required to Purchase Lands Identified for Conservation

Under the Florida Forever program, various acquisition lists or work plans are developed to identify projects that are eligible for Florida Forever funding. The Department of Environmental Protection (DEP), the Department of Agricultural and Consumer Services (DACS), the Fish and Wildlife Conservation Commission (FWC) and each of the five water management districts all maintain at least one list of lands identified for potential conservation. It is also possible that settlement agreements or final judgments would require discrete land acquisitions. While not incorporated in the report at this time, future editions may include this analysis if applicable.

State Agency Plans

The 2017 Florida Forever Priority List is the largest among all of the plans reviewed by EDR.[69] It identifies 118 areas approved for acquisition totaling 3,623,871 acres, of which 1,460,281, or 40.30 percent have already been acquired. For the remaining acreage, 1,460,502 are fee acres and 703,078 are less-than-fee acres[70]. The Florida Forever Five-Year Plan, which is a report containing more detailed project-specific information, provides the tax-assessed value of the acreage to be acquired for each project. The total estimated cost of purchasing these lands is $1,541.55 million for the fee and $738.53 million[71] for the less-than-fee.

The Florida Forever Priority List represents those proposed projects that have been approved by the Board of Trustees of the Internal Improvement Trust Fund for acquisition by DEP's Division of State Lands under section 259.105(3)(b), Florida Statutes. State agencies, local governments, nonprofit and for-profit organizations, private land trusts, and individual land owners may submit

[69] Florida Forever Priority List available at: http://publicfiles.dep.state.fl.us/DSL/OES/FloridaForeverAnnualRpts/FLDEP_DSL_OES_FloridaForeverAnnualReport2017_20170920.pdf. (Accessed December 2017).
[70] Numbers may not sum to the total due to rounding.
[71] Note that the San Felasco Conservation Corridor, a less-than-fee acquisition, did not have an assessed value. This value was estimated using the total cost per acre among other less-than-fee future acquisitions and applying it to the acres to be acquired for the corridor.

an application to the Acquisition and Restoration Council (ARC) for consideration of a new Florida Forever project or an addition to an existing, listed Florida Forever project.[72] The ARC conducts a full review of the proposed project if five of the ten voting members vote affirmatively to move the project to a full review.[73] Afterward, at least five ARC members must vote affirmatively to include the project on the Florida Forever list subject to approval by the Board of Trustees.[74]

On an annual basis, ARC is required to review the most current Florida Forever Priority List and develop a new list, ranked and prioritized pursuant to requirements in section 259.105, Florida Statutes, and rules promulgated in chapter 18-24 of the Florida Administrative Code. The new list is then presented to the Board of Trustees for approval.[75] The ARC categorizes and ranks each project within one of the following categories: Critical Natural Lands Project, Partnership and Regional Incentives Projects, Less-Than-Fee Projects, Climate Change Lands Projects, Substantially Complete Projects, and Critical Historical Resources Projects.[76] The Board of Trustees may remove projects from the list, but may not add any new projects or rearrange the priority rankings.[77]

DEP also prepares a Division of State Lands Annual Florida Forever Work Plan (DSL Work Plan) that further prioritizes the approved Florida Forever Priority List and sets forth available funding for land acquisition by the Division of State Lands in that fiscal year.[78] In developing the DSL Work Plan, DEP's Division of State Lands takes into consideration the categories of projects determined by ARC and places each project in the High, Medium, or Low Priority Group.[79] The High Priority Group represents no more than the top 33 percent of the project acreages within each category.[80] The final DSL Work Plan is a subset of the Florida Forever Priority List representing a selection of projects within the High Priority or Medium Priority Groups.

DEP's Division of Recreation and Parks (DRP) and its Office of Greenways and Trails (OGT) also develop and maintain individual acquisition or restoration lists pursuant to section 259.105(3)(l), Florida Statutes. These potential acquisition lists are developed in accordance with the specific criteria and performance measures of the Florida Forever program and represent projects that are eligible for Florida Forever funding by OGT and DRP under sections 259.105(3)(e) and (h), Florida Statutes. Specifically, DRP's list identifies inholding parcels and additions to existing state parks as well as eligible capital expenditures. OGT's list represents potential acquisitions of greenways and trails or greenways and trails systems pursuant to the Florida Greenways and Trails Act, chapter 260, Florida Statutes. The DRP and OGT lists identify acreage and expected acquisition costs.

[72] § 259.105(3), Fla. Stat.
[73] Fla. Admin. Code R. 18-24.004.
[74] § 259.105(13), Fla. Stat.
[75] *Id.*
[76] § 259.105(17), Fla. Stat.
[77] § 259.106(16), Fla. Stat.
[78] § 259.105(17), Fla. Stat.
[79] § 259.105(17), Fla. Stat.; *see also* Fla. Admin. Code R. 18-24.006.
[80] Fla. Admin. Code R. 18-24.006.

DEP also administers competitive grant programs that provide financial assistance to local governments and eligible nonprofit environmental organizations to acquire conservation and recreation lands through funds available under the Florida Forever program. The Florida Communities Trust, currently housed in DEP, administers the Parks and Open Space Grant Program and the Stan Mayfield Working Waterfront Program, and DEP's Division of Recreation and Parks administers the Florida Recreation Development Assistance Program. These grant programs fund projects based upon a competitive application cycles and, therefore, maintain priority funding lists that change each fiscal year based upon the applications for eligible projects. For this reason, these lists are not included in this assessment.

DEP maintains the Florida State Owned Lands and Records Information System (SOLARIS), which is intended to be a complete history of all land purchases by the state. This database identifies conservation lands and the funding sources. A historical breakdown of funding sources[81] for the lands held by DEP was used to develop the cost sharing estimates included in the table below. The full estimate of future expenditures necessary to purchase lands identified in the DEP plans came from agency reports and is shown in Table 2.3.1.

Table 2.3.1 Estimated Future Expenditures on Conservation Lands by DEP (in $millions)

	Fee Acres	Federal Cost	State Cost	Regional Cost	Local Cost	Fee Cost
FL Forever 5yr	1,460,502.00	$33.60	$1,397.86	$107.73	$2.36	$1,541.55
Greenways & Trails	52.69	$0.02	$1.02	$0.08	$0.00	$1.13
Rec & Parks	3,493.43	$0.19	$8.07	$0.62	$0.01	$8.90
Fee Total	1,464,048.12	$33.82	$1,406.96	$108.43	$2.37	$1,551.58
	LTF Acres	**Federal Cost**	**State Cost**	**Regional Cost**	**Local Cost**	**LTF Cost**
FL Forever 5yr	703,078.00	$16.10	$669.69	$51.61	$1.13	$738.53
Greenways & Trails	-	$-	$-	$-	$-	$-
Rec & Parks	-	$-	$-	$-	$-	$-
LTF Total	703,078.00	$16.10	$669.69	$51.61	$1.13	$738.53
	Total Acres	**Federal Cost**	**State Cost**	**Regional Cost**	**Local Cost**	**Total Cost**
DEP Total:	2,167,126.12	$49.92	$2,076.65	$160.04	$3.50	$2,290.11

Note: "$-" indicates an estimate of no future expenditures whereas "$0.00" indicates an estimate of future expenditures less than $5,000.

DACS administers land acquisition programs that purchase fee simple and less-than-fee simple interests in conservation lands. According to agency reports, the Rural and Family Lands Protection Program has acquired 15,937.93 less-than-fee acres at a total cost of $41.01 million for conservation since its inception in 2001. To estimate the cost of future potential acquisitions, EDR adjusted the program's historical conservation land purchases for inflation and calculated a historical cost per acre for the program in Fiscal Year 2016-17 dollars. Applying this to the less-than-fee acres for purchase yields an expected cost of $690.83 million for the 122 projects. Including the expected $14.24 million in pending acquisitions for the next year, the total estimated future expenditures for the Rural and Family Lands Protection Program is $705.06 million. Historically, the acquisitions have been funded 89.15 percent by DACS, 6.07 percent by the federal

[81] The database was reduced down to non-duplicate entries of conservation lands of more than zero acres acquired between Fiscal Years 1917-18 and 2016-17. The one hundred year date range is used to maintain a large sample and all prices are adjusted to a common base year to account for inflation.

government, and 4.79 percent by local governments. These shares were applied to the estimates of future costs.

DACS also receives funding through the Forest Legacy Program, a federal grant program administered by the U.S. Forest Service whose purpose is to support state efforts to protect environmentally sensitive forest lands.[82] According to agency reports, DACS has acquired 10,534 fee acres at a total cost of $42.42 million since the inception of the Forest Legacy Program in 2005. The agency has identified four properties totaling 2,200 fee acres and 8,018 less than-fee acres for acquisition in the next year with expected costs of $5.6 million and $13.76 million, respectively. Their future expected acquisition list identifies an additional 28 conservation properties totaling 37,138 fee acres and 61,640 less-than-fee acres with expected costs of $91.33 million and $44.91 million, respectively. Approximately 35.7 percent of the fee costs and 51.81 percent of the less-than-fee costs will be federally funded. Historically less than 2 percent of funding for these acquisitions has been privately provided. To avoid forecasting unpredictable future private expenditures and to remain focused on government expenditures, private expenditures are excluded for the purposes of cost sharing. The remaining costs have historically been split as follows: 49.02 percent state, 39.95 percent regional, and 11.03 percent local. These shares were applied to the estimates of future costs.

In addition to administering these programs, DACS maintains the Florida Forest Service Inholdings and Additions list pursuant to section 259.105(3)(f), Florida Statutes, which identifies potential inholding parcels and additions to existing state forests. The current list identifies 27 properties totaling 8,080.26 fee acres. The county in which these acres reside is indicated. To estimate the future costs, the cost per acre for each county, adjusted into Fiscal Year 2016-17 dollars, is calculated using the SOLARIS database and then applied to the county in which the desired land is located.[83] This yields a total estimated cost of acquisition of $32.55 million. The full estimate of future expenditures necessary to purchase lands identified by DACS plans is shown in Table 2.3.2.

Table 2.3.2 Estimated Future Expenditures on Conservation Lands by DACS (in $millions)

	Fee Acres	Federal Cost	State Cost	Regional Cost	Local Cost	Fee Cost
Rural Family Lands	-	$-	$-	$-	$-	$-
Forest Legacy	39,338	$34.60	$30.55	$24.90	$6.88	$96.93
Inholding/Addition	8,080	$0.77	$27.95	$2.44	$1.38	$32.55
Fee Total	47,418	$35.38	$58.50	$27.35	$8.26	$129.48
	LTF Acres	**Federal Cost**	**State Cost**	**Regional Cost**	**Local Cost**	**LTF Cost**
Rural Family Lands	336,457	$42.77	$628.54	$-	$33.75	$705.06
Forest Legacy	69,658	$30.39	$13.86	$11.29	$3.12	$58.67
Inholding/Addition	-	$-	$-	$-	$-	$-
LTF Total	406,115	$73.17	$642.40	$11.29	$36.87	$763.73
	Total Acres	**Federal Cost**	**State Cost**	**Regional Cost**	**Local Cost**	**Total Cost**
DACS Total:	**453,533**	**$108.54**	**$700.90**	**$38.64**	**$45.13**	**$893.21**

[82] https://www.fs.fed.us/spf/coop/programs/loa/aboutflp.shtml. (Accessed December 2017).

[83] One area of land for future acquisition resided in two counties. For this, the average cost/acre across the two counties was used.

FWC maintains an Inholdings and Additions Acquisitions list pursuant to section 259.105(3)(g), Florida Statutes, which identifies inholding parcels and additions to lands managed by FWC for the conservation of fish and wildlife. This list currently consists of 493 properties totaling 193,550.75 acres across the state. The county in which these acres reside is indicated. To estimate the cost of acquisition, the cost per acre per county, adjusted to Fiscal Year 2016-17 dollars, is derived from the SOLARIS database and applied to the acreage count in each county. These lands are estimated to cost $410.50 million. An estimate of all future expenditures by federal, state, regional, and local governments necessary to purchase lands identified in plans set forth by state agencies is shown in Table 2.3.3.

Table 2.3.3 Estimated Future Expenditures on Conservation Lands by State Agencies (in $millions)

	Acres	Federal Cost	State Cost	Regional Cost	Local Cost	Total Cost
DEP	2,167,126.12	$49.92	$2,076.65	$160.04	$3.50	$2,290.11
DACS	453,533.26	$108.54	$700.90	$38.64	$45.13	$893.21
FWC	193,550.75	$9.75	$352.46	$30.83	$17.46	$410.50
Total	2,814,210.13	$168.21	$3,130.00	$229.51	$66.09	$3,593.82

Note that these are rough estimates based primarily upon historical costs per acre and that only purchase price has been addressed. Actual costs would be some degree higher when accounting for further costs of acquisition, such as environmental assessments and appraisals, which are unique to each conservation land purchase.

Water Management District Plans

In 2001, the water management districts developed their initial Florida Forever Water Management District Work Plans (Work Plans) identifying projects that are eligible for funding under the Florida Forever Act as required under section 373.199, Florida Statutes. In developing these Work Plans, the water management districts were required to integrate their existing surface water improvement and management plans, Save Our Rivers acquisition lists, stormwater management projects, water restoration projects, and any other land acquisitions or activities that would assist in achieving the Florida Forever goals.[84]

These Work Plans are updated on an annual basis and are reported as a separate chapter in the water management districts' consolidated annual reports.[85] The annual updates include a status of land acquisition for the eligible projects, a list of projects completed during the year, modifications or additions to the Work Plan, a description of land management activities, a list of surplused lands, and the progress of funding, staffing, and resource management of district projects.[86]

[84] § 373.199(3), Fla. Stat.
[85] § 373.036(7), Fla. Stat.
[86] *Id.*

Each of the five water management districts provide some degree of detail regarding historic conservation land purchases and identify lands for future acquisition in their Florida Forever Work Plan Annual Reports. To supplement the data in these reports, greater detail regarding historic acquisitions was requested from and provided by the districts. To estimate all future expenditures by federal, state, regional, and local governments necessary to purchase the lands identified in these plans, a consistent methodology was required. Historic acquisition data identifies acreage obtained, type of ownership, region, purchase price, and funding source. EDR calculated the historic cost share by identifying the share of the total historic purchase price paid by federal, state, regional, local, and other dollars. Using price indices from the U.S. Bureau of Labor Statistics, all historic purchases were converted into federal fiscal year[87] 2016-17 dollars. A cost per acre was then determined for each region and each ownership type.[88] This allowed for fee and less-than-fee proposed acquisitions in differing regions of a district to have different estimated costs per acre. These costs per acre by ownership and region were then applied to the proposed acreage of those ownership types in those regions.[89] The estimated future expenditures to purchase conservation lands in WMD plans can be found in Table 2.3.4.

Table 2.3.4 Estimated Future Expenditures on Conservation Lands by WMDs (in $millions)

	Acres	Federal Cost	State Cost	Regional Cost	Local Cost	Total Cost
Northwest Florida	600,043.00	$15.86	$652.39	$14.58	$-	$682.83
St. Johns River	118,358.00	$18.36	$232.46	$14.37	$23.72	$288.91
South Florida	131,216.15	$31.14	$903.33	$355.39	$66.93	$1,356.79
Southwest Florida	602,300.00	$1,052.33	$2,670.81	$7.40	$670.38	$4,400.92
Suwannee River	59,501.00	$107.36	$184.42	$-	$-	$291.78
Total	1,511,418.15	$1,225.05	$4,643.42	$391.74	$761.03	$7,021.23

Note that these are rough estimates based primarily upon historical costs per acre and that only purchase price has been addressed. Actual costs would be some degree higher when accounting for further costs of acquisition, such as environmental assessments and appraisals, which are unique to each conservation land purchase.

These plans are often very broad and are not designed with the expectation that the purchase will be completed within a five-year period or even within the remainder of the current Florida Forever program. Moreover, they are not necessarily representative of the projects that the water management districts are actively pursuing for acquisition. Table 2.3.5 identifies total acreage of

[87] Federal fiscal years are from October 1 through September 30 and are used here because the WMDs report their data in this format.

[88] In the instance of a proposed acquisition existing in a region or of an ownership type not historically seen, WMD wide cost/acre was used for the ownership type.

[89] Exceptions to this methodology include: St. Johns River does not itemize their proposed acquisitions and only provide an acreage total. This acreage was split into fee and less-than-fee acquisition based on their historical purchases and district-wide costs per acre were applied to the total acreages by ownership type. South Florida did not provide less-than-fee or fee information, nor were historic acquisitions broken into regions. District-wide adjusted average costs per acre were used. Suwannee River's proposed acquisition list does not identify ownership type. This acreage was split into fee and less-than-fee acquisition based on their historical purchases. Additionally, not all proposed acquisitions could be matched to a region with historic purchases, so district-wide costs per acre were used. Finally, Suwannee River did not provide a list of potential acquisitions for 2017, but indicated the list will return in 2018 and that it has not changed since 2016.

the water management districts,[90] the approximate acreage they already hold in conservation[91], and the acreage identified for potential future acquisition along with the shares those acquisitions represent of the district's acreage. The final two columns indicate the amount of conservation land each district would hold in acres if all lands in the acquisition plans were acquired.

Table 2.3.5 Share of Florida Owned as Conservation Lands by WMDs

	Total Acres	Acquired Acres	Share	Future Acres	Share	Past + Future Acres	Share
Northwest Florida	7,108,509.00	223,555.00	*3.14%*	600,043.00	*8.44%*	823,598.00	*11.59%*
St. Johns River	7,500,208.00	760,000.00	*10.13%*	118,358.00	*1.58%*	878,358.00	*11.71%*
South Florida	10,311,310.00	1,200,000.00	*11.64%*	131,216.15	*1.27%*	1,331,216.15	*12.91%*
Southwest Florida	6,259,161.00	449,498.00	*7.18%*	602,300.00	*9.62%*	1,051,798.00	*16.80%*
Suwannee River	4,836,523.00	287,823.00	*5.95%*	59,501.00	*1.23%*	347,324.00	*7.18%*
Total	**36,015,711.00**	**3,278,947.00**	***9.10%***	**1,511,418.15**	***4.20%***	**4,790,365.15**	***13.30%***

Combined State and Water Management District Plans and Effects

Considering all lands identified in plans set forth by state agencies or water management districts, Table 2.3.6 identifies the total acreage and share of the state that would be acquired if all planned lands were obtained.[92] While the current acreage and shares include federal, local, and private conservation land acquisitions, the additions based on future plans do not. If all identified state and WMD lands were acquired, approximately 43.48 percent[93] of the state would be held as conservation land. If federal, local, and private plans were accounted for, this share would be even greater.

Table 2.3.6 Share of Florida to be Acquired as Conservation Lands

	Acres	Share
Current Cons. Land Acquired	10,657,205.00	30.93%
State Cons. Land to Acquire	2,814,210.13	8.17%
WMD Cons. Land to Acquire	1,511,418.15	4.39%
Total if all Acquired	14,982,833.28	43.48%

[90] Note that the acreage listed is calculated from GIS maps provided by the water management districts. The total acreage of the state differs from the total that is used to calculate the total share of conservation land in the state because the district maps include a large amount of water.

[91] Acquired Acres data was taken from each district's 2017 Florida Forever Work Plan.

[92] EDR has reason to believe that some overlap exists between the various plans. Further, the currently identified boundaries of future Florida Forever projects may include acreages that are no longer suitable for conservation. For example, projects that were listed early on may now have other improvements that would make those acreages no longer suitable for conservation. It is unclear how often boundaries are modified to reflect these changing situations.

[93] To allow for comparison across editions, this percentage is calculated using the state total 34.46 million acres that was used in the original edition of the report.

Adding the projected total costs for the additional conservation lands identified in plans produces a preliminary estimate of $10.6 billion as shown in Table 2.3.7. Of the total, the analysis suggests that nearly 75 percent would be a state responsibility. At the average rate of annual state conservation land acquisition expenditures over the most recent five fiscal years, this would take about 163 years to come up with the state's share. The extreme difference between the calculated need and the current level of investment indicates that serious policy discussion is necessary if these acquisition plans are to be undertaken. As is, this projection does not include all costs of acquisition (such as environmental assessments and appraisals) which makes it understated. Counteracting this effect is the possibility that the lands may be donated, exchanged, or sold cheaper than other similar lands were historically; this would result in lower actual future expenditures than the preliminary estimate suggests.

Table 2.3.7 Total Costs of Acquiring Additional Conservation Lands (in $millions)

	Federal Cost	State Cost	Regional Cost	Local Cost	Total Costs
State Cons. Land to Acquire	$168.21	$3,130.00	$229.51	$66.09	$3,593.82
WMD Cons. Land to Acquire	$1,225.05	$4,643.42	$391.74	$761.03	$7,021.23
Total if all Acquired	$1,393.26	$7,773.42	$621.25	$827.12	$10,615.05
Share of Total	13.13%	73.23%	5.85%	7.79%	

2.4 Forecasting Dedicated Conservation Land Revenues

EDR is required to forecast revenues that are "dedicated in current law to maintain conservation lands" for federal, state, regional, and local forms of government. After conducting an extensive legal review, EDR discovered that no significant sources of revenue exist that are dedicated in law solely for this purpose. Assuming the Legislature desired to accomplish this in the future, the 2017 edition of this report included a discussion that identified and forecasts revenues that have historically been used or might be available for this purpose.

Furthermore, as there is very little in current law indicating that revenue sources are dedicated to conservation land maintenance, the identification of potential gaps in projected expenditure and dedicated revenues is somewhat problematic. The 2017 edition of this report included a discussion of what the gap may look like if certain revenue sources were dedicated to maintaining conservation lands.

It is worth noting, however, that in Fiscal Year 2016-17 the state spent $38.86 per acre[94] on conservation land management. As seen previously, the state alone has identified over 2.8 million acres of land in plans for future conservation. This indicates that an additional $112.2 million will be necessary, on an annual basis, to cover the state management costs of those future acquisitions. Using this cost per acre and the total acreage currently in existence and potentially to be acquired in the future, a total of $597.2 million would be spent annually by federal, state, regional and local

[94] LMUAC Report, *supra* note 57.

forms of government as well as private entities for the purposes of managing conservation lands in Florida.

2.5 Additional Effects Associated with Conservation Lands

The direct effects on property taxes, by county, resulting from public and private ownership of conservation lands are described in subsection 2.1 of this report. Those results consider only the taxable value directly lost from the lands being held for conservation and do not consider any potential positive impact on the valuation of nearby parcels. However, if the value of surrounding properties grows faster as a result of the existence of the conservation land, a portion of the lost taxable value would be recovered. To the extent that the nearby presence of conservation land results in a one-time premium increase with no effect on future growth, there would be a much more modest effect. For this reason, EDR has chosen to analyze the potential positive ad valorem impact of conservation lands in Florida by comparing values of parcels in the conservation land (conservation zone), parcels in the surrounding area (surrounding zone), and ones in the remaining area of each county (zone-beyond).[95]

Analysis of Ad Valorem Impacts Resulting from Public Ownership

When the use of land is restricted to conservation purposes only, it is removed, fully or partially, from the local ad valorem tax base. From an economic perspective, this tax loss may be offset to some extent by increased tax collections on adjacent and nearby parcels. In this regard, conservation lands create amenities and/or open spaces that theoretically lead to increases in the market value of the parcels near the conservation land. Assuming this beneficial market effect exists, the heightened market value increases the just value of these parcels and potentially enlarges the local ad valorem tax base. This means that the overall impact on property taxes depends on the net loss resulting from the negative impact associated with public and private ownership of conservation lands and the positive impact associated with the degree to which any market value increases feed through to the taxable value. It is possible that the pattern of future growth would be influenced as the percentage of land dedicated to conservation increases in tandem with the desire for new development. This may be particularly relevant in counties where the share of conservation land is already high, as can be seen in Tables 2.1.2 through 2.1.4.

An economic theory referred to as the "proximate principle" indicates that residents would be willing to pay a price premium for properties close to an open space and that, as the property location moves away from the open space, the price premium reduces.[96] While EDR tested this principle in the previous edition of this report and did not find direct support for it, the methodology has now been refined to only analyze parcels directly adjacent to the conservation lands. In addition, the scope has been broadened to consider the possibility of other hypotheses. For example, an alternative hypothesis is that the acquisition of land for conservation purposes limits

[95] The negative impact on property taxes associated with public and private ownership of conservation lands is discussed in subsection 2.1.

[96] When comparison is done to find the effect of proximate principle, it should be done among comparable properties (i.e., holding other things equal).

the quantity of land available in a county for other purposes. This is referred to as the "scarcity hypothesis." If this hypothesis alone holds true, the value of *all* non-conservation lands would increase, particularly in urban counties.

Comparisons of parcel value and use (e.g., single-family, commercial, industrial) in the conservation zones, surrounding zones, and zone-beyond were completed to test the "proximate principle" and "scarcity hypothesis." As shown in Table 2.5.1, there are 133,743 parcels in the conservation zone, 92,965 parcels in the surrounding zone, and 4,959,825 parcels in the zone-beyond. Separating the 67 counties into urban and rural groups improves this analysis as urban counties hold higher population densities, have lower availability of nearby open space, and face higher competition for land than rural counties. Figure 2.5.1 provides a map showing the geographic distribution of rural and urban counties in Florida.

[See figure on following page]

Figure 2.5.1 Map of Urban and Rural Counties in Florida

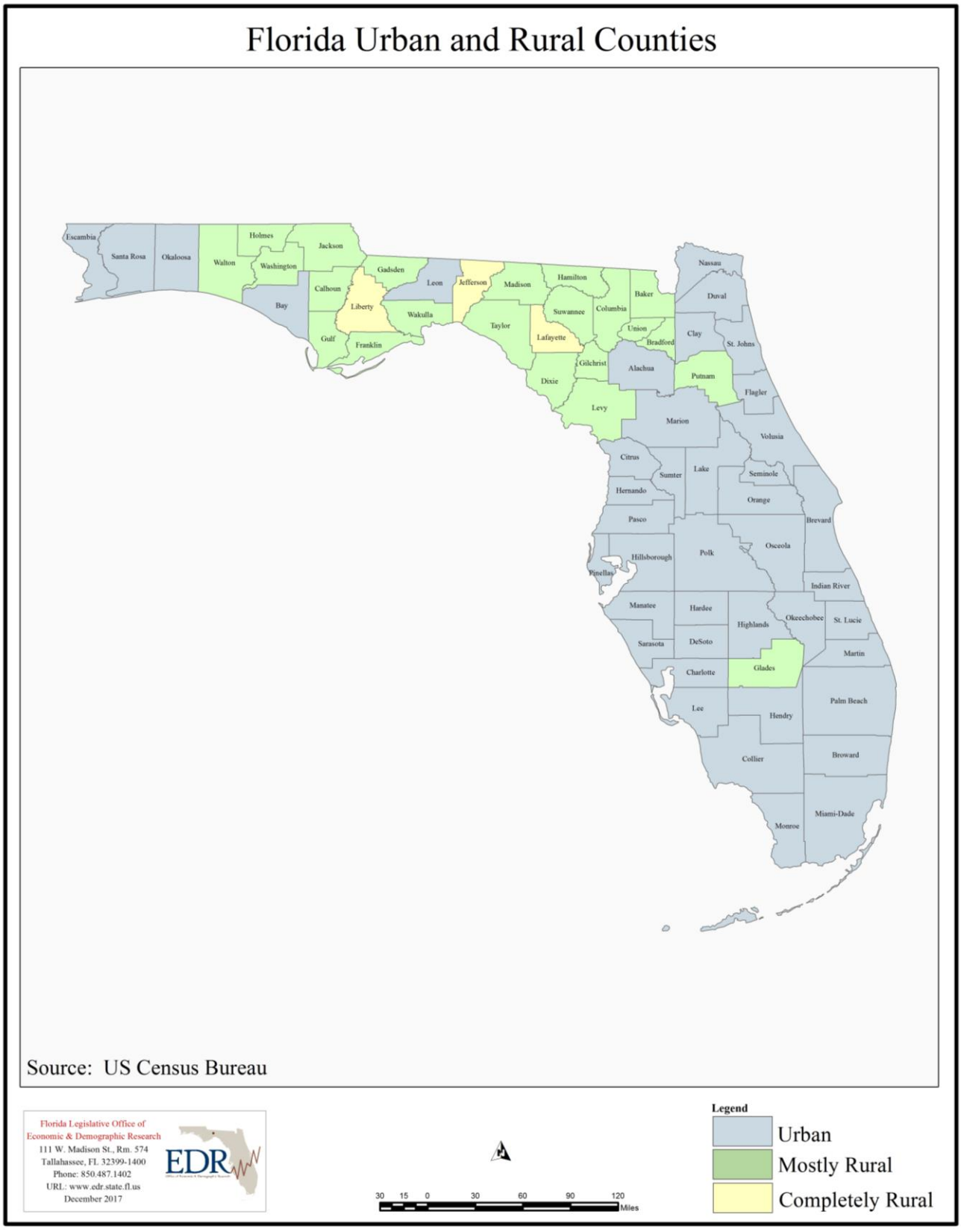


Table 2.5.1 Per-Acre Value Comparison across Zones, Part 1 – Urban Counties

	Conservation Zone			Surrounding Zone			Zone-Beyond		
County	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre
Alachua	665	$1,969	$1,439	1,628	$50,289	$3,617	56,729	$128,945	$30,974
Bay	255	$15,984	$8,846	391	$4,172	$1,287	56,895	$271,038	$106,318
Brevard	4,271	$5,049	$4,843	4,170	$7,620	$3,469	165,639	$270,639	$77,121
Broward	1,440	$2,587	$2,481	1,259	$54,546	$23,418	281,348	$1,475,040	$347,274
Charlotte	767	$1,404	$1,353	1,157	$3,971	$1,119	117,884	$147,622	$43,053
Citrus	587	$4,548	$4,456	2,619	$11,486	$4,454	86,473	$49,433	$13,268
Clay	315	$2,269	$1,915	755	$5,846	$1,640	53,924	$224,763	$62,788
Collier	36,618	$2,482	$2,060	2,327	$10,744	$5,426	102,837	$93,697	$41,119
Miami-Dade	16,385	$2,777	$2,482	2,255	$47,419	$28,693	298,706	$1,303,397	$624,825
DeSoto	238	$3,262	$1,811	272	$4,672	$1,282	11,258	$16,151	$4,737
Duval	1,501	$16,851	$12,863	2,246	$29,586	$10,838	196,691	$465,812	$132,624
Escambia	247	$74,964	$52,560	1,063	$22,709	$9,971	83,894	$233,926	$75,897
Flagler	237	$1,941	$1,125	473	$6,253	$2,643	43,396	$291,653	$72,876
Hardee	38	$2,069	$1,409	102	$3,719	$1,804	8,528	$11,289	$2,465
Hendry	396	$4,282	$3,284	314	$4,668	$2,217	21,041	$9,574	$3,962
Hernando	1,818	$3,866	$3,772	3,163	$7,543	$2,709	67,642	$99,369	$23,206
Highlands	3,777	$968	$820	5,190	$1,658	$856	67,410	$38,911	$12,680
Hillsborough	752	$10,316	$7,378	2,408	$18,996	$5,677	287,531	$690,165	$185,608
Indian River	412	$4,250	$3,931	585	$12,759	$4,356	44,832	$353,147	$87,671
Lake	1,950	$1,961	$1,880	3,089	$3,135	$1,599	100,281	$204,025	$62,293
Lee	2,604	$4,840	$4,611	2,135	$26,182	$7,890	263,310	$249,845	$66,933
Leon	313	$2,230	$2,129	1,689	$10,984	$2,461	61,619	$263,424	$65,870
Manatee	304	$2,106	$1,876	353	$5,112	$2,717	78,544	$678,756	$165,678
Marion	1,381	$2,587	$2,498	3,431	$8,010	$1,574	159,173	$53,572	$12,393
Martin	4,574	$8,396	$6,603	5,269	$15,842	$6,762	45,549	$350,287	$181,101
Monroe	26,279	$3,647	$2,820	7,030	$76,423	$49,154	50,191	$109,647	$73,928
Nassau	156	$6,333	$6,076	390	$7,573	$2,086	27,188	$120,408	$46,836
Okaloosa	344	$3,515	$2,577	1,080	$10,584	$4,809	54,324	$392,898	$149,632
Okeechobee	339	$2,490	$1,680	292	$1,693	$564	19,027	$16,534	$5,085
Orange	539	$3,521	$3,350	1,165	$22,936	$4,056	268,637	$694,220	$208,623
Osceola	702	$5,958	$4,736	867	$7,582	$1,295	84,281	$333,249	$84,155
Palm Beach	4,115	$4,165	$3,602	1,330	$7,708	$2,839	168,782	$885,479	$318,811
Pasco	580	$2,364	$1,696	1,498	$17,091	$5,005	143,378	$325,707	$86,253
Pinellas	454	$20,408	$19,330	951	$143,367	$51,418	178,154	$787,405	$303,430
Polk	2,706	$882	$558	5,052	$3,140	$871	212,330	$104,264	$25,878
St. Johns	718	$8,606	$6,585	1,318	$30,749	$14,505	64,871	$602,673	$194,260
St. Lucie	798	$8,903	$7,672	704	$11,857	$4,802	85,133	$341,823	$101,097
Santa Rosa	751	$3,574	$3,180	1,411	$4,311	$1,626	56,366	$120,153	$37,935
Sarasota	360	$8,055	$7,489	645	$36,768	$15,673	131,669	$318,680	$123,601
Seminole	617	$3,753	$3,264	905	$52,076	$13,833	88,775	$688,061	$178,465
Sumter	393	$1,718	$1,408	315	$3,601	$812	45,327	$472,182	$79,116
Volusia	3,201	$3,126	$2,724	7,611	$3,174	$853	153,104	$241,353	$57,268
Group	124,897	$4,047	$3,337	80,907	$12,766	$4,753	4,592,671	$279,262	$90,474
State	133,743	$3,546	$2,941	92,965	$10,262	$3,783	4,959,825	$186,429	$60,710

Table 2.5.1 Per-Acre Value Comparison across Zones, Part 2 – Rural Counties

	Conservation Zone			Surrounding Zone			Zone-Beyond		
County	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre
Baker	413	$801	$798	293	$1,616	$422	7,232	$29,407	$7,158
Bradford	89	$2,576	$1,109	330	$3,684	$1,023	8,971	$21,839	$7,197
Calhoun	31	$1,377	$762	47	$1,337	$218	6,420	$3,826	$1,117
Columbia	570	$1,150	$1,045	639	$2,397	$603	21,576	$21,551	$6,127
Dixie	343	$1,592	$939	454	$1,825	$487	9,588	$11,044	$4,016
Franklin	1,105	$1,524	$1,492	1,118	$11,585	$6,176	10,316	$148,660	$91,006
Gadsden	118	$1,359	$1,001	278	$2,707	$523	16,241	$18,349	$4,339
Gilchrist	236	$3,010	$2,588	445	$5,853	$1,396	8,084	$8,514	$2,909
Glades	311	$4,726	$1,546	324	$1,261	$302	6,701	$17,146	$8,679
Gulf	191	$7,226	$7,170	277	$4,014	$1,860	10,127	$92,091	$61,531
Hamilton	348	$1,858	$1,489	426	$1,895	$471	7,604	$3,688	$1,398
Holmes	64	$1,259	$1,239	119	$2,347	$328	8,321	$4,467	$785
Jackson	122	$3,502	$3,395	284	$2,659	$976	23,006	$5,566	$1,958
Jefferson	376	$1,087	$905	396	$2,081	$347	7,009	$6,574	$1,300
Lafayette	215	$909	$862	278	$1,285	$256	4,112	$3,440	$644
Levy	633	$1,550	$1,178	842	$2,402	$701	28,244	$10,889	$4,190
Liberty	683	$978	$962	334	$2,093	$344	3,361	$3,849	$1,055
Madison	164	$1,360	$1,292	203	$1,630	$350	9,452	$3,168	$745
Putnam	864	$1,832	$1,665	1,267	$2,565	$768	58,761	$17,844	$7,410
Suwannee	185	$1,904	$1,585	371	$3,576	$804	18,340	$7,402	$1,845
Taylor	286	$634	$631	310	$1,167	$341	10,955	$11,993	$3,515
Union	28	$7,431	$3,631	172	$4,254	$759	3,769	$12,023	$2,895
Wakulla	679	$1,814	$1,774	1,081	$5,174	$810	14,643	$24,776	$6,288
Walton	529	$4,341	$4,153	1,262	$10,515	$5,323	38,562	$85,948	$45,788
Washington	263	$891	$823	508	$1,588	$374	25,759	$4,542	$1,790
Group	8,846	$1,887	$1,633	12,058	$2,648	$834	367,154	$12,596	$4,976
State	133,743	$3,546	$2,941	92,965	$10,262	$3,783	4,959,825	$186,429	$60,710

Table 2.5.1 shows that per-acre just values in the surrounding zone are higher than those in the conservation zone for most counties (per-acre land values are also higher for 25 counties), which largely verifies the finding in subsection 2.1 that the use of parcels in conservation land is restrictive and hence generates less tax value. More important is the value comparison between the surrounding zone and the zone-beyond. While the proximate principle would suggest that values in the surrounding zone would be higher than those in the zone-beyond, the opposite is identified for every county. Such a result appears to contradict the proximate principle. This may be the result of the data used to construct the analysis. The parcels used include those coded for residential, commercial, industrial, and many other purposes and do not provide an "apples-to-apples" comparison. To further this comparative analysis, the next step is to categorize data into four major groups: residential, commercial, industrial, and others.[97]

[97]The NAL data codifies parcels with 99 use codes, along lines of residential, commercial, industrial, agricultural, institutional, governmental, miscellaneous, Centrally Assessed, and Non-Agricultural Acreage usages. Besides residential, commercial, and industrial groups, all other usages are lumped into the "other" group for the sake of simplicity in this report.

Limiting the analysis to residential parcels, there are only six counties in which both per-acre just value and land value in the surrounding zone are greater than those in the zone-beyond.[98] All of the six counties are rural, and no such positive difference is found in any urban county (see Table 2.5.2 Part 1 and 2). The Map of Figure 2.5.2 shows that the six counties are all located in or near the panhandle area, including Calhoun, Gilchrist, Hamilton, Jackson, Lafayette, and Union counties.

Table 2.5.2 Residential Value Comparison between Zones, Part 1 – Rural Counties

	Surrounding Zone			Zone-Beyond			Comparison*	
County	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre	JV/Acre	LV/Acre
Calhoun	5	$24,617	$6,743	4,258	$12,438	$5,584	1	1
Gilchrist	314	$14,833	$7,338	5,881	$10,889	$5,399	1	1
Hamilton	186	$11,255	$6,284	5,866	$7,581	$3,725	1	1
Jackson	71	$29,729	$7,161	18,881	$11,282	$4,490	1	1
Lafayette	119	$11,597	$5,224	2,059	$8,706	$4,236	1	1
Union	76	$34,682	$11,656	2,027	$21,496	$9,393	1	1
Baker	130	$18,588	$5,855	5,701	$38,808	$11,322	0	0
Bradford	112	$14,213	$6,589	7,748	$27,596	$10,335	0	0
Columbia	284	$10,289	$4,091	18,441	$24,733	$7,556	0	0
Franklin	988	$48,047	$27,270	9,481	$150,925	$88,926	0	0
Gadsden	97	$20,057	$4,009	13,905	$24,430	$6,159	0	0
Glades	86	$28,028	$13,899	4,921	$33,360	$14,756	0	0
Gulf	196	$36,771	$19,257	9,526	$108,396	$63,003	0	0
Holmes	29	$6,204	$2,385	4,595	$9,191	$3,308	0	0
Jefferson	67	$9,841	$3,731	3,829	$12,497	$4,857	0	0
Levy	454	$8,594	$4,512	24,689	$12,959	$5,618	0	0
Liberty	116	$4,914	$1,777	2,011	$11,483	$4,331	0	0
Putnam	833	$4,922	$1,796	56,580	$19,791	$8,172	0	0
Suwannee	208	$8,568	$3,384	15,303	$9,667	$3,528	0	0
Taylor	136	$10,526	$5,747	9,470	$18,152	$6,607	0	0
Wakulla	592	$18,097	$5,107	13,193	$30,763	$8,718	0	0
Dixie	216	$12,058	$7,669	8,271	$12,517	$5,425	0	1
Madison	80	$7,875	$5,480	5,867	$8,271	$3,622	0	1
Walton	793	$103,723	$55,373	35,855	$112,453	$53,864	0	1
Washington	252	$6,238	$3,364	22,812	$5,287	$3,851	1	0
Group	6,440	$19,213	$9,433	311,170	$24,097	$10,268	0	0
State	55,678	$49,009	$21,402	4,580,974	$300,581	$91,231	0	0

* 1 indicates that value in the surrounding zone is greater than its counterpart in the zone-beyond, 0 otherwise.

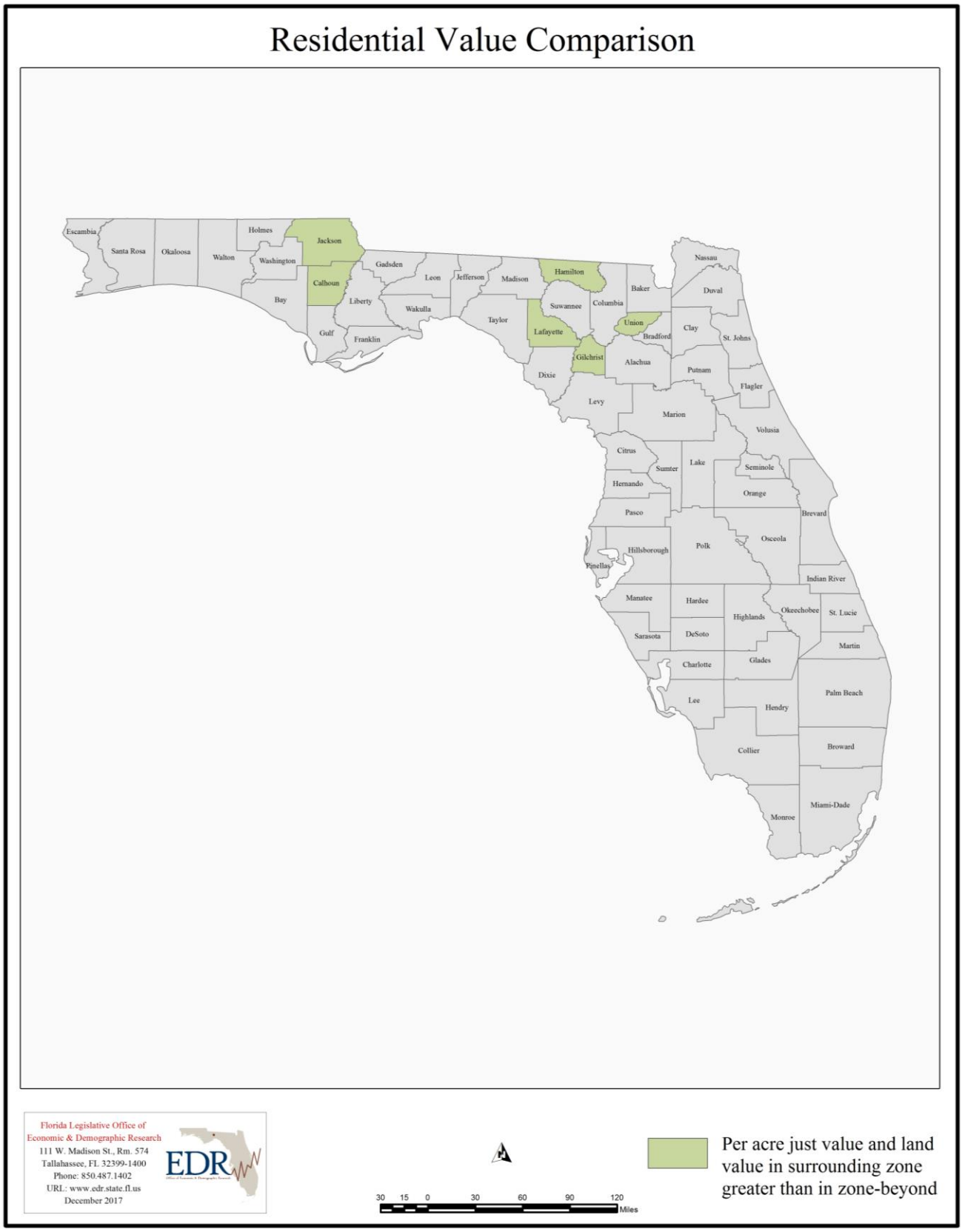
[98] The focal comparison should be between the surrounding zone and the zone-beyond as economic theories hypothesize that "premium" values are created due to the adjacency to the establishment of conservation land, compared to the rest of the county. Therefore, only the surrounding zone and the zone-beyond are listed in tables beginning with Table 2.5.2 through the remainder of this subsection.

Table 2.5.2 Residential Value Comparison between Zones, Part 2 – Urban Counties

	Surrounding Zone			Zone-Beyond			Comparison*	
County	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre	JV/Acre	LV/Acre
Alachua	968	$39,472	$7,824	50,107	$137,311	$31,743	0	0
Bay	197	$10,022	$3,876	50,998	$280,581	$93,706	0	0
Brevard	3,442	$10,751	$5,367	159,211	$317,588	$85,281	0	0
Broward	851	$812,265	$155,840	267,842	$1,516,556	$310,802	0	0
Charlotte	894	$23,173	$8,888	112,560	$166,108	$45,944	0	0
Citrus	1,985	$27,930	$10,670	81,227	$56,480	$12,522	0	0
Clay	540	$30,650	$9,290	51,453	$223,681	$56,995	0	0
Collier	609	$15,729	$10,364	85,253	$235,048	$97,903	0	0
Miami-Dade	425	$384,722	$225,985	280,966	$1,317,119	$606,451	0	0
DeSoto	85	$19,096	$7,501	7,592	$35,890	$10,481	0	0
Duval	1,720	$125,458	$46,759	185,238	$486,075	$121,511	0	0
Escambia	825	$138,372	$52,567	76,956	$239,336	$59,552	0	0
Flagler	276	$156,832	$66,068	42,208	$319,473	$73,715	0	0
Hardee	33	$20,082	$5,191	5,253	$29,573	$8,410	0	0
Hendry	93	$12,930	$7,281	18,496	$21,184	$10,570	0	0
Hernando	2,568	$36,688	$10,142	64,101	$112,844	$21,228	0	0
Highlands	4,730	$16,849	$5,828	59,766	$57,463	$16,390	0	0
Hillsborough	1,516	$128,793	$33,958	272,577	$731,152	$189,909	0	0
Indian River	438	$44,845	$23,181	41,832	$396,415	$84,352	0	0
Lake	1,651	$22,563	$8,629	92,806	$219,516	$59,672	0	0
Lee	1,254	$145,010	$62,225	243,113	$310,987	$76,932	0	0
Leon	1,251	$45,778	$11,779	57,803	$261,826	$59,771	0	0
Manatee	121	$45,345	$16,756	74,864	$715,199	$165,946	0	0
Marion	2,664	$33,348	$9,568	145,925	$72,626	$17,239	0	0
Martin	482	$367,890	$229,383	41,926	$473,634	$258,406	0	0
Monroe	4,670	$46,752	$32,744	31,126	$192,456	$126,363	0	0
Nassau	252	$51,355	$18,403	25,098	$123,257	$45,891	0	0
Okaloosa	591	$61,383	$25,702	50,024	$423,232	$146,098	0	0
Okeechobee	53	$8,106	$4,757	16,588	$30,786	$10,143	0	0
Orange	896	$99,759	$29,500	254,925	$730,251	$202,840	0	0
Osceola	494	$71,741	$14,795	80,249	$401,828	$84,945	0	0
Palm Beach	818	$175,115	$68,729	158,542	$925,384	$333,374	0	0
Pasco	935	$101,070	$22,065	135,836	$346,126	$79,846	0	0
Pinellas	755	$533,804	$179,314	168,670	$809,372	$319,898	0	0
Polk	1,090	$19,091	$6,482	190,037	$145,332	$35,347	0	0
St. Johns	941	$233,234	$122,898	62,225	$642,035	$200,692	0	0
St. Lucie	455	$104,667	$55,166	80,629	$398,520	$101,204	0	0
Santa Rosa	747	$31,528	$13,199	52,718	$128,387	$33,923	0	0
Sarasota	428	$205,192	$95,516	125,552	$396,290	$141,817	0	0
Seminole	670	$114,234	$30,084	84,521	$707,018	$161,576	0	0
Sumter	95	$6,719	$1,783	43,575	$633,712	$87,609	0	0
Volusia	5,730	$10,143	$4,144	139,416	$267,711	$50,211	0	0
Group	49,238	$54,287	$23,522	4,269,804	$385,059	$115,969	0	0
State	55,678	$49,009	$21,402	4,580,974	$300,581	$91,231	0	0

* 1 indicates the value in the surrounding zone is greater than the counterpart in the zone-beyond, 0 otherwise.

Figure 2.5.2 Map of Residential Value Comparison between Zones



Compared to the results in Table 2.5.1, the numbers in Table 2.5.2 seem to demonstrate that per-acre values in the surrounding zone are greater than ones in the zone-beyond for some rural counties, but not for any urban counties. A further step worth taking in this analysis is to narrow the data to focus on parcels used for single-family housing only.[99] Table 2.5.3 (Part 1 and 2) presents results for this subgroup of single-family parcels. In this table, there are twelve rural counties and three urban counties where both per-acre just values and land values in the surrounding zone are found to be greater than those in the zone-beyond. This finding may indicate some support for the existence of "premium" values in the surrounding zone; however, the rural areas of the state still dominate, which is contrary to expectation. Figure 2.5.3 shows the locations of these 15 counties (three coastal urban counties and twelve rural counties).

Table 2.5.3 Single-Family Value Comparison between Zones, Part 1 – Rural Counties

	Surrounding Zone			Zone-Beyond			Comparison		
County	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre	JV/Acre	LV/Acre	Conservation % of County Land
Calhoun	2	$51,658	$11,541	1,052	$20,097	$5,744	1	1	1.66%
Dixie	52	$23,096	$10,887	1,336	$18,698	$5,173	1	1	26.57%
Gilchrist	69	$26,057	$8,358	997	$16,448	$4,896	1	1	3.51%
Glades	29	$59,071	$22,348	702	$44,774	$12,555	1	1	16.88%
Hamilton	33	$24,185	$7,354	463	$13,443	$2,937	1	1	7.40%
Jackson	35	$41,388	$8,608	4,405	$20,234	$4,471	1	1	3.50%
Jefferson	26	$21,175	$5,142	939	$20,013	$4,548	1	1	28.09%
Lafayette	23	$23,921	$5,838	279	$14,858	$3,803	1	1	17.36%
Madison	3	$15,855	$4,061	973	$13,786	$3,006	1	1	3.51%
Union	27	$56,602	$12,795	434	$28,994	$8,201	1	1	4.59%
Walton	306	$235,986	$89,436	14,045	$157,660	$45,225	1	1	34.76%
Washington	28	$12,734	$3,076	358	$6,544	$2,265	1	1	13.85%
Baker	40	$24,155	$5,695	2,279	$54,618	$12,090	0	0	44.34%
Bradford	36	$20,885	$8,806	3,221	$37,071	$10,418	0	0	11.58%
Columbia	76	$14,657	$3,904	6,920	$37,015	$7,305	0	0	29.69%
Franklin	409	$88,190	$37,585	3,676	$203,272	$85,948	0	0	55.03%
Gadsden	46	$21,722	$4,824	6,196	$32,424	$5,507	0	0	6.30%
Gulf	72	$51,935	$14,722	3,755	$136,264	$48,437	0	0	15.40%
Holmes	11	$8,570	$2,228	1,301	$12,462	$2,884	0	0	4.59%
Liberty	28	$5,460	$1,793	447	$17,259	$4,008	0	0	63.24%
Putnam	186	$4,913	$1,200	5,337	$23,284	$6,936	0	0	24.25%
Suwannee	43	$12,586	$2,821	2,285	$15,371	$2,862	0	0	4.91%
Wakulla	235	$26,063	$4,922	3,820	$40,159	$7,354	0	0	63.07%
Levy	88	$13,442	$5,245	2,691	$18,405	$4,683	0	1	24.58%
Taylor	33	$20,773	$8,467	2,761	$25,856	$5,247	0	1	14.53%
Group	1,936	$29,792	$10,545	70,672	$39,510	$10,529	0	1	22.97%
State	20,718	$114,982	$44,325	3,362,633	$414,748	$115,891	0	0	30.26%

* 1 indicates the value in the surrounding zone is greater than the counterpart in the zone-beyond, 0 otherwise.

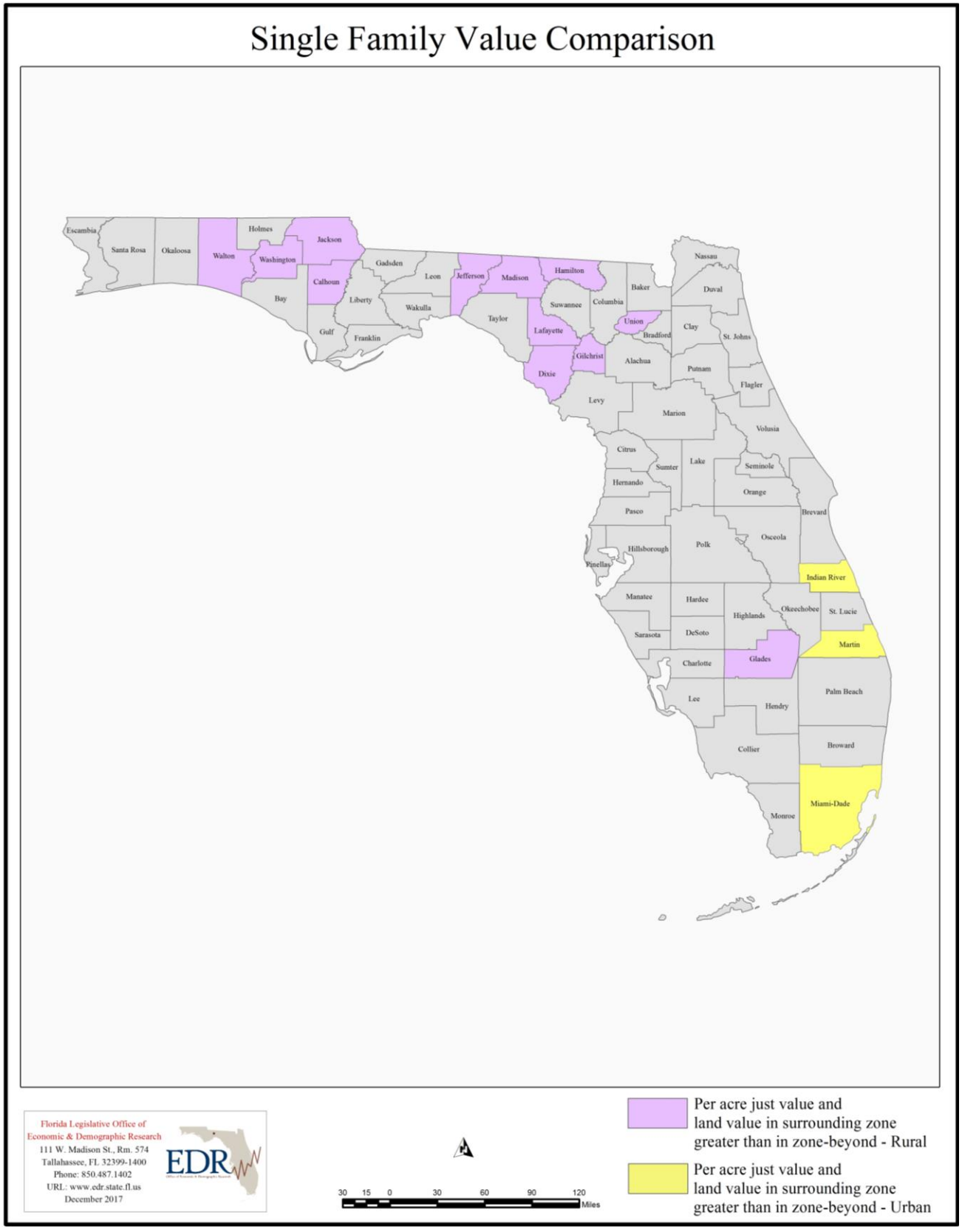
[99] The NAL dataset specifies ten sub-codes for residential parcels, from residential vacancy to condominiums. Focusing on only single-family parcels facilitates an "apples-to-apples" comparison.

Table 2.5.3 Single-Family Value Comparison between Zones, Part 2 – Urban Counties

	Surrounding Zone			Zone-Beyond			Comparison		
County	# of Parcels	JV/Acre	LV/Acre	# of Parcels	JV/Acre	LV/Acre	JV/Acre	LV/Acre	Conservation % of County Land
Miami Dade	310	$1,579,412	$941,198	255,490	$1,308,371	$600,426	1	1	70.00%
Indian River	202	$422,686	$161,280	35,827	$422,291	$72,705	1	1	33.52%
Martin	335	$534,948	$315,324	32,910	$512,943	$274,275	1	1	17.56%
Alachua	653	$24,452	$5,773	40,676	$142,935	$30,166	0	0	19.68%
Bay	53	$36,483	$8,317	37,168	$308,175	$87,405	0	0	14.43%
Broward	696	$1,169,388	$267,445	250,637	$1,510,090	$307,158	0	0	61.98%
Charlotte	96	$112,545	$22,029	37,349	$270,164	$31,348	0	0	35.52%
Clay	227	$45,100	$11,210	42,696	$260,628	$62,050	0	0	36.34%
Collier	172	$134,514	$68,677	55,761	$367,751	$133,498	0	0	66.99%
DeSoto	23	$41,815	$8,494	2,734	$43,622	$9,257	0	0	12.33%
Duval	1,202	$181,398	$62,339	178,372	$481,230	$115,042	0	0	21.20%
Hardee	21	$40,258	$7,900	2,515	$43,068	$8,703	0	0	1.20%
Hernando	651	$66,641	$11,144	42,132	$134,516	$19,833	0	0	28.65%
Highlands	235	$57,597	$6,724	14,945	$103,060	$16,065	0	0	28.60%
Hillsborough	1,070	$185,644	$50,588	259,336	$730,827	$194,189	0	0	17.24%
Lake	646	$36,078	$10,732	67,258	$231,873	$55,446	0	0	30.21%
Leon	682	$63,767	$14,706	50,692	$260,339	$57,193	0	0	35.63%
Manatee	82	$74,056	$22,741	62,156	$739,668	$152,013	0	0	12.95%
Marion	901	$55,755	$10,758	60,238	$104,757	$17,251	0	0	35.78%
Monroe	1,667	$306,067	$170,910	14,660	$970,884	$531,014	0	0	96.30%
Nassau	148	$96,195	$29,769	14,701	$159,849	$46,124	0	0	7.12%
Okaloosa	434	$115,319	$43,443	44,619	$440,943	$139,909	0	0	54.11%
Okeechobee	12	$22,400	$10,179	4,478	$58,474	$11,766	0	0	18.16%
Orange	351	$176,093	$53,699	214,310	$759,260	$208,373	0	0	16.86%
Osceola	238	$120,453	$23,473	65,293	$431,081	$79,570	0	0	20.02%
Palm Beach	425	$299,028	$113,959	145,568	$933,810	$328,276	0	0	34.55%
Pasco	675	$133,351	$28,353	103,914	$367,203	$72,628	0	0	22.95%
Pinellas	664	$591,857	$210,074	156,328	$812,606	$325,605	0	0	12.76%
Polk	403	$37,542	$10,209	116,278	$208,706	$41,878	0	0	24.76%
St. Lucie	288	$134,861	$55,149	67,834	$426,900	$98,093	0	0	10.70%
Santa Rosa	329	$57,231	$17,362	35,369	$149,147	$30,288	0	0	40.35%
Sarasota	301	$188,399	$85,637	98,839	$424,774	$136,246	0	0	45.37%
Seminole	517	$164,392	$39,934	81,592	$699,756	$156,647	0	0	20.93%
Sumter	39	$5,714	$1,015	37,943	$758,857	$99,693	0	0	31.25%
Volusia	487	$56,737	$15,501	121,215	$274,402	$45,493	0	0	30.42%
Brevard	746	$225,277	$90,030	132,006	$342,567	$84,325	0	1	42.04%
Citrus	772	$50,400	$15,696	28,165	$84,538	$11,699	0	1	37.41%
Escambia	582	$230,967	$77,028	67,492	$243,543	$54,049	0	1	11.30%
Flagler	168	$278,206	$88,575	26,143	$424,128	$58,222	0	1	13.99%
Hendry	11	$41,163	$10,914	1,122	$41,094	$10,934	1	0	20.39%
Lee	648	$290,552	$102,754	134,434	$418,386	$72,488	0	1	21.01%
St. Johns	620	$452,280	$203,485	50,766	$701,688	$188,010	0	1	19.67%
Group	18,782	$141,884	$54,993	3,291,961	$473,268	$132,322	0	0	33.49%
State	20,718	$114,982	$44,325	3,362,633	$414,748	$115,891	0	0	30.26%

* 1 indicates the value in the surrounding zone is greater than the counterpart in the zone-beyond, 0 otherwise.

Figure 2.5.3 Map of Single Family Property Value Comparison between Zones



The results shown in Table 2.5.3 do not appear to support the theory that higher values are generated by proximity to conservation zones, at least at a statewide level. Further analysis is needed to explain why higher value existed in the 12 rural and 3 urban counties noted above. Future research will focus on these counties and their unique properties.[100]

A similar analysis was performed for the commercial and industrial groupings. One would expect that commercial and industrial entities would not place higher value on properties near conservation areas. The results were opposite from what was expected.[101] Commercial and industrial properties both showed higher value when in the surrounding zone than when in the zone-beyond. Of these land uses, the lower valued industrial parcels showed the strongest effect. This may suggest that the conservation value is the highest value for these areas of the state and, absent that value, there would be no meaningful market. In effect, the acquisition of conservation land establishes a new price floor. However, this theory is a working hypothesis and future reports need to delve into this further.

Further, the sample size in the surrounding zone for each county is relatively small, particularly for rural counties, and is even smaller for particular land uses such as commercial and industrial. For example, counties like Calhoun and Madison have only two and three single family parcels in the surrounding zone, respectively. Valuation of such small samples may reflect more of particularity of such individual parcels, rather than representativeness of parcel valuation in general.

Table 2.5.4 Parcel Distributions in Types of Usage

	Residential		Commercial		Industrial		Other		Total	
	# of Parcels	%	# of Parcels	%	# of Parcels	%	# of Parcels	%	# of Parcels	%
Conservation Zone	6,460	4.83%	444	0.33%	27	0.02%	126,812	94.82%	133,743	100.00%
Surrounding Zone	55,678	59.89%	2,051	2.21%	584	0.63%	34,652	37.27%	92,965	100.00%
Zone-beyond	4,580,974	92.36%	159,840	3.22%	47,530	0.96%	171,480	3.46%	4,959,825	100.00%

Considering sample size is critical when parcels are divided into subgroups by usage types.[102] For example, in Table 2.5.4, 133,743 parcels are found in the conservation zone across the state. For parcels in the surrounding zone, 60 percent of them are residential and 37 percent are in the "other" category. When it comes to the zone-beyond, 90 percent of those parcels are residential. The representation of commercial and industrial parcels are very small in the surrounding zone, which contributes to their respective samples being small.[103]

[100] The type of conservation land may matter, too. In this regard, urban parks with recreational activities and attractive views for property holders may exhibit an effect, while a vast wetland in a remote area may not.
[101] Given the preliminary nature of the results derived from the data, tables for commercial, industrial, and other use codes are not included in this report. Copies of these tables are available from EDR upon request.
[102] Subgroups of each usage type will be further distributed into 67 counties.
[103] When defining "surrounding zone" a level of arbitrariness is probably unavoidable. Another difficulty could be the possibility that there exist not as many single family parcels in some of the rural counties.

Table 2.5.3 can further be used to begin evaluating the scarcity hypothesis by considering the share of each county held for conservation. Conservation land as a percentage of county land is a better measure of the degree to which land has been reserved for conservation purposes, indicative of land scarcity for non-conservation purposes. While an initial review of these percentages does not show any detectable pattern, future editions of this report will further analyze this hypothesis.

Results presented in the discussion and tables of this subsection do not yet provide support for the theories being tested, and the analysis is still inconclusive. However, the findings provide guidance as to where future research is needed. This edition does not include any positive ad valorem impact resulting from the existence of conservation lands in Florida.

2.6 Costs of Acquisition and Maintenance under Fee and Less-than-fee Simple Ownership

EDR is required to compare the cost of acquiring and maintaining conservation lands under fee simple or less-than-fee simple ownership. In the 2017 edition of this report, EDR indicated that in order to quantify the difference in the cost of acquiring and maintaining conservation lands under fee simple or less-than-fee simple ownership, EDR would need to analyze the costs of acquiring and maintaining an acquisition project in fee simple versus the cost of acquiring a lesser interest in the *same* project. Further, one would have to assume that the acquisition of a lesser property interest than fee simple would be appropriate and consistent with the overall conservation goals identified for the property, which, in reality, will differ from project to project.

It is intuitive that incorporating alternatives to fee simple acquisition (such as a conservation easement) allows more lands to come under public ownership for conservation or recreation purposes with less expenditure of state funds for acquisition. When a less-than-fee simple interest in land is acquired, public agencies purchase only those rights or interests in the land that are necessary to achieve the conservation or protection goals of the land. The private landowners retain the possessory interest over their land and all the uses for the rights or interests not specifically acquired by the public agency.[104] Allowing private landowners to remain stewards of their own land, when appropriate to achieve public policy goals, additionally reduces the state's costs to manage the lands in the future.

Public land acquisition agencies are encouraged to include less-than-fee simple techniques to augment their traditionally fee simple acquisition programs.[105] As such, the option to negotiate a less-than-fee interest as part of, or in lieu of, an otherwise proposed fee acquisition is permissible. There are also specific public land acquisition programs or categories within programs that seek to identify only less-than-fee acquisitions, such as the Rural and Family Lands Protection Program and the less-than-fee category of the Florida Forever Priority List.

To provide further comparison of the cost to acquire a less-than-fee interest in land versus a fee simple interest, EDR reviewed appraisal reports for four less-than-fee acquisition projects. Each

[104] § 253.0251(2), Fla. Stat.
[105] § 253.0251(1), Fla. Stat.

of the four projects evaluated had an estimated value of over $1 million and therefore, two independent appraisals were available for each project.[106] All four projects consisted of properties with active agricultural operations. The projects were ranked as Tier One projects on the 2016 Rural and Family Lands Protection Program List or included in the less-than-fee category of the Florida Forever Priority List. All four easements authorized continued agricultural use with some degree of limitation to protect the overall conservation values of the property. The three easements negotiated under the Rural and Family Lands Protection Program identified DACS' Florida Forest Service (FFS) as the monitoring agency. The fourth easement negotiated by DEP's Division of State Lands (DSL) as part of the Florida Forever Priority List identified DEP's Office of Environmental Services (OES) as the monitoring agency. While the specific rights reserved by the property owners varied slightly among the four easements, all of the easements prohibited activities and uses inconsistent with the conservation purposes of the easement.

Generally, all eight appraisals provided an opinion of the market value of the proposed easement by taking the difference between the market value of the land before placement of the easement and the market value of the land once the easement is in place. EDR reviewed the assessed market values of the four easements and found that on average the less-than-fee market value was 52 percent of the fee simple market value with a range from 45 percent to 65 percent of the fee simple market value. Further, the appraisals for the same properties were not significantly different being only one to two percent apart from one another. In the future, EDR will continue to review appraisals for less-than-fee acquisitions to determine whether the average market value of the less-than-fee interests is stable over time. Note, however, that EDR did not examine the final acquisition price of these four projects, which may have been more or less than the actual market value of the conservation easement and is highly dependent upon the individual negotiations between the seller and the state.

As for management costs, because less-than-fee acquisitions do not generally provide for active management by the state agency and, instead, allow for the property owner to retain primary management responsibility, the costs to the state for management of these lands are minimal and are generally limited to expenditures related to monitoring onsite activities for consistency with the easement provisions. In addition, for the four acquisition projects reviewed by EDR, the purpose of the easement was to preserve portions of the property as productive farmland and forestland while preserving the properties' natural resource values. Therefore, analyzing the cost to manage these particular parcels if the state acquired a fee simple interest is somewhat misleading because the acquiring agencies did not appear to intend a fee simple acquisition as an alternative to these projects. While EDR cannot determine what the management costs would have been for the four less-than-fee projects had the acquiring agency purchased a fee simple interest, EDR did compare monitoring costs and management costs identified in the 2017 Land Management Uniform Accounting Council (LMUAC) Report.

The cost identified by DSL/OES to monitor conservation easements and land protection agreements in Fiscal Year 2016-17 was $0.21 per acre.[107] There were no costs reported by

[106] § 253.025, Fla. Stat. (requiring two appraisals when the estimated value of the parcel exceeds $1 million and requiring a third appraisal if the first two appraisals exceed $1 million and differ significantly).
[107] Note that this cost per acre includes all conservation easements, not only those that are monitored in a given year. Excluding non-monitored acreage in Fiscal Year 2016-17, the cost per-acre would be $1.09.

DACS/FFS for monitoring easements acquired under the Rural and Family Lands Protection Program. In comparison, the average cost per acre for fee simple lands managed by the Florida Fish and Wildlife Commission (FWC) and FFS was $26.64 per acre. EDR did not include a statewide average of the costs per acre reported by all five land managing agencies because some of the figures did not appear to reflect a realistic management cost for the four projects (e.g., Division of Historic Resources' $10,531 per acre to manage historic properties). Instead, EDR assumed that the four less-than-fee projects would be managed for similar purposes and uses as those properties managed by FFS and FWC if fee simple interests were acquired.

3. Assessment of Water Management District Supply & Demand Projections

Part of section 403.928(1)(b), Florida Statutes, requires EDR to include a compilation of projected water supply and demand data developed by each water management district (WMD) with notations regarding any significant differences between the methods used by the districts to calculate the data. This section further requires EDR to estimate future expenditures necessary to achieve the Legislature's intent that sufficient water be available for all existing and future reasonable-beneficial uses and the natural systems, and that adverse effects of competition for water supplies be avoided. Accomplishing this will require an integrated model of Florida's water supply and demand that can be used to evaluate impacts of varying water supply and demand on the Florida economy. EDR will ultimately categorize water demand in a way that will be optimal for its modelling efforts, and these categories may be slightly different than the categorization used by the WMDs. The underlying drivers of water demand, however, are the same. Subsections 3.1 and 3.2 discuss the demand and supply projections of the WMDs, respectively. While the integrated supply and demand model is still several years from deployment, subsection 3.3 discusses EDR's current efforts and the data that is necessary to create such a model.

Background

A recent public opinion survey conducted by the University of Florida shows that the majority of Floridians rate water as an issue of top importance for the state.[108] Floridians rely on underground freshwater reserves, called aquifers, to supply most of the state's diverse water needs. In some areas, surface water sources, such as lakes and reservoirs, are also used as a water supply source. In many regions of the state, these traditional groundwater and surface water sources can no longer meet the growing water demands of the population, while also feeding Florida's rivers, springs, and lakes. This has led policy makers to focus on water resource management and identify alternative water sources.

The water demand categories and terminology used in the following discussion represent those of the WMDs, the Florida Department of Environmental Protection, and the U.S. Geological Survey. Many of these demand categories are referred to as "supply" or "self-supplied" while actually representing an underlying demand. For example, in the majority of WMDs the "public supply" category represents the demand of all users receiving water from a public or private utility and does not represent the total potential available supply of water. As EDR is required to analyze the supply and demand data of the WMDs while noting differences, the terminology of the WMDs is used throughout the following subsection.

How Many Floridians Will There Be?

Increasing use of water is largely driven by the growing Florida population. Over the span of less than 50 years, the state changed from a mostly rural state with a population of 7 million in 1972[109]

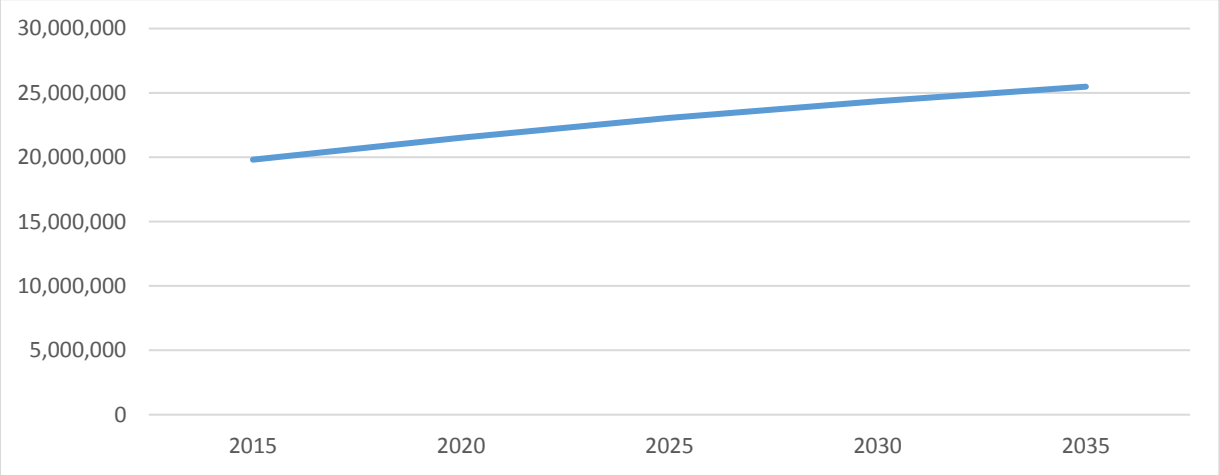
[108] Lamm, A. 2016. Public opinions of water quantity & quality (2016). Center for Public Issues Education, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. http://www.piecenter.com/issues/water/water/ (Accessed December 13, 2017)

[109] "Florida Estimates of Population 1972" Bureau of Economic and Business Research, University of Florida (1973). Available in EDR. 2017. Population and Demographic Data - Florida Products. Historical: Countywide,

to the third most populous state in the nation (after California and Texas) with a population of 20.5 million as of April 2017. Between 2017 and 2035, Florida's population is expected to increase by another 25 percent, or approximately 5 million residents.[110] This increase is similar to accommodating five more cities the size of Jacksonville in the next 18 years.

Growth rates vary throughout the state, with four metropolitan areas accounting for most of the population growth: Miami – Palm Beach area, greater Orlando area, Tampa area, and Jacksonville area. Even though the population increase is smaller in the other regions, in every county the population is projected to grow, requiring plans for meeting additional water needs.[111]

Figure 3.1.1 Projected Population in Florida



Source: Florida Demographic Estimating Conference, December 2017.

Water Sources

The state has historically relied mostly on fresh groundwater to provide for its needs. Groundwater's high quality, plentiful supply during low rainfall seasons, and ease of access historically made the cost of withdrawing, treating, and supplying fresh groundwater very low. In selected regions in south Florida and the Florida panhandle, easily accessible surface water from lakes, reservoirs, or canals also provided for a part of water needs.

In 2015, estimated total water demand in Florida was 6,407.2 million gallons per day (mgd),[112] and nearly two-thirds of water demand (65 percent) was provided by groundwater.[113] Public supply, which largely represents residential, commercial, and industrial customers served by public and private utilities, is especially dependent on groundwater, with 89 percent of water for

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Unincorporated and Incorporated Totals: 1972-2017. http://edr.state.fl.us/Content/population-demographics/data/index-floridaproducts.cfm. (Accessed on December 13, 2017).

[110] Florida Demographic Estimating Conference, December 2017.

[111] *Id*.

[112] Compiled by EDR based on WMDs' Regional Water Supply Plans and Water Supply Assessments.

[113] Marella, R.L., 2015, *Water withdrawals in Florida*, 2012: U.S. Geological Survey Open-File Report 2015–1156, 10 p., http://dx.doi.org/10.3133/ofr20151156.

public water supply provided by aquifers. Agriculture is the second largest user of groundwater,[114] with 56 percent of water for agricultural use provided by groundwater.[115]

Freshwater withdrawals have increased to the point where they are impacting water resources and related natural systems in some regions.[116] Alternative water sources (such as reclaimed water, or brackish groundwater) have to be considered in water supply planning, and water from these sources is typically more expensive to treat and deliver, as compared to traditional groundwater and surface water sources.

How Much Water Will Be Needed?

According to water demand projections developed by the state's five water management districts (WMDs) for planning purposes, from 2015 to 2035, water demand is expected to increase by 17 percent, from 6,407.2 to 7,515.9 mgd. Each of the WMDs categorizes its water demand into six generally consistent categories: public supply (e.g., water utilities), domestic self-supplied (e.g., wells providing for both indoor and outdoor household water needs), agricultural self-supplied, recreational-landscape irrigation (e.g., golf courses and parks), commercial-industrial-institutional-mining self-supplied, and power generation. Driven by population growth, public supply is expected to increase from 2,508.4 to 3,091.7 mgd (or by 23 percent). More water will also be used to provide for such needs of the growing population as recreational-landscape irrigation and power generation. While by absolute value the increases of recreational-landscape irrigation and power generation categories are small (144.6 mgd and 77.3 mgd, respectively), the rates of increase are substantial (27 percent and 66 percent, respectively). Agricultural self-supplied is expected to grow from 2,549.6 to 2,703.9 mgd, or by 6 percent. Florida is ranked first in the nation in the production value of citrus, sugarcane, and various fresh market vegetables,[117] and these crops will continue to account for a large portion of irrigated acreage and agricultural irrigation water use.[118] Water demand in commercial-industrial-institutional-mining self-supplied category is also expected to grow, though the increase is small.

[See figure on following page]

[114] Agriculture is estimated to be the largest water use category in 2012; however, relatively large proportion of agricultural water use is supplied by surface water.
Based on: Marella, R.L., 2015, *Water withdrawals in Florida*, 2012: U.S. Geological Survey Open-File Report 2015–1156, 10 p., http://dx.doi.org/10.3133/ofr20151156. (Accessed on January 4, 2018).

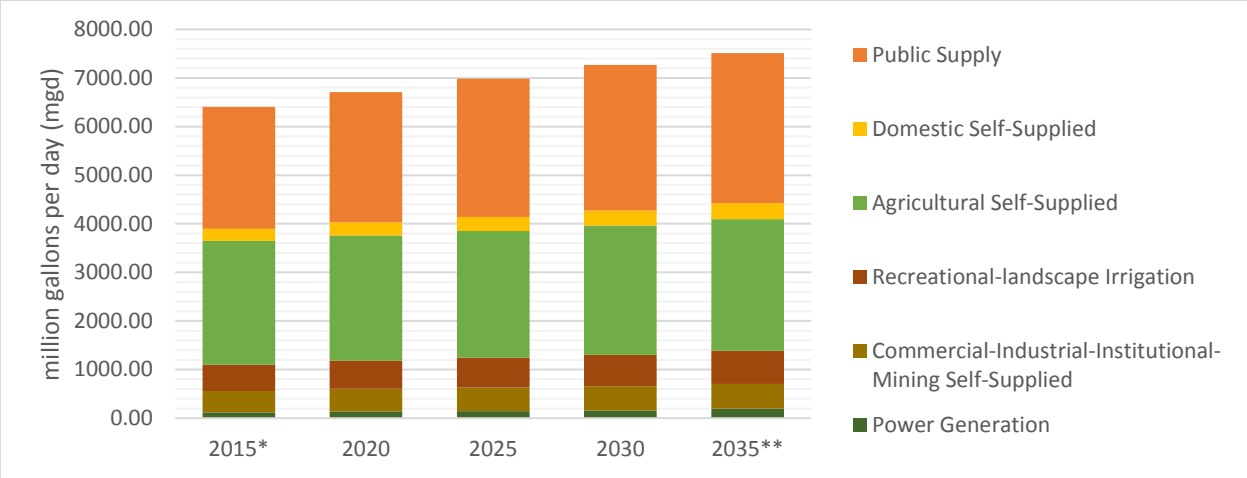
[115] Based on Table 1 in Marella, R.L., 2015, *Water withdrawals in Florida*, 2012: U.S. Geological Survey Open-File Report 2015–1156, 10 p., http://dx.doi.org/10.3133/ofr20151156. (Accessed on January 4, 2018).

[116] As evidenced by Minimum Flows and Minimum Levels recovery and prevention strategies set for various water bodies in Florida.

[117] Florida Department of Agriculture and Consumer Services (DACS). Undated. Florida Agriculture Overview and Statistics. DACS, Division of Marketing and Development, Tallahassee, FL. http://www.freshfromflorida.com/Divisions-Offices/Marketing-and-Development/Education/For-Researchers/Florida-Agriculture-Overview-and-Statistics. (Accessed on December 13, 2017).

[118] The Balmoral Group. 2017. Florida Statewide Agricultural Irrigation Demand Estimated Agricultural Water Demand, 2015 – 2040. Produced for Florida Department of Agriculture and Consumer Services. The Balmoral Group, 165 Lincoln Ave Winter Park, FL 32789. http://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning. (Accessed on December 13, 2017).

Figure 3.1.2 Statewide Water Demand Projections Developed by WMDs for Planning Purposes (assuming average annual rainfall, mgd)



* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Some RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
** For the Lower East Coast Region of SFWMD, 2030 water demand projections were used for 2035 water demand projections. RWSP for the region is currently being updated, and its draft version is expected to be available in early 2018.

Water Demand during Droughts

Water demand for many uses is influenced by weather. Projections for a drought year are referred to as a "1-in-10 year drought," meaning an event that results in an increase in water demand of a magnitude that would have a 10 percent probability of occurring during any given year.[119] The estimated difference between projected 2035 average and drought water demands is approximately 7 percent for public supply and domestic self-supplied categories. For example, lower rainfall may lead households to water their lawns more frequently. For agricultural self-supplied category, the increase in demand would depend on irrigation methods, types of crops, and historical weather patterns that define a 1-in-10 year drought event. On the statewide aggregate level, agricultural water demand is estimated to increase by 44 percent (when 2035 agricultural water demand projections developed in Regional Water Supply Plans and Water Supply Assessments are compared for average and 1-in-10 year drought conditions). Note that these are statewide estimates, and the increase in various regions can be higher or lower.[120]

A Degree of Uncertainty in Water Demand Projections

In addition to rainfall conditions, water demand depends on economic conditions, water use habits and preferences, changing irrigation technologies and household appliances, and other factors.

[119] The description is based on Florida Department of Environmental Protection (DEP), et al. 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.
[120] These percentages were estimated by summing projected 2035 water demand for average and 1-in-10 year droughts for all the water supply planning regions. Note that regions included in Central Florida Water Initiative (CFWI) overlap with the regions used in SWFWMD, and hence, in EDR's discussion of 1-in-10 year projected demands, water demand is double-counted for these regions for both average and drought year conditions.

Since changes in these factors are difficult to predict, there is a degree of uncertainty in water demand projections. The projections developed by the WMDs are planning level only, and actual water use may vary based on conservation efforts, climate, economics, and other factors. WMDs generally review and revise their regional water supply plans and water supply assessments every five years, accounting for changing conditions and additional information becoming available. A comparison of 20-year water demand projections completed by the SFWMD shows that the projections can stay the same, or be revised upward or downward, as economic conditions in the region change, additional data is collected, or estimation methodology is adjusted. Generally, the longer the planning horizon, the more uncertain the water demand projections will be at the end of the planning horizon.

What Can Be Done to Get More Water?

As traditional water sources are becoming limited, alternative water sources can be used to satisfy the growing water demands. According to section 373.019(1), Florida Statutes, such sources include:

- Salt water (e.g., desalinized sea water);
- Brackish surface and groundwater;
- Surface water captured predominately during wet weather flows;
- Sources made available through addition of new storage capacity for surface or groundwater (e.g., reservoirs);
- Reclaimed water;
- Stormwater;
- The downstream augmentation of water bodies with reclaimed water; and
- Any other water supply source that is designated as nontraditional in the applicable regional water supply plan.

Specific projects that may be implemented to meet growing water demands are divided into two categories: water resource development projects and water supply development projects. Water resource development refers to projects intended to provide regional benefits as opposed to utility-specific or localized benefits. This includes the collection and evaluation of surface water and groundwater data; structural and nonstructural programs to protect and manage water resources; the development of regional water resource implementation programs; the construction, operation, and maintenance of major public works facilities to provide for flood control, surface and underground water storage, and groundwater recharge augmentation; and related technical assistance to local governments, government-owned and privately owned water utilities, and self-

suppliers.[121] In turn, water supply development refers to activities intended to benefit specific utilities or other users. These include the planning, design, construction, operation, and maintenance of public or private facilities for water collection, production, treatment, transmission, or distribution for sale, resale, or end use.[122] In addition, water conservation efforts can be implemented to reduce water demand.

Based on the water supply planning documents developed by WMDs and the most recent summary compiled by the Florida Department of Environmental Protection (DEP),[123] traditional sources along with the volume of water that can potentially be generated using water resource development projects and water supply development projects exceeds the currently projected water demands. Water conservation will also play an important role in curbing future water demands.

Implementing water conservation and utilizing alternative water sources will require significant funding. Sources of this funding can include federal, state, regional (WMDs), and local government agencies along with private entities.

How is Water Supply Planning Implemented in Florida?

Water supply planning in Florida integrates activities implemented on the state, regional, and local levels. DEP has the statewide authority for water resource management. DEP has general supervisory authority over the WMDs, which in turn implement water resources programs on the regional level.[124] The WMDs further coordinate water supply planning with local governments, public and private utilities, and other stakeholders. This system is intended to provide for the continuity of the water management policy statewide, while also addressing regional and local specifics.

On the state level, the Florida Water Plan is developed by DEP in cooperation with WMDs, regional water supply authorities, and others. Relevant to water supply planning, the Florida Water Plan includes DEP programs and activities related to water supply and also includes WMDs' Water Management Plans.[125] In addition, DEP collaborates with the WMDs on developing annual reports to the Governor and the Legislature on the status of regional water supply planning in each WMD.[126]

On the regional level, the State of Florida is divided into five WMDs: Northwest Florida (NWFWMD), Suwannee River (SRWMD), St. Johns River (SJRWMD), Southwest Florida (SWFWMD), and South Florida (SFWMD). To facilitate water resource planning, the district boundaries follow surface water basin boundaries. WMDs are responsible for four key mission areas: water supply planning, water quality, flood protection and floodplain management, and natural systems. WMDs develop district water management plans for the planning period of at

[121] § 373.019(24), Fla. Stat.
[122] § 373.019(26), Fla. Stat.
[123] Florida Department of Environmental Protection (DEP). 2016. Regional Water Supply Planning. 2016 Annual Report. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/FINAL%20Regional%20Water%20Supply%20Planning%202016%20Status%20Annual%20Report.pdf. (Accessed on December 13, 2017).
[124] § 373.026, Fla. Stat.
[125] § 373.036(1), Fla. Stat.
[126] § 373.709(6), Fla. Stat.

least 20 years. The plans must be updated at least once every 5 years, and should include a districtwide water supply assessment (WSA).[127] At its option, a governing board of a WMD may substitute an annual strategic plan for the requirement to develop a district water management plan.[128]

The WSA should determine:

a. Existing legal uses, reasonably anticipated future needs, and existing and reasonably anticipated sources of water and conservation efforts; and

b. Whether existing and reasonably anticipated sources of water and conservation efforts are adequate to supply water for all existing legal uses and reasonably anticipated future needs and to sustain the water resources and related natural systems.[129]

WMDs can define water supply planning regions to assist the planning purposes.[130] If a WMD determines that in a water supply planning region water needs are likely to exceed available water sources over the planning horizon (in the next 20 years), the WMD prepares a Regional Water Supply Plan (RWSP), which identifies alternatives for meeting the anticipated future water needs.[131]

In two regions, RWSPs are developed through coordinated efforts of two or more WMDs, along with DEP, local governments, and other stakeholders. In north Florida, where groundwater withdrawals influence aquifer levels across WMDs' boundaries, the North Florida Regional Water Supply Partnership (NFRWSP) was set up to coordinate the planning between SJRWMD and SRWMD. The planning area includes 14 north Florida counties. Similarly, in central Florida, where the boundaries of SJRWMD, SWFWMD, and SFWMD meet and where population and water demand are projected to grow at a fast rate, the Central Florida Water Initiative (CFWI) was set up to coordinate the development of a RWSP.[132] The planning region covers areas in five counties: Orange, Osceola, Polk, Seminole, and the southern portion of Lake.

The RWSPs must be based on at least a 20-year planning period, they are updated every five years, and they are required by statute to include, but need not be limited to, the following:[133]

- A water supply development and water resource development component that includes:
    a. An estimate of all existing and future needs
    b. A list of water supply and water resource development projects
    c. An estimate of the water made available by each project
    d. The timeframe for implementation

[127] § 373.036, Fla. Stat.
[128] § 373.036(2)(e), Fla. Stat.
[129] § 373.036(2)(b), Fla. Stat.
[130] § 373.036, Fla. Stat.
[131] § 373.709, Fla. Stat.
[132] § 373.0465, Fla. Stat.
[133] § 373.709, Fla. Stat., summarized in: The Florida Department of Environmental Protection (DEP). 2017. Regional Water Supply Plans (RWSPs). DEP, Tallahassee, FL. June 2017: 1p.

e. An analysis of funding needs and sources
f. The identification of an implementing entity
g. The status of project implementation

- Funding strategy for water resource development projects;

- Consideration of how the water supply development project options serve the public interest or save costs;

- Technical data and information necessary to support the plan;

- List of water bodies for which minimum flows and minimum water levels (MFLs) have been established or will be established;

- Assessment of how the plan and projects support MFL recovery and/or prevention strategies or water reservations while ensuring sufficient water for existing and future reasonable-beneficial uses and the natural systems and avoiding adverse effects of competition for water supplies;

- An analysis of the areas in which a chapter 378, Florida Statutes, variance may be used to create water supply development or water resource development projects; and

- List of water bodies for which reservations of water pursuant to section 373.223(4), Florida Statutes, have been established.

On the local level, local governments are required to plan for their water and wastewater needs, as well as other infrastructure and public services, as a part of their comprehensive planning process.[134] At least every seven years, local governments must determine if there is a need to amend their comprehensive plan.[135] Furthermore, in the areas covered by RWSPs, when a WMD approves or updates a RWSP, local governments are required to coordinate their comprehensive plans with the RWSP within 18 months. Specifically, the local governments must revise the Potable Water Sub-Element, Conservation Element, Capital Improvements Element, and the Intergovernmental Coordination Element of the comprehensive plans. In the Potable Water Sub-Element, a water supply facilities work plan should be adopted to meet existing and projected demand for at least a 10-year planning period. In turn, the Conservation Element should be revised to assess current and projected water needs and sources for at least a 10-year planning period,

[134] The information regarding comprehensive planning is summarized from the following two sources: (1) Florida Department of Economic Opportunities. 2017. Evaluation and Appraisal Review of the Comprehensive Plan. Florida Department of Economic Opportunities, Tallahassee, FL. http://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/evaluation-and-appraisal-of-comprehensive-plans (Accessed on December 13, 2017), and (2) Florida Department of Economic Opportunities. 2017. Water Supply Planning. Florida Department of Economic Opportunities, Tallahassee, FL. http://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/water-supply-planning (Accessed on December 13, 2017).

[135] § 163.3191, Fla. Stat.

including the analysis of water use and water conservation. In the Capital Improvements Element of the comprehensive plan, capital improvements projects must be identified to be implemented in the first 5 years of the work plan. The Intergovernmental Coordination Element must be revised to facilitate coordination of the comprehensive plan with the regional water supply authorities and with the RWSP.[136]

Note that in addition to DEP, WMDs, and local governments, other agencies and organizations play various roles in water supply planning, including the Florida Department of Agriculture and Consumer Services (DACS), Florida Department of Economic Opportunity, regional water supply authorities, public and private water utilities, industrial and commercial entities, and agricultural stakeholders.

Water supply planning is also linked with other statutory requirements intended to manage and protect water resources, including:

- **Consumptive use permits:** unless otherwise exempt, all water withdrawals in Florida are regulated through a system of consumptive use / water use permits (CUPs/WUPs) granted by WMDs. Each permit applicant must establish that the proposed use of water is reasonable-beneficial, consistent with the public interest, and will not interfere with any existing legal uses of water. In addition, withdrawals may not be harmful to the water resources in the area.[137]

- **Water reservations:** water reservations are a legal mechanism to set aside water for the protection of fish and wildlife or public health and safety, making it unavailable for allocation to consumptive uses. Water reservation rules specify the locations, quantities, timing, and distribution of the water being reserved for the natural system. Determining the necessary quantity, timing, and distribution of the water is accomplished through evaluation of data and information linking the local hydrology to water needed for protection of fish and wildlife.[138]

- **Minimum flows and minimum water levels (MFLs):** Chapter 373.042, Florida Statutes, requires the WMDs or the Department of Environmental Protection to establish MFLs for priority aquifers, surface watercourses, and other surface water bodies. By definition, adopted MFLs identify the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. By establishing the limit at which further withdrawals would be significantly harmful, the WMD's MFLs provide a

[136] § 163.3177, Fla. Stat.
[137] §§ 373.219, 373.223, Fla. Stat.
[138] §§ 373.223(4), 373.709(2)(h), Fla. Stat.; cited verbatim from page 65 of Florida Department of Environmental Protection. 2015. Report on Expansion of Beneficial Use of Reclaimed Water, Stormwater and Excess Surface Water (Senate Bill 536). Office of Water Policy, Florida Department of Environmental Protection, Tallahassee, FL, 230p. https://floridadep.gov/sites/default/files/SB536%20Final%20Report.pdf. (Accessed on January 2, 2018).

benchmark to help establish excess quantities of water that are available from priority water bodies.[139]

- **Restricted allocation areas (RAAs):** RAAs are defined as areas within a water supply planning region of the SFWMD, SWFWMD, or SJRWMD where the governing boards of the WMDs have determined that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period and where the governing boards of the WMDs have applied allocation restrictions with regard to the use of specific sources of water.[140] RAAs are discussed extensively in RWSPs developed by SFWMD, with the focus on the limits on water availability from various water sources in specific RAAs. RAAs are also discussed in WUP/CUP application handbooks of SWFWMD and SFWMD.[141] RAAs are also discussed in planning documents of CFWI, cooperatively developed by SJRWMD, SWFWMD, and SFWMD.[142]

- **Water resource caution areas (WRCAs):** WRCAs are geographic areas defined by a WMD as having existing water resource problems or areas in which water resource problems are projected to develop during the next twenty years.[143] WRCA designation is implemented either by rule if the district uses the designation in its CUP/WUP program, or in its RWSPs if it does not. DEP then uses this designation in wastewater facility permitting. Applicants for permits to construct or operate a domestic wastewater treatment facility located in, discharging to, or serving population in a WRCA are required to prepare a water reuse feasibility study as a part of their permit application.[144] WRCAs can be smaller, larger, or they can coincide with the water supply planning regions defined by WMDs. Recovery strategies for existing WRCAs are accounted for in the development of RWSPs. For example, in NWFWMD, one of the two WRCAs spans the southern portion of a three-county water supply planning region, and this WRCA is designated to address concerns with sustainability of the coastal Floridan aquifer. Reuse of reclaimed water from

[139] Cited from p. 65 of Florida Department of Environmental Protection. 2015. Report on Expansion of Beneficial Use of Reclaimed Water, Stormwater and Excess Surface Water (Senate Bill 536). Office of Water Policy, Florida Department of Environmental Protection, Tallahassee, FL, 230p. https://floridadep.gov/sites/default/files/SB536%20Final%20Report.pdf. (Accessed on January 2, 2018).
[140] § 373.037, Fla. Stat.
[141] See (1) p. 47 in SWFWMD. 2015. Water Use Permit Applicant's Handbook Part B. September 2015; Revised October 2015; and (2) p. 54 in SFWMD. 2015. Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District. Effective September 7, 2015.
[142] See p. 32 and p. 132 of Central Florida Water Initiative (CFWI). 2015. Regional Water Supply Plan. Planning Document, Volume I. CFWI. https://www.cfwiwater.com/. (Accessed on January 2, 2018).
[143] Fla. Admin. Code Ch. 62-40.
[144] Referenced from DEP. 2014. Florida Department of Environmental Protection Geospatial Open Data: Florida Water Resource Caution Areas (WRCA). http://geodata.dep.state.fl.us/datasets/florida-water-resource-caution-areas-wrca. (Accessed on December 13, 2017).

domestic wastewater treatment facilities is required within WRCAs in NWFWMD, unless such reuse is not economically, environmentally, or technically feasible.[145]

Water Supply Planning Regions

WMDs have identified several water supply planning regions for their water supply plans (Table 3.1.1 and Figure 3.1.3). While WSAs and RWSPs for various regions were developed in different years (with some not having been finalized yet), estimated or projected water demand for "average year" rainfall conditions are available for most regions for the period 2015 through 2035, with 5-year intervals. The exception is one region in SFWMD: for the Lower East Coast Region, demand projections for 2035 are not available. In this report, 2030 water demand projections for the Lower East Coast Region are used for both 2030 and 2035, which is consistent with DEP's 2016 RWSP Annual Status Report.[146]

It is also important to mention that 2015 estimates reported in RWSPs and WSAs may differ from the actual 2015 water use. Most of the RWSPs and WSAs were developed prior to the date when the final 2015 data were available. For such water supply planning regions, 2015 water use was projected based on water use in prior years (most often, 2010 water use or a previous five-year average of water use). Note that in this report EDR uses the words "projected" and "estimated" interchangeably. WMDs generally use the word "projected" to describe the values forecasted using the data for the prior years, and the word "estimated" to describe the values calculated for a given year based on the data for that same year.

Water demand projections for 1-in-10 year drought conditions are also provided for the last year in the 20-year planning period. For some regions, however, such projections are not available for the 5-year intervals within the 20-year planning period (for example, all regions in SRWMD and SJRWMD). It should be noted that WMDs are not required to develop water demand projections for 1-in-10 year drought conditions for the interim 5-year intervals in the 20-year planning period.

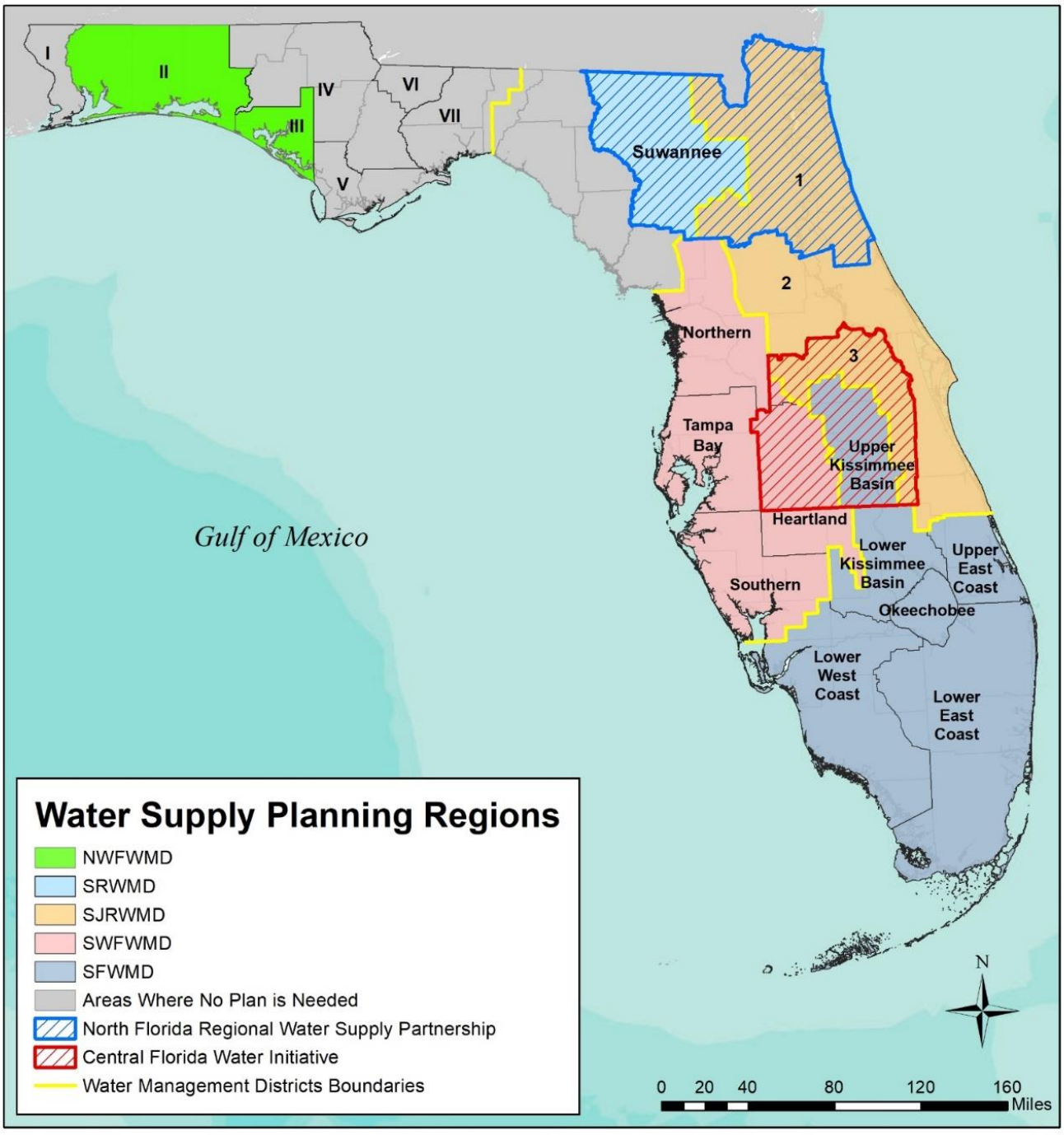
In addition to water demand projections, WSAs and RWSPs include evaluation of water source options (including alternative water supply), as well as water resource development projects and water supply development projects.

[See figure on following page]

[145] Cited from DEP. 2016. Regional Water Supply Planning. 2016 Annual Report. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/FINAL%20Regional%20Water%20Supply%20Planning%202016%20Status%20Annual%20Report.pdf. (Accessed on December 13, 2017).

[146] Florida Department of Environmental Protection (DEP). 2016. Regional Water Supply Planning. 2016 Annual Report. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/FINAL%20Regional%20Water%20Supply%20Planning%202016%20Status%20Annual%20Report.pdf. (Accessed on December 13, 2017).

Figure 3.1.3 Regions Identified for Water Supply Planning



Note: WMD coloring in the legend only apply to regions that currently need a regional water supply plan.
Source: Cited from DEP. 2016. Regional Water Supply Planning. 2016 Annual Report. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/FINAL%20Regional%20Water%20Supply%20Planning%202016%20Status%20Annual%20Report.pdf. (Accessed on December 13, 2017).

Table 3.1.1 Water Supply Planning Regions Identified for this Report

Water Management District	Water Supply Planning Region	Abbreviation used in the report	Counties	Current Status of Water Supply Planning	Planning horizon
NWFWMD	I	**NW-I**	Escambia	Districtwide Water Supply Assessment (2013)[a]	2010-2035
	II	**NW-II**	Santa Rosa, Okaloosa, and Walton		
	III	**NW-III**	Bay	Regional Water Supply Plan (2014)	2010-2035
	IV	**NW-IV**	Calhoun, Holmes, Jackson, Liberty, Washington	Districtwide Water Supply Assessment (2013)[b]	2010-2035
	V	**NW-V**	Gulf and Franklin		
	VI	**NW-VI**	Gadsden		
	VII	**NW-VII**	Jefferson (part), Leon, Wakulla		
SRWMD	Area outside NFRWSP	**SR-outside NFRWSP**	Dixie, Jefferson (part), Lafayette, Levy (part), Madison, and Taylor	Draft updates for 2010 districtwide water supply assessment [c]	2010-2035
	Area in NFRWSP	**SR-NFRWSP**	Alachua (part), Baker (part), Bradford (part), Columbia, Gilchrist, Hamilton, Putnam (part), Suwannee, and Union	NFRWSP Regional Water Supply Plan (2017) [c]	2010-2035
SJRWMD	North Florida, included in NFRWSP (Region 1)	**SJR-NFRWSP**	Alachua (part), Baker (part), Bradford (part), Clay, Duval, Flagler, Nassau, Putnam (part), St. Johns	NFRWSP Regional Water Supply Plan (2017) [c]	2010-2035
	Central Springs and East Coast (Region 2, formerly Regions 2, 4, and 5)	**SJR-CSEC**	Brevard, Indian River Marion (part), Lake (part), Volusia and Okeechobee (part)	Draft Central Springs East Coast Regional Water Supply Plan [c]	2015-2040
	Central Florida, included in CFWI (Region 3)	**SJR-CFWI**	Orange (part), Osceola (part), Seminole and Lake (part)	CFWI Regional Water Supply Plan (2015) [c]	2010-2035
SWFWMD	Northern Planning Region	**SW-NR**	Citrus, Levy (part), Marion (part), Lake (part), and Sumter	Regional Water Supply Plan (2015); partially in CFWI Regional Water Supply Plan (2015)	2010-2035
	Tampa Bay Planning Region	**SW-TB**	Pasco, Hillsborough, and Pinellas	Regional Water Supply Plan (2015)	2010-2035
	Heartland Planning Region	**SW-HR**	Hardee, Highlands (part), Polk (part),	Regional Water Supply Plan	2010-2035

Water Management District	Water Supply Planning Region	Abbreviation used in the report	Counties	Current Status of Water Supply Planning	Planning horizon
				(2015); partially in CFWI Regional Water Supply Plan (2015)	
	Southern Planning Region	**SW-SR**	Charlotte (part), DeSoto, Manatee, and Sarasota	Regional Water Supply Plan (2015)	2010-2035
SFWMD	Upper Kissimmee Basin, part of CFWI	**SF-UKB-CFWI**	Orange (part), Osceola (part), and Polk (part)	CFWI Regional Water Supply Plan (2015) [c]	2010-2035
	Lower Kissimmee Basin	**SF-LKB**	Okeechobee (part), Highlands (part), and Glades (part)	Regional Water Supply Plan (2014)	2010-2035
	Upper East Coast	**SF-UEC**	Martin, Okeechobee (part), and St. Lucie	Regional Water Supply Plan (2016)	2010-2040
	Lower East Coast	**SF-LEC**	Broward, Collier (part), Hendry (part), Miami-Dade, Monroe (part), and Palm Beach	Regional Water Supply Plan (2013)	2010-2030
	Lower West Coast	**SF-LWC**	Charlotte (part), Collier (part), Glades (part), Hendry (part), Monroe (part), and Lee	DRAFT Regional Water Supply Plan (2017)	2014-2040[d]

[a] RWSP was developed for Region II in 2012. Given that WSA was developed for the whole district in 2013 based on updated information, EDR combined region II with the other regions covered in WSA (except Region III).
[b] Following the data provided by DEP and NWFWMD, corrections were made for water demand projections for selected regions, as compared with the projections published in 2013 districtwide Water Supply Assessment.
[c] For some planning regions, demand projections have not yet been finalized, or are finalized by reported in RWSPs on aggregate levels only. For such regions, demand estimates and projections were requested from DEP, and these data are the same as information used in DEP 2016 annual report.[147]
[d] Water demand projections for 2015 were shared by SFWMD staff for the use in this report.

3.1 Water Demand Projections

Based on RWSPs and WSAs prepared by the WMDs, in 2015, total estimated water use in Florida was 6,407.20 million gallons per day (mgd), with public supply and agricultural self-supplied categories accounting for 39 percent and 40 percent of total water withdrawals, respectively. Overall, water demand is projected to increase by 17 percent over the next 20 years (by 2035). The increase is largely driven by projected population growth, affecting the public supply and recreational-landscape irrigation self-supplied sectors. The demand for public supply is projected to increase by 23 percent, and the demand for recreational-landscape irrigation self-supplied is projected to increase by 27 percent.

[147] Florida Department of Environmental Protection (DEP). 2016. Regional Water Supply Planning: 2016 Annual Report. DEP, Tallahassee, FL, 49p. https://floridadep.gov/water-policy/water-policy/documents/2016-annual-status-report-regional-water-supply-planning. (Accessed on January 2, 2018).

The agricultural self-supplied category was the largest water use category in 2015 according to WMDs' estimates, slightly exceeding the estimated public supply category. By 2035, water use in agriculture is projected to grow by 6 percent. While the increase is significant by its absolute value (154.3 mgd), it is smaller than the projected increase in public supply (583.3 mgd), and is comparable with the projected increase in recreational-landscape irrigation (144.6 mgd). Still, the agricultural self-supplied category is expected to continue being one of the two largest water demand categories, accounting for 36 percent of projected water demand in 2035 (given average rainfall conditions).

In the following sections, the forecasts developed for each water demand category are discussed. These forecasts are developed by the WMDs. Note that the water use varies depending on weather conditions (such as rainfall) or economic factors. First, the report discusses the demand projections given average rainfall conditions.[148] Water demands during drought years are discussed in the following section. The degree of uncertainty in the WMD water demand projections is discussed next.

Water demand projections discussed in this section were developed by the WMDs for planning purposes only. Florida Statutes specify that as a part of the planning process, a districtwide WSA should determine whether existing and reasonably anticipated sources of water and conservation efforts are adequate to supply water for all existing legal uses and reasonably anticipated future needs and to sustain the water resources and related natural systems.[149] The statutes also specify that in the regions where existing sources are not adequate to supply water for existing and future uses and to sustain the water resources and related natural systems, RWSPs must include a water supply development component with a list of projects with total capacity exceeding the water supply needs for all existing and future reasonable-beneficial uses within the planning horizon.[150] In other words, as a part of the planning process, the WMDs are required to identify potential options to meet all existing and future reasonable-beneficial uses and to sustain the water resources for the planning period.

[See table on following page]

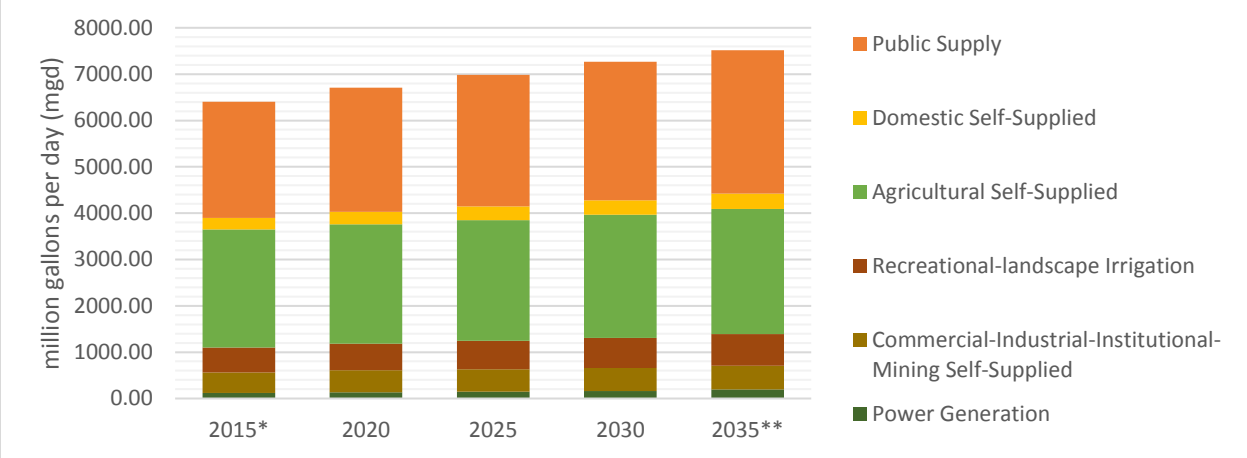
[148] An average rainfall year is described as a year having rainfall with a 50 percent probability of being exceeded over a 12-month period (Source: SFWMD. 2017. Lower West Coast Water Supply Plan Update: Planning Document. Draft, August, 2017. South Florida Water Management District, West Palm Beach, FL). It is also referred to as "5-in-10" conditions.
[149] §373.036(2)(b)4b, Fla. Stat.
[150] §373.709(2)(a), Fla. Stat.

Table 3.1.2 Statewide Projected Water Demands (mgd; assuming average annual rainfall)*

Water Use Categories	2015**	2020	2025	2030	2035***
Public supply	2,508.36	2,678.73	2,844.44	2,994.41	3,091.65
Domestic self-supplied	250.45	271.21	291.46	312.24	331.88
Agricultural self-supplied	2,549.62	2,573.52	2,608.18	2,657.31	2,703.90
Recreational-landscape irrigation	539.08	576.41	613.47	649.79	683.65
Commercial-industrial-institutional-mining self-supplied	441.79	472.22	482.48	496.45	509.55
Power generation	117.91	135.01	147.20	160.37	195.22
Total	**6,407.20**	**6,707.08**	**6,987.22**	**7,270.56**	**7,515.87**

* All the estimates in subsection 3.1 of the report are based on WMDs' RWSPs/WSAs. These estimates are slightly different from the values reported in DEP's 2016 Annual Status Report on Regional Water Supply Planning (see https://floridadep.gov/water-policy/water-policy/documents/2016-annual-status-report-regional-water-supply-planning). The difference is due to the fact that for SF-LWC, EDR used the 2017 draft RWSPs (accessed on November, 2017), while DEP (2016) relied on the 2012 RWSP. Also, projected water demand for the agricultural self-supplied category in NW-VI were adjusted per request by NWFWMD. The difference can also be due to rounding. For the estimates used in this report, see Tables A1 through A26 in the Appendix A to this report.
** The 2015 estimate reported in the WMDs' RWSPs and WSAs may differ from the actual 2015 water use. Most of the RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
*** For the SF-LEC, 2030 water demand projections were used for 2035 water demand projections. RWSP for the region is currently being updated, and its draft version is expected to be available in early 2018.

Figure 3.1.4 Statewide Projected Water Demand, by Water Use Category (mgd; assuming average rainfall)



* The 2015 estimate reported in the WMDs' RWSPs and WSAs may differ from the actual 2015 water use. Most of the RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
** For the SF-LEC, 2030 water demand projections were used for 2035 water demand projections. RWSP for the region is currently being updated, and its draft version is expected to be available in early 2018.

Table 3.1.3 Titles of Water Demand Categories Used in This Report, as Compared with RWSPs/WSAs and Reports by DEP and USGS

This Section of the EDR Report		RWSPs/WSAs					DEP*	USGS**
Title	**Abbreviation**	NWFWMD	SJRWMD and SRWMD	CFWI	SWFWMD	SFWMD		
Public Supply	**PS**	Public Supply	Public Supply	Public Supply	Public Supply	Public Water Supply	Public Supply	Public Supply
Domestic Self-Supplied	**DSS**	Domestic Self-Supply and Small Public Supply Systems	Domestic Self-Supply and Small Public Supply Systems	Domestic Self-Supply and Small Utility	NA***	Domestic Self-Supply	Domestic Self-Supply and Small Public Supply Systems	Domestic Self-Supplied
Agricultural Self-Supplied	**AG**	Agricultural water use	Agricultural Irrigation Self-supply	Agriculture	Agriculture	Agricultural Self-Supply	Agricultural Self-Supply	Agricultural Self-Supplied
Recreational-landscape irrigation	**REC**	Recreation Self-Supply	Landscape / Recreational / Aesthetic Irrigation Self-supply	Landscape / Recreational / Aesthetic	Landscape / Recreation	Recreational / Landscape Self-Supply	Recreational Self-Supply	Recreational-landscape irrigation
Commercial-Industrial-Institutional-Mining Self-Supplied	**CIIM**	Industrial, Commercial, and Institutional Self-Supply	Commercial / Industrial / Institutional and Mining Dewatering Self-supply	Commercial / Industrial / Institutional and Mining / Dewatering	Industrial / Commercial and Mining / Dewatering	Industrial / Commercial / Institutional Self-Supply	Commercial / Industrial / Institutional Self-Supply	Commercial-industrial-mining self-supplied
Power Generation	**PG**	Power Generation	Thermoelectric Power Generation Self-supply	Power Generation	Power Generation	Power Generation self-supply	Thermoelectric Power Generation Self-Supply	Power Generation

* Florida Department of Environmental Protection (DEP), et al. 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.

** Marella, R.L., 2015, *Water withdrawals in Florida*, 2012: U.S. Geological Survey Open-File Report 2015–1156, 10 p., http://dx.doi.org/10.3133/ofr20151156. (Accessed on January 4, 2018).

*** SWFWMD's RWSPs include this category into public supply.

The WMDs refer to water demand categories using slightly different titles (Table 3.1.3). With the exception of commercial-industrial-institutional-mining self-supplied category, EDR adopted the titles used by U.S. Geological Survey (USGS).[151]

Along with the titles of the demand categories, the description of the demand categories also differs slightly among the RWSPs/WSAs. For information purposes only, a description of the categories found to be the most characteristic for WMDs' planning activities is provided below.[152] WMDs may use slightly different category titles and definitions in their RWSPs than those used in this section of this report. No changes were made in this report to the estimates and projections reported in RWSPs/WSAs per category to account for potential differences in the definitions. Differences in the estimation methodologies are highlighted, and some of them may be related to the differences in the definitions of the demand categories. The description of the categories are the following:

- **Public supply (PS):** The use of water provided by any municipality, county, regional water supply authority, special district, public or privately owned water utility, or multijurisdictional water supply authority for human consumption and other purposes.[153] This category includes PS systems with average annual permitted quantities equal to or above 0.1 mgd. The only exception is SWFWMD that includes all PS systems, including those smaller than 0.1 mgd, in this category.

- **Domestic self-supplied (DSS):** Estimated aggregate use of 1) domestic use not provided by a public supply system or 2) (except SWFWMD) public supply use provided by a permitted public supply system with an average daily withdrawal below the minimum reporting threshold for Public Supply (i.e., 0.1 mgd).[154]

- **Agricultural self-supplied (AG):** Agricultural irrigation use reported by crop category by county. Non-irrigation uses such as aquaculture, fish farming, livestock and dairy uses may be reported separately or in the aggregate. Plans account for state goals for ethanol

[151] Instead of the title used in USGS (Marella 2014), i.e. "commercial-industrial-mining self-supplied", this report uses the title "commercial-industrial-institutional-mining self-supplied" title to reflect WMDs' practice of including institutional, as well as mining and dewatering water use into the projections. For comparison, DEP (2009) titles this category as "Commercial / Industrial / Institutional Self-Supply."
Sources: Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).
Florida Department of Environmental Protection (DEP), et al. 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.
[152] Unless otherwise noted, descriptions are based upon Florida Department of Environmental Protection (DEP), et al. 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.
[153] The definition is taken from SJRWMD (personal communications).
[154] This definition is based on DEP (2009), with slight modifications.
Source: Florida Department of Environmental Protection (DEP), et al. 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.

feedstocks and biodiesel, and quantify the water demands for such activities in their regions.[155]

- **Recreational-landscape irrigation (REC):** Predominantly golf course irrigation, but may include uses such as water parks and permitted landscape irrigation not served by public supply systems. Some WMDs may also include known use by non-permitted suppliers.

- **Commercial-industrial-institutional-mining self-supplied (CIIM):[156]** Commercial, industrial, and institutional uses over the threshold (i.e., 0.1 mgd) are reported individually. Those below the threshold may be reported in aggregate if their use is known or reported. The category includes consumptive uses for mining, pulp, and paper mills, chemical manufacturing, food processing, bottled water, and military and civilian institutional uses.

- **Power Generation (PG):** All freshwater quantities withdrawn for consumptive uses by permitted suppliers. Some Districts may also include reported freshwater use by non-permitted suppliers.

Future Population and Water Needs for Public Supply and Domestic Self-Supplied

Forecasts of future water demand for PS and DSS categories are dependent upon forecasting the future population of the state. Florida is the third most populous state in the nation (after California and Texas), with 20.5 million people calling Florida home in 2017. Over a half of the state population (52 percent) resides in only seven counties: Miami-Dade (2.7 million people, SF-LEC region), Broward (1.9 million, SF-LEC region), Palm Beach (1.4 million, SF-LEC region), Hillsborough (1.4 million, SW-TB region), Orange (1.3 million, split between SJR-CFWI and SF-UKB-CFWI regions), Pinellas (1.0 million, SW-TB region), and Duval (0.9 million, SJR-NFRWSP).[157]

Florida is also one of the fastest growing states in the nation. By 2035, the state population is projected to reach 25.5 million. The most populous regions are also the regions with largest expected increases in population. A quarter of the population increase in Florida from 2017 to 2035 is anticipated to occur in three counties in SF-LEC region – Miami-Dade, Broward, and Palm Beach (with total population increase of 1.2 million people). Another area that accounts for a large proportion (18 percent) of the statewide population increase is central Florida: in Orange, Osceola, and Polk Counties, population is projected to increase by 0.9 million people. Other counties with significant population increase are Hillsborough (0.5 million people; SW-TB region), Lee (0.3 million people; SF-LWC region), and Duval (0.2 million people; SJR-NFRSP region). Although

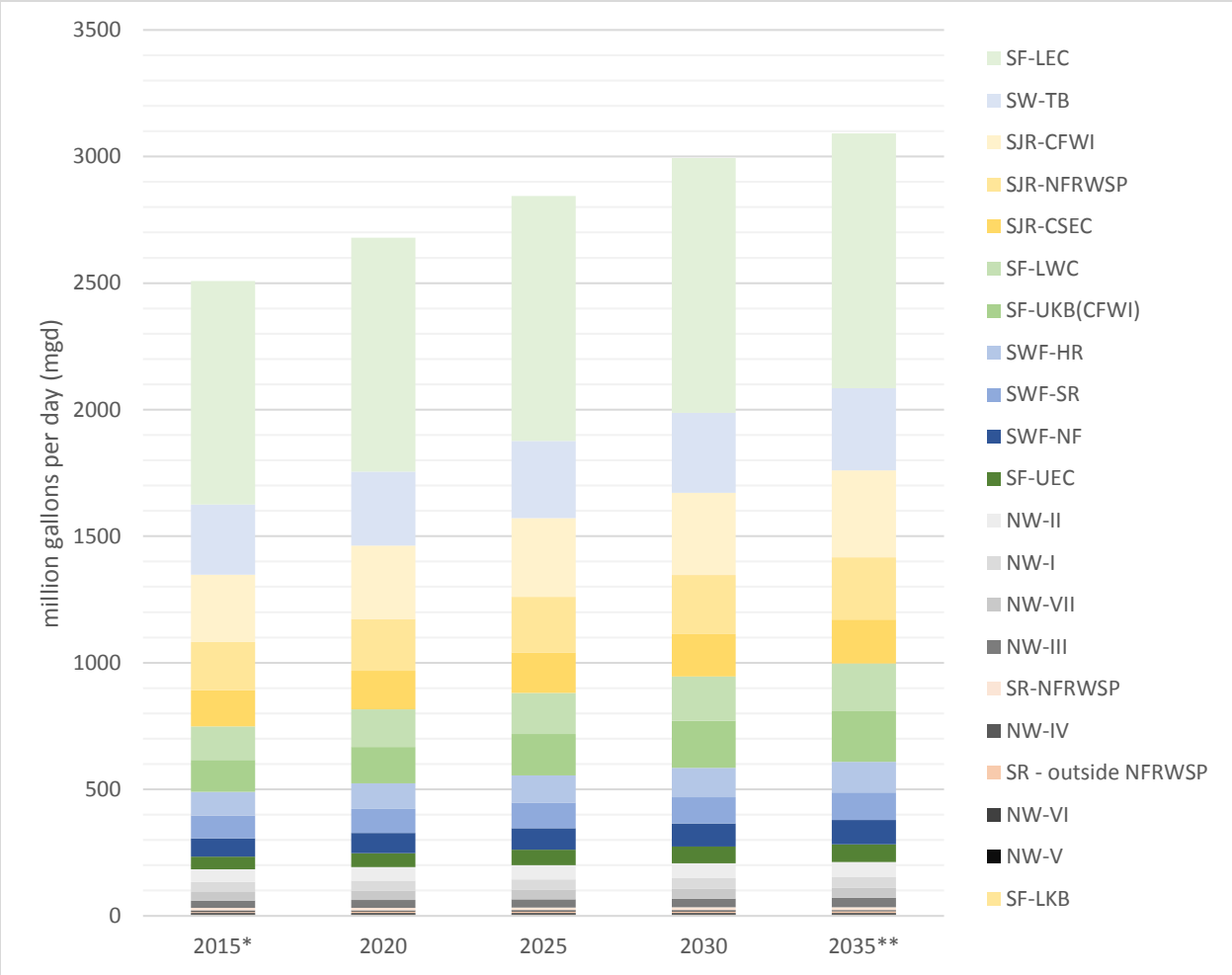
[155] While WMDs account for freeze protection in water use permitting, this water use is excluded from agricultural self-supplied projections in RWSPs/WSAs.
[156] *Supra* note 151.
[157] Florida Demographic Estimating Conference, December 2017.

the increase in population in the other counties is smaller, all the counties in Florida are projected to grow.[158]

Public Supply and Domestic Self-Supplied Categories

The most populous regions account for a large proportion of the total water demand in the public supply category. In 2015, SF-LEC accounted for nearly one-third (35 percent) of the total water withdrawals for the PS category in the state (Figure 3.1.5). This region is expected to continue accounting for a large part of the projected 2035 PS water demand.

Figure 3.1.5 Projected Water Demand in Public Supply Category, by Planning Regions, Sorted in the Order of Magnitude of Water Demand in 2015 (mgd; assuming average annual rainfall)



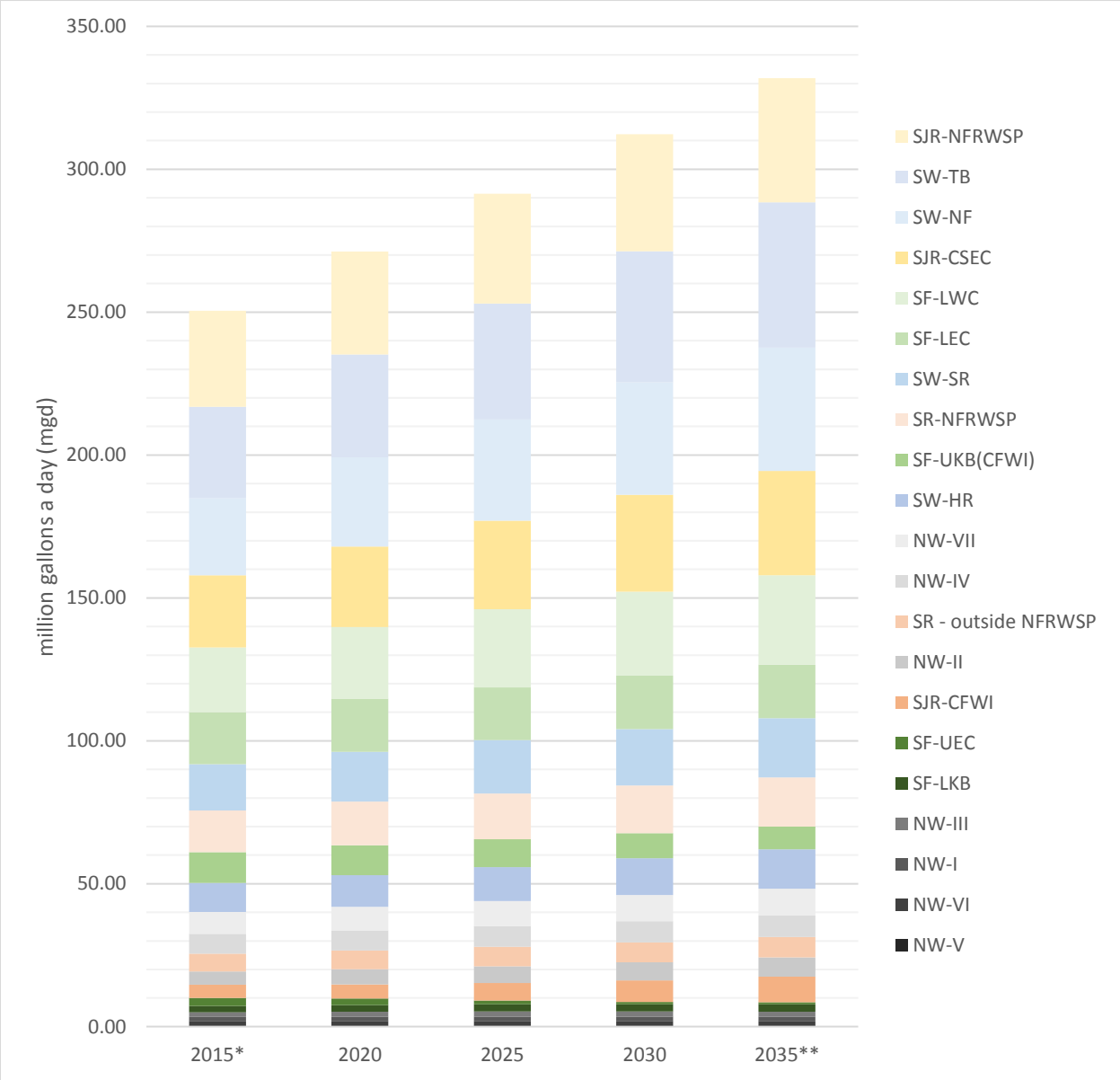
* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Most of the RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).

** For the SF-LEC, 2030 water demand projections were used for 2035 water demand projections. The RWSP for the region is currently being updated, and its draft version is expected to be available in early 2018.

[158] *Id.*

In total, DSS accounts for a relatively small share of the total water withdrawals in Florida, with the water demand in DSS being approximately ten times smaller than in PS. Over two-thirds (68 percent) of the increase in DSS from 2015 to 2035 will occur in four regions: SW-TB, SW-NR, SJR-CSEC, and SJR-NFRWSP (Figure 3.1.6).

Figure 3.1.6 Projected Water Demand in DSS Category, by Planning Regions, Sorted in the Order of Magnitude of Water Demand in 2015 (mgd; assuming average annual rainfall)



The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Most of the RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).

** For the SF-LEC, 2030 water demand projections were used for 2035 water demand projections. The RWSP for the region is currently being updated, and its draft version is expected to be available in early 2018.

Public Supply and Domestic Self-Supplied WMD Methodology

Population Projections

Section 373.709, Florida Statutes, contains guidance for the population projections to be used in the RWSPs. At a minimum, the WMDs are required to consider the University of Florida Bureau of Economic and Business Research (BEBR) medium population projections and population projection data, as well as any analysis submitted by a local government 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.

Currently, all WMDs generally rely on the BEBR medium population projections to forecast county-level population. However, for purposes of water supply planning for the public supply and domestic self-supplied categories, WMDs employ various methods to distribute the county-level projections to the sub-county regions within individual PS service areas. Sub-county population projections are also needed to forecast water demand for the counties split between (or among) WMDs (see Table 3.1.1 for the counties included in each planning region).

Note that in different water supply regions, the RWSPs and WSAs were completed in different years (see Table 3.1.1). As a result, RWSPs and WSAs use county population projections developed by BEBR in different years.

WMDs develop projections for the year-round (also referred to as "permanent") population for the areas served by PS systems, as well as the areas not served by PS systems (i.e., domestic self-supplied). To differentiate the growth in public supply and domestic self-supplied categories, first, county population is distributed to the service areas of each PS system. For entities not served by PS systems (classified as domestic self-supplied), future population is assessed as the difference between the projected county population and the PS population.

To estimate the "permanent" population *currently* served by PS utilities, county population estimates (derived from U.S. Census and/or BEBR) were allocated to PS systems' service areas using aerial photography, PS systems' service area boundary GIS files, and census block and/or traffic analysis zone (TAZ)[159] boundaries, along with corresponding demographic data. A similar approach was used to project population for the counties split between or among water supply planning regions and/or WMDs. In SWFWMD and NWFWMD, for some PS systems, the number of active meter connections (or number of residential dwelling units served) was also used to estimate current population served.

Next, population growth projections for each PS system were determined using the following key methods:

[159] Specifically, SFWMD relied on the use of traffic analysis zones (TAZ) to distribute the estimated and projected populations into utility service areas within each county or portion of the county. Traffic analysis zones, which are based on U.S. Census data, are defined by the Florida Department of Transportation and local metropolitan planning organizations. The projections rely on the information from local sources and account for demographic changes.

- High, medium, or low county growth scenarios developed by BEBR were considered for the WSA developed in NWFWMD in 2013, and a specific scenario was selected for each utility service area based on the associated cities' historical growth rates. For unincorporated areas, county-wide medium growth rates (developed by BEBR) were used.

- A percent-share method was used in RWSPs developed for SJ-NFRWSP, SR-NFRWSP, SR-outside NFRWSP, SJ-CSEC, and regions in SFWMD.[160] For example, if a utility served 10 percent of population in the base year (typically 2010), it was assumed that it will also serve 10 percent of population in the county in 2030 (where county population is forecasted using BEBR projections - medium scenario). This method implies a uniform population growth rate for all PS systems within a county. In NFRWSP's planning documents, it was further assumed (for larger public systems such as JEA) that residents on domestic self-supplied would convert to public supply with the rate of 1 percent per year.

- SWFWMD contracted with GIS Associates, a private consulting company, to develop a model for projecting population growth at the parcel level. Growth rates were estimated for each land parcel, and they were aggregated and used to project population for each public supply system or service area. First, the initial parcel growth rates were determined based on the historical growth rate for each census block. These parcel growth rates were then compared with the land available for development (using the Build-Out Model developed by GIS Associates for SWFWMD). The population growth estimated from parcel-level data was aggregated to county level and compared with BEBR population projections. If parcel-level estimates produced higher county population growth than BEBR projections, then the parcel-level estimates were reduced. This process was repeated iteratively until the projected population matched the BEBR projections. In contrast, if the estimated growth rate was below BEBR projections, additional population growth was assumed for additional parcels, which were selected using a Growth Drivers Model (this model estimated the likelihood of development for parcels with various characteristics).

- The SJRWMD, SWFWMD, and SFWMD have contracted with BEBR to produce parcel-level population projections for the upcoming 2020 CFWI RWSP. First, County Build-out Submodels were developed using property parcel data for each of the five counties that are entirely or partly within the CFWI area.[161] The purpose of the County Build-out Submodel is to develop maximum residential development potential at the parcel level. Next, population growth was modeled between the current estimated population and the build-out population. Projections are based on a combination of historic growth trends, and

[160] Historically, SFWMD used various methods to project population growth: (a) compound annual growth rate method (to represent slow projected growth rate in the beginning of the planning period) (used in LWC RWSP); (b) linear interpolation method that assumes the same growth rate for the whole planning period (applied to LEC RWSP), and (c) application of the county population growth rate based on BEBR's medium scenario directly to the PS service areas (Lower Kissimmee Basin RWSP).

[161] In addition to the five CFWI counties, the districts include Brevard County for modelling purposes.

spatial constraints and influences, which both restrict and direct growth. Population growth calculations were controlled to BEBR's 2017 medium projections (BEBR's latest population forecasts for the years 2020 through 2045), which were available in five-year increments.

- SJRWMD developed its own parcel-level projection model which may be used in the future. Similar to the build-out model used by SWFWMD, this model distributes BEBR county population projections to specific parcels. First, for each parcel, information regarding the relevant census block, PS system serving the parcel, and WMD jurisdiction is identified. Using property appraisers and zoning information, the parcels are then classified as developed (such as single family, stores, and supermarkets) and developable (such as vacant residential and improved agricultural). For developed parcels, the current number of residential units is assessed (based on property appraiser information and other sources, if available). The share of residential units in each PS system or service area, as a percent of the total number of residential units in the county, is estimated. This share is then used to allocate the total county population to each PS service area. The estimated population in residential units is compared with the actual population currently served by PS system, and if the estimate is higher than the actual population, the difference is attributed to DSS. DSS also includes the population outside PS service areas. Next, the person-per-acre ratio is calculated for developed areas. Assuming that the person-per-acre ratio does not change over the planning horizon, the estimate is then applied to developable parcels to generate the refined population projections. Specifically, the parcels are selected according to the development ranks assigned to them (from high rank to low rank). When the estimated future population for the selected parcels adds up to the projected BEBR population, the parcel selection process stops.

Each method currently used (or proposed to be used) to develop population projections has pros and cons. The percent-share method has been historically accepted by the WMDs and other stakeholders as the method that produces adequate results for RWSPs. An advantage of the method is its simplicity and the ease of communicating the results to stakeholders. However, the method is based on the assumption that all PS systems will grow at the same rate. When this assumption cannot be justified, WMDs need to coordinate population projections with all PS systems in a county to discuss tradeoffs in the population projections among PS systems' service areas to ensure (a) any differences in growth rates are adequately represented; and (b) the aggregate county population projections remain equal to the BEBR medium scenario projections.

The build-out model and parcel-level population projection models used by SWFWMD and SJRWMD facilitate the outreach to PS systems and ensure linkages between water supply planning and the CUP/WUP processes. However, these models are more complex than the percent-share method, and they complicate outreach to stakeholders other than PS systems.

Overall, the WMDs generally use county-level BEBR (medium) population projections, following the statutory requirements. The WMDs rely on various methods to distribute these county-level BEBR (medium) population projections to sub-county regions (Table 3.1.4). Due to the differences

in the methods used by the WMDs, for the counties split between/among WMDs, the total population projections may not add up to BEBR county (medium) population projections.

Table 3.1.4 Summary of WMDs' Population Projection Methods Used for Service Areas of PS Systems

	Percent-share method	Aggregating parcel-level projections	Other
All regions in NWFWMD	-	-	✓
All regions in SRWMD	✓	-*	-
All regions in SJRWMD	✓	-*	-
All regions in SWFWMD	-	✓	-
All regions in SFWMD	✓	-	-

* Expected to be used in future RWSPs updates.

Water Demand Projections

For PS systems and the domestic self-supplied category, water demand is estimated as the product of (a) population projections and (b) per capita per day water use. The per capita per day is assessed using historical data for PS systems,[162] or the average county or state per capita water use. For DSS, not including small PS systems, a residential per capita per day water use is used in determining future water demands. As discussed later in this subsection, tourists, commuters, and commercial and industrial entities served by public supply systems are generally not separately estimated.[163] In these cases, they would be captured in the per capita residential calculation. This means that the per capita is, strictly speaking, higher than a typical household's individual use.

For PS systems, the average per capita per day water use assessment requires accounting for:

- Water import to and export from a PS system, and water losses in the water treatment process;

- Water demand of non-residential customers supplied by PS systems;

- Water demand of non-permanent population (such as commuters, seasonal residents, and tourists); and

- Variation in per capita water use from year to year (driven by weather and other factors).

All WMDs except SWFWMD and SFWMD include water losses in water treatment and delivery in the per capita use estimate (i.e., rely on gross [raw] water withdrawals per capita). SWFWMD is the only WMD that uses a *gross per capita use* definition that excludes losses in water treatment

[162] The potential reduction in per capita water use over the planning horizon is examined in the "water conservation" component of RWSPs/WSAs.

[163] In regards to non-permanent populations, SWFWMD estimates per capita uses separately.

and delivery.[164] This approach is consistent with the guidance developed by DEP in 2008[165] and 2014.[166] *Gross per capita use* is defined as a ratio of service area's finished water use and residential population. Finished water is the water withdrawn plus any water imported from another utility, minus water exported to another utility and minus losses that occur during transport and treatment of the water (DEP 2014).[167]

While the gross per capita use definition employed by SWFWMD does not account for the treatment and delivery losses, the information about the losses is collected by SWFWMD and is considered in regional water supply planning. Based on discussions with SWFWMD staff, on the regional scale, for SWFWMD the losses are less than 5 percent of the total PS demand estimates, implying that the decision to include or exclude the losses does not impact the final estimation result significantly. At the same time, SWFWMD's reliance on the gross per capita use facilitates the linkages between CUP/WUP and water supply planning.

SFWMD discusses both gross per capita and raw water per capita in its RWSPs. For example, the SF-LKB RWSP developed in 2014 states: "the water demand projections represent finished water per capita use rates and net water demands. These are different from raw water per capita rates and gross demands that reflect water withdrawn at the source prior to treatment."[168] In contrast, the SF-LWC RWSP developed in 2017 includes the following discussion of per capita use rate: "Net (finished) water per capita use rates (PCURs) were developed for each utility using historic water use information and estimated service area populations. PCURs were assumed to remain constant through 2040. The PCURs were applied to population projections to develop future [PS] net (finished) water demands for each utility. To calculate gross (raw) demands, the corresponding treatment efficiency for each utility based on treatment process type(s) were applied as a raw-to-finished ratio to net (finished) demands."[169]

A summary of methods used by WMDs to estimate per capita per day water use is provided in Table 3.1.5.

[See table on following page]

[164] Historically, SRWMD also relied on *Gross per capita use* estimates. However, for the district, the losses in water treatment and delivery were negligible, and hence, including or excluding them from the per capita estimate did not influence the final result.
[165] Florida Department of Environmental Protection (DEP). 2008. Guidance on Per Capita Water Use: Uniform Definitions and Performance Measures. DEP, Tallahassee, FL. 4p.
[166] Florida Department of Environmental Protection (DEP). 2014. Per Capita Water Use. Water Resource Fact Sheet Series. Office of Water Policy, DEP, Tallahassee, FL. 2p.
[167] *Id*.
[168] P. 88, South Florida Water Management District (SFWMD). 2014. Lower Kissimmee Basin Water Supply Plan. SFWMD, Orlando Service Center, Orlando, FL.
[169] P. 27, South Florida Water Management District (SFWMD). 2017. Lower West Coast Water Supply Plan Update: Planning Document. Draft, August, 2017. South Florida Water Management District, West Palm Beach, FL.

Table 3.1.5 Summary of Per Capita Per Day Water Use Calculation Methods Used in Regional Water Supply Plans and Water Supply Assessments

	Gross Per Capita Per Day	Raw Water Withdrawals Per Capita Per Day
All regions in NWFWMD	-	✓
All regions in SRWMD	-*	✓
All regions in SJRWMD	-	✓
All regions in SWFWMD	✓	-
All regions in SFWMD	✓	✓

* Historically used.

Water demand by non-residential customers served by a PS is generally included in the per capita water use estimates. However, in its 2013 WSA, NWFWMD states that where public suppliers report large industrial or other use separately, that use is excluded from PS water withdrawal estimates and placed in CIIM.

Different approaches are employed by the WMDs to account for water use of non-permanent population. SFWMD, NFRWSP, SJRWMD, and SRWMD project PS systems' demand using permanent population estimates only. As a result, current per capita per day use is inflated for PS systems serving a large number of non-permanent customers. While this per capita use implicitly accounts for non-permanent population served by PS systems, this approach assumes that the current ratio of permanent to non-permanent population water use will apply to future periods. This method also complicates the estimation of savings from potential water conservation programs. However, this approach is less information-intensive, which is important to regions with limited data regarding water use by non-permanent populations.

NWFWMD also focuses on permanent population only. However, for areas with a large transient population, the NWFWMD worked with utilities to obtain a more accurate estimate of population served by the PS systems.

SWFWMD is the only WMD that explicitly estimates non-permanent population served by PS systems. The method relies on data for hospital admissions (to estimate seasonal population), data for county-level lodging rooms (to estimate tourist population), and estimates from U.S. Census Bureau American Community Surveys (to estimate commuter population). In addition, SWFWMD has CUP/WUP reporting requirements on PS systems with each permit holder to report annual data regarding population and dwelling unit served, allowing the district to collect data to more accurately estimate PS systems' population.

A summary of the methods used to account for non-permanent population in water demand projections is summarized in Table 3.1.6.

[See table on following page]

Table 3.1.6 Summary of WMDs' Methods Used to Project Non-permanent Population for PS Systems' Service Areas

	Explicitly Projected	Accounted for Implicitly
All regions in NWFWMD	-	✓
All regions in SRWMD	-	✓
All regions in SJRWMD	-	✓
All regions in SWFWMD	✓	-
All regions in SFWMD	-	✓

Finally, to account for variation in water use from year to year, most WMDs rely (or plan to rely in the future) on five-year average per capita rate estimates.[170] However, historically, some regions operated with one-year per capita use estimates only (e.g., RWSPs for SF-LKB and SF-LEC). For the 2013 WSA in NWFWMD, per capita use was estimated using base year (2010) data, and if the estimate was judged to misrepresent actual water use due to metering problems, droughts, high water loss, or other reasons, a three-year average (2009 – 2011) was calculated. For SF-UEC RWSP, a three-year average was used.

Note that small public supply systems (i.e., systems holding permits for withdrawals of less than 0.1 mgd) represent a gray area between PS and DSS (Table 3.1.7). In SRWMD, SJRWMD, NFRWSP, and SWFWMD planning areas, future water demand for all PS systems (including small systems) was estimated using the same methodology as discussed above; however, the projections for the small PS systems were included into the DSS category, not the PS category. In NWFWMD, small systems were included in public supply category if it was probable that the systems would meet the 0.1 mgd threshold during the planning period, or if multiple small systems within a county collectively met the threshold and together accounted for a major portion of the county's water usage. The other small PS systems were categorized as DSS. For SWFWMD, the small PS systems were not included into the DSS category. The projections for all public supply utilities were individually listed in the 2015 RWSP. In SFWMD, individual projections were not derived for the small PS systems, and their demand was estimated through the general procedure used to project water demand in the DSS category. Since DSS generally represents a small proportion of total water demand, the differences in the methods used to account for small PS systems are not expected to significantly influence regional or state water demand projections.

[See table on following page]

[170] Currently, NFRWSP, SWFWMD, and SF-LWC RWSP rely on five-year average per capita rate estimates.

Table 3.1.7 Summary of WMDs' Methods Used to Account for Water Demand for Small Public Supply Systems with Permitted Capacity less than 0.1 mgd*

	Projections for individual small PS systems are developed		Projections for individual small PS systems are not developed
	Included in DSS	Included in PS	
All regions in NWFWMD	-	✓**	-
All regions in SRWMD	✓	-	-
All regions in SJRWMD	✓	-	-
All regions in SWFWMD	-	✓	-
All regions in SFWMD	-	-	✓

*As stated above, the differences in approaches should not significantly affect the water demand estimates on a regional scale.
** Small systems were included in public water supply category if it was probable that the systems would meet the 0.1 mgd threshold during the planning period, or if multiple small systems within a county collectively met the threshold and together account for a major portion of the county's water usage.

The WMDs also differ in their approaches to forecasting water demand for residential irrigation wells. SWFWMD defines irrigation wells as private wells smaller than 6 inches in diameter that do not require a CUP/WUP. These wells are used primarily for outdoor irrigation purposes at residences that are connected to a central utility system and receive potable water service for indoor use. SWFWMD estimated the number of domestic irrigation wells by county by examining well construction permits in its GIS database, focusing on wells less than 5 inches in diameter that are within public supply service areas.[171] An exponential growth rate was used to project the future number of irrigation wells. In water demand projections, the SWFWMD estimated that approximately 300 gallons per day are used for each irrigation well. This estimated water demand for residential irrigation wells is included in the PS category.

In contrast, NWFWMD includes water demand for homeowners with small diameter landscape irrigation wells in the recreational-landscape irrigation water use category. In the other districts/planning regions, water demand that is supplied from residential irrigation wells is not explicitly accounted for due to current data limitations. Based on discussions with WMD staff, this demand usually represents 2 percent or less of the total water demand in the PS sector, and hence, the exclusion should not significantly influence the water demand estimates on a regional scale.

A summary of approaches used by WMDs to account for water demand for residential irrigation wells is presented in Table 3.1.8.

[See table on following page]

[171] Although irrigation wells are defined as wells with a diameter smaller than 6 inches, in reality, most residential irrigation wells are less than 5 inches in diameter.

Table 3.1.8 Summary of WMDs' Methods Used to Account for Water Demand for Residential Irrigation Wells

	Included in REC*	Included in PS	Not Accounted for**
All regions in NWFWMD	✓	-	-
All regions in SRWMD	-	-	✓
SJR-NFRWSP and SJR-CSEC	-	-	✓
All regions in CFWI	-	-	✓
All regions in SWFWMD	-	✓	-
All regions in SFWMD	-	-	✓

*REC refers to the recreational-landscape irrigation category which is predominantly golf course irrigation.
**As stated above the exclusion should not significantly affect the water demand estimates on a regional scale.

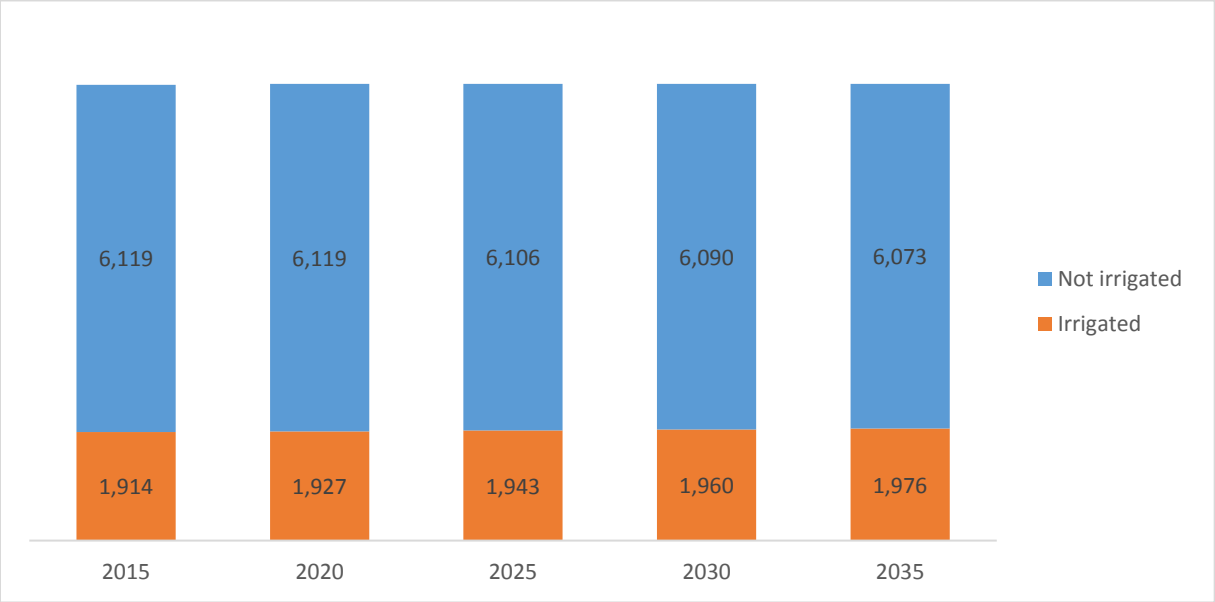
Agricultural Acreage and Water Use

The agricultural self-supplied category was estimated to be the largest water use category in the state in 2012.[172] Crop irrigation accounts for the majority of agricultural water use. In 2015, more than one-fifth (22 percent) of agricultural acreage was irrigated in Florida. This proportion is projected to stay approximately the same until 2035, with only a slight increase in irrigated acreage.[173]

[See figure on following page]

[172] Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).
[173] According to section 570.93, Florida Statutes, the Florida Department of Agriculture and Consumer Services (DACS) is charged with developing estimates of statewide agricultural water demand. Several updates of the Florida Statewide Agricultural Irrigation Demand (FSAID) project have been released in the past. This report uses results from the fourth update of FSAID released in July 2017. Note that most of the RWSPs / WSAs were completed prior to the release of the fourth FSAID update, and hence, they use or discuss results from the previous FSAID versions. See The Balmoral Group. 2017. Florida Statewide Agricultural Irrigation Demand Estimated Agricultural Water Demand, 2015 – 2040. Produced for Florida Department of Agriculture and Consumer Services. The Balmoral Group, 165 Lincoln Ave Winter Park, FL 32789 (DACS).
http://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning. (Accessed on December 14, 2017).

Figure 3.1.7 Florida Agricultural Acreage Projections (in thousand acres)



Based on FSAID IV accessed October 2017, available at https://fdacs-fsaid.com/ and in The Balmoral Group (2017)[174]

Under contract with DACS, The Balmoral Group developed the Florida Statewide Agricultural Irrigation Demand (FSAID) product that forecasts agricultural acreage and water demand projections in five-year increments for the State of Florida.[175] The FSAID project began in 2013, with the first water demand projections (referred to as FSAID I) released in 2014, and annual updates released thereafter.[176] The most recent projections (referred to as FSAID IV) were released in 2017.[177] These updates reflect continued discussions and data sharing among The Balmoral Group, DACS, and WMDs aimed to make FSAID the best available source of agricultural water use projections for the water supply planning regions. In this report, EDR uses results from the most recent (fourth) update of FSAID released in July, 2017 (referred to as FSAID IV here).[178] Note that most of the RWSPs and WSAs were completed prior to the release of FSAID IV, and hence, they use or discuss results from previous FSAID versions.

[174] The Balmoral Group. 2017. Florida Statewide Agricultural Irrigation Demand: Estimated Agricultural Water Demand, 2015 – 2040. Produced for the Florida Department of Agriculture and Consumer Services. http://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning. (Accessed on December 14, 2017).

[175] § 570.93(2), Fla. Stat. (requiring DACS to develop, for consideration by the WMDs, data indicative of future agricultural water demands based on at least a 20 year planning period).

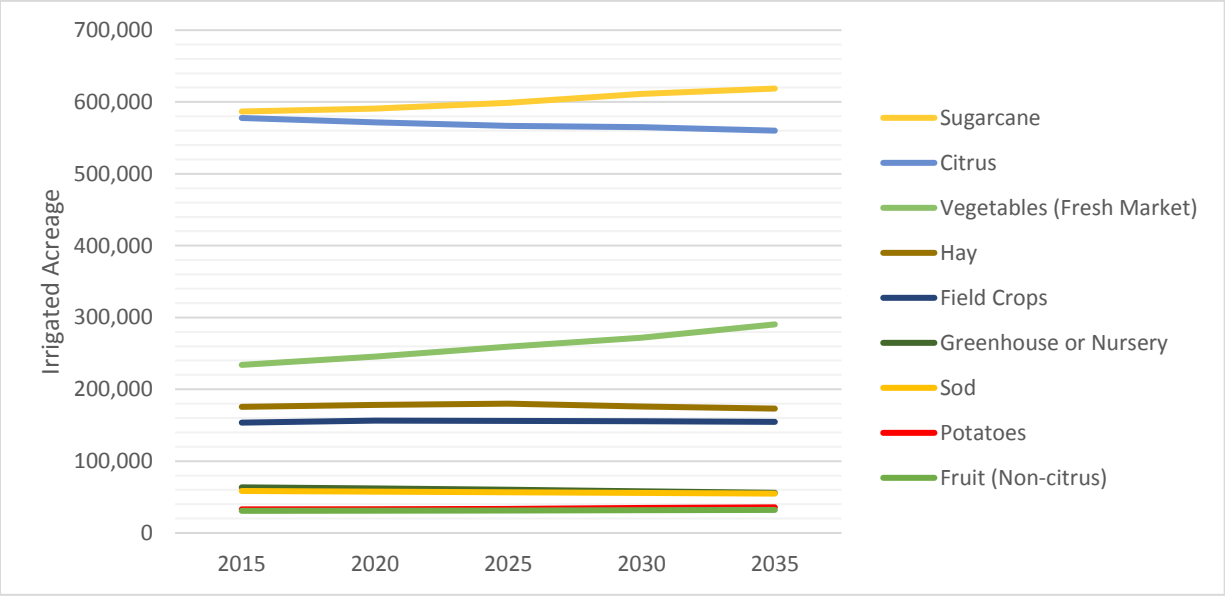
[176] The Balmoral Group. 2017. Florida Statewide Agricultural Irrigation Demand: Estimated Agricultural Water Demand, 2015 – 2040. Produced for the Florida Department of Agriculture and Consumer Services. http://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning. (Accessed on December 14, 2017). (Accessed on January 30, 2018).

[177] Florida Department of Agriculture and Consumer Services (DACS). 2017. Agricultural Water Supply Planning. DACS, Tallahassee, FL. http://www.freshfromflorida.com/Business-Services/Water/Agricultural-Water-Supply-Planning. (Accessed on January 4, 2018).

[178] *Id*.

According to FSAID IV, approximately two-thirds of the irrigated acreage statewide in 2015 was devoted to sugarcane and citrus. The remaining acreage was divided among fresh market vegetables (12 percent), hay (9 percent), field crops (8 percent), greenhouse and nursery (3 percent), sod (3 percent), potatoes (2 percent), and non-citrus fruits (2 percent). This distribution of acres is projected to remain fairly constant from 2015 through 2030, with slight increases in sugarcane and fresh market vegetable acreage, and a slight reduction in citrus acreage.[179]

Figure 3.1.8 Projected Agricultural Irrigated Acreage in Florida



Based on FSAID IV accessed October 2017, available at https://fdacs-fsaid.com/.

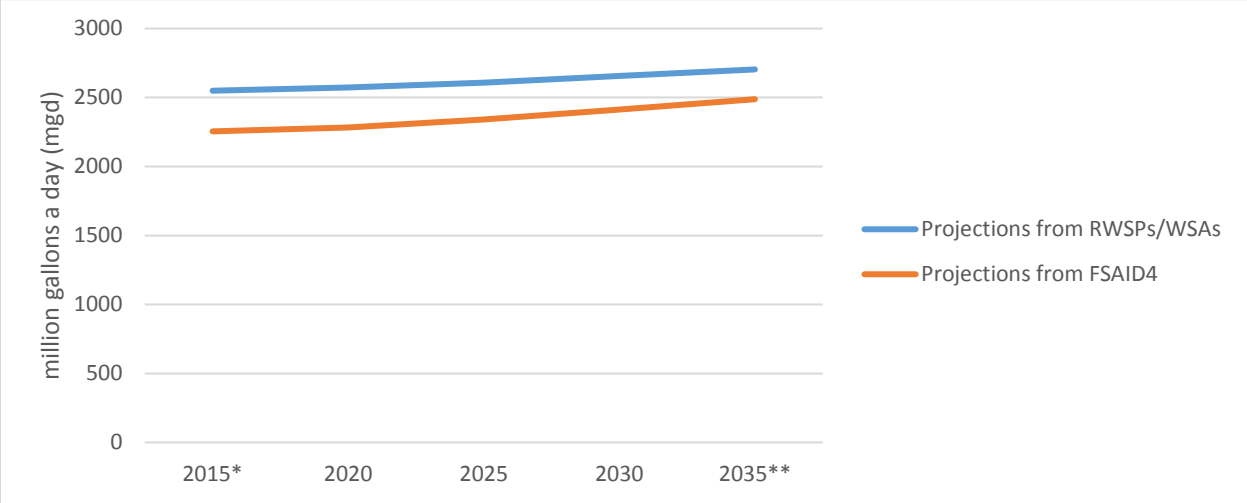
FSAID IV estimated that non-irrigation agricultural water demand is significantly smaller than irrigation agricultural water use, accounting for 155 mgd in 2015. Seventy percent of this water use was for frost/freeze protection (mostly for citrus and non-citrus fruit crops). Livestock demand accounted for 25 percent of non-irrigation agricultural water use, and a third of this demand was in SFWMD (31 percent), while SWFWMD and SRWMD accounted for a quarter each. Water demand for aquaculture was 6 percent of non-irrigation agricultural water use in 2015, and NWFWMD accounted for more than a third of this demand (36 percent). Water demand for livestock and aquaculture is projected to stay the same from 2015 through 2035.[180]

Total agricultural water demand projections were largely consistent between FSAID IV and the aggregate projections from RWSPs/WSAs. According to FSAID IV, water demand for agriculture was approximately 2,254.8 mgd in 2015, and it is expected to increase by 10 percent by 2035. In turn, according to the projections developed by WMDs, agricultural water demand in 2015 was 2,549.6 mgd, and the projected increase is 6 percent (Figure 3.1.9). Note that some of the RWSPs incorporated information from previous releases of FSAID to forecast agricultural acreage and/or

[179] FSAID IV, https://fdacs-fsaid.com/. (Accessed October 2017).
[180] *Id*.

water demand, while other RWSPs/WSAs used other methodologies. Also, while the FSAID IV and RWSPs/WSAs projections are similar at the statewide level, they diverge for specific regions in Florida, and both may differ from metered water use data (where available).

Figure 3.1.9 Agricultural Water Demand Projections (mgd; assuming average annual rainfall)***

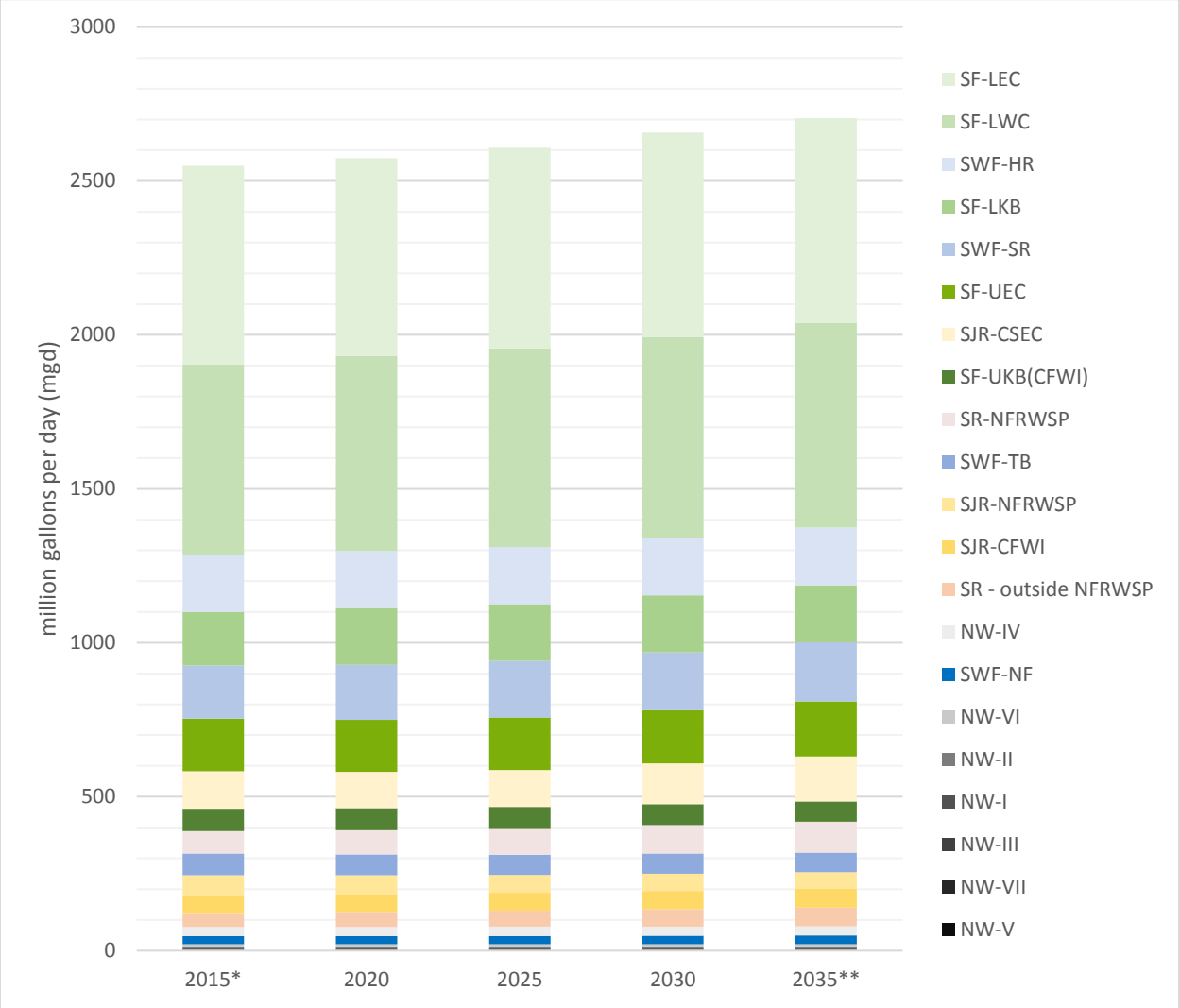


* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Most of the RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
** For the SF-LEC, 2030 water demand projections were used for 2035 water demand projections. The RWSP for the region is currently being updated, and its draft version is expected to be available in early 2018.
*** Note that some of the RWSPs incorporated information from previous releases of FSAID to forecast agricultural water acreage and/or demand, while other RWSPs/WSAs used other methodologies.

According to the projections developed by WMDs, SF-LEC and SF-LWC planning regions accounted for and will continue to account for approximately half of all agricultural water use in Florida (Figure 3.1.10).

[See figure on following page]

Figure 3.1.10 Agricultural Water Demand Projections, by WMD Planning Regions, Sorted in the Order of Magnitude in 2015 (mgd; assuming average annual rainfall)



* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Some RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
** For the SF-LEC, 2030 water demand estimates were used as estimates of 2035 water demand.

Agricultural Self-Supplied Category WMD Methodology

According to legislation[181] passed in 2013, in determining the best available data for agricultural self-supplied water needs, the WMDs shall consider the data indicative of future water demands provided by DACS pursuant to section 570.93, Florida Statutes, and agricultural demand projection data and analysis submitted by a local government, if the data and analysis support the local government's comprehensive plan. Any adjustment of or deviation from the data provided

[181] Ch. 2013-177, § 3, Laws of Fla. (codified at § 373.709(2)(a)1.b., Fla. Stat.).

by DACS must be fully described, and the original data must be presented along with the adjusted data.

One of the most recent water supply plans – RWSP for NFRWSP (including SJR-NFRWSP and SR-NFRWSP, completed in 2017) utilizes the second update of FSAID (FSAID II), released in June 2015, for agricultural water demand projections. Unpublished demand projections for SJR-CSEC and SR-outside NFRWSP were produced together with the plan for NFRWSP and they also rely on FSAID II.

The current RWSP for CFWI (including SF-UKB-CFWI, SJR-CFWI, and portions of SW-HR and SW-NR, completed in 2015) utilizes agricultural water demand projections developed by SJRWMD, SWFWMD, and SFWMD, using their respective methodologies for their jurisdictions. However, the 2020 CFWI RWSP will rely on FSAID IV, while also accounting for the North Ranch sector plan not included in FSAID IV.

For several existing RWSPs/WSAs, irrigated water demand projections were developed internally by the WMDs. To forecast water demand for each county and each crop, WMDs used data: (1) collected by USGS and U.S. Department of Agriculture (USDA), (2) available in WMDs' agricultural CUP/WUP databases, and (3) provided by other sources, such as the University of Florida/Institute of Food and Agricultural Sciences, Florida Farm Bureau, and other agricultural stakeholders.

Specifically, NWFWMD examined measurable, historical, and recent trends in reported water use, irrigated acreage, crop types, and numbers of agricultural well construction permits and CUPs/WUPs. Where slight decreases or no clear trends in acreage was detected, the base year (2010) acreage was assumed to stay constant for the whole planning horizon (to conservatively estimate agricultural water use). Where significant increasing trends were detected, 2015 projections reflected continuation of the trend. Values for subsequent years were then kept constant. In addition to agricultural irrigation, NWFWMD estimated non-irrigation water needs, which were expected to remain on the base year (2010) levels.

SWFWMD projected irrigated citrus acreage by applying a short-term (2008-2013) average growth rate to the base year (2010) acreage. To project non-citrus irrigation acreage, a long-term linear trend was estimated using the 2001-2011 acreage data. Where linear trends resulted in zero or negative results, an exponential equation was used. Where long- and short-term trends went in different directions (e.g., nurseries and sod), the long-term trend was used, but the projections were constrained to the lowest or the highest acreage value observed for the historical data range used. An average permitted irrigation rate per acre was then calculated from historical data to project irrigation water demand. In addition to agricultural irrigation, SWFWMD estimated non-irrigation water needs, which were expected to remain on the base year levels.

In SFWMD, agricultural irrigation acreage was historically estimated as part of the overall SFWMD's GIS land use analysis.[182] The most recent report (SF-LWC) utilizes the acreage

[182] 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. The "weighted average" irrigation efficiency factor (weighted by acres that recover/recycle water) reflected the combined acres and irrigation efficiencies

projections produced by the third version of FSAID (FSAID III). Projected acreage was combined with irrigation rate estimates produced by Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) to estimate future irrigation water demand. AFSIRS calculates net and gross irrigation requirements for each crop category and irrigation system type given historical climatic data. Non-irrigation agricultural water use (livestock watering and aquaculture) is similar to FSAID III.

None of the WMDs project water demand for freeze/frost protection as a part of the RWSPs/WSAs. However, freeze/frost protection is accounted for in the CUP/WUP process. RWSPs developed by SWFWMD indicate that freeze/frost protection accounts for a small percent of annual agricultural water use, and hence, not accounting for this use does not significantly influence the total agricultural water use estimates and projections.

To summarize, the FSAID project began in 2013, with the first water demand projections (referred to as FSAID I) released in 2014, and annual updates released thereafter. The most recent projections (referred to as FSAID IV) were released in 2017. As FSAID projections were developed and updated, RWSPs/WSAs largely relied on agricultural water demand projections developed internally by the WMDs, some combining FSAID irrigated acreage projections with agricultural per acre irrigation rates developed internally. An exception is the RWSP for NFRWSP completed in 2017 that fully adopted FSAID II agricultural water use projections. The five WMDs are collaborating with DACS and The Balmoral Group on refining the FSAID product to better represent regional specifics. It is anticipated that the future RWSPs developed by the WMDs will utilize future versions of the FSAID projections, as The Balmoral Group and DACS continue revising FSAID to be more representative of agricultural water use in specific water supply planning regions.

Table 3.1.9 Summary of Methods Used to Project Agricultural Irrigation Water Demand*

	FSAID	FSAID in combination with AFSIRS	Other
All regions in NWFWMD	-	-	✓
All regions in SRWMD	✓	-	-
All regions in SJRWMD	✓	-	-
All regions in SWFWMD	-	-	✓
All regions in SFWMD	-	✓	-

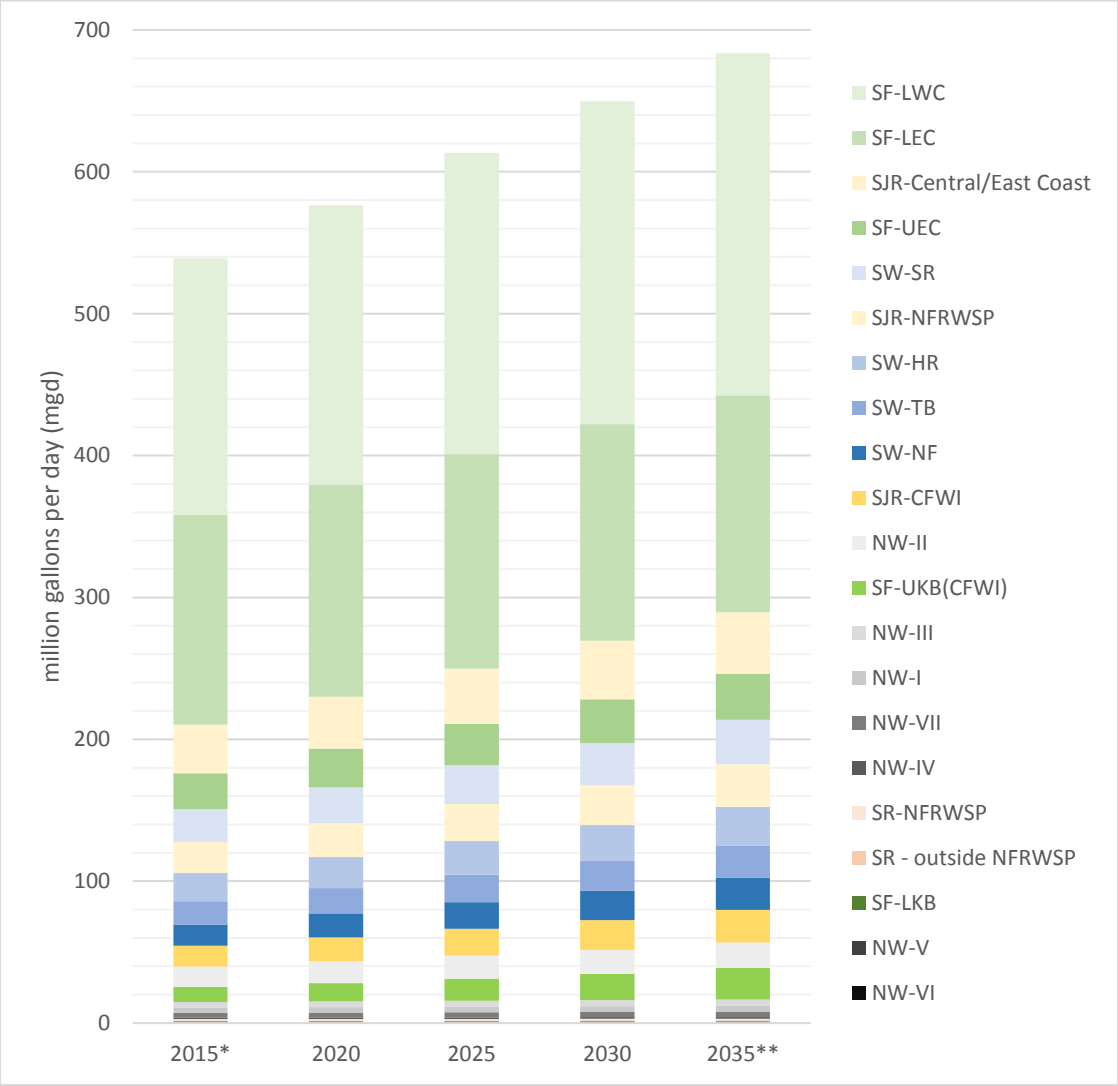
* The WMDs are collaborating with DACS and The Balmoral Group on refining the FSAID product to better represent regional specifics. In the future, the WMDs anticipate relying on FSAID to a greater extent.

identified for all acres within the regions based on data within the regulatory permitting database. 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 levels.

Recreational-Landscape Irrigation

According to water demand estimates and projections developed by WMDs, recreational-landscape irrigation accounted for 8 percent of 2015 statewide water demand. Two regions, SF-LEC and SF-LWC, accounted for 61 percent of water demand in this category. The SF-LWC region is also projected to account for more than half (55 percent) of the increase in water use in this category statewide from 2015 through 2035.

Figure 3.1.11 Recreational-Landscape Irrigation Water Demand, by WMD Planning Regions, Sorted in the Order of Magnitude in 2015 (mgd; assuming average annual rainfall)



* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Some RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).

** For the SF-LEC, 2030 water demand estimates were used as estimates of 2035 water demand.

Recreational-Landscape Irrigation WMD Methodology

Projected increases in water demand were generally linked with population growth. The forecast methods varied among the WMDs and water supply planning regions. In NWFWMD, water demand was estimated for the following types of uses: landscape and recreational irrigation (for users of two categories: wells smaller than 8 inches in diameter, and wells larger than that diameter), golf course irrigation, aesthetic use, and water-based recreation. Once the base year water use for each category was estimated (using the estimated number of wells and estimated water use for each well type), the increase in demand for each category was assumed to be proportional to the county population growth. Specifically, for each county, demands for 2015 through 2035 were projected at five-year intervals by multiplying the total 2010 estimated REC category water use by the BEBR medium population projection growth rates.

In SR-NFRWSP, SJR-NFRWSP, SJR-CSEC, and SR-outside NFRWSP, water demand for the REC category was projected at the county level using respective REC historic average gallon per capita per day (gpcd) rates. The average gpcd was applied to the additional population projected by BEBR for each five-year increment (medium scenario) and the associated water demand was added to the 2010 base-year water use. Future acreage estimates were interpolated from 2010 acreage and 2010 water use ratios.

The SFWMD and SWFWMD developed separate projections for golf and non-golf irrigation. In the SFWMD, for golf courses, existing acreage was first identified (through golf course inventories, land use coverage data, and water use permits). Time series trends of irrigated golf course acreage for each county were then developed and reviewed, and compared with the trends in urban growth (such as a time series of annual new privately owned residential building permits within each county).[183] Using this estimated trend in acreage, water demand was estimated using an AFSIRS model that predicted gross and net irrigation requirements for sod. Sprinkler irrigation was assumed with 75 percent efficiency, and rainfall and potential evapotranspiration data for the respective region was used. Sandy soil parameters were used in the AFSIRS runs as a simplifying and conservative assumption. Other irrigation demands under the REC category are generally assumed to grow at the same rate as the local population.

The SWFWMD relied on a golf course industry consulting firm (Pellucid Corp) to project the future demand for golf acres, to evaluate the current supply of golf acres, and to assess the additional golf acreage that would be needed to meet the growing demand. The SWFWMD provided long-term demographic projections (e.g., age, income, and race) derived from Woods and Poole Economics[184] to the consulting firm to assist in projecting demands for future rounds of golf in the district. Based on the golf participation rate and the rounds played statistics, the consultant estimated "play rate" for various demographic groups, and then used these results to assess an overall play rate for each county over the planning horizon. This demand was compared with estimated "supply" (i.e., the number of golf courses in each county, the number of holes in these facilities, and facility-reported rounds per hole). The comparison was done using Eighteen-Hole Equivalent (EHE) golf course units. Future increases in the golf acreage to meet the growing

[183] For the most recent plans, no clear trend was observed for the golf courses (in fact, some re-development of golf courses, where they are converted to residential subdivisions, was observed). Source: SFWMD, discussion with staff.
[184] See databases at Wood and Poole Economics, https://www.woodsandpoole.com/our-databases/. (Accessed on December 14, 2017).

demand were then estimated. The consultant also indicated that two-thirds of new golf courses are constructed in a way that may increase their water demand by approximately 15 percent. This was accounted for by calculating a base year water use per EHE for each county, and then applying the 15 percent increase to the water use per EHE for 66 percent of EHEs added in a given year. For non-golf recreational-landscape irrigation, SWFWMD assumed that water use would grow at the county's population expected growth rate.

Table 3.1.10 Summary of WMDs' Methods Used to Project Recreational-Landscape Irrigation Water Demand

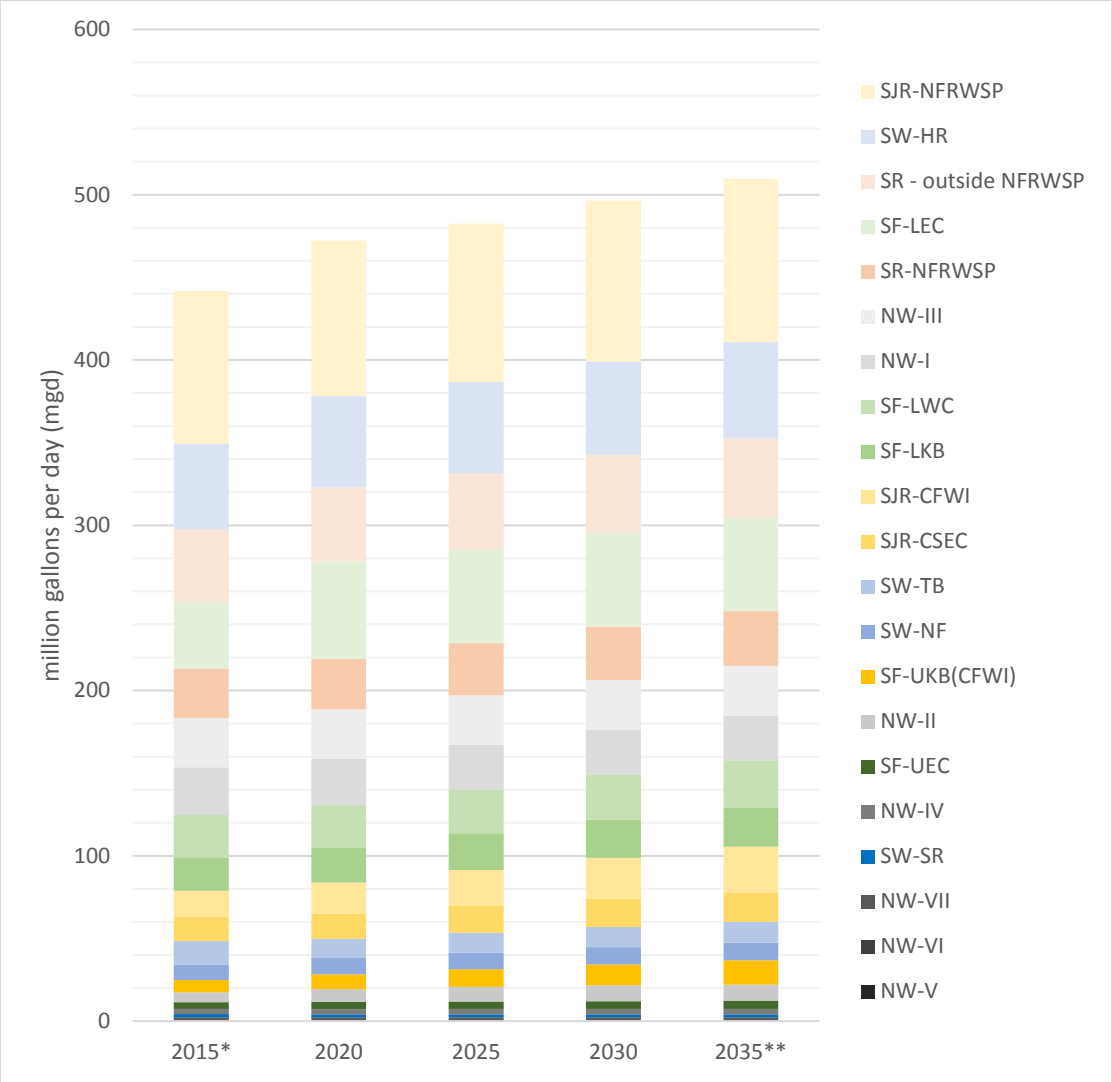
	Total REC demand is assumed to be proportional to county population	Separate Models for golf and non-golf irrigation projections	Other
All regions in NWFWMD	-	-	✓
All regions in SRWMD	✓	-	-
All regions in SJRWMD	✓	-	-
All regions in SWFWMD	-	✓	-
All regions in SFWMD	-	✓	-

Commercial-Industrial-Institutional-Mining Self-Supplied

According to water demand estimates developed by WMDs, water use in this category accounted for 7 percent of total estimated water demand in Florida in 2015, and the water demand is expected to increase only slightly by 2035. In fact, in SW-SR, SW-TB, and SW-NR, water demand in this category is projected to shrink slightly. In contrast, water demand is projected to almost double in SJR-CFWI (increase from 15.9 mgd to 27.7 mgd). A significant increase is also projected for SF-LEC (40 percent, from 40.5 mgd to 56.6 mgd).

[See figure on following page]

Figure 3.1.12 Commercial-Industrial-Institutional-Mining Self-Supplied Water Demand, by WMD Planning Regions, Sorted in the Order of Magnitude in 2015 (mgd; assuming average annual rainfall)



* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Some RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
** For the SF-LEC, 2030 water demand projections were used as projections for 2035 water demand.

Commercial-Industrial-Institutional-Mining Self-Supplied WMD Methodology

This category aggregates water use of diverse industries and operations. NWFWMD relied on the water demand projections produced by the individual CUP/WUP holders. SWFWMD focused on a specific water user – Mosaic Company – that accounted for a significant share of water withdrawals. The percentage change in water use for mines was based on changes in projected withdrawal rates. Projected use was lower in counties where mines are being phased down or closed, and increased in counties where mining production was scheduled to increase or commence in the future. For the CUP/WUP holders in the CIIM category other than the Mosaic Company,

SWFWMD developed water demand projections by multiplying water use data from the water well database (maintained by SWFWMD) by the Gross Regional Product (GRP) growth factor (from the Woods and Poole Economics GRP forecasts, by county).

In SFWMD, CIIM demand estimates are based on reported use. Recirculated water (e.g., water used in many geothermal heating and cooling systems) is not considered a part of water demand for RWSP purposes. Projected water demand is calculated separately for large and distinct CIIM user groups, such as mining operations and refinement of agricultural products.

For example, for the counties in SF-LKB and SF-UEC Regions, the demand for CIIM was projected to grow at the same rate as the county population. In turn, for Miami-Dade County (SF-LEC), the historic water pumpage for the aggregate industry (i.e., mining, quarrying, and rock washing) was compared to industrial production (measured by The *Federal Reserve Index of Industrial Production-Nonmetallic Mineral Mining and Quarrying*[185]). Future annual industrial production was projected using official forecasts for the United States economic growth (gross domestic product), by evaluating the growth rate relationship between mineral mining industrial production and the gross domestic product. It was assumed that projected water demand will follow the recurring boom and bust patterns of economic growth.

In Palm Beach County (SF-LEC), the sugar industry accounted for a large share of total CIIM water use. Historical water use in sugar production showed a decline in the sugar industry's unit water use per ton of sugar produced. The trend to more efficient water use was extrapolated forward. For non-sugar industries, the current usage was assumed to continue until the CUP/WUP expiration date for each CIIM permit in SFWMD's Water Use Regulatory Database. After that time, water use in this sector is projected to increase at the rate of population growth.

For Broward County in SF-LEC, as well as the counties in SF-LWC region, it was assumed that the CIIM demand would be stable over the twenty-year planning horizon.

The NFRWSP divided all users into two groups, depending on whether or not their water use is projected to grow in response to the increase in population. Water demands for large commercial and industrial facilities (e.g., pulp and paper mills) that are not impacted by population growth were held constant. For the industries that are expected to grow, historic average gallons per capita per day (gpcd) was estimated at the county level. The average gpcd was then applied to the additional population projected by BEBR (medium scenario) for each five-year increment and the associated water demand was added to the base year, 2010 water use. Note that for mining/dewatering operations, only water that is lost in the process is included in water use. It is estimated that water loss accounts for approximately 5 percent of the total surface water withdrawals of the mine operation.

[See table on following page]

[185] FRS. 2012. *Nonmetallic Mineral Mining and Quarrying*. Federal Reserve System Board of Governors, Washington, DC. NAICS 2123.

Table 3.1.11 Summary of Methods Used to Project CIIM Demand*

	Projected directly by CUP holders	Projected internally by WMDs			
		Assumed constant	Based on population projections	Based on historical water use trends	Based on regional economic trends
Regions in NWFWMD	✓	-	-	-	-
Regions in SRWMD and SJRWMD	✓	✓	✓	✓	-
Regions in SWFWMD	-**	-	-	✓	✓
SF-LEC	-	✓	-	✓	✓
SF-LKB and SF-UEC	-	-	✓	-	-
SF-LWC	-	-	-	✓	-

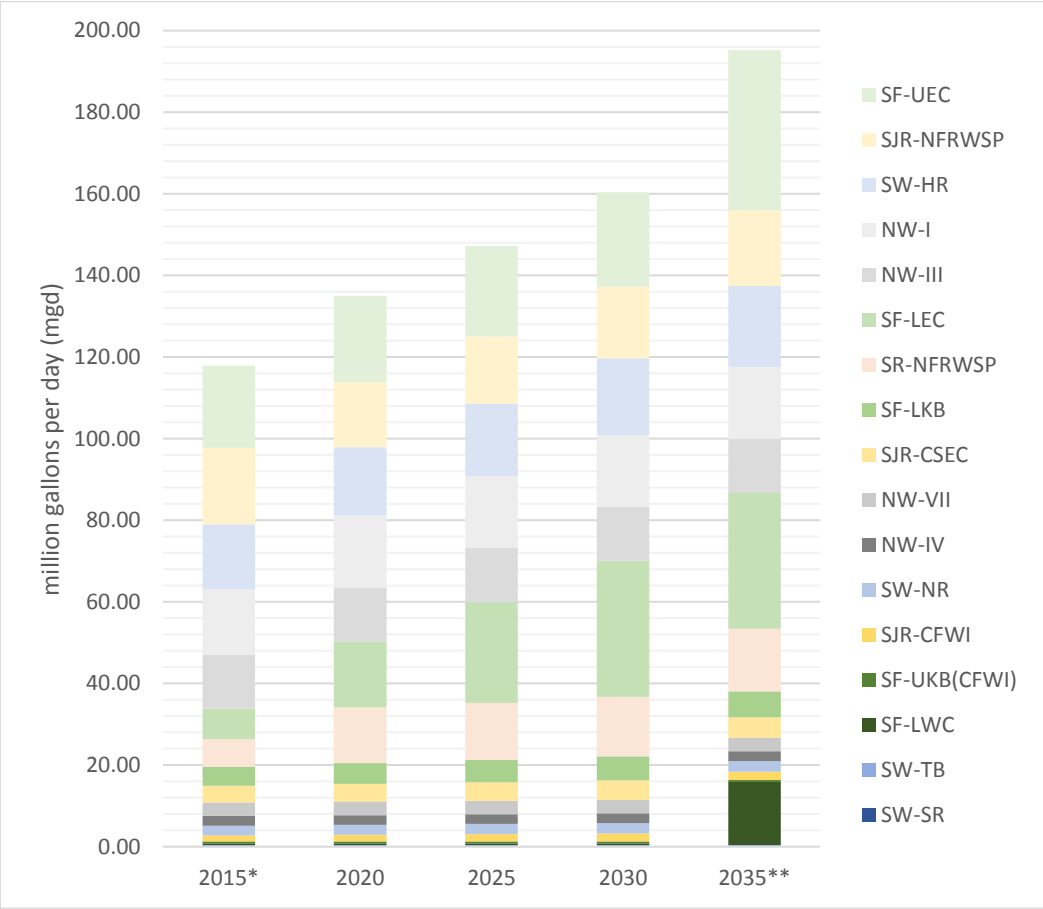
* Some WMDs use more than one method to project water demand, differentiating the methods by water use groups. Furthermore, the CFWI RWSP relies on the methods used by SJRWMD, SWFWMD, and SFWMD in their respective jurisdictions, and for SF-UKB-CFWI, reference to the other three SFWMD reports are provided. As these three reports use different methodologies, EDR was not able to identify the method used specifically in SF-UKB-CFWI for CIIM.
** Mining dewatering projections, specifically Mosaic were based on consultation with CUP holders.

Power Generation

According to estimates developed by WMDs, water demand in this category accounted for 2 percent of total water demand in 2015. Five regions accounted for the bulk of water use in this category: SF-UEC, SJR-NFRWSP, SW-HR, NW-I, and NW-III. In the next 20 years, water demand in this category is expected to increase significantly in SF-LWC, SF-LEC, and SF-UEC.

[See figure on following page]

Figure 3.1.13 Power Generation - Water Demand, by WMD Planning Regions, Sorted in the Order of Magnitude in 2015 (mgd; assuming average annual rainfall)



* The 2015 estimate reported in the WMDs' regional water supply plans (RWSPs) and districtwide water supply assessments (WSAs) may differ from the actual 2015 water use. Some RWSPs and WSAs were developed prior to the date when the final 2015 data were available, and hence, 2015 water use was projected based on water use in prior years (often, 2010 water use or a previous five-year average of water use).
** For the SF-LEC, 2030 water demand estimates were used as estimates of 2035 water demand.

Power Generation WMD Methodology

With the exception of the RWSPs developed by SWFWMD, all the other regions relied on ten-year plans for facility expansion to project the water demand in power generation sector. The Florida Public Service Commission requires each power generation entity to produce detailed ten-year site plans for each of its facilities. These plans include planned facilities and generating capacity expansions, as well as the decommissioning of facilities and reductions associated with more efficient processes. Using this information, for each PG facility with a planned capacity expansion, PG consumptive use capacity projections were interpolated between the existing capacity and the planned capacity, as detailed in the ten-year site plans. The average daily water use per power generation capacity unit (gallons per megawatt) for various power generation types and fuel sources was calculated from historical data or taken from industry or agency literature. Future water demand was projected as a product of future capacity and the estimated rate of water use per energy unit.

Beyond the ten-year site plans, the projections are developed through discussions and close collaborations with facility representatives. In NFRWSP, the projections were calculated for each facility using a linear extrapolation of the existing and planned expansion dates and data and BEBR medium population projection rates.

Unlike other WMDs, in SWFWMD, demand projections were developed by multiplying the 2010 amount of water used for each PG facility by growth factors based on Woods and Poole Economics' GRP forecasts by county in five-year increments. For example, if a PG facility used 0.30 mgd in 2010, and the county calculated growth factor from 2010 to 2015 was 3 percent, the 2015 projection for the facility was estimated as 1.03 x .030 = 0.31 mgd. Water use for the base year (2010) was derived from the database of permits.

Methods used to project water demand for PG category are summarized in Table 3.1.12.

Table 3.1.12 Summary of Methods Used to Project PG Demand

	Based on ten-year plans for facility expansion	Based on GRP forecast
All regions in NWFWMD	✓	-
All regions in SJRWMD	✓	-
All regions in SRWMD	✓	-
All regions in SWFWMD	-	✓
All regions in SFWMD	✓	-

Environmental Restoration Treated as Water Demand

The SWFWMD uniquely expresses environmental restoration demands as a part of the total regional water demand evaluation for SW-SR, SW-HR, and SW-TB (in SW-NR, the environmental restoration (ER) is not explicitly estimated). Note that unlike the demand categories discussed above, environmental restoration demand is not met by water withdrawals, but by leaving or restoring the water flow or level in water bodies. The other districts generally account for environmental demand within their water supply analyses. For example, the NFRWSP references the recovery strategy for the Santa Fe River, which had an explicit recovery target for Santa Fe River.

As shown in Table 3.1.13, the differences in approach, demand versus supply, used by SWFWMD and the other WMDs are largely due to historical reasons (i.e., requirements for the recovery strategy for the Southern Water Use Caution Area (SWUCA)).

[See table on following page]

Table 3.1.13 Approaches Used to Account for Environmental Restoration Water Use Demands

	Expressed as a water demand category	Expressed as a part of water supply analysis
Regions in NWFWMD, SRWMD, SJRWMD, and SFWMD	-	✓
Regions in SWFWMD	✓	✓

Environmental restoration (ER) "comprises quantities of water that may need to be developed and/or existing quantities that need to be retired to facilitate recovery of natural systems to meet their MFLs."[186] The SWFWMD links the ER demand analysis with the MFL analysis, with ER demand being assessed for each water body or region, including: SWUCA (in SW-SR, SW-HR, and SW-TB), Upper Peace River (SW-HR), Northern Tampa Bay Water Use Caution Area (NTBWUCA, SW-TB), Lower Hillsborough River (SW-TB) and Lower Alafia River (SW-TB). The assessment is based on hydrologic models of each region. Note that for some water bodies, ER demands were not determined at the time when the RWSPs were developed; and hence, the regional estimates present the lower bounds on the ER.

Table 3.1.14 Projected ER Water Demands, by Regions in SWFWMD (mgd; assuming average annual rainfall)

Region	2015	2020	2025	2030	2035
SW-NR	Not explicitly assessed	Not explicitly assessed	Not explicitly assessed	Not explicitly assessed	Not explicitly assessed
SW-TB	-	5.54+	10.54+	10.54+	10.54+
SW-HR	-	2.7+	10+	10+	10+
SW-SR	TBD	TBD	5+	5+	5+

Water Demand during Drought

For some use sectors, water demand depends on weather conditions, increasing during the periods with lower rainfall. Florida law[187] requires WMDs to account for unusually dry periods in their RWSPs/WSAs:

> A quantification of the water supply needs for all existing and future reasonable-beneficial uses within the planning horizon. The level-of-certainty planning goal associated with identifying the water supply needs of existing and future reasonable-beneficial uses must be based upon meeting those needs for a 1-in-10-year drought event.

[186] p. 54, in 2015 RWSP for SW-NR; see SWFWMD. 2015. 2015 Regional Water Supply Plan. SWFWMD, https://www.swfwmd.state.fl.us/documents/plans/RWSP/2015/. (Accessed on December 20, 2017).
[187] § 373.709 (2)(a)(1), Fla. Stat.

DEP defines a 1-in-10 year drought event as:

> An event that results in an increase in water demand of a magnitude that would have a 10 percent probability of occurring during any given year. The level-of-certainty water supply planning goal is to assure at least a 90 percent probability, during any given year that all the needs of reasonable-beneficial water uses will be met while also sustaining water resources and related natural systems.[188]

The percent increase in projected water demand based on average and 1-in-10 year drought conditions is presented in Table 3.1.15. Note that this information is presented for the projected demand in 2035, except for SF-LEC, where 2030 projections were used.

For CIIM and PG categories, no increase in water use is expected in the drought year conditions. For agricultural self-supplied, the projected increase in water demand during 1-in-10 year droughts differs significantly among regions. For example, in NW-V, agricultural water demand includes livestock watering only, which is projected to stay the same for average and 1-in-10 year drought conditions. In contrast, in SF-LEC, projected 2030 water demand for 1-in-10 year drought conditions is estimated to be twice the demand for average rainfall conditions. Drought year demand in that region is driven by the types of crops, irrigation system efficiencies, soil types, and other factors. For example, according to SF-LEC RWSP, Palm Beach County is ranked first in the United States in total sugarcane acres under cultivation and accounts for 77 percent of the total sugarcane acreage in Florida. The county also has unique muck soils that retain more moisture than the sandy soils prevalent in many other areas in Florida; this leads to a large difference between average and drought year irrigation requirements. Estimated net irrigation requirements for sugarcane in the Palm Beach County Everglades Agricultural Area is 6.0 inches for average rainfall, and 15.4 inches for a 1-in-10 year drought. In other words, the 1-in-10 year drought net irrigation requirement for that area is 2.6 times higher than the requirement during average conditions, influencing the drought demand estimates for SF-LEC. For the other regions in Florida, estimated percent increases in agricultural water demand for the drought conditions range from 0 percent to 100 percent, that is, between the estimates for NW-V and SF-LEC, respectively.

Recreational-landscape irrigation demand given 1-in-10 year drought conditions is estimated to increase by 6 percent in NW-III, but by 45 percent in NFRWSP (relative to the average year projections for 2035). Finally, the water demand increases in the PS and DSS individual categories range from 6 percent (SWFWMD, SJRWMD, and SRWMD) to 21 percent (SF-LKB). Based on a conversation with SFWMD staff, residential landscape irrigation accounts for a large proportion of the total demand in PS and DSS categories, making the demand in these categories especially dependent on the rainfall patterns in the SFWMD.

Overall, it is estimated that the aggregate 2035 water demand can increase by 21 percent given 1-in-10 year drought conditions, as compared with the average year conditions. The estimated increase varies among demand categories and regions. The definition of a 1-in-10 year drought is based on historical weather patterns, and hence, the severity of a 1-in-10 year drought event may

[188] Quoted *verbatim* with formatting from p. 16 in Florida Department of Environmental Protection (DEP). 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.

differ among the regions. These experiential differences can partially explain the different projected water demand increases associated with drought conditions. The difference can also be attributed to the variation in the types of agricultural crops produced, proportion of residential landscape irrigation in the PS and DSS water demand, types of irrigation systems used, as well as the differences in the estimation methods among the WMDs.

[See table on following page]

Table 3.1.15 Projected 2035 Water Demand: Increase in 1-in-10 Year Drought Projections as Compared with Years of Average Rainfall*

Region	Public supply	Domestic self-supplied	Agricultural self-supplied	Recreational-landscape Irrigation	Commercial-industrial-institutional-mining self-supplied	Power generation	Total
NW-I	7.0%	7.0%	11.7%	11.3%	0.0%	0.0%	4.1%
NW-II	7.0%	4.6%	6.4%	9.3%	0.0%	NA	6.5%
NW-III	7.0%	7.0%	7.6%	5.9%	0.0%	0.0%	3.5%
NW-IV	7.0%	7.0%	18.6%	8.0%	0.0%	0.0%	9.3%
NW-V	7.0%	7.0%	0.0%	8.2%	0.0%	NA	6.4%
NW-VI	7.0%	7.0%	4.0%	10.2%	0.0%	NA	5.2%
NW-VII	7.0%	7.0%	7.4%	8.9%	0.0%	0.0%	6.6%
SR-outside NFRWSP	6.1%	5.8%*	13.9%	30.3%	0.0%	NA	7.8%
SR-NFRWSP and SJR-NFRWSP	6.0%	6.0%	14.2%	45.5%	0.0%	0.0%	8.2%
SJR-CSEC	6.0%	5.8%*	14.7%	38.1%	0.0%	0.0%	11.9%
CFWI, including SJR-CFWI, SF-UKB-CFWI, and parts of SW-HR and SW-NR	6.0%	6.0%	49.5%	23.4%	0.0%	0.0%	15.1%
SW-NR**	6.0%***	***	12.1% [IV]	29.2%	0.0%	0.0%	9.0%
SW-TB	6.0%***	***	8.1% [IV]	27.9%	0.0%	0.0%	7.2%
SW-HR**	6.0%***	***	36.6% [IV]	27.8%	0.0%	0.0%	19.7%
SW-SR	6.0%***	***	20.0% [IV]	27.3%	0.0%	0.0%	15.4%
SF-LKB	21.3%	21.2%	35.2%	40.0%	0.0%	0.0%	30.1%
SF-UEC	17.5%	17.6%	55.4%	28.8%	0.0%	0.0%	37.0%
SF-LEC*	9.6%	10.2%	100.7%	23.6%	0.0%	0.0%	41.6%
SF-LWC	6.2%	5.9%	16.9%	6.7%	0.0%	0.0%	12.2%
Aggregate[V]	7.4%	6.6%	43.9%	19.9%	0.0%	0.0%	20.8%

* All the percentages are estimated at EDR by dividing 2035 projections for 1-in-10 year drought conditions by 2035 projections for average conditions. Due to rounding, the estimated percentages may be different from the actual drought demand factors used by WMDs. For SF-LEC, 2030 estimates are used, since the 2035 assessment is not available. For the underlying data, see Appendix B.

** SW-NR and SW-HR overlap with the CFWI planning area.

*** SWFWMD combined PS and DSS categories in their RWSP summary tables.

[IV] SWFWMD estimates 2-in-10 rather than 1-in-10 year drought water demand.

[V] The aggregate estimate is based on average and drought year water demand projections for the regions listed in this table. Since some regions overlap, the aggregate total water demand in this table is not equal to the statewide water demand.

Drought Demand Assessment WMD Methodology

In all RWSPs and WSAs, it is assumed that water demand in CIIM and PG categories is not affected by the drought conditions. For PS and DSS, WMDs use "drought demand factors", which are coefficients capturing the water use increase during drought conditions. In SWFWMD, it is assumed to be equal to 1.06.[189] In turn, NWFWMD uses the multiplier of 1.07 (estimated based on the comparison of total water demand by PS utilities for a drought year, 2006, and an average rainfall year, 2008). SFWMD uses county-specific drought demand factors. For example, in Glades County, the drought demand factor is 1.03, while in north-east Okeechobee County, the drought demand factor is 1.172.

Non-irrigation agricultural water use is assumed to be the same for average and drought-year rainfall conditions. For agricultural irrigation, the RWSP for NFRWSP (SR-NFRWSP and SJR-NFRWSP) utilizes drought year projections based on FSAID II. Note that FSAID assessed 1-in-10 year drought demand using econometric techniques and historical data for agricultural irrigation. Hence, the accuracy of the estimates depend on the availability of historical agricultural irrigation data for the various regions. In turn, SFWMD and NWFWMD rely on assessments of irrigation requirements for each crop and each county based on the AFSIRS model and readily available historical weather data. While FSAID uses an econometric model, AFSIRS relies on simulations to estimate irrigation requirements based on crop water budgets, combining estimated crop evapotranspiration and crop water use coefficients.[190] Finally, SWFWMD relies on a model called AGMOD to develop agricultural irrigation projections for average and dry conditions. Similar to AFSIRS, AGMOD uses estimated irrigation requirements for various crops; the model is used in the agricultural CUP/WUP process to estimate agricultural irrigation requirements.[191] Since the model does not calculate 1-in-10 year drought water demands, a "moderate drought" is projected instead, defined as a drought that falls in the 20th percentile (also called a 2-in-10 year drought).

For recreational-landscape irrigation, SFWMD and NWFWMD use irrigation demand results from the AFSIRS model, which assumes the crop coefficients of sod to represent the crop coefficients of turf and landscape plants. In turn, NFRWSP developed 1-in-10 year drought factors for each county, using the highest year water use from 2006 to 2014 and the estimated percent increase from the average 2006 to 2014 REC water use. SWFWMD applied drought factors, however, they were differentiated by type of recreation irrigation, rather than by counties. Drought year projections are estimated to be 30 percent higher than average year quantities for golf irrigation and 26 percent higher for the other landscape irrigation.

[189] This value of the drought demand factor was based on the final report of the One-in-Ten Year Drought Subcommittee of the Water Planning Coordination Group, as discussed in the Appendix 3-3 of the SWFWMD's 2015 Regional Water Supply Plan. This appendix can be found at https://www.swfwmd.state.fl.us/documents/plans/RWSP/2015/. (Accessed on December 20, 2017).

[190] South Florida Water Management District (SFWMD). Appendix Q: Brief AFSIRS Description. SFWMD, West Palm Beach, FL. 3p. https://www.sfwmd.gov/sites/default/files/documents/app%20q%20afsirs.pdf. (Accessed on January 2, 2018).

[191] Southwest Florida Water Management District (SWFWMD). 2017. AGMOD for Windows. SWFWMD. https://www.swfwmd.state.fl.us/software/agmod.php. (Accessed on January 2, 2018).

Water Conservation

Both average and drought year water demand projections discussed above are based on historical water use, and increases in water use efficiency over time are not addressed.

In a 2009 guidance document, DEP[192] discusses existing laws and policies emphasizing the importance of considering water conservation activities as a part of the water supply planning process, including the water use efficiency requirement for CUPs/WUPs based on the definition of "reasonable-beneficial use" (sections 373.223 and 373.019(16), Florida Statutes), the water conservation goal for the state set in the Water Resource Implementation Rule (chapter 62-40, F.A.C.), and the statewide water conservation program for PS (section 373.227, Florida Statutes).

Based on Chapter 62-40, F.A.C., and section 373.227, Florida Statutes, the overall water conservation goal of the state shall be to prevent and reduce wasteful, uneconomical, impractical, or unreasonable use of water resources. Conservation of water shall be required unless not economically, environmentally, or technically feasible.

Chapter 62-40, F.A.C., further specifies that WMDs shall accomplish this goal by:

(a) Assisting local governments, water supply utilities, regional water supply authorities, and other parties in designing and implementing plans and programs to conserve water. Such programs may include analyzing the effectiveness of particular water conservation measures.

(b) Coordinating with DACS in the development of agricultural water conservation programs and best management practices.

(c) Requiring efficient use of water. In determining efficiency requirements, WMDs shall consider the effectiveness of efficiency measures already being implemented, including whether a public water supply utility has achieved the per capita water use goal if such a goal is adopted by rule by the appropriate WMD, and the need for and feasibility of additional measures.

Overall, water conservation can significantly alter the projected 2035 water demand. It was estimated that in NFRWSP, water conservation can potentially offset one-half of the projected increase in water demand in PS and DSS, given two assumptions: a high participation rate in water conservation programs, and a reduction in the gross per capita rate in some PS and DSS areas to the 2010 to 2014 average region-wide gross per capita rate. In contrast, in the CFWI RWSP, different assumptions are made, and water conservation is estimated to reduce 2035 water demand in various water demand categories by 1 percent – 5 percent. Similarly, water conservation in the PS sector in NWFWMD could potentially reduce 2035 PS water demand by nearly 5 percent. RWSPs developed by SFWMD include descriptive discussions of water conservation programs implemented by the SFWMD. Finally, water conservation potential for SWFWMD is summarized in Table 3.1.16.

[192] Florida Department of Environmental Protection (DEP), et al. 2009. Format and Guidelines for Regional Water Supply Plans. DEP, NWFWMD, SFWMD, SWFWMD, SJRWMD, and SRWMD.

Table 3.1.16 Water Conservation Potential for SWFWMD

Region	2035 projected water demand (mgd, average rainfall)	Estimated water conservation (mgd)	Potential reduction in projected 2035 water demand due to water conservation
SW-NR	203.91	23.55	11.55%
SW-TB	475.02	52.04	10.96%
SW-HR	428.40	13.86	3.24%
SW-SR	354.76	18.80	5.30%

Water Conservation WMD Methodology

WMDs rely on a variety of methods to estimate water conservation potential. In NWFWMD, for PS planning purposes, a simple method was used to calculate the potential conservation water savings: the difference between the 2035 water demand projections based on (1) estimated 2010 gross per capita rates and (2) the rate of 150 gallons per capita daily (gpcd). It was understood that, for some public supply utilities, achieving a gross per capita rate of 150 gpcd might not be feasible or cost-effective. However, if this target can be achieved, approximately 19.59 mgd could be saved by the 44 utilities whose per capita use in 2010 exceeded 150 gpcd. Given that 2035 water demand for PS is projected at 194 mgd, such water conservation could potentially reduce PS demand by 4.7 percent.

In NFRWSP, two approaches were compared. First, similar to NWFWMD, the district assessed water conservation potential given a particular per capita use goal. For the PS and DSS categories, the NFRWSP analyzed the average 2010-2014 gross per capita rate for the entire NFRWSP area. If all public supply systems and DSS residents achieved at least the average 2010-2014 gross per capita rate for the NFRWSP area, water conservation could be increased by 13 mgd, potentially offsetting part of the future demand increase in these categories.

Second, NFRWSP assessed water conservation potential for water use categories (excluding AG) using the EZ Guide.[193] Separate estimates of agricultural irrigation efficiency were used. Overall, for the region, it was estimated that approximately 41 mgd of the projected demand for 2035 can be eliminated by water conservation. Combining the estimates produced using these two approaches, the upper limit of the water conservation potential in NFRWSP is 54 mgd.

In CFWI and SW-HR RWSPs, the EZ Guide was also used to estimate water conservation potential for the PS, DSS, and CIIM sectors, based on a variety of assumptions about conservation practices and participation rates.[194] In CFWI, the EZ Guide was also used to evaluate conservation potential

[193] From the Conserve Florida Clearinghouse brochure, "The EZ Guide Online website ... enables any water supply utility in Florida to quickly review water supply trends, and analyze and view the estimated water use breakdown and conservation action effectiveness for their specific utility. The EZ Guide Online utilizes large public databases containing parcel attribute, census, and water supply data to estimate water use at the parcel level." See Conserve Florida Clearinghouse, http://www.conservefloridawater.org/. (Accessed on December 14, 2017).

[194] For example, in CFWI, for the PS category, only cost-effective conservation strategies (best management practices) were examined, with $3 per 1000 gallons used as the cut-off for cost-effectiveness. Participation rates (i.e., percentage of potential opportunities to implement a conservation practice) were based on SWFWMD studies of actual projects. These rates were 23 percent for retrofit-based best management practices and 12.5 percent for best management

for the REC sector, while in SW-HR, estimated REC savings were based on the soil moisture sensor and irrigation audit best management practices.

In SW-TB, for the PS sector, estimated conservation potential for the planning region is based on the Tampa Bay Water (TBW) Long-Term Master Water Plan completed in 2013. The plan takes into account statistical evaluations of existing conservation programs that have been implemented by member governments of TBW as well as a literature review of available and emerging technologies / programs.

In SW-SR, for the PS sector, the Florida Automated Water Conservation Estimation Tool (FAWCET) developed at SJRWMD was used to estimate the potential of water conservation. Note that FAWCET was used on a trial basis and will not be used in future plans as it is no longer supported by the SJRWMD. For DSS, it was assumed that the same savings rate can be achieved as the estimated savings for PS-residential (i.e., 3 percent). The water conservation potential for CIIM is considered to be directly proportional to that of CIIM uses served by public supply systems.

For agricultural self-supplied category in CFWI, the estimate of reasonably achievable water conservation was based on mobile irrigation laboratory evaluations (for farms that had follow-up evaluations only). Assuming farmers' water conservation practices adoption rate of 12.5 percent, the estimated agricultural water conservation potential is 10.9 mgd, or 5 percent of 2035 water demand projections for AG.

In turn, for all regions in SWFWMD, to estimate the quantity of water that could potentially be saved through agricultural water conservation, the SWFWMD used the "model" farms concept. The model farms concept is a quantification tool to determine the potential for water savings for various scenarios of irrigation system conversions and/or best management practices that are specific to a number of different agricultural commodities and associated water use factors such as soil type, climate conditions, crop type, etc.

In CFWI RWSP, it was also mentioned that conservation potential assumed for Power Generation sector was 1.2 percent of 2035 water demand or 0.27 mgd.

practices that require another party to visit the site. Estimates of water conservation potential were calculated for a group of seven utilities, which collectively represent 53 percent of the 2010 CFWI Planning Area PS demand. The resultant demand-weighted 4.1 percent average water conservation potential for these utilities was then extrapolated to the remainder of the study area by applying it to the projected 2035 PS demand of 653.27 mgd, resulting in 26.78 mgd of public supply water conservation potential. For DSS in the CFWI planning area, the water conservation potential was assumed to be directly proportional to that of the residential part of PS. It was estimated that residential per capita water conservation potential was 5.57 gallons per day. Based on this assumption, DSS water conservation potential was 1.19 mgd, or approximately 5 percent of 2035 water demand projections for DSS. For REC sector, the estimate of water conservation potential was derived from the percentage of water conservation estimated by the EZ Guide for publicly-supplied outdoor water use, and using the conservation program participation rates estimated by SWFWMD. Similarly, the water conservation potential for commercial-industrial-mining self-supplied is considered to be directly proportional to that of CIIM uses served by public supply systems, and was derived from the EZ Guide. Estimated percent savings was 1.2 percent of 2035 water demand data, or 1.15 mgd.

Overall, WMDs use a variety of methods to assess water conservation potential for various water use sectors. Water conservation can significantly alter water demand projections for average and drought year conditions discussed above.

Degree of Uncertainty in Water Demand Projections

Overall, water use in each sector is influenced by a variety of social, economic, and climate/weather factors. PS demand primarily depends on choices made by Florida residents about where to reside, and how they will use water (which in turn depends on habits, appliances installed in homes, etc.). Economic factors also influence water demand in agricultural and commercial-industrial-institutional-mining self-supplied categories. The factors influencing water demand are hard to predict over the long-term planning horizon.[195]

Given the interplay of many uncertainties, how well can WMDs project future water demands, especially for a long-term, 20-year planning horizon? To test confidence in the projections, WMDs systematically alter the projections by making discrete changes in the assumptions. For example, WMDs compare demand projections given alternative future population forecasts or agricultural acreage projections. WMDs also compare projections developed in the past with current projections to see how the forecasts change as additional data become available.

Specifically, CFWI focused on the degree of uncertainty in PS water demand projections caused by potential errors in the forecasts of future population growth.[196] A high population growth scenario was analyzed based on the BEBR high population projections for each county. These results were compared with the results for BEBR medium population growth projections (discussed above). For 2035, assuming the high population projections, PS demand would be 14 percent higher than the demand estimated using BEBR medium population projections (both estimates were made for average rainfall conditions).

As part of a previous RWSP developed for SF-LWC in 2012, the SFWMD examined the degree of uncertainty in agricultural water demand projections associated with the unknowns regarding future citrus acreage. Citrus, in particular, accounted for a large proportion of total water demand in the region, and the effect of citrus greening on citrus acreage in the region was difficult to predict. High and low projections of future citrus acreage and citrus irrigation requirements were developed. The difference between the low- and high-range 2030 citrus acreage projections was approximately 24 percent (or 29,000 acres). The related percentage difference in the average year water demand projections for the entire agricultural self-supplied sector was approximately 6 percent.

The SFWMD uses another strategy for evaluating the degree of certainty in water demand projections: the District compares the latest demand projections with the projections completed in the previous water supply plans (generally, 5 to 10 years ago). For example, the RWSP developed

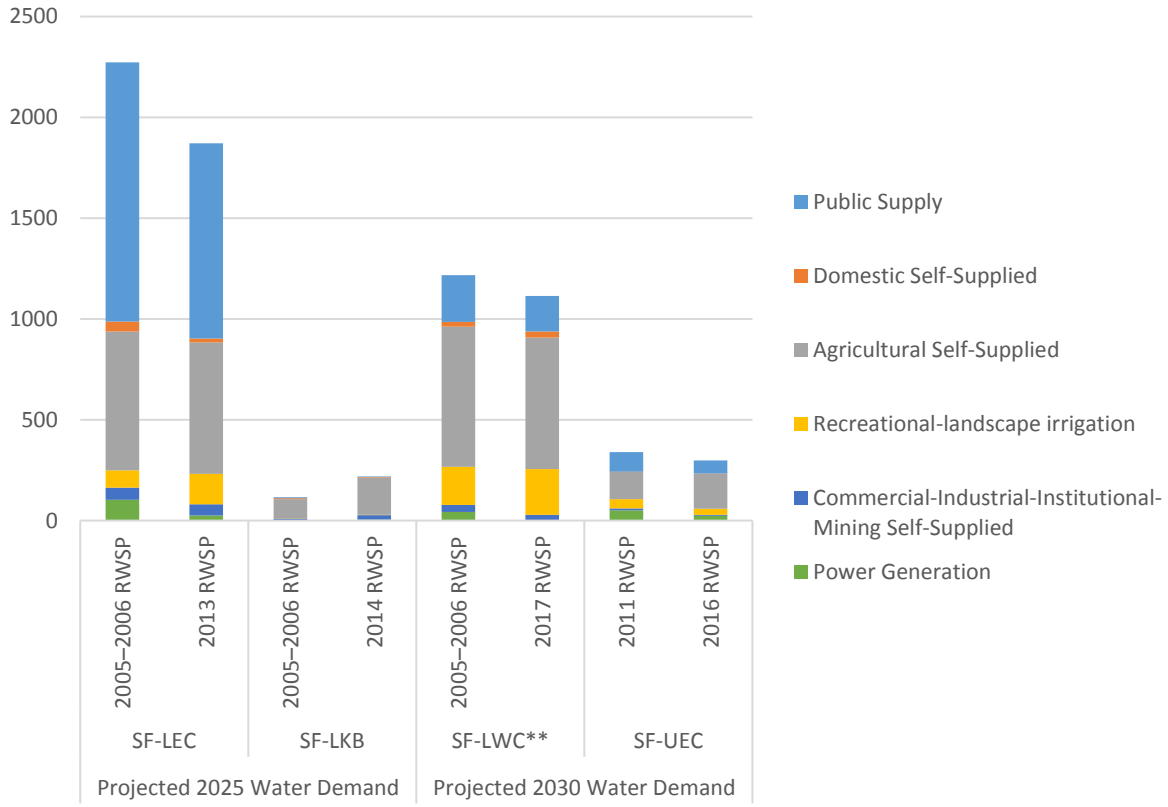
[195] See a similar discussion of uncertainty in water demand projections in Texas Water Development Board. 2017. 2017 State Water Plan: Water for Texas. Texas Water Development Board, Austin, TX, 133p. https://www.twdb.texas.gov/waterplanning/swp/2017/index.asp. (Accessed on January 4, 2018).

[196] In this regard, an error is any deviation from the actual population growth relative to the forecasted growth.

in 2000 for SF-LEC, the PS demand for 2015 was overestimated by approximately 40 percent, while the 2005-2006 RWSP overestimated it by approximately one-third. These differences illustrate the effect of uncertainty in water demand projections. Note that part of the difference in projected and actual water use may be due to water conservation activities that were not taken into account in the demand projections.

Comparisons of the water demand projections from the most recent SFWMD RWSPs and the previous plans developed for the same regions are presented in Figure 3.1.14. A significant (18 percent) reduction in the 2025 projected water demand is observed for the SF-LEC region, while projections for SF-LKB increase slightly. The difference can primarily be attributed to the changes in regional economic conditions (e.g., revisions of the urban growth trends), or changes in the methodology (e.g., inclusion of irrigated pasture in projected agricultural water demand). Similarly, water demand projections for 2030 were reduced for SF-UEC and SF-LWC, in comparison with the estimates in the previous RWSPs.

Figure 3.1.14 SFWMD Water Demand Projections in Perspective*



* A degree of uncertainty is present in any forecast or projection of future conditions, and SFWMD is commended for attempting to quantify it by comparing demand projections from the past and current RWSPs.
** For SF-LWC, a range of projections was provided in the 2005-2006 RWSP. The low boundary on the 2030 agricultural water demand projections was used by EDR as it most closely aligns with the current projections.

Overall, there is a degree of uncertainty in any future water demand projections. Uncertainty is inherent in all projections or forecasts, and examining the degree of uncertainty in projections and

forecasts is a best practice encouraged in the scientific and academic literature.[197] All WMDs should engage in this type of error analysis, and those that have started are encouraged to continue.

Water Demand Projections by WMDs: Summary

Water demand is projected to increase by 17 percent in the next 20 years and reach 7,515.9 mgd (assuming average annual rainfall and not accounting for new conservation activities). PS and AG will remain the two largest water demand categories. Due to expected population increase, growth in the PS category is projected to outpace growth in the other demand categories (by absolute value). The projected water demand can be even higher if drought conditions occur, with 1-in-10 year droughts potentially increasing the 2035 demand by an estimated 20.8 percent. On the other hand, the increases in demand can be partially offset if effective water conservation strategies are implemented. Overall, a degree of uncertainty cannot be avoided in water demand projections, with the uncertainty increasing with how far into the future the projections extend.

While WMDs use a variety of methods to project water demand in various sectors, the approaches used to develop projections exhibit general consistency. Staff in the WMDs, DACS, and DEP collaborate to improve the accuracy and consistency of projections across the state. At the same time, in developing projections, WMDs need to account for variations in planning and CUP/WUP practices, data availability, district-specific regulatory requirements, and the hydro-geology of various regions. Regional water supply planning has been evolving since its inception, with methods being refined over time as new tools and information become available.

3.2 Water Supply Projections

As discussed in subsection 3.1 above, the WMDs estimate a total statewide increase in water demand of 17 percent between 2015 and 2035. Sources traditionally used to meet this demand are reaching their sustainable limits in many regions of the state. In all regions, traditional water supplies have, at least in part, come from groundwater because it is generally more cost-efficient relative to other sources. These cost-efficiencies are related to groundwater's natural high quality, plentiful supply, and ease of access. In selected regions in south Florida and the Florida panhandle, easily accessible surface water from lakes, reservoirs, or canals also provide a portion of traditional water supplies.

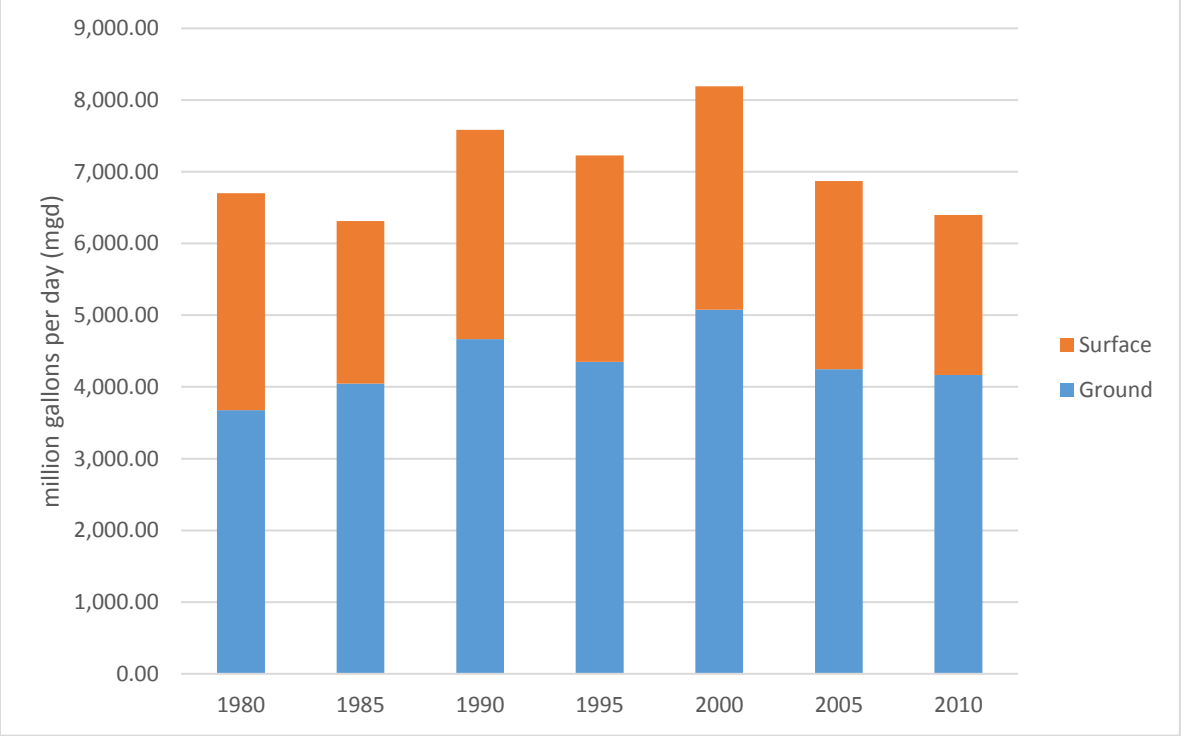
To meet the increasing water demand, WMDs consider a variety of additional (referred to as alternative) water supply sources, including: fresh groundwater (i.e., non-traditional aquifers), brackish groundwater (i.e., deeper aquifer levels, or coastal aquifer areas), fresh surface water (e.g., rivers, canals, and lakes), reclaimed water (i.e., highly treated wastewater), and seawater. In addition, the creation of additional storage capacity through reservoirs or aquifer storage and recovery (ASR) provide storage of excess ground and surface water, predominately during wet-weather flows. Through the Regional Water Supply Plans (RWSPs) and Water Supply

[197] For example, see discussion in Fishhoff B. and A.L. Davis. 2014. Communicating scientific uncertainty. *Proceedings of The National Academy of Sciences of the United States of America (PNAS)*, 111, Supplement 4, 13664–13671. http://www.pnas.org/content/111/Supplement_4/13664.full. (Accessed on January 4, 2018).

Assessments (WSAs), the WMDs have concluded that the water needs of the state can be met through the 2035 planning horizon with a combination of traditional and alternative water sources, appropriate management, conservation, and implementation of the projects identified in the applicable RWSP or WSA.

From a statewide perspective, fresh groundwater from aquifers serves as the primary source of water supply (Figure 3.2.1). All completed RWSPs identify groundwater from at least one aquifer as a traditional (i.e., historically used) water supply source, with a few regions also identifying surface and/or stormwater as traditional sources (Table 3.2.1). On a regional basis, the RWSPs have identified some areas of the state where increases in fresh groundwater withdrawals are limited due to potential adverse impacts on the water resource and related natural systems as well as existing legal users. The RWSPs also state that potential increases in withdrawals in these areas will have to be evaluated on an application-by-application basis to determine if the project meets applicable water use permitting criteria.

Figure 3.2.1 Total Estimated Freshwater Withdrawals in Florida from Groundwater and Surface Water Sources



Source: USGS (2016). Historical Water-Use in Florida: Historical Water-Use by Category 1970-2012. https://fl.water.usgs.gov/infodata/wateruse/historical.html. (Accessed on December 19, 2017).

Table 3.2.1 Traditional Water Supply Sources for Water Supply Planning Regions Identified in RWSPs

Regions	Fresh Groundwater	Surface Water	Stormwater	No RWSP
NW-I, NW-IV, NW-V, NW-VI, NW-VII	-	-	-	✓
NW-II	✓	-	-	-
NW-III	✓	-	-	-
SR-outside NFRWSP	-	-	-	✓
SR-NFRWSP and SJR-NFRWSP	✓	-	-	-
SJR-Central & East Coast	✓	-	-	-
CFWI*	✓III	-	-	-
SF-LKB	✓III	✓IV	-	-
SF-UEC	✓V	✓	-	-
SF-LEC	✓V	✓	-	-
SF-LWC	✓VI	✓VII	✓VIII	-
SW-NR**	✓	-	-	-
SW-TB	✓	-	-	-
SW-HR**	✓	-	-	-
SW-SR	✓	-	-	-

* CFWI includes SJR-CFWI, SF-UKB-CFWI, and parts of SW-HR and SW-NR.
** This region partially overlaps with CFWI.
III Specifically, surficial, intermediate, and upper Floridan aquifers.
IV Specifically, Lake Istokpoga, Lake Okeechobee, and canals.
V Specifically, surficial aquifer system including Biscayne Aquifer in LEC.
VI Specifically, surficial and intermediate aquifer systems.
VII Specifically, Caloosahatchee River (C-43 Canal) and connected canals.
VIII Artificial ponds are discussed in the RWSP.

Since the opportunities for increasing freshwater withdrawals from traditional ground and surface water sources may, in some areas, be limited, alternative water sources and water resource development projects have been identified to meet the 20-year demand projections while protecting the natural resources of the area. According to section 373.019, Florida Statutes, "alternative water supplies" mean:

- salt water;
- brackish surface and groundwater;
- surface water captured predominately during wet-weather flows;
- sources made available through the addition of new storage capacity for surface or groundwater;
- water that has been reclaimed after one or more public supply, municipal, industrial, commercial, or agricultural uses;

- the downstream augmentation of water bodies with reclaimed water;
- stormwater; and
- any other water supply source that is designated as nontraditional for a water supply planning region in the applicable regional water supply plan.[198]

Within each RWSP, WMDs are required to identify water supply development project options (including traditional and alternative water supply project options) and water resource development projects to meet the 20-year projected demands.[199] For each project identified, WMDs are required to provide an estimate of the amount of water to become available through the project, the timeframe for implementing the project option, the estimated planning-level costs for capital investment and operation and maintenance, an analysis of funding needs and potential sources of funding, the entity that should implement the project option, and status of project implementation.[200]

Water resource development projects are intended to provide regional benefits as opposed to utility-specific or localized benefits.[201] Section 373.019(24), Florida Statutes, defines "water resource development" as the formulation and implementation of regional water resource management strategies including:

- the collection and evaluation of surface water and groundwater data;
- structural and nonstructural programs to protect and manage water resources;
- the development of regional water resource implementation programs;
- the construction, operation, and maintenance of major public works facilities to provide for flood control, surface and underground water storage, and groundwater recharge augmentation; and
- related technical assistance to local governments, government-owned and privately owned water utilities, and self-suppliers to the extent assistance to self-suppliers promotes the policies as set forth in section 373.016.

Examples of water resource development projects include the following types of projects (when a regional benefit is provided): aquifer recharge, aquifer storage and recovery systems, water storage reservoirs, reuse of reclaimed waters, and water conservation programs. Also included are studies

[198] Note that the NW-II region designated fresh groundwater from the inland Floridan aquifer and the sand and gravel aquifer as nontraditional (alternative) water sources.
[199] § 373.709(2)(a)-(b), Fla. Stat.
[200] §§ 373.709(2)(a)3.; 373.709(2)(b)2., Fla. Stat.
[201] Fla. Admin. Code R. 62-40.531(5).

matching reclaimed water generators with users, feasibility studies, pilot projects, demonstration projects, and mobile irrigation labs.[202]

Water resource development is primarily the role of the WMDs.[203] The WMDs take the lead in identifying and implementing water resource development projects, and are responsible for securing the necessary funding for regionally significant water resource development projects.

In contrast, water supply development refers to activities intended to benefit specific utilities or other users.[204] Section 373.019(26), Florida Statutes, defines "water supply development" as the planning, design, construction, operation, and maintenance of public or private facilities for water collection, production, treatment, transmission, or distribution for sale, resale, or end use. Examples of water supply development projects include wellfields, aquifer storage and recovery wells, desalination facilities, water storage reservoirs, water conservation programs, and reuse facilities.[205]

Water supply development is primarily the role of local governments, regional water supply authorities, and public and private utilities. These entities take the lead in implementing water supply development project options and securing necessary funds for capital and operating costs.[206]

Currently, according to DEP and the WMDs, future water demands through 2035 will be met for all regions. Specifically, in the DEP 2016 Annual Status Report on Regional Water Supply Planning document:

> Between 2015 and 2035, statewide demand for fresh water is estimated to increase by about 1.176 billion gallons per day (bgd). Of that, 421.2 mgd is not met by existing source capacity. To date, the RWSPs have identified potential water conservation savings between 327.4 and 353.3 mgd, and alternative water supply projects that could, if constructed, produce approximately 1.463 bgd of water by 2035. This quantity is more than adequate to meet projected 2035 needs.[207]

Table 3.2.2 summarizes water supply and demand projections for 2015 – 2035 compiled by DEP as a part of 2016 Annual Report on Regional Water Supply Planning.

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[202] Fla. Admin. Code R. 62-40.531(5).
[203] § 373.705(1)(a), (2)(b), Fla. Stat.
[204] Fla. Admin. Code R. 62-40.531(4).
[205] Fla. Admin. Code R. 62-40.531(4).
[206] § 373.705(1)(b), Fla. Stat.
[207] See p.7 of DEP. 2016. Regional Water Supply Planning. 2016 Annual Report. DEP, Tallahassee, FL. https://floridadep.gov/water-policy/water-policy/documents/2016-annual-status-report-regional-water-supply-planning. (Accessed December 2017). Note that according to the EDR summary compiled as a part of this report, between 2015 and 2035, statewide demand for fresh water is estimated to increase by 1.109 billion gallons per day (bgd). The difference between the EDR and DEP projections is due to the fact that for SF-LWC, EDR used the 2017 draft RWSP (accessed on November, 2017), while DEP (2016) relied on the 2012 RWSP. Also, projected water demand for the agricultural self-supplied category in NW-VI was adjusted per request by NWFWMD. The difference can also be due to rounding. For the estimates used in this report, see Tables A1 through A26 in the Appendix A to this report.

Table 3.2.2 Summary of Regional Water Supply Plans for 2015-2035

Water Management District Planning Region	Net Demand Change (mgd)	Future Demand Not Met with Existing Source Capacity (mgd)***	Potential Conservation Savings (mgd)	Future Demand Not Met After All Conservation Implemented (mgd)***	Potential Water from Alternative Water Supply Projects (mgd)
Northwest Florida WMD			**2015-2035**		
Region II	19.5	1.8	6.5	0	48
Region III	8.9	0	9.5	0	35
Regions I, IV, V, VI, & VII	12	n/a*	3.6	n/a	n/a
Districtwide	**40.4**	**1.8**	**19.6**	**0**	**83**
Suwannee River WMD			**2015-2035**		
SR Portion of NFRWSP	43.7	See NFRWSP	17.9 - 21	See NFRWSP	1
District (excluding NFRWSP)	21.8	n/a	10.9	n/a	n/a
Districtwide	**65.5**	**NFRWSP**	**28.8 - 31.9**	**NFRWSP**	**1**
St. Johns River WMD			**2015-2035**		
North Florida (SJ Portion of NFRWSP)	68.5	See NFRWSP	22.7 - 32.1	See NFRWSP	96.2
Central Springs East Coast	78.8	28	33.6 - 47	0	307.4
Central Florida (SJ Portion of CFWI)	105.9	See CFWI	17.3	See CFWI	201
Districtwide	**253.2**	**28 + CFWI + NFRWSP**	**73.6 - 96.4**	**CFWI + NFRWSP**	**604.6**
Southwest Florida WMD			**2015-2035**		
Northern (excluding CFWI)	51.8	31.5	18.8	12.7	90.9
Tampa Bay	63.8	1.2	41.6	0	103.3
Heartland (excluding CFWI)	7.6	1.7	3.5	0	4
Southern	50.2	7.9	15	0	185.3
SWF Portion of CFWI	45.5	See CFWI	8.5	See CFWI	46.4
Districtwide	**218.9**	**42.3 + CFWI**	**87.4**	**12.7 + CFWI**	**429.9**
South Florida WMD			**2015-2035****		
Lower Kissimmee Basin	17.5	0	0	0	0
Upper Kissimmee Basin (SF Portion of CFWI)	82.1	See CFWI	11	See CFWI	86.2
Upper East Coast	52.4	3	14	0	78
Lower East Coast**	188.8	7	52	0	92
Lower West Coast**	256.8	20	41	0	88
Districtwide	**597.6**	**30 + CFWI**	**118**	**CFWI**	**344.2**
STATEWIDE TOTAL	**1,175.6**	**421.2**	**327.4 - 353.3**	**241.9 - 253.8**	**1,462.7**
Multi-District Planning Regions					
CFWI (2015-2035)	*233.6*	*233.6*	*36.8*	*196.7*	*333.6*
NFRWSP (2015-2035)	*112.2*	*85.5*	*40.7 - 53*	*32.5 - 44.4*	*97.2*

Source: Florida Department of Environmental Protection (DEP). 2016. Regional Water Supply Planning: 2016 Annual Report. DEP, Tallahassee, FL, 49p. https://floridadep.gov/water-policy/water-policy/documents/2016-annual-status-report-regional-water-supply-planning.

* This indicates that a RWSP is not required for that region or regions.

** SFWMD is transitioning from 2010-2030 RWSPs to 2015-2035 RWSPs. In DEP (2016), for the Lower West Coast and Lower East Coast planning regions, which are not yet through 2035, 2030 numbers were used for 2035 for the purposes of these calculations only.

*** The statewide total for these column includes the CFWI and NFRWSP numbers below.

Assessment of Overall Water Supplies and Availability

The WMDs identify technically and economically feasible options for water resource and supply development. While they identify the total potential water available from each project, they generally do not publish total potential water available for use from the existing sources.[208] Below, water availability from various potential sources of water supply is discussed, including groundwater (fresh and brackish), surface water, reclaimed water, and seawater.[209]

Groundwater

Most of the fresh groundwater that is used in Florida comes from the Floridan aquifer system (Figure 3.2.2). In 2010, of a total groundwater use of 4.1 billion gallons per day (bgd), approximately 2.6 bgd was obtained from the Floridan aquifer.[210] The remaining groundwater was provided by the Biscayne, surficial, and intermediate aquifer systems. Finally, the sand-and-gravel aquifer has served as a water source in the Florida panhandle.

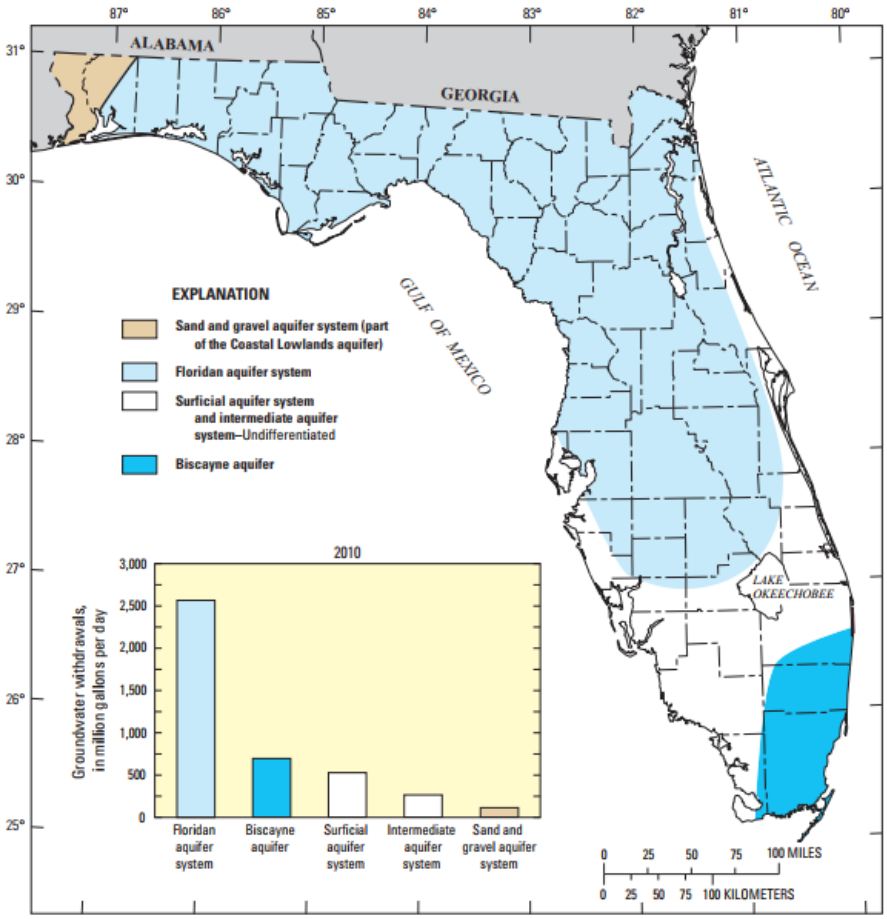
[See figure on following page]

[208] The concept of water availability has been discussed in other states. For example, in Texas, the 2017 State Water Plan states: "Water availability refers to the maximum volume of raw water that could be withdrawn annually from each source (such as a reservoir or aquifer) during a repeat of the drought of record. Availability does not account for whether the supply is connected to or legally authorized for use by a specific water user group. Water availability is analyzed from the perspective of the source and answers the question: How much water from this source could be delivered to water users as either an existing water supply or, in the future, as part of a water management strategy? Determining water availability is the first step in assessing potential water supply volumes for a planning group."
Source: page 6 in Texas Water Development Board. 2017. 2017 State Water Plan: Water for Texas. Texas Water Development Board, Austin, Texas. http://www.twdb.texas.gov/waterplanning/swp/2017/. (Accessed on January 9, 2018).

[209] Additionally, districts assess aquifer storage and recovery (ASR) and stormwater projects. EDR intends to work with the districts to include an assessment of these types of projects in future editions of the report.

[210] Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).

Figure 3.2.2 Approximate Areal Extent throughout which Principal Aquifers in Florida are the Primary Source of Groundwater Withdrawals, 2010



Source: Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. Accessed on December 14, 2017.

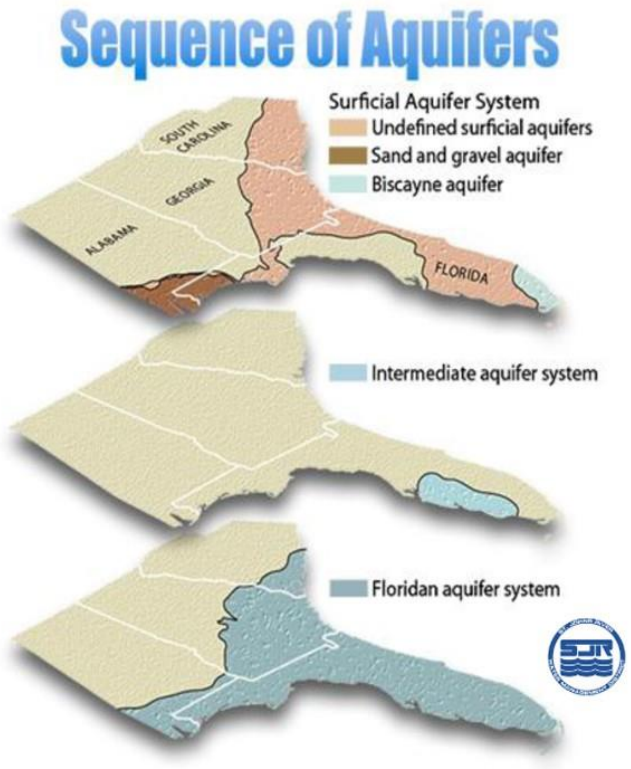
Floridan Aquifer System

The Floridan aquifer system extends from the southern portions of Alabama, Georgia, and South Carolina to south Florida (Figure 3.2.3). It provided 62 percent of Florida's total fresh groundwater withdrawals in 2010.[211] In parts of the state, the Floridan aquifer system is divided into the upper and lower Floridan aquifer. For technical details on the Floridan aquifer system, see information available from the U.S. Geological Survey.[212]

[See figure on following page]

[211] Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).
[212] U.S. Geological Survey (USGS). (undated) Floridan Aquifer System Groundwater Availability Study. https://fl.water.usgs.gov/floridan/. (Accessed on January 8, 2018).

Figure 3.2.3 Schematics Representing Aquifer Systems in Florida



Source: SJRWMD. Undated. Sequence of Aquifers. Cited in Florida Department of Environmental Protection (DEP). 2017. Aquifer Essentials. DEP, Tallahassee, FL. https://floridadep.gov/fgs/geologic-topics/content/aquifer-essentials. (Accessed on December 19, 2017).

In northern and central Florida, the Floridan aquifer system is the main source of fresh groundwater. For some regions included in the NFRWSP, CFWI, and SWFWMD, the WMDs' assessments showed that future increases in freshwater withdrawals from the upper Floridan aquifer are not possible without impacting or significantly harming water resources; and hence, without additional aquifer recharge projects, the aquifer cannot be relied upon solely to meet increasing water demands in these regions without addressing these impacts. In parts of NWFWMD, as well as in SW-NR, and SF-LKB, freshwater from the Floridan aquifer system, together with other traditional/primary sources, is expected to be sufficient to meet future water demands in the regions. In addition, in SR-outside the NFRWSP and SJR-CSEC, RWSPs/WSAs have not been finalized, and therefore, the data are insufficient to make a conclusion about groundwater availability.

In the southern portion of the state, the upper Floridan aquifer (UFA) is deeper and contains brackish water.[213] The UFA is considered an alternative water supply source in the SF-UEC, SF-

[213] Brackish groundwater is water that has a greater total dissolved solids content than occurs in freshwater, but not as much as seawater. In the RWSPs, WMDs define brackish groundwater as having total dissolved solids concentration greater than 500 milligrams per liter (mg/L).

LEC, and SF-LWC regions. About 40 public water supply utilities and several golf courses in these regions currently utilize the UFA as a source, and the use of the UFA is projected to increase to meet future needs. Brackish water from the UFA can be blended with freshwater or it can be treated through a brackish water desalination process for potable standards. Finally, the lower Floridan aquifer is also considered as an alternative water supply source in some Florida regions.

Biscayne, Sand and Gravel, and Other Surficial Aquifers

According to the U.S. Geological Survey (USGS), the surficial aquifer system includes any otherwise undefined aquifers that are present at the land surface. While the Biscayne aquifer and the sand and gravel aquifer are present at the land surface, they are generally treated separately due to their importance as water sources.[214]

The Biscayne aquifer is the second most used source of fresh groundwater in the state (after the Floridan aquifer system), providing for 17 percent of fresh groundwater withdrawals in 2010.[215] The Biscayne aquifer is the primary source of water for Miami-Dade and Broward counties and the southern portion of Palm Beach County,[216] a large portion of the SF-LEC region. In addition, the Biscayne aquifer is used by the Florida Keys Aqueduct Authority via a wellfield located in Miami-Dade County. According to SF-LEC RWSP, this source's further development is limited by regulatory restrictions. The Biscayne aquifer is primarily recharged by local rainfall; however, water from the Kissimmee - Lake Okeechobee - Everglades regional water system can be conveyed through the Central and Southern Florida Flood Control Project to the east coast to recharge the Biscayne aquifer during extended dry periods.

The sand and gravel aquifer has been and, for the planning horizon, will continue to be an important water source for region NW-I (Escambia County) and parts of NW-II (Santa Rosa County). However, on the state level, this aquifer is not a significant source of water. In 2010, this aquifer accounted for only 4 percent of the fresh groundwater withdrawn in the state.[217]

In the SFWMD, the surficial aquifer system is a primary source of groundwater in the SF-LWC and SF-UEC. In the SF-LWC RWSP, the SFWMD identifies the surficial aquifer system to include the Water Table and Lower Tamiami aquifers. The surficial aquifer system is directly connected to surface water bodies (canals, ponds) in most of the SFWMD. Increased withdrawals from the surficial aquifer system (and the freshwater portion of the intermediate aquifer system) are generally limited due to the potential impacts on wetlands and existing legal water users, the potential for saltwater intrusion, and the possibility of reaching the maximum developable limits[218]

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[214] USGS Groundwater Atlas of the United States. https://pubs.usgs.gov/ha/ha730/ch_g/G-text2.html. (Accessed January 2018).

[215] Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).

[216] Florida Department of Environmental Protection (DEP). 2015. Aquifers. Florida Department of Environmental Protection, Tallahassee, FL https://fldep.dep.state.fl.us/swapp/Aquifer.asp#P4. (Accessed on November 15, 2017).

[217] Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).

[218] Maximum developable limit is discussed, for example, in subsection 3.2.4, Basis of Review for Water Use Permit Applications, SFWMD, https://www.sfwmd.gov/sites/default/files/documents/bor_wu.pdf. (Accessed on January 9, 2018).

of aquifers. New or increased allocations will be evaluated on an application-by-application basis to determine if the project meets consumptive use permitting criteria.[219]

In CFWI, the surficial aquifer is best suited for domestic and recreational-landscape irrigation uses. Since most of the users of water from the surficial aquifer have small demands (i.e., with well diameter less than 4 inches), they have not been required to have individual CUPs/WUPs (but were covered by general CUPs/WUPs). In addition, water from this aquifer can have poor taste and odor, requiring additional treatment to be used for drinking water purposes. An exception is the area in eastern Polk County where the aquifer is thicker and capable of supplying larger volumes of water. In this area, almost all permitted water withdrawals from the aquifer are for agricultural irrigation.[220] However, the CFWI RWSP concludes that, on a regional level, the majority of water uses for the surficial aquifer were for domestic self-supplied and recreational-landscape irrigation, and in general, these users have small-scale demands whose impacts, if any, may be mitigated.[221]

Intermediate Aquifer

Aquifers between the surficial aquifer system and the Floridan aquifer system comprise the intermediate aquifer system.[222] The intermediate aquifer system provided 11 percent of fresh groundwater withdrawals in the state in 2010.[223] It serves as a main source of water supply in Sarasota, Charlotte, and Lee counties,[224] which are included in the SW-SR and SF-LWC regions. Opportunities for further development of the intermediate aquifer system to meet rising water demand are limited.

Groundwater Availability

Most RWSPs / WSAs provide a qualitative description of groundwater availability, as summarized in Table 3.2.3. RWSPs have concluded on a regional basis that in some areas, increases in fresh groundwater withdrawals are limited due to potential adverse impacts to the water resource and related natural systems and existing legal users. The RWSPs also state that potential increases in groundwater withdrawals in these areas will have to be evaluated on an application-by-application basis to determine if the project meets applicable water use permitting criteria. Brackish groundwater (along with supplies from other sources) can serve as a supplemental or alternative water supply source for several regions in Florida.

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[219] See page vii in South Florida Water Management District (SFWMD). 2017. Lower West Coast Water Supply Plan Update. Planning Document. SFWMD, West Palm Beach, FL. https://www.sfwmd.gov/our-work/water-supply/lower-west-coast. (Accessed on January 11, 2018).

[220] See page 102 in Central Florida Water Initiative (CFWI). (CFWI). 2015. Regional Water Supply Plan. Planning Document, Volume I. CFWI. https://www.cfwiwater.com/. (Accessed on January 2, 2018).

[221] See page 125 in Central Florida Water Initiative (CFWI). (CFWI). 2015. Regional Water Supply Plan. Planning Document, Volume I. CFWI. https://www.cfwiwater.com/. (Accessed on January 2, 2018).

[222] Florida Department of Environmental Protection (DEP). 2015. Aquifers. Florida Department of Environmental Protection, Tallahassee, FL https://fldep.dep.state.fl.us/swapp/Aquifer.asp#P4. (Accessed on November 15, 2017).

[223] Marella, R.L., 2014, Water withdrawals, use, and trends in Florida, 2010: U.S. Geological Survey Scientific Investigations Report 2014-5088, 59 p., http://dx.doi.org/10.3133/sir20145088. (Accessed on December 14, 2017).

[224] Florida Department of Environmental Protection (DEP). 2015. Aquifers. Florida Department of Environmental Protection, Tallahassee, FL https://fldep.dep.state.fl.us/swapp/Aquifer.asp#P4. (Accessed on November 15, 2017).

Table 3.2.3 Additional Water Withdrawals to Satisfy Future Water Demands (see color legend after table)***

Region	Groundwater Role in Supplying Current Regional Water Needs	Projected Increase in Total Water Demand (mgd)	Surficial (including Biscayne and Sand and Gravel aquifers)	Intermediate	Upper Floridan	Lower Floridan
NW-I	Supplies majority of regional needs	2.51 (2015-2035)	adequate	Absent / not used	non-potable	non-potable
NW-II	Traditional source along with surface water; supplies majority of regional needs	19.47 (2015-2035)	adequate	Not a major source	limited	non-potable
NW-III	Minor source (not exceeding 17% of total regional water use)	8.88 (2015-2035)	Locally important for some use (e.g. REC)	locally significant	adequate to meet the small projected increase in withdrawals	Not differentiated from Upper Floridan
NW-IV	Supplies majority of regional needs	1.29 (2015-2035)	Not a major source / absent	Not a major source	adequate	Not differentiated from Upper Floridan
NW-V	Significant source	0.05 (2015-2035)	Locally important	Limited local use	adequate	Not differentiated from Upper Floridan
NW-VI	63% of the total water used in 2010; only utilized for PWS	0.42 (2015-2035)	Not a major source	Occasionally utilized for DSS	adequate	Not differentiated from Upper Floridan
NW-VII	The primary water source	7.68 (2015-2035)	Negligible / absent	Absent / not used	adequate	Not differentiated from Upper Floridan
SR-outside NFRWSP	The primary water source	21.80 (2015-2035)	Not a major source	Absent/not a major source	Sufficiency under review	Not differentiated from Upper Floridan across much of the region
SR-NFRWSP and SJR-NFRWSP	Traditional source; supplies majority of regional needs	112.18 (2015-2035)	Not a major source	Absent/not a major source	limited	Brackish; considered as an alternative water source
SJR-Central & East Coast	Traditional source	78.75 (2015-2035)	Sufficiency under review	Sufficiency under review	Sufficiency under review	Sufficiency under review
CFWI*	Traditional source; supplies majority of regional needs	233.58 (2015-2035)	Not very productive[IV]	Used for DSS and REC; limited regional role in meeting future demands	Limited	Fresh to brackish; needs to be further evaluated as an alternative water supply source[IV]
SF-LKB	Traditional source, along with surface water	17.54 (2015-2035)	produces small quantities used for PS, DSS, lawn irrigation, and small-scale agriculture; adequate	Not a major source	Currently used for PS and AG; adequate	Non-potable; not assessed as potential source
SF-UEC	Traditional source, along with surface water	81.73 (2015-2040)	Accounted for 40% of PS in 2013, in addition to portions of REC; development is mostly maximized	Not a major source	Brackish in many areas, accounted for 60% of PS in 2013; in addition to AG use; adequate, except localized impacts	Saline; not assessed as potential source
SF-LEC	Traditional source; supplies majority of regional needs	188.80 (2015-2030)	Provides more than 1 bgd; further development is limited	Absent / not used	Brackish; considered as an alternative water supply source	Saline; not assessed as potential water supply
SF-LWC	Traditional, major source	240.00 (2014-2040)	Accounted for 40% of PS in 2014, in addition to REC, DSS; development is mostly maximized	used for AG, REC and PS; limited	Brackish; used primarily by PS utilities as an alternative water source	Saline; not assessed as potential water supply

Region	Groundwater Role in Supplying Current Regional Water Needs	Projected Increase in Total Water Demand (mgd)	Surficial (including Biscayne and Sand and Gravel aquifers)	Intermediate	Upper Floridan	Lower Floridan
SW-NR**	Traditional source; supplies majority of regional needs	51.34 (2015-2035)	Upper Floridan and surficial aquifers in most places function as a single unit	absent	Adequate	Includes layers with freshwater; being explored as an alternative water source
SW-HR**	Traditional source; Upper Floridan supplies almost all regional needs	53.50 (2015-2035)	small proportion of total regional water supply; used mostly in Highlands and Polk counties	not present over much of the planning region; where present is used for DSS and REC	Adequate to meet the future water demands	Brackish; considered as an alternative water supply
SW-TB	Traditional source	63.77 (2015-2035)	limited	limited	limited	being explored as an alternative water source
SW-SR	Traditional source; supplies majority of regional needs	50.19 (2015-2035)	limited	limited	limited	being explored as an alternative water source

Legend:

Grey	aquifer is either not present, or not used on the regional scale
Yellow	aquifer has been regionally important, but it has limited capacity to sustain increases in withdrawals
Green	aquifer has been regionally important, and it has adequate capacity to sustain projected increases in withdrawals
Blue	has not been used traditionally, but considered as an alternative water supply source
White	conclusive information is not currently available

Sources: based on information from RWSPs / WSAs for respective districts, unless noted.
* CFWI includes SJR-CFWI, SF-UKB-CFWI, and parts of SW-HR and SW-NR.
** The region partially overlaps with CFWI.
*** Varying descriptions of water use and availability of water across aquifers is due to the differences in descriptions used in the relevant RWSPs/WSAs.
[IV] Based on Kwiatkowski, P.J. 2017. CFWI Lower Floridan Aquifer Drilling and Testing, C30 Site Project. Presentation for Project & Lands Committee Meeting, South Florida Water Management District, October 11, 2017. https://apps.sfwmd.gov/webapps/publicMeetings/viewFile/10869. (Accessed on December 19, 2017).

The focus of the quantitative assessment of groundwater availability differs among WMDs. For example, in the 2015 CFWI RWSP, an estimate of the total volume of groundwater that could be withdrawn without impacting natural resources was produced. It was estimated that a total quantity, from all sources, of 850 mgd could be managed. This amount could increase to 925 mgd if management activities to reduce potential impacts on natural systems are implemented. Given the current level of water withdrawals, "the amount of additional groundwater available in the CFWI Planning Area could be within the range of 50 mgd to 125 mgd, depending on the viability of local and regional management measures to mitigate withdrawal effects on natural systems."[225]

In turn, SWFWMD in some cases reports potential *additional* groundwater availability above the volumes currently being used. Moreover, for the Floridan aquifer system, permitted, but unused groundwater is reported (Table 3.2.4), with the exception of SW-NR RWSP, which reports that

[225] p. C-19 in Central Florida Water Initiative (CFWI). 2015. 2015 Final CFWI RWSP, Planning Document, Volume IA.

fresh groundwater is sufficient to meet the increasing water demand for the planning horizon (i.e., the groundwater withdrawals can exceed currently permitted but unused volumes up to the levels of projected future demands).

Table 3.2.4 SWFWMD Groundwater Availability Assessment (mgd)

Regions	Projected Increase in Total Water Demand (2015-2035)	Surficial and Intermediate Fresh Groundwater	Upper Floridan Permitted but Unused Fresh Groundwater	Potential Additional Brackish Groundwater
SW-NR	51.34	NA	23.40*	TBD
SW-TB	63.77	5.5	15.00	9.40 (permitted unused)
SW-HR	53.50	8.0	51.36	TBD
SW-SR	50.19	20.4	2.86	14.09 (permitted unused)

* It is anticipated that regional future demand can be met with groundwater, provided existing and anticipated future impacts are mitigated or avoided with conservation and reclaimed water use. The quantity of groundwater available in each county is equivalent to each county's projected 2035 demand. Fresh groundwater does not include quantities potentially available from Lower Floridan aquifer.

For regions outside of SWFWMD and CFWI, the RWSPs reference minimum flows and minimum water levels (MFLs) as well as other documents and reports with assessments of groundwater conditions and/or total potential availability. For this section of the report, EDR did not review these documents, and only summarized the information available in RWSPs/WSAs.

Table 3.2.5 summarizes examples of various approaches used to report the results of groundwater availability assessments.

Table 3.2.5 Groundwater Availability Assessment Results Reported in the RWSPs

Regions	Quantitative Assessment Described in RWSPs		Qualitative Description	Assessment has not Been Finalized
	Total Available***	Permitted but Unused Groundwater		
NW-II and NW-III	-	-	✓	-
SR-outside NFRWSP and SJR-CSEC	-	-	-	✓
All regions in NFRWSP	-	-	✓	-
All regions in CFWI	✓	-*	✓	-
All regions in SWFWMD	-	✓**	✓	-
All regions in SFWMD	-	-	✓	-

* Permitted but unused fresh groundwater volumes are discussed for the CFWI areas under the jurisdiction of SWFWMD.
** Permitted but unused groundwater volumes are reported for Floridan aquifer system, except SW-NR RWSP, which reports that fresh groundwater is sufficient to meet the increasing water demand for the planning horizon.
*** Total Available is defined here by EDR as estimated total volume of groundwater that can be withdrawn from aquifers while also sustaining water resources and related natural systems.

Groundwater Assessment WMD Methodology

WMDs rely on computer models to examine the potential impacts of base year (or reference conditions) water withdrawals, as well as future projected water withdrawals on aquifers, springs, rivers, lakes, and wetlands that depend on groundwater inflow and levels. The impacts are assessed for water bodies with and without MFLs. In coastal areas, the potential for salt water intrusion due to withdrawals is also investigated.

For areas that currently rely predominantly on groundwater, analyses were completed by the WMDs assuming all additional water demand will be met by the traditional groundwater sources. For the regions that rely on a mix of ground and surface water sources (e.g., areas in SFWMD, SWFWMD, and SJRWMD), the assessment was completed using percentages of surface water to groundwater withdrawals based on historical ratios, model calibration results, information from CUPs/WUPs, consultation with water users, and RWSP estimates. In addition, use of alternative water supplies is included if applicable. Development of many of these models incorporated an external peer review by experts, prior to finalization and application.

Modelling is supplemented by the analysis of hydrologic data for the various aquifer systems. These data are obtained from monitoring wells located in the planning area. In addition, information is gathered by evaluating trends in historical measurements, assessing intrusion of saltwater from coastal areas and deeper aquifers, saltwater interface mapping, permitting knowledge, and input from stakeholders.

Models used by WMDs for water supply planning purposes are summarized in Table 3.2.6. Their geographical domains are displayed on Figures 3.2.4 to 3.2.8.

[See table on following page]

Table 3.2.6 Models Used to Examine Groundwater Availability for Water Supply Planning Purposes

Region	Water Supply Planning Model	Abbreviation	Additional Description
Regions in NWFWMD	Western Domain and Eastern Domain Models	REGII DSTRAM	REGII DSTRAM Eastern Domain and REGII DSTRAM Western Domain models[226]
SR-NFWRSP and SJR-NFRWSP	North Florida-Southeast Georgia regional groundwater flow model	NFSEG	Based on MODFLOW-NWT (Niswonger et al. 2011)[227], a formulation of MODFLOW 2005 (Harbaugh 2005)[228]; does not model salinity changes; 7 aquifer layers; grid cell 2,500 x 2,500 ft.
SR-outside NFRWSP	North Florida-Southeast Georgia regional groundwater flow model	NFSEG	See above
SR-outside NFRWSP	North Florida Model	NFM	Used for the 2010 WSA
SJRWMD – various geographical areas	East Central Florida regional groundwater flow model	ECF	These groundwater flow models are based on USGS MODFLOW (McDonald and Harbaugh, 1988).[229] The models account for multiple aquifers and semi-confining units, and for the interaction between the Floridan aquifer and surficial aquifer.[230]
	Northern District Model	NDM	
	Northeast Florida regional groundwater model	NEF	
	Palm Coast Florida regional groundwater model	PC	
	Peninsular Florida regional groundwater mode	PF	
	Volusia County regional groundwater model	VOL	
	East Central Florida Transient groundwater model	ECFT	
	Expanded East Central Florida Transient groundwater model	ECFTX	

[226] For additional information, see the following three sources: (1) HydroGeoLogic, Inc. 2007. Saltwater Intrusion in the Floridan Aquifer in Walton, Okaloosa, and Santa Rosa Counties, Florida: Eastern Domain Model, Final Report. September 2007. (2) HydroGeoLogic, Inc. 2007. Saltwater Intrusion in the Floridan Aquifer in Walton, Okaloosa, and Santa Rosa Counties, Florida: Eastern Domain Forecast Simulations. March 2007. (3) HydroGeoLogic, Inc. and Hazlett-Kincaid, Inc. 2007. Saltwater Intrusion in the Floridan Aquifer in Walton, Okaloosa, and Santa Rosa Counties, Florida: Western Domain Forecast Simulations. March 2007.

[227] Niswonger, R.G., Panday, Sorab, and Ibaraki, Motomu, 2011, MODFLOW-NWT, A Newton formulation for MODFLOW-2005: U.S. Geological Survey Techniques and Methods 6-A37, 44 p.

[228] Harbaugh, A.W., 2005, MODFLOW-2005, the U.S. Geological Survey modular ground-water model -- the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16.

[229] McDonald, M.G., and A.W. Harbaugh, 1988. A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model. U.S. Geological Survey, Techniques of Water-Resource Investigation of the United States Geological Survey.

[230] ArcGIS. 2017. Regional Groundwater Numerical Model Boundaries of the St Johns River Water Management District (SJRWMD). SJRWMD, Palatka, FL. https://www.arcgis.com/home/item.html?id=651a8fcf28b745269f5c0bf057720400#overview. (Accessed on December 20, 2017).

Region	Water Supply Planning Model	Abbreviation	Additional Description
	Expanded East Central Florida Transient groundwater model	ECFTX (under development)	
CFWI (including areas in SJRWMD, SWFWMD, and SFWMD)	Northern Planning Region groundwater flow model (aka Northern District Model)	NDM	The model is based on USGS MODFLOW; does not model salinity changes; 7 aquifer layers; grid cell 1,250 x 1,250 ft.
SW-NR	Southern District Model	SDM	MODFLOW-SURFACT groundwater flow and solute transport; 7 aquifer layers; grid cell 2500x2500 ft.
SW-SR	Integrated Northern Tampa Bay model	INTB	Primarily designed to simulate conditions throughout the District south of the Hillsborough River and Green Swamp. See more in Beach and Chan (2003).[231]
SW-TB	Peace River Integrated Model	PRIM	Coupled HSPF (surface water) and MODFLOW (groundwater)
Various areas in SWFWMD	Southern Water Use Caution Area, model MODHMS	SWUCA MODHMS	MODHMS, proprietary model code by HydroGeoLogic, Inc.; based on MODFLOW
	Districtwide regulation model, version 3	DWRM3	MODHMS extends the MODFLOW-SURFACT™ "to include overland and channel flow and transport."[232]
	Lower Kissimmee Basin Groundwater Model	LKBGW	Mainly used to evaluate water use permit (WUP) applications, but also has implications for water supply planning
SF-LKB	Lower East Coast Subregional Model	LECsR	Based on USGS SEAWAT, steady-state, similar to MODFLOW code (Harbaugh et al, 2000)[233]; does not model salinity changes; 4 aquifer layers; grid cell 2,640 x 2,640 ft.
SF-LEC	East Coast Floridan Model	ECFM	Based on USGS MODFLOW; does not model salinity changes; focuses on groundwater flow in Surficial aquifer system; grid cell 704x704 ft.
SF-LEC and SF-UEC	West Coast Floridan Model	WCFM	Based on USGS's SEAWAT; models salinity changes; 7 aquifer layers (does not simulate surface water or the Surficial aquifer system); grid cell 2,400 x 2,400 ft.
SF-LWC*	Lower West Coast Surficial and Intermediate Aquifer Model	LWCSIM	Based on USGS SEAWAT-2000 code: models salinity changes; 7 aquifer layers (does not simulate surface water or the Surficial aquifer system); grid cell 2,400 x 2,400 ft.

[231] Beach, M. and Chan, D., 2003. Southern District Ground-Water Flow Model: Version 1.0. Southwest Florida Water Management District, Hydrologic Evaluation Section. Brooksville, FL.

[232] Scientific Software Group. 2017. MODHMS. Scientific Software Group, Salt Lake City, Utah 84152. http://www.scisoftware.com/environmental_software/product_info.php?products_id=225. (Accessed on December 20, 2017).

[233] Harbaugh, A.W., Banta, E.R., Hill, M.C., and McDonald, M.G., 2000, MODFLOW-2000, The U.S. Geological Survey Modular Ground-Water Model - User guide to modularization concepts and the ground-water flow process. U.S. Geological Survey Open-File Report 00-92, 121 p.

Region	Water Supply Planning Model	Abbreviation	Additional Description
SF-LWC*			The current version is under development. The model uses the USGS MODFLOW code (Harbaugh 2005)[234]; it represents 9 aquifer layers[235] ; grid cell 1,000 x 1,000 ft.

* RWSP mentions Lower West Coast Surficial Aquifer System Model (LWCSAS), which is based on USGS MODFLOW and which models the surficial aquifer.

[See figure on following page]

[234] Harbaugh, A.W., 2005, MODFLOW-2005, The U.S. Geological Survey modular ground-water model -- the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16, variously p.

[235] The description is based on SFWMD. 2017. Aquifer Performance Testing of the Sandstone Aquifer, Lower West Coast Planning Area. Technical Publication WS-42. South Florida Water Management District, West Palm Beach, FL. https://www.sfwmd.gov/sites/default/files/documents/ws-42_lwc_sandstone_aquifer_apt.pdf. (Accessed on December 22, 2017).

Figure 3.2.4 Geographical Areas for Groundwater Models Used in NWFWMD

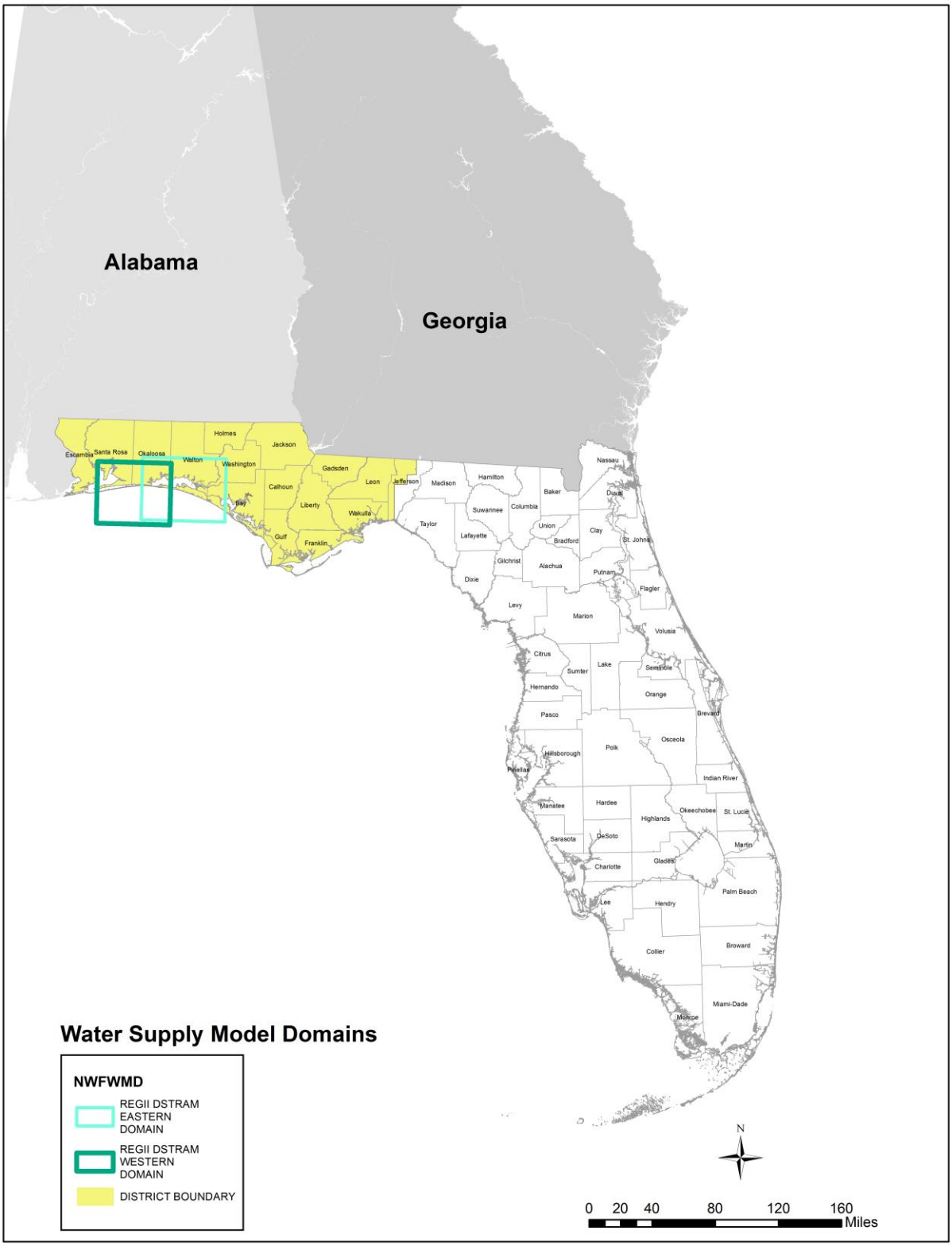


Figure 3.2.5 Geographical Areas for Groundwater Models Used in SRWMD

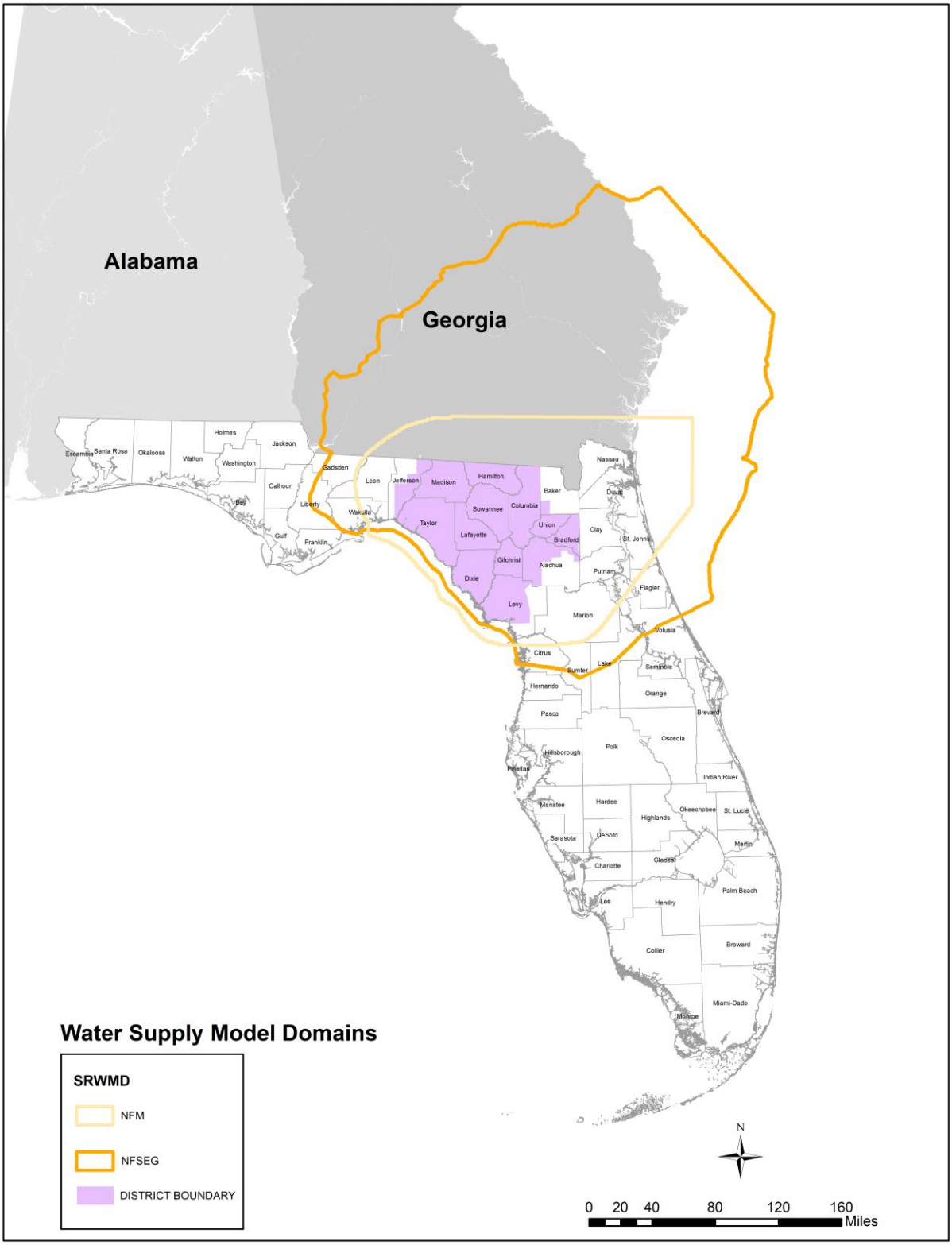


Figure 3.2.6 Geographical Areas for Groundwater Models Used in SJRWMD

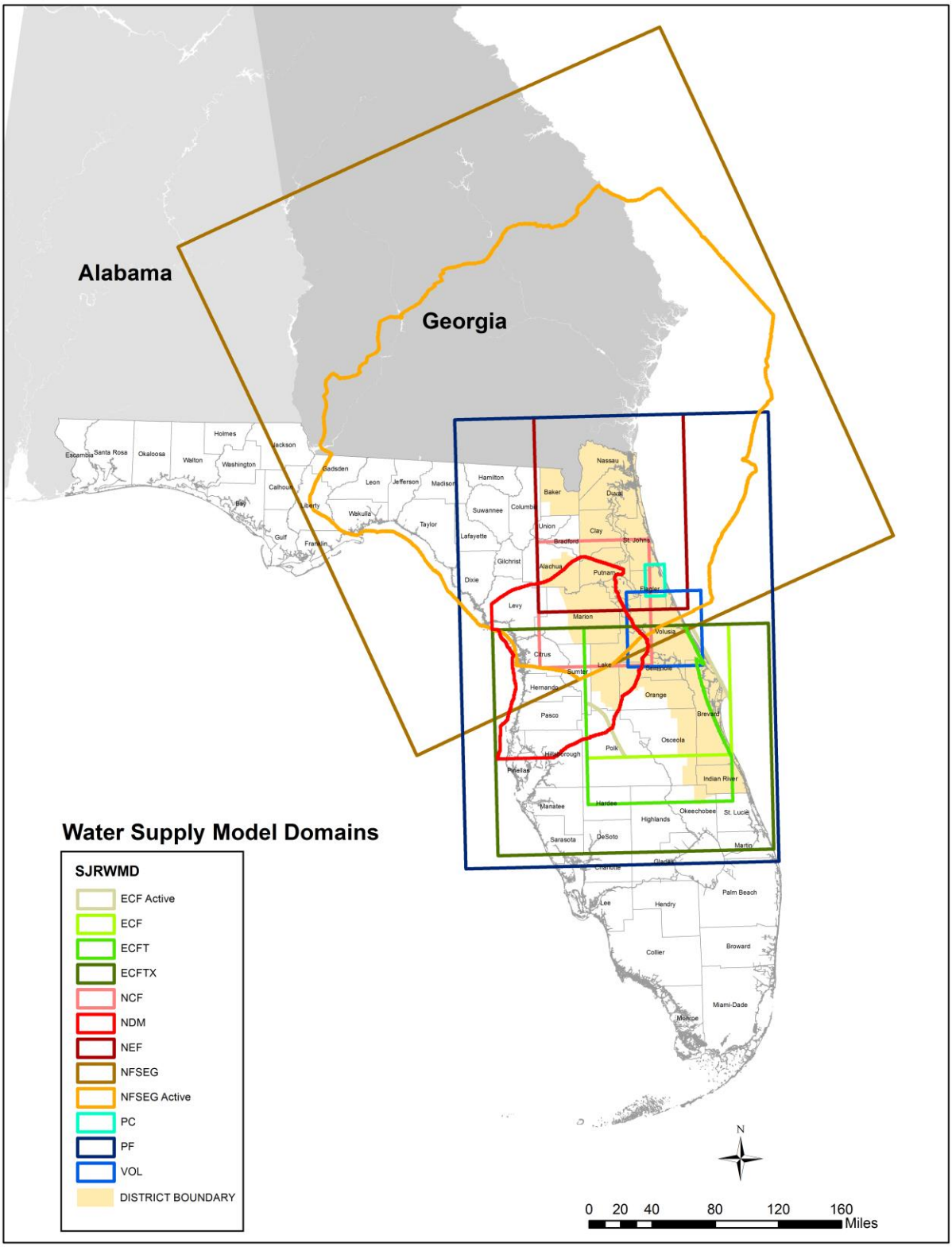


Figure 3.2.7 Geographical Areas for Groundwater Models Used in SWFWMD

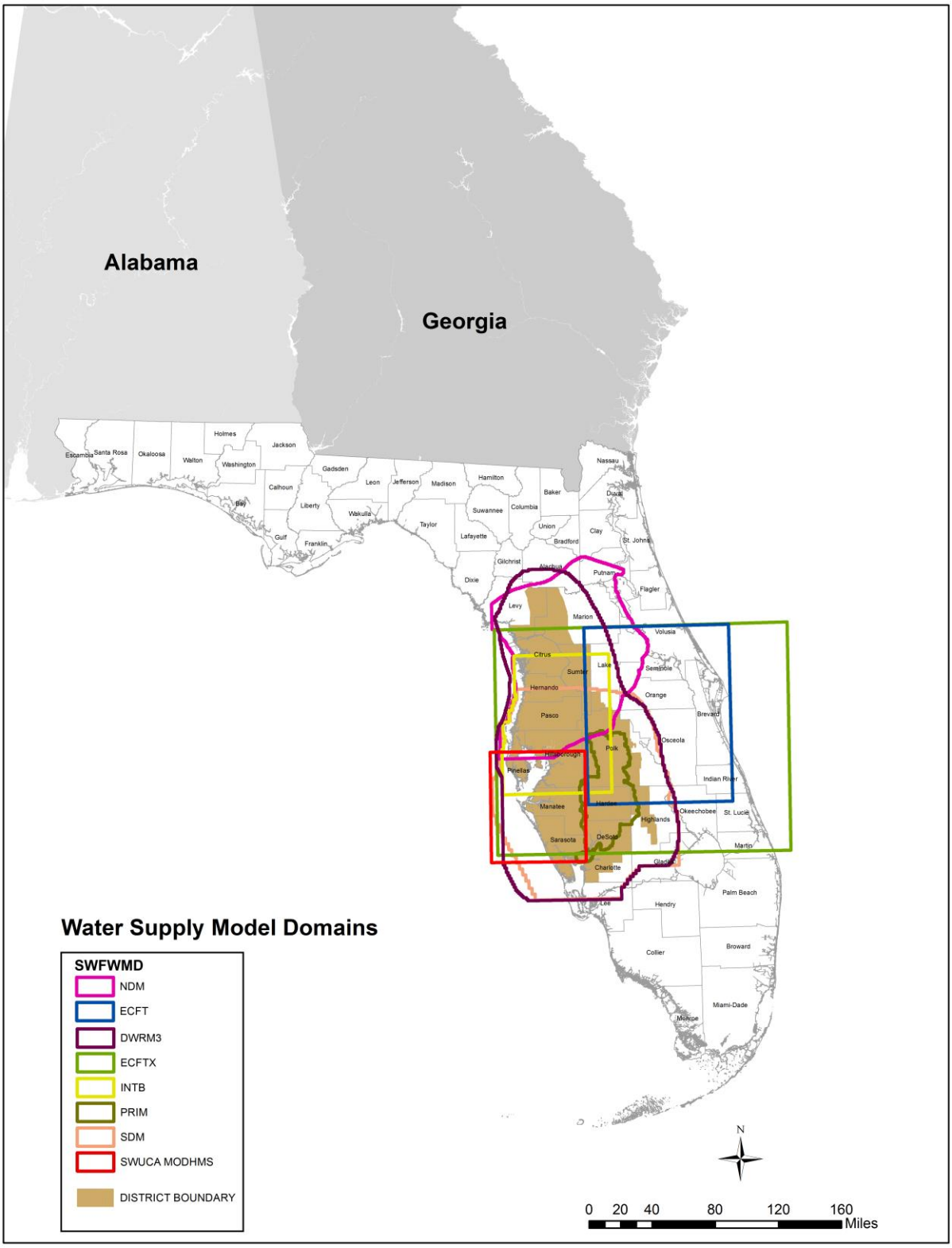
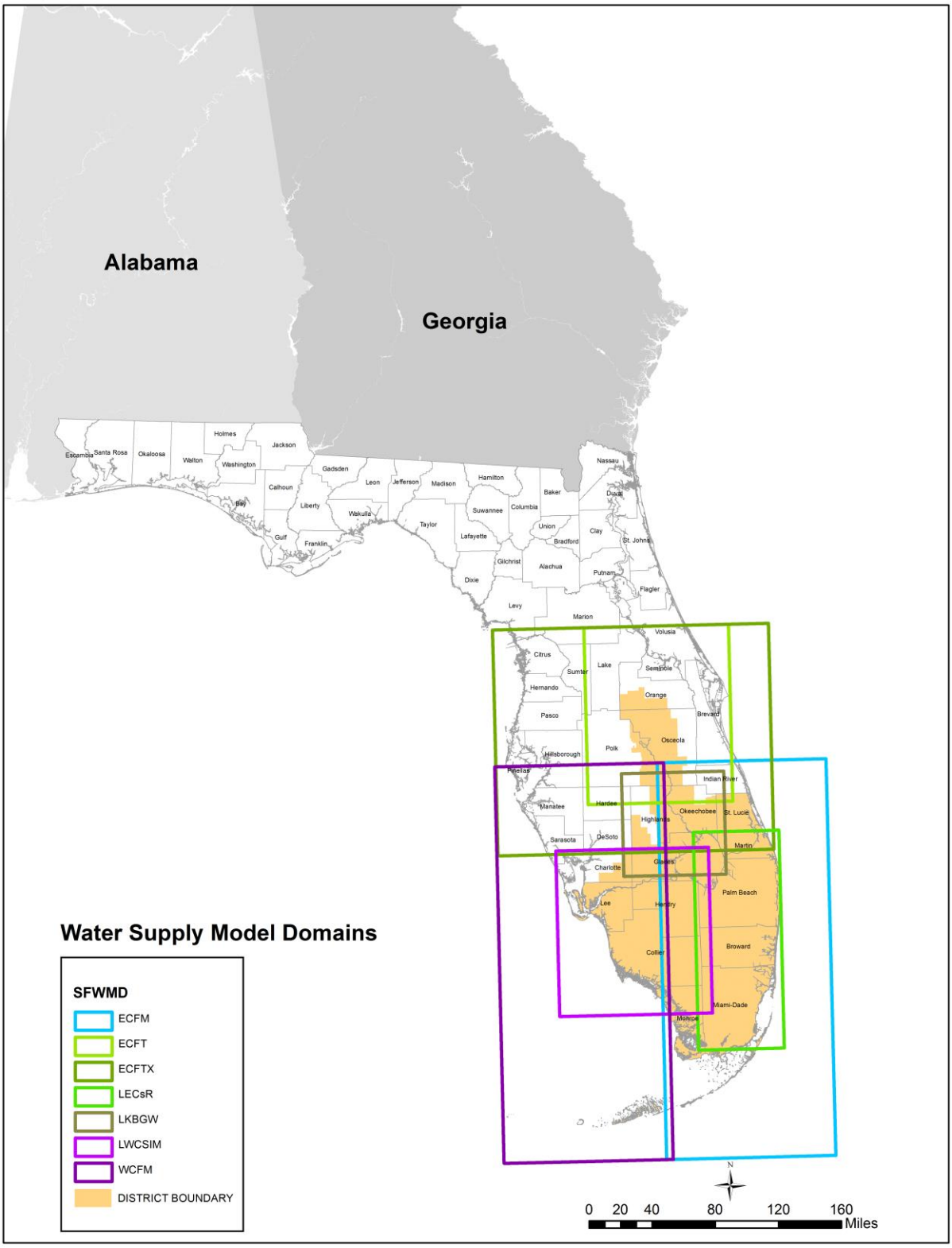


Figure 3.2.8 Geographical Areas for Groundwater Models Used in SFWMD



Surface Water

Surface water sources are a significant water supply option in many parts of the state (see traditional water source description in Table 3.2.1 above). RWSPs primarily discuss surface water availability in a narrative form; however, quantitative assessment of water availability is also provided for some regions and water resources (Table 3.2.7). An exception is SWFWMD, which consistently reports quantitative assessment of the current use, as well as potential additional use of surface water resources for all 4 of its planning regions.

[See table on following page]

Table 3.2.7 Examples of Surface Water Availability Results Reported in RWSPs/WSAs*

Region	Surface Water Source	Current Use	Assessment of Water Availability to Meet Future Demand without Impacting the Resource
NW-III	Deer Point Lake Reservoir	Withdrawals of approximately 52 mgd in 2010; The primary water source for the region (the source of water for nearly 90 percent of the county's population)	Sufficient in volume to meet the demands through the 20-year planning horizon (projected 61.4 mgd). Bay County may withdraw an annual average quantity of up to 98 mgd.
SW-TB	Alafia River	Tampa Bay Water (TBW) has an allocation from the Alafia River. Withdrawals are permitted according to a flow-based withdrawal schedule with an annual average of 18.7 mgd (estimate of long term average yield)	Unpermitted Potentially Available Withdrawals: 19 mgd
SW-SR	Peace River	Used for water supply by Peace River Water Authority	Unpermitted Potentially Available Withdrawals – 73.1 mgd
SW-NR	Withlacoochee River	0.54 mgd is currently permitted but not used	0.54 mgd to 88.5 mgd. The upper end includes permitted but unused quantities plus the estimated remaining available surface water.
SW-TB	Alafia River @ Bell Shoals Rd.	23.4 mgd permitted average annual withdrawal limits; current withdrawals = 14 mgd	19 mgd unpermitted potentially available withdrawals
SW-TB	Little Manatee River @ FPL Reservoir	9.0 mgd permitted average annual withdrawal limits; current withdrawals = 6.0 mgd	0.0 mgd unpermitted potentially available withdrawals
SW-HR	Josephine Creek @ WMD Boundary	0.97 mgd permitted average annual withdrawal limits; current withdrawals = 0.13 mgd	3.73 mgd unpermitted potentially available withdrawals. Actual availability depends on SFWMD coordination as creek is on WMD boundary.
SW-SR	Manatee River @ Dam	35.0 mgd permitted average annual withdrawal limits; current withdrawals = 26.3 mgd	0.0 mgd unpermitted potentially available withdrawals
SW-SR	Braden River @ Dam	7.0 mgd permitted average annual withdrawal limits; current withdrawals = 5.4 mgd	0.3 mgd unpermitted potentially available withdrawals
SW-SR	Cow Pen Slough @ I-75	0.0 mgd permitted average annual withdrawal limits	36.6 mgd unpermitted potentially available withdrawals
SW-SR	Myakka River @ Sarasota	0.0 mgd permitted average annual withdrawal limits	25.3 mgd unpermitted potentially available withdrawals
SW-SR	Myakkahatchee Creek @ Diversion	4.5 mgd permitted average annual withdrawal limits; current withdrawals = 1.4 mgd	0.5 mgd unpermitted potentially available withdrawals
SW-SR	Peace River @ Treatment Plant	33.1 mgd permitted average annual withdrawal limits; current withdrawals = 20.3 mgd	73.1 mgd unpermitted potentially available withdrawals
SW-SR	Shell Creek @ Dam	8.5 mgd permitted average annual withdrawal limits; current withdrawals = 4.8 mgd	16.1 mgd unpermitted potentially available withdrawals
SF-LKB;	Lakes Istokpoga and its hydraulically connected canals (Indian Prairie Basin Area)	Traditional water source for the region. Primary source for agricultural irrigation in Indian Prairie Basin.	MFL and RAA water body. Water availability limited beyond current permitted allocations due to storage capacity and flood control and existing legal water users
SF-LKB;	Kissimmee River	RWSP provides limited information regarding the current use of surface water	In 2014, rulemaking was initiated to develop a water reservation rule for the Kissimmee Basin, which includes the Kissimmee River

Region	Surface Water Source	Current Use	Assessment of Water Availability to Meet Future Demand without Impacting the Resource
SF-LKB; SF-UEC; SF-LEC; SF-LWC	Lakes Okeechobee and its hydraulically connected canals	Traditional water source for these regions. Multi-purpose water body critical to flood protection and water supply	MFL and RAA water body. Water availability limited beyond current permitted allocations due to dike integrity, storage capacity, environmental needs, and existing legal users
SF-UEC	C-23, C-24 and C-25 canals	Traditional water source in the region. Primary source for agricultural irrigation	RAA water body. Water availability limited beyond current permitted allocations due to storage capacity, and existing legal water users. Canal system not connected to Lake Okeechobee or other regional storage system. Dependent on local rainfall for recharge.

*Note that this table consists of examples of surface water availability that has been quantified in RWSPs. Thus, it is not intended to be an exhaustive list.

Surface Water Availability Assessment WMD Methodology

The methodologies used by WMDs to assess surface water availability differ to reflect regional specifics. The methodologies range from a mere acknowledgement of significant water resources available (e.g., NW-VII) to sophisticated models developed to examine potential impacts on the various components of ecosystems (e.g., St. Johns River Water Supply Impact Study[236] referenced in the CFWI RWSP).

In several regions, surface water resources are protected by water reservation rules, restricted allocation area (RAA) rules, or minimum flows and minimum levels (MFLs) and related recovery strategies. In such areas, additional water withdrawals to meet increasing water demand may be limited. For water bodies with no MFLs, RAAs, or reservations, other criteria were used to account for the need to sustain water resources and related natural systems. For example, in SWFWMD, for the water bodies for which MFL or reservations have not yet been established, a set of planning level criteria has been used to determine potential water availability (see Appendix 4-2, Criteria for Determining Potential Availability from Rivers, in SWFWMD 2015). [237] SRWMD completed a surface water availability assessment for the DEP report required by Senate Bill 536 passed in 2014.[238] This work included a preliminary assessment for waterbodies that will have future MFLs in accordance with the current priority list.

Due to the diversity of the methodologies used by the WMDs to reflect hydrology and ecology of various systems, a summary of these methods is not included in this report.

[236] SJRWMD. 2012. *St. Johns River Water Supply Impact Study (SJ2012-1).* St. Johns River Water Management District, Palatka, FL. https://www.sjrwmd.com/documents/water-supply/#wsis-final-report. (Accessed on December 20, 2017).

[237] SWFWMD. 2015. 2015 Regional Water Supply Plan. SWFWMD, https://www.swfwmd.state.fl.us/documents/plans/RWSP/2015/. (Accessed on December 20, 2017).

[238] Senate Bill 536 required "DEP, in coordination with stakeholders to conduct a comprehensive study and submit a report on the expansion of use of reclaimed water, stormwater, and excess surface water in this state." See more in Florida Department of Environmental Protection. 2015. Report on Expansion of Beneficial Use of Reclaimed Water, Stormwater and Excess Surface Water (Senate Bill 536). Office of Water Policy, Florida Department of Environmental Protection, Tallahassee, FL, 230p. https://floridadep.gov/water/domestic-wastewater/content/senate-bill-536-sb-536-study. (Accessed on January 2, 2018).

Reclaimed Water

Reclaimed water is water that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility.[239] Reuse is the deliberate application of reclaimed water for a beneficial purpose. Reuse includes:[240]

- Slow-rate land application projects with restricted access (e.g., application to pastures and areas used to grow feed, as well as irrigation of managed timber plantations);[241]
- Slow-rate land application systems with public access (e.g., golf courses, parks, and cemeteries);[242]
- Rapid-rate land application systems[243] (e.g., rapid infiltration basins and absorption fields);[244]
- Projects making reclaimed water from domestic wastewater sources available for industrial applications;[245]
- Groundwater recharge projects (e.g., injection wells or use of reclaimed water to create barriers to saltwater intrusion);[246]
- Indirect potable reuse projects (e.g., discharges to groundwater or surface waters that are used as potable water supplies);[247]
- Wetlands creation, restoration, and enhancement projects; and
- Other uses (e.g., toilet flushing, fire protection, aesthetics, etc.).

In addition to reuse, some RWSPs identify "potable quality water offset," that is the amount of potable quality water estimated to be saved through the use of reclaimed water.[248] The CFWI RWSP further explains this concept as follows:

[239] Fla. Admin. Code R. 62-610.200.
[240] Fla. Admin. Code R. 62-610.810.
[241] According to Part III of Chapter 62-610, F.A.C., slow-rate land application systems involve the application of reclaimed water to a vegetated land surface with the applied reclaimed water being treated as it flows through the plant-soil matrix. A portion of the flow percolates to the groundwater and some is used by the vegetation. Offsite surface runoff of the applied reclaimed water is generally avoided. Surface application techniques include ridge-and-furrow and border strip flooding. Spray irrigation systems can use fixed risers or moving systems, such as center pivots.
[242] Part III of Chapter 62-610, F.A.C.
[243] These systems are considered as "reuse" for groundwater recharge.
[244] Part IV of Chapter 62-610, F.A.C.
[245] Part VII of Chapter 62-610, F.A.C.
[246] Part V of Chapter 62-610, F.A.C.
[247] If permitted under Part V of Chapter 62-610, F.A.C.
[248] Part I of 62-610, F.A.C.

> Potable-quality water offset is defined as the replacement of existing or proposed potable-quality ground or surface-water withdrawals with reclaimed or another alternative water source. While components of groundwater recharge and wetland augmentation are considered reuse by statutory definition, these applications do not replace future potable system demands such as irrigation and industrial applications.[249]

Due to the diversity of approaches and terminology used in RWSPs, EDR's assessment results are presented in a list format, as opposed to the table format that is used in other sub-sections.

Reclaimed water use and availability assessment results for the water supply planning regions are the following:

- Planning regions in NWFWMD:
    - Baseline: in 2010, 95.56 mgd of domestic wastewater was generated, and 49.01 mgd was of reuse quality. Approximately 12.17 mgd was used to offset potable quality water.
    - Projected: additional wastewater potentially available for reuse in 2035 is 75.96 mgd, with NW-II, NW-III, and NW-VII accounting for most of it.

- Planning regions in NFRWSP:
    - Baseline: in 2015, 154.53 mgd of domestic wastewater was generated, with beneficial reuse of 46.36 mgd.
    - Projected: potential additional wastewater reused in 2035 ranges from 27 to 103 mgd.

- Planning regions in CFWI:
    - Baseline: in 2010, 193 mgd of wastewater was generated. Of this amount, 174 mgd was treated and reused in a beneficial manner (specifically, 105 mgd was treated and reused for irrigation and industrial uses, and 73 mgd was reused for aquifer recharge and environmental enhancement). The remaining 15 mgd of was discharged to surface water features or sent to percolation ponds.
    - Projected: by 2035, wastewater flows are projected to exceed 314 mgd, an increase of 121 mgd from 2010. With 29 mgd identified from supplemental sources to help during peak demand periods, reuse flows are anticipated to exceed 343 mgd by 2035. Between 2010 and 2035 reuse is anticipated to increase by 165 mgd, which could result in approximately 106 mgd of potable-quality water being offset.

- SW-NR:
    - Baseline: in 2010, estimated wastewater flow in the region was 16.84 mgd, with utilization of 9.04 mgd, and potable quality water benefits of 6.69 mgd.

[249] P. E-3. Central Florida Water Initiative (CFWI). 2015. Regional Water Supply Plan: Appendices to Volume I. cfwiwater.com. (Accessed on December 21, 2017).

- Projected: in 2035, estimated wastewater flow in the region is 30.17 mgd, with utilization of 23.78 mgd, and potable quality water benefits of 16.79 mgd (with post-2010 benefits of 10.64 mgd).

- SW-HR:
  - Baseline: in 2010, estimated wastewater flow in the region was 31.95 mgd, with utilization of 11.95 mgd, and potable quality water benefits of 11.11 mgd.
  - Projected: in 2035, estimated wastewater flow in the region is 51.28 mgd, with utilization of 45.84 mgd, and potable quality water benefits of 40.19 mgd (with post-2010 benefits of 28.56 mgd).

- SW-TB:
  - Baseline: in 2010, estimated wastewater flow in the region was 225.64 mgd, with utilization of 91.36 mgd, and potable quality water benefits of 57.55 mgd.
  - Projected: in 2035, estimated wastewater flow in the region is 247.72 mgd, with utilization of 176.06 mgd, and potable quality water benefits of 123.25 mgd (with post-2010 benefits of 65.7 mgd).

- SW-SR:
  - Baseline: in 2010, estimated wastewater flow in the region was 62.71 mgd, with utilization of 33.89 mgd, and potable quality water benefits of 23.71 mgd.
  - Projected: in 2035, estimated wastewater flow in the region is 80.63 mgd, with utilization of 70.55 mgd, and potable quality water benefits of 49.39 mgd (with post-2010 benefits of 25.68 mgd).

- SF-LEC:
  - Baseline: in 2010, average treated volume was 639 mgd, with 71 mgd reused. Most of the treated wastewater (594 mgd) was disposed through deep well injection (353 mgd) and ocean outfalls (240 mgd). Of the 44 wastewater treatment plants in the LEC, 6 use ocean outfall.
  - Projected: by 2030, wastewater flows are projected to increase to 831 mgd with utilization of 420 mgd. By 2025, 60 percent of wastewater discharged through ocean outfalls must be beneficially reused,[250] leading to beneficial reuse of 177.8 mgd.

- SF-UEC:
  - Baseline: in 2013, regional capacity of the wastewater treatment facilities totaled 48.2 mgd; an average of 22.4 mgd of wastewater was treated, and 7.8 mgd of the treated wastewater was reused.
  - Projected: utilities are projecting that treated wastewater flows will increase from 22.4 mgd in 2013 to approximately 39 mgd by 2040. Applying the current reuse

[250] § 403.086(9)(c)1, Fla. Stat.

rate of 35 percent to projected increase in treated wastewater flows results in 5 mgd of additional reuse by 2040.

- SF-LKB:
    - Baseline: in 2010, utilities generated an average of 0.86 mgd of reclaimed water, most of which was utilized for beneficial use.
    - Projected: by 2035, water reuse is projected to increase to 1.06 mgd, most of which will be utilized for beneficial use.

- SF-LWC:
    - Baseline: in 2014, regional permitted capacity totaled 158.9 mgd, with an average of 76.7 mgd of wastewater treated. Most of this treated wastewater was reused for golf course and landscape irrigation, industrial uses, and groundwater recharge (specifically, 76.7 mgd was reused, but this included 21.4 mgd of supplemental water). Public access irrigation accounted for 69.1 mgd of the 76.7 mgd reused in 2014. The remaining 7.6 mgd of water reuse was for groundwater recharge, and other miscellaneous applications like agriculture, wetlands, cooling water, treatment processes, and toilet flushing. Effluent not reused was disposed of through deep well injection (8.5 mgd) or surface-water disposal (11.9 mgd).
    - Projected: utilities are projecting wastewater flows, including supplemental water, will increase from 77 mgd in 2014 to approximately 163 mgd by 2040. Utility projections estimate an additional 86 mgd of reuse by 2040.

Overall, WMDs use a variety of formats to report projected reclaimed water flow, reuse, and potable-quality water offsets in RWSPs/WSAs, which makes it difficult to compile statewide projections of potential reclaimed water availability, or to compare projections across planning regions. At the same time, the information reported in RWSPs/WSAs shows that there is significant potential to use reclaimed water to meet part of the increasing water demand and to offset groundwater withdrawals.

WMDs' Reclaimed Water Potential Availability and Reuse WMD Assessment Methodology
In addition to identifying specific project options (see water resource supply development project summary in the beginning of subsection 3.2 in this report), WMDs also discuss projections of the total potential wastewater generation, and scenarios with alternative total rates of potential reuse.

WMDs focus on domestic wastewater treatment facilities (WWTF) with 2010 permitted wastewater treatment capacities equal to or greater than 0.1 mgd. As a first step, WMDs projected future wastewater flow. To accomplish this task, SFWMD relied on projections of wastewater flow (and water reuse flow) provided by individual WWTFs / utilities. The other WMDs projected wastewater flow using forecasts of the future population to be served by WWTFs (based on projected population growth within relevant service areas). It should be noted that CFWI takes a hybrid approach to projecting wastewater and water reuse flows. Each utility is asked to provide projections, but if no projections are available, the projections are produced internally.

To project domestic wastewater flow, NFRWSP, CFWI, and SWFWMD assumed that the increased sewered population will generate approximately 84 gallons per capita per day (gpcd) of wastewater to the local WWTFs. The 84 gpcd represents an average of 69 gpcd generated by residential customers (indoor use) and 15 gpcd generated by industrial/commercial customers (indoor use).[251] In addition, NFRWSP and SWFWMD recognized that potential future wastewater flows could be reduced due to residential indoor water conservation activities and/or utilities' inflow and infiltration reduction programs. The NWFWMD WSA does not discuss specific assumptions regarding the per capita wastewater flow rate.

Approaches used to develop future wastewater flow projections are summarized in Table 3.2.8.

Table 3.2.8 Approaches Used in RWSPs/WSAs to Project Future Domestic Wastewater Flow

	The flow is assumed proportional to population growth	Specific assumptions regarding per capita wastewater flow are discussed	Projections produced by individual WWTFs are used in the RWSP
Regions in NWFWMD	✓	-	-
Regions in NFRWSP	✓	✓	-
Regions in CFWI	✓*	✓	✓*
Regions in SWFWMD	✓	✓	-
Regions in SFWMD	-	-	✓

*Each utility is requested to provide projections, but if not available, the flow is assumed proportional to population growth.

Once the future wastewater flow is estimated, the WMDs employ various methods to project the treatment and utilization of this flow:

- In NWFWMD, the reuse flows in 2010 that replaced potable-quality water (multiplied by a peaking factor of 1.5) was subtracted from projected wastewater flows. The result represented future reclaimed water potentially available for reuse.

- In NFRWSP, the estimated future wastewater flow was multiplied by the DEP utilization goal of 75 percent.[252] The result represented *potential new* reclaimed water available for reuse. For comparison, NFRWSP created a scenario with the DEP utilization goal replaced with the 2010 percent beneficial reuse utilization. As a low boundary on future

[251] As stated in the RWSP, the 84 gpcd is based upon empirical sources for residential flows referenced from Vickers (2001) and AWWA Research Foundation (1999). Additionally, the Florida Administrative Code, Chapter 64E-6, "Standards for Onsite Sewage Treatment and Disposal Systems", Rule 64E-6.008 System Size Determinations, Section (1)(B) Table I - System Design supports designs for wastewater return flows averaging 15 gpcd for employees at a commercial/industrial facility.

[252] Statewide reuse utilization goal was defined in Florida Department of Environmental Protection (DEP). 2003. Water Reuse for Florida: Strategies for Effective Use of Reclaimed Water. The Reuse Coordinating Committee, Water Reuse Work Group, Water Conservation Initiative. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/valued_resource_FinalReport_508C.pdf. (Accessed on December 21, 2017).

reclaimed water availability, NFRWSP used the difference between the 2010 WWTF flow at 75 percent utilization[253] and the 2010 actual beneficial reuse. This volume represents *existing* potential reclaimed water that could be reused.

- In CFWI, potable-quality water offset was defined for each individual WWTF. On the CFWI-wide scale, it comes to 64 percent of the projected increase in wastewater flow.

- In SWFWMD, projected reuse of 70 percent wastewater flow utilization was assumed, where 70 percent represents the District's wastewater flow utilization goal by 2035 (2040 goal is 75 percent).

- In SF-LEC, the utilization is provided by each of the utilities. The requirements of subsection 403.086(9), Florida Statutes, were considered. The statute requires eliminating six ocean outfalls in southeastern Florida, and mandates the affected wastewater utilities to reuse at least 60 percent of the outfall flows by 2025.

- In SF-UEC, SF-LWC, and SF-LKB, the utilization is provided by each of the utilities. Beneficial reuse is as defined in chapter 62-610 of the Florida Administrative Code.

To summarize, while the general approach to reclaimed water availability assessment is similar among the RWSPs/WSA, assumptions used by the WMDs differ, based on local data, existing reuse, and regional or state reuse goals. For example, the assumptions regarding future beneficial reuse rate range from 35 percent (i.e., current beneficial reuse in SF-UEC) to 75 percent (i.e., the target set by DEP (2003) and used in one of the scenarios considered by NFRWSP).[254]

Seawater

Seawater[255] can potentially offer an unlimited supply of water; however, the treatment of this source is more expensive than other water sources. As stated in the CFWI RWSP:

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[253] Florida Department of Environmental Protection (DEP). 2003. Water Reuse for Florida: Strategies for Effective Use of Reclaimed Water. The Reuse Coordinating Committee, Water Reuse Work Group, Water Conservation Initiative. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/valued_resource_FinalReport_508C.pdf. (Accessed on December 21, 2017).

[254] Statewide reuse utilization goal was defined in Florida Department of Environmental Protection (DEP). 2003. Water Reuse for Florida: Strategies for Effective Use of Reclaimed Water. The Reuse Coordinating Committee, Water Reuse Work Group, Water Conservation Initiative. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/valued_resource_FinalReport_508C.pdf. (Accessed on December 21, 2017). For more information on reclaimed water in Florida, see DEP's report titled Report on Expansion of Beneficial Use of Reclaimed Water, Stormwater and Excess Surface Water (Senate Bill 536). https://floridadep.gov/sites/default/files/SB536%20Final%20Report.pdf. (Accessed December 2017).

[255] Seawater is water that has a dissolved-solids content of 35,000 milligrams per liter or more (see U.S. Geological Survey. 2013. National Brackish Groundwater Assessment. Information Sheet. U.S. Geological Survey. https://water.usgs.gov/ogw/gwrp/brackishgw/files/brackish_infosheet_v8.pdf. (Accessed on December 19, 2017).

> Special case situations, such as co-locating a seawater desalination plant with an electric power plant or sizeable reclaimed water discharge facility, may make this alternative water supply source more competitive with the development of other alternative water supply sources.[256]

Feasibility studies for co-locating seawater treatment facilities with power plants have been conducted, and several potential seawater or intracoastal water supply projects have been identified.[257]

In SW-NR, an option for a 15 mgd seawater desalination facility co-located at the Crystal River power station near the Gulf of Mexico in Citrus County has been identified. Note that conceptual details and estimated costs of this project depend on operational changes at the Crystal River power station.

In SW-TB, two options for large-scale seawater desalination facilities in the planning region were evaluated. The options include a 10 mgd expansion of TBW's existing facility at the Big Bend power station in Hillsborough County, and a new facility co-located with the Anclote River power station near the Gulf of Mexico in Pasco County. The Anclote River desalination facility option was evaluated as either a 25 mgd capacity project, or the phased development of a 7 mgd facility with a later expansion to 21 mgd to accommodate the actual growth of water demands. Total potential additional water supply from seawater desalination is estimated at 35 mgd.

In SW-SR, two options for large-scale seawater desalination facilities have been identified. The options would be located at Port Manatee in Manatee County, on lower Tampa Bay, and on an industrial site by the Venice Airport in Sarasota County. Both options are conceptualized as having capacities of 20 mgd (total seawater desalination potential of 40 mgd). The options would circulate over 400 mgd of water in order to dilute discharge concentrate at a 20 to 1 ratio.

In SF-LEC, two seawater desalination treatment plants are currently located in Monroe County (on Stock Island and in Marathon). Their combined supply capacity is 3 mgd. A feasibility study conducted in 2006[258] evaluated co-location of seawater treatment facilities with power plants in south Florida. The study concluded that the most feasible three sites are co-located with Florida Power and Light facilities in Fort Myers, Fort Lauderdale, and Port Everglades.

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[256] P. 116, Central Florida Water Initiative (CFWI). 2015. 2015 Final CFWI RWSP, Planning Document, Volume I. https://cfwiwater.com/pdfs/plans/CFWI_RWSP_VolI_Draft_2015-10-26.pdf. (Accessed on December 21, 2017).

[257] CFWI RWSP references the following three sources: (1) Metcalf & Eddy. 2006. Technical and Economic Feasibility of Co-located Desalination Facilities. Contract No. CN040927-WO05. Prepared for the South Florida Water Management District, West Palm Beach, FL; (2) Beck, R.W. 2004. Final Report on Five Potential Seawater Demineralization Project Sites – Task C.5. Special Publication SJ2004-SP6. Prepared for the SJRWMD under contract S.E.459AA, Palatka, FL.; and (3) Applied Technology, Inc., Janicki Environmental, and R.W. Beck. 2006. Evaluation of Potential Impacts of Demineralization Concentrate Discharge to the Indian River Lagoon, Special Publication SJ2007-SP3. Prepared for the St. Johns River Water Management District, Palatka, FL.

[258] SF-LEC RWSP references Metcalf & Eddy. 2006. Technical and Economic Feasibility of Co-located Desalination Facilities. Contract No. CN040927-WO05. Prepared for the South Florida Water Management District, West Palm Beach, FL.

For NWFWMD and NFRWSP, as well as SF-UEC, SF-LKB, SF-LWC, only a general discussion of seawater desalination as a potential water source is included in their RWSPs/WSA. Finally, for SR-outside NFRWSP and SJR-CSEC, the RWSPs are being updated, and therefore, the availability of seawater as a potential water source is yet to be determined.

Overall, while seawater is available, desalination is required before seawater can be used for water supply purposes and the concentrate from the desalination process must be managed to meet regulatory and environmental criteria. In addition to treatment facilities, pump stations and pipelines would be required to transport finished water from the coast to the interior portions of the state. Significant advances in treatment and efficiencies in seawater desalination have occurred over the past decade. While seawater treatment costs are decreasing and capital costs are becoming competitive with above ground reservoir options, operational costs remain moderately higher than other water supply options.[259]

Water Supply Data from WMDs: Summary

Following the requirements of section 373.036, Florida Statutes, WMDs' WSAs provide regional evaluation of water supply source and projections of future demands. For planning regions where a WMD determines that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period, RWSPs are required to include a list of water supply development project options, with the total capacity of projects exceeding projected future demands.[260] According to RWSPs and WSAs compiled by EDR for this report, between 2015 and 2035, statewide water demand is projected to increase by 1,109 mgd. According to DEP's summary of RWSPs,[261] 754 mgd is projected to be met by existing source capacity. The DEP summary also shows that between 327 and 353 mgd of the projected demand increase can potentially be offset by water conservation. Finally, alternative water supply projects could, if constructed, produce approximately 1,463 mgd of water by 2035. Hence, the total capacity of water supply development project options far exceeds the projected increase in demand, especially if the offset from water conservation is taken into account.

RWSPs also discuss planning-level costs for capital investment and operating and maintaining the water supply development project options.[262] Other than the NWFWMD, each district will need to implement at least some of the alternative water supply projects identified in the RWSPs (or other projects yet to be evaluated) to meet its 2035 water demand. The RWSPs show that significant financial investments will be required in order to develop and implement these alternative water supplies. For example, according to DEP,[263] total project costs for alternative water supply projects in Fiscal Years 2005-06 to 2015-16 was $5.2 billion (with an additional 808.6 mgd created upon

[259] This description is taken from NFRWSP RWSP.
[260] § 373.709, Fla. Stat.
[261] See https://floridadep.gov/water-policy/water-policy/documents/2016-annual-status-report-regional-water-supply-planning. (Accessed December 2017).
[262] § 373.709, Fla. Stat.
[263] See https://floridadep.gov/water-policy/water-policy/documents/2016-annual-status-report-regional-water-supply-planning. (Accessed December 2017).

completion). Similarly, funding may be required to implement water conservation initiatives to offset part of the projected increase in water demand. As discussed in the next section, an economic analysis of projected statewide water demand and supply may help forecast the funding needed for water supply and conservation projects, as well as any economic repercussions of not making the investments on a timely basis. An economic analysis can potentially assist in examining the cost of droughts and water shortages for the state economy, as well as the economic effects of various water resource management and policy decisions. To conduct such analysis, total water available from various water sources can be examined to estimate costs of water supply alternatives. Total available water is defined here by EDR as the estimated total volume of water that can be taken from a source to meet water demand, while also leaving enough water to sustain water resources and related natural systems. The RWSPs and WSAs present data regarding total water availability, a key piece of EDR's future economic analysis.

3.3 Integrated Water Supply and Demand Model

Section 403.928, Florida Statutes, requires EDR to conduct an analysis of the future expenditures necessary to comply with laws governing water supply and water quality as well as to achieve the Legislature's intent that sufficient water be available for all existing and future reasonable-beneficial uses and the natural systems, while avoiding the adverse effects of competition for water supplies.

This statutory requirement should be further operationalized to a set of measurable criteria to allow evaluation of the sufficiency of projected water supply expenditures relative to the expected demand. One possible effect of competition for water supplies is the potential impacts of water withdrawals on water resources and related natural systems. Following the approach used by the WMDs in developing the RWSPs/WSAs, EDR interpreted one requirement of avoiding "adverse effects of competition for water supplies" as the need to sustain the water resources and related natural systems.[264]

In Florida, the cheapest and historically dominant traditional water sources – fresh groundwater and surface water – are economically considered scarce. Signs that the traditional water sources are scarce include conflicts among stakeholders regarding water allocation decisions[265] and the need to set minimum flows and minimum water levels (MFLs) recovery strategies for some water bodies.[266] Scarcity of traditional water sources does not necessarily mean that Florida is running

[264] WMDs examine if existing water sources are sufficient to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period; see section 373.709, Florida Statutes.

[265] Stakeholder conflicts as a sign of water scarcity was mentioned in by Phyllis, P.S. and Lynne, G.D. 1993. Getting the Most Valuable Water Supply Pie: Economic Efficiency in Florida's Reasonable-Beneficial Use Standard, *J. Land Use & Envtl. L.* 491, 520.

[266] For example, see (1) Suwannee River Water Management District (SRWMD). 2014. Recovery Strategy: Lower Santa Fe River Basin. Lower Santa Fe and Ichetucknee Rivers and Priority Springs Minimum Flows and Levels. SRWMD, Live Oak, FL 32060. http://fl-suwanneeriver.civicplus.com/DocumentCenter/View/9116. (Accessed on December 26, 2017); and (2) Chapter 40d-80, Rules of SWFWMD, Recovery and Prevention Strategies For Minimum Flows and Levels https://www.swfwmd.state.fl.us/files/database/site_file_sets/2/40D-80_NTB_Phase_II_05262010.pdf. (Accessed on December 26, 2017).

out of water. Through 2035, projected water demand in Florida can still be fully satisfied, given the water conservation, water supply development, and water resource development projects currently summarized in the RWSPs and DEP (2016).[267] However, these summaries do imply that Floridians will need to rely on more costly alternative water sources to satisfy a portion of their needs.

Scarcity of traditional water supplies and the need to rely on more costly alternative water sources can have the following economic consequences:

- *Increasing costs of water supply*: The costs of alternative water supplies are generally higher than the cost of traditional sources. For example, Table 3.3.1 presents a comparison of the costs for traditional and alternative water supplies completed by the SJRWMD. Fresh groundwater is generally the cheapest source, followed by brackish and surface water sources (that require investments in additional treatment to meet water quality standards). Finally, seawater is the most expensive source, due to significant capital and operating costs.[268]

Table 3.3.1 Comparative Costs for Supplying Water from Various Sources within the SJRWMD

Water Supply Source	Average Daily Flow (mgd)	Total Unit Cost ($/1000 gal)
Upper Floridan Aquifer	10	$0.27*
	20	$0.25*
Seawater	10	$8.51*
	20	$7.21*
Brackish Groundwater	10	$2.55*
	20	$2.05*
Surface Water	10	$2.43*
	20	$1.74*
Potable reuse	10	$0.90 - $3.91**
	20	$0.86 - $3.85**

Source: based on Florida Department of Environmental Protection, Office of Water Policy, Report on Expansion of Beneficial Use of Reclaimed Water, Stormwater and Excess Surface Water (Senate Bill 536), December 2015. The original information is from SJRWMD. 2014. *Potable Reuse Investigation of the St. Johns River Water Management District: The Costs for Potable Reuse Alternatives.* St. Johns River Water Management District.
* These costs do not include transmission cost from source to use area (as stated in Taylor Engineering, Inc. 2016[269]).
** Includes capital construction, operation and maintenance costs.

[267] Florida Department of Environmental Protection (DEP). 2016. Regional Water Supply Planning. 2016 Annual Report. DEP, Tallahassee, FL. https://floridadep.gov/sites/default/files/FINAL%20Regional%20Water%20Supply%20Planning%202016%20Status%20Annual%20Report.pdf. (Accessed on December 13, 2017).
[268] See the discussion of various water supply sources in Taylor Engineering, Inc. 2016. Initial Assessment of Alternative Water Supply Options for Clay County Utility Authority. Final Report, January 2016. C2015-057, Taylor Engineering, Inc. Jacksonville, FL. https://www.clayutility.org/aws/documents/AWSTechnicalReport.pdf. (Accessed on December 26, 2017).
[269] See page 7 in Taylor Engineering, Inc. 2016. Initial Assessment of Alternative Water Supply Options for Clay County Utility Authority. Final Report, January 2016. C2015-057, Taylor Engineering, Inc. Jacksonville, FL. https://www.clayutility.org/aws/documents/AWSTechnicalReport.pdf. (Accessed on December 26, 2017).

Increasing costs of water treatment and supply can lead to higher prices paid for water by public supply (PS) customers. Other water users (such as agricultural self-supplied (AG) and commercial-industrial-institutional-mining self-supplied (CIIM)) can also face higher costs of water. To defray the direct impact on the end-users, government agencies may implement cost-share and grant programs funded by tax dollars and fees. Depending on the magnitude of the increases in water prices, costs, and government budgets, the transition to alternative water supplies due to economic scarcity of traditional sources can have an effect on a variety of economic activities in the state.[270]

- *Changing framework for economic decision making*: If the burden of the cost for water supply development is shifted entirely to water users, their framework for making decisions will change to incorporate the increased cost of water. As a result, future economic development of the state will be driven by the industries and entities that can afford costly investments in water treatment. This means that water users will need to make adjustments to increase the return on water use activities. For example, in agriculture, farmers may face multiple decisions among (a) reduction in yields due to water use reduction; (b) investment in improving irrigation efficiency; and (c) switching to the crops that provide higher value per unit of water.[271] Resulting changes in agricultural practices could influence sales and trade, employment, and taxes generated by agriculture and related industries, such as agricultural suppliers, processors, and distributors.[272]

- *Changing structure of Florida's economy*: Economic literature discusses the state of a "mature water economy",[273] in which the costs of developing additional (alternative) water supplies are sharply rising to the point when re-allocation of water among existing users becomes a less costly alternative. In such an economy, access to water may be granted based on economic (or societal) benefits associated with the various economic sectors.[274] In such conditions, the existing structure of the state economy could change and future economic development may

[270] With time, the costs of alternative water sources may go down as water treatment technologies improve. However, one also needs to account for the entirety of the consequences of using alternative water sources, which are not captured through market transactions. One example is the potential costs of greenhouse gas emissions associated with energy-intensive seawater desalination (see Kipp, J., Bracciano, D., Foerste, E., and P. Jones. The Energy-Water Nexus: A Case Study of Tampa Bay Water. Presentation at Emerging Energy Issues and Topics In-Service Training. University of Florida, Program for Resource Efficient Communities, September 29, 2011. http://buildgreen.ufl.edu/IST%20Materials%20for%20Agents/Kipp_Energy_Water_Nexus.pdf. (Accessed on January 3, 2018).

[271] Additional options may include investing in brackish water desalination (if brackish water is considered as an alternative water source) or accepting potential changes in consumer perceptions of agricultural produce (if reclaimed water is allowed to be used in irrigation).

[272] See additional discussion on this topic in Mendelsohn, R. 2016. Adaptation, Climate Change, Agriculture, and Water. Choices. Quarter 3. http://www.choicesmagazine.org/choices-magazine/theme-articles/theme-overview-water-scarcity-food-production-and-environmental-sustainabilitycan-policy-make-sense/adaptation-climate-change-agriculture-and-water. (Accessed on December 28, 2017).

[273] This term was introduced by Randall, A. 1981. Property Entitlements and Pricing Policies for a Maturing Water Economy. *Australian J. of Agric. Econ*. 195, p. 196.

[274] Similarly, Klein et al. (2009) discuss that the language in the *Model Water Code* (that was used to develop Chapter 373, Florida Statutes) implies granting priority in CUPs/WUPs to more economically productive uses. See Klein, C.A., Angelo, M.J., and R. Hamann. 2009. Modernizing Water Law: The Example of Florida. 61 *Fla. L. Rev.* 403.

be driven explicitly by the water uses that are determined by decision-makers to provide significant economic (or societal) benefits.

- *Changes in reliability, resiliency, and vulnerability of water supply*[275]: Hashimoto et al. (1982) identified three indicators to measure the performance of water systems given the variability of water demand and supply: (1) how often the system fails (reliability); (2) how quickly the system returns to a satisfactory state once a failure has occurred (resiliency); and (3) how significant the likely consequences of failure may be (vulnerability).[276]

  Historically, plentiful groundwater and surface water sources provided reliable water supplies during the periods of low rainfall. Economic scarcity of water from traditional sources and changing rainfall and temperature patterns make the choice of water sources similar to stock portfolio selection. Selection of a "portfolio" of water supplies will need to guarantee enough water to meet water demand during periods of low rainfall, and it should account for variations in water demand due to anticipated changes in economic conditions, production processes, or users' preferences and habits. Such portfolio selection of water supply sources should be able to accommodate a reasonable margin of error in the water demand and supply forecasts. If water shortages occur, the following consequences may follow:[277]

  - Deficiency of public water supply with implications in related sectors;
  - Loss of production in various water using industries due to water shortage;
  - Loss of tourism due to water use bans and water shortages, including cancellation of tourist reservations, closure of water-demanding leisure facilities (such as water parks, golf courses), or compensation of damages in tourist resorts; and
  - Loss or reduction in crop yields and production.

- *Changes in water resource policies and programs*: Economic scarcity in traditional groundwater and surface water sources may trigger policy changes. For example, agencies have already been implementing or supporting programs to increase water use efficiency and encourage water conservation including:

[275] See a description of using these indicators to manage water supply sources for Tampa Bay Water in Asefa, T., Clayton, J., Adams, A. and D. Anderson. 2014. Performance evaluation of a water resources system under varying climatic conditions: Reliability, Resilience, Vulnerability and beyond. *Journal of Hydrology* 508 (2014) 53–65, https://www.earthsystemcog.org/site_media/projects/climatewater/1-s2.0-S0022169413007725-main.pdf. (Accessed on December 26, 2017).

[276] Hashimoto, T., Stedinger, J.R., Loucks, D.P., 1982. Reliability, Resiliency, and Vulnerability Criteria for Water Resources System Performance Evaluation, Water Resources Research 10 (1), 14–20. http://pure.iiasa.ac.at/14077/1/wrcr3066.pdf. (Accessed on December 26, 2017).

[277] The list is based on: European Commission. 2007. Water Scarcity and Droughts: In-depth Assessment. Second Interim Report. DG Environment, European Commission. http://ec.europa.eu/environment/water/quantity/pdf/comm_droughts/2nd_int_report.pdf. (Accessed on December 30, 2017).

- Outreach and educational programs (e.g., to teach homeowners how to adjust their irrigation system schedules);

- Mandatory restrictions (e.g., watering restrictions for residential irrigation);

- Labeling and certification (e.g., Florida Water Star^{SM} conservation certification program for new and existing homes and commercial developments);

- Cost-share programs (e.g., to install more efficient irrigation systems);

- Conservation pricing (e.g., higher per-gallon water price for high water users on PS); and

- Metering of water withdrawals that was not historically required (e.g., for large agricultural operations).

Other government programs have been developed to encourage water storage for the purposes of regulating stormwater flow and encouraging groundwater recharge, such as dispersed water storage on agricultural land.[278] Finally, fees for water withdrawals and payments for aquifer recharge have been options discussed in the past.[279]

The cost-effectiveness of water resource management programs varies.[280] Introduction of new water resource policies and programs can create both economic opportunities, as well as added costs and regulatory uncertainty among water users.

Constructing a Water Model for Florida

EDR will be assessing a variety of approaches to examining the economic consequences of water resource allocation and the competition for water supplies. An economic model is in the process of being developed to allow evaluation of future water demand statewide, while also accounting for Florida's hydro-geology, related constraints on water supply, and laws and policies regulating water use and protection of water resources. The key tasks for model development include:

(1) Assessing potential cost of droughts and water shortages for the state economy;

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[278] For example, see description of programs implemented in SFWMD in South Florida Water Management District (SFWMD). Undated. Water Storage Strategies. SFWMD, West Palm Beach, FL. https://www.sfwmd.gov/our-work/water-storage-strategies. (Accessed on December 30, 2017).

[279] While CUPs/WUPs require application fees, current water use policies in Florida are not set up to collect volumetric fees for water withdrawals. However, the idea of such fees was explored in the past. For example, a report completed in 1989 recommended, "collect a fee from all users based on water used. Credits shall be given for aquifer recharge, use of reclaimed water, reverse osmosis, desalination, or other alternative technologies." Source: p. 15, Governor's Water Resource Commission. 1989. Final Report. Submitted to Governor Bob Martinez, December 1, 1989. Available at http://ufdc.ufl.edu/WL00004996/00001/1. (Accessed on December 19, 2017).

[280] See more in Olmstead, S. 2010. The Economics of Managing Scarce Water Resources. *Review of Environmental Economics and Policy*, Volume 4, Issue 2, 1 July 2010, Pages 179–198.

(2) Projecting the funding needed for necessary water supply projects;

(3) Analyzing the total cost of the projects and programs needed to meet water demand relative to the funds currently available; and

(4) Examining the discrete economic effects of various water resource management and policy decisions.

A host of models have been discussed in the literature that will assist in some or all of these tasks:

1. Engineering models have been developed to examine the direct costs of supplying water to various economic sectors (including construction and operation costs). These models enable the identification of cost-minimizing combinations of water supplies given water demand projections.[281]

2. Economic models have been developed to examine societal well-being (referred to as "welfare") from water use. Such models allow analyzing net economic benefits from water use in various activities, or reductions in economic benefits due to lack of water (i.e. scarcity cost). The models typically employ optimization routines to find the water use pattern that maximizes welfare from water use. The two fundamental approaches to representing the economy are computable general equilibrium (CGE) and partial equilibrium models. In both approaches, economic sectors are described using mathematical terms. These terms capture information about technologies (i.e., the relationship between production inputs and outputs), consumer preferences (that determine demand for goods and services), and policies. Water use can be represented as a production input (e.g., for agriculture and industries) or as a consumer good (e.g., drinking water). Partial equilibrium models focus on one or a few economic sectors only, while CGE models are aimed at capturing the complex structure of an economy with interdependencies among economic sectors and activities. Overall, economic models allow predicting change in economic variables such as prices, output, and economic welfare that result from policy changes, including changes in water allocation.[282]

3. System dynamics models have been developed that explore the structural links and feedbacks (i.e., circular causality) between socio-economic and natural systems jointly evolving over time. Such models are guided by first-order differential equations explaining systems' behavior over time and the feedback links among model components.[283]

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[281] For example, see Harou J.J., Pulido-Velazquez, M., Rosenberg, D.E., Medellin-Azuara, J., Lund, J.R., and R.E. Howitt. Hydro-Economic Models: Concepts, design, applications, and future prospects. *Journal of Hydrology*, 375, 627-643.

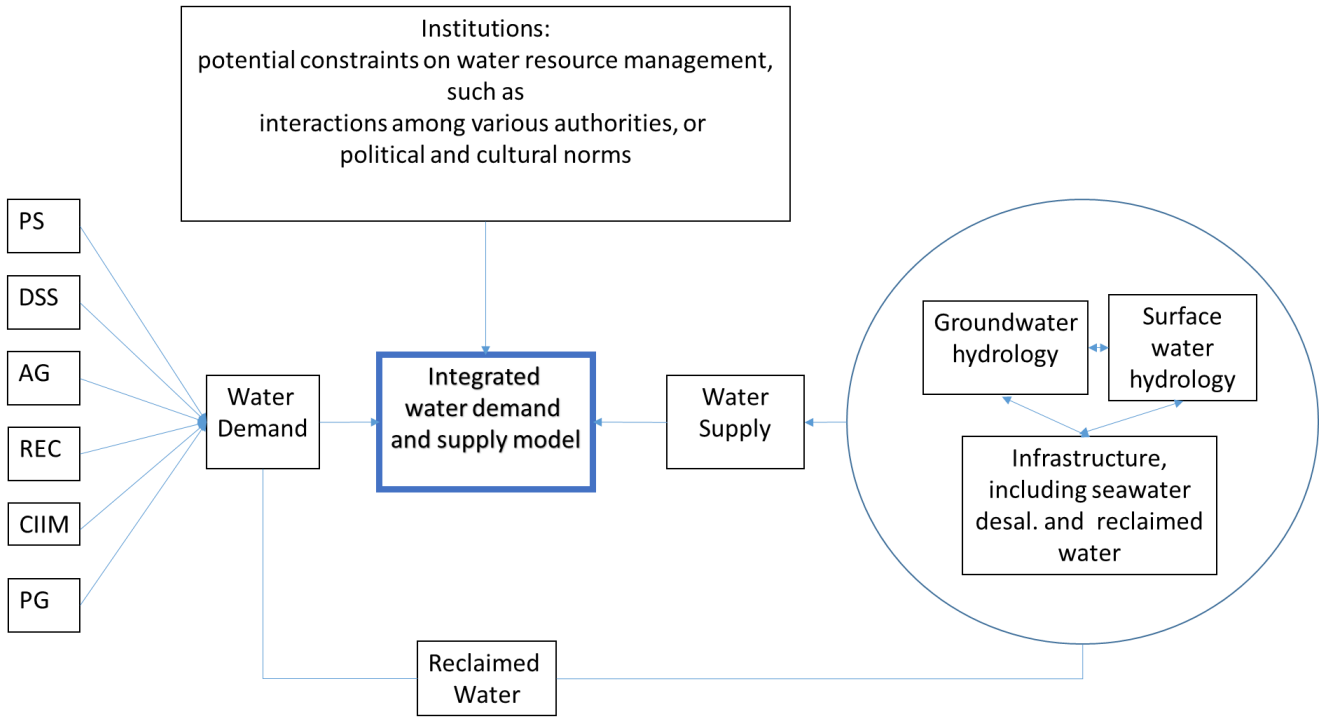
[282] See more in Dudu, H. and S. Chumi. 2008. Economics of Irrigation Water Management: A Literature Survey with Focus on Partial and General Equilibrium Models. Policy Research Working Paper, #4556. The World Bank. 63p.
For a general description of CGE models, see Purdue University. 2011. GTAP Models: Computable General Equilibrium Modeling and GTAP. Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University, West Lafayette, Indiana. https://www.gtap.agecon.purdue.edu/models/cge_gtap_n.asp. (Accessed on December 30, 2017).

[283] Examples of such models are the global socio-economic-environmental system dynamics model by Davies and Simonovic (2011), and water-energy model developed for Tampa Bay area (Zuang 2014). Sources: (1) Davies E.G.R.

4. Finally, other approaches exist such as game theoretic models and agent-based models.

Selecting a particular modeling approach will require (a) comparison of the advantages and limitations of different approaches; (b) examination of the practices used for regional and statewide water supply planning in other states and countries; and (c) discussions of the expected outputs from the model with policy makers and stakeholders. Figure 3.3.1 schematically represents the potential components of such a model.

Figure 3.3.1 Schematic Representation of Integrated Water Demand and Supply Model



Source: modified from Brooker et al. (2012)[284]

Modelling Water Demand

Water demand can be modeled using methods similar to the ones currently used by the WMDs; however, consistent methods will be employed statewide. Greater emphasis will likely be placed on the end-user rather than the supplier as is currently done by WMDs. In this regard, there would be a greater degree of granularity among those users (e.g., permanent residents versus tourists) to

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and S.P. Simonovic. 2011. Global Water Resources Modeling with an Integrated Model of the Social–Economic–Environmental System. *Advances in Water Resources*, 34: 684–700; (2) Zuang, Y. 2014. A System Dynamics Approach to Integrated Water and Energy Resources Management. Ph.D. Dissertation, Civil and Environmental Engineering, University of South Florida. http://scholarcommons.usf.edu/etd/5164/. (Accessed on December 30, 2017).

[284] Booker, J.F., Howitt, R.E., Michelsen, A.M. and R.A. Young. 2012. Economics and the modeling of water resources and policies. *Nat. Resour. Model.*, 25: 168-218.

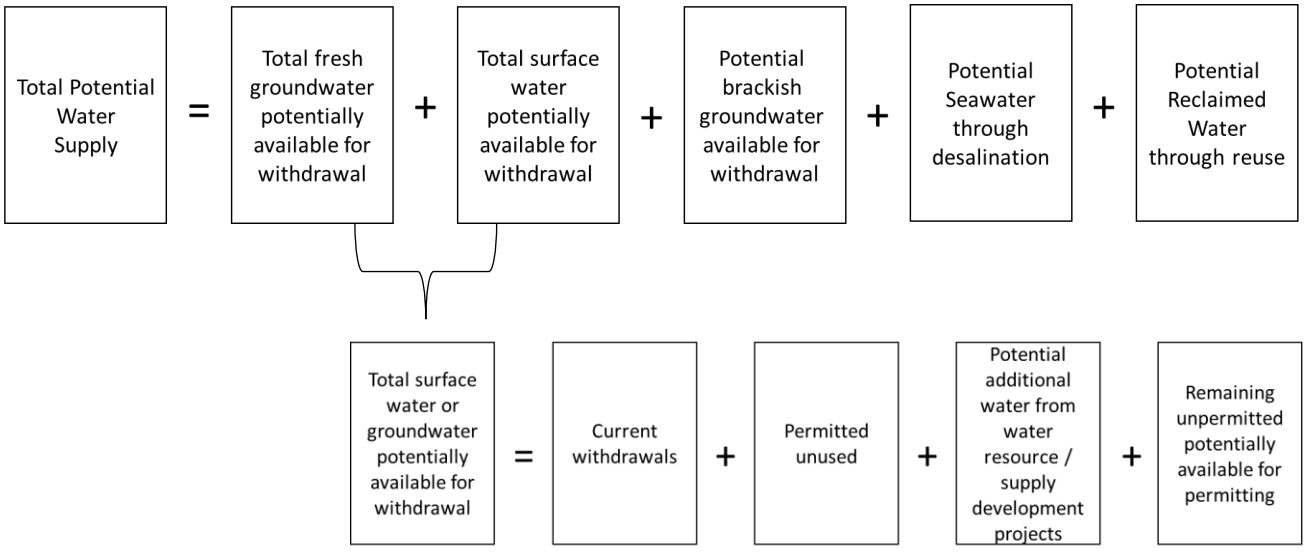
capture the different growth rates associated with each population segment and/or economic sector. Depending on data availability, water conservation potential may be assessed as a part of water demand analysis.

Modelling Water Supplies

EDR's water supply analysis will rely on the data provided by the WMDs and other appropriate sources. Emphasis will be on working cooperatively with the WMDs and DEP to achieve greater statewide consistency, such that the WMDs' water supply data can seamlessly transition into EDR's statewide model.

The processes in the natural system include the interactions of surface water, groundwater, and infrastructure. Total water supply is the sum of available groundwater and surface water, as well as water made available through infrastructure investments, such as seawater desalination and reclaimed water use. For a visualization, see Figure 3.3.2.

Figure 3.3.2 Conceptual Water Supply Equations*



* Total potentially available water is defined here by EDR as the estimated total volume of water that can be taken from a source while also leaving enough water to sustain water resources and related natural systems. EDR intends to work with WMDs on incorporating aquifer storage and recovery, as well as stormwater, into this diagram.

An example of water supply developed by SWFWMD that EDR can build upon for estimating total potential water supply can be seen in Table 3.3.2. Note that ideally, total potential water supply available from the Upper Floridan aquifer would be total water volume that can be permitted, as opposed to permitted but unused water.

[See table on following page]

Table 3.3.2 Potential Additional Water Availability in SWFWMD through 2035 (mgd)*

	Fresh Groundwater		**Surface Water**		**Desalination**		**Reclaimed Water**	**Total**
	Surficial and Intermediate	Upper Floridan Permitted Unused	Permitted Unused	Adjusted Unpermitted	Seawater	Brackish groundwater	Benefits	
SW-NR	NA	23.40	0.54	88.00	15.00	TBD	10.64	**137.58**
SW-TB	5.50	15.00	65.60	19.00	35.00	9.40	65.70	**215.20**
SW-HR	8.00	51.36	0.84	3.73	NA	TBD	28.56	**92.49**
SW-SR	20.40	2.86	29.90	151.90	40.00	14.09	25.68	**284.83**
Total	**33.90**	**92.62**	**96.88**	**262.63**	**90.00**	**23.49**	**130.58**	**730.10**

* The original tables in RWSPs also included water conservation.

Modelling Scenarios

Because no district can meet its projected future demand solely with existing source capacity (see Table 3.2.2), the assumptions regarding water conservation and alternative water supply projects are critical. In this regard, scenarios can be developed demonstrating the effects of alternative levels of infrastructure expenditure, water demand management strategies, and changes in policies and regulations. These scenarios are a form of stress-testing to assess the forecast sensitivity to adverse developments.

4. Assessment of Florida's Water Resources

Florida's waters are the state's most basic and valued resource, providing an array of benefits crucial to existence, quality of life, and the economy. These benefits include water storage, flood protection, water purification, habitat for plant and animal species, recreational and educational opportunities, and scenic beauty. Florida is ranked third in the country in inland water area with 40 percent of its total area covered by water and has large supplies of fresh water in its underground aquifers.[285] The state has 27,561 miles of streams and rivers, more than 7,700 lakes larger than 10 acres in size covering a surface area of 1.6 million acres, 11.3 million acres of freshwater and tidal wetlands, and a coastline of 2,118 linear miles.[286] Florida also has more than 1,000 known springs to date.[287] This includes 33 first magnitude springs (a flow greater than 100 cubic feet per second or approximately 64.6 million gallons of water per day), the most of any other state or country.[288] Ninety percent of Florida's population relies on several sources of high-quality groundwater for their drinking water[289]—a demand that is in addition to the needs of the natural environment.

The management, protection, and restoration of Florida's surface water and groundwater require a coordinated effort among various state agencies, water management districts, public and private utilities, local governments, and other stakeholders. Because water is a public resource benefiting the entire state, water resource management is conducted on a state and regional basis.[290] The Florida Department of Environmental Protection (DEP) is vested with the power and responsibility to conserve, protect, manage, and control waters of the state with the flexibility to delegate appropriate powers to the various water management districts.[291]

This section of the report provides an assessment of the various programs and initiatives associated with water supply and water quality. The assessment includes historic and estimated future expenditures on water programs and projects, forecasts of revenues used for these purposes, and an identification of gaps between projected revenues and estimated expenditures.

4.1 Historical, Current, and Projected Future Water Resource Expenditures

Funding for water resources in Florida is provided by a variety of institutions, including the federal and state governments, regional governments, local governments, and private non-governmental entities. EDR reviewed and analyzed a variety of available data sources for historical and current information on water-related appropriations and expenditures.[292]

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[285] Integrated Report, *supra* note 12.
[286] *Id* at 39.
[287] *Id*.
[288] Marella, R.L. *Water Withdrawals in Florida, 2012,* U.S. Geological Survey Open File Report 2015-1156, available at: https://pubs.usgs.gov/of/2015/1156/ofr20151156_marella-water-use-2012.pdf. (Accessed on December 10, 2017).
[289] Integrated Report, *supra* note 12.
[290] § 373.016(4)(a), Fla. Stat.
[291] § 373.016(5), Fla. Stat.
[292] Sources include the annual General Appropriations Acts, the Florida Accounting Information Resource (FLAIR) System, the Legislative Appropriations/Planning and Budgeting System (LAS/PBS), periodic agency reports, Water Management District annual financial reports, local government annual financial reports, and Public Service Commission private utility data. It should be noted that the structure of federal, state, and local funding often results

Expenditures of State and Federal Funds

Each year, the Legislature appropriates General Revenue, state trust funds, and federal trust funds to support programs and initiatives relating to water resources. For this section of the report, EDR completed an analysis of historical legislative appropriations and the associated expenditures for various water resources programs and initiatives related to water supply and water quality.

Section 373.036, Florida Statutes, requires DEP to develop the Florida Water Plan in cooperation with the WMDs, regional water supply authorities, and other appropriate entities. The Florida Water Plan includes, but is not limited to, the state's water quality standards, the district water management plans, and the water resource implementation rule in chapter 62-40 of the Florida Administrative Code. The Florida Water Plan is also required to include the programs and activities of DEP that relate to water supply, water quality, flood protection and floodplain management, and natural systems. DEP identified the following programs and activities: [293]

- Water Supply: Source and Drinking Water Program; State Revolving Fund; and Water Reuse Program.

- Water Quality: Watershed Management Program; Stormwater Programs; Wastewater Program; Ground Water Program; and Water Quality Standards Program

- Natural Systems: Beaches, Everglades Restoration, Submerged Lands and Environmental Resources Coordination Program, Florida Coastal Office, and Mining, Mitigation, and Delineation.

- Flood Protection and Floodplain Management: recognizes that the water management districts have the primary responsibility over these activities.

Ideally, to identify the state's water supply and water quality-related expenditures, EDR would align the appropriations and expenditures to the programmatic structure identified in the Florida Water Plan, and include any other projects and initiatives identified by EDR in the state budget as relating to water resources. Given the current budget structure and the complexity of multi-year historical comparisons, EDR relied on a broader framework for identifying relevant water resource-related expenditures.

Executive branch agencies are required to be organized along functional or program lines.[294] Since DEP is the primary agency for implementing environmental protection programs, including water resource-related programs on the state-level, EDR primarily focused on its organizational structure and only included other state agencies where appropriate. For DEP, the agency currently divides itself into three primary areas: Land and Recreation, Regulatory, and Ecosystem Restoration.

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in the duplicative reporting of the same dollars. Attempting to sum the reported expenditures across the various sectors may lead to erroneous conclusions.

[293] DEP, Florida Water Plan, https://floridadep.gov/water-policy/water-policy/content/florida-water-plan. (Accessed on January 9, 2018).

[294] § 20.02(5), Fla. Stat.

Within these primary areas, there are offices and divisions that implement various programs and activities. Based on the current structure of DEP, EDR identified the water-related offices and divisions, and the water-related programs, projects, or initiatives in DEP's Regulatory and Ecosystem Restoration areas that received an appropriation in the most recent ten years and assigned them to the following components where appropriate: **Water Supply** or **Water Quality and Other Water Resource-Related Programs**. Additionally, in order to ensure that the staff implementing such programs or initiatives were taken into account in EDR's analysis, the related personnel appropriations and expenditures were identified and grouped within these two components. For offices or divisions that conducted programs and initiatives that included, but were not exclusively, water resource-related, EDR included those areas and noted that not all of the expenditures were directly related to water resources.

Water Supply Expenditures

For the purpose of this report and the development of EDR's integrated water supply and demand model, EDR defined water supply projects or initiatives as activities that promote the availability of sufficient water for all existing and future reasonable-beneficial uses and the natural systems. This would include those activities associated with increasing available water supplies and related water infrastructure, as well as water supply planning activities.[295] For the most part, expenditures for water supply occur on the regional and local level with some programs and activities occurring on the state level.

Within the water supply expenditures component, the state-appropriated funding is primarily associated with the Drinking Water State Revolving Fund (DWSRF) administered by DEP's Division of Water Restoration Assistance pursuant to section 403.8532, Florida Statutes, and the federal Safe Drinking Water Act.[296] With funding provided by federal and state sources, the DWSRF provides low interest loans to eligible public water systems for the construction of drinking water systems. In order to receive the federal capitalization grant for the state revolving fund, the state must match at least 20 percent of the total grant amount made available to the state.[297]

For each year that funding is available for new projects, DEP receives funding requests from public water system owners and prioritizes eligible projects according to the extent the project is intended to remove, mitigate, or prevent adverse effects on public health and drinking water quality.[298] The total money loaned to any single public water system cannot be more than 25 percent of the total funds available for projects for that year, and the minimum amount of each loan is $75,000.[299] Furthermore, 15 percent of funds allocated each year is reserved for small community water systems and up to 15 percent is reserved for qualifying financially disadvantaged communities.[300]

[295] Activities associated with ensuring the quality and safety of Florida's drinking water, such as the regulation of public water systems by DEP under the Florida Safe Drinking Water Act under part IV of chapter 403, Florida Statutes, or by the Florida Department of Health under section 381.0062, Florida Statutes, are included (when identifiable) within EDR's water quality and other water resource-related program component.
[296] 42 U.S.C. §300f et. seq.
[297] 42 U.S.C. § 300j-12(e).
[298] Fla. Admin. Code R. 62-552.300.
[299] § 403.8532(8), Fla. Stat.
[300] § 403.8532, Fla. Stat.; *see also* Fla. Admin. Code R. 62-522-500.

In addition to the DWSRF, beginning in Fiscal Year 2017-18, the Water Storage Facility Revolving Loan program was created with an appropriation of $30.0 million.[301] Since Fiscal Year 2007-08, the Legislature has appropriated an average of $89.8 million for the revolving funds, mostly from federal funding sources (91.5 percent). Table 4.1.1 shows the annual cash expenditures since Fiscal Year 2007-08.[302] Because the table only shows expenditures through June 30, 2017, expenditures for the Water Storage Facility Revolving Loan program will first be included in the 2019 edition of this report. Due to the inconsistent history of these expenditures, the forecast relies on a 3-year moving average.

Table 4.1.1 Water Supply Annual Expenditures and Forecast (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	**FY07-08**	**FY08-09**	**FY09-10**	**FY10-11**	**FY11-12**
Revolving Fund - Drinking Water	$58.32	$50.99	$72.52	$76.45	$72.23
CASH EXPENDITURES BY FISCAL YEAR*	**FY12-13**	**FY13-14**	**FY14-15**	**FY15-16**	**FY16-17**
Revolving Fund - Drinking Water	$34.75	$82.49	$52.95	$27.41	$57.49
Forecast	**FY17-18**	**FY18-19**	**FY19-20**	**FY20-21**	**FY21-22**
State Water Supply Expenditures	$45.95	$43.62	$49.02	$46.20	$46.28
Forecast	**FY22-23**	**FY23-24**	**FY24-25**	**FY25-26**	**FY26-27**
State Water Supply Expenditures	$47.16	$46.55	$46.66	$46.79	$46.67

*Through June 30, 2017.

Water Quality and Other Water Resource-Related Program Expenditures

Article II, Section 7 of the Florida Constitution requires that adequate provision in law be made for the abatement of water pollution. Recognizing the importance of the state's water resources, the Florida Legislature passed the Florida Air and Water Pollution Control Act[303] in 1967 and the Florida Water Resource Act[304] in 1972. The Florida Safe Drinking Water Act[305] was passed in 1977 to ensure "safe drinking water at all times throughout the state, with due regard for economic factors and efficiency in government."[306] In addition, chapter 376, Florida Statutes, addresses surface and groundwater pollution through various programs including state-funded cleanup for petroleum and dry-cleaning solvents, waste cleanup requirements for potentially responsible

[301] See the Special Topic subsection 5.3 entitled "The 2017 Legislative Session: Senate Bill 10" for additional information about this program.
[302] The personnel expenditures associated with the Drinking Water State Revolving Fund are included within the total personnel expenditures for Water Restoration Assistance, Table 4.1.4. According to DEP, the cost to administer the Drinking Water State Revolving Fund in Fiscal Year 2015-16 was $703,314. *See* DEP, Drinking Water State Revolving Fund Annual Report – State Fiscal Year 2017, available at: https://floridadep.gov/wra/srf/documents/drinking-water-state-revolving-fund-annual-report-sfy-2017. (Accessed December 2017).
[303] Ch. 67-436, Laws of Fla.; § 403.011 et seq.
[304] Ch. 72-299, Laws of Fla.; Ch. 373, Fla. Stat.
[305] Ch. 77-337, Laws of Fla.; § 403.850, Fla. Stat. et seq.
[306] Ch. 77-337, § 2, Laws of Fla.; § 403.851(3), Fla. Stat.

parties, and restoration of certain potable water systems or private wells impacted by contamination.

To identify the water quality and other water resource-related program expenditures, EDR reviewed the projects and initiatives implemented by DEP and other appropriate state agencies that protect or restore the quality of Florida's groundwater and surface waters, as well as the activities associated with the regulation of drinking water in Florida.

For the water quality and other water resource-related program component, EDR grouped the identified programs, projects, and initiatives into four categories generally following the internal structure of DEP: Environmental Assessment and Restoration; Water Restoration Assistance; Other Programs and Initiatives; and Regulatory/Clean-up Programs.

Environmental Assessment and Restoration

DEP's Division of Environmental Assessment and Restoration (DEAR) implements critical responsibilities under state and federal law for the purpose of protecting and restoring water quality in Florida. More specifically, DEAR is responsible for developing, adopting, and reviewing Florida's surface water quality standards; monitoring and reporting on water quality; assessing water bodies to identify pollution problems; developing water quality restoration targets referred to as total maximum daily loads (TMDLs); developing and implementing water quality restoration plans such as basin management action plans (BMAPs), and providing laboratory services to DEP and other agencies.[307]

Appropriations and expenditures related to DEAR, including personnel and operational costs, monitoring programs, laboratory services and support, and the TMDL program are included in this category. Since Fiscal Year 2007-08, the Legislature has appropriated approximately $42.0 million annually, on average, for the identified programs. The majority of the funding has been from state sources (69 percent) with the remaining 31 percent supported with federal sources. Most of the federal funding is associated with the TMDL program. Table 4.1.2 shows the annual cash expenditures since Fiscal Year 2007-08.

[See table on following page]

[307] DEP, Division of Environmental Assessment and Restoration, https://floridadep.gov/dear. (Accessed on December 20, 2017).

Table 4.1.2 DEP's Division of Environmental Assessment and Restoration Expenditures (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Personnel	$5.42	$12.91	$12.67	$11.31	$10.67
Operations	$2.10	$2.40	$2.25	$2.33	$2.22
Lab Support	$0.53	$0.68	$1.51	$0.70	$0.50
Watershed Monitoring	$2.04	$2.15	$2.02	$1.94	$1.93
TMDL Program	$35.78	$28.45	$18.08	$19.89	$17.74
Other Projects	$0.31	$1.97	$2.73	$2.66	$2.03
TOTAL	**$46.19**	**$48.57**	**$39.26**	**$38.83**	**$35.09**

CASH EXPENDITURES BY FISCAL YEAR*	FY12-13	FY13-14	FY14-15	FY15-16	FY16-17
Personnel	$10.23	$11.30	$13.02	$12.81	$12.08
Operations	$2.14	$2.56	$2.59	$2.63	$3.56
Lab Support	$0.62	$0.62	$0.32	$0.19	$0.51
Watershed Monitoring	$2.00	$3.59	$3.09	$2.30	$2.33
TMDL Program	$19.77	$15.66[308]	$14.41	$28.18	$22.22
Other Projects	$1.85	$1.89	$1.57	$2.18	$0.95
TOTAL	**$36.62**	**$35.61**	**$35.01**	**$48.29**	**$41.65**

*Through June 30, 2017.

In 1999, the Florida Legislature passed the Florida Watershed Restoration Act,[309] which established the state's program for establishing and implementing the TMDL program required by section 303(d) of the federal Clean Water Act.[310] Under section 303(d) of the Clean Water Act, states are required to develop lists of water bodies that do not fully support beneficial uses, such as drinking water, fisheries, recreation, and agriculture, and to calculate pollutant reduction levels necessary to meet state water quality standards. Florida's TMDL program is administered by DEAR in coordination with DACS, the water management districts, local governments, local soil and water conservation districts, environmental organizations, regulated entities, and other appropriate agencies and affected pollution sources.[311]

DEP implements the TMDL program through a watershed management approach based on natural boundaries rather than political boundaries. Under this approach, Florida's surface water basins are divided into five basin groups that each rotate through a five-year cycle of watershed management involving: (1) monitoring, (2) assessment, (3) TMDL development, (4) basin management action plan (BMAP) development, and (5) implementation of restoration activities.[312] The watershed management approach allows resources to be focused on specific basins throughout

[308] The General Appropriations Act of 2013 authorized $1.7 million of TMDL funding for springs restoration projects and activities. *See* ch. 2013-40, Laws of Fla.
[309] Ch. 99-233, §§ 1-3, Laws of Fla.
[310] 33 U.S.C. § 1313(d).
[311] § 403.061(1), Fla. Stat.
[312] Integrated Report, *supra* note 12.

the state during each phase and ideally ensures that a given basin will be assessed at least every five years.

The expenditures identified for the TMDL program are primarily related to projects and activities adopted in BMAPs. BMAPs are Florida's primary mechanism for implementing TMDLs.[313] A BMAP identifies the appropriate management strategies available through existing water quality protection programs, the implementation schedules, feasible funding strategies, and plans for evaluating the effectiveness of the management strategies. BMAPs also equitably allocate pollutant reductions to individual basins, as a whole to all basins, or to each identified point source or category of nonpoint sources. When a BMAP is adopted, the management strategies and schedules become the compliance plan for the responsible parties.[314]

In 2016, the Florida Legislature passed the Florida Springs and Aquifer Protection Act (Springs and Aquifer Protection Act), which established certain requirements with regard to water quality and water quantity of Outstanding Florida Springs (OFSs). The Springs and Aquifer Protection Act recognizes DEP as having primary responsibility over water quality in springs and directs DEP to delineate priority focus areas for each OFS or group of springs that contains one or more OFSs and is defined as impaired, and to incorporate the priority focus areas in the appropriate BMAP.[315] DEP is also required to assess all OFSs for impairment based on numeric nutrient standards; initiate development of BMAPs for existing TMDLs for OFSs; develop remediation plans for onsite sewage treatment and disposal systems (OSTDS) if such sources are contributing at least 20 percent of nonpoint source nitrogen pollution (or if otherwise determined to be necessary by DEP to achieve the TMDL); and revise existing BMAPs addressing OFSs to meet the additional requirements.

In addition to the funds appropriated to DEP for water quality initiatives associated with assessment and restoration, the Legislature also appropriates funds to support programs administered by the Department of Agriculture and Consumer Services (DACS). Since Fiscal Year 2007-08, the annual appropriations for these programs have averaged approximately $25.2 million per year, primarily from state sources. Table 4.1.3 shows the annual cash expenditures since Fiscal Year 2007-08.

[See table on following page]

[313] Integrated Report, *supra* note 12.
[314] § 403.067(7), Fla. Stat.; *see also* Integrated Report, *supra* note 12.
[315] § 373.803, Fla. Stat.

Table 4.1.3 DACS Water-Related Expenditures (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Personnel	$2.72	$2.65	$2.64	$2.61	$2.26
Operations	$0.35	$0.30	$0.27	$0.27	$0.35
Best Management Practices	$18.18	$8.51	$6.55	$10.98	$10.74
Hybrid Wetlands	$0.00	$0.00	$0.00	$0.00	$0.00
Other Projects	$1.04	$1.00	$0.54	$0.42	$0.33
TOTAL	**$22.29**	**$12.46**	**$10.00**	**$14.28**	**$13.68**
CASH EXPENDITURES BY FISCAL YEAR*	**FY12-13**	**FY13-14**	**FY14-15**	**FY15-16**	**FY16-17**
Personnel	$2.32	$2.43	$2.58	$2.77	$3.45
Operations	$0.38	$0.39	$0.50	$0.56	$0.75
Best Management Practices	$14.58	$14.94	$21.29	$20.24	$34.53
Hybrid Wetlands	$0.00	$0.03	$4.61	$4.30	$11.55
Other Projects	$0.86	$0.64	$0.42	$0.54	$0.69
TOTAL	**$18.15**	**$18.44**	**$29.41**	**$28.40**	**$50.96**

*Through June 30, 2017.

Much of this funding is to support projects and initiatives related to the implementation of agricultural best management practices (BMPs). DACS has primary authority to develop and adopt by rule BMPs that address agricultural nonpoint sources. BMPs are designed to improve water quality while maintaining agricultural production through practices and measures that reduce the amount of fertilizers, pesticides, animal waste, and other pollutants that enter the state's waters. Typical practices include nutrient management, irrigation management, and water resource protection.[316] Implementing BMPs provide a presumption of compliance with water quality standards.[317] When DEP includes agricultural pollutant sources in a BMAP, producers must demonstrate compliance by implementing the appropriate BMPs or conducting water quality monitoring prescribed by DEP or the WMD to demonstrate compliance with water quality standards.[318] DEP, WMDs, and DACS are required to assist parties responsible for agricultural pollutant sources with implementation of BMPs. To that end, DACS implements cost-share programs to provide financial assistance for BMP implementation. According to DACS, as of March 31, 2017, a total of 11,316,311 acres were enrolled in agricultural BMPs.[319]

Water Restoration Assistance

In 2016, the Florida Legislature added the Division of Water Restoration Assistance (DWRA) within DEP. DWRA is responsible for providing financial assistance primarily to eligible local

[316] DACS, *What are Agricultural Best Management Practices?*, available at: http://www.freshfromflorida.com/content/download/30796/761833/Brochure_-What_are_Agricultural_Best_Management_Practices.pdf. (Accessed December 2017).
[317] § 403.067(7)(c), Fla. Stat.
[318] § 403.067(7)(b), Fla. Stat.
[319] DACS, *Statewide Enrollment Map*, available at: http://www.freshfromflorida.com/content/download/25962/500103/OAWP_Statewide_Enrollment_Map.pdf. (Accessed on December 20, 2017).

governments and utilities to fund water quality and water quantity projects throughout the state. This includes the federal and state-funded State Revolving Fund, nonpoint source grants, beach management funding, non-mandatory land reclamation program (or mine restoration funding), and the Deepwater Horizon program. DWRA also manages legislatively appropriated water projects and springs restoration funding.[320]

Within these financial assistance areas, EDR identified funding associated with the Clean Water State Revolving Fund, Clean Water Act 319 grants, and water quality restoration grants (also known as TMDL grants) as primarily relating to water quality protection and restoration. The other programs managed by DWRA overlap, or may include for specific projects, components of water quality protection or restoration such as Deepwater Horizon projects, springs restoration projects, and to a certain extent, the mine restoration projects.

Appropriations and expenditures related to DEP's DWRA,[321] including personnel and the various loan and grant programs, are included in this category. Since Fiscal Year 2007-08, the Legislature has provided annual appropriations for the identified programs totaling approximately $295.4 million per year, on average. Of the total appropriations, approximately 58 percent has been funded from federal sources and 42 percent from state sources. Most of the federal funding is associated with the State Revolving Fund, including grants for Wastewater Treatment Facilities Construction and grants for Small Community Wastewater Treatment. On average, approximately 84 percent of the identified expenditures are related to water quality protection and restoration projects through the State Revolving Fund, nonpoint source grants, and authorized water projects and springs restoration projects. Table 4.1.4 shows the annual cash expenditures since Fiscal Year 2007-08.

[See table on following page]

[320] DEP, *Division of Water Restoration Assistance*, https://floridadep.gov/wra. (Accessed December 2017).
[321] Although DWRA is a newer organizational unit within DEP, many of the funded programs and projects have been ongoing for many years. EDR utilized state accounts to create a historical series for this category.

Table 4.1.4 Water Restoration Assistance Expenditures (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Personnel	$4.89	$4.86	$4.58	$4.47	$4.19
Operations	$0.91	$0.79	$0.38	$0.61	$0.66
Revolving Fund - Wastewater Facilities	$169.92	$76.86	$121.18	$107.04	$154.88
Revolving Fund - Wastewater Small Community	$29.24	$13.93	$21.97	$9.67	$12.59
Water Projects	$108.37	$120.94	$41.31	$28.86	$16.58
Nonpoint Source Funds	$47.44	$33.99	$25.84	$19.60	$4.22
Springs Restoration	$0.00	$0.00	$0.00	$0.00	$0.00
Beach Projects/Restoration[322]	$37.25	$30.01	$16.87	$12.46	$15.97
Non-Mandatory Land Reclamation	$7.16	$3.05	$2.48	$2.29	$4.92
Deepwater Horizon Projects[323]	$0.00	$0.00	$0.00	$0.00	$0.58
Other Projects	$0.00	$15.00	$0.00	$0.00	$0.50
TOTAL	**$405.18**	**$299.44**	**$234.61**	**$185.00**	**$215.09**

CASH EXPENDITURES BY FISCAL YEAR*	FY12-13	FY13-14	FY14-15	FY15-16	FY16-17
Personnel	$3.84	$3.75	$3.38	$3.28	$6.58
Operations	$0.64	$0.38	$0.48	$0.42	$0.50
Revolving Fund - Wastewater Facilities	$101.75	$80.60	$162.99	$119.05	$161.73
Revolving Fund - Wastewater Small Community	$22.03	$37.33	$21.60	$16.49	$7.28
Water Projects	$16.44	$9.26	$20.07	$43.43	$49.96
Nonpoint Source Funds	$3.66	$2.49	$2.51	$2.84	$10.96
Springs Restoration	$0.00	$10.00	$0.06	$5.19	$9.36
Beach Projects/Restoration	$15.52	$15.69	$24.92	$37.42	$37.24
Non-Mandatory Land Reclamation	$1.44	$0.86	$1.53	$2.18	$1.02
Deepwater Horizon Projects	$1.52	$3.12	$32.70	$12.82	$18.93
Other Projects	$0.00	$0.12	$0.01	$0.16	$0.37
TOTAL	**$166.83**	**$163.60**	**$270.24**	**$243.29**	**$303.93**

*Through June 30, 2017.

On average, approximately 62 percent of the identified expenditures were spent on providing financial assistance to construct stormwater and wastewater infrastructure and certain projects addressing green infrastructure, as well as water or energy efficiency improvements[324] through the

[322] Beach restoration and inlet management projects are not considered water quality restoration or improvement projects. However, because of the significance of funding assistance for beaches in Florida, EDR has included expenditures on beach restoration and inlet management projects within this section for reference among the other water funding assistance programs. In future editions, EDR may exclude expenditures on beach and inlet management projects.

[323] The amounts shown are those expenditures identified as being related to water resources and are not inclusive of all expenditures funded through Deepwater Horizon-related settlements. Additional detail on Deepwater Horizon is provided in subsection 5.2 of the report.

[324] Pub. L. 112-74; *see also* Fla. Admin. Code R. 62-300.200(20) (incorporating by rule EPA's guidance on green project reserve eligibility for the Clean Water State Revolving Fund program).

federal and state-funded Clean Water State Revolving Fund.[325] Additionally, through the Small Community Wastewater Construction Grant program, DEP awards grants to assist disadvantaged small communities with their needs for adequate sewer facilities,[326] including planning, design, construction, upgrade, or replacement of wastewater collection, transmission treatment, disposal, and reuse facilities.[327] These grants are only available for projects that have received a state revolving fund loan,[328] which reduces the principal amount owed on the loan. The highest priorities are given to those projects that eliminate a public health hazard. Projects that are included in an adopted BMAP or Reasonable Assurance Plan, protect surface and groundwater quality by reducing sources of pollution, promote reuse, or address compliance problems of the facility are also given priority.[329]

Funding for projects that address water pollution from nonpoint sources, such as stormwater runoff from urban and agricultural areas, is provided through the federal Clean Water Act Section 319(h) grants[330] and the state's TMDL Water Quality Restoration grants. The types of projects eligible for Section 319(h) grants include demonstration and evaluation of BMPs, groundwater protection from nonpoint sources, public education programs on nonpoint source management, and nonpoint pollution reduction in priority watersheds.[331] Eligible projects require a minimum 40 percent nonfederal match.[332] Projects eligible for the state's TMDL Water Quality Restoration Grants are evaluated and ranked according to such factors as the impairment status of the receiving water, estimated pollutant load reduction, percentage of local matching funds, cost effectiveness, inclusion of education component, and whether the local government has a dedicated funding source for stormwater management (such as a stormwater utility fee under section 403.0893, Florida Statutes).[333]

A more recent funding initiative is the annual statutory distribution from the Land Acquisition Trust Fund for spring restoration, protection, and management projects. Of the funds remaining after payment of debt service for Florida Forever bonds and Everglades restoration bonds, a minimum of 7.6 percent or $50 million is to be appropriated for springs projects.[334] In the General Appropriations Acts of 2015, 2016, and 2017, the Legislature appropriated funds for land acquisition to protect springs and for projects that protect water quality and water quantity that flow from springs. In DEP's Springs Funding Guidance Document, eligible projects are categorized in the following high-level project types: agricultural BMPs, water conservation, hydrologic restoration, land acquisition, reuse, wastewater collection and treatment, stormwater, and other water quality or quantity projects. In selecting projects, DEP considers certain factors including nutrient reductions or measurable improvements of water quality, water savings, cost

[325] 33 U.S.C. § 1383; § 403.1835, Fla. Stat.
[326] § 403.1838(2), Fla. Stat.
[327] § 403.1838(2)-(3), Fla. Stat.
[328] Fla. Admin. Code R. 62-505.300.
[329] § 403.1835(7), Fla. Stat.; Fla. Admin. Code R. 62-503.300(1)(e).
[330] 33 U.S.C. § 1329(h).
[331] DEP, *Federal Clean Water Act Grants*, https://floridadep.gov/wra/319-tmdl-fund/content/federal-clean-water-act-grants. (Accessed on Dec. 22, 2017).
[332] 33 U.S.C. § 1329(h).
[333] DEP, *State Water Quality Restoration Grants*, available at: https://floridadep.gov/wra/319-tmdl-fund/content/state-water-quality-restoration-grants. (Accessed December 2017).
[334] § 375.041(3)(b)2., Fla. Stat.

sharing available, readiness to proceed in a timely manner, proximity to primary focus areas or springs, and cost effectiveness. Special consideration is given to projects contained in restoration, prevention or recovery plans (such as adopted BMAPs), reasonable assurance plans, and minimum flows and minimum water levels recovery or prevention strategies for Outstanding Florida Springs. Through Fiscal Year 2016-17, approximately $24.6 million of the funds appropriated for springs restoration has been spent. Additionally, according to DEP, approximately $102 million of the appropriated funds for springs restoration in Fiscal Years 2014-15 through 2017-18 is encumbered under grant agreements for springs projects.

Although springs restoration projects can address multiple water resource benefits, a review of DEP's springs project lists revealed that the majority of projects were intended to improve water quality through the reduction of nutrient loading.[335] Because EDR could not identify specific expenditures by project, the springs restoration funding is reported entirely within the water quality and other water resource-related program component.

The final major category of funding assistance is provided through specific legislative appropriations for water projects identified each year in the General Appropriations Act. These water projects vary from year to year, although some projects have received funding in multiple years. The projects include water quality improvement, stormwater and wastewater management, drinking water infrastructure projects, and water restoration projects. Expenditures on water projects have ranged from as high as $120.9 million in Fiscal Year 2008-09 to as little as $9.3 million in Fiscal Year 2013-14. In the most recent fiscal years, 2015-16 and 2016-17, spending on water projects has averaged approximately $45 million per year with the majority of the projects related to stormwater and wastewater infrastructure projects and septic-to-sewer projects. Additionally, water supply projects such as drinking water infrastructure projects and alternative water supply projects also received funding under this category. Although expenditures for drinking water infrastructure projects and alternative water supply projects would relate to water supply, they are included in this section because EDR was unable to identify expenditures related to specific projects in order to allocate accurately the expenditures related to water supply and water quality.

Other Programs and Initiatives

In addition to Environmental Assessment and Restoration and Water Restoration Assistance, the Legislature has appropriated approximately $135.8 million per year, on average, over the past ten years, for a variety of other water quality restoration projects and initiatives. Of these funds, approximately 98 percent has come from state sources and two percent from federal sources. The largest initiative included in this category is Everglades restoration.[336] In addition, appropriations have been made for lake restoration (including Lake Apopka), muck dredging and removal, and the Florida Keys Area of Critical State Concern.

A small portion in this category is associated with DEP's Office of Water Policy, which is primarily responsible for addressing statewide water management issues in coordination with the

[335] For DEP's springs restoration project lists, visit: https://floridadep.gov/springs/restoration-funding. (Accessed December 2017).

[336] A more detailed discussion of Everglades restoration is included in subsection 5.1 of the report.

WMDs and other agencies.[337] Their responsibilities include developing statewide water policies, providing guidance for DEP and WMD water-related programs and activities, reviewing WMD programs, plans, and activities for consistency with applicable laws, assisting the Governor's Office with reviewing WMD budgets, reviewing WMD MFL priority lists, schedules and proposed rules, and providing guidance for WMD regional water supply plans.

The annual cash expenditures since Fiscal Year 2007-08 are shown in Table 4.1.5.

Table 4.1.5 Other Programs and Initiatives Expenditures (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Everglades Restoration	$119.21	$55.84	$38.35	$69.27	$27.54
Office of Water Policy	$0.00	$0.00	$0.00	$0.00	$0.00
Other Projects	$8.81	$6.67	$5.21	$6.47	$6.91
TOTAL	**$128.02**	**$62.51**	**$43.56**	**$75.74**	**$34.45**
CASH EXPENDITURES BY FISCAL YEAR*	**FY12-13**	**FY13-14**	**FY14-15**	**FY15-16**	**FY16-17**
Everglades Restoration	$26.60	$93.92	$54.56	$115.77	$140.37
Office of Water Policy	$1.79	$2.27	$2.29	$2.36	$2.32
Other Projects	$8.06	$7.61	$15.46	$14.88	$17.76
TOTAL	**$36.45**	**$103.81**	**$72.31**	**$133.01**	**$160.44**

*Through June 30, 2017.

Regulatory and Clean-Up Programs

EDR included DEP's regulatory section in its analysis of expenditures for water quality and other water resource-related programs because these areas either implement or enforce laws related to water quality, provide research that supports water-related programs, or implement programs that address pollution of surface and groundwater.

Since Fiscal Year 2007-08, the Legislature has appropriated approximately $264.9 million annually, on average, for regulatory and clean-up programs administered by DEP. The majority of this funding, approximately 92.4 percent, has been funded from state sources and is associated with clean-up programs for hazardous waste sites; petroleum tanks; underground tanks; and water wells. The personnel included in this grouping include district offices, water resource management, waste management, and the Florida Geological Survey. Because the district offices are responsible for implementing programs relating to air and waste regulation, as well as water resource protection and restoration, EDR was unable to identify the personnel who exclusively work on water within the available data; therefore, all personnel costs have been included. Table 4.1.6 shows the annual cash expenditures since Fiscal Year 2007-08.

[337] DEP, *Office of Water Policy*, https://floridadep.gov/water-policy. (Accessed on Jan 11, 2018).

Table 4.1.6 Regulatory and Clean-up Program Expenditures (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Personnel	$66.19	$66.33	$66.67	$65.60	$61.48
Operations	$9.21	$8.80	$7.25	$7.37	$8.04
Petroleum Restoration	$173.66	$162.13	$28.35	$109.54	$120.29
Waste Clean-Up	$73.59	$60.86	$147.16	$37.79	$41.45
Other Projects	$33.06	$34.14	$41.10	$37.93	$42.41
TOTAL	**$355.71**	**$332.26**	**$290.53**	**$258.23**	**$273.67**
CASH EXPENDITURES BY FISCAL YEAR*	**FY12-13**	**FY13-14**	**FY14-15**	**FY15-16**	**FY16-17**
Personnel	$58.87	$59.07	$58.15	$56.24	$52.74
Operations	$6.88	$7.13	$7.65	$8.42	$8.63
Petroleum Restoration	$132.11	$81.85	$59.73	$80.97	$119.44
Waste Clean-Up	$36.68	$26.38	$28.68	$37.40	$36.11
Other Projects	$34.13	$29.88	$30.57	$31.37	$33.00
TOTAL	**$268.67**	**$204.30**	**$184.79**	**$214.40**	**$249.92**

*Through June 30, 2017.

As shown in Table 4.1.6, petroleum cleanup activities account for the majority of expenditures in this category ranging from approximately 32 percent to 49 percent in Fiscal Years 2007-08 through 2016-17 (except in Fiscal Year 2009-10 in which less than 10 percent was spent on petroleum restoration). DEP's Division of Waste Management (DWM), discussed further below, administers the Petroleum Restoration Program, which oversees a variety of state-assisted petroleum cleanup eligibility programs and other funding initiatives to advance cleanup on eligible sites, authorized in chapter 376, Florida Statutes.

The expenditures shown for Waste Clean-Up include the activities associated with the following major types of clean-up efforts: dry-cleaning solvent contamination; hazardous waste; underground storage tanks; water wells; and contracts with local governments. The average annual expenditures for each of the four types of clean-up efforts are $6.6 million; $9.2 million; $8.9 million; and $9.0 million, respectively. In addition, the expenditures shown for Other Projects include various programs and projects including waste planning grants, underground storage tank compliance verification, solid waste management activities, and transfers to other agencies for specified activities (e.g., to the Department of Health for Biomedical Waste Regulation).

DEP's Division of Waste Management (DWM), in coordination with the district offices, implements state and federal laws to protect the environment from improper handling and disposal of solid and hazardous waste. It also oversees and contracts for the cleanup of contaminated sites. DWM's responsibilities include implementing the Dry-Cleaning Solvent Program and Petroleum Restoration Program, managing and overseeing state-funded investigation and cleanup activities, investigating reports of known or suspected soil and groundwater contamination, and storage tank

compliance.[338] DWM is also responsible for the development of rules relating to underground and aboveground storage tanks, solid waste, hazardous waste, and cleanup programs.

DEP's Division of Water Resource Management (DWRM) implements laws for the protection of Florida's drinking water, groundwater, and natural systems; reclamation of mined lands; and the preservation of Florida's beach and dune system. DWRM undertakes programmatic responsibilities (such as rulemaking and policy development), coordinates compliance and enforcement activities of DEP's district offices for various programs protective of water quality, including the industrial, domestic wastewater, drinking water, underground injection control, and National Pollutant Discharge Elimination System (NPDES) stormwater programs. It also oversees the professional licensing of water and wastewater treatment plant operators and water distribution system operators. In addition, DWRM regulates certain activities relating to beaches, inlet and port projects, mining, and oil and gas exploration, drilling and production activities.[339] Finally, DWRM implements the Water Supply Restoration Program under section 376.30(3)(c), Florida Statutes, which provides for the restoration or replacement of potable water systems or potable private wells impacted by contamination from pollutants.

DEP's six district offices located throughout the state were also included in this analysis, largely because of the duties implemented by district staff with regard to permitting, inspections, and compliance and enforcement of regulated activities.[340] In coordination with the appropriate division offices, district offices implement permitting programs related to air, water resources (including drinking water, domestic wastewater, industrial wastewater, and submerged lands and environmental resources), hazardous and solid waste management, and storage tank compliance.

Forecast of Expenditures on Water Quality and Other Water Resource-Related Programs
Table 4.1.7 provides a forecast for total state expenditures on water quality and other water resource-related programs. The highest level of expenditures during the period occurred in Fiscal Year 2007-08, followed by six years of year-to-year declines. The annual expenditures began to grow again after the low point in Fiscal Year 2013-14. The growth rates for the past three years have been 13 percent, 13 percent, and 21 percent, respectively. Because of this unusual pattern, the forecast relies on a three-year moving average growth rate until the historical peak expenditure level is surpassed, at which point the forecast growth rate is changed to population growth.

[See table on following page]

[338] DEP, *Division of Waste Management*, https://floridadep.gov/waste. (Accessed on January 11, 2018).
[339] DEP, *Division of Water Resource Management*, https://floridadep.gov/water. (Accessed on December 22, 2017).
[340] DEP, *District Offices*, https://floridadep.gov/districts. (Accessed on December 22, 2017).

Table 4.1.7 History and Forecast of State Expenditures on Water Quality and Other Water Resource-Related Programs (in $millions)

History	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Expenditures	$957.39	$755.24	$617.96	$572.08	$571.98
History	**FY12-13**	**FY13-14**	**FY14-15**	**FY15-16**	**FY16-17**
Expenditures	$526.72	$525.76	$591.76	$667.39	$806.90
Forecast	**FY17-18**	**FY18-19**	**FY19-20**	**FY20-21**	**FY21-22**
Expenditures	$931.26	$1,083.67	$1,099.84	$1,115.77	$1,131.40
Forecast	**FY22-23**	**FY23-24**	**FY24-25**	**FY25-26**	**FY26-27**
Expenditures	$1,146.71	$1,161.56	$1,175.91	$1,175.91	$1,189.80

Regional Expenditures

Each year in the state budget, the Legislature appropriates funds to support the Water Management Districts (WMDs). Since Fiscal Year 2007-08, the appropriations to support the districts' water quality and other water resource-related programs have been approximately $13.0 million per year, on average. Most of the funding is provided through DEP; however, the expenditures related to Everglades restoration are provided through the Florida Department of Transportation. Through the State Transportation Trust Fund, a portion of the toll revenue from the Alligator Alley Toll Road is provided in some years to the South Florida Water Management District for Everglades restoration projects.[341] Table 4.1.8 shows the annual cash expenditures since Fiscal 2007-08.

[See table on following page]

[341] § 338.26, Fla. Stat. (Each year, tolls are generated from the use of Alligator Alley. The Department of Transportation is authorized to transfer any funds in excess of those used to conduct certain activities prescribed in paragraph (3)(a) to SFWMD for Everglades restoration.)

Table 4.1.8 State Expenditures for Water Management Districts (in $millions)

CASH EXPENDITURES BY FISCAL YEAR*	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12
Operations and Permitting Assistance	$1.78	$9.70	$3.76	$4.74	$0.19
Minimum Flows and Levels	$0.00	$0.00	$0.00	$0.00	$0.00
Wetland Protection	$0.65	$0.63	$0.49	$0.61	$0.36
Dispersed Water Storage	$0.00	$0.00	$0.00	$0.00	$0.00
Everglades Restoration	$2.00	$2.00	$0.00	$0.00	$0.00
TOTAL	**$4.43**	**$12.34**	**$4.24**	**$5.35**	**$0.55**

CASH EXPENDITURES BY FISCAL YEAR*	FY12-13	FY13-14	FY14-15	FY15-16	FY16-17
Operations and Permitting Assistance	$1.71	$2.26	$8.08	$8.30	$8.30
Minimum Flows and Levels	$0.00	$0.00	$0.00	$1.50	$1.50
Wetland Protection	$0.73	$2.44	$0.88	$0.00	$0.00
Dispersed Water Storage	$0.00	$0.00	$10.00	$5.00	$5.00
Everglades Restoration	$4.40	$4.40	$8.60	$7.06	$0.00
TOTAL	**$6.84**	**$9.10**	**$27.56**	**$21.87**	**$14.80**

*Through June 30, 2017.

Recognizing that water resource problems vary in magnitude and complexity from region to region across the state, the Legislature vests in DEP the power and responsibility to accomplish conservation, protection, management and control of waters of the state, but with enough flexibility to accomplish these ends through the delegation of powers to the various WMDs.[342]

Chapter 373, Florida Statutes, provides the state's five WMDs with broad authority to conduct a wide range of regulatory and non-regulatory programs and initiatives addressing four areas of responsibility: water supply, water quality, flood protection and floodplain management, and natural systems. Similar to the analyses for the WMDs' conservation land acquisition and management, in order to identify expenditures of the WMDs related to water supply and water quality, EDR reviewed the WMDs' budget documents, which, in general, provide additional information on the adequacy of fiscal resources, and therefore the district expenditures, related to the four areas of responsibility. Specifically, EDR reviewed the WMDs' preliminary budgets and tentative budgets developed in accordance with sections 373.535 and 373.536, Florida Statutes, respectively.

Within the preliminary and tentative budgets, each WMD reports the prior fiscal year's actual expenditures allocated at the program level to the water supply, water quality, flood protection and floodplain management, and natural systems areas of responsibility.[343] For purposes of developing their budgets, the WMD program areas identified in section 373.536, Florida Statutes, along with DEP's guidance on standard definitions are:

[342] § 373.016(5), Fla. Stat.
[343] § 373.536(5), Fla. Stat.

- 1.0 Water Resource Planning and Monitoring: includes all water management planning, including water supply planning, development of minimum flows and levels, and other water resources planning; research, data collection, analysis, and monitoring; and technical assistance (including local and regional plan and program review).

- 2.0 Acquisition, Restoration and Public Works: includes the development and construction of all capital projects (except for those contained in Program 3.0), including water resource development projects, water supply development assistance, water control projects, and support and administrative facilities construction; cooperative projects; land acquisition and the restoration of lands and water bodies.

- 3.0 Operation and Maintenance of Lands and Works: includes all operation and maintenance of facilities, flood control and water supply structures, lands, and other works authorized by Chapter 373, Florida Statutes.

- 4.0 Regulation: includes water use permitting, water well construction permitting, water well contractor licensing, environmental resource and surface water management permitting, permit administration and enforcement, and any delegated regulatory program.

- 5.0 Outreach: includes all environmental education activities, such as water conservation campaigns and water resources education; public information activities; all lobbying activities relating to local, regional, state, and federal governmental affairs; and all public relations activities, including related public service announcements and advertising in the media.

- 6.0 Management and Administration:[344] includes all governing [and basin board] support; executive support; management information systems; unrestricted reserves; and general counsel, ombudsman, human resources, finance, audit, risk management, and administrative services.

Within these statutorily-prescribed program areas, these are also activities and sub-activities identified that provide greater detail into what particular activities fall within the broader program areas. The actual-audited expenditures allocated among the four areas of responsibility are reported only at the program level. Note that the allocation among the four areas of responsibility represent estimates, which may include allocations that split programs, activities, and sub-activities, in cases where overlap exists.

Further, to avoid double counting WMD expenditures between the conservation land and water sections of this report, the total expenditures on subcategories "2.1 Land Acquisition" and "3.1 Land Management" have been removed[345] from the expenditures in the following four tables. Table 4.1.9 provides a forecast and details a history of expenditures by the WMDs on water supply.

[344] For the purposes of this analysis, program area 6.0 is excluded.

[345] While the districts are not required to divide each subcategory into the four primary categories, Northwest Florida WMD approximated that 10% of land acquisition and management is categorized as Water Supply, and 30% to each of Water Quality, Flood Protection, and Natural Systems. These shares are used across all districts and years to address the removal of subcategories 2.1 Land Acquisition and 3.1 Land Management.

Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average as it best fits the nature of the data.

Table 4.1.9 Water Management District Water Supply Expenditures (in $millions)

History	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$7.31	$3.49	$8.31	$8.03	$8.20
SJRWMD	$23.52	$22.20	$22.27	$42.49	$42.38
SFWMD	$80.96	$81.99	$89.62	$90.43	$85.53
SWFWMD	$63.87	$60.96	$57.40	$53.38	$34.06
SRWMD	$2.35	$2.67	$3.20	$5.00	$6.19
Total	$178.01	$171.31	$180.81	$199.34	$176.35
Forecast	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Total	$185.08	$187.29	$184.82	$185.73	$185.95

Source: Annual Budgets of the Water Management Districts.

Table 4.1.10 provides a forecast and details a history of expenditures by the WMDs on water quality. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average growth rate as it best fits the nature of the data.

Table 4.1.10 Water Management District Water Quality Expenditures (in $millions)

History	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$2.54	$1.50	$3.67	$5.67	$4.92
SJRWMD	$25.50	$23.17	$23.76	$24.57	$25.05
SFWMD	$71.71	$61.10	$87.03	$88.53	$89.18
SWFWMD	$41.34	$30.38	$23.52	$19.12	$25.12
SRWMD	$1.00	$1.29	$1.65	$2.01	$4.09
Total	$142.09	$117.44	$139.63	$139.89	$148.36
Forecast	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Total	$154.70	$162.26	$170.51	$179.46	$188.57

Source: Annual Budgets of the Water Management Districts.

Table 4.1.11 provides a forecast and details a history of expenditures by the WMDs on flood protection. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average growth rate as it best fits the nature of the data.

Table 4.1.11 Water Management District Flood Protection Expenditures (in $millions)

History	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$3.00	$1.64	$2.34	$2.89	$2.70
SJRWMD	$19.91	$17.42	$17.93	$7.44	$8.42
SFWMD	$102.31	$95.54	$93.58	$90.29	$90.42
SWFWMD	$24.74	$31.42	$30.87	$26.11	$17.47
SRWMD	$1.33	$1.75	$1.99	$2.38	$4.47
Total	$151.29	$147.76	$146.70	$129.11	$123.48
Forecast	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Total	$117.92	$109.59	$102.61	$96.11	$89.78

Source: Annual Budgets of the Water Management Districts.

Table 4.1.12 provides a forecast and details a history of expenditures by the WMDs on natural systems. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average as it best fits the nature of the data.

Table 4.1.12 Water Management District Natural Systems Expenditures (in $millions)

History	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$2.86	$2.02	$2.91	$4.33	$3.60
SJRWMD	$18.76	$16.69	$17.28	$30.63	$31.10
SFWMD	$77.67	$82.82	$120.00	$134.85	$121.42
SWFWMD	$43.13	$32.79	$27.17	$34.21	$32.77
SRWMD	$1.86	$2.40	$2.73	$3.61	$5.86
Total	$144.27	$136.72	$170.09	$207.63	$194.75
Forecast	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**
Total	$185.99	$194.07	$192.68	$190.91	$192.55

Source: Annual Budgets of the Water Management Districts.

Table 4.1.13 provides a forecast and details a history of water expenditures[346] by special districts[347] that are located in multiple counties. Based on survey results, a portion of the local government account identified as 537 Conservation and Resource Management is expended on water supply and a portion on water quality protection and restoration. Further, the accounts identified as 535 Sewer/Wastewater Services, 536 Water-Sewer Combination Services, and 538 Flood Control/Stormwater Management have been classified as water quality protection and restoration expenditures. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average growth rate as it best fits the nature of the data.

[346] For further details on the source and methodology of this data, see the "Local Expenditures" piece of subsection 2.2.

[347] There exists a small number of governmental entities (e.g., utility authorities) that cross counties but are technically not special districts. Their expenditures are included here.

Table 4.1.13 Water Expenditures by Regional Special Districts (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Supply	$0.01	$0.01	$0.01	$0.01	$0.01
Quality Protection & Restoration	$103.00	$63.92	$102.14	$101.13	$100.54
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Supply	$0.01	$0.01	$0.01	$0.01	$0.01
Quality Protection & Restoration	$112.25	$119.84	$126.86	$137.06	$146.50

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts a portion of 537 shared out by local government survey results for supply and demand; 535, 536, 538, and a portion of 537 shared out by local government survey results for quality protection and restoration.

Local Expenditures

Table 4.1.14 provides a forecast and details a history of water supply expenditures by local governments. Based on survey results, a portion of the local government account[348] identified as537 Conservation and Resource Management is expended on water supply. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on population growth rates[349]as it best fits the nature of the data.

Table 4.1.14 Water Supply Expenditures by Local Governments (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$9.11	$26.90	$8.46	$6.95	$7.00
Municipalities	$1.27	$1.46	$1.29	$1.25	$0.83
Special Districts	$0.01	$0.04	$0.04	$0.02	$0.03
Total	$10.39	$28.40	$9.78	$8.22	$7.85
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$8.08	$8.21	$8.34	$8.47	$8.60

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts a portion of 537 shared out by local government survey.

[348] For further details on the source and methodology of this data, see the "Local Expenditures" piece of subsection 2.2.

[349] Florida Demographic Estimating Conference, December 2017.

Table 4.1.15 provides a forecast and details a history of water quality protection and restoration expenditures by local governments. Based on survey results, a portion of the local government account identified as537 Conservation and Resource Management is expended on water quality protection and restoration. Further, the accounts identified as 535 Sewer/Wastewater Services, 536 Water-Sewer Combination Services, and 538 Flood Control/Stormwater Management have been classified as water quality protection and restoration expenditures. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Forecasts rely on a three-year moving average growth rate as it best fits the nature of the data.

Table 4.1.15 Water Quality Protection & Restoration Expenditures by Local Governments (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$2,007.39	$2,010.79	$2,019.60	$2,060.02	$2,143.76
Municipalities	$2,889.55	$2,965.93	$3,052.59	$3,111.40	$3,159.03
Special Districts	$324.02	$355.19	$389.63	$399.78	$420.25
Total	$5,220.96	$5,331.92	$5,461.83	$5,571.20	$5,723.05
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$5,818.05	$5,953.72	$6,096.96	$6,240.78	$6,388.41

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 535, 536, 538, and a portion of 537 shared out by local government survey.

Public and Private Utilities Expenditures

Table 4.1.16 provides a forecast and details a history of expenditures by public water utilities. The source of this data is the local government account identified as 533 Water Utility Services. It is possible that a portion of public utility expenditures has been accounted for in the local government expenditures through EDR's categorization of the accounts identified as 535, 536, and 538 described above. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. Population growth drives the forecast as utility expenditures are expected to follow population growth.

Table 4.1.16 Expenditures by Public Water Utilities (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Public Utilities	$1,124.27	$1,134.01	$1,141.99	$1,154.18	$1,160.78
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Public Utilities	$1,178.14	$1,197.78	$1,216.94	$1,236.06	$1,254.99

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 533.

Table 4.1.17 provides a forecast and details a history of expenditures by private water utilities. The basis for this data was provided to EDR by the Florida Public Service Commission (PSC). As of December 2017, only 38 of Florida's 67 counties are within the jurisdiction of the PSC. Because of this, the remaining expenditures from counties outside of their jurisdiction were estimated based on per capita utility expenditures. This methodology should provide suitable estimates due to a similar mix[350] of rural an urban counties both in and out of the PSC's jurisdiction. Note that the historic data is in calendar years. For forecasting purposes, it was converted to state fiscal years. Population growth drives the forecast as utility expenditures are expected to follow population growth.

Table 4.1.17 Expenditures by Private Utilities (in $millions)

History	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015
Public Utilities	$84.08	$81.79	$70.63	$71.43	$74.27
Forecast	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**
Public Utilities	$74.06	$75.30	$76.55	$77.83	$79.13

Source: A historical series was created using data provided by the Florida Public Service Commission.

4.2 Estimating Water Expenditures Necessary to Comply with Laws, Regulations, and Legislative Intent

In future editions, this section will include an analysis and estimates of the future expenditures by federal, state, regional, and local governments and all public and private utilities necessary to comply with laws governing water supply and water quality as well as to achieve the Legislature's intent that sufficient water be available for all existing and future reasonable-beneficial uses and the natural systems, while avoiding the adverse effects of competition for water supplies. This analysis requires an operational integrated water supply and demand model. For details on this model, see subsection 3.3 Integrated Water Supply and Demand Model.

4.3 Forecasting Revenues Dedicated and Historically Allocated to Water

EDR is required to forecast "federal, state, regional, and local government revenues dedicated in current law for the purposes… [of projects or initiatives associated with water supply and water quality protection and restoration] or that have been historically allocated for these purposes, as well as public and private utility revenues." There are a variety of revenue sources that support

[350] Counties in PSC jurisdiction: Alachua, Bradford, Brevard, Broward, Charlotte, Clay, Duval, Escambia, Franklin, Gadsden, Gulf, Hardee, Highlands, Jackson, Lake, Lee, Leon, Levy, Manatee, Marion, Martin, Monroe, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Seminole, St. Johns, St. Lucie, Sumter, Volusia, and Washington.
Counties out of PSC jurisdiction: Baker, Bay, Calhoun, Citrus, Collier, Columbia, DeSoto, Dixie, Flagler, Gilchrist, Glades, Hamilton, Hendry, Hernando, Hillsborough, Holmes, Indian River, Jefferson, Lafayette, Liberty, Madison, Miami-Dade, Santa Rosa, Sarasota, Suwannee, Taylor, Union, Wakulla, and Walton.

state appropriations related to water resources, including specific taxes and fees that are dedicated in law. Similar to the analysis of state-appropriated expenditures, the following discussion identifies and forecasts the relevant revenues as either ***Water Supply*** or ***Water Quality and Other Water Resource-Related Programs***.

State-Appropriated Revenue Sources

Historically, the Legislature has appropriated state and federal trust funds, as well as General Revenue, to support programs, projects, and initiatives related to water resources, often combining state and federal sources to support the same activities. As a result, this section on state-appropriated revenue sources includes both state and federal trust funds and the revenue sources that are deposited in the identified trust funds.

Water Supply Revenue Sources

The primary sources of revenue for water supply initiatives are federal grants and repayment of loans, which are deposited in the Drinking Water Revolving Loan Trust Fund.[351] The trust fund is used to provide low-interest loans for planning, engineering, design, and construction of public drinking water systems and improvements of such systems.

Based on a review of state accounts and agency trust fund data for the last 5 years, a historical data series was constructed for the identified revenues. The Long-term Revenue Analysis includes a forecast for federal grants, which is used as the basis for the forecast through Fiscal Year 2026-27. For repayments of loans, a historical average level is used for the forecast. The historical series and the forecast are shown in Table 4.3.1.

Table 4.3.1 Revenues Available for Water Supply (in $millions)

HISTORY	FY12-13	FY13-14	FY14-15	FY15-16	FY16-17
Federal Grants	$53.90	$58.27	$29.12	$34.71	$35.70
Repayment of Loans	$33.15	$41.24	$47.22	$44.97	$90.00
TOTAL	**$87.04**	**$99.51**	**$76.34**	**$79.67**	**$125.70**
FORECAST (FY17-18 through FY21-22)	**FY17-18**	**FY18-19**	**FY19-20**	**FY20-21**	**FY21-22**
Federal Grants	$36.30	$36.90	$37.50	$38.10	$38.60
Repayment of Loans	$44.50	$44.50	$44.50	$44.50	$44.50
TOTAL	**$80.80**	**$81.40**	**$82.00**	**$82.60**	**$83.10**
FORECAST (FY22-23 through FY26-27)	**FY22-23**	**FY23-24**	**FY24-25**	**FY25-26**	**FY26-27**
Federal Grants	$39.10	$39.60	$40.10	$40.60	$41.10
Repayment of Loans	$44.50	$44.50	$44.50	$44.50	$44.50
TOTAL	**$83.60**	**$84.10**	**$84.60**	**$85.10**	**$85.60**

[351] § 403.8533, Fla. Stat.

In addition to the federal grants and repayment of loans, state funds including General Revenue and the Land Acquisition Trust Fund receipts are also deposited in the Drinking Water Revolving Loan Trust Fund to provide the state match for federal grants. The state matching funds average approximately $6.5 million per year.

Water Quality and Other Water Resource-Related Program Revenue Sources

There are a number of state and federal revenue sources that have been used historically to support appropriations related to water quality. For this analysis, these revenues are categorized as either Documentary Stamp Tax revenue or Non-Documentary Stamp Tax revenue.

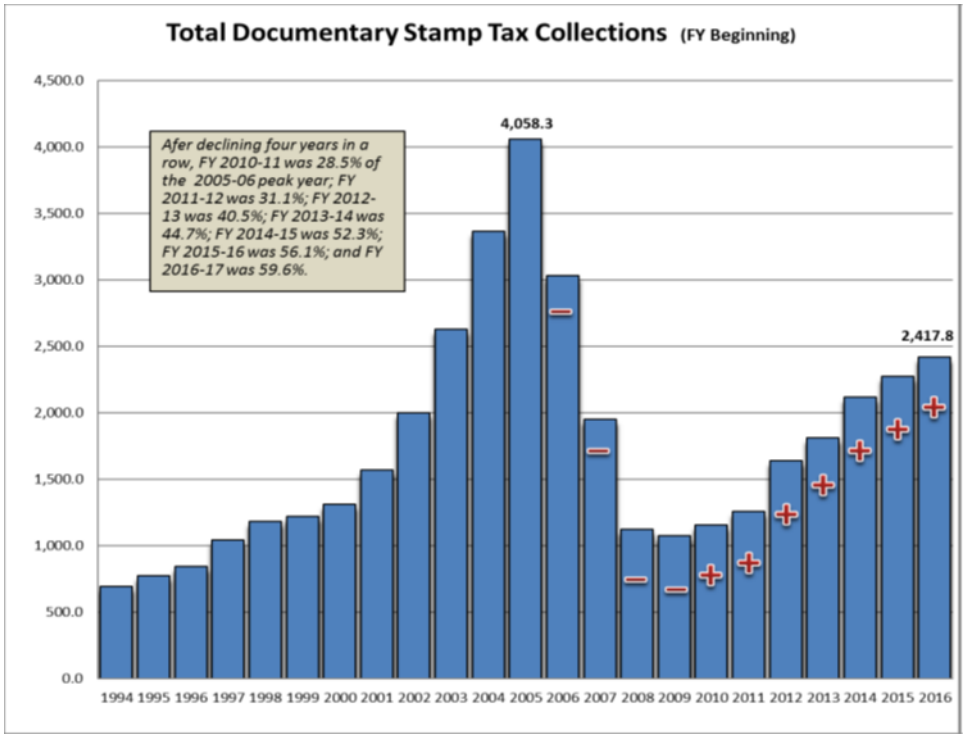
Documentary Stamp Tax Revenue

The primary source of revenue currently dedicated to water and land conservation and restoration is the Documentary Stamp Tax,[352] which is largely dependent on the health of Florida's housing market. Today, Florida's housing market is still recovering from the extraordinary upheaval of the housing boom and its subsequent collapse. The housing boom was underway by late Fiscal Year 2002-03 and clearly in place by Fiscal Year 2003-04, with the peak occurring during Fiscal Year 2005-06. Documentary Stamp Tax collections (shown in Figure 4.3.1) also reached their peak in Fiscal Year 2005-06, posting total collections of more than $4.0 billion. At the end of last fiscal year, collections were 59.6 percent of their prior peak. The pace of Florida's recovery in Documentary Stamp Tax collections will be driven in large measure by the time it takes the construction industry to revive fully.

[See figure on following page]

[352] Ch. 201, Fla. Stat.

Figure 4.3.1 Total Documentary Stamp Tax Collections



Overall, the housing market continues to move slowly forward. Single-family building permit activity, an indicator of new construction, remains in positive territory, beginning with strong back-to-back growth in both the 2012 and 2013 calendar years (over 30 percent in each year). The final data for the 2014 calendar year revealed significantly slowing (but still positive) activity—posting only 1.6 percent growth over the prior year. However, calendar year activity for 2015 and 2016 ran well above their respective periods a year prior; single-family data was higher than the prior year by 20.3 percent in 2015 and by 11.1 percent in 2016. Despite the strong percentage growth rates in four of the last five calendar years, the level is still low by historic standards—about half of the long-run per capita level. More recent data for the first six months of the 2017 calendar year indicates that single-family building permit activity increased by 14.8 percent over the prior year during this period.

The availability of funding for water resources is closely linked to the trajectory of this revenue source. At the August 2017 General Revenue Estimating Conference, the forecast for Documentary Stamp Tax total collections was increased for Fiscal Year 2017-18 by $21.1 million over the previous estimate to $2.522 billion. Positive growth is expected to continue over the next three fiscal years (2018-19 at 4.0 percent, 2019-20 at 3.7 percent, and 2020-21 at 3.6 percent). These combined growth rates produce anticipated collections of $2.818 billion in Fiscal Year 2020-21. The prior peak level of nearly $4.1 billion is not expected to be reached until Fiscal Year 2032-33.

Table 4.3.2 shows the historical and forecasted total collections from the Documentary Stamp Tax, as well as the constitutionally required distribution to the LATF.[353] The estimates were adopted at the General Revenue Estimating Conference (August 2017).

Table 4.3.2 Documentary Stamp Tax History and Forecast (in $millions)

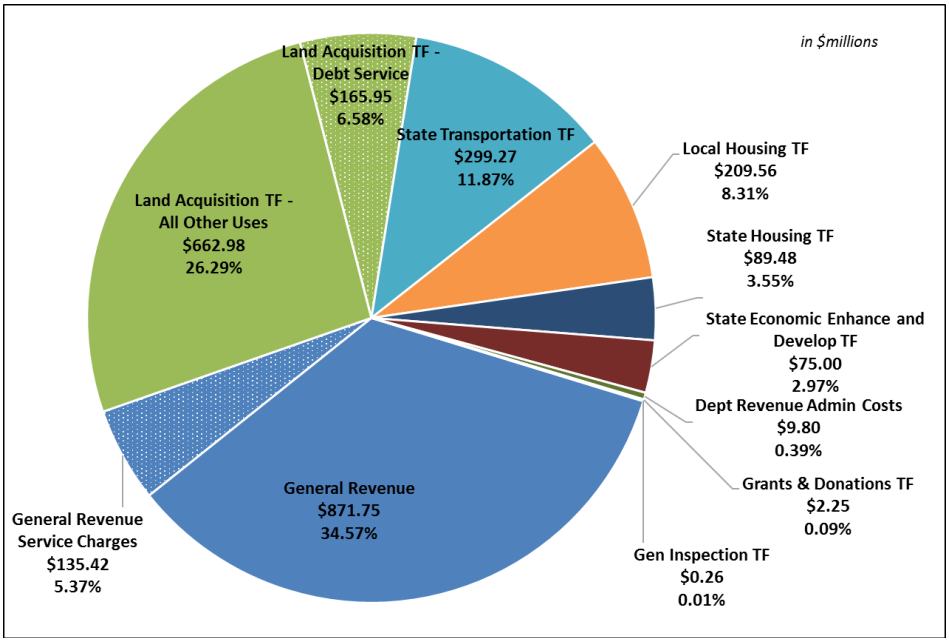
Fiscal Year	Total Doc Stamps	Percent Change	Total to LATF	Debt Service	Remainder LATF	Uncommitted LATF Based on Statute
FY12-13	$1,643.40	30.26%				
FY13-14	$1,812.50	10.29%				
FY14-15	$2,120.80	17.01%				
FY15-16	$2,276.87	7.36%				
FY16-17	$2,417.76	6.19%				
FY17-18	$2,521.72	4.30%	$828.93	$165.95	$662.98	**$408.24**
FY18-19	$2,622.59	4.00%	$862.22	$166.30	$695.92	**$402.94**
FY19-20	$2,719.63	3.70%	$894.24	$166.43	$727.81	**$426.86**
FY20-21	$2,817.54	3.60%	$926.55	$166.33	$760.22	**$451.17**
FY21-22	$2,918.97	3.60%	$960.03	$144.97	$815.06	**$496.06**
FY22-23	$3,021.13	3.50%	$993.74	$134.04	$859.70	**$540.70**
FY23-24	$3,123.85	3.40%	$1,027.64	$113.94	$913.70	**$594.70**
FY24-25	$3,226.94	3.30%	$1,061.66	$113.88	$947.78	**$628.78**
FY25-26	$3,330.20	3.20%	$1,095.73	$90.53	$1,005.20	**$686.20**
FY26-27	$3,436.76	3.20%	$1,130.90	$70.21	$1,060.69	**$746.69**

Section 201.15, Florida Statutes, directs the distribution of Documentary Stamp Tax revenues.[354] Figure 4.3.2 illustrates the effect of the statutory distributions for the 2017-18 fiscal year. The total forecast for Documentary Stamp Tax revenue is over $2.5 billion, with an estimated $1.8 billion (72.8 percent) expected to be distributed to the General Revenue Fund and the LATF. In the figure, the distribution to the LATF is split into two component parts (debt service and all other uses) that together reach the required 33 percent after the deduction for the Department of Revenue's administrative costs.

[See figure on following page]

[353] In 2014, Florida voters approved the Water and Land Conservation constitutional amendment (Amendment 1) to provide a dedicated funding source for water and land conservation and restoration. The amendment created article X, section 28 of the Florida Constitution, which requires that starting on July 1, 2015, for 20 years, 33 percent of the net revenues derived for the existing excise tax on documents must be deposited into the Land Acquisition Trust Fund.
[354] A forecast showing the distributions is available on EDR's website: http://edr.state.fl.us/content/conferences/docstamp/docstampresults.pdf.

Figure 4.3.2 Fiscal Year 2017-18 Statutory Distribution of Documentary Stamp Tax Revenue



The LATF is expected to receive approximately $828.9 million in total, including nearly $166.0 million for debt service payments and $663.0 million for other uses. Pursuant to the Florida Constitution, the funds in the LATF must be expended only for the following purposes:

1) As provided by law, to finance or refinance: the acquisition and improvement of land, water areas, and related property interests, including conservation easements, and resources for conservation lands including wetlands, forests, and fish and wildlife habitat; wildlife management areas; lands that protect water resources and drinking water sources, including lands protecting the water quality and quantity of rivers, lakes, streams, springsheds, and lands providing recharge for groundwater and aquifer systems; lands in the Everglades Agricultural Area and the Everglades Protection Area, as defined in Article II, Section 7(b); beaches and shores; outdoor recreation lands, including recreational trails, parks, and urban open space; rural landscapes; working farms and ranches; historic or geologic sites; together with management, restoration of natural systems, and the enhancement of public access or recreational enjoyment of conservation lands.

2) To pay the debt service on bonds issued pursuant to Article VII, Section 11(e).

Of the LATF revenues available for other uses, approximately $254.8 million is dedicated in law to the Everglades, spring restoration, and Lake Apopka projects as provided in section 375.041, Florida Statutes. The remaining $408.2 million is available for other qualifying projects authorized and appropriated by the Legislature. Table 4.3.3 shows the Fiscal Year 2017-18 appropriations from the LATF. Excluding the WMDs, slightly less than one-half of these appropriations are for water quality and other water resource-related programs, with total combined appropriations of

$308.8 million, or approximately 42 percent of the total. Within the water quality components, the largest programs include Everglades projects ($155.1 million); springs restoration ($50.0 million); beach projects ($29.5 million); and agriculture best management practices ($23.7 million). The trust fund is also used to pay debt service for Everglades and Florida Forever bonds; to support land conservation and management activities; and to support agency operations at DEP, DACS, FWC, and the Department of State, although pending litigation filed by the Florida Wildlife Federation is challenging specific appropriations from the LATF.[355]

Table 4.3.3 Land Acquisition Trust Fund Appropriations (in $millions)

Program Area	FY17-18 Recurring	FY17-18 Nonrecurring	FY17-18 Total	FY18-19 Base Budget
Land Conservation and Management	$209.69	$0.51	$210.20	$210.35
Debt Service	$170.32	$0.00	$170.32	$170.32
Water Quality - Other Programs and Initiatives	$69.35	$95.19	$164.55	$69.36
Water Quality - Water Restoration Assistance	$86.49	$0.00	$86.49	$86.50
Water Quality - Environmental Assessment and Restoration	$37.72	$0.00	$37.72	$37.77
Water Quality - Regulatory and Clean-up Programs	$20.06	$0.00	$20.06	$20.14
Water Management Districts	$18.68	$0.00	$18.68	$18.68
All Other Programs	$28.12	$0.00	$28.12	$28.24
TOTAL	**$640.44**	**$95.70**	**$736.14**	**$641.36**

Non-Documentary Stamp Tax Revenue

In order to determine the types of revenue historically allocated for water quality and other water resource-related programs, the various state and federal trust funds from which funds have been appropriated in the most recent five-year period were identified and are described below.

The **Internal Improvement Trust Fund**[356] is primarily used to support land conservation activities; however, it is also used to pay for personnel costs associated with environmental assessment and restoration and regulatory programs. The primary sources of revenue for the trust fund include marina and dock leases and mining and oil leases.

The **Inland Protection Trust Fund**[357] serves as a repository for funds to respond to incidents of inland contamination related to the storage of petroleum and petroleum products. The primary sources of revenue for the trust fund are pollutant taxes, petroleum storage tank registration fees, other licenses and permits, and sales of surplus property.

[355] The outcome of pending civil litigation in *Florida Wildlife Federation, Inc. v. Joe Negron, as President of the Florida Senate et al.*, No. 2015 CA 001423 (Fla. 2d Cir. Ct. amended complaint filed Jan. 10, 2017) pertaining to specific appropriations from the Land Acquisition Trust Fund and spending of appropriated money by the executive agencies, may affect future editions of this report. Revenue forecasts for conservation land management and water resources may require future adjustments to reflect any final decisions of the litigation.

[356] § 253.01, Fla. Stat.

[357] § 376.3071, Fla. Stat.

The **General Inspection Trust Fund**[358] supports programs operated by DACS, including water policy personnel and the agriculture best management practices program. The primary sources of revenue for water resources programs are nitrogen fees and fertilizer licenses.

The **Florida Coastal Protection Trust Fund**[359] serves as a repository for funds to prevent, clean up, and rehabilitate after a pollutant discharge. The primary sources of revenue are pollutant taxes as well fines, penalties, and judgments, including those associated with Deepwater Horizon.

The **Minerals Trust Fund**[360] is used to provide administrative costs for reclaiming lands disturbed by the severance of minerals; to fund the geological survey of the state; to fund the regulation of oil and gas exploration and production; and to serve as a repository for funds to respond to petroleum incidents causing environmental damage or contamination. The primary sources of revenue are distributions from Severance Taxes and fees, including oil and gas application fees.

The **Florida Permit Fee Trust Fund**[361] serves as a repository for funds to prevent, clean up, and rehabilitate pollutant discharges. The primary source of revenue is permit fees, including waste permits and water facilities permits.

The **Save Our Everglades Trust Fund**[362] serves as a repository for funds intended to implement projects and initiatives associated with Everglades restoration. The primary sources of revenue are transfers from General Revenue and other state trust funds and bond proceeds.

The **Solid Waste Management Trust Fund**[363] is used to provide funding for solid waste activities including providing technical assistance to local governments and the private sector and performing regulatory and enforcement functions. The primary sources of revenue are waste tire fees and other licenses and permits.

The **Wastewater Treatment and Stormwater Management Revolving Loan Trust Fund**[364] is used to provide loans to local governments for the planning, design, construction, and implementation of wastewater management systems, stormwater management systems, nonpoint source pollution management systems, and estuary conservation and management. The primary sources of revenue include federal grants, loan repayments, and state matching funds.

The **Water Quality Assurance Trust Fund**[365] is used to respond to incidents of contamination that pose a serious danger to the quality of groundwater and surface water resources, including clean-up of hazardous substances and dry-cleaning products. The primary sources of revenue include pollutant taxes, dry-cleaning taxes and fees, and lead-acid battery fees.

[358] § 570.20, Fla. Stat.
[359] § 376.11, Fla. Stat.
[360] § 376.41, Fla. Stat.
[361] § 403.0871, Fla. Stat.
[362] § 373.472, Fla. Stat.
[363] § 403.709, Fla. Stat.
[364] § 403.1835(9)(a), Fla. Stat.
[365] § 376.307, Fla. Stat.

The **Nonmandatory Land Reclamation Trust Fund**[366] is used for the reclamation and acquisition of lands disturbed by phosphate mining and not subject to mandatory reclamation;[367] to abate imminent hazard as provided by law; and to close abandoned phosphogypsum stack systems. The primary sources of revenue for the trust fund are a distribution from the Severance Tax on phosphate rock and proceeds from the sale of surplus property.

The **Grants and Donations Trust Fund**[368] is used to support various environmental and natural resource programs. The primary sources of revenue for the trust fund are non-federal grants and donations.

The **Federal Grants Trust Fund**[369] serves as a repository for funds to be used for allowable grant activities funded by restricted program revenues from federal sources. The primary source of revenue is federal grant awards.

Within the identified trust funds, the following types of revenue (listed in alphabetical order) were identified as being used to support water quality and other water resource-related programs in the current or previous five years.

Fees and Licenses: A variety of fees and licenses are charged by state agencies pay for the costs of programs and services. Some of the fees supporting these trust funds include nitrogen fees, storage tank registration fees, submerged lands application and easement fees, oil and gas application fees, and permit fees. Types of licenses include fertilizer licenses and wastewater operator licenses. Revenues are used to support personnel and projects related to environmental assessment and restoration, water restoration assistance, and regulatory and clean-up programs.[370]

Fines, Penalties, and Judgments: Proceeds from various fines, penalties, and judgments, such as fines and penalties associated with coastal and inland pollutant spills, including the Deepwater Horizon oil spill, are included in this revenue source.[371] Revenues are used to support personnel and projects related to environmental assessment and restoration, water restoration assistance, and regulatory and clean-up programs.[372]

Grants and Donations: Federal and non-federal grants and private donations are received by the state to support allowable personnel and projects related to environmental assessment and restoration, water restoration assistance, and regulatory and clean-up programs.[373] Current federal

[366] § 378.035, Fla. Stat.
[367] Chapter 211 and 378, Florida Statutes, require reclamation of all new phosphate mines after July 1, 1975, in accordance with mandatory standards adopted in rule. For lands disturbed by the severance of phosphate prior to July 1, 1975, and ultimately abandoned, the Nonmandatory Land Reclamation Trust Fund provides funding for voluntary reclamation of the land by the landowner or acquisition of the land by the state, subject to the criteria in chapter 378, Florida Statutes, and rule chapter 62C-17 of the Florida Administrative Code.
[368] § 403.1832, Fla. Stat.
[369] § 20.25501, Fla. Stat.
[370] *See* §§ 376.11, 376.303, 576.045, 403.087, and 403.871, Fla. Stat.
[371] Additional details on Deepwater Horizon are included in subsection 5.2 of this report.
[372] *See* §§ 288.80, 377.43, 376.121, and 373.430, Fla. Stat.
[373] *See* §§ 20.25501 and 403.1832, Fla Stat.

awards include grants for leaking underground storage tank remediation, nonpoint source implementation, water quality management planning, and wastewater/stormwater revolving loans.

Pollutant Taxes and Fees: The state levies several taxes on barrels of pollutants that are produced in or imported into Florida, including a Tax for Coastal Protection, a Tax for Water Quality, and a Tax for Inland Protection.[374] In addition, the state imposes a registration fee and a gross receipts tax on dry-cleaning facilities; a registration fee and a tax on perchloroethylene sold or imported by a dry-cleaning facility; a fee on each new tire sold at retail; and a fee for each new or remanufactured lead-acid battery.[375] The tax and fee revenues are used primarily for the prevention, cleanup, and rehabilitation of pollutant discharges.

Repayment of Loans: The repayment of loans associated with the wastewater/stormwater revolving loan fund are used to provide additional eligible grants and loans under the provisions of the Clean Water Act.[376]

Sales and Leases: State agencies are authorized to collect revenues from various sales and leases. The types of sales and leases that generate revenue for the identified trust funds include proceeds from sales of agency services outside of state government, sales of surplus property or equipment, marina and dock leases, and oil and mining leases. Revenues from sales and leases are used to support personnel and projects related to environmental assessment and restoration, water restoration assistance, and regulatory and clean-up programs.[377]

Severance Taxes: The state levies an excise tax on the severance of solid minerals and the production of oil and gas. Under current law, distributions of the Severance Taxes are made to various state trust funds, to General Revenue, and to local governments. For this report, only the distributions to the Minerals Trust Fund and the Nonmandatory Land Reclamation Trust Fund are included.[378]

Based on a review of state accounts and agency trust fund data, a historical data series was constructed for the identified revenues. With the exception of repayment of loans, each of the revenues sources is forecasted as part of a Consensus Estimating Conference, including the Revenue Estimating Conferences for Transportation, General Revenue, and the Long-Term Revenue Analysis. The assumptions used within these conferences provide the basis for the forecast through Fiscal Year 2026-27. For the repayment of loans, a historical average level is used for the forecast. The historical series and the forecast are shown in Table 4.3.4.

[See table on following page]

[374] *See* § s. 206.9935, Fla. Stat.
[375] *See* § ss. 376.303, 376.70, 376.75, 403.709, 403.718, and 403.7185, Fla. Stat.
[376] *See* § 403.1835, Fla. Stat.
[377] *See* §§ 253.03, 253.0341, 270.22, 273.055, and 375.041, Fla. Stat.
[378] *See* § 211.06, 211.31, 211.3103, and 211.3106, Fla. Stat.

Table 4.3.4 Non-Documentary Stamp Tax Revenues Available for Water Quality and Other Water Resource-Related Programs (in $millions)

HISTORY	FY12-13	FY13-14	FY14-15	FY15-16	FY16-17
FEES AND LICENSES	$38.61	$40.85	$37.83	$34.88	$40.32
FINES, PENALTIES, JUDGMENTS	$106.42	$90.05	$88.76	$10.35	$4.32
GRANTS AND DONATIONS	$99.24	$88.09	$94.73	$88.94	$90.53
POLLUTANT TAXES AND FEES	$242.87	$248.53	$255.26	$268.15	$274.71
REPAYMENT OF LOANS	$86.83	$102.85	$99.72	$83.38	$95.95
SALES AND LEASES	$25.81	$18.17	$16.07	$16.06	$23.88
SEVERANCE TAXES	$5.48	$5.26	$4.76	$6.81	$6.62
TOTAL NON-DOCUMENTARY STAMP TAX REVENUES	**$605.26**	**$593.80**	**$597.14**	**$508.58**	**$536.32**
FORECAST (FY 2017-18 TO FY 2021-22)	**FY17-18**	**FY18-19**	**FY19-20**	**FY20-21**	**FY21-22**
FEES AND LICENSES	$41.00	$41.60	$42.20	$42.80	$43.40
FINES, PENALTIES, JUDGMENTS	$4.40	$4.50	$4.60	$4.70	$4.80
GRANTS AND DONATIONS	$92.00	$93.40	$94.80	$96.20	$97.60
POLLUTANT TAXES AND FEES	$278.80	$283.40	$287.60	$291.40	$294.70
REPAYMENT OF LOANS	$93.00	$93.00	$93.00	$93.00	$93.00
SALES AND LEASES	$24.30	$24.70	$25.10	$25.50	$25.90
SEVERANCE TAXES	$7.00	$7.00	$7.00	$7.10	$7.20
TOTAL NON-DOCUMENTARY STAMP TAX REVENUES	**$540.50**	**$547.60**	**$554.30**	**$560.70**	**$566.60**
FORECAST (FY 2022-23 TO FY 2026-27)	**FY22-23**	**FY23-24**	**FY24-25**	**FY25-26**	**FY26-27**
FEES AND LICENSES	$44.00	$44.60	$45.20	$45.70	$46.20
FINES, PENALTIES, JUDGMENTS	$4.90	$5.00	$5.10	$5.20	$5.30
GRANTS AND DONATIONS	$98.90	$100.20	$101.50	$102.70	$103.90
POLLUTANT TAXES AND FEES	$298.00	$301.30	$304.60	$307.90	$311.20
REPAYMENT OF LOANS	$93.00	$93.00	$93.00	$93.00	$93.00
SALES AND LEASES	$26.30	$26.60	$26.90	$27.20	$27.50
SEVERANCE TAXES	$7.00	$6.00	$6.00	$6.00	$6.00
TOTAL NON-DOCUMENTARY STAMP TAX REVENUES	**$572.10**	**$576.70**	**$582.30**	**$587.70**	**$593.10**

Regional Revenues

The WMDs are required to report their annual revenues in their Comprehensive Annual Financial Reports. While each district must report its total revenues, the breakdown of categories is largely at the discretion of the district. As a result, intergovernmental sources cannot be identified at a more granular level. Table 4.3.5 provides a forecast and details a history of WMD revenues from their own sources. Ad valorem collections comprise 50 to 95 percent of this revenue, with the remainder a mix of investment earnings, timber harvesting and sales, apiary use, billboard and cell tower leases, sales of excavated materials, cattle grazing, alligator egg harvests, feral hog hunts, and other miscellaneous revenues. As a result, the forecast of the ad valorem share of this revenue relies on the growth rate of county taxable value as adopted by the January 2018 Ad Valorem Revenue Estimating Conference. The forecast of the remaining share of this revenue relies on population growth. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years.

Table 4.3.5 Water Management District Revenues from Own Sources (in $millions)

History	LFY 06-07	LFY 07-08	LFY 08-09	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$7.98	$6.68	$6.06	$6.18	$5.40	$5.05	$5.50	$5.09	$6.50	$5.57
SJRWMD	$152.83	$160.70	$153.57	$137.33	$120.86	$93.95	$83.88	$84.88	$87.57	$90.24
SFWMD	$606.64	$628.33	$599.38	$525.23	$459.54	$344.62	$309.54	$316.57	$324.62	$316.11
SWFWMD	$258.38	$264.35	$240.72	$209.46	$179.91	$128.01	$108.31	$105.60	$109.17	$113.46
SRWMD	$10.73	$8.75	$7.55	$9.01	$8.37	$7.44	$7.30	$6.48	$6.84	$7.53
Total	$1,036.55	$1,068.82	$1,007.27	$887.22	$774.09	$579.08	$514.54	$518.62	$534.70	$532.91

Forecast	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Total	$572.71	$610.41	$665.01	$701.59	$740.16

Source: Comprehensive Annual Financial Reports of the Water Management Districts.

Table 4.3.6 provides a forecast and details a history of WMD revenues sourced from other governments. This can be federal, state, or local cities and counties. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.6 Water Management District Revenues from Intergovernmental Sources (in $millions)

History	LFY 06-07	LFY 07-08	LFY 08-09	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14	LFY 14-15	LFY 15-16
NWFWMD	$33.11	$33.46	$29.18	$27.00	$21.03	$13.36	$6.86	$10.24	$12.62	$13.72
SJRWMD	$119.66	$139.48	$88.20	$66.72	$45.76	$24.95	$20.77	$20.84	$26.83	$24.79
SFWMD	$265.75	$266.06	$144.60	$93.38	$73.93	$50.35	$39.22	$73.57	$98.92	$128.93
SWFWMD	$42.44	$98.76	$74.18	$55.11	$33.52	$32.51	$21.01	$10.53	$11.41	$7.77
SRWMD	$27.51	$27.67	$18.44	$16.35	$11.77	$5.05	$4.52	$7.48	$12.73	$15.36
Total	$488.46	$565.42	$354.61	$258.56	$186.01	$126.22	$92.39	$122.67	$162.52	$190.57

Forecast	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Total	$193.62	$196.66	$199.68	$202.65	$205.59

Source: Comprehensive Annual Financial Reports of the Water Management Districts.

Table 4.3.7 provides a forecast and details a history of water supply revenues from federal sources to special districts[379] that are located in multiple counties. Considering only the accounts identified as 323.300 Franchise Fee – Water, 334.310 State Grant – Water Supply System, and 335.310 State Revenue Sharing – Water Supply System, no water supply revenues are generated independently by these special districts nor are they generated by the state for these special districts. The account identified as 331.310 Federal Grant – Water Supply System is categorized as a water supply revenue from the federal government. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

[379] There exists a small number of governmental entities (e.g., utility authorities) that cross counties but are technically not special districts. Their expenditures are included here.

Table 4.3.7 Water Supply Revenues Generated to Regional Special Districts by Government Source (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Federal	$-	$-	$-	$-	$0.48
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Federal	$0.36	$0.37	$0.38	$0.38	$0.39

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Account 331.310.

Table 4.3.8 provides a forecast and details a history of water quality protection and restoration revenues by special districts that are located in multiple counties. Based on survey results, a portion of the local government account identified as 343.700 Service Charge – Conservation and Resource Management is self-generated for use on water quality protection and restoration projects and initiatives. Further, the account identified as 323.600 Franchise Fee – Sewer is categorized as water quality protection and restoration self-generated revenue. The accounts identified as 334.350 State Grant – Sewer/Wastewater and 335.360 State Grant – Stormwater management are categorized as water quality protection and restoration revenues from the state. Finally, the account identified as 331.350 Federal Grant – Sewer/Wastewater is categorized as water quality protection and restoration revenue from the federal government. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.8 Water Quality Protection & Restoration Revenues Generated to Regional Special Districts by Government Source (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Self	$1.73	$0.88	$1.92	$1.95	$2.22
State	$5.80	$2.47	$2.94	$2.26	$0.31
Federal	$-	$-	$-	$1.06	$1.28
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Self	$2.19	$2.23	$2.26	$2.30	$2.33
State	$0.81	$0.82	$0.83	$0.85	$0.86
Federal	$1.25	$1.27	$1.29	$1.31	$1.33

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 323.600 and a portion of 343.700 shared out by local government survey results for self; 334.350, 334.360, and 335.350 for State; and 331.350 for Federal.

Local Revenues

Table 4.3.9 provides a forecast and details a history of water supply revenues that are self-generated by local governments. Based on survey results, a portion of the local government

account[380] identified as 343.700 Service Charge – Conservation and Resource Management is self-generated for use on water supply projects and initiatives. Further, the account identified as 323.300 Franchise Fee – Water is categorized as water supply self-generated revenue. In addition, local governments may have other revenue sources used to fund water supply initiatives including impact fees and special assessments. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.9 Water Supply Revenues Generated by Local Governments (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$1.76	$1.80	$1.79	$1.81	$1.82
Municipalities	$6.05	$13.37	$10.86	$11.57	$21.43
Special Districts	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$7.81	$15.17	$12.65	$13.38	$23.26
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$21.13	$21.48	$21.82	$22.17	$22.51

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 323.300 and a portion of 343.700 shared out by local government survey results.

Table 4.3.10 provides a forecast and details a history of water supply revenues generated by the state and provided to local governments. The accounts identified as 334.310 State Grant – Water Supply System and 335.310 State Revenue Sharing – Water Supply System are categorized as water supply revenues from the state. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.10 Water Supply Revenues Generated to Local Governments from the State (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$1.00	$1.01	$1.75	$0.56	$2.02
Municipalities	$7.65	$8.27	$11.39	$2.62	$1.45
Special Districts	$0.00	$0.18	$0.18	$0.18	$0.18
Total	$8.65	$9.46	$13.32	$3.36	$3.65
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$3.64	$3.70	$3.76	$3.82	$3.87

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 334.310 and 335.310.

[380] For further details on the source and methodology of this data, see the "Local Expenditures" piece of subsection 2.2.

Table 4.3.11 provides a forecast and details a history of water supply revenues generated by the federal government and provided to local governments. The account identified as 331.310 Federal Grant – Water Supply System is categorized as water supply revenue from the federal government. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.11 Water Supply Revenues Generated to Local Governments from the Federal Government (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$1.31	$0.70	$0.00	$0.00	$0.08
Municipalities	$19.62	$9.08	$10.54	$6.73	$7.97
Special Districts	$0.17	$0.87	$0.01	$0.59	$0.38
Total	$21.10	$10.66	$10.55	$7.33	$8.42
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$8.28	$8.42	$8.55	$8.69	$8.82

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 331.310.

Table 4.3.12 provides a forecast and details a history of water quality protection and restoration self-generated revenues by local governments. Based on survey results, a portion of the local government account identified as 343.700 Service Charge – Conservation and Resource Management is self-generated for use on water quality protection and restoration projects and initiatives. Further, the account identified as 323.600 Franchise Fee – Sewer is categorized as water quality protection and restoration self-generated revenue. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.12 Water Quality Protection & Restoration Revenues Generated by Local Governments (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$1.46	$1.77	$1.29	$1.67	$1.79
Municipalities	$24.80	$33.21	$24.39	$28.61	$28.73
Special Districts	$124.44	$145.59	$152.15	$156.48	$163.76
Total	$150.70	$180.57	$177.84	$186.76	$194.28
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$195.56	$198.82	$202.00	$205.17	$208.31

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 323.600 and a portion of 343.700 shared out by local government survey results.

Table 4.3.13 provides a forecast and details a history of water quality protection and restoration revenues generated by the state and provided to local governments. The accounts identified as 334.350 State Grant – Sewer/Wastewater and 335.360 State Grant – Stormwater management are categorized as water quality protection and restoration revenues from the state. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.13 Water Quality Protection & Restoration Revenues Generated to Local Governments from the State (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$22.67	$21.37	$8.92	$8.19	$27.74
Municipalities	$36.91	$33.70	$21.58	$12.37	$13.42
Special Districts	$0.99	$0.27	$1.04	$1.07	$1.14
Total	$60.58	$55.35	$31.55	$21.62	$42.30
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$37.74	$38.37	$38.98	$39.60	$40.20

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 334.350, 334.360, and 335.350.

Table 4.3.14 provides a forecast and details a history of water quality protection and restoration revenues generated by the federal government and provided to local governments. The account identified as 331.350 Federal Grant – Sewer/Wastewater is categorized as water quality protection and restoration revenue from the federal government. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.14 Water Quality Protection & Restoration Revenues Generated to Local Governments from the Federal Government (in $millions)

History	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Counties	$1.15	$1.81	$2.03	$2.61	$5.65
Municipalities	$30.57	$25.09	$14.09	$11.58	$11.55
Special Districts	$28.07	$0.50	$-	$0.41	$1.72
Total	$59.79	$27.40	$16.12	$14.60	$18.91
Forecast	**FY 14-15**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**
Total	$18.13	$18.43	$18.72	$19.02	$19.31

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 331.350.

Public and Private Utilities Revenues

Table 4.3.15 provides a forecast and details a history of revenues generated by public water utilities. The source of this data is the local government accounts identified as 314.300 Utility Service Tax – Water, 343.300 Service Charge – Water Utility, 343.500 Service Charge – Sewer/Wastewater Utility, and 343.600 Service Charge – Water/Sewer Combination Utility. Note that the historic data was in local fiscal years, which begin October 1 and end September 30. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.15 Revenues Generated by Public Water Utilities (in $millions)

History	LFY 04-05	LFY 05-06	LFY 06-07	LFY 07-08	LFY 08-09	LFY 09-10	LFY 10-11	LFY 11-12	LFY 12-13	LFY 13-14
Public Utilities	$4,869.47	$5,302.39	$5,426.70	$5,654.46	$5,873.88	$6,182.08	$6,492.27	$6,750.38	$6,837.88	$7,123.38

Forecast	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19
Public Utilities	$7,167.67	$7,287.14	$7,403.74	$7,520.05	$7,635.23

Source: Annual Financial Report data obtained from the Florida Department of Financial Services, Division of Accounting and Auditing, Bureau of Local Government Accounts 314.300, 343.300, 343.500, and 343.600.

Table 4.3.16 provides a forecast and details a history of revenues generated by private water utilities. The basis for this data was provided to EDR by the Florida Public Service Commission (PSC). Only 38 of Florida's 67 counties are within the jurisdiction of the PSC. As a result, the remaining revenues from counties outside of their jurisdiction were estimated based on per capita utility expenditures. This methodology should provide suitable estimates due to a similar mix of rural an urban counties both in and out of the PSC's jurisdiction. Note that the historic data is in calendar years. For forecasting purposes, it was converted to state fiscal years. As revenues are largely based on population, forecasts rely on population growth rates.

Table 4.3.16 Revenues Generated by Private Utilities (in $millions)

History	CY 2007	CY 2008	CY 2009	CY 2010	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015
Public Utilities	$136.80	$143.51	$137.39	$130.85	$123.44	$119.24	$99.63	$102.36	$106.83

Forecast	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20
Public Utilities	$106.34	$108.11	$109.91	$111.74	$113.61

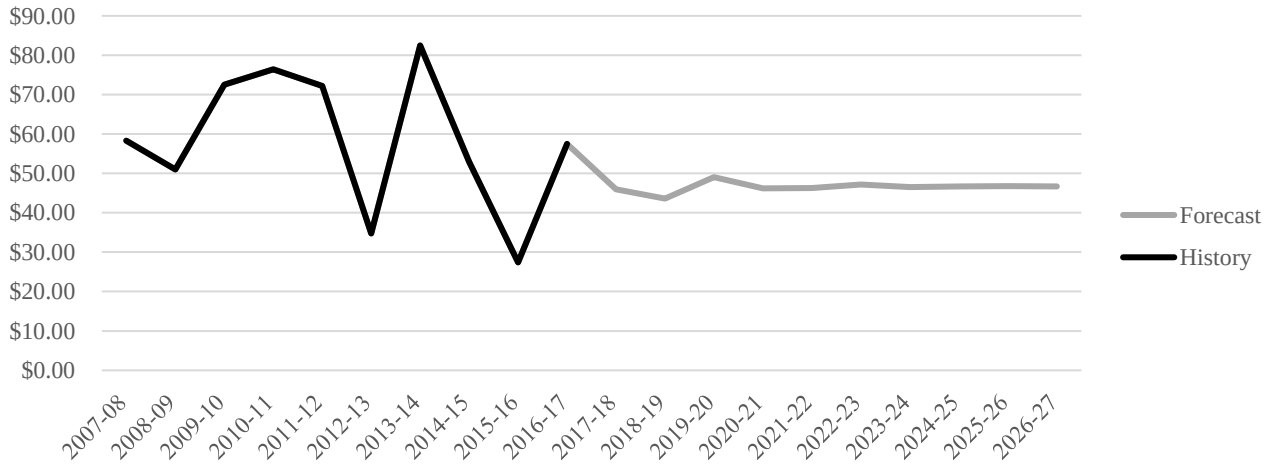
Source: A historical series was created using data provided by the Florida Public Service Commission.

4.4 Water-related Expenditure and Revenue Gap

This assessment is required to identify the gap between projected revenues and projected expenditures. Prior subsections of this report have developed the necessary revenue and expenditure projections to conduct this analysis.

Water supply expenditures by the state have been inconsistent. This is likely due, in order of magnitude, to: (1) the effect on state revenues used as match caused by the housing boom, collapse of the housing market, and onset of the Great Recession; (2) the varying size of federal grant awards; and (3) the terms and rates of loan repayments. The history of these expenditures is shown in Figure 4.4.1. This type of data is very difficult to forecast with any reliable degree of accuracy. The forecast used for the purposes of this gap analysis was a simple 3-year moving average, which is also shown in Figure 4.4.1.

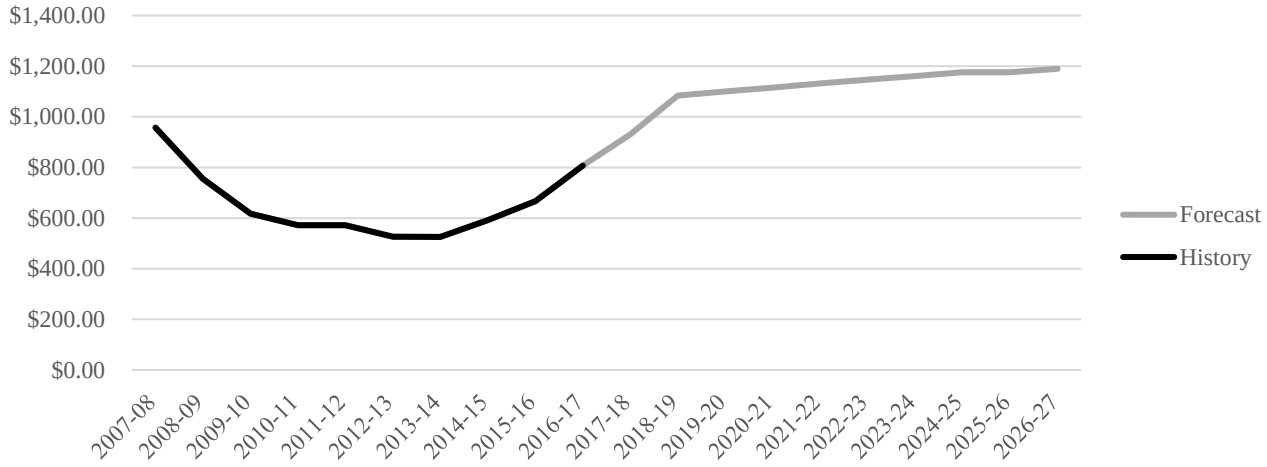
Figure 4.4.1 Water Supply Expenditures (in $millions)



Water quality expenditures by the state have been more stable; however, there was a significant decline following the collapse of the housing market, which was exacerbated by the Great Recession. In the most recent three years, expenditure levels have recovered, growing by an average of 15 percent per year. The history of these expenditures is shown in figure 4.4.2. This type of data is very difficult to forecast with any reliable degree of accuracy. The forecast used for the purposes of this gap analysis was a three-year moving average growth rate until the historical peak expenditure level (Fiscal Year 2007-08) was surpassed, at which point the forecast growth rate was changed to population growth. The forecast it produces is shown in Figure 4.4.2.

[See figure on following page]

Figure 4.4.2 Water Quality and Other Water Resource-Related Program Expenditures (in $millions)



In subsection 4.3, EDR identified various state and federal revenue sources dedicated or historically allocated to water resource purposes. Through the state Revenue Estimating Conference process, most of these revenues already have official forecasts associated with them. Table 4.4.1 details these revenue forecasts along with the projected expenditures.

For purposes of the gap analysis, the water resource revenues include the non-Documentary Stamp Tax revenue sources described and forecasted in subsection 4.3 of this report, the water-related statutory distributions of Documentary Stamp Taxes to the LATF, and a historical average General Revenue funding level. Based on the projected revenues from sources historically allocated to water resources, the recent levels of expenditure increases cannot be sustained into the future without supplementation from other revenue sources, including statutorily uncommitted Documentary Stamp Taxes in the LATF, additional General Revenue funds, or the use of bonds. However, the Legislature has historically appropriated LATF funds above and beyond the water-related statutory distributions. In Fiscal Year 2017-18, for example, the Legislature appropriated a total of $308.8 million from LATF to water-related activities. While all of the uncommitted Documentary Stamp Tax revenues distributed to the LATF could be used for water-related projects and initiatives, there are currently other priorities supported by these revenues, including land conservation. To the extent the uncommitted Documentary Stamp Taxes in the LATF are used for water resources, it would remove the ability to use them for land conservation or other purposes.

[See table on following page]

Table 4.4.1 Forecast of Potential Water Resource Revenues, Expenditure, and Gap (in $millions)

Revenues	**FY17-18**	**FY18-19**	**FY19-20**	**FY20-21**	**FY21-22**	**FY22-23**	**FY23-24**	**FY24-25**	**FY25-26**	**FY26-27**
Non-Doc Stamp Revenues*	$621.30	$629.00	$636.30	$643.30	$649.70	$655.70	$660.80	$666.90	$672.80	$678.70
Doc Stamps Water-Related Statutory Distributions to LATF	$254.75	$292.98	$300.95	$309.06	$319.00	$319.00	$319.00	$319.00	$319.00	$314.00
Average Water-Related GR Funding	$127.20	$127.20	$127.20	$127.20	$127.20	$127.20	$127.20	$127.20	$127.20	$127.20
Total Potential Revenue Available	**$1,003.25**	**$1,049.18**	**$1,064.45**	**$1,079.56**	**$1,095.90**	**$1,101.90**	**$1,107.00**	**$1,113.10**	**$1,119.00**	**$1,119.90**
Expenditures										
Total Projected Water Resource Expenditures	**$977.21**	**$1,127.29**	**$1,148.86**	**$1,161.96**	**$1,177.68**	**$1,193.87**	**$1,208.10**	**$1,222.58**	**$1,222.70**	**$1,236.47**
Difference										
Gap (Revenues minus Expenditures)	**$26.04**	**($78.11)**	**($84.41)**	**($82.40)**	**($81.78)**	**($91.97)**	**($101.10)**	**($109.48)**	**($103.70)**	**($116.57)**
Other Revenues Potentially Available to Close the Gap										
LATF Doc Stamps Statutorily Uncommitted	*$408.24*	*$402.94*	*$426.86*	*$451.17*	*$496.06*	*$540.70*	*$594.70*	*$628.78*	*$686.20*	*$746.69*

*This row consists of the "Total Non-Documentary Stamp Tax Revenues" shown in Table 4.3.4 plus the total revenues available for water supply shown in Table 4.3.1. As discussed in subsection 4.3, these revenues include both state and federal sources that are appropriated by the Legislature.

While the Legislature has generally used cash to pay for water resources projects in recent years, Documentary Stamp Tax revenues can be used to secure bonds for some of these purposes. In Fiscal Year 2018-19, the total remaining statutory authority for the issuance of Florida Forever and Everglades bonds is $3.6 billion. Table 4.4.2 shows the available authority by program.

Table 4.4.2 Florida Forever and Everglades Restoration Bonding Authority

Bond Program	**Available Authority**
Florida Forever	$3.3 billion
Everglades Restoration	$200 million
Everglades Restoration (Florida Keys)	$100 million
TOTAL	$3.6 billion

In 2017, the Legislature authorized the issuance of Florida Forever bonds to pay for costs related to land acquisition, planning, and construction of certain water storage reservoirs.[381] The bonds may be issued in an amount of up to $800 million for this purpose; the authorization falls within the $3.3 billion total available authorization.[382] Florida Forever bonds are statutorily limited to $300 million in annual debt service, and it is the intent of the Legislature that all bonds issued be retired by December 31, 2040. The annual limitation on debt service could potentially be reached before issuing the full $3.3 billion of remaining bond authorization. For Fiscal Year 2018-19, based on the current debt service payments for previously issued bonds, the Legislature could appropriate up to an additional $160 million for debt service payments to secure new bonds. Assuming 20-year level debt at a 5.0 percent long-term interest rate, up to $1.9 billion in new Florida Forever bonds, including bonds for water storage reservoirs, could be issued in Fiscal Year 2018-19 within the $300 million annual debt service cap.

Bonds for Everglades restoration may be issued in an amount not to exceed $100 million per fiscal year, unless the Legislature authorizes an additional amount of bonds within the statutory criteria.[383] For example, Everglades restoration bonds to fund the Florida Keys Area of Critical State Concern protection program and the City of Key West Area of Critical State Concern may be issued in an amount not to exceed $50 million per fiscal year. Everglades restoration bonds must be issued by Fiscal Year 2019-20. Thus, bonds of $100 million per year for Everglades restoration and $50 million per year for Florida Keys/Key West could be issued for Fiscal Years 2018-19 and 2019-20; however, no bonds can be issued after that point without a statutory change. Assuming 20-year level debt at a 5.0 percent long-term interest rate, new bonds of $150 million would generate a need for approximately $12.0 million in additional annual debt service.

Although the sale of bonds can significantly increase the amount available for expenditure in a given fiscal year, it is important to remember in any year where a bond sale is made, a portion of the Documentary Stamp Tax revenue is obligated into the future. This means that the state gives up a portion of the future tax collections in order to enjoy the benefit of having a larger amount to spend on projects in the present time. Based on the current statutory distributions of Documentary Stamp Tax collections to the LATF, increases to the required debt service payments will have corresponding decreases to the statutory distributions for water-related projects as well as the uncommitted cash. Essentially, new bond authorizations have the effect of shifting funds in future years from paying for new projects to paying debt service for previously authorized projects—the total distributions to the LATF would remain the same.

[381] See Ch. 2017-10, § 3, Laws of Fla. (codified at § 373.4598, Fla. Stat.).
[382] § 201.15(3)(a), Fla. Stat. No bonds may be issued for water storage reservoirs unless such bonds are approved and the debt service for the remainder of the fiscal year in which the bonds are issued is specifically appropriated in the General Appropriations Act or other law.
[383] § 215.619, Fla. Stat.

5. Special Topics

Because of the complexity of the programs and initiatives devoted to Florida's water resources and conservation lands, EDR has identified special topics that are more appropriately discussed on their own rather than being split among the report's conservation land, water quality, and water supply subsections. These topics may vary from year to year. The topics included in this year's report are Everglades restoration, Deepwater Horizon, and Senate Bill 10 (2017), which are important components in the state's efforts to protect its natural resources.

5.1 Everglades Restoration

The Florida Everglades, the "River of Grass," is a mosaic of sawgrass marshes, freshwater ponds, prairies, and forested uplands that supports a diverse plant and wildlife community. The Greater Everglades ecosystem originally encompassed 11,000 square miles from central Florida to the Florida Keys. Historically, sheets of freshwater naturally flowed from the Kissimmee chain of lakes to Lake Okeechobee, where its flood waters traveled southward through a variety of low-lying habitat types before finally emptying into the Gulf of Mexico, Florida Bay, and Biscayne Bay.

Because of efforts to drain the marshland for flood control, agriculture, and development, the Everglades today is half the size it was a century ago. Yet, what remains of the Everglades is still considered one of the most unique ecosystems in the world and one of Florida's great treasures.[384] The Everglades wetlands provide numerous benefits to South Florida including water supply, flood control, and recreational opportunities, and serve as a unique habitat for diverse species of wildlife and plant life.[385] The Everglades wetlands also provide natural water storage for the environment during drier seasons and serve as an important water recharge area for South Florida.

To restore and protect the greater Everglades ecosystem, the Florida Legislature established the State of Florida's responsibilities in a series of statutes under the Florida Water Resources Act, chapter 373, Florida Statutes. In addition to authorizing the South Florida Water Management District (SFWMD) to serve as the local sponsor for the majority of restoration efforts,[386] the Legislature directed the roles and responsibilities of both the Department of Environmental Protection and SFWMD for plans authorized through the Everglades Forever Act, the Comprehensive Everglades Restoration Plan, the Northern Everglades and Estuaries Protection Program, and the Everglades Restoration Investment Act.

Everglades Forever Act

In 1994, the Legislature enacted the Everglades Forever Act (EFA) establishing a long-term commitment to restoring and protecting the remaining Everglades ecosystem by improving water quality and water quantity.[387] The EFA required SFWMD to develop a plan for achieving

[384] § 373.4592(1)(a), Fla. Stat.
[385] § 373.4592(1), Fla. Stat.
[386] § 373.1501, Fla. Stat.
[387] Ch. 94-115, §§ 1-2, Laws of Fla. (codified as amended in § 373.4595, Fla. Stat.).

compliance with state water quality standards, including total phosphorous criterion, by 2003. In 2003, the EFA was amended to incorporate SFWMD's Long-Term Plan for Achieving Water Quality Goals for Everglades Protection Area consisting of various projects that would achieve compliance with the total phosphorous criterion in the Everglades Protection Area.[388]

In 2014, the EFA was amended to include the State of Florida and U.S. Environmental Protection Agency's agreement on new strategies for improving water quality in the Everglades. Known as the Restoration Strategies Regional Water Quality Plan, this technical plan includes the creation of 6,500 acres of new stormwater treatment areas (STAs) and 116,000 acre-feet of additional water storage (flow equalization basins or FEBs) to achieve compliance with the water quality standards for the Everglades.[389] The estimated cost of implementing the Restoration Strategies is $880 million over a 13-year period. A total of $500.7 million in funds will be provided by SFWMD with the balance to be provided by the state. The 2013 Legislature appropriated $32 million on a recurring basis to support the implementation of the technical water quality plan.

Comprehensive Everglades Restoration Plan

In 2000, Congress approved the Comprehensive Everglades Restoration Plan (CERP) with the passage of the Water Resources Development Act of 2000, Public Law 106-541 (WRDA 2000) to provide a coordinated plan for restoring the water resources of central and southern Florida, including the Everglades. The CERP is a large, comprehensive, long-term 50-50 partnership with the federal government, which focuses primarily on the restoration of the water quantity, quality, timing, and distribution within the Everglades ecosystem. The CERP consists of more than 60 projects that will take more than 30 years to complete at a cost of an estimated $13.5 billion. Under WRDA 2000, the federal government is responsible for 50 percent of the cost of carrying out CERP projects, although land acquisition necessary to implement CERP projects is the responsibility of the State (the amount of which is credited towards the State's share).

In addition, the Central Everglades Planning Project (CEPP), a component of the CERP, was federally approved in December 2016. The cost of the CEPP is estimated to be $1.98 billion, nearly half of which ($991.5 million) will be funded by the state pursuant to the cost-share requirements in section 601(e) of WRDA 2000.[390] As discussed in subsection 4.3, section 375.041, Florida Statutes, already directs distributions of certain funds in the Land Acquisition Trust Fund (LATF) for Everglades restoration, including the CEPP component of the CERP. Note that the implementation of CEPP may change as a result of Florida legislation passed in 2017 (Senate Bill 10). This legislation is discussed further in subsection 5.3 below.

Northern Everglades and Estuaries Protection Act

In 2007, the Legislature enacted the Northern Everglades and Estuaries Protection Program (NEEPP), which expanded on the existing Lake Okeechobee Protection Program, to include protection and restoration of Lake Okeechobee, Caloosahatchee, and St. Lucie River

[388] The "Everglades Protection Area" is defined as Water Conservation Areas 1, 2A, SB, 3A, 3B, the Arthur R. Marshall Loxahatchee National Wildlife Refuge, and the Everglades National Park. § 373.4592(2)(i), Fla. Stat.
[389] SFWMD, Restoration Strategies Regional Water Quality Plan. 2012. Available at: https://www.sfwmd.gov/sites/default/files/documents/rs_waterquality_plan_042712_final.pdf. For additional information, see also SFWMD, Restoration Strategies for Clean Water for the Everglades, https://www.sfwmd.gov/our-work/restoration-strategies. (Accessed January 2018).
[390] Water Infrastructure Improvements for the Nation Act (WIIN Act), Pub. L. No.114-322 (2016).

watersheds.[391] The purpose of the NEEPP is to coordinate implementation of watershed-based protection plans to improve water quality and quantity, control exotic species, and restore habitat within these three northern Everglades watersheds.[392]

In 2016, the Florida Legislature amended NEEPP to reflect the basin management action plans adopted for Lake Okeechobee (2014), the Caloosahatchee Estuary Basin (2012), and the St. Lucie Estuary Basin (2013), as the pollution control programs for these watersheds. The amendments also clarify the roles and responsibilities of SFWMD, DEP, and DACS in implementing the program.[393]

Everglades Restoration Investment Act

In 2000, the Legislature passed the Everglades Restoration Investment Act, which provided the framework for the state to fund its share of the partnership, through cash or bonds to finance or refinance the cost of acquisition and improvement of land and water areas necessary for implementing CERP.[394] In 2007 and 2008, the Legislature expanded the use of the Save Our Everglades Trust Fund and bonds issued for Everglades restoration to include the Lake Okeechobee Watershed Protection Plan and the River Watershed Protection Plans under the Northern Everglades and Estuaries Protection Program, and the Keys Wastewater Plan.[395]

State Funding for Everglades Restoration

Since Fiscal Year 2007-08, the Legislature has appropriated over $1.25 billion for projects related to Everglades restoration. The majority of the funding (shown in the "Restoration Projects" column) is for projects that support CERP and the Restoration Strategies Regional Water Quality Plan. Table 5.1.1 shows the annual cash expenditures for projects related to Everglades restoration. Because many of these expenditures can be spent over multiple years, only 59 percent of the total appropriations has currently been spent.

[See table on following page]

[391] Ch. 2007-253, § 3, Laws of Fla. (amending § 373.4595, Fla. Stat.).
[392] § 373.4595, Fla. Stat.
[393] Ch. 2016-1, § 15, Laws of Fla. (amending § 373.4595, Fla. Stat.). For more information on basin management action plans associated with NEEPP, visit: DEP, Basin Management Action Plans, https://floridadep.gov/dear/water-quality-restoration/content/basin-management-action-plans-bmaps.
[394] Ch. 2000-129, § 5, Laws of Fla. (codified as amended in § 373.470, Fla. Stat.).
[395] The Keys Wastewater Plan is defined as "the plan prepared by the Monroe County Engineering Division dated November 2007 and submitted to the Florida House of Representatives on December 4, 2007). § 373.470(2)(e), Fla. Stat.

Table 5.1.1 State Expenditures for Everglades Restoration (in $millions)

Fiscal Year	Restoration Projects	Land Acquisition	Florida Keys Wastewater Treatment	Lake Okeechobee Agricultural Projects	Other Projects	TOTAL
FY07-08	$119.21	$0.00	$0.00	$0.00	$0.00	$119.21
FY08-09	$55.84	$0.00	$0.00	$0.00	$0.00	$55.84
FY09-10	$38.35	$0.00	$0.00	$0.00	$0.00	$38.35
FY10-11	$69.27	$0.00	$0.00	$0.00	$0.00	$69.27
FY11-12	$27.54	$0.00	$0.00	$0.00	$0.00	$27.54
FY12-13	$26.60	$0.00	$0.00	$0.00	$0.00	$26.60
FY13-14	$54.77	$0.00	$39.16	$0.00	$0.00	$93.92
FY14-15	$35.25	$0.00	$10.72	$4.72	$3.88	$54.56
FY15-16	$55.50	$0.05	$26.20	$6.65	$27.37	$115.77
FY16-17	$89.70	$6.52	$6.23	$5.72	$32.19	$140.37
TOTAL	**$572.03**	**$6.57**	**$82.31**	**$17.09**	**$63.44**	**$741.44**

*Through June 30, 2017.

The funding sources for Everglades restoration projects have included General Revenue, trust fund balances, and bond proceeds. Current law authorizes the issuance of bonds to finance or refinance the cost of Everglades restoration.[396] Bonds may be issued in Fiscal Years 2002-03 through 2019-20, in an amount not to exceed $100 million per fiscal year except under certain conditions.[397] To date, the state has issued approximately $336.8 million of Everglades bonds. The most recent year that new bonds were authorized was Fiscal Year 2014-15, when the Legislature authorized bonds of up to $50.0 million for the purpose of constructing sewage collection, treatment, and disposal facilities included in the Florida Keys Area of Critical State Concern.[398]

As of October 2017, the aggregate principal amount of outstanding bonds is approximately $217.4 million, with debt service of approximately $23.4 million due in Fiscal Year 2017-18. If no new bonds are sold, the estimated debt service is expected to decline each year through Fiscal Year 2034-35, at which time the Everglades bonds would be retired. Table 5.1.2 shows the estimated debt service that will be due each fiscal year.

[See table on following page]

[396] § 215.619, Fla. Stat.
[397] Section 215.619(1)(a), Florida Statutes, authorizes bonds to exceed $100 million per fiscal year if DEP requests additional amounts to achieve cost savings or accelerate the purchase of lands, or the Legislature authorizes additional bonds to fund the Florida Keys and Key West Areas of Critical State Concern.
[398] Specific Appropriation 1626A, ch. 2014-51, Laws of Fla. (Fiscal Year 2014-15 General Appropriations Act).

Table 5.1.2 Everglades Restoration Bonds Outstanding Debt Service (in $millions)

Fiscal Year	Outstanding Debt Service	Expected Interest Subsidy	Net Debt Service Owed*
FY17-18	$24.00	($0.58)	$23.42
FY18-19	$24.02	($0.55)	$23.47
FY19-20	$24.06	($0.51)	$23.55
FY20-21	$24.11	($0.47)	$23.64
FY21-22	$24.14	($0.43)	$23.71
FY22-23	$24.20	($0.39)	$23.81
FY23-24	$24.26	($0.34)	$23.91
FY24-25	$24.32	($0.31)	$24.00
FY25-26	$17.81	($0.26)	$17.56
FY26-27	$17.88	($0.20)	$17.68
FY27-28	$10.33	($0.14)	$10.20
FY28-29	$10.27	($0.07)	$10.20
FY29-30	$6.93	$0.00	$6.93
FY30-31	$6.93	$0.00	$6.93
FY31-32	$6.93	$0.00	$6.93
FY32-33	$3.43	$0.00	$3.43
FY33-34	$3.43	$0.00	$3.43
FY34-35	$3.43	$0.00	$3.43
TOTAL	**$280.47**	**($4.26)**	**$276.22**

*As of October 2017.

The Everglades bonds have been issued on a parity basis with Florida Forever bonds, which means both bond programs have a first lien on pledged revenues (i.e., Documentary Stamp Tax). The debt service is paid from the LATF for both Florida Forever bonds and Everglades bonds.

In addition to the Documentary Stamp Tax used to support debt service for Everglades bonds, the Legislature has also designated a portion of funds deposited into the LATF be appropriated for Everglades restoration projects.[399] The provision requires that a minimum of the lesser of 25 percent or $200 million be appropriated for Everglades restoration projects that implement the CERP, including the Central Everglades Planning Project, the Long-Term Plan, and the Northern Everglades and Estuaries Protection Program. The 2017 Legislature added the following list of projects to the eligible uses of CERP funds: the Everglades Agricultural Area Storage Reservoir Projects, the Lake Okeechobee Watershed Project, the C-43 West Basin Storage Reservoir Project, the Indian River Lagoon-South Project, the Western Everglades Restoration Projection, and the Picayune Strand Restoration Project.[400] The 2017 Legislature also authorized the sum of $64 million to be transferred annually from the LATF to the Everglades Trust Fund annually beginning in Fiscal Year 2018-19 for the EAA reservoir project.[401]

Federal Funding for Everglades Restoration

Under CERP, the federal government is required to fund half of the costs for restoration. Federal funding is provided through the U.S. Army Corps of Engineers and the U.S. Department of the

[399] § 375.041, Fla. Stat.
[400] Additional details are provided in subsection 5.3 of the report. *See also* ch. 2017-10, Laws of Fla.
[401] *Ibid.*

Interior. According to the Congressional Research Service, the federal government has spent just over $1.0 billion on Everglades restoration efforts since 2011.[402] Table 5.1.3 shows the federal funding since Federal Fiscal Year 2011.

Table 5.1.3 Federal Expenditures for Everglades Restoration (in $millions)

Federal Fiscal Year	Dept. of Interior	Army Corps	TOTAL
FY10-11	$70.60	$131.07	$201.67
FY11-12	$99.88	$142.49	$242.37
FY12-13	$66.36	$96.01	$162.36
FY13-14	$70.45	$47.62	$118.07
FY14-15	$62.27	$68.55	$130.82
FY15-16	$64.43	$94.05	$158.47
TOTAL	**$433.99**	**$579.77**	**$1,013.76**
FY16-17 Proposed	$63.00	$106.00	$169.00
FY17-18 Proposed	$54.00	$76.00	$130.00

Regional Funding for Everglades Restoration

For this year's report, no funding from SFWMD has been included, although it certainly exists. Because SFWMD is the local sponsor and receives funding from a variety of sources, additional research is needed to identify the expenditures made from the district's own sources of revenue. Future editions of this report will include these expenditures.

5.2 Deepwater Horizon Oil Spill

On April 20, 2010, the Deepwater Horizon mobile drilling rig exploded, caught fire, and eventually sank, triggering a massive release of oil and natural gas from BP's exploratory Macondo well.[403] Over the next 87 days, approximately 3.19 million barrels (134 million gallons) of oil was released into the northern Gulf of Mexico before the Macondo well was capped.[404] As the discharged oil rose through the water column to the sea surface, oil slicks cumulatively covered over 43,300 square miles of ocean surface and contaminated over 1,300 miles of shoreline, including beaches, bays, estuaries, and marshes, from eastern Texas to the Florida Panhandle.[405]

The resolution of civil claims and criminal charges against BP and other responsible parties resulted in the creation of various funding streams intended to aid in the recovery of natural resources and economies affected by the Deepwater Horizon incident. While EDR was not directly

[402] *Everglades Restoration: Federal Funding and Implementation Progress*. Congressional Research Service (Oct. 6, 2017). Available at https://www.everycrsreport.com/reports/R42007.html. (Accessed December 2017).

[403] Deepwater Horizon Natural Resource Damage Assessment Trustees, *Deepwater Horizon Oil Spill, Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* (2016), available at: http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Chapter-2_Incident-Overview_508.pdf.

[404] *Id.*

[405] *Id.*

requested to provide any analysis on the funding made available through these settlement agreements for water quality or water supply projects, a brief discussion is included in this edition of the report.

Environmental Claims

On April 4, 2016, the U.S. District Court entered a consent decree wherein BP agreed to pay a total of $14.9 billion to resolve claims for civil penalties, natural resource damages, response costs, and other damages brought by the federal government and five Gulf States (Florida, Alabama, Louisiana, Mississippi, and Texas) in connection with the Deepwater Horizon incident.[406] The BP consent decree is in addition to previous settlement of claims against other responsible parties including Transocean and Anadarko.

Three funding streams were established to allocate the criminal and civil penalties received as part of the settlement of the environmental claims: the Natural Resource Damage Assessment restoration; the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast Act of 2012 (RESTORE Act); and the National Fish and Wildlife Foundation's (NFWF) Gulf Environmental Benefit Fund. Figure 5.2.2 provides details on the available funding streams.

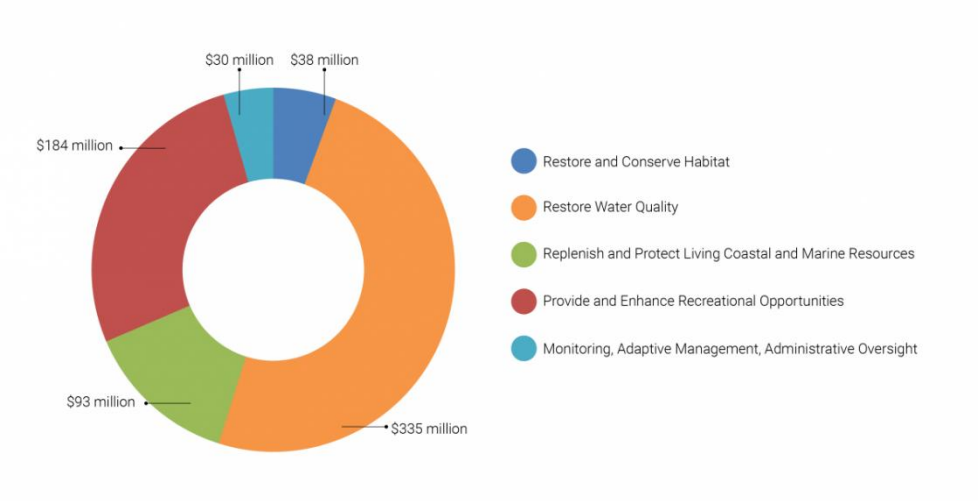
Improvement of water quality is one of the goals of some of these available funding streams. For example, the restoration of water quality is one of the restoration goals of the Florida Restoration Area for the natural resource damage restoration funding. Specifically, $335 million of the total $680 million natural resource damage funding is allocated to the restoration of water quality. Of that amount, $35 million is allocated to address nutrient reduction from nonpoint sources and $300 million for other water quality projects such as stormwater treatment, hydrologic restoration, and reduction of sedimentation.[407]

[See figure on following page]

[406] *See In re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010*, MDL No. 2179 1394949 (E.D. La. Apr. 4, 2016), Consent Decree Among Defendants BP Exploration & Production Inc. ("BPXP"), the United States of America, and the States of Alabama, Florida, Louisiana, Mississippi, and Texas.

[407] National Oceanic and Atmospheric Administration, Gulf Spill Restoration, *Allocation of Florida Restoration Area Funds*, http://www.gulfspillrestoration.noaa.gov/restoration-areas/florida/allocation-florida-restoration-area-funds. (Accessed on December 22, 2017).

Figure 5.2.1 Florida Allocation of Natural Resource Damage Restoration Funds



Source: NOAA, Gulf Spill Restoration, http://www.gulfspillrestoration.noaa.gov/restoration-areas/florida.

The RESTORE Act dedicated 80 percent of civil and administrative penalties paid under the Clean Water Act by the responsible oil spill parties to the federal Gulf Coast Restoration Trust Fund.[408] The RESTORE Act calls for a regional approach to restoring the ecosystem and economy of the Gulf Coast region. The RESTORE Act outlines a structure for using the funds and allocates funding among five buckets. The Gulf Coast Ecosystem Restoration Council[409] (Council) administers the Comprehensive Plan Component (30 percent of total or $1.6 billion) and Spill Impact Component (30 percent of total or $1.6 billion). The U.S. Department of the Treasury administers the Direct Component (35 percent of total or $1.86 billion) and the Centers of Excellence (2.5 percent of total or $133 million) grant programs. The U.S Department of Commerce National Oceanic and Atmospheric Administration administers the NOAA Restore Act Science Program (2.5 percent of total or $133 million).

Restoration of water quality and quantity is specifically identified as one of the five goals established Council-administered Comprehensive Plan Component.[410] The Council's Initial Funded Priority List focused on habitat restoration and water quality restoration. Subsequent Funded Priority Lists will more fully consider all five Council goals.[411] Within the Initial Funded Priority List approved in December of 2015, Florida projects related to water quality restoration include stormwater and wastewater infrastructure projects, septic-to-sewer projects, cost-sharing

[408] Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act), Pub. L. 112-141, Subtitle F.
[409] The Gulf Coast Ecosystem Restoration Council is comprised of the Governors of the five Gulf States, the Secretaries of the U.S. Department of the Interior, Army, Commerce, Agriculture, and Homeland Security, and the Administrator of the U.S. Environmental Protection Agency.
[410] Gulf Coast Ecosystem Restoration Council, *Comprehensive Plan Update 2016*, https://www.restorethegulf.gov/comprehensive-plan. (Accessed on December 28, 2017).
[411] According to the Gulf Coast Ecosystem Restoration Council's Comprehensive Plan Update 2016, the Five Council Goals are: Restore and Conserve Habitat; Restore Water Quality and Quantity, Replenish and Protect Living Coastal and Marine Resources; Enhance Community Resilience; and Restore and Revitalize the Gulf Economy.

with landowners for BMP implementation, and planning activities associated with contaminated sediment removal.[412]

Additionally, water quality projects are also eligible activities under the RESTORE Act's Direct Component and Spill Impact Component.[413] Grant funding under the Direct Component is available to affected counties in Florida[414] and requires each county to submit for approval by the U.S. Treasury Department a Multiyear Implementation Plan identifying each activity for which the county seeks funding.[415] Funding under the Spill Impact Component is available to the Gulf Coast states and requires each state, through its Governor or designee, to submit for approval by the Council a State Expenditure Plan describing each activity for which the state seeks funding.[416]

The National Fish and Wildlife Foundation (NFWF) established the Gulf Environmental Benefit Fund to receive $2.544 billion in criminal fines under two plea agreements with BP[417] and Transocean[418] as a result of the Deepwater Horizon incident. Under the plea agreements, funding is available for projects that "remedy harm and eliminate or reduce the risk of future harm to Gulf coast natural resources" impacted by the oil spill.[419] Projects in Florida are selected in consultation with state and federal resource managers (Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of Environmental Protection (DEP), the U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration (NOAA)). Projects that measurably improve water quality are among the types of projects in Florida that have been awarded funding by NFWF.[420]

[See figure on following page]

[412] Gulf Coast Ecosystem Restoration Council, *Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE Act) Initial Funded Priorities List*, available at: https://www.restorethegulf.gov/sites/default/files/FPL_forDec9Vote_Errata_04-07-2016.pdf. (Accessed December 28, 2017).

[413] RESTORE Act, Pub. L. 112-141, § 1603; *see also* Eligible Activities for the Section 311(t) Gulf RESTORE Program Components Rule, 31 C.F.R. §§ 34.201, 34.203.

[414] Allocation of Funds, Direct Component Rule, 31 C.F.R. § 34.302(b)-(c) (identifying the percent of funding available to disproportionately affected counties and nondisproportionately impacted counties in Florida).

[415] Application Procedure – Direct Component Rule, 31 C.F.R. 34.303. For a list of Direct Component Awards and Direct Component Multiyear Implementation Plans Accepted by the Treasury, visit: https://www.treasury.gov/services/restore-act/Pages/Direct%20Component/Direct-Component.aspx. (Accessed December 2017).

[416] State Expenditure Plan – Spill Impact Component Rule, 31 C.F.R. 34.203.

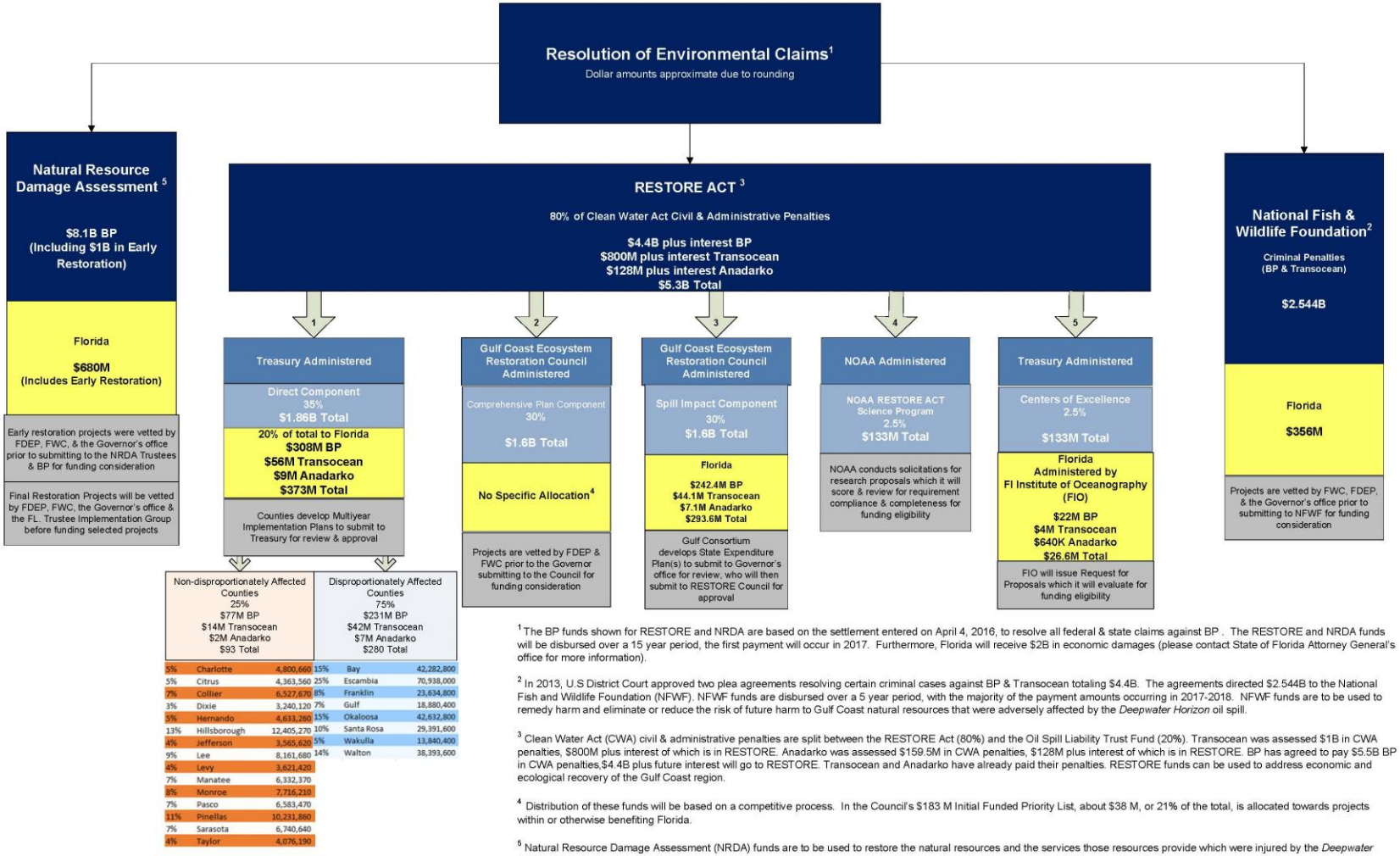
[417] Plea Agreement, *United States v. BP Exploration and Production*, (E.D. La. Jan. 29, 2013) ("BP Plea Agreement") available at: https://www.justice.gov/sites/default/files/criminal-vns/legacy/2012/12/17/2012-11-15-BP-Guilty-Plea-Agreement.pdf. (Accessed December 2017).

[418] Plea Agreement, *United States v. Transocean Deepwater Inc.*, No. 13-001 "H" (E.D. La Feb. 14, 2013) ("Transocean Plea Agreement") available at: https://www.justice.gov/sites/default/files/criminal-vns/legacy/2013/01/18/2013-01-03-transocean-plea-agreement.pdf. (Accessed December 2017).

[419] BP Plea Agreement, *supra* note 417 at 17; Transocean Plea Agreement, *supra* note 418 at Exhibit B, page 2.

[420] National Fish and Wildlife Foundation, *Gulf Environmental Benefit Fund in Florida*, http://www.nfwf.org/gulf/Pages/GEBF-Florida.aspx. (Accessed on December 28, 2017).

Figure 5.2.2 Deepwater Horizon Funding from Environmental Claims



Source: Florida Department of Environmental Protection.

Economic Claims

The BP consent decree was conditioned upon the prior resolution of claims brought by the five Gulf states for economic damages,[421] which resulted in a separate settlement agreement worth $4.9 billion.[422] With regard to economic damages, Florida will receive a total of $2 billion, the largest share among the Gulf states.[423] Florida received the initial payment of $400 million in July 2016 with subsequent payments of approximately $106.7 million to occur annually from Fiscal Year 2018-19 through Fiscal Year 2032-33.[424]

In 2017, the Florida Legislature passed House Bill 7077 and House Bill 7079 amending the original Gulf Coast Economic Corridor Act, created in part VI of chapter 288, Florida Statutes, to address the use of funds recovered for economic damages to the state as a result of the Deepwater Horizon incident.

Triumph Gulf Coast, Inc. (Triumph), a nonprofit organization created within the Department of Economic Opportunity, was designated to administer 75 percent of funds received from the settlement agreement for the benefit of eight disproportionately affected counties,[425] which are defined as Bay, Escambia, Franklin, Gulf, Okaloosa, Santa Rosa, Walton, and Wakulla.[426] In Fiscal Year 2016-17, Triumph received $300 million. In Fiscal Years 2018-19 through 2032-33, Triumph will receive approximately $80 million annually. The remaining 25 percent of funds received will be deposited in the General Revenue Fund for appropriation by the Legislature.

Triumph is authorized to make awards to any person, organization, or local government for projects or programs for economic development within the disproportionately affected counties. Awards may be provided for:

1. Ad valorem tax reduction;

2. Local match requirements for projects related to the Rural Infrastructure Fund in section 288.0655, Florida Statutes;

3. Public infrastructure projects for construction, expansion, or maintenance shown to enhance economic recovery, diversification, and enhancement of the disproportionately affected counties;

4. Grants for the following within the disproportionately affected counties:
    a. Establishing and maintaining equipment and trained personnel for local action plans of response to respond to disasters;

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[421] *Supra* note 406.
[422] *In Re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010*, MDL No. 2179 (E.D. La. Oct. 5, 2015), Settlement Agreement Between the Gulf States and the BP Entities With Respect to Economic and Other Claims Arising from the Deepwater Horizon Incident, Attachment 1, Payment Schedule for State Claims Payment.
[423] *Id*.
[424] *Id.*
[425] § 288.8013
[426] § 288.8012(3), Fla. Stat.

b. Programs at K-20 educational institutions that prepare students for future occupations and careers;
c. Programs that provide sustainable workforce skills that are not confined to a single employer; or
d. Advertising and promoting tourism and Fresh From Florida by the tourism entity created under section 288.1226, Florida Statutes, and grants to promote workforce and infrastructure.[427]

Triumph is required to establish an application procedure and a scoring process for selecting projects and programs that have a potential to increase economic activity within the disproportionately affected counties. Projects or programs that benefit the environment in addition to the economy are among the types of projects that must be given priority.[428]

5.3 The 2017 Legislative Session: Senate Bill 10

In 2017, the Florida Legislature passed Committee Substitute for Senate Bill 10 relating to the conservation and protection of water resources (Senate Bill 10).[429] Senate Bill 10 establishes certain requirements for water storage projects south of Lake Okeechobee and creates a program for providing financial assistance to local government agencies for water storage facilities. Future editions of this report will incorporate relevant expenditures into the appropriate sections.[430]

EAA Reservoir
First, Senate Bill 10 creates section 373.4598, Florida Statutes, Water Storage Reservoirs, which, among other things, establishes an expedited schedule for the South Florida Water Management District (SFWMD) to design and construct the Everglades Agricultural Area (EAA) reservoir project. The EAA reservoir project is included in the Comprehensive Everglades Restoration Plan (CERP) as Component G. Currently, the water storage features of the EAA reservoir project are divided into two projects: PPA North and the EAA Storage and ASR/Decomp Ph2. According to the Integrated Delivery Schedule, planning for PPA North, which is a component of the Central Everglades Planning Project (CEPP), is scheduled to commence in 2018.[431] Planning for the EAA Storage and ASR/Decomp Ph2 is scheduled to commence in 2021.[432]

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[427] § 288.8017(1), Fla. Stat.
[428] § 288.8017(2), Fla. Stat. (identifying the list of factors that would require projects and programs to be given priority in the selection process).
[429] Ch. 2017-10, Laws of Fla.
[430] Senate Bill 10 also creates the Everglades Restoration Agricultural Community Employment Training Program within the Department of Economic Opportunity and prohibits the use of inmates for correctional work programs in the agricultural industry in the EAA or any area experiencing high unemployment rates in the agricultural sector. EDR will not be reporting on these initiatives.
[431] The planning study for CEPPP was initiated in October 2011 to identify project components that would focus restoration on more natural flows to the central and southern Everglades. *See* U.S. Army Corps of Engineers, *Central Everglades Planning Project*, http://www.saj.usace.army.mil/Missions/Environmental/Ecosystem-Restoration/Central-Everglades-Planning-Project/. (Accessed December 2017). Congress authorized the CEPP in the Water Infrastructure Improvements for the Nation Act (WIIN Act), Pub. L. No. 114-322 (Dec. 12, 2016).
[432] U.S. Army Corps of Engineers, Integrated Delivery Schedule (December 2010), available at:

In particular, deadlines are established to: (1) identify land and express interest to landowners and lessees in acquiring such lands; (2) develop with the U.S. Army Corps of Engineers (Corps) a post-authorization change report for the CEPP to revise the project component located on the A-2 parcel to increase water storage to a minimum of 240,000 acre-feet on the A-2 parcel, and (3) request the Corps to initiate a project implementation report for the EAA reservoir project if the post-authorization change report is not submitted for congressional approval by October 1, 2018, or has not received congressional approval by December 31, 2019, unless an extension is granted by the Legislature.

C-51 Reservoir Project

Second, section 373.4598(9), Florida Statutes, recognizes the C-51 reservoir project as a water storage facility project in western Palm Beach County, south of Lake Okeechobee, and establishes requirements with regard to this project if state funds are appropriated to implement it. The C-51 reservoir project consists of in-ground reservoirs and conveyance structures that will provide water supply and water management benefits to participating water utilities, and will provide environmental benefits by reducing freshwater discharges lost to tide and making more water available for natural systems. Phase I of the C-51 reservoir project will provide approximately 14,000 acre-feet of storage and Phase II will provide approximately 46,000 acre-feet of storage.[433]

The SFWMD is authorized to negotiate with the owners of the C-51 reservoir project site to acquire land or enter into a public-private partnership. The SFMWD is also authorized to acquire from willing sellers land near the C-51 reservoir through the purchase or exchange of district or state-owned land to implement Phase II of the project. If state funds are appropriated for Phase I or Phase II of the C-51 reservoir project, SFWMD is required to operate the reservoir to maximize the reduction of high-volume regulatory releases from Lake Okeechobee to the estuaries. The water made available through the project must be used for natural systems in addition to any allocated amounts of water supply, and no water from Lake Okeechobee may be used to support consumptive use permits.[434]

Water Storage Facility Revolving Loan Fund Program

Lastly, Senate Bill 10 creates the water storage facility revolving loan program, section 373.475, Florida Statutes, and authorizes the use of funds in the Water Protection and Sustainability Program Trust Fund, section 403.890, Florida Statutes, for this revolving loan fund. Under this program, DEP is authorized to provide funding assistance to local governments or water supply entities for the development and construction of water storage facilities in order to increase the availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems.[435] In order to ensure that this loan program is operated in perpetuity, DEP may require reasonable service fees of no less than 2 percent or greater than 4 percent of the loan amount to be used exclusively for the purposes of implementing the loan program.[436]

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http://www.saj.usace.army.mil/Portals/44/docs/Environmental/IDS/IDS_PLACEMAT_05JAN2017_web.pdf?ver=2017-01-07-164638-380. (Accessed December 2017).

[433] § 373.4598(9), Fla. Stat.

[434] *Id.*

[435] § 373.475(3), Fla. Stat.

[436] § 373.475(10), Fla. Stat.

Senate Bill 10 provides $33.0 million nonrecurring funding for the EAA reservoir project from the Land Acquisition Trust Fund (LATF) for Fiscal Year 2017-18. Of the total amount appropriated, $30 million is for land acquisition and other planning of the EAA reservoir project and $3.0 million is for the development of the post-authorization change report for CEPP.[437] The legislation further provides that beginning in Fiscal Year 2018-19, an appropriation of $64 million is to be made annually from the LATF to the Everglades Trust Fund for the EAA reservoir project. Any funds remaining in a fiscal year from the EAA reservoir project are made available for Phase II of the C-51 reservoir project or the Everglades restoration projects passed in chapter 2016-201, Laws of Florida, in addition to the lesser of $200 million or 25 percent of the LATF already available for Everglades restoration projects.[438]

With regard to the C-51 reservoir project, Senate Bill 10 provides a nonrecurring appropriation of $30 million from the General Revenue Fund to the Water Resource Protection and Sustainability Program Trust Fund to provide a 30-year loan through the water storage facility revolving loan program to implement Phase I of the C-51 reservoir project. An additional $1.0 million nonrecurring from the LATF is appropriated for the purpose of negotiating Phase II of the C-51 reservoir project.[439]

[437] Ch. 2017-10, §§ 10-11, Laws of Fla.
[438] § 375.041(3)(b)4., Fla. Stat.
[439] Previous funding was provided for the C-51 reservoir project in Fiscal Years 2014-15 ($500,000 from the Water Management Lands Trust Fund) and Fiscal Year 2016-17 ($2.0 million from General Revenue). Expenditures related to these appropriations are included in Table 5.1.1 in the amounts shown for "Other Projects."

6. Overlap in Water and Conservation Land Expenditures

The annual assessment is required to identify any overlap in the expenditures for water resources and conservation lands. Historically, when EDR has encountered overlap in expenditures, the benefits of said expenditures are apportioned based upon funding sources. For example, if the state provides economic development funding for a firm to build a headquarters in Florida such that the state covers 25 percent of the costs and the firm covers the remaining 75 percent, EDR would apportion the economic benefits that headquarters brings to the state and credit 25 percent to the state funding and 75 percent to the firm. This apportionment cannot be applied to expenditures on water resources and land conservation for other purposes. To do so would require EDR to analyze expenditure data for each acquisition project and apportion a specific amount solely to water resource protection.

Segregating the cost for water resource conservation and protection from other conservation goals of a particular acquisition poses a great deal of difficulty because a portion of funding for land conservation may have been intended to primarily protect water resources, whereas land conservation for other purposes, such as species protection, may also provide benefit to water resource protection or restoration. In fact, through public land acquisition programs, such as the Florida Forever program, agencies are encouraged to identify and promote a combination of goals, including protection of Florida's water resources; thereby, creating an intended overlap among various environmental benefits.

For almost three decades, the Legislature has recognized that the alteration and development of Florida's natural landscape to accommodate its growing population has not only led to the loss of important fish and wildlife habitat, outdoor recreational areas, forests, and coastal open space, but has also contributed to the degradation of the state's valuable water resources, including groundwater, surface waters, streams, wetlands, springs aquifers, and estuaries.[440] The natural relationship between land and surface and groundwater in Florida underscores the importance of land conservation as a tool for water resource protection.

Whether intended to be the primary purpose or not, protection of water supply and water quality may result from conserving land in its predominantly natural state. For example, areas identified as providing for groundwater recharge protects land areas where rainfall, streams and other sources infiltrate downward into the ground recharging groundwater—the primary source of Florida's drinking water. Reducing impervious surfaces that result from development or high-pollutant land uses may also contribute to water quality protection within that watershed. Further, conservation of wetlands and their functions provide natural filtration of pollutants for stormwater, habitat for fish and wildlife, important flood storage areas and storm protection. Protection of coastal wetlands also provide natural buffers to erosion from storms and storage areas for flooding.

EDR has identified land acquisitions by water management districts as clearly having a primary water resource benefit which results in overlap. In light of the specific duties and responsibilities of the water management districts for regional water management activities, the districts are statutorily authorized to acquire land for "flood control, water storage, water management,

[440] *See* § 259.101, Fla. Stat.; *see also* § 259.105, Fla. Stat.

conservation and protection of water resources, aquifer recharge, water resource and water supply development, and preservation of wetlands, streams, and lakes."[441] The water management districts' expenditures on conservation land and water areas are further explained in subsection 2.2. In this report, EDR has once again apportioned WMD land acquisition expenditures entirely to conservation land, despite the statutory language referenced above. In this regard, nearly all public conservation land acquisition results directly or indirectly in the protection of water resources. Ideally, land acquired for district works (e.g., infrastructure) should be separately identified and attributed to water resources; however, EDR cannot make this distinction with the currently available data.

Another area of land acquisition that clearly has water resource benefits and results in overlap is land acquisition for springs protection. As stated in subsection 4.1, above, in the last three years (2015 through 2017), the Legislature appropriated funds for land acquisition to protect springs and for projects that protect water quality and water quantity that flow from springs. In DEP's Guidance on Springs Project Funding dated October 17, 2017, DEP identified factors to be considered for land acquisition including proximity to primary focus areas or springs, location within a BMAP area, recharge potential, current land use, and manageability.[442] According to DEP, approximately $19.3 million of total springs funding to date has been for projects that include a land acquisition component.[443] State expenditures for all springs restoration projects are shown in Table 4.1.4. In this report, EDR has apportioned springs restoration funding used for land acquisition entirely to water resources.

[441] § 373.139, Fla. Stat.
[442] DEP, Guidance on Springs Project Funding, October 17, 2017, available at: https://floridadep.gov/sites/default/files/Spring%20Guidance%20Document%202017.pdf. (Accessed on January 4, 2017).
[443] Telephonic communication with DEP on February 6, 2018. Note that this amount reflects current state funding that has been spent or is encumbered.

7. Conclusion

EDR has completed the second annual assessment of Florida's water resources and conservation lands, pursuant to section 403.928, Florida Statutes, and has identified a schedule for completion of the remaining analyses.

Regarding conservation land and the impact on ad valorem taxation, all of the taxable values associated with conservation lands that are owned publicly in fee simple ownership are essentially reduced to zero. On net, roughly 3.12 percent of the statewide county tax base and 2.77 percent of the statewide school tax base were lost. As a result, approximately $531 million in county taxes and $424 million in school taxes were shifted to other property owners or lost due to lands being held in conservation in 2017. Approximately 30 percent of all land in the State of Florida is managed for conservation purposes. If all lands identified in plans set forth by state agencies and water management districts are acquired, this share jumps to over 43 percent. Currently, a dedicated revenue source for managing the state's lands does not exist, and the additional lands that are acquired will entail additional costs for management as well as the acquisition cost. The projected cost for the future acquisitions by the state and water management districts exceeds $10.6 billion. The additional cost for managing these lands is projected to be $172.4 million for both the state and water management districts, annually. With just under one third of the land in the State of Florida already acquired for conservation and nearly half identified for future conservation land acquisition, serious policy questions arise. It is EDR's objective that this report will assist policy makers in future decisions regarding Florida's natural resources.

Regarding water, water demand is projected to increase by 17 percent in the next 20 years and reach 7,515.9 millions of gallons daily by 2035. The water needs of the state, however, can be met through the 2035 planning horizon with a combination of traditional and alternative water sources, appropriate management, conservation, and implementation of identified projects. In the 2016-17 fiscal year, the State of Florida expended approximately $57 million on water supply projects and an additional $806 million on water quality programs. In the most recent three fiscal years, expenditures for water resources have increased steadily, leading to questions about sustainability. Based on the projected revenues from sources historically allocated to water resources, the recent levels of increases cannot be sustained into the future without supplementation from other revenue sources, including statutorily uncommitted Documentary Stamp Taxes, additional General Revenue funds, or the use of bonds. Future editions of this report will include an analysis of future expenditures necessary to comply with laws governing water supply and water quality as well as achieve the Legislature's intent that sufficient water be available for all existing and future reasonable-beneficial uses and the natural systems, while avoiding adverse effects of competition for water supplies.

Appendix A: Projected Water Demand – Average Year Rainfall Conditions

Table A.1 NW-I Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	40.13	40.85	41.48	42.04	42.51
Domestic self-supplied	1.46	1.48	1.50	1.51	1.52
Agricultural self-supplied	3.32	3.32	3.32	3.32	3.32
Recreational-landscape irrigation	3.74	3.81	3.86	3.91	3.96
Commercial-industrial-institutional-mining self-supplied	28.91	28.07	27.08	27.09	27.10
Power generation	15.91	17.59	17.59	17.59	17.59
Total	93.48	95.11	94.83	95.46	95.99

Table A.2 NW-II Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	49.81	53.21	56.33	59.15	60.00
Domestic self-supplied	4.63	5.32	5.90	6.36	6.70
Agricultural self-supplied	6.54	6.54	6.54	6.54	6.54
Recreational-landscape irrigation	14.42	15.36	16.25	17.06	17.78
Commercial-industrial-institutional-mining self-supplied	5.88	7.83	8.96	9.58	9.74
Power generation	0.00	0.00	0.00	0.00	0.00
Total	81.29	88.26	93.98	98.70	100.76

Table A.3 NW-III Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	28.89	30.83	32.75	34.64	36.51
Domestic self-supplied	1.59	1.77	1.86	1.83	1.69
Agricultural self-supplied	2.25	2.25	2.25	2.25	2.25
Recreational-landscape irrigation	3.79	4.01	4.22	4.39	4.55
Commercial-industrial-institutional-mining self-supplied	29.76	29.83	29.90	30.11	30.15
Power generation	13.26	13.26	13.26	13.26	13.26
Total	79.54	81.95	84.24	86.48	88.42

Table A.4 NW-IV Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	5.80	5.87	5.95	6.03	6.10
Domestic self-supplied	6.87	7.08	7.26	7.40	7.53
Agricultural self-supplied	29.59	29.59	29.59	29.59	29.59
Recreational-landscape irrigation	1.04	1.07	1.09	1.11	1.12
Commercial-industrial-institutional-mining self-supplied	3.09	3.15	3.21	3.28	3.34
Power generation	2.39	2.39	2.39	2.39	2.39
Total	48.77	49.15	49.48	49.79	50.07

Table A.5 NW-V Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	3.74	3.76	3.77	3.78	3.79
Domestic self-supplied	0.51	0.51	0.51	0.51	0.51
Agricultural self-supplied	0.15	0.15	0.15	0.15	0.15
Recreational-landscape irrigation	0.47	0.48	0.48	0.48	0.48
Commercial-industrial-institutional-mining self-supplied	0.42	0.42	0.42	0.42	0.42
Power generation	0.00	0.00	0.00	0.00	0.00
Total	5.30	5.31	5.32	5.34	5.35

Table A.6 NW-VI Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	4.63	4.73	4.83	4.93	5.02
Domestic self-supplied	1.44	1.46	1.46	1.46	1.46
Agricultural self-supplied	6.63	6.63	6.63	6.63	6.63
Recreational-landscape irrigation	0.20	0.21	0.21	0.21	0.21
Commercial-industrial-institutional-mining self-supplied	0.75	0.75	0.75	0.75	0.75
Power generation	0.00	0.00	0.00	0.00	0.00
Total	13.66	13.78	13.88	13.98	14.07

Table A.7 NW-VII Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	34.32	35.67	37.02	38.37	39.70
Domestic self-supplied	7.67	8.26	8.76	9.17	9.42
Agricultural self-supplied	1.88	1.88	1.88	1.88	1.88
Recreational-landscape irrigation	3.30	3.46	3.60	3.74	3.85
Commercial-industrial-institutional-mining self-supplied	1.16	1.16	1.16	1.16	1.16
Power generation	3.32	3.32	3.32	3.32	3.32
Total	51.65	53.74	55.74	57.64	59.33

Table A.8 Total NWFWMD Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	167.33	174.92	182.13	188.93	193.63
Domestic self-supplied	24.19	25.88	27.24	28.25	28.82
Agricultural self-supplied	50.36	50.36	50.36	50.36	50.36
Recreational-landscape irrigation	26.96	28.38	29.71	30.91	31.95
Commercial-industrial-institutional-mining self-supplied	69.97	71.21	71.48	72.39	72.66
Power generation	34.88	36.56	36.56	36.56	36.56
Total	373.68	387.31	397.47	407.40	413.98

Table A.9 SR-outside NFRWSP Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	4.77	4.91	5.07	5.18	5.29
Domestic self-supplied	6.31	6.54	6.79	7.00	7.19
Agricultural self-supplied	44.81	49.3	52.31	56.65	61.07
Recreational-landscape irrigation	0.72	0.73	0.74	0.75	0.76
Commercial-industrial-institutional-mining self-supplied	43.94	45.05	46.01	47.11	48.04
Power generation	0.00	0.00	0.00	0.00	0.00
Total	100.55	106.53	110.92	116.69	122.35

Table A.10 SR-NFRWSP Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	9.47	9.89	10.29	10.64	10.99
Domestic self-supplied	14.6	15.33	16.02	16.66	17.22
Agricultural self-supplied	72.21	78.79	85.74	93.03	100
Recreational-landscape irrigation	0.88	0.92	0.95	0.98	1.00
Commercial-industrial-institutional-mining self-supplied	29.81	30.61	31.56	32.34	32.95
Power generation	6.79	13.67	13.91	14.6	15.32
Total	133.76	149.21	158.47	168.25	177.48

Table A.11 Total SRWMD Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	14.24	14.8	15.36	15.82	16.28
Domestic self-supplied	20.91	21.87	22.81	23.66	24.41
Agricultural self-supplied	117.02	128.09	138.05	149.68	161.07
Recreational-landscape irrigation	1.6	1.65	1.69	1.73	1.76
Commercial-industrial-institutional-mining self-supplied	73.75	75.66	77.57	79.45	80.99
Power generation	6.79	13.67	13.91	14.6	15.32
Total	234.31	255.74	269.39	284.94	299.83

Table A.12 SJR-NFRWSP Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	189.49	205.2	220.19	233.41	245.59
Domestic self-supplied	33.61	36.00	38.41	40.96	43.49
Agricultural self-supplied	65.52	60.62	57.21	55.77	53.58
Recreational-landscape irrigation	21.85	24.05	26.19	28.17	30.00
Commercial-industrial-institutional-mining self-supplied	92.32	94.09	95.76	97.32	98.77
Power generation	18.74	15.89	16.47	17.48	18.56
Total	421.53	435.85	454.23	473.11	489.99

Table A.13 SJR-CSEC Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	144.11	152.31	160.1	167.29	173.93
Domestic self-supplied	25.29	28.21	31.05	33.89	36.45
Agricultural self-supplied	121.69	118.52	119.45	131.99	145.99
Recreational-landscape irrigation	34.08	36.56	38.94	41.20	43.30
Commercial-industrial-institutional-mining self-supplied	14.44	15.37	16.25	17.07	17.82
Power generation	4.11	4.32	4.54	4.76	4.98
Total	343.72	355.29	370.33	396.2	422.47

Table A.14 SJR-CFWI Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	266.08	289.83	310.74	324.81	342.99
Domestic self-supplied	4.61	4.90	6.09	7.53	8.91
Agricultural self-supplied	57.09	57.59	58.38	59.53	61.01
Recreational-landscape irrigation	14.65	16.76	18.89	21.01	23.12
Commercial-industrial-institutional-mining self-supplied	15.90	18.84	21.77	24.73	27.68
Power generation	1.52	1.66	1.79	1.92	2.05
Total	359.85	389.58	417.66	439.53	465.76

Table A.15 Total for SJRWMD Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	599.68	647.34	691.03	725.51	762.51
Domestic self-supplied	63.51	69.11	75.55	82.38	88.85
Agricultural self-supplied	244.3	236.73	235.04	247.29	260.58
Recreational-landscape irrigation	70.58	77.37	84.02	90.38	96.42
Commercial-industrial-institutional-mining self-supplied	122.66	128.3	133.78	139.12	144.27
Power generation	24.37	21.87	22.80	24.16	25.59
Total	1,125.1	1,180.72	1,242.22	1,308.84	1,378.22

Table A.16 SW-NR Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	71.72	79.36	85.55	91.07	96.14
Domestic self-supplied	27.06	31.15	35.37	39.37	43.14
Agricultural self-supplied	26.89	26.82	27.14	27.72	28.55
Recreational-landscape irrigation	14.99	16.86	18.78	20.73	22.71
Commercial-industrial-institutional-mining self-supplied	9.55	9.83	10.13	10.42	10.72
Power generation	2.36	2.43	2.50	2.56	2.64
Total	152.57	166.45	179.47	191.87	203.91

Table A.17 SW-TB Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	277.09	291.84	305.02	315.36	324.58
Domestic self-supplied	31.81	36.06	40.60	45.82	50.82
Agricultural self-supplied	71.26	67.79	66.48	65.11	64.21
Recreational-landscape irrigation	16.5	17.98	19.47	20.94	22.40
Commercial-industrial-institutional-mining self-supplied	14.2	11.61	11.93	12.25	12.57
Power generation	0.39	0.40	0.41	0.42	0.44
Total	411.25	425.68	443.91	459.90	475.02

Table A.18 SW-HR Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	93.38	100.88	108.25	115.13	121.36
Domestic self-supplied	10.12	11.04	11.9	12.81	13.77
Agricultural self-supplied	183.73	184.55	185.49	186.61	187.84
Recreational-landscape irrigation	19.87	21.70	23.5	25.32	27.33
Commercial-industrial-institutional-mining self-supplied	51.85	55.10	55.39	56.61	58.20
Power generation	15.95	16.81	17.75	18.80	19.90
Total	374.90	390.08	402.28	415.28	428.40

Table A.19 SW-SR Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	90.07	95.50	100.42	104.73	108.58
Domestic self-supplied	16.18	17.45	18.63	19.71	20.66
Agricultural self-supplied	173.22	178.15	183.72	187.88	192.20
Recreational-landscape irrigation	23.20	25.23	27.3	29.41	31.51
Commercial-industrial-institutional-mining self-supplied	1.89	1.75	1.77	1.78	1.80
Power generation	0.01	0.01	0.01	0.01	0.01
Total	304.57	318.09	331.85	343.52	354.76

Table A.20 Total for SWFWMD Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	532.26	567.58	599.24	626.29	650.66
Domestic self-supplied	85.17	95.70	106.50	117.71	128.39
Agricultural self-supplied	455.10	457.31	462.83	467.32	472.8
Recreational-landscape irrigation	74.56	81.77	89.05	96.40	103.95
Commercial-industrial-institutional-mining self-supplied	77.49	78.29	79.22	81.06	83.29
Power generation	18.71	19.65	20.67	21.79	22.99
Total	1,243.29	1,300.3	1,357.51	1,410.57	1,462.09

Table A.21 SF-LKB Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	2.93	3.06	3.17	3.28	3.38
Domestic self-supplied	2.22	2.33	2.44	2.54	2.64
Agricultural self-supplied	173.70	184.70	184.80	184.90	185.00
Recreational-landscape irrigation	0.61	0.62	0.63	0.64	0.65
Commercial-industrial-institutional-mining self-supplied	20.40	21.20	22.10	23.00	23.90
Power generation	4.60	5.10	5.50	5.90	6.40
Total	204.46	217.01	218.64	220.26	222.00

Table A.22 SF-UEC Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	49.89	55.22	60.7	65.55	69.5
Domestic self-supplied	2.78	2.32	1.36	0.75	0.74
Agricultural self-supplied	170.53	168.68	170.86	173.31	178.57
Recreational-landscape irrigation	25.37	27.36	29.2	30.92	32.49
Commercial-industrial-institutional-mining self-supplied	4.17	4.38	4.57	4.73	4.88
Power generation	20.20	21.20	22.20	23.20	39.20
Total	272.95	279.15	288.89	298.45	325.38

Table A.23 SF-LWC Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	132.08	147.55	162.08	175.69	188.14
Domestic self-supplied	22.64	24.99	27.29	29.43	31.37
Agricultural self-supplied	618.95	634.93	644.66	653.01	665.92
Recreational-landscape irrigation	180.79	196.8	212.53	227.62	241.23
Commercial-industrial-institutional-mining self-supplied	25.47	25.65	26.60	27.49	28.30
Power generation	0.40	0.40	0.40	0.40	15.40
Total	980.32	1,030.31	1,073.56	1,113.64	1,170.35

Table A.24 SF-LEC Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030
Public supply	883.10	924.00	967.60	1,007.40
Domestic self-supplied	18.20	18.60	18.50	18.70
Agricultural self-supplied	646.60	641.50	652.20	663.90
Recreational-landscape irrigation	148.00	149.50	151.10	152.80
Commercial-industrial-institutional-mining self-supplied	40.50	58.70	56.60	56.60
Power generation	7.50	16.10	24.70	33.30
Total	1,743.90	1,808.40	1,870.70	1,932.70

Table A.25 SF-UKB-CFWI Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	126.85	144.26	163.13	185.94	200.15
Domestic self-supplied	10.83	10.41	9.77	8.82	7.95
Agricultural self-supplied	73.06	71.22	69.38	67.54	65.70
Recreational-landscape irrigation	10.61	12.96	15.54	18.39	22.40
Commercial-industrial-institutional-mining self-supplied	7.38	8.83	10.56	12.61	14.66
Power generation	0.46	0.46	0.46	0.46	0.46
Total	229.19	248.14	268.84	293.76	311.32

Table A.26 Total for SFWMD Water Use Projections by Category (mgd)

Water Use Category	2015	2020	2025	2030	2035
Public supply	1,194.85	1,274.09	1,356.68	1,437.86	1,468.57
Domestic self-supplied	56.67	58.65	59.36	60.24	61.40
Agricultural self-supplied	1682.84	1701.03	1721.9	1742.66	1759.09
Recreational-landscape irrigation	365.38	387.24	409.00	430.37	449.57
Commercial-industrial-institutional-mining self-supplied	97.92	118.76	120.43	124.43	128.34
Power generation	33.16	43.26	53.26	63.26	94.76
Total	3,430.82	3,583.01	3,720.63	3,858.81	3,961.75

Appendix B: Projected Water Demand – Average Year Rainfall and Drought Year Conditions

All of the percentages in the appendix are estimated at EDR by dividing 2035 projections for 1-in-10 year drought conditions by 2035 projections for average conditions. The estimated percentages may be different from the actual drought demand factors used by WMD due to rounding. For LEC, 2030 estimates are used, since the 2035 assessment is not available.

Table B.1 NW-I Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	42.51	45.48	7.00%
Domestic self-supplied	1.52	1.62	7.00%
Agricultural self-supplied	3.32	3.71	11.75%
Recreational-landscape irrigation	3.96	4.40	11.25%
Commercial-industrial-mining self-supplied	27.10	27.10	0.00%
Power generation	17.59	17.59	0.00%
Total	95.99	99.90	4.08%

Table B.2 NW-II Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	60.00	64.20	7.00%
Domestic self-supplied	6.70	7.01	4.64%
Agricultural self-supplied	6.54	6.96	6.42%
Recreational-landscape irrigation	17.78	19.44	9.34%
Commercial-industrial-mining self-supplied	9.74	9.74	0.00%
Power generation	0.00	0.00	NA
Total	100.76	107.35	6.54%

Table B.3 NW-III Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	36.51	39.07	7.00%
Domestic self-supplied	1.69	1.81	7.00%
Agricultural self-supplied	2.25	2.42	7.56%
Recreational-landscape irrigation	4.55	4.82	5.93%
Commercial-industrial-mining self-supplied	30.15	30.15	0.00%
Power generation	13.26	13.26	0.00%
Total	88.42	91.53	3.52%

Table B.4 NW-IV Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	6.10	6.53	7.00%
Domestic self-supplied	7.53	8.05	7.00%
Agricultural self-supplied	29.59	35.09	18.59%
Recreational-landscape irrigation	1.12	1.21	8.01%
Commercial-industrial-institutional-mining self-supplied	3.34	3.34	0.00%
Power generation	2.39	2.39	0.00%
Total	50.07	54.70	9.26%

Table B.5 NW-V Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	3.79	4.05	7.00%
Domestic self-supplied	0.51	0.55	7.00%
Agricultural self-supplied	0.15	0.15	0.00%
Recreational-landscape irrigation	0.48	0.52	8.19%
Commercial-industrial-institutional-mining self-supplied	0.42	0.42	0.00%
Power generation	0.00	0.00	NA
Total	5.35	5.69	6.36%

Table B.6 NW-VI Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	5.02	5.37	7.00%
Domestic self-supplied	1.46	1.56	7.00%
Agricultural self-supplied	6.63	6.89	3.95%
Recreational-landscape irrigation	0.21	0.24	10.17%
Commercial-industrial-institutional-mining self-supplied	0.75	0.75	0.00%
Power generation	0.00	0.00	NA
Total	14.07	14.81	5.24%

Table B.7 NW-VII Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	39.70	42.48	7.00%
Domestic self-supplied	9.42	10.08	7.00%
Agricultural self-supplied	1.88	2.02	7.45%
Recreational-landscape irrigation	3.85	4.19	8.86%
Commercial-industrial-institutional-mining self-supplied	1.16	1.16	0.00%
Power generation	3.32	3.32	0.00%
Total	59.33	63.25	6.61%

Table B.8 Total NWFWMD Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	193.63	207.18	7.00%
Domestic self-supplied	28.82	30.68	6.45%
Agricultural self-supplied	50.36	57.24	13.67%
Recreational-landscape irrigation	31.95	34.82	8.98%
Commercial-industrial-institutional-mining self-supplied	72.66	72.66	0.00%
Power generation	36.56	36.56	0.00%
Total	413.98	437.24	5.62%

Table B.9 SR-outside NFRWSP Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	5.29	5.61	6.05%
Domestic self-supplied	7.19	7.61	5.84%
Agricultural self-supplied	61.07	69.58	13.93%
Recreational-landscape irrigation	0.76	0.99	30.26%
Commercial-industrial-institutional-mining self-supplied	48.04	48.04	0.00%
Power generation	0.00	0.00	NA
Total	122.35	131.83	7.75%

Table B.10 SR-NFRWSP and SJR-NFRWSP Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	256.58	271.95	5.99%
Domestic self-supplied	60.71	64.34	5.98%
Agricultural self-supplied	153.58	175.39	14.20%
Recreational-landscape irrigation	31.00	45.10	45.48%
Commercial-industrial-institutional-mining self-supplied	131.72	131.72	0.00%
Power generation	33.88	33.88	0.00%
Total	667.47	722.38	8.23%

Table B.11 SJR-CSEC Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	173.93	184.35	5.99%
Domestic self-supplied	36.45	38.56	5.79%
Agricultural self-supplied	145.99	167.42	14.68%
Recreational-landscape irrigation	43.30	59.78	38.06%
Commercial-industrial-institutional-mining self-supplied	17.82	17.82	0.00%
Power generation	4.98	4.98	0.00%
Total	422.47	472.91	11.94%

Table B.12 CFWI Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	654.34	693.61	6.00%
Domestic self-supplied	24.42	25.89	6.02%
Agricultural self-supplied	214.84	321.18	49.50%
Recreational-landscape irrigation	72.18	89.05	23.37%
Commercial-industrial-institutional-mining self-supplied	95.85	95.85	0.00%
Power generation	22.41	22.41	0.00%
Total	1,084.04	1,247.99	15.12%

Table B.13 SW-NR Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply*	139.28	147.64	6.00%
Domestic self-supplied*	*	*	*
Agricultural self-supplied	28.55	31.99	12.05%
Recreational-landscape irrigation	22.71	29.35	29.24%
Commercial-industrial-institutional-mining self-supplied	10.72	10.72	0.00%
Power generation	2.64	2.64	0.00%
Total	203.91	222.35	9.04%

* SWFWMD combines the Domestic self-supplied category with the Public supply category in their RWSPs.

Table B.14 SW-TB Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply*	375.4	397.92	6.00%
Domestic self-supplied*	*	*	*
Agricultural self-supplied	64.21	69.43	8.13%
Recreational-landscape irrigation	22.40	28.64	27.86%
Commercial-industrial-institutional-mining self-supplied	12.57	12.57	0.00%
Power generation	0.44	0.44	0.00%
Total	475.02	509.00	7.15%

* SWFWMD combines the Domestic self-supplied category with the Public supply category in their RWSPs.

Table B.15 SW-HR Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply*	135.13	143.24	6.00%
Domestic self-supplied*	*	*	*
Agricultural self-supplied	187.84	256.5	36.55%
Recreational-landscape irrigation	27.33	34.94	27.84%
Commercial-industrial-institutional-mining self-supplied	58.20	58.20	0.00%
Power generation	19.90	19.90	0.00%
Total	428.40	512.78	19.70%

* SWFWMD combines the Domestic self-supplied category with the Public supply category in their RWSPs.

Table B.16 SW-SR Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply*	129.24	137.00	6.00%
Domestic self-supplied*	*	*	*
Agricultural self-supplied	192.20	230.57	19.96%
Recreational-landscape irrigation	31.51	40.12	27.32%
Commercial-industrial-institutional-mining self-supplied	1.80	1.80	0.00%
Power generation	0.01	0.01	0.00%
Total	354.76	409.50	15.43%

* SWFWMD combines the Domestic self-supplied category with the Public supply category in their RWSPs.

Table B.17 Total for SWFWMD Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply*	779.05	825.8	6.00%
Domestic self-supplied*	*	*	*
Agricultural self-supplied	472.8	588.49	24.47%
Recreational-landscape irrigation	103.95	133.05	27.99%
Commercial-industrial-institutional-mining self-supplied	83.29	83.29	0.00%
Power generation	22.99	22.99	0.00%
Total	1,462.08	1,653.62	13.10%

* SWFWMD combines the Domestic self-supplied category with the Public supply category in their RWSPs.

Table B.18 SF-LKB Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	3.38	4.10	21.30%
Domestic self-supplied	2.64	3.20	21.21%
Agricultural self-supplied	185.00	250.20	35.24%
Recreational-landscape irrigation	0.65	0.91	40.00%
Commercial-industrial-institutional-mining self-supplied	23.90	23.90	0.00%
Power generation	6.40	6.40	0.00%
Total	222.00	288.70	30.05%

Table B.19 SF-UEC Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	69.50	81.68	17.53%
Domestic self-supplied	0.74	0.87	17.57%
Agricultural self-supplied	178.57	277.44	55.37%
Recreational-landscape irrigation	32.49	41.83	28.75%
Commercial-industrial-institutional-mining self-supplied	4.88	4.88	0.00%
Power generation	39.20	39.20	0.00%
Total	325.38	445.91	37.04%

Table B.20 SF-LWC Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	188.14	199.80	6.20%
Domestic self-supplied	31.37	33.22	5.90%
Agricultural self-supplied	665.92	778.68	16.93%
Recreational-landscape irrigation	241.23	257.34	6.68%
Commercial-industrial-institutional-mining self-supplied	28.30	28.30	0.00%
Power generation	15.40	15.40	0.00%
Total	1,170.35	1,312.74	12.17%

Table B.21 SF-LEC Average and Drought Year Water Use Projections by Category

Water Use Category	2030 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	1,007.40	1,104.00	9.59%
Domestic self-supplied	18.70	20.60	10.16%
Agricultural self-supplied	663.90	1332.50	100.71%
Recreational-landscape irrigation	152.80	188.90	23.63%
Commercial-industrial-institutional-mining self-supplied	56.60	56.60	0.00%
Power generation	33.30	33.30	0.00%
Total	1,932.70	2,735.90	41.56%

Table B.22 Total SFWMD, Excluding SF-UKB-CFWI, Average and Drought Year Water Use Projections by Category

Water Use Category	2035 projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply	1,198.92	1,307.90	9.09%
Domestic self-supplied	52.71	57.02	8.18%
Agricultural self-supplied	1,514.82	2,361.38	55.89%
Recreational-landscape irrigation	394.68	447.15	13.29%
Commercial-industrial-institutional-mining self-supplied	108.80	108.80	0.00%
Power generation	55.10	55.10	0.00%
Total	3,325.05	4,337.34	30.44%

Table B.23 Total for Planning Regions in Florida, Including Overlapping Regions of CFWI and SWFWMD, Average and Drought Year Water Use Projections by Category

Water Use Category	2035* projected water demand (mgd)		Difference (%)
	5-in-10 conditions	1-in-10 conditions	
Public supply and Domestic self-supplied	3,542.28	3,803.05	7.36%
Agricultural self-supplied	2,792.03	4,018.12	43.91%
Recreational-landscape irrigation	710.31	851.77	19.91%
Commercial-industrial-institutional-mining self-supplied	563.06	563.06	0.00%
Power generation	215.12	215.12	0.00%
Total	7,822.82	9,449.22	20.79%

* Except SF-LEC, for which 2030 projections are used, since 2035 projections are not available

Appendix C: Acronyms

Table C.1 List of All Acronyms Used in this Report

ACRONYM	MEANING
AFR	Annual Financial Report
AFSIRS	Agricultural Field Scale Irrigation Requirements Simulation
AG	Agricultural self-supplied
ARC	Acquisition and Restoration Council
ASR	Aquifer storage and recovery
AV	Assessed value
BEBR	Bureau of Economic and Business Research (a function of the University of Florida)
bgd	Billion gallons per day
BMAP	Basin management action plan
BMP	Best management practice
CARL	Conservation and Recreation Lands
CAV	County assessed value
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
CFWI	Central Florida Water Initiative
CGE	Computable general equilibrium
CIIM	Commercial-industrial-institutional-mining self-supplied
CTV	County taxable value
CUP	Consumptive use permit
DACS	Florida Department of Agriculture and Consumer Services
DEAR	Division of Environmental Assessment and Restoration (a division of the Florida Department of Environmental Protection)

DEP	Florida Department of Environmental Protection
DFS	Florida Department of Financial Services
DOR	Florida Department of Revenue
DRP	Division of Recreation and Parks (a division of the Florida Department of Environmental Protection)
DSL	Division of State Lands (a division of the Florida Department of Environmental Protection)
DSS	Domestic self-supplied
DWM	Division of Waste Management (a division of the Florida Department of Environmental Protection)
DWRA	Division of Water Restoration Assistance (a division of the Florida Department of Environmental Protection)
DWRM	Division of Water Resource Management (a division of the Florida Department of Environmental Protection)
DWSRF	Drinking Water State Revolving Fund
EAA	Everglades Agricultural Area
EDR	Economic and Demographic Research
EEL	Environmentally Endangered Lands
EFA	Everglades Forever Act
EHE	Eighteen-hole equivalent
ER	Environmental restoration
FAWCET	Florida Automated Water Conservation Estimation Tool
FCC	Fiscally constrained counties
FEB	Flow equalization basin
FFS	Florida Forest Service (a function of the Florida Department of Agriculture and Consumer Services)
FNAI	Florida Natural Areas Inventory
FSAID	Florida Statewide Agricultural Irrigation Demand (A roman numeral following the acronym indicates the version number)
FWC	Florida Fish and Wildlife Conservation Commission
gpcd	Gallon per capita per day
GRP	Gross regional product

JV	Just value
LATF	Land Acquisition Trust Fund
LFA	Lower Floridan Aquifer
LMUAC	Land Management Uniform Accounting Council
MCU	Middle Confining Unit
MFL	Minimum flows and minimum water levels
mgd	Million gallons per day
NEEPP	Northern Everglades and Estuaries Protection Program
NFRWSP	North Florida Regional Water Supply Partnership
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWFWMD	Northwest Florida Water Management District
NW-I	Northwest Florida Water Management District's water supply planning region I
NW-II	Northwest Florida Water Management District's water supply planning region II
NW-III	Northwest Florida Water Management District's water supply planning region III
NW-IV	Northwest Florida Water Management District's water supply planning region IV
NW-V	Northwest Florida Water Management District's water supply planning region V
NW-VI	Northwest Florida Water Management District's water supply planning region VI
NW-VII	Northwest Florida Water Management District's water supply planning region VII
OES	Office of Environmental Services (an office of the Florida Department of Environmental Protection's Division of State Lands)
OFS	Outstanding Florida Springs
OGT	Office of Greenways and Trails (an office of the Florida Department of Environmental Protection's Division of Recreation and Parks)
OSTDS	Onsite sewage treatment and disposal system
P2000	Preservation 2000

PCUR	Per capita use rate
PG	Power generation
PS	Public supply
PSC	Florida Public Service Commission
RAA	Restricted allocation areas
REC	Recreational-landscape irrigation
RESTORE ACT	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast Act of 2012
RWSP	Regional Water Supply Plan
SAV	School-district assessed value
SF-LEC	South Florida Water Management District's Lower East Coast water supply planning region
SF-LKB	South Florida Water Management District's Lower Kissimmee Basin water supply planning region
SF-LWC	South Florida Water Management District's Lower West Coast water supply planning region
SF-UEC	South Florida Water Management District's Upper East Coast water supply planning region
SF-UKB-CFWI	South Florida Water Management District's Upper Kissimmee Basin water supply planning region which is part of the Central Florida Water Initiative
SFWMD	South Florida Water Management District
SJR-CFWI	St. Johns River Water Management District's water supply planning region inside the Central Florida Water Initiative
SJR-CSEC	St. Johns River Water Management District's Central Springs and East Coast water supply planning region
SJR-NFRWSP	St. Johns River Water Management District's water supply planning region inside the North Florida Regional Water Supply Partnership
SJRWMD	St. Johns River Water Management District
SOLARIS	Florida State Owned Lands and Records Information System
SR-NFRWSP	Suwannee River Water Management District's water supply planning region inside the North Florida Regional Water Supply Partnership
SR-OUTSIDE NFRWSP	Suwannee River Water Management District's water supply planning region outside the North Florida Regional Water Supply Partnership
SRWMD	Suwannee River Water Management District
STA	Stormwater treatment area

STV	School taxable value
SWFWMD	Southwest Florida Water Management District
SW-HR	Southwest Florida Water Management District's Heartland water supply planning region
SW-NR	Southwest Florida Water Management District's Northern water supply planning region
SW-SR	Southwest Florida Water Management District's Southern water supply planning region
SW-TB	Southwest Florida Water Management District's Tampa Bay water supply planning region
SWUCA	Southern Water Use Caution Area
TAZ	Traffic analysis zone
TBW	Tampa Bay Water
TMDL	Total maximum daily load
TV	Taxable value
UFA	Upper Floridan Aquifer
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WMD	Water Management District
WRCA	Water resource caution areas
WRDA 2000	Water Resources Development Act of 2000
WSA	Water Supply Assessment
WUP	Water use permit
WWTF	Wastewater treatment facilities