



**2021**

# INFRASTRUCTURE REPORT CARD

**A COMPREHENSIVE ASSESSMENT  
OF FLORIDA'S INFRASTRUCTURE**





Every four years, America's civil engineers provide a comprehensive assessment of the nation's 17 major infrastructure categories in ASCE's Report Card for America's Infrastructure. Using a simple A to F school report card format, the Report Card examines current infrastructure conditions and needs, assigning grades and making recommendations to raise them. The ASCE Committee on America's Infrastructure, made up of 31 dedicated civil engineers from across the country with decades of expertise in all categories, volunteers their time to work with ASCE Infrastructure Initiatives staff to prepare the Report Card. The Committee assesses all relevant data and reports, consults with technical and industry experts, and assigns grades using the following criteria:

## What are our key criteria for grading?

### **CAPACITY**

Does the infrastructure's capacity meet current and future demands?

### **CONDITION**

What is the infrastructure's existing and near-future physical condition?

### **FUNDING**

What is the current level of funding from all levels of government for the infrastructure category as compared to the estimated funding need?

### **FUTURE NEED**

What is the cost to improve the infrastructure? Will future funding prospects address the need?

### **OPERATION AND MAINTENANCE**

What is the owners' ability to operate and maintain the infrastructure properly? Is the infrastructure in compliance with government regulations?

### **PUBLIC SAFETY**

To what extent is the public's safety jeopardized by the condition of the infrastructure and what could be the consequences of failure?

### **RESILIENCE**

What is the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents? How able is it to quickly recover and reconstitute critical services with minimum consequences for public safety and health, the economy, and national security?

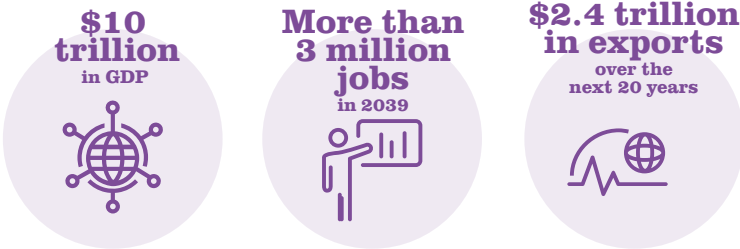
### **INNOVATION**

What new and innovative techniques, materials, technologies, and delivery methods are being implemented to improve the infrastructure?

*National Findings*

# INVESTMENT PAYS

Every four years, ASCE estimates the investment needed in each infrastructure category to maintain a state of good repair and earn a grade of B. The most recent analysis reveals that while we've made incremental immediate gains in some of the infrastructure categories, our long-term investment gap continues to grow. We're still just paying about half of our infrastructure bill – and the total investment gap has gone from \$2.1 trillion over 10 years to nearly \$2.59 trillion over 10 years. As ASCE discovered in its 2021 study, Failure to Act: Economic Impacts of Status Quo Investment Across Infrastructure Systems, failing to close this infrastructure investment gap brings serious economic consequences. By 2039, a continued underinvestment in our infrastructure at current rates will cost:



When we fail to invest in our infrastructure, we pay the price. Poor roads and airports mean travel times increase. An aging electric grid and inadequate water distribution make utilities unreliable. Problems like these translate into higher costs for businesses to manufacture and distribute goods and provide services. These higher costs, in turn, get passed along to workers and families. By 2039, America's overdue infrastructure bill will cost the average American household \$3,300 a year, or \$63 a week. When we fail to invest in our infrastructure, we pay the price.

The good news is that closing America's infrastructure gap is possible with big, bold action from Congress, continued financial support from states and localities, and smart investments and management by infrastructure owners.

**By 2039, America's overdue infrastructure bill will cost the average American household \$3,300 a year, or \$63 a week.**



**JOHN T. ALSOP JR. BRIDGE  
JACKSONVILLE, FLORIDA**



# CUMULATIVE INVESTMENT NEEDS BY SYSTEM

**ON CURRENT TRENDS, 2020 TO 2029 in Billions**

Infrastructure System	Total Needs	Funded	Funding Gap
Surface Transportation <sup>1</sup>	\$2,834	\$1,619	\$1,215
Drinking Water / Wastewater / Stormwater <sup>2</sup>	\$1,045	\$611	\$434
Electricity <sup>2</sup>	\$637	\$440	\$197
Airports <sup>2</sup>	\$237	\$126	\$111
Inland Waterways & Marine Ports <sup>2</sup>	\$42	\$17	\$25
Dams <sup>3</sup>	\$93.6	\$12.5	\$81
Hazardous & Solid Waste <sup>4</sup>	\$21	\$14.4	\$7
Levees <sup>5</sup>	\$80	\$10.1	\$70
Public Parks & Recreation <sup>6</sup>	\$77.5	\$9.5	\$68
Schools <sup>7</sup>	\$870	\$490	\$380
<b>Totals</b>	<b>\$5,937</b>	<b>\$3,350</b>	<b>\$2,588</b>

*1 Data taken from ASCE Failure to Act 2021 study + rail funding gap from ASLRRRA*

*2 Data taken from ASCE Failure to Act 2021 study. [www.asce.org/failuretoact](http://www.asce.org/failuretoact)*

*3 Includes estimates from ASDSO, USACE, U.S. Bureau of Reclamation, and FEMA*

*4 Data based on conversations with ASTSWAMO: RCRA Part C; Brownfield analysis; the Superfund funding*

*information does not include DOE's Environmental Management program*

*5 Total needs numbers is based on discussions with the National Committee on Levee Safety*

*6 Estimates from National Parks Service; National Association of State Park Directors; City Parks, and National Association of State Park Directors*

*7 Data from State of our Schools: America's K-12 Facilities (2016). 21st Century School Fund, Inc., U.S. Green Building Council, Inc.*



*Our assessment of*

# FLORIDA'S 2021 INFRASTRUCTURE

**We Evaluated Each Category for:**

**Funding**

**Condition**

**Future  
Need**

**Public  
Safety**

**Capacity**

**Operation &  
Maintenance**

**Innovation**

**Resilience**

**And Provided a Grade Based on Our Findings:**

**A**

**EXCEPTIONAL, FIT FOR THE FUTURE**

**B**

**GOOD, ADEQUATE FOR NOW**

**C**

**MEDIOCRE, REQUIRES ATTENTION**

**D**

**POOR, AT RISK**

**F**

**FAILING/CRITICAL, UNFIT FOR PURPOSE**



## Florida's Infrastructure

# EXECUTIVE SUMMARY

Infrastructure is the backbone of Florida's economy and a necessary part of every Floridian's day. Poor infrastructure affects us all—businesses and people are simply less productive when the power goes off or when deliveries are delayed. In places like Miami and Orlando, commuters know the cost of congestion far too well because it now exceeds \$1,000 per driver each year. Only one failure of a necessary part of the infrastructure system initiates a cascade of increased costs, delays and energy expenditure.

An economic study prepared for ASCE called the *Failure to Act Report* calculated the cost of poor infrastructure to every American household, demonstrating that \$9 out of our of families' pockets are spent every day dealing with these inefficiencies and inconveniences. The good news is that investment to stem the backlog of mediocre infrastructure conditions can help turn the tide for Florida's economy and our workers. In this Report Card, several rising grades have resulted from focused investment in areas like coastal areas, energy and ports, or where Florida Department of Transportation (FDOT), Florida Department of Environmental Protection (FDEP), and other local agencies are pushing smart investment solutions in roadways and stormwater systems.

We have added new infrastructure chapters and evaluated the grades for Dams, Levees and Solid Waste to this Report Card. The grades range from B+ to D- and overall are higher than the National Report Card average. Florida's population has grown at a rate of about 1% per year, adding about 300,000 people, which is the equivalent

of adding a city the size of Orlando every year. Investing in infrastructure must be Florida's top priority so we can continue to be the place people want to live, work, and visit from around the country and world.

## RECOMMENDATIONS TO RAISE THE GRADE

- 1 Continue leadership and investment in critical transportation and freight sectors to strengthen the economy and public safety.
- 2 Improve routine data collection and assessment in Schools, Dams, and Levees sectors to expand the public's and lawmakers' access to information to inform safety and funding decisions.
- 3 Expand the application of new approaches, materials, and technologies across Florida's infrastructure sectors to improve its ability to withstand or quickly recover from natural or man-made hazards.



Features: Port of Miami; Lake Okeechobee Dam; Brightline Train System; Orlando International Airport Terminal C; NASA Vehicle Assembly Building; Sunshine Skyway Bridge

## Florida's Infrastructure

# EXECUTIVE SUMMARY

### AVIATION

**C+** The aviation industry contributes to over 43,000 jobs, up 40% from just 10 years ago, and its economic impact has grown to \$175 billion in 2019. From 2016 to 2019, the portion of Florida's overall airfield pavement in fair to good condition slipped from 93% to 81%. FDOT has identified \$2.2 billion in funding needs for airports. Aviation is critical to Florida's business and tourism travel, and improvements will boost the state's economy.

### BRIDGES

**B** The condition of Florida's bridges has remained consistently and significantly above the national level. In 2020, nearly 65% of Florida bridges were in good condition compared to the national value of 45%, with only about 3% of Florida's bridges in Poor condition compared to more than 7% nationally. Leveraging improvements in material science, bridge design, and construction methods alongside an aggressive maintenance program, FDOT is extending the useful life of many of the state's bridges.

### COASTAL AREAS

**C-** Florida's economy is heavily dependent upon tourism from its natural coastal environment. Aside from their significant economic impacts, beaches reduce storm damage to coastal infrastructure and communities. While local municipalities are making strides in coastal restoration, natural erosion and coastal development threaten Florida's coasts. Approximately 62% of Florida's 825 miles of sandy shoreline shows signs of erosion with 50% identified as critically eroded. Federal disaster funding has reduced the funding gap, but significant work remains.

### DAMS

**D-** Florida's nearly 1,000 dams are on average 50-years-old, compared to 57 years nationally. There are 98 High Hazard Potential (HHP) dams, meaning if it failed, loss of life or economic damage would be expected. 41% of HHP dams have an Emergency Action Plan on record, compared with 81%

nationally. The state provides education and safety resources, but no loan or grant funding exists to assist dam owners with repairs, and a \$60 million funding gap remains to address the state's non-Federal HHP dams.

### DRINKING WATER

**C** Florida's rural residents receive drinking water from small, privately-operated plants or wells, whereas urban areas are provided drinking water by public, franchised, or private utilities with larger facilities. Few utilities inspect more than 20% of their distribution pipelines annually for leaks. Florida is a national leader in the reuse of reclaimed water, making up 35% of all water supply projects. Drinking water infrastructure improvements are estimated at \$22 billion over the next 20 years.

### ENERGY

**C+** Utilities have been investing in resiliency, and Florida is among the five states nationally with the shortest outage duration, less than 90 minutes per outage. Major energy companies like Florida Power & Light Company, Duke Energy, and Tampa Electric Company plan to spend billions of dollars annually to install underground lines, harden existing infrastructure against major storms, and optimize their grids. Energy companies in Florida continue to invest in renewable energy sources, such as solar.

### LEVEES

**D+** Florida has more than 90 levee systems with over 1,053 miles of infrastructure that has reached an average age of 58-years-old. Just 40% of Florida's levees have been assessed for risk, although most of them are classified as low risk. 80% of the state's levees were federally constructed and are operated and maintained by state water management districts. These districts have introduced Ad Valorem Taxes to annually generate hundreds of millions of dollars for O&M, but capital rehabilitation and reconstruction costs are projected to cost billions of dollars. The remaining 20% of Florida's levees that were not federally constructed depend on a limited amount of local technical and financial resources.



Features: Port of Miami; Lake Okeechobee Dam; Brightline Train System; Orlando International Airport Terminal C; NASA Vehicle Assembly Building; Sunshine Skyway Bridge

## PORTS

**B** Florida's 15 seaports generate nearly 900,000 jobs and \$117.6 billion in economic value. Over the last five years, Florida's seaports have invested significantly in capacity and operational improvements to accommodate larger post-Panamax vessels, improve cargo/intermodal transfer efficiency, and enhance the cruise experience for millions of passengers. During the period from FY 2011 to 2018, Florida invested more than \$1.19 billion in improvements across its 15 seaports, helping ensure the ports are ready for the future.

## ROADS

**C+** Florida demonstrates efficient programming of state resources, namely fuel taxes and state appropriations, which have increased between 2019 and 2021 from \$9.7 billion to more than \$10.3 billion. While Florida keeps pace with its growing needs, the state is also planning for the future with an increased focus on building resilience, attention to the evolving transportation needs of its growing elderly population, and a willingness to integrate innovations across the transportation system.

## SCHOOLS

**D+** Across Florida's 67 school districts, there are nearly 3,600 K-12 schools and about 180,000 permanent classrooms. As the average building age increases, currently at 31-years-old, the need for repairs and rehabilitation grows. To address aging facilities and looming capacity needs, state funding from motor vehicles licensing and taxes has increased between 2016 and 2020 by a total of nearly \$40 million. However, available funding is not sufficient to meet the needs.

## SOLID WASTE

**B+** Increased populations of both permanent residents and visiting tourists are contributing to the amount of municipal solid waste (MSW) generated, which is nearly triple the national per capita average of 4.51 pounds per day. FDEP has programs in place to adequately protect Florida's natural resources, while permitting and monitoring MSW handling. In general, the solid waste infrastructure in Florida is good, with opportunities to improve recycling and reuse programs.

## STORMWATER

**C** Florida's stormwater management infrastructure plays a significant role in maintaining suitable conditions through flood protection and water quality improvements. 35% of the state's local governing bodies reported having a stormwater program to fund and maintain the infrastructure. However, needs are significant, about \$14 million per stormwater entity by 2023. Senate Bill 1954 signed in May 2021 designates \$500 million to support the implementation of projects in the Statewide Flooding and Sea Level Rise Resilience Plan.

## TRANSIT

**C** Florida's transit systems provide millions of people with automobile, bus, paratransit, rail, and ferry services. Florida's local funds and multi-regional expansions have tracked with the changing operational needs while state and federal funds have increased to fill some gaps and contribute to capital investments. Florida's transit system benefits from adaptive planning, such as first and last mile options, to counteract challenges like population growth, impacts from climate change, and increased dependence on digital systems.

## WASTEWATER

**C** Florida is a national leader in reclaimed wastewater and climate adaptation frameworks thanks to partnerships among utilities, universities, and industry leaders. Smaller systems are increasingly overwhelmed by the frequent and extreme weather events. As Florida infrastructure ages, recent legislation has directed utilities to institutionalize asset management to improve efficient and effective resource use. However, as new technologies are integrated, the sector cannot become complacent due to the growing threat caused by vulnerable cyber security networks.



**BLUE ORIGIN LAUNCH COMPLEX 36  
CAPE CANAVERAL, FLORIDA**





## Florida's Infrastructure

# AVIATION

### EXECUTIVE SUMMARY

Aviation is critical to the Florida economy. Today, the industry contributes to over 43,000 jobs, up 40% from just 10 years ago, and aviation's economic impact has grown from \$144 billion in 2014 to \$175 billion in 2019. The system includes 4 large hub airports (MCO - Orlando, MIA - Miami, FLL - Fort Lauderdale, and TPA - Tampa Bay), 20 commercial service, and 110 general aviation airports that support nearly 170 million commercial airline passengers annually, up from 149 million in 2016. From 2016 to 2019, the portion of Florida's overall airfield pavement in fair, satisfactory, or good condition slipped from 93% to 81%. Over the next five years, the Florida Department of Transportation has identified approximately \$2.2 billion in funding needs for Florida's airports, but just \$1.4 billion has been identified through a combination of federal, state, local, and private dollars. Importantly, Florida airports are improving safety. Between 2019 and 2020, primary runway deficiencies improved by 4% and deficiencies on non-primary runways dropped by 11%.

### CAPACITY

With a 23-minute, 18-mile trip across Tampa Bay in 1914, Florida became home to the first recognized commercial flight in world history. More than a century later, Florida now has 4 large hub airports (MCO - Orlando, MIA - Miami, FLL - Fort Lauderdale, and TPA - Tampa Bay), 20 commercial service, and 110 general aviation airports that support nearly 170 million commercial airline passengers annually, up from 149 million in 2016.<sup>1</sup> Florida's airports are a critical component to the state's diverse economy driven by tourism, agriculture, aerospace, and manufacturing. The aviation industry contributes to over 43,000 jobs, a nearly 40% increase in the last decade, and makes a statewide annual economic impact that has grown from \$144 billion in 2014 to \$175 billion in 2019.<sup>2,3</sup> Florida's aviation infrastructure also provides critical services to communities such as medical transportation, law enforcement, search and rescue, and disaster response and recovery.

According to the U.S. Census Bureau's 2020 estimates, Florida is the third-most populous state with over 21 million residents.<sup>4</sup> Therefore, as aviation demands change and capacity enhancement projects emerge, federal and state agencies including the Federal Aviation Administration (FAA)

and Florida Department of Transportation (FDOT) monitor the aviation environment, analyze population projections and airport operations data, and recommend ways to meet evolving needs. Notably, in early 2020, these organizations were required to adapt to the COVID-19 pandemic. Due to the onset of the pandemic, the aviation sector's capacity was dramatically impacted as a drastic decline was seen in passenger boardings while cargo volumes increased due to the expansion of "e-commerce."<sup>5</sup> According to air carriers nationwide, the expectation is that the industry will bounce back from the pandemic's multifaceted effects over the course of a few years. However, many of the long-term impacts remain unknown.<sup>6</sup> Therefore, as this report draws from pre-pandemic publications, the expectation is that the capacity projections may lag slightly as the pandemic's effects impact the sector.

Florida's Airports System Plan (FASP) published regional forecasts that evaluated the ratio of aircraft operations (terminal and runway demand) to the annual service volume (ASV - terminal and runway capacity). When the ratio reaches 60%, airports are advised to begin planning for capacity enhancements. By 2035, analysis shows that 11 airports are expected to exceed the 60% threshold, 6 airports (MIA, SFB, SGJ, EVB, FIN, VRB) are anticipated to exceed the 80% capacity threshold, and 3 airports (FXE, OPF, TMB) are anticipated to reach the 100% capacity threshold. More than one-third of these capacity-strained facilities are commercial service airports, so more detailed hourly capacity studies should also be conducted to comprehensively evaluate their capacity needs. Overall, these 20 airports (18 commercial and 2 general aviation) qualify for capacity project funding to address the ground transportation, landside connections, airside connections and terminal connection needs.<sup>7</sup>

Partially contributing to these capacity needs is the projected 2.1% annual growth that is anticipated in Florida's air cargo sector. International air cargo is a multi-billion-dollar industry with Florida serving as Latin America's largest gateway into the U.S. In 2014, 2.7 million tons of domestic and international air cargo passed through Florida's airports, and by 2035, that value is projected to increase to 4.1 million tons.<sup>8</sup>

To offset the growing demand, Florida airports are actively working on capacity improvements. At Orlando International Airport (MCO), work is underway on the South Terminal Complex which will add 15 gates capable of accommodating up to 18 aircraft depending on the fleet mix. The project also consists of the Intermodal Terminal Facility which links the South Terminal Complex to the other terminals, but also provides space for up to three regional rail systems (SunRail commuter rail, Brightline inter-city rail, and possibly a third system for the International Drive area). At Tampa International Airport (TPA), capacity improvements started with a new Rental Car Facility followed by capacity improvements which

<sup>1</sup> [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/fasp-elevate-2021-brochure\\_final.pdf](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/fasp-elevate-2021-brochure_final.pdf)

<sup>2</sup> <https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/Florida.pdf>

<sup>3</sup> [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/fdot-eis-executive-summary\\_update.pdf?sfvrsn=e0ce2adb\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/fdot-eis-executive-summary_update.pdf?sfvrsn=e0ce2adb_2)

<sup>4</sup> <https://www.census.gov/library/stories/2021/04/2020-census-data-release.html>

<sup>5</sup> American Society of Civil Engineers, "Failure to Act: Economic Impacts of Status Quo Investment Across Infrastructure Systems," 2021.

<sup>6</sup> <https://infrastructurereportcard.org/wp-content/uploads/2020/12/Aviation-2021.pdf>

<sup>7</sup> Florida Aviation System Plan (FASP) 2035 Update (2017) Chapter 6 - Aviation Activity Forecasts <https://www.fdot.gov/aviation/FASP2035>

<sup>8</sup> <https://www.fdot.gov/aviation/cargo.shtm>

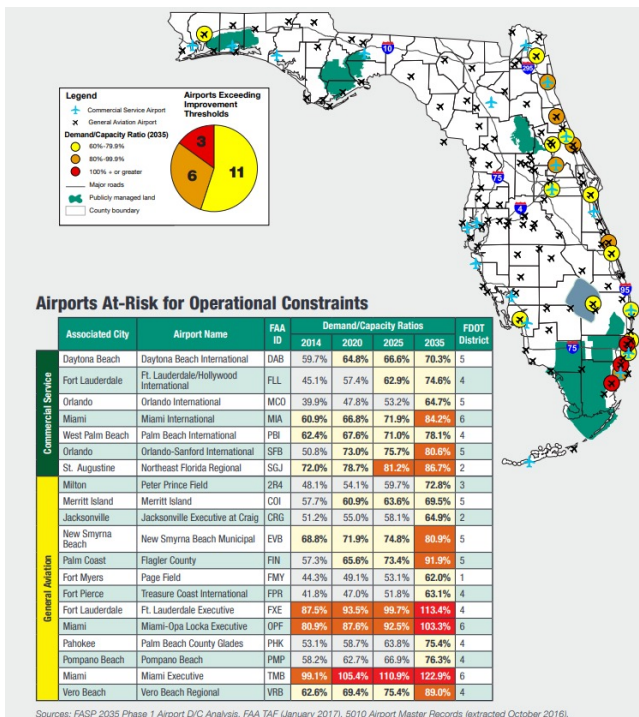


help decongest curbsides, roads and the Main Terminal. Plans for a new Airside D with 16 new gates have been temporarily postponed due to the COVID-19 pandemic, but timing is being reevaluated. In June of 2019, the Miami-Dade County Board of County Commissioners adopted a new Capital Improvement Program at Miami International Airport (MIA) that will fund up to \$5 billion in airport wide modernization projects over the next five to 15 years, paving the way for future growth in passenger and cargo traffic at MIA - projected to reach 77 million travelers and more than four million tons of freight by the year 2040.

routine inspections and analyzing data, and it benefits from data sharing and participation from more than 90 public use airport facilities throughout the seven FDOT Districts. Airports that did not participate in 2019 SAPMP report include Northeast Florida Regional Airport (SGJ, District 2), Orlando International Airport (MCO, District 5), Miami International Airport (MIA, District 6), and Tampa International Airport (TPA, District 7).

The FDOT Aviation Office evaluates airport pavement condition on a continuous 3-year cycle using the pavement condition index (PCI) methodology that characterizes the types, severity level, and quantity of distress. This information is utilized to calculate a PCI numeric value that represents the overall condition of the pavement and ranges from 0 (a condition category of "FAILED") to 100 ("GOOD"). The PCI methodology also provides an indication of the degree of maintenance, repair, or rehabilitation efforts that will be required to sustain functional pavement.<sup>9</sup>

According to the 2021 FASP Annual Report, of the participating airports (general aviation, commercial, and reliever airports), the statewide average PCI for runways was 75 while the overall airfield average PCI was 71. With values above 70, this means Florida's runways and airfields are in "SATISFACTORY" condition, but portions may require surface treatment such as crack sealing. From 2016 to 2019, the portion of Florida's overall airfield pavement in "FAIR", "SATISFACTORY," and "GOOD" condition slipped from 93% to 81%.<sup>10 11</sup> In order to address immediate needs for airport runways below the critical PCI of 65, approximately \$1.2 billion dollars would be needed. An additional \$2 billion in rehabilitation would be required over a ten-year period.<sup>12</sup>



## CONDITION, OPERATION, & MAINTENANCE

A critical factor contributing to the aviation system's safe and efficient operation is pavement condition, particularly for runways, taxiways, aprons, and other areas supporting aircraft operations. To qualify for Airport Improvement Program (AIP) Grant Program funding, airports are required by the FAA to develop and implement a pavement maintenance program. Therefore, to identify, prioritize, and schedule pavement maintenance, repair, and major rehabilitation projects, the FDOT leads the Statewide Airfield Pavement Management Program (SAPMP). The SAPMP assists airports in performing

## FUNDING & FUTURE NEED

The FDOT maintains a grant program to assist in providing a safe, cost-effective, and efficient statewide aviation system. FDOT grant funds help airports build and maintain runways and taxiways, eliminate airport hazards, protect airspace, develop plans, acquire land, build terminals and other facilities, and complete other types of airport improvement projects. The Florida Aviation Grant Program is funded through the State Transportation Trust Fund (STTF), which, in turn, is partially funded by 6.9 cents per gallon tax imposed on qualifying aviation fuel sales.

In addition to funds from the Florida Aviation Grant Program, most Florida airports are eligible to apply for and receive grants from the FAA. Through the AIP, the FAA provides funding to airports included in the National Plan of Integrated Airport Systems (NPIAS). From 2015 to 2019, Florida's total grant funding from FAA's AIP increased annually from more than \$132 million in 2015 to over \$226 in 2019. However, AIP funding fell in 2020 to \$178 million, but was buoyed by \$36 million from the Coronavirus Aid, Relief, and Economic Security (CARES) Act.<sup>13</sup>

Over the next five years, the FDOT Work Program has identified approximately \$2.2 billion in funding needs for Florida's

9 [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/fasp-elevate-2021-brochure\\_final.pdf](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/fasp-elevate-2021-brochure_final.pdf)

10 <https://infrastructurereportcard.org/state-item/florida/>

11 [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/volume-1.pdf?sfvrsn=7f19152b\\_0](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/volume-1.pdf?sfvrsn=7f19152b_0)

12 Statewide Pavement Management Summary Reports Volume 1 (2019) <https://www.fdot.gov/aviation/pavement.shtm>

13 [https://www.faa.gov/airports/aip/grant\\_histories/#history](https://www.faa.gov/airports/aip/grant_histories/#history)



more than 100 NPIAS airports. From 2020 to 2021, the total Work Program funding decreased from about \$7.6 billion to approximately \$6.9 billion. <sup>14</sup> The evaluation of identified needs and funding from the FAA and FDOT shows that there is a funding gap between what FDOT has programmed for NPIAS airport projects and the development needs identified by the FAA. This gap is approximately \$800 million; however, the total amount of FAA funding for airports for the next 5 years is currently unknown. <sup>15</sup>

The Passenger Facility Charge (PFC) program allows airports that enplane at least 2,500 passengers per year to impose a facility fee of up to \$4.50 per each flight segment, for a maximum of \$18.00 roundtrip total. Collected revenue from PFCs may fund pre-approved safety, security, capacity, noise reduction, and air carrier competition enhancements. Since the 1990s, the total PFCs collected by various airports in Florida range from nearly \$400,000 to over \$5 billion. <sup>16</sup> With over 90 million passengers enplaning each year at Florida's commercial service airports, PFCs are an effective way to close the gap between the FAA's estimates and the anticipated state and federal funding identified for the same period.

With limited grant funding available, airports are looking to raise capital funds on their own rather than solely relying on federal and state grants. Furthermore, these capital resources are expected to help meet the local funding match that is required to receive grants.



**FLL INTERNATIONAL**

<sup>14</sup> [fasp-elevate-2021-brochure\\_final.pdf](https://www.fdot.com/aviation/asp/asp.asp?guid=db564b60-e95e-4c4e-b1f6-76ccd9608da5)

<sup>15</sup> FDOT – Florida Aviation System Plan 2035 – Summary Report (2017) <https://www.florida-aviation-database.com/library/filedownload.aspx?guid=db564b60-e95e-4c4e-b1f6-76ccd9608da5>

<sup>16</sup> [https://www.faa.gov/airports/pfc/monthly\\_reports/](https://www.faa.gov/airports/pfc/monthly_reports/)

LOCATION	TOTAL PFC APPROVED
(DAB) Daytona Beach International	\$44,248,626
(VPS) Eglin AFB/Destin-Ft Walton Beach	\$44,211,218
(FLL) Fort Lauderdale/Hollywood International	\$2,023,359,886
(GNV) Gainesville Regional	\$13,645,529
(JAX) Jacksonville International	\$363,462,178
(EYW) Key West International	\$35,130,681
(MLB) Melbourne Orlando International	\$25,640,518
(MIA) Miami International	\$2,597,130,503
(APF) Naples Municipal	\$991,336
(ECP) Northwest Florida Beaches International	\$48,700,720
(MCO) Orlando International	\$5,030,693,530
(SFB) Orlando Sanford International	\$97,050,210
(PBI) Palm Beach International	\$304,200,098
(PNS) Pensacola International	\$144,489,392
(PGD) Punta Gorda	\$18,831,198
(SRQ) Sarasota/Bradenton International	\$83,313,937
(RSW) Southwest Florida International	\$908,293,745
(PIE) St. Pete-Clearwater International	\$49,672,547
(TLH) Tallahassee International	\$56,306,718
(TPA) Tampa International	\$1,687,138,071
(MTH) The Florida Keys Marathon International	\$390,001

## PUBLIC SAFETY

Airport safety depends on infrastructure both inside and outside the terminals. Along the runway, “Hot Spots” are a safety related problem typically involving complex or confusing intersections that may result in pilot error and issues of remaining in approved airspace. Currently, 14% of Florida airports have at least one hot spot. Another area critical for protecting the public is the Runway Safety Area (RAS) which reduces the risk of damaging airplanes in the event of an



undershoot, overshoot, or excursion from the runway. Between 2019 and 2020, primary runway deficiencies improved by 4% with 14% of the state's primary runways still needing RAS updates. Over the same timeframe, deficiencies on non-primary runways dropped by 11% with a total of 8% needing improvements.

Inside the state's 20 commercial service airport terminals, all have implemented pandemic safety plans to protect airport customers and staff and to mitigate the spread of COVID-19. While each COVID-19 safety plan is tailored to the area's specific needs and requirements, all include a variety of safety and cleaning procedures, electrostatic sprayers, installation of social-distancing signage and barriers, and requirements for all passengers and staff to wear facial coverings. An additional level of safety includes staff and/or passenger health screenings, enhanced air filtration systems, and partnerships with other health and safety experts to improve sanitization.

## INNOVATION & RESILIENCE

The FAA has sought to roll out the NextGen system to modernize the nation's aviation infrastructure. One component of this system is the Electronic Airport Layout Plan which uses GIS rather than the traditional static-map format for navigation to allow airports and the FAA to collect, store and update important information about the airport in an efficient, usable format.<sup>17</sup> Currently, only 41% of Florida airports have adopted this level of innovation.<sup>18</sup>

Airports are a critical piece of a community's resilience because they can be used to provide rapid response to emergency situations or as a staging ground for recovery efforts in the wake of disasters. However, as Florida annually prepares for hurricane season, only 54% of the state's airports have emergency airfield lighting systems in place which means they would be challenged to remain operational through an extreme weather event or man-made disaster. Furthermore, redundancy in transportation options make an infrastructure system resilient. However, from 2019 to 2020, the percentage of intermodal systems at Florida's airports fell – rail system connectivity decreased from 20% in 2019 to 19% in 2020 while bus system connectivity declined from 60% in 2019 to 57% in 2020.

## LET'S RAISE THE AVIATION GRADE

To continue preparing for and prioritizing capacity enhancements, the FDOT should maintain a database of demand/capacity needs that are updated on a rolling basis as individual airport master plans and other studies are completed.

- Evaluate and react to the rapidly evolving changes required for challenges presented by global pandemics and safety of the traveling public.
- Adapt to the growing influence of unmanned aircraft systems (UAS)

- Address aviation sector funding shortfalls
- Raise or eliminate the cap on the Passenger Facility Charge (PFC) to allow airports the needed revenue to invest in their infrastructure.
- Foster technological innovation and support the implementation of new technologies, like NextGen, that offer the ability to reduce congestion and improve capacity.
- Protect airspace and promote compatible land uses around airports.
- Using Florida's existing Strategic Intermodal System portfolio, make improvements to roads, multi-modal connections, and commitments to maintain the general aviation industry that helps to relieve the congestion from the commercial service airports.

## FIND OUT MORE

- Statewide Airfield Pavement Management Program (SAPMP) Update Summary Report - <http://www.dot.state.fl.us/aviation/pavementManagement.shtm>
- Florida Aviation Project Handbook 2019-2020- [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/florida-aviation-project-handbook-2019-2020cef64731451e475a995aa522c9aa5922.pdf?sfvrsn=2ee80049\\_0](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/aviation/florida-aviation-project-handbook-2019-2020cef64731451e475a995aa522c9aa5922.pdf?sfvrsn=2ee80049_0)
- Florida Transportation Plan – [www.floridatransportationplan.com](http://www.floridatransportationplan.com)
- FTP Vision Element – May 2020 - [http://floridatransportationplan.com/pdf/REPORT\\_FDOT\\_Vision2020\\_final\\_Apr20\\_spreads.pdf](http://floridatransportationplan.com/pdf/REPORT_FDOT_Vision2020_final_Apr20_spreads.pdf)
- Continuing Florida Aviation System Planning Process – [www.cfaspp.com](http://www.cfaspp.com)
- Florida Statewide Aviation Economic Impact Study - <https://www.fdot.gov/aviation/economicimpact.shtm>
- Florida Aviation System Plan - 2012 Statewide Overview, prepared by the Florida Department of Transportation, Aviation Office, 2012. <http://www.cfaspp.com/FASP/Fasp.aspx>
- "FAA Budget Request Balances Current Needs, NextGen," Aviation Week, [www.aviationweek.com/aftermarket-solutions/faa-budget-request-balances-current-needs-nextgen](http://www.aviationweek.com/aftermarket-solutions/faa-budget-request-balances-current-needs-nextgen)

<sup>17</sup> <https://www.faa.gov/nextgen/>

<sup>18</sup> <https://www.florida-aviation-database.com/library/filedownload.aspx?guid=db564b60-e95e-4c4e-b1f6-76ccd9608da5>

TAMPA INTERNATIONAL AIRPORT  
BY: HOK





## Florida's Infrastructure BRIDGES

### EXECUTIVE SUMMARY

In recent years, amid significant population growth and a modest uptick in the state's bridge inventory, the condition of Florida's bridges has remained consistently and significantly above the national level. In 2020, nearly 65% of Florida bridges were in Good condition compared to the national value of 45%, with only about 3% of Florida's bridges in Poor condition compared to more than 7% nationally. Though outperforming nationwide trends for Good bridges by around 20% annually, the condition of Florida's bridges has decreased in recent years at a slightly quicker pace than what has been recorded nationally. To address these challenges, the Governor increased the FDOT's budget from \$9.7 billion in 2020 to \$10.3 billion in 2021 with \$516 million programmed specifically for bridge repairs and replacements. Additionally, federal funding has also increased from \$1.8 billion in 2015 to nearly \$2.1 in 2020. Leveraging improvements in material science, bridge design, and construction methods alongside an aggressive maintenance program, FDOT is extending the useful life of many of the state's bridges, strengthening them to impacts from climate change, and minimizing public safety issues.

### CAPACITY & CONDITION

Since 2016, the Florida Department of Transportation's (FDOT) bridge inventory has grown from 12,355 structures to nearly 12,600 assets.<sup>1,2</sup> Bridges generally consist of three components: the deck or riding surface, the superstructure for supporting the deck, and the substructure which transfers loads to the ground. All aspects of the bridge must be inspected and maintained to ensure safe passage by users.

According to the FDOT Bridge Inventory 2021 Annual Report, the FDOT is responsible for maintenance of more than 56% of the state's bridges. Next, county governments maintain almost 4,000 bridges or about 31%, cities and towns maintain more than 1,200 bridges or over 10%, and other entities, such as railroads and parks, preserve the remaining 300 or more bridges.

Regardless of ownership status, FDOT oversees most of the state's bridge inspections and rating processes. While FDOT publishes condition information including federal metrics like "Structurally Deficient," or "Functionally Obsolete," and multiple Florida-specific measures like "Overall Condition Rating," this report uses the Federal Highway Administration's (FHWA)

"Good, Fair, Poor" system as the primary condition performance measure. This measuring system makes it possible to annually compare the status of Florida's bridge inventory to the national average.<sup>3</sup> FHWA's bridge condition is determined by the lowest numerical rating assigned to the bridge's various components. If the lowest rating is greater than or equal to 7, the bridge is classified as Good, if it is rated 5 or 6, it is classified as Fair, and if the bridge is rated less than or equal to 4, the classification is Poor.

Figure 2 shows that between 2017 and 2020, the condition of Florida's bridges remained consistently and significantly above the national level. Over this timeframe, Florida outperformed the national values for bridges in Good condition by around 20% annually. For instance, FHWA's 2020 performance measures show data for nationwide bridge condition being 45% – Good, 47.7% – Fair, and 7.3% — Poor, while Florida's bridges are reported as 64.9% – Good, 31.9% – Fair, and 3.2% – Poor. Considering only the bridges on Florida's portion of the National Highway System, the overall percentages improve slightly as 67.16% – Good, 31.42% – Fair, and 1.42% – Poor.

When analyzing bridge condition trends from 2017 to 2020, Figure 3 shows that the percentage of Florida's bridges in Good condition decreased. The same trend is seen across the United States, but Florida's change over time occurred more quickly. Florida's overall bridge portfolio seems to be modestly trending downward. This is determined by the percentage of bridges in Fair and Poor condition both increasing from 2017 to 2020. While the effects of maintenance may not be keeping perfect pace with Florida's dynamic bridge conditions, the FDOT, cities, and counties are prioritizing preventative and routine maintenance, repairs, and rehabilitations to maximize limited funds to ensure Florida's bridge conditions remain well above the national average.

Now consider the percentage of Florida bridges that are characterized as Structurally Deficient. Though the term "Structurally Deficient" has been used less frequently in recent years, Florida has reported a slight uptick from 1.9% in 2016 to 3.2% in 2020. Notably, about 64% of the state's Structurally Deficient bridges are county owned and maintained.<sup>4</sup> Though Florida's values are much less than what is reported at the national level – 7.9% in 2016 to 7.3% in 2020 – the state fell from being tied for top 3 in the nation for the lowest percentage of Structurally Deficient bridges in 2017 to top 8 in 2020.<sup>5</sup> Again, while Florida's values are much lower than those of 40 other states, the trend is moving in the wrong direction.

According to the FHWA's data on bridge condition by posting status, the portion of bridges that were closed, posted for load, or posted for other restrictions stayed fairly consistent at 7.47% in 2017 to 7.42% in 2020.<sup>6</sup> Importantly, more than 90% of closed or posted bridges are the responsibility of county, city, and town governments.<sup>7</sup> This is likely due to limited budgets, a growing stock of older bridges, resource limitations,

1 [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/str/bi/annual\\_rpt\\_21.pdf?sfvrsn=7e71b1f1\\_4](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/str/bi/annual_rpt_21.pdf?sfvrsn=7e71b1f1_4)

2 <https://artbridgereport.org/state/profile/FL>

3 <https://www.fhwa.dot.gov/tpm/pubs/PM2FAQs.pdf>

4 <https://artbridgereport.org/state/profile/FL>

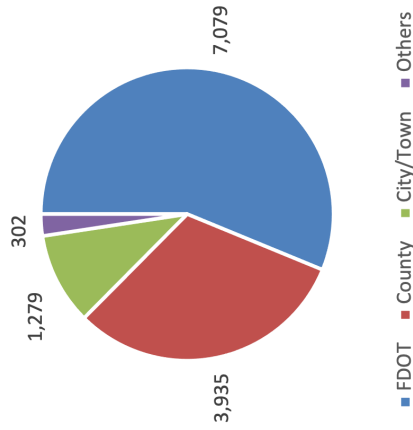
5 <https://artbridgereport.org/state/profile/FL>

6 <https://www.fhwa.dot.gov/bridge/britab.cfm>

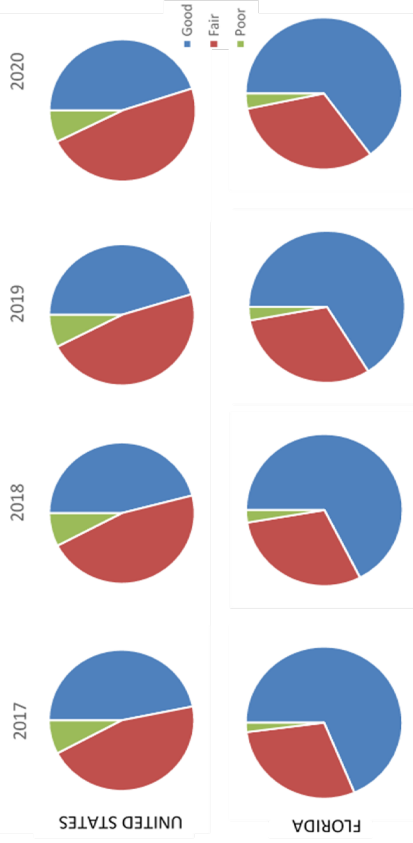
7 [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/str/bi/annual\\_rpt\\_21.pdf?sfvrsn=7e71b1f1\\_4](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/str/bi/annual_rpt_21.pdf?sfvrsn=7e71b1f1_4)



**FIGURE 1: FLORIDA'S BRIDGE INVENTORY BY MAINTENANCE RESPONSIBILITY**



**FIGURE 2: COMPARISON OF FLORIDA AND US BRIDGE CONDITION OVER TIME (2017 TO 2020)**



**FIGURE 3: TRENDS IN FLORIDA AND US BRIDGE CONDITION OVER TIME (2017 TO 2020)**

Year	United States Bridge Condition			Florida Bridge Condition		
	% Good	% Fair	% Poor	% Good	% Fair	% Poor
2017	46.83	45.41	7.74	68.65	29.34	2.00
2018	45.99	46.37	7.64	67.46	29.89	2.64
2019	45.31	47.21	7.48	66.14	30.98	2.88
2020	45.02	47.70	7.28	64.87	31.89	3.24
Percentage Change Over Time	-1.81	2.29	-0.46	-3.79	2.55	1.24

**FIGURE 4: FLORIDA'S BRIDGE CONDITION BASED ON VARIOUS AGE RANGES**

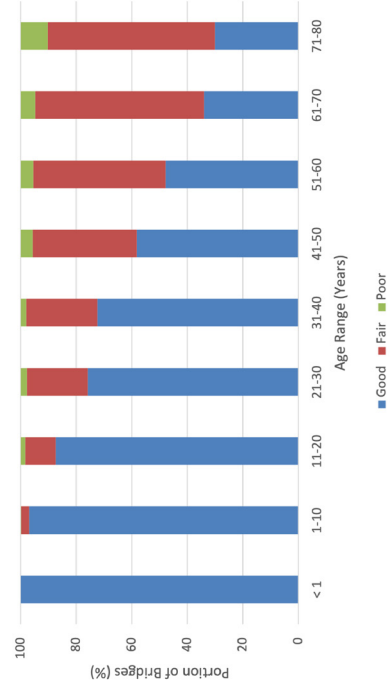


Figure 1: [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/str/bi/annual\\_rpt\\_21.pdf?sfvrsn=7e71b1f1\\_4](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/str/bi/annual_rpt_21.pdf?sfvrsn=7e71b1f1_4)

Figure 2 & 3: <https://www.fhwa.dot.gov/bridge/nbi/no10/owner20.cfm#fl>  
 Figure 4: <https://www.fhwa.dot.gov/bridge/nbi/no10/yrblt20.pdf>





and possibly the need for more prioritized asset management techniques. Finally, while bridge age is not necessarily an indication of condition, Figure 4 shows that as the age of Florida's bridges increase so too does the portion of the stock rated as Fair and Poor. Most bridges were designed for a service life of 50 years.

### FIGURES ON PREVIOUS PAGE

## OPERATION, MAINTENANCE, & PUBLIC SAFETY

More than 13 million daily crossings occur over 1,000 bridges that have been identified for various types of bridge work. Within this portfolio needing bridge work, 400 bridges supporting half a million daily crossings are characterized as Structurally Deficient. While Structurally Deficient bridges are not considered unsafe for public use unless the bridge is also closed, FDOT's work program requires that once bridges with strength replacement needs are identified, they must have corrective actions initiated within six years. Whether the proposed bridge is characterized as Structurally Deficient or not, sector experts have identified them as in need of operations and maintenance (O&M) efforts including replacement, widening, and rehabilitation. These efforts improve user access and public safety. For bridge assets needing structural repair, FDOT's policy for economical replacement is to perform construction within 9 years of deficiency identification.

As Florida has experienced significant population and traffic volume increases in recent years, routine inspection and maintenance practices have contributed to many bridges safely functioning well past their original design life. Improvements in material science, bridge design, and construction methods are also being leveraged using an aggressive maintenance program to extend the useful life of the bridges, thereby minimizing public safety issues and the need to replace a large number of bridges within a short time period.

## FUNDING & FUTURE NEEDS

Funding for Florida's bridges comes from a combination of federal, state, and local sources, as well as private tolls.

At the federal level, the Highway Trust Fund, which historically funds the nation's road and bridge projects, apportioned more than \$1.8 billion in 2015 and increased that funding to nearly \$2.1 billion in 2020. However, the HTF has, as its primary funding source, the federal motor fuels tax which has remained unchanged since 1993.

At the state level, FDOT's current 5-year bridge program (2015/2016 - 2019-2020) contains a budget of \$2 billion to fund repairs and replacements of existing bridges. Specifically, FDOT's objective is to ensure that 90% of FDOT-maintained bridges achieve a state of good repair while keeping all department-maintained bridges safely opened to the public. Moving forward, Governor Ron DeSantis' Fiscal Year 2021-2022 Florida Leads budget revealed an increase in transportation-

related funding. Within the overall \$101.5 billion budget, \$10.3 billion is being invested in various transportation-related infrastructure sectors, a value that is up from the previous budget of \$9.7 billion. FDOT will have \$9.44 billion for the State Transportation Work Program, with almost \$516 million programmed to support 89 bridges in need of scheduled repairs and 18 bridges requiring replacement.

From 2017-2021, tolls, local funding, and private investments totaled about 18% of the sector's needs. However, gross revenues from tolls alone are only projected to grow from about \$1 billion in 2016 to around \$1.3 billion in 2025. Therefore, other opportunities for increasing revenue and/or reducing costs are necessary to meet the needs of the sector's aging infrastructure. For instance, Public Private Partnerships (P3)'s Design Build (DB) delivery methods have been proven to save 30% of design and construction costs of the traditional design-bid-build delivery methods. Recent nationally recognized FDOT projects utilizing DB are the I-4 Ultimate Improvements project in Orlando, the Port of Miami Tunnel and I-595 Improvement projects in Ft. Lauderdale.

## RESILIENCE

Resilience refers to the overall bridge and transportation system's capacity to withstand against significant multi-hazard incidents and the ability to expeditiously recover and reconstitute critical services with minimum damage to public safety, health, the economy, and national security. The most serious threat to bridges in Florida is the corrosion of steel reinforced concrete substructures in coastal regions due to sea level rise and extreme weather events. Advancements in material specifications and design practices have helped to meet this challenge. It has been shown through various studies that a bridge failure is most likely to be caused by an extreme event, such as flooding and scour. There is now a statewide bridge scour evaluation program to identify scour critical bridges and to provide scour countermeasures as a corrective action where required. Preventative maintenance also helps to reduce the potential for deterioration that leads to bridge failure.

## INNOVATION

Innovation refers to the implementation and strategic use of innovative techniques and delivery methods. FDOT has implemented the use of new materials and technologies in its bridge construction and repair/rehabilitation program. FDOT integrates new bridge and pavement materials which require less frequent maintenance and renovation such as High Performance Concrete (HPC) and Carbon Fiber Reinforced Polymers. HPC can increase the minimum service life of a bridge to 75 years instead of the standard 50 years. The new concrete mixtures are less permeable to water and more resistant to environmental degradation.

In addition, FDOT's State Materials Office is a nationally and internationally recognized leader in materials testing and research. The FDOT has spearheaded research and evaluation of corrosion behavior on marine structures and experimentation with new materials for corrosion prevention and corrosion control for over twenty years. Cathodic Protection Systems have been implemented as an effective, long term corrosion control method on Florida's bridges. New



coating products are currently being tested to identify effective materials and practices to make Florida bridges more durable and reduce life-cycle maintenance costs.

“Smart” bridge technology consisting of wireless sensors mounted on a bridge can measure vibration, strain, temperature and changes in bridge condition such as steel corrosion and concrete deterioration. Information is then passed to a computer for analysis allowing continuous monitoring of the bridge’s structural integrity. The new Flagler Bridge in West Palm Beach, FL was constructed with smart bridge technology.

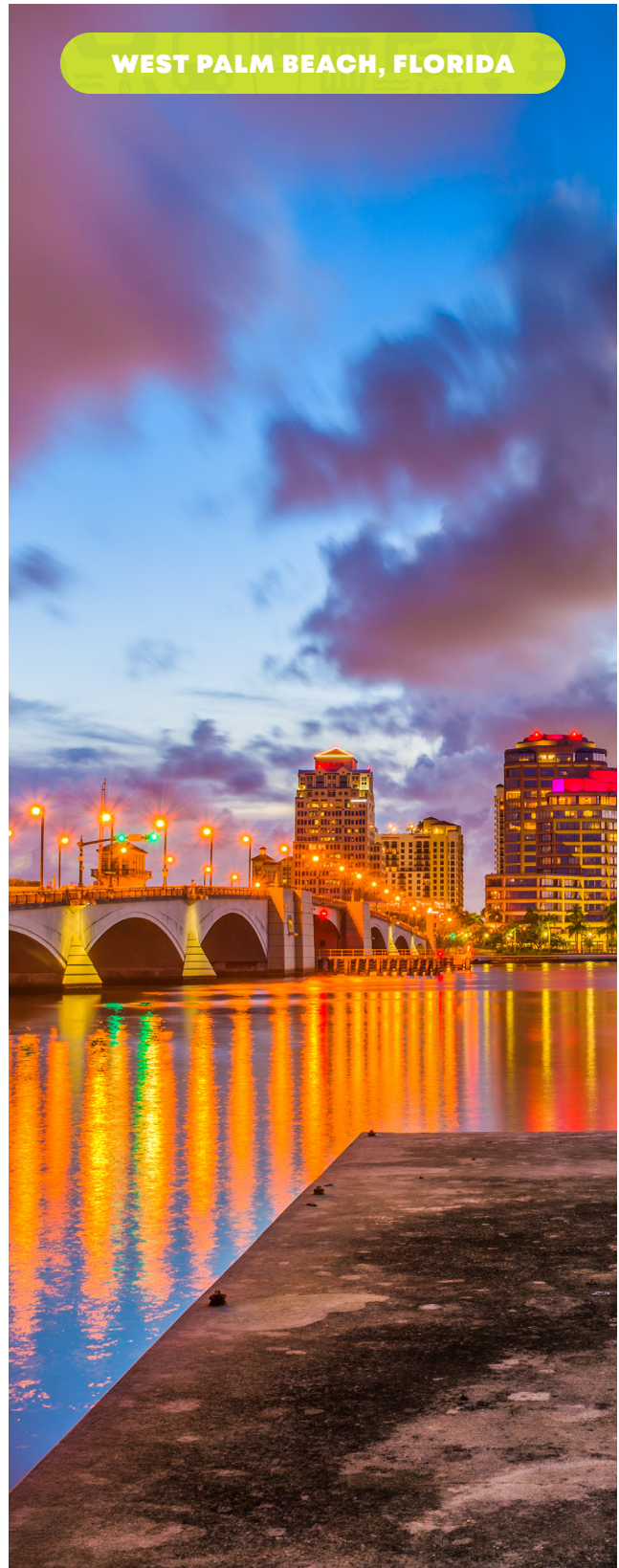
## LET’S RAISE THE BRIDGES GRADE

- Fund repair and rehabilitative strengthening measures thereby increasing the service life of existing bridges to bridge the gap between designated need for replacement and budgeted work programs.
- Develop a state-wide strategic plan for long-term transportation research to develop more resilient bridges.
- Increase investment from all levels of government and the private sector, to repair, improve, and expand the state’s highway and bridge systems. Increase annual investment levels for bridge repair, reconstruction, and renovation by approximately \$8 billion annually from all levels of government, to a total annual funding level of \$20.5 billion.
- Develop performance-based investment strategies which will ensure available resources are directed to those projects with the highest performance return on investment and encourage the use of asset management programs.
- Use freight movement efficiency as a measure of the overall surface transportation system’s performance and contribution to economic strength.

## FIND OUT MORE

- FDOT- Transportation Planning, [www.dot.state.fl.us/planning](http://www.dot.state.fl.us/planning)
- FDOT MAP-21 – Moving Ahead for Progress in the 21st Century – 2014 Performance Report, [www.dot.state.fl.us/planning/performance/MAP-21/MAP-21PerformanceReport.pdf](http://www.dot.state.fl.us/planning/performance/MAP-21/MAP-21PerformanceReport.pdf)
- FDOT – Invitation to Innovation, [www.dot.state.fl.us/officeofdesign/innovation](http://www.dot.state.fl.us/officeofdesign/innovation)
- FHWA – Center for Accelerating Innovation, [www.fhwa.dot.gov/innovation](http://www.fhwa.dot.gov/innovation)

### WEST PALM BEACH, FLORIDA





## Florida's Infrastructure **COASTAL AREAS**

### EXECUTIVE SUMMARY

Florida's economy is heavily dependent upon tourism from its natural coastal environment. In 2017, residents and tourists made an estimated 940-million-day visits to Florida's beaches, an increase of 16% or about 810 million, in 2012. Over the same five-year timespan, direct sales generated from the state's beaches increased by 12%, from \$50 billion to about \$56 billion, translating into local, state, and federal tax revenues of \$2.7 billion, \$3.1 billion, and \$6.8 billion, respectively. Aside from their significant economic impacts, beaches reduce storm damage to coastal infrastructure and communities. Unfortunately, erosion caused by natural changes and human activities such as navigation inlets and coastal development threaten Florida's coastal areas. Approximately 62% of Florida's 825 miles of sandy shoreline shows signs of erosion and over 50% are identified as critically eroded. Ameliorating this erosion requires nearly \$6.5 billion, but the state is only allocating \$50 million per year with little guarantee of future funding at this level, particularly due to lower tourism tax revenues and shifting priorities associated with COVID-19. It should be noted that recent federal disaster funding has helped lessen the funding gap in the short-term, but significant work remains.

### CAPACITY

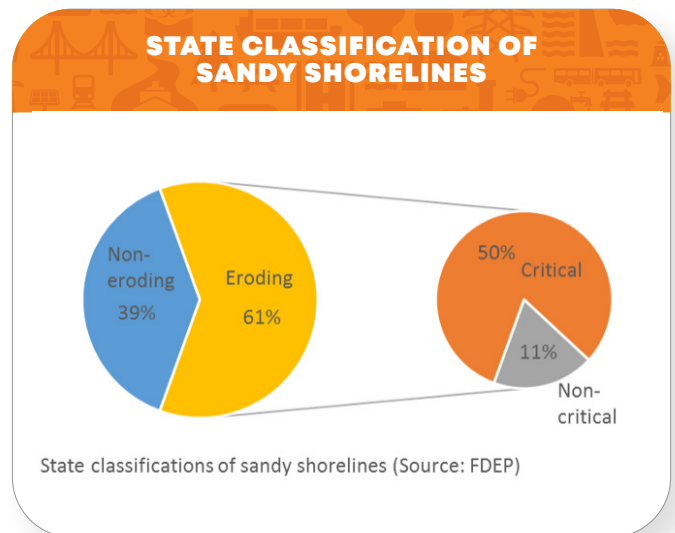
In April 2020, the Florida Department of Environmental Protection (FDEP) released its Strategic Beach Management Plans for seven regions throughout the state. The regional plans provide inventories of beach projects, background information, strategies to address critically eroded beaches, regional barrier inlet inventories, and inlet management strategies. Overall, the state's capacity to implement beach nourishment projects faces three specific challenges: (1) Reduced availability of sources of sand, (2) environmental constraints, and (3) political boundaries. Many years of active beach nourishment in Florida have depleted or severely diminished nearshore sand sources driving local, state, and federal projects to rely upon inland sources of mined sands to be trucked to project locations, increasing overall costs. Environmental concerns also impose constraints on beach maintenance and preservation efforts. For instance, the presence of nearshore hardbottom areas limit the potential width and length of nourished beaches which is critical to the longevity and efficacy of beach nourishment projects. Other nearshore resources, such as corals, sponges, or seagrasses also impose constraints on the size of a project, potentially decreasing the expected area. Additionally, permitting agencies generally require detailed environmental studies to minimize impacts to these natural resources due to their ecological importance.

Politics, in the form of "sand wars," also play a significant role in the capacity of coastal areas. While the state of Florida

generally recognizes sand located offshore, counties in state waters follow the county lines until reaching the federal limits, three miles offshore. Therefore, the state does not regulate sand taken from federal waters. In these waters, the federal government currently does not follow county political boundaries. Instead, any public entity may use this sand resource. Consequently, the difference in these political boundaries often results in communities fighting over the use of federal sand resources used to improve coastal areas.

### CONDITION

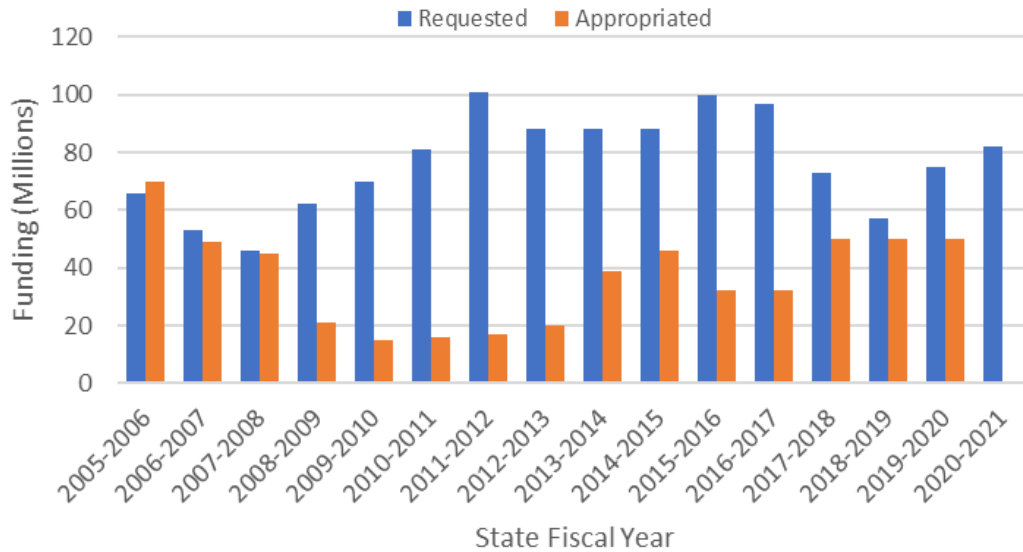
Of the 825 miles of sandy shoreline, the distance from New York City to Jacksonville, Florida, 419.6 miles has been designated as critically eroded beach and 90.9 miles as non-critically eroded beach. Nearly 62% of Florida's sandy beaches (510.5 miles) are eroded or eroding. The FDEP designates 8.7 miles of inlet shoreline as critically eroded and 3.2 miles as non-critically eroded. Since 1989, when the FDEP generated its first list of erosion areas, the miles of critically eroding shorelines have increased by 93% (217.6 to 419.6 miles). Since 2016, the total length of critically eroded shoreline has increased by 1%. By inference, the erosive threat to upland development, recreational interests, wildlife habitat and important cultural resources has also increased.



Florida has 66 coastal barrier inlets in Florida (21 on the Atlantic coast and 45 on the Gulf coast). Studies have shown that inlets created and enhanced to provide more direct access for commercial shipping to the ocean from inland waterways are responsible for approximately 80% to 85% of beach erosion on the east coast and to a lesser extent on the west coast of Florida. Initially adopted in October 2000 and most recently approved in April 2020, the FDEP released its updated Strategic Beach Management Plan, which in part provides a list of planned beach restoration projects, sand resources and innovative technologies, and identifies bypassing objectives and actions to balance sediment budgets on adjacent beaches.



STATE FUNDING FOR INLET PROJECTS



OPERATION AND MAINTENANCE

Beaches and inlets are located in an extremely dynamic environment, constantly experiencing the effects of waves, tides, and currents. With the built environment relying upon the stability of such infrastructure, the most critical component to beach and inlet management is maintenance.

Due to the importance of the environmental health of Florida's beaches and waterways for attracting tourists, construction

windows for beach nourishment projects are limited to a few months out of the year. In many cases, construction can only occur during the winter months, outside of the sea turtle nesting season. Unfortunately, during the winter months, everyday wave conditions are worse than during the summer, which causes more erosion during a project, increasing the volume of sand that needs to be used, and the cost of the project along with it.

PUBLIC SAFETY

Developed and natural areas within the coastal regions of Florida incur the risk of short-term effects from extreme events and long-term effects associated with a changing climate and human-related impacts. Many coastal areas in Florida are experiencing erosion, which results in increased risk exposure to storm damage and public safety effects. Developing and applying local and regional beach management strategies proves essential to decreasing the risk exposure in coastal areas and providing storm damage reduction benefits. In addition to typical residential development, many key infrastructure elements in Florida, such as the St. Lucie Power Plant and the Virginia Key Wastewater Treatment Plant, lie adjacent to the coast. In the case of severe beach erosion, both infrastructure sites could result in significant public safety issues as well as financial loss. These areas represent two of many examples throughout Florida directly affected by coastal management strategies and timely implementation.

FUNDING

State funding for coastal areas is focused on preserving the economic benefits from tourism and recreational activities. Federal funding, on the other hand, primarily focuses on storm damage reduction. At the local level, tourist development taxes



generally form the primary means of paying for beach projects and maintenance efforts. Some local governments collect additional ad valorem taxes or approved municipal service or tax benefits to support beach management activities.

During the two-year period following 2016-2017, a nearly \$50 million decline in requested statewide funding occurred, likely due to an influx of federal dollars from post-disaster grants related to Hurricanes Irma and Michael. From 2017 to 2020, appropriated funding has remained steady at \$50 million per year. However, in 2021, Governor DeSantis increased funding for beach nourishment to \$100 million, with the option of adding up to \$50 million more from the American Rescue Plan to continue addressing the state's critically eroded shorelines.

While State funds for inlet projects fall well below the levels of funding needed, the state has appeared to ramp up the dollars allocated to such projects. For example, for FY2015-16, local governments requested nearly \$10 million in funding for inlet projects and the state provided no funding. However, in FY2017-18 and FY2018-19, the state provided more than \$13 million dollars each year for inlet construction projects.

## FUTURE NEED

To estimate a future long-term funding need, the United States Army Corp of Engineers (USACE) developed an approximate 20-year cost for managing its 137 miles of federal Florida beach projects. This estimate corresponds to about \$693,000 per year per mile of beach. If Florida must actively manage all current critical erosion areas, that equates to managing 407 miles of shoreline. Applying the above costs per year per mile yields a potential 20-year need of \$5.6 billion. Beach and inlet projects are eligible for state funding under Amendment 1. However, the Land Acquisition Trust Fund does not guarantee any funding for these projects. While a consistent allocation of \$50 million per year has occurred over the past three years, there is no guarantee of future funding at this level, particularly as Florida endures lower tourism tax revenues and experiences shifting priorities associated with Covid-19.

Federal funding is also unpredictable. Future federal funding will likely continue to relate to storm recovery efforts. Given these circumstances, local governments may have to carry a larger financial burden to manage beaches within their communities. Notably, Florida's Gulf coast counties have received funds resulting from the RESTORE Act, which allocates Clean Water Act administrative and civil penalties paid by parties responsible for the Deepwater Horizon oil spill in 2012. The five affected Gulf coast states, including Florida, will receive funds to restore and protect the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, coastal wetlands, and economy of the Gulf coast region. Some of these funds may directly benefit coastal areas infrastructure.

Additionally, the USACE is in the process of developing the South Atlantic Coastal Study (SACS) which targets several goals that promote sustainable and resilient long-term projects throughout the South Atlantic region. This study was granted \$16 million dollars in federal funding and is broken down into two tiers. Tier 1 Risk Assessment Analysis focused on developing a Coastal Hazard System grid for the East Coast. In August of 2019, Tier 1 concluded their findings and developed a framework that helps assess risk with the creation of the Composite Risk Index. Tier 2 is in the process of starting and will

work towards developing a detailed risk management measure and cost library with a standardized list of risk reduction actions specifically targeted to Focus Areas. Through this second phase, a critical goal is to locate viable sand sources both through offshore dredging as well as using existing upland mine sources, and evaluating the costs associated with such projects.



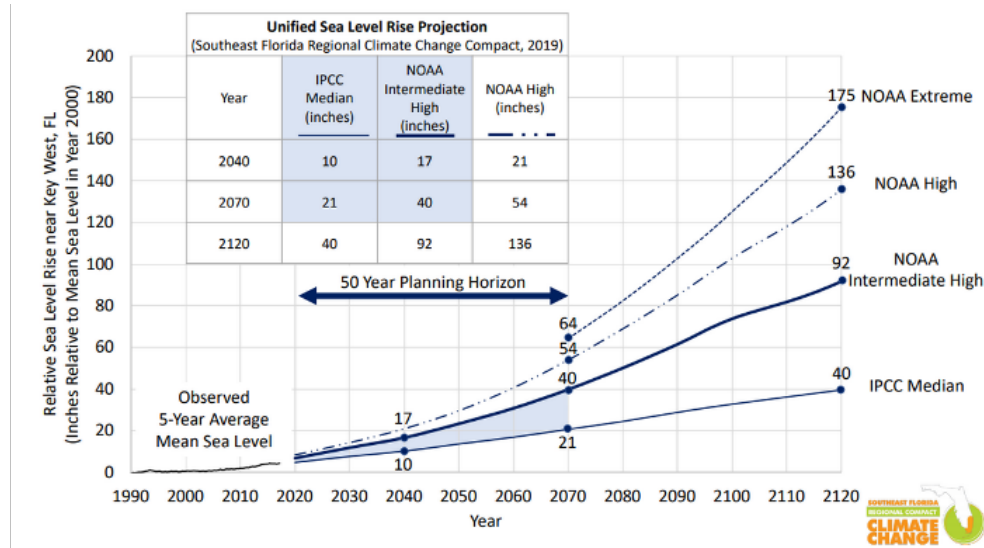
## RESILIENCE

Resiliency in Florida's coastal areas depends on the ability to consistently withstand or quickly recover from storm effects, higher water levels (short and long term), and the associated changes in shoreline position. Due to significant coastal development and associated infrastructure along the Florida coast, maintenance of beaches, wetlands and other natural protective features proves critical in limiting risk exposure. However, due to the human footprint, as population growth and development has invaded these natural systems the effect has limited nature's ability to recover from extreme events, as well as adapt to potential long-term changes, such as sea level rise. Therefore, human support is required to maintain these systems and their ability to protect at a level suitable for the nearby infrastructure. Since human intervention is generally required for the expeditious recovery of a beach and dune system, the regulatory and funding process to accomplish this task is often the critical challenge. A holistic, multi-faceted approach on a regional basis might represent the most ideal means of management; however, it is not always applied. As a result, the current approach to coastal storm risk management occurs as a myriad of individual projects addressing independent problems with multiple stakeholders, funding sources, cultural resources, environmental impacts, and other concerns. Recent severe storm impacts along with expanded research on long-term trends may be shifting the paradigm from reactive to proactive.

The future of resilience in the state of Florida has shown promising signs of implementation with the creation of the Office of Resilience and Coastal Protection. The purpose of creating this office is aimed at helping coastal communities and habitats to not only combat issues concerning sea level rise, but also to provide a source of funding, technical assistance and



### UNIFIED SEA LEVEL RISE PROJECTION RELATIVE SEA LEVEL RISE NEAR KEY WEST, FLORIDA



coordination among all branches of government. This initiative will further enhance resilience strategies in Florida. Particularly, the Office of Resilience and Coastal Protection will oppose all off-shore oil and gas pursuits off the coast of Florida and prevent any hydraulic fracturing from occurring in the state.

## INNOVATION

Innovations in Florida's coastal areas generally revolve around managing sediments within a region in a sustainable manner. Notably, a recent success story of regional sediment management (RSM) practices includes a navigation and beach project involving St. Augustine Inlet in St. Johns County. In 2012, the USACE and St. Johns County dredged 2.1 million cubic yards from three inlet elements — Porpoise Point area near the inlet, the inlet's navigation channel, and a small portion of the inlet's ebb shoal — to nourish 2.3 miles of critically eroding St. Augustine Beach. The Porpoise Point and navigation channel dredging served to make the inlet channel safely navigable while minimizing the amount of sand taken from the ebb shoal, which acts as a sediment sink that could adversely affect beaches to the north of inlet.

Together, the USACE and FDEP are also examining nearshore disposal of inlet-trapped sediments that are too fine for beach placement that otherwise become "lost" from the coastal system. In many cases, these sediments originate from the ocean but become finer as they move to interior waterways. Furthermore, the FDEP has periodically evaluated innovative technologies as alternatives to traditional dredge and fill projects to determine the most effective and less costly techniques for beach nourishment. While it has not done so since 2008, it has authorized the use of coastal structures to lengthen intervals between beach nourishments.

Finally, many agencies are currently emphasizing "living shorelines," natural or nature-based structures such as oyster shell breakwaters designed to protect property from extreme

storms and flooding over hard protection measures such as seawalls. In Florida, these efforts have generally limited themselves to individual property owners located on inland waterways without a comprehensive, statewide approach to implementing these innovations.

## LET'S RAISE THE COASTAL AREAS GRADE

- Provide for consistent, reliable, and sufficient funding at all levels — federal, state, and local.
- Identify, quantify, and implement regional sediment management (RSM) strategies.
- Adopt regionalization management approach to constructing and maintaining beaches. RSM practices has contributed to this approach. Bidding projects together can help spread the financial burden of maintaining a healthy and protective coastal area.
- Improve inlet management. Despite many well-intentioned efforts, sediments still become captured within flood and ebb shoals and further inland. Implement ways, through for example nearshore berms, to reintroduce lost sediments into the littoral system that one cannot place directly on beach.
- Reevaluate policies allowing construction seaward of Coastal Construction Control Line.
- Strategically acquire coastal lands to protect Florida's remaining undeveloped coastal lands and increase the resiliency of Florida's natural, economic, and social infrastructures.
- Consider relocating infrastructure from high risk areas where feasible and/or apply relevant coastal design conditions.

SOUTH BEACH MIAMI, FLORIDA





### Florida's Infrastructure

# DAMS

## EXECUTIVE SUMMARY

Florida's nearly 1,000 dams are primarily earthen structures that provide containment of mine tailings, flood control, fish and wildlife habitats, recreation, and water supply. Of the 996 dams in Florida, 98 dams are High Hazard Potential (HHP), meaning if the dam failed, loss of life or economic damage would be expected. Currently, 87% of the HHP dams in the state have been rated and nearly all of them have been inspected in the last five years. Forty-one percent of HHP dams have an Emergency Action Plan (EAP) on record, compared with 81% nationally. EAPs are prepared to understand potential emergencies and to provide a comprehensive plan that is implemented to protect loss of life and minimize damage to the surrounding area. Based on needed and available funding, there is a significant funding gap - \$60 million - to repair or rehabilitate Florida's non-Federal HHP dams. The average age of the state's dams is 50-years-old, slightly younger than the national average of 57 years. However, the high average age makes incorporating resiliency and innovation into the redesign expensive, particularly for the 80% of dam owners who are private citizens or organizations. Though the state provides free access to numerous technical and safety-related resources, Florida currently does not have a loan or grant funding program to financially assist owners with dam repair, abandonment, and/or removal projects.

### FIGURE 1: HERBERT HOOVER DIKE

*The 143-mile long earthen embankment dam encompasses Lake Okeechobee and is classified as a High Hazard Potential dam.*



## INTRODUCTION

Unlike some of the more visible infrastructure, dams are typically not thought of by the public, even though they play a vital role in our state's water-related infrastructure. Florida is home to 996 dams. Dams come in many shapes and sizes, but their primary purpose is to impound water or other materials, such as waste clays. Dams can provide water supply, irrigation, recreation, flood control, and waste containment. The majority of uses for Florida dams include containment of wastewater or mine tailings (the largest category with more than 400 dams serving this purpose), recreation (at 271 dams), flood control (with 157 dams), water supply, and fish and wildlife habitats.

Dams can be constructed of earth, concrete, or other materials and typically range in height from just a few feet to over several hundred feet tall. Over 900 Floridan dams are constructed of earthen material. Approximately 360 dams are greater than 25 feet tall, with about 70 dams at 100 feet tall or more.

Florida dam owners include State (14%) and local governments (5%), the federal government (<1%), and private citizens or organizations (80%). Most dams are privately owned and operated, with 98% of them regulated by the State. Since 1975, the U.S. Army Corps of Engineers (USACE) has maintained the National Inventory of Dams (NID) which now includes publicly available data on over 90,000 dams nationwide. <https://nid.sec.usace.army.mil>. However, the NID does not store information on dams lower than 25 feet in height with a storage capacity of less than 15 acre-feet or dams lower than 7 feet in height with a storage capacity less than 50 acre-feet, unless they are otherwise classified as High Hazard Potential or Significant Hazard Potential. The NID data are provided to USACE by the individual states.

## CAPACITY & CONDITION

Currently the NID shows that Florida has 996 dams, with 98% of them regulated by the state. Dams are generally categorized based on the consequence and severity of damage that could occur should the dam fail.

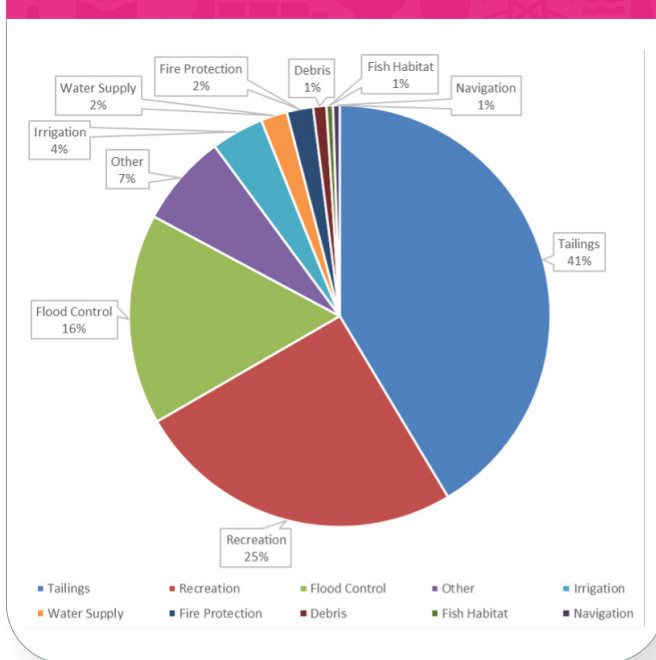
- High Hazard Potential (HHP) - Failure of the dam could result in loss of life
- Significant Hazard Potential (SHP) - Failure of the dam would likely result in significant loss of property or significant economic damage / environmental impact
- Low Hazard Potential (LHP) - Failure of the dam would not likely result in loss of property, economic damage, nor environmental impact

Of the 996 dams in Florida, 98 dams are HHP, 337 dams are SHP, 426 dams are LHP, and 135 dams have not yet been assessed for hazard potential. The USACE NID began collecting Condition Assessment data on state regulated HHP dams in 2009. Eighty-seven percent of Florida HHP dams have been rated. However, not all of the data have been updated in the NID, but have been reported in the Performance Progress Reports for FEMA.





**FIGURE 2: BREAKDOWN OF THE DAMS IN FLORIDA BY THEIR PRIMARY PURPOSE**



## OPERATION & MAINTENANCE

From 2010 to 2018, the inspections, remediation oversight, permitting, and emergency preparedness work of the decentralized Florida Dam Safety Program (composed of the Florida Department of Environmental Protection, North Florida Water Management District, Suwannee River Water Management District, St. Johns River Water Management District, Southwest Florida Water Management District, and South Florida Water Management District) was facilitated by a full-time staff equivalent of about 20 people. In comparison to the national average, this staff maintained a significantly smaller portfolio of state-regulated dams per full time employee equivalents (FTEs). However, a forthcoming update to the NID showing a transition of some HHP dams into the National Levee Database is expected to produce a lower ratio of dams per FTE as the overall number of HHP dams decreases.

Of the documented 98 HHP dams in Florida, nearly all of them are state regulated and have been inspected in the last 5 years. However, condition data remains unentered into the database except for the mention that four state-regulated high hazard potential dams were remediated in 2018 due to hydraulic/ structural deficiencies.

The average age of dams in Florida is 50-years-old, less than the national average of 57 years.

The high average age means that the construction standards were unlikely to incorporate newer materials, approaches to resilience, and protections for downstream communities.

Therefore, evolving impacts of increasingly frequent and severe extreme weather may be taxing the state's infrastructure. To address these challenges, routine O&M, which is the responsibility of the owner, is critical. The longer the dam is in operation without continual maintenance, the more likely it is to require a significant amount of funding to rehabilitate.

In Florida, the State Dam Safety Officer manages the annual National Dam Safety Program State Assistance Grant, administered by FEMA, to increase Emergency Action Plans (EAP), perform detailed inspections, and provide training for agency and industry personnel. However, within Florida's portfolio of dams, about 40% are "pre-rule" meaning they do not operate under permits and are not required to perform inspections. Proposed activities to alter pre-rule dam construction, operation, repair, and maintenance or remove or abandon require a permit that includes inspection requirements.

A dam's EAP is prepared to understand potential emergencies and to provide a comprehensive plan that is implemented to protect loss of human life and minimize damage to the surrounding area. EAPs include inundation mapping to assist local emergency management personnel with the safe and proper evacuation of the area. Like fire drills, EAPs should be practiced regularly. Florida strongly encourages HHP and SHP dam owners to develop EAPs. Currently, 41% of the HHP dams have an EAP as compared to the national average of 81%.

## FUNDING & FUTURE NEEDS

The Association of State Dam Safety Officials (ASDSO) developed an estimation method to calculate the cost to repair the nation's dams based on the number, size and classification. This information is used to assist state dam safety offices. According to their 2019 report, entitled the Cost of Rehabilitating Our Nation's Dams, ASDSO estimated that over \$70 million was needed to repair or rehabilitate Florida's non-Federal HHP dams. However, the gap between the funding available and the funding required is substantial, well over \$60 million.

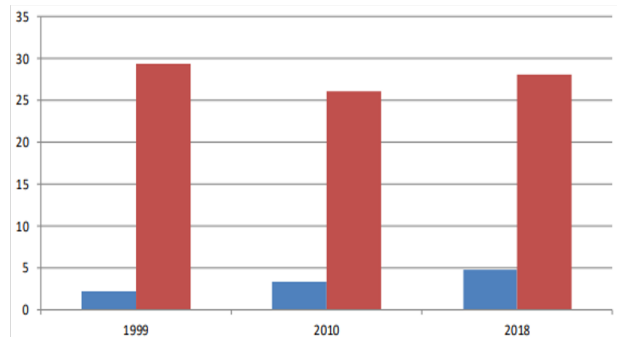
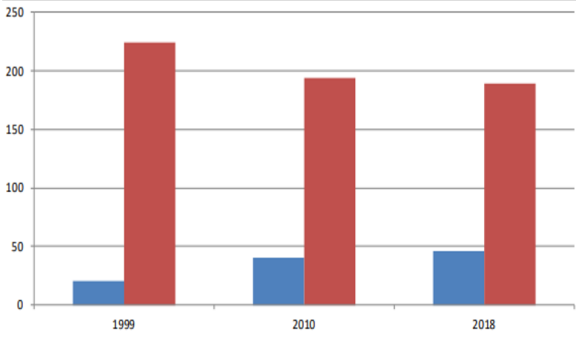
Additionally, Florida currently does not have a loan or grant funding program to directly assist dam owners with repair, abandonment, and/or removal projects. The High Hazard Potential Dam Rehabilitation Grant Program was authorized by Congress in 2016, as part of the Water Infrastructure Improvements to the Nation Act (WIIN 2016). In recent years, funding has increased slightly from \$10 million to \$11 million. The program was created so that the Federal Emergency Management Agency would be able to "...Provide technical, planning, design, and construction assistance in form of grants to non-Federal sponsors for rehabilitation of eligible high hazard potential dams."

## PUBLIC SAFETY

While most dams pose a level of public safety hazard, the average American is probably not aware of that risk. In some cases, even people living downstream of dams are unaware of the dam and the hazard it presents. The public can find more information about living near dams from FEMA's resources entitled Living with Dams: Know Your Risks.



**FIGURE 3:**  
**(LEFT) STATE-REGULATED DAMS PER FTE (BLUE) & NATIONAL AVERAGE (RED).**  
**(RIGHT) STATE-REGULATED HHP DAMS PER FTE (BLUE) & NATIONAL AVERAGE (RED)**



Due to the relatively flat terrain of Central and South Florida, flooding from a failure would likely be far-reaching. Weather including hurricanes and significant rainfall can lead to failure, particularly by overtopping. Since 2013, there have been 7 dam failures within the state, with 2 of those failures happening at the same dam. There was no loss of human life associated with these failures.

Florida's Herbert Hoover Dike is the longest dam within the state. The 143-mile long earthen embankment dam encompasses Lake Okeechobee and is classified as a HHP dam. In 2006, the USACE assigned a Dam Safety Action Classification (DSAC) Level 1 to the dam indicating the dam was almost certain to fail under normal operating conditions. Since that time, the USACE has been working to remediate the dam, but more rehabilitation repairs are required and expected to continue through 2022.

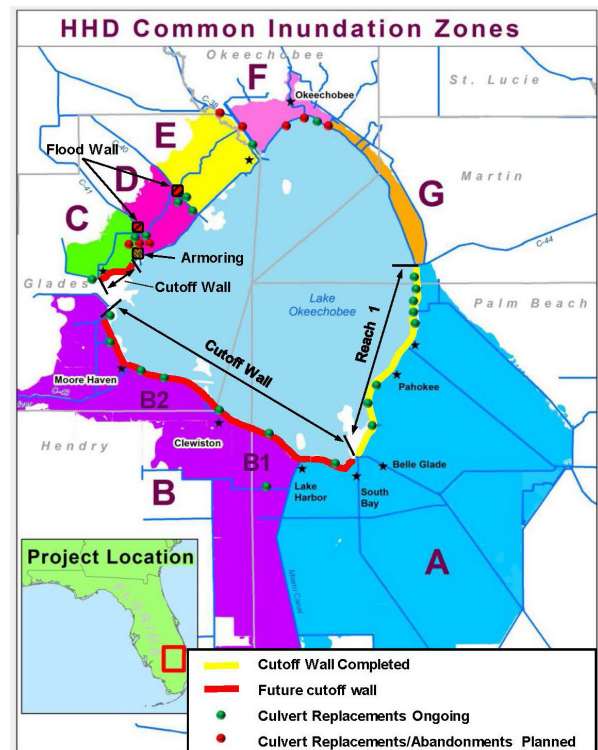
## RESILIENCE & INNOVATION

Since Hurricane Katrina and the levee failures in New Orleans, and with climate change effecting flooding frequency, incorporating resiliency into dams has become a priority throughout the nation. The current state of the practice accounts for resiliency within the design of dams; however, dams with older than average ages were typically not designed to account for varying load conditions due to climate change and/or changes in populations downstream.

Florida's population grew by nearly 1.8% between 2018 and 2019 to more than 21 million, adding more than 368,000 residents. Over the next five years, Florida's population growth is expected to persistently slow to 1.3%, but still average 1.5% per year for the entire period (2019 through 2024). With this growing population, the risk to life and property also continue to increase.

Innovation in the dam arena has come from improved flood inundation modeling. Inundation mapping continues to become more accurate and reliable. This information can improve EAPs, emergency preparedness, and better risk assessments to determine rehabilitation priority. Unfortunately, incorporating resiliency and innovation into the redesign of aging structures requires significant funding that can be difficult to attain for private dam owners.

**FIGURE 4: HERBERT HOOVER DIKE COMMON INUNDATION ZONES AND REHABILITATION ACTIVITIES**



Another area for innovation that is slowly being adopted for inspections is the use of drones and unmanned remote operated vehicles (ROV). Drones have been used to inspect intake/outlet structures above the waterline, while ROVs can perform inspections in submerged pipes and upstream slopes. Though neither method can replace full scale inspections, they can provide excellent information, much more quickly and at a lower expense than full inspections.



## LET'S RAISE THE DAMS GRADE

- Develop funding mechanism to assist private dam owners with repairs and rehabilitation of their structures.
- HHP and SHP dams should be inspected and action taken to require dam owners to rehabilitate the dams as needed.
- Require all HHP and SHP dam owners to develop, maintain, and practice EAPs for their dams
- Provide more public awareness and education on the dams

## FIND OUT MORE

- Association of State Dam Safety Officials (ASDSO), The Cost of Rehabilitating Our Nation's Dams – A Methodology, Estimate, & Proposed Funding Mechanics, Updated 2019
- ASDSO, 2018 Statistics on State Dam Safety Regulation
- ASDSO, Dam Safety Incident Database <https://damsafety.org/incidents>
- FEMA, Living with Dams: Know Your Risks - [https://www.fema.gov/media-library-data/20130726-1845-25045-7939/fema\\_p\\_956\\_living\\_with\\_dams.pdf](https://www.fema.gov/media-library-data/20130726-1845-25045-7939/fema_p_956_living_with_dams.pdf)
- United States Army Corps of Engineers, National Inventory of Dams - <https://nid.sec.usace.army.mil/>
- <https://damsafety-prod.s3.amazonaws.com/s3fs-public/files/FL-Performance%20Report%202018.pdf>
- Figure 2: Data provided by the USACE NID: <https://nid.sec.usace.army.mil/ords/f?p=105:113:16201125751522::NO::>
- Figure 3: Data provided by the National Dam Safety Program and ASDSO: <https://damsafety-prod.s3.amazonaws.com/s3fs-public/files/FL-Performance%20Report%202018.pdf>



## Florida's Infrastructure

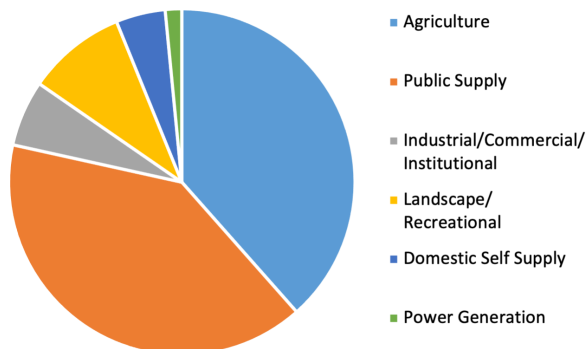
# DRINKING WATER

## EXECUTIVE SUMMARY

Florida's rural residents often receive their drinking water from small, privately-operated water treatment plants or private wells, whereas urban areas tend to have their drinking water provided by public, franchised, or private utilities with larger treatment facilities. The state's four largest water distribution systems – Jacksonville, Miami-Dade County, Palm Beach County, and the City of Tampa – own and operate approximately 18,112 total miles of pipe; Miami-Dade County's system alone is 8,569 miles. With regards to operations and maintenance, few utilities inspect more than 20% of their distribution pipelines annually for leaks, with several inspecting less than 5%. The state's 2020 average daily freshwater water demand was estimated to be 6.5 billion gallons per day, which is approximately 90% of the state's estimated 7.2 billion gallons a day that is available. Importantly, Florida is a national leader in the reuse of reclaimed water, with reclaimed water projects making up 35% of all water supply projects. Looking forward, Florida will need to spend about \$22 billion in the next 20 years in drinking water infrastructure improvements, according to the U.S. Environmental Protection Agency.

**FIGURE 1: FLORIDA'S LARGEST WATER USERS**

### Florida's Largest Water Users



## INTRODUCTION

The Florida Department of Environmental Protection (FDEP) currently regulates the operation of 5,031 active public and private drinking water treatment systems in Florida, which serve the state's estimated population of 21.5 million people. According to FDEP's Regional Water Supply Planning 2019 Annual report, the state's 2020 average daily freshwater water demand was estimated to be 6.5 billion gallons per day, which is approximately 90% of the state's estimated 7.2 billion gallons a day that is available.

Currently, the largest users of freshwater in Florida are Public Supply (40%) and Agriculture (38%), which are followed by Landscape/Recreational (9%), Industrial/Commercial/Institutional (6%), Domestic Self Supply (5%), and Power Generation (2%).

The percentage of Florida's water use that is used for Public Supply, Landscape/Recreational, and Domestic Self Supply has increased over the past five years, while Agriculture, Industrial/Commercial/Institutional, and Power Generation has decreased. Future demands are still expected to increase, but not as significantly as last predicted five years ago, even with a predicted increase in population.

## CONDITION & CAPACITY

Florida is comprised of 67 counties, of which 42 counties are categorized as "Urban," 22 counties are "Mostly Rural," and 3 counties are categorized as "Completely Rural." Residents in the more urban portions of the state tend to have their drinking water provided by public, franchised, or private utilities with larger treatment facilities. These utility providers, their systems, and the number of customers vary in size, but the state's four largest water distribution systems – Jacksonville, Miami-Dade County, Palm Beach County, and the City of Tampa – own and operate approximately 18,112 total miles of pipe; Miami-Dade County's system alone is 8,569 miles. The total combined water treatment system peak day capacity is 1,013 million gallons per day (MGD), ranging from a peak day capacity of 110 MGD for Palm Beach County to a peak day capacity of 464 MGD for Miami-Dade County. These four providers serve more than 1.3 million customer accounts, which represent over 4.5 million people (21.2% of the state), of which approximately 82.3% are residential water customers.

Communities in the more rural portions of the state may be served by larger water distribution systems, but are more likely served by private wells or small, privately-operated water treatment plants sized to meet the needs of mobile home parks, apartments, or similar facilities. Unlike with the larger treatment plants which source groundwater from the deep Floridan Aquifer, rural areas typically utilize shallow, non-artesian surficial aquifers that receive water primarily from local rainfall.

Whether deep or shallow, most Floridians' drinking water comes from aquifers, which are becoming increasingly stressed as the state's population and resultant drinking water demand continues to increase. Since 2015, the population has grown by a total of nearly 9% (an average of 1.76% annually) with an upswing in water demand that has tracked similar overall and annual rates – approximately 8% and 1.67%, respectively.



When the total capacity is evaluated across the state's entire network of drinking water systems, projections of how long the utilities' current transmission and treatment systems can meet future demands ranges from 5 years to over 45 years. However, utility providers statewide feel they will be able to serve reliable drinking water to their customers over the next 20 years even if it requires developing projects to meet the additional water needs.

With regard to the condition of the utilities evaluated, a majority of the distribution systems are over 40-years-old, and the average age of the treatment facilities is nearly 50-years-old. The utility providers did not experience a significant number of unplanned service or treatment process disruptions. The utility providers also did not experience a significant number of planned service disruptions; however, several providers did experience significant treatment process disruptions. The percentage of unaccounted water flow in the water systems ranged from 3% to the highest recording of 11.7%. The smaller providers tended to have lower percentages and the larger providers tended to have higher percentages.

## OPERATIONS & MAINTENANCE

With regards to operations and maintenance, few utilities inspect more than 20% of their distribution pipelines annually for leaks, with several inspecting less than 5%. Last year, the percentage of preventive maintenance work orders that were not closed within one month varied, with several utilities reporting over 30% not closed. Furthermore, the utilities' planned to unplanned maintenance ratio (total expenditures on planned maintenance/total expenditures on unplanned maintenance) varied significantly, with a majority of the utilities having a much higher amount of unplanned maintenance compared to their planned maintenance. The larger utilities tended to have exponentially larger expenditures on their unplanned maintenance when compared to their planned maintenance, with some up to 35 times more.

A significant number of utilities own infrastructure that is older than 40 years, with some utilities owning treatment facilities that are 50-years-old. Therefore, streamlining asset management throughout the state's utilities and increasing their employees' training hours on new asset management approaches and platforms is necessary to improve the operation and maintenance efforts and condition of the infrastructure.

## FUNDING & FUTURE NEED

According to the U.S. Environmental Protection Agency's (EPA) Drinking Water Infrastructure Needs Survey and Assessment – Sixth Report to Congress, Florida will need to spend about \$22 billion in the next 20 years, in drinking water infrastructure improvements (20-year need in January 2015 dollars). This value increased by \$4.5 billion or nearly 26% between the Fifth and Sixth Report to Congress. This estimate represents the total capital cost required over 20 years to construct infrastructure that ensures Florida's drinking water systems continue to provide safe and reliable water to the public. These projects pertain mainly to the collection, treatment, storage, and

distribution of drinking water in Florida. However, this estimate does not consider updated population growth models which anticipate a more than 23% increase in the state's population between 2020 to 2040 from 21.6 million to 26.4 million, impacting the state's future drinking water resource needs.

According to FDEP's Regional Water Supply Planning 2019 Annual Report, between FY19-20 and FY20-21, the State has budgeted \$80 million towards alternative water supply funding. Additionally, the State has spent or committed more than \$5.4 billion towards water resource and water supply development projects. Of the total identified projects, the State has invested \$897.9 million (17%), the Water Management Districts (WMD) have invested \$1.2 billion (23%), and water suppliers have committed to providing \$3.3 billion (61%).

Further referencing FDEP's 2019 Annual Report, Florida's demand for freshwater is expected to increase by 14% from 6.5 billion to 7.4 billion gallons per day from 2020 and 2040. The state's WMDs expect the future water needs to be met largely with existing sources, though additional projects estimating nearly 340 MDG are needed by 2040. This additional quantity of water is expected to be achieved through recharge, alternative water supplies, or saved through conservation. More than 60% of this need is accounted for by about 20 counties in North and Central Florida.

## RESILIENCE & INNOVATION

Florida is a national leader in the reuse of reclaimed water. Reclaimed water projects make up 35% of all water supply projects with 462 MGD made available to date. Reclaimed water is water from wastewater treatment facilities that has been treated for beneficial reuse purposes such as lawn and agricultural irrigation, groundwater recharge, and industrial processes. Florida's investment in reclaimed water helps to ensure that Florida will meet its future, growing water demands.

To ensure reclaimed water can meet supply needs and to streamline coordination of this resource, the state designates areas as Water Resource Caution Areas. Water Resource Caution Areas are designated when a WMD determines the area has existing water resource constraints or forecasts constraints during the next 20 years. Through these designations, the state can build upon past success in reclaimed water development and identify additional areas where more reclaimed water can be beneficially used.

Florida's investment in reclaimed water not only increases the state's drinking water supply, but also improves the overall resilience of its drinking water network. The reclaimed water supply increases system redundancy by offering an additional source of drinking water, and its substantive volume will improve the state's ability to adapt to the increasing demands of a growing population.

## PUBLIC SAFETY

The state has not had major incidents of drinking water system failures or challenges to public health because Florida is meeting its own standards and Safe Drinking Water Act standards. Of the utility providers evaluated, only one provider



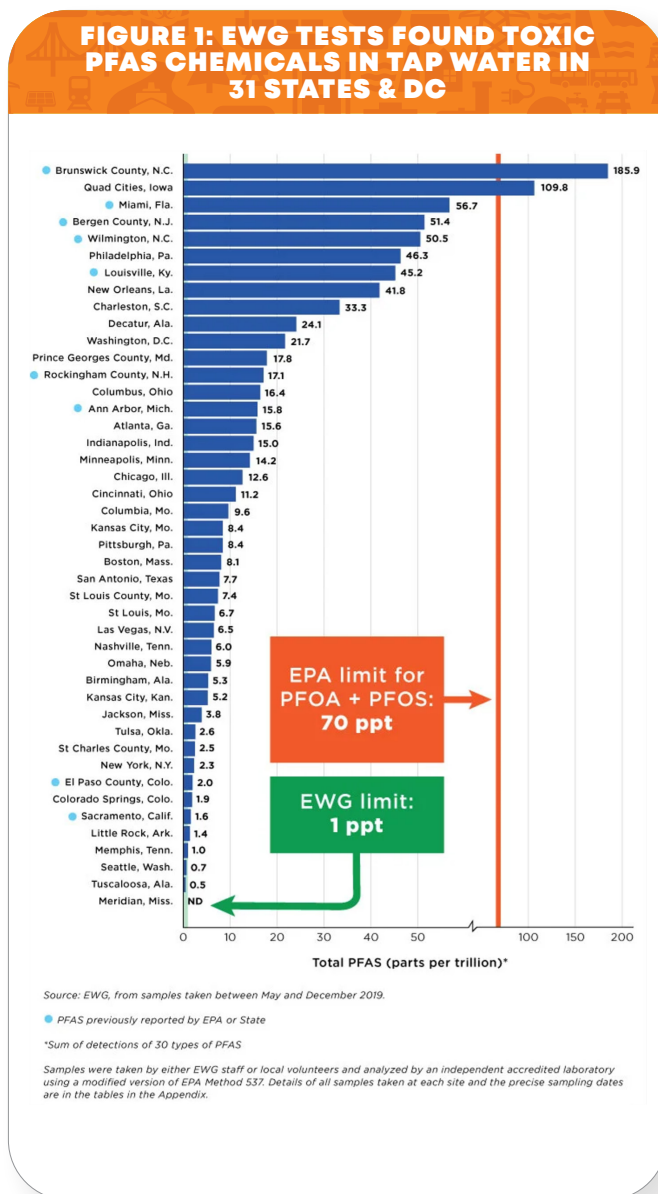
indicated that their water treatment facilities or distribution system was ever in noncompliance, and that occurs less than one day per year.

A growing health concern in Florida includes testing, regulations, and limits for per- and polyfluoroalkyl substances (PFAS), which are being found in contaminated drinking water. This family of ‘forever chemicals’ do not breakdown once they are introduced into the environment. Studies also show that the chemicals can build up in human blood and organs. PFAS are currently not regulated. There is no simple and inexpensive technology for effectively removing PFAS from drinking water, though existing treatment technology options include granular activated carbon, ion exchange, and reverse osmosis.

## LET’S RAISE THE DRINKING WATER GRADE

- An immediate investment in Florida’s water infrastructure must be made to ensure that Floridians can continue to have access to a safe and adequate water supply. The health and welfare of the public, as well as the economy, depend on it.
- Florida’s anticipated increase in water demand due to high population growth will have a major financial impact on the utilities serving Florida residents. Conservation and alternative source development efforts need to continue to reduce projected water demands. Ground water resources will no longer be able to support the increased demands. New treatment technologies will have to be evaluated and implemented.
- Additional investments should be made in technology implementation and asset management to best maintain and upkeep these critical assets throughout their useful life.
- Sustainability and resiliency should be streamlined across all drinking water infrastructure sectors. Sustainability and resilience principles can reduce operating costs, reduce the need for new water sources, and extend the life of water infrastructure components. “For water and wastewater utilities, sustainability is about creating reliable, consistent infrastructure that can be managed, maintained and upgraded - without destroying the environment or bankrupting users.”

**FIGURE 1: EWG TESTS FOUND TOXIC PFAS CHEMICALS IN TAP WATER IN 31 STATES & DC**



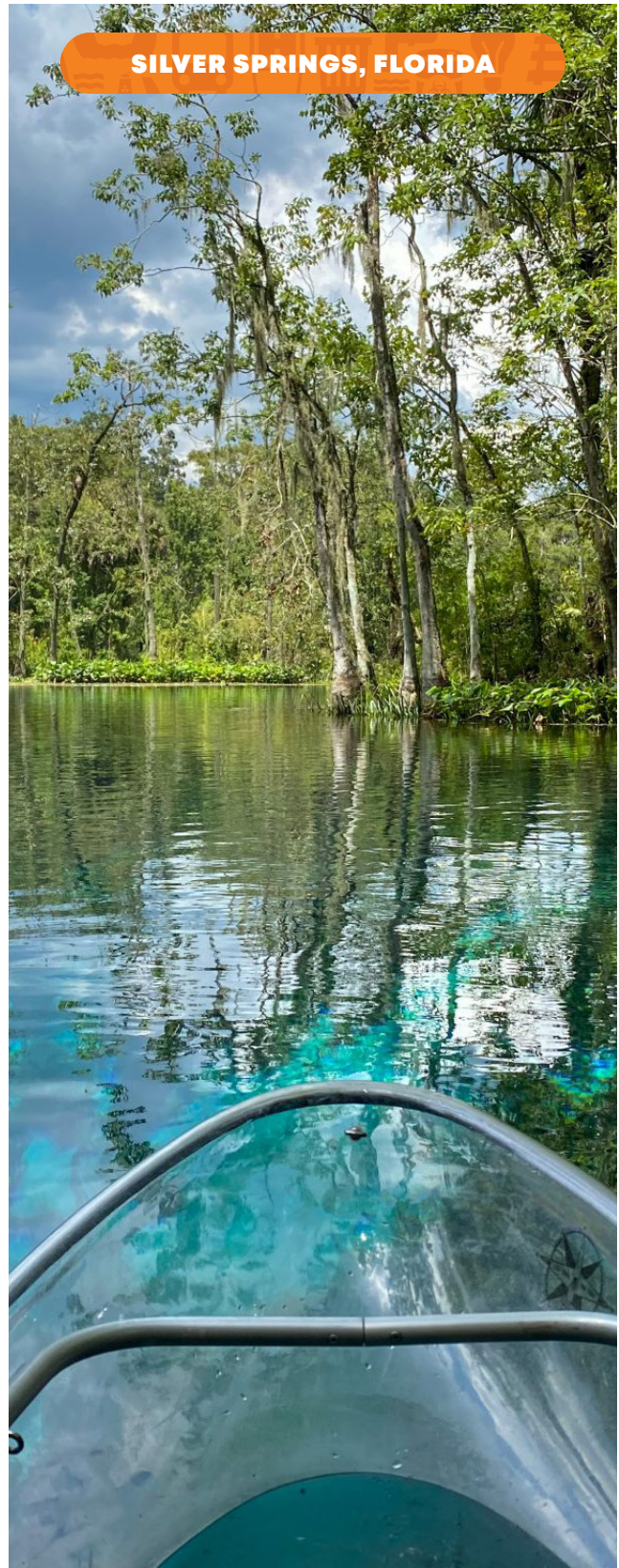
## FIND OUT MORE

- FDEP, Annual Report on Violations of the U.S. and Florida Safe Drinking Water Acts in the State of Florida: January – December 2018, July 30, 2019. ([https://floridadep.gov/sites/default/files/2018%20FL%20Annual%20Compliance%20Report\\_1.pdf](https://floridadep.gov/sites/default/files/2018%20FL%20Annual%20Compliance%20Report_1.pdf))
- FDEP, Drinking Water Database, Basic Facility Report for All Districts, May 12, 2020. (<https://floridadep.gov/water/source-drinking-water/documents/basic-facility-reports-all-districts>)
- FDEP, Regional Water Supply Planning Annual Report 2019, 2019. (<https://fdep.maps.arcgis.com/apps/MapSeries/index.html?appid=04f84e6ae64c45e292e5b3db82f045e3>)
- FDEP webpage, Division of Water Resources Management description, September 22, 2020. ([www.dep.state.fl.us/water/groundwater/index.htm](http://www.dep.state.fl.us/water/groundwater/index.htm))
- Florida’s Water Resources, Tatiana Borisova and Tara Wade, June 2017. (<https://edis.ifas.ufl.edu/pdffiles/FE/FE75700.pdf>)
- PFAS Contamination of Drinking Water Far More Prevalent Than Previously Reported, Sydney Evans, David Andrews, Ph.D., Tasha Stoiber, Ph.D., and Olga Naidenko, Ph.D., January 22, 2020. (<https://www.ewg.org/research/national-pfas-testing/>)
- Securing Florida’s Water Future, Florida Chamber of



- Commerce, 2016. (<http://www.flchamber.com/wp-content/uploads/2017/07/SecuringFloridasWaterFuture-Web.pdf>)
- Southwest Florida Regional Planning Council, March 2002 ([https://www.swfrpc.org/wp-content/uploads/SRPP/Vol1\\_Final\\_Revised\\_1201.pdf](https://www.swfrpc.org/wp-content/uploads/SRPP/Vol1_Final_Revised_1201.pdf))
  - Sustainable Water Infrastructure: Rethinking water and wastewater systems with resilience in mind, Sarah Fister Gale, June 1, 2017 (<https://www.waterworld.com/water-utility-management/article/16191763/sustainable-water-infrastructure-rethinking-water-and-wastewater-systems-with-resilience-in-mind>)
  - The Florida Legislature Office of Economic and Demographic Research, Economic Differences: Urban and Rural Areas, Senate Committee on Commerce and Tourism, November 13, 2017 (<http://edr.state.fl.us/Content/presentations/economic-development/RuralEconomicChallenges.pdf>)
  - United States Census Bureau Population Estimates. (<https://www2.census.gov/programs-surveys/popest/tables/2010-2019/state/totals/nst-est2019-01.xlsx>)
  - United States Environmental Protection Agency (U.S. EPA), Basic Information on PFAS, September 28, 2020. (<https://www.epa.gov/research/national-pfas-testing/>)
  - U.S. EPA, Drinking Water Infrastructure Needs Survey and Assessment, Sixth Report to Congress, March 2018. ([https://www.epa.gov/sites/production/files/2018-10/documents/corrected\\_sixth\\_drinking\\_water\\_infrastructure\\_needs\\_survey\\_and\\_assessment.pdf](https://www.epa.gov/sites/production/files/2018-10/documents/corrected_sixth_drinking_water_infrastructure_needs_survey_and_assessment.pdf))
  - U.S. EPA, Financing Resilient and Sustainable Water Infrastructure, September 28, 2020. (<https://www.epa.gov/waterfinancecenter/financing-resilient-and-sustainable-water-infrastructure>)
  - U.S. EPA, Sustainable Water Infrastructure, September 28, 2020. (<https://www.epa.gov/sustainable-water-infrastructure>)

### SILVER SPRINGS, FLORIDA



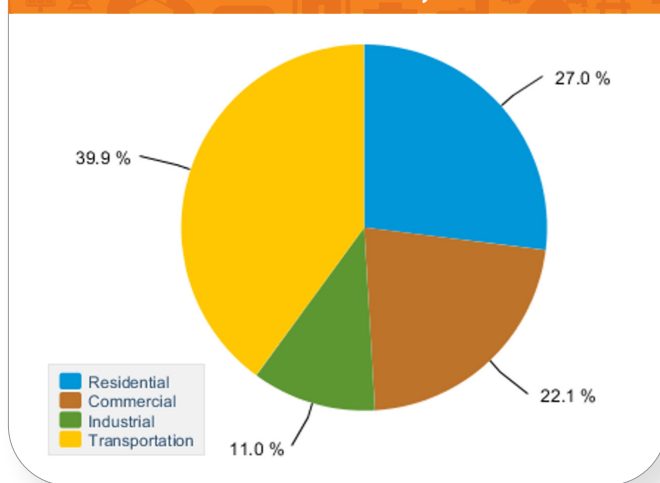


# Florida's Infrastructure ENERGY

## EXECUTIVE SUMMARY

Electric transmission and distribution lines span the state and are owned and operated by 5 investor-owned electric utility companies, 34 municipally owned electric companies, and 18 rural electric cooperatives. Florida's natural gas pipelines are owned and operated by 8 investor-owned natural gas utilities, 27 municipally owned natural gas utilities, and 4 special gas districts. In 2020, electric services were provided to nearly 8.2 million customers, up slightly from approximately 8 million in 2018. The average residential price per kilowatt hour (kWh) in Florida is \$0.117 per kWh, lower than the average regional and U.S. residential prices of \$0.119 and \$0.130 per kWh, respectively. Utilities have been investing in resiliency and in 2019, Florida was among the five areas in the nation with the shortest outage duration totaling less than 90 minutes. Florida Power & Light Company plans to bury between 2% - 3% of its distribution lines each year and invest \$1 billion annually into storm hardening for the next 10 years. Meanwhile Duke Energy's Florida subsidiary plans to invest \$6.5 billion over 10 years into feeder and lateral hardening and underground installations, and development of self-optimizing grids. Tampa Electric Company (TECO) plans to spend approximately \$977 million from 2020 through 2029 to install underground distribution laterals.<sup>1</sup>

**FIGURE 1:  
FLORIDA ENERGY CONSUMPTION BY  
END USE SECTOR, 2019**



## INTRODUCTION

According to the United States Department of Energy's Energy Information Administration (EIA), from 2017 to 2021, Florida has maintained its national ranking of fourth for total energy consumption behind Texas, California, and Louisiana. Florida uses nearly eight times more energy than it produces. Figure 1 depicts the end-use markets consuming energy. In 2019, the largest consumer was the transportation sector comprising nearly 40% of the state's total consumption, up from 37% in 2017. Over the same two-year timeframe, Florida's remaining consumption sectors all saw modest declines: residential (27%), commercial (approx. 22%), and industrial sectors (11%).<sup>2 3</sup>

While Florida's electric energy is sourced from a diverse fuel mixture including renewables (non-hydroelectric), out-of-state purchases, coal, natural gas, nuclear, and other sources, electricity generation is expected to remain heavily dependent upon natural gas. However, over the next decade, shifts are expected in the state's energy generation portfolio as natural gas is projected to decline by about 6% while renewables are projected to increase by nearly 10%.

Once the energy is generated, the infrastructure related to transporting electric power to customers includes transmission and distribution (T&D) circuits, while oil and natural gas is delivered by pipelines. Electric T&D lines span the state and are owned and operated by 5 investor-owned electric utility companies, 34 municipally owned electric companies, and 18 rural electric cooperatives. Florida's natural gas pipelines are owned and operated by 8 investor-owned natural gas utilities, 27 municipally owned natural gas utilities, and 4 special gas districts.<sup>4</sup>

To ensure public transparency and proactive planning, Florida regulates the state's energy sector through two distinct, yet cooperative agencies – the Florida Public Service Commission (FPSC) and the Florida Department of Agriculture and Consumer Services' Office of Energy (FDACS OOE). The FPSC provides oversight and planning for various aspects of the energy sector through review of routine reporting on issues including safety, rate base and economics, fuel diversity, storm hardening, efficiency and reliability.

To assure an adequate and reliable supply of electricity in Florida, the FPSC has jurisdiction over the generation and bulk transmission planning of all electric utilities. The Commission is responsible for reviewing electric utility Ten-Year Site Plans and determining the need for major new power plant and transmission line additions under the Florida Power Plant and Transmission Line Siting Acts. Finally, the FPSC also has authority to set conservation goals for Florida's investor-owned and municipal electric utilities.

Additionally, the FDACS OOE is the legislatively designated state energy policy and program development office. The FDACS OOE evaluates energy related studies, analyses, and stakeholder

1 Florida approves utility storm protection plans; analysts advocate measures beyond undergrounding, Utility Dive, August 13, 2020, <https://www.utilitydive.com/news/florida-approves-utility-storm-protection-plans-analysts-advocate-measures/583360/>.

2 Florida - State Energy Profile Overview - U.S. Energy Information Administration (EIA)

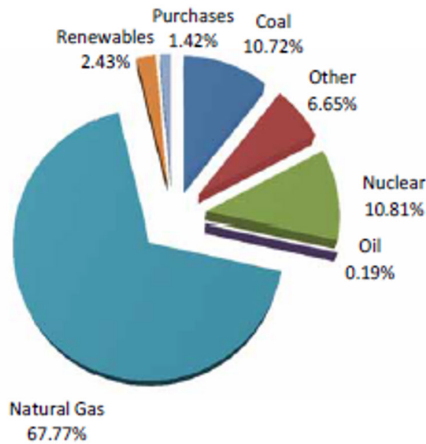
3 <https://www.eia.gov/state/analysis.php?sid=FL>

4 Florida Public Service Commission (PSC) report

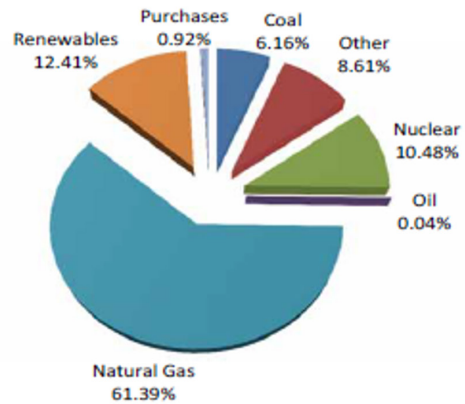




FIGURE 2: FLORIDA ENERGY CONSUMPTION BY END USE SECTOR, 2019



2019: ACTUAL %



2029: FORECAST %

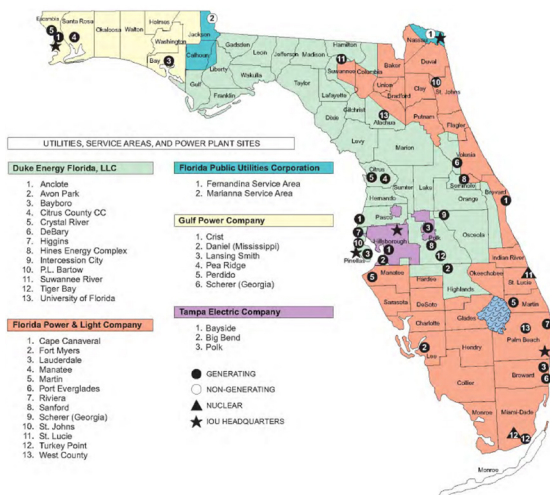
input to recommend energy policies and programs to the Governor and Legislature that will move Florida toward a more diversified, stable, reliable and resilient energy portfolio.

## CAPACITY & CONDITION

### ELECTRICITY: TRANSMISSION & DISTRIBUTION LINES

According to a 2021 FPSC report, Florida's two largest electricity companies – Duke Energy and Florida Power & Light Company – provide services to nearly 7 million residential, commercial, industrial, and other customers.<sup>5</sup> To accomplish this, high-voltage transmission lines convey electricity to local substations, distribution lines, and, then to homes and businesses. This means that some utilities like Duke Energy currently have enough capacity within their network of 44 to 525 kilovolt (Kv) transmission lines to reliably meet customers' needs and bridge multiple service areas and utilities.<sup>6</sup> However, from 2015 to 2021, Florida's population grew by nearly 1.2 million residents, so other electricity providers like the Florida Power & Light Company have expanded their capacity to meet needs. Specifically, Florida Power & Light Company's bulk transmission system, including both overhead and underground lines, have increased by nearly 500 circuit miles of transmission lines and approximately 70 substations.<sup>7</sup> As these larger energy systems adjust to meet needs, smaller organizations like Seminole Electric Cooperative, Inc., collaborate with them to extend services to rural communities through the distribution systems. To do so cost-effectively requires coordination among energy generation, transmission, and distribution owners and operators, particularly when supply and/or demand side practices are adjusted to efficiently manage capacity on the line.

FIGURE 3: INVESTOR-OWNED ELECTRIC UTILITIES AND APPROXIMATE SERVICE AREAS



5 Florida Public Service Commission 2021, Facts & Figures of the Florida Utility Industry

6 Duke Energy Florida, LLC Ten-Year Site Plan, 2021

7 Florida Power and Light Ten-Year Site Plan, 2021



While Florida's T&D capacity only modestly increased to meet consumer needs, the state's electricity sector has taken significant strides in streamlining "smart" technologies systemwide. For instance, companies are installing remote sensors and monitoring tools with advanced communication capabilities that deliver real-time information from thousands of points along the grid. Such devices – smart sensors on homes, along the T&D lines, and at management centers— help to identify and diagnose outages, highlight opportunities for rerouting around trouble spots, educate users on energy usage, and improve the efficiency of returning service.<sup>8 9</sup>

### OIL & NATURAL GAS: PIPELINES

While Florida produces a modest amount of oil and natural gas, these resources predominantly rely on approximately 50,000 miles of natural gas transmission and distribution pipelines, a nearly 2,000-mile increase since 2017.<sup>10</sup> Florida receives most of its natural gas supplies from the Gulf Coast region via three interstate pipelines: the Florida Gas Transmission line, the Gulfstream pipeline, and the Sabal Trail Transmission line. The Florida Gas Transmission line runs from Texas through the Florida Panhandle to Miami; the Gulfstream pipeline is an underwater link from Mississippi and Alabama to Central Florida; and the Sabal Trail Transmission line, the smallest capacity of the three interstate systems, extends from southern Georgia to central Florida, stopping in Polk and Osceola counties.

### FUNDING & FUTURE NEED

In 2020, electric services were provided to nearly 8.2 million customers, up slightly from approximately 8 million in 2018. Over the same two-year period, residential accounts remained steady at almost 90% of the total customers. However, the average residential price per kilowatt hour (kWh) rose modestly from \$0.116 per kWh to \$0.117 per kWh but remained under the average regional and U.S. residential prices of \$0.119 and \$0.130 per kWh, respectively.<sup>11</sup>

In 2019, Florida Governor DeSantis signed Senate Bill 796 into law thus enacting the Storm Protection Plan Cost Recovery statute. This statute requires each investor-owned electric

utility to prepare and submit a 10-year transmission and distribution storm protection plan to the PFSC to be reviewed at least every three years. It also gives FPSC jurisdiction to hold annual proceedings to determine whether utilities have prudently incurred costs to be recovered through increased charges to ratepayers as well as for transitioning distribution lines underground.<sup>12</sup> As FPSC maintains regulatory oversight on energy rate-setting, they ensure utilities can recoup costs from storm damage without overburdening ratepayers with large fees.<sup>13</sup> Currently, monthly Storm Protection Plan Cost Recovery charges range from non-applicable in some public utilities to as low as \$0.31 per month to \$2.39 per month.<sup>14</sup>

Currently, Florida Power & Light Company operates approximately 71,000 miles of residential distribution lines, which represents approximately one half of the state's total. Of these lines, approximately 38% are already installed underground. Florida Power & Light Company plans to bury between 2% - 3% of its distribution lines each year.<sup>15</sup> Over the next ten years, Florida Power & Light Company also plans to invest \$1 billion annually into storm hardening. Duke Energy's Florida subsidiary plans to invest \$6.5 billion over ten years into feeder and lateral hardening and underground installations, and development of self-optimizing grids. Tampa Electric Company (TECO) plans to spend approximately \$977 million from 2020 through 2029 to install underground distribution laterals.<sup>16</sup>

### OPERATION, MAINTENANCE, & PUBLIC SAFETY

Many of Florida's investor-owned utilities are engaged in routine operations and maintenance (O&M) practices. Such practices include pole inspections and replacements, hardening the transmission and distribution system, vegetation management, joint use agreements on shared poles, converting existing and installing new lines underground, and inspecting major substations.<sup>17</sup>

Specifically, Duke Energy has improved their reliability using a prioritization process that balances historical and current year performance data including number of interruptions, customers interrupted, and minutes of interruption to determine the order and portion of the system for targeted O&M efforts. Furthermore, Duke Energy's current performance

<sup>8</sup> <https://www.fpl.com/reliability/system-improvements.html>

<sup>9</sup> <https://www.fpl.com/smart-meters/control.html>

<sup>10</sup> <https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities>

<sup>11</sup> Facts & Figures of the Florida Utility Industry, Florida Public Service Commission, 2019, <http://www.psc.state.fl.us/Files/PDF/Publications/Reports/General/Factsandfigures/June%202019.pdf>

<sup>12</sup> <http://www.psc.state.fl.us/Files/PDF/Publications/Reports/General/AnnualReports/2020.pdf>

<sup>13</sup> Storm Protection Plan Cost Recovery Clause, Rule 25-6.031, Florida Administrative Code & Florida Administrative Register, Florida Department of State, February 18, 2020, <https://www.flrules.org/gateway/ruleno.asp?id=25-6.031>.

<sup>14</sup> [http://www.psc.state.fl.us/Files/PDF/Utilities/Electricgas/BillingAdjustments/ba\\_total-2021.pdf](http://www.psc.state.fl.us/Files/PDF/Utilities/Electricgas/BillingAdjustments/ba_total-2021.pdf)

<sup>15</sup> Our power lines will be buried for storm safety. It could cost FPL up to \$35 billion., South Florida Sun Sentinel, October 17, 2019, <https://www.sun-sentinel.com/business/fl-bz-storm-protection-costs-20191017-crfsevrmtzdmlicx2bvuvorvuy-story.html>.

<sup>16</sup> Florida approves utility storm protection plans; analysts advocate measures beyond undergrounding, Utility Dive, August 13, 2020, <https://www.utilitydive.com/news/florida-approves-utility-storm-protection-plans-analysts-advocate-measures/583360/>.

<sup>17</sup> <http://www.psc.state.fl.us/Files/PDF/Publications/Reports/General/AnnualReports/2020.pdf>



data is continuously monitored to identify emergent and seasonal issues including load balancing for cold weather, unexpected performance trends, and the need for field inspections to diagnose devices experiencing multiple interruptions.

Such routine O&M efforts result in a more reliable energy supply with fewer interruptions, thus strengthening public safety as Florida experiences increasingly hotter temperatures and extreme weather events year after year. In 2019, according to the EIA, energy customers across the country, on average, experienced more than 3.2 hours of interruptions during major events and 1.5 hours of interruptions without major events, or nearly a total of 5 hours without power. However, in 2019, Florida was among the five areas in the nation with the shortest outage duration totaling less than 90 minutes.<sup>18</sup> These metrics are significantly less than the state's electricity interruptions reported in 2017 when Florida was among the top five states experiencing the longest total interruption time due to the hurricanes and severe storms that year.<sup>19</sup>

FPSC requires that annual safety compliance evaluations be conducted for every natural gas pipeline. These evaluations are comprised of field inspections, programmatic assessments, and thorough dialogue with operations managers. Between 2015 and 2020, such efforts have yielded a downward trend in violations, 155 down to 19, due, in part, to the large portion of pipeline corrections/improvements that are occurring over the same timeframe.<sup>20</sup> However, reports from the US DOT Pipeline and Hazardous Materials Safety Administration show a modest decrease in the number of operators maintaining the state's gas distribution lines, an area for future workforce development as systems become more digitized and responsive to remote control.

## INNOVATION

According to a 2020 report coauthored by the FDACS OOE and the Central Florida Clean Cities Coalition, electric vehicle (EV) adoption in Florida has accelerated in recent years and is expected to continue increasing, namely through the adoption of battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV).<sup>21</sup>

In response to this trend, Governor Ron DeSantis announced \$8.6 million in funding to strengthen Florida's electric vehicle infrastructure, funds drawn from the state's settlement with Volkswagen regarding its misrepresentation of air emissions. The funding aims to broaden access to charging stations along

the most traveled corridors, expanding the existing network by 50%.<sup>22</sup> Later in 2020, the state legislature continued a proactive approach to integrating energy and transportation infrastructure systems together by passing SB 7018<sup>23</sup> which directed the Florida Department of Transportation, in consultation with the Florida Public Service Commission, FDACS OOE, and relevant stakeholders, to develop a "Master Plan" for furthering electric vehicle infrastructure expansion. Unlike approaches taken in other states, Florida is requiring utilities to actively engage in the planning and deployment of EVs as they play a critical role in ensuring adequate energy supply.<sup>24</sup> Finally, as recent as March 2021, Florida's policymakers introduced legislation that would increase revenues from licensure of electric and hybrid vehicles to fund an Electric Vehicle Infrastructure Grant Program to financially assist public authorities with the installation of electric vehicle charging stations.<sup>25</sup>

As Florida leads the way in collaborating across energy utilities, the state's transportation agency, policymakers, and other stakeholders, the learning curve for electric vehicles likely formulates the precedent for autonomous vehicles, of which, Florida already has supportive laws and regulations. For example, the Florida Turnpike Enterprise may enter into one or more agreements to fund, construct, and operate facilities for the advancement of autonomous and connected technologies to improve safety and reduce congestion.<sup>26</sup>

## RESILIENCE

The resilience of Florida's energy system has improved in recent years. The state's electric companies have invested in hardening the T&D lines which strengthens the system to withstand extreme events while also transitioning portions of the grid underground to minimize service interruptions. Furthermore, by incentivizing cross-sector planning and determining multi-sector benefits, Governor DeSantis, the FPSC, and the state legislature have bridged the state's energy and transportation networks with infrastructure funding to accommodate EVs. Such efforts are aiding the build-out of charging stations in rural areas along hurricane evacuation routes to ensure individuals with EVs can use primary and secondary routes when evacuating. The same state leaders also passed the Storm Protection Plan Cost Recovery statute which enables utilities to equitably recoup and reinvest resources following natural disasters. While these efforts increase protection to the lines, they lack the improvements in redundancy and adaptivity that characterize resilient systems. Future work to increase systemic resilience could involve adding additional lines to transport

<sup>18</sup> *Today in Energy – U.S. Power Customers Experienced an Average of Nearly Five Hours of Interruptions in 2019*, U.S. Energy Information Administration, November 6, 2020, <https://www.eia.gov/todayinenergy/detail.php?id=45796>.

<sup>19</sup> *Today in Energy – Average US electricity customer interruptions totaled nearly 8 hours in 2017*, U.S. Energy Information Administration, November 30, 2018, <https://www.eia.gov/todayinenergy/detail.php?id=37652>.

<sup>20</sup> <https://primis.phmsa.dot.gov/comm/states.htm>

<sup>21</sup> <https://www.fdacs.gov/content/download/92160/file/Future-EV-Infrastructure-and-Infrastructure-Models-Interim-Report.pdf>

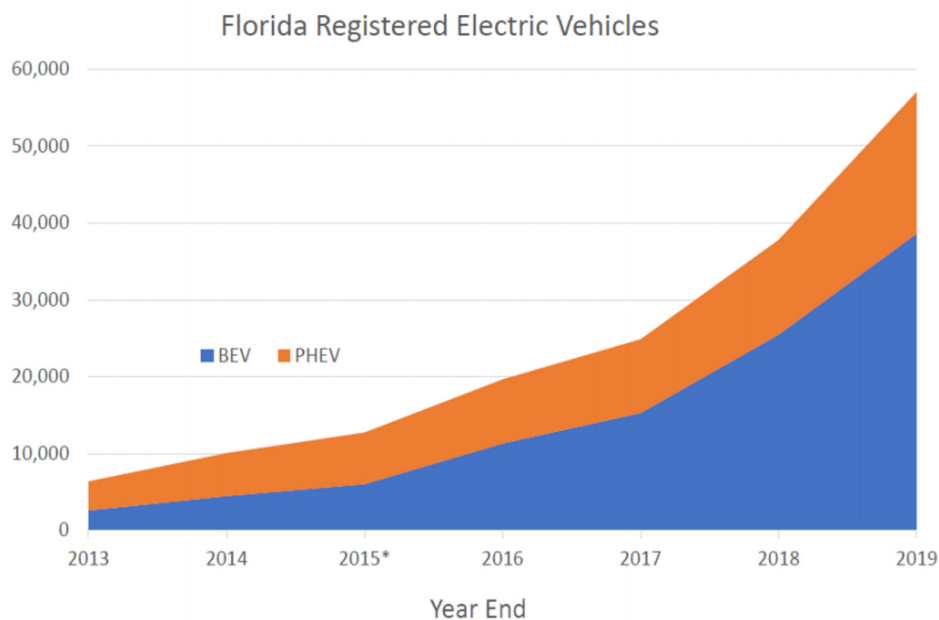
<sup>22</sup> <https://www.flgov.com/2020/07/10/governor-ron-desantis-announces-next-steps-to-strengthen-floridas-electric-vehicle-infrastructure/>

<sup>23</sup> <https://afdc.energy.gov/laws/utility-examples#/mandates>

<sup>24</sup> <https://www.fdacs.gov/Energy/Florida-Electric-Vehicle-Roadmap>

<sup>25</sup> <https://www.flsenate.gov/Session/Bill/2021/138/Amendment/303668/PDF>

<sup>26</sup> <https://afdc.energy.gov/laws/all?state=FL>


**FIGURE 4: FLORIDA REGISTERED ELECTRIC VEHICLES OVER TIME**


fuels in case of any failures or increasing line capacity to adapt to the state's growing energy needs.

Finally, when utilities expand their portfolio of backup energy options, they become more redundant and resilient to service interruptions that are increasingly being threatened by frequent and severe weather. Many Florida utilities rely upon a few forms of fossil-based fuels while a growing number are installing significant amounts of solar capacity – this is occurring both at the residential and utility-scale. However, current cost-recovery policies pertaining to Net Energy Metering (NEM) customers, those who sell excess solar energy generated at their homes back to the grid, are being discussed among FPSC, utilities, and other solar energy stakeholders. The challenge stems from the cost NEM customers are being paid for the resale of their solar capacity; solar energy is purchased at a retail cost rather than wholesale or less. Because of this rate, Florida's energy utilities have explained that the NEM customers' use of the grid is essentially being subsidized by non-NEM customers who do not have the fixed asset that drives cost-savings and divergent usage rates. Energy utilities and FPSC are considering the potential equity implications as they navigate the evolving at-home solar energy landscape.

## LET'S RAISE THE ENERGY GRADE

- Promote the use of energy sources and generation methods that allow for equity, affordability, and access by all members of the community and lessen the burden of energy production and distribution on under-resourced communities.
- Continue to support the acceleration of storm hardening, pole replacement, transitioning lines underground, vegetation management, and other measures that reduce weather related outages.

UNIVERSITY OF FLORIDA CENTRAL ENERGY PLANT

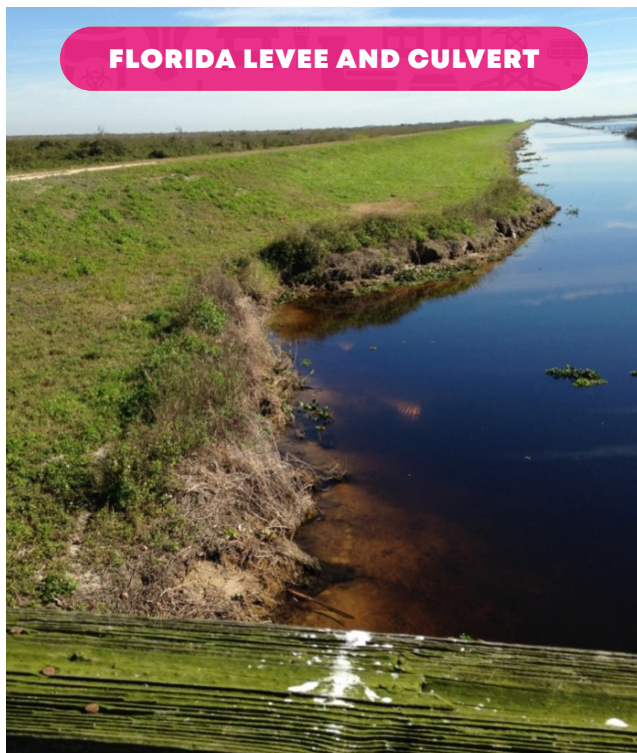




# Florida's Infrastructure LEVEES

## EXECUTIVE SUMMARY

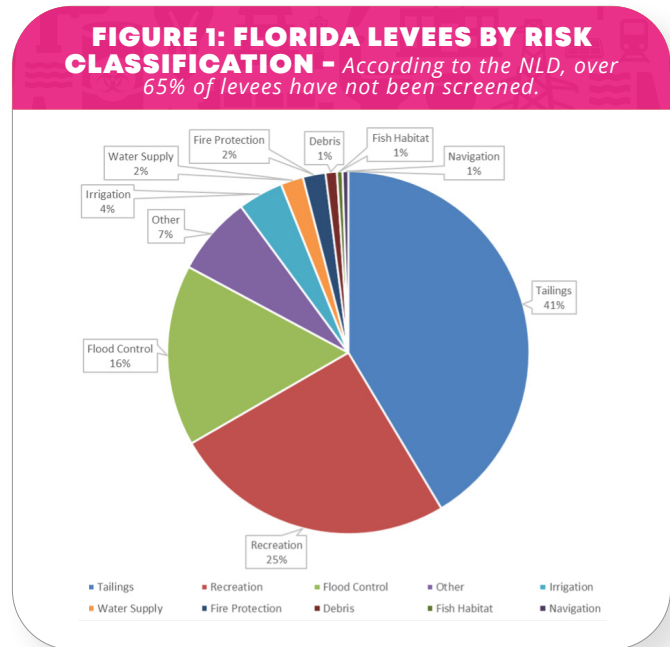
As Florida's population grows and threats from extreme weather become increasingly frequent and severe, levees are playing an increasingly important role in protecting property and the public. Florida has more than 90 levee systems with over 1,053 miles of infrastructure that has reached an average age of 58-years-old. These systems protect nearly \$100 billion in property values, more than 1.6 million in population, and 481,000 structures. However, only 40% of Florida's levees have been assessed for risk with most of them being classified as low risk. Nearly 80% of the state's levees were federally constructed and are currently operated and maintained by state water management districts. These districts have introduced Ad Valorem taxes to annually generate hundreds of millions of dollars for Operations & Maintenance (O&M), while significant capital rehabilitation and reconstruction costs are projected to cost billions of dollars. The remaining 20% of Florida's levees that were not federally constructed depend on a limited amount of local technical and financial resources. Without ample funding and expertise to perform routine O&M, the likelihood increases that these systems may require significant capital investments for rehabilitation. Unfortunately, there is very little to no publicly available information for non-federally constructed levees. This means the O&M and funding needs for privately owned and operated levees is largely unknown.



## INTRODUCTION

Like dams, levees are not typically visible infrastructure. But did you know there are over 1,000 miles of levees in the state of Florida? And due to the relatively flat terrain of Florida, these embankments provide critical flood control to large population centers that are significant to the state's economic productivity.

Levees are manmade structures that can be comprised of earthen embankments, floodwalls, closure structures, pump stations, and/or interior drainage features. These structures provide differing levels of flood protection and are typically constructed along canals, rivers, coastlines, and other waterways. In 2006, the U.S. Army Corps of Engineers (USACE) began developing a comprehensive database of the levees throughout the United States under its Levee Safety Program. This program and portfolio of inspection and assessment data includes extensive information on the levees' construction, current condition, and hazard potential. The public can access the National Levee Database (NLD) at <https://levees.sec.usace.army.mil/#/>. Currently, the NLD provides data on 96 levee systems in the state of Florida.



## CAPACITY & CONDITION

According to the USACE National Levee Database, Florida has more than 90 levee systems with over 1,053 miles protecting nearly \$100 billion in property values, more than 1.6 million in population and 481,000 structures.

The hazard potential for levees is determined by several risk-related factors: potential failure mechanisms, the likelihood of those failure mechanisms, and the consequences following a failure. Each levee system is then assigned a Levee Safety Action Classification (LSAC) to communicate the system's risk. Classifications range from Very High Risk to Very Low Risk,

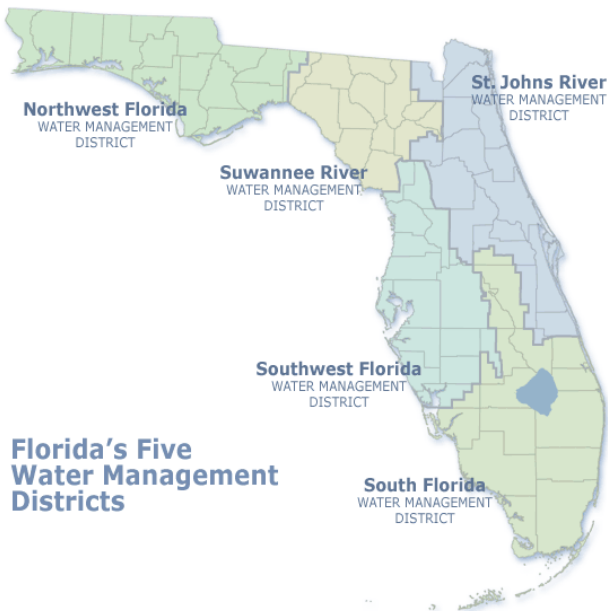
allowing the USACE to prioritize funding to the systems with the highest risk. Within Florida's levee system, only 40% have been assessed for risk. Of the portion of the state's levee inventory that has been assessed, 36% are classified as low, 2% are moderate, and 2% are classified as high risk. When translating these risk categories into miles of levee system, more than 1,000 miles are classified as low risk, 55 miles are moderate risk, and nearly 37 miles are high risk levees. At the time of this report, 60 of the state's levee systems have inspection ratings, with 70% of those inspections indicating an unacceptable rating.

control structures, and over 620 culverts. SFWMD has an annual levee system O&M budget of over \$200 million. The primary means of generating these O&M funds are the Ad Valorem taxes instituted by the local WMDs within their respective regions.

The remaining 20% of Florida's levees that were not federally constructed depend on local technical and financial resources for O&M. Like all infrastructure, when levees are routinely maintained, they operate properly and their useful life can be maximized. However, the longer the levee system is in operation without routine maintenance, the more likely it is to require a significant amount of funding to rehabilitate the structure. Unfortunately, there is very little to no publicly available information for levees constructed by agencies other than USACE, particularly privately owned and operated levee infrastructure. This means the O&M and funding needs for this portion of the state's infrastructure is largely unknown.

When considering levee systems' future needs, SWFMD's 2017 Study on Infrastructure Life Cycle Forecasting and Project Prioritization, found that the SFWMD infrastructure replacement costs alone are projected to require billions of dollars.

**FLORIDA'S FIVE WATER MANAGEMENT DISTRICTS**  
*South Florida Water Management is responsible for almost 80% of the known levee systems in Florida*



**PUBLIC SAFETY**

While most levees pose a level of public safety hazard, the general public is not aware of that risk. In some cases, even people living downstream of levees are unaware of the levee and the hazard it presents. Due to the relatively flat terrain of Florida, flooding from a failure would likely be far-reaching. Weather related events like hurricanes and significant rainfall are potential triggers to instances of failure, particularly overtopping.

According to the NLD, levees protect 1.67 million people, \$100 billion in property value, and 481,000 structures within the state, with the majority of these people and assets residing in south Florida. A failure of these levees could have substantial impacts to very large, economically vital population centers.

While FEMA does not construct or inspect levee systems, the agency does provide accreditation. This accreditation indicates the levee provides adequate risk reduction to the population and infrastructure behind the levee. Only 7% of the levees in the state are accredited through FEMA, as indicated in the NLD. Furthermore, most of the levees under the WMD's purview have Emergency Action Plans (EAPs).

**OPERATION AND MAINTENANCE, FUNDING, & FUTURE NEEDS**

Most levee systems in Florida were built by the USACE and have an average age of 58-years-old. Typically, the maintenance of levee infrastructure is the responsibility of the owner. However, as the federally constructed levees were completed, five regional Water Management Districts (WMD) were created. The USACE constructed levee systems were transferred to the WMDs, so they are now responsible for their O&M.

South Florida Water Management District (SFWMD) is responsible for the Central and Southern Flood Control Project which constitutes almost 80% of the state's known levees. Being the largest of Florida's WMDs, SFWMD has eight field stations who operate and maintain the largest number of levee systems. SFWMD's O&M staff oversee approximately 2,100 miles of levees and berms, 87 pump stations, more than 780 water

**RESILIENCE & INNOVATION**

Since Hurricane Katrina and the levee failures in New Orleans, and with climate change effecting flooding frequency, incorporating resiliency into levees has become a priority throughout the nation. The current state of practice accounts for resiliency within the design of levees. However, due to their average age within Florida, it is likely most of these critical structures were not designed to account for varying load conditions due to climate change and/or changes in populations downstream.



Florida's population grew by almost 1.8% between April 1, 2018 and April 1, 2019 to well over 21 million residents after adding nearly 370,000 people. Over the next five years, Florida's population growth is expected to slow to 1.3%, but average 1.5% per year for the entire period (2019 through 2024). With this growing population, the risk to life and property continues to increase.

Innovation in the levee arena has come from improved flood inundation modeling. Inundation mapping continues to become more accurate and reliable. This information can then relate to better EAPs, emergency preparedness, and better risk assessments to determine rehabilitation priority. Another area for innovation that is slowly taking shape is the use of drones for inspecting levees. While drone inspections cannot replace full scale inspections, drone flights can quickly gather significant information that can help with the ongoing routine maintenance of a levees and provide critical support and enhance safety during recovery after significant weather events. Unfortunately, incorporating resiliency and innovation into the redesign of aging structures requires significant funding and that funding can be difficult to attain, particularly for private levee owners.

## LET'S RAISE THE GRADE OF LEVEES

- Develop funding mechanism to assist private levee owners with repairs, rehabilitation, and improved resilience of their structures.
- Develop EAPs for the remaining levees currently without them.
- Add non-Federally constructed, owned, and operated levees to the NLD.
- Continue assessing risk of the levees to prioritize rehabilitation and repair funding.
- Provide more public awareness and education on the levees .

## FIND OUT MORE

- South Florida Water Management District, Infrastructure Life Cycle Forecasting and Project Prioritization, prepared by Atkins, July 2017
- United States Army Corps of Engineers, National Levee Database - <https://levees.sec.usace.army.mil/#/>
- United States Army Corps of Engineers, Levee Portfolio Report - <https://usace.contentdm.oclc.org/utills/getfile/collection/p266001coll1/id/6922>
- <https://www.mvn.usace.army.mil/LSAC/>

### EARTHEN LEVEE EMBANKMENT ALONG FLORIDA CANAL



### SEEPAGE OBSERVED ALONG DOWNSTREAM TOE OF LEVEE



### FLORIDA LEVEE WITH OVERGROWN VEGETATION







# Florida's Infrastructure PORTS

## EXECUTIVE SUMMARY

Together, Florida's 15 seaports generate nearly 900,000 jobs and \$117.6 billion in economic value. Over the last five years, Florida's seaports have invested significantly in capacity and operational improvements to accommodate larger Post-Panamax vessels, improve cargo/intermodal transfer efficiency, and enhance the cruise experience for millions of passengers. Port Tampa Bay acquired new gantry cranes in 2016, welcoming the largest container ship to ever call at the Port. Port Everglades received three Super Post-Panamax container gantry cranes in 2020 and expects to complete its expansion by 2022. Royal Caribbean Cruises Ltd., in collaboration with Miami-Dade County, opened Terminal A at PortMiami in 2018, which is the largest cruise terminal in the United States. Other terminals are also undergoing substantial expansion. During the period from FY 2011 to 2018, the State of Florida invested more than \$1.19B in improvements across its 15 seaports, helping ensure the ports are ready for the future.

## INTRODUCTION

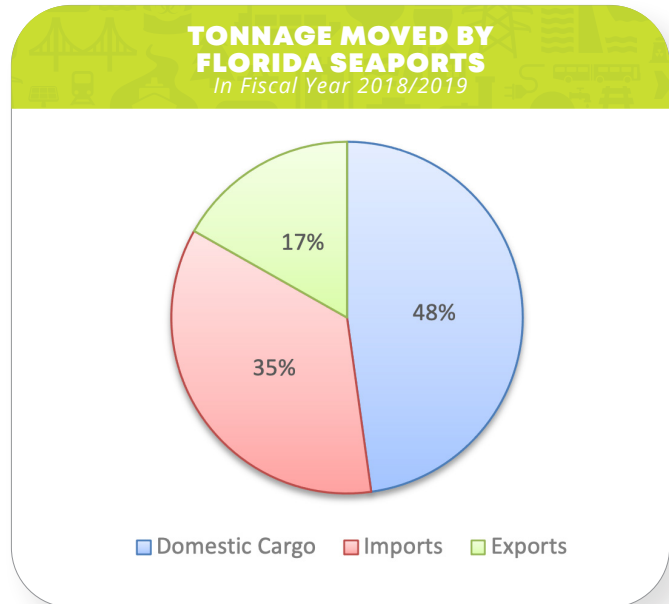
The State of Florida has 15 public seaports: the Ports of Pensacola, Panama City, Port St. Joe, and Citrus in the northwest part of the state, Ports St. Pete, Manatee, and Tampa Bay along the southwest coast, PortMiami, Port Everglades, Port of Palm Beach and Port of Fort Pierce in the southeast, and Port of Canaveral, JAXPORT, and Port of Fernandina along the northeast coast. Finally, the Port of Key West is in the southern most tip of the state.

Seaports support Florida's economy and way of life by moving exports and imports and supporting the cruise industry. Together, Florida's 15 seaports generate nearly 900,000 jobs, directly or indirectly, and generate \$117.6 billion in economic value. Maritime activities in Florida account for about 13 percent of Florida's total economic output and contribute \$4.2 billion in state and local taxes. The cruise industry alone generates 149,000 jobs and \$7.1 billion in wages for Florida workers.

## CONDITION & CAPACITY

Florida's ports are world leaders in passenger cruises. Florida's share of national cruise traffic represents nearly two thirds of the entire U.S. port cruise traffic. A record 16.8 million passengers embarked and disembarked at Florida seaports in FY 2018. Ports in the state have continued to strategically invest in cruise infrastructure to take advantage of the proximity to tropical destinations, and these investments have yielded results; in FY2018/2019, 18.3 million passengers embarked on cruise ships, up significantly from 16.8 million passengers just one year earlier. While the COVID-19 pandemic shut down cruises, there are promising signs the industry is poised to economically recover.

Florida ports also play a major role in goods movement. According to the U.S. Department of Transportation (USDOT) Maritime Administration, total twenty-foot equivalent units (TEUs) container traffic at 10 of Florida seaports increased by an average annual rate of 4.1% from 2000 to 2017. Florida's four largest container ports – Everglades, Jacksonville, Miami and Palm Beach – have consistently ranked among the top 20 busiest ports by TEU traffic in the nation.



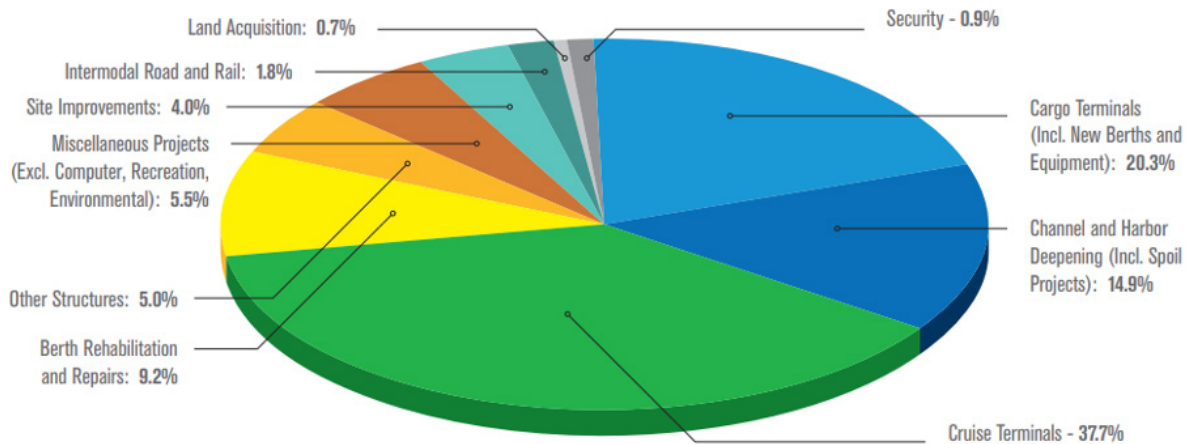
Adequate capital improvement funding is essential to build and maintain the new capacity Florida's seaports and their intermodal partners need now to convert these promising opportunities into tonnage.

Each of Florida's ports has important projects in the works. Deepening the channels and harbors is critical for remaining competitive and handling the trend of larger vessels in the world shipping fleet that require 47- to 50-foot shipping channels. Miami has been dredged to 50 feet. Canaveral, Everglades, and Jacksonville are either in the construction stages of deepening their channels or have already completed the projects. Other waterside projects underway include maintenance dredging at Lake Worth Inlet and a \$471 million expansion of cargo berths at Port Everglades. The Port of Pensacola will rehabilitate its berths over the next five years and the Port of Key West plans to upgrade cruise ship docking facilities.

Landside investments are also needed – inside and outside of the port gates – to accommodate bigger ships. JAXPORT is in the process of a \$238.7 million container expansion. Port Everglades is investing in Super Post-Panamax gantry cranes to unload and reload larger ships more efficiently. Ports are also heavily impacted by the connecting infrastructure, including roads and rail. A number of Florida's ports, including Port of Palm Beach and PortMiami, benefit from on-dock rail from Florida East Coast Railway. Meanwhile, cities and the state have been investing in mitigating highway chokepoints by completing megaprojects like the PortMiami Tunnel.



### FLORIDA PORTS COUNCIL 2020-2024 FIVE-YEAR FLORIDA SEAPORTS MISSION PLAN



**Data Source:** Individual seaports five-year CIP total is \$3.1 billion.

**Exhibit 2 Note:** Project categories used in this document are sorted by major investment type, but sometimes a project will cross over into two or more categories.

Florida's ports were hit hard by the COVID-19 pandemic, with an estimated economic loss of more than \$22 billion and 169,000 direct and indirect jobs. Losses of 5.6 million tons of liquid bulk cargo, 1.6 million tons of dry bulk cargo, 522,592 TEUs of containerized cargo, and 4.9 million cruise passengers is anticipated, putting \$776.8 million of state and local tax revenues at risk. While it is unclear what the future holds for Florida's ports, there is encouraging news out of JAXPORT which recorded 7% year-over-year growth in vehicle volumes and 5% year-over-year growth in container volumes during the first quarter of its fiscal year (October 1, 2020 – December 31, 2020).

## FUNDING & FUTURE NEEDS

Florida's ports are funded by a variety of methods including bonds, fees, state and federal grants, leases, and local taxes. The revenues generated by the ports are expended on asset management and capital development projects.

Florida is somewhat unique in that state funding and financing is provided to port facilities. This has helped foster economic growth in the state and ensured Florida remains competitive in a global marketplace.

The Florida Seaport Transportation and Economic Development (FSTED) Program finances port transportation projects on a 50/50 state-local matching basis, thereby creating a partnership between the state and its seaports. FSTED accelerated the pace at which seaports have been able to build the facilities needed to compete with out-of-state ports and to sustain and enlarge the state's share of international commerce. The FSTED program was budgeted at \$25 million in the most recent fiscal year.

Other state programs include the Strategic Port Investment Initiative, which is managed by Florida Department of Transportation (FDOT). A minimum of \$35 million is provided to seaports each year. As with FSTED, ports must provide a 50% local match. Another program run by FDOT is the Strategic Intermodal System, which includes funding for facilities that enable interregional, interstate, and international travel. Finally, Florida's State Infrastructure Bank makes loans to infrastructure owners, including port facilities. It should also be noted that two settlements – the Volkswagen Settlement and the Triumph Grants resulting from the 2010 Gulf Oil Spill – also provide funds to mitigate economic and environmental damages.

During the period from FY 2011 to 2018, the State of Florida has invested more than \$1.19 billion in improvements across its 15 seaports. Adding to that, in 2021, Governor DeSantis approved the Florida Leads budget which funds FDOT at \$10.3 billion, including \$110.6 million for seaport infrastructure improvements.

Congress also provides funding for port infrastructure. The federal Harbor Maintenance Trust Fund (HMTF), designed to pay for dredging in harbors, is funded through a 0.125% user fee on the value of the cargo in imported containers. Typically, that comes to about \$15 per container box.

Ports can apply for funding for landside infrastructure improvements from competitive grant programs such as INFRA and RAISE (formally BUILD/TIGER). These funds are oversubscribed, and most dollars go to projects outside port gates; however, Florida has a track-record of success. Most recently, PortMiami was awarded a \$7 million INFRA grant for truck gate innovations.



Florida's seaports have programmed nearly \$3.1 billion in capital improvements as part of their Five-Year Capital Improvement Plans between 2019 and 2023. The state's five busiest seaports by volume (Canaveral, Everglades, Jacksonville, Miami, and Tampa) account for 90 percent of the capital expenditures. More recently, Congress made \$225 million available for ports in the Port Infrastructure Development Program.

## PUBLIC SAFETY & RESILIENCE

Florida's ports are proactively working to address vulnerabilities from major hurricanes. For example, Ports Canaveral, Everglades, JAXPORT, Manatee, and Tampa all house fuel terminals and are important nodes in the energy supply chain. These ports are working with the petroleum industry and the state to identify needed investments in infrastructure and institute better communications methods to be better prepared for major hurricanes. Additionally, seaports in the state are working with utility providers to harden electrical infrastructure to withstand higher winds. After Hurricane Irma in 2017, Florida Power & Light claimed a \$3 billion investment in grid hardening significantly reduced damages across the state. Strong support from the state legislature, like the \$2.6 million awarded to the FDEP's Office of Resiliency and Coastal Protection Florida Resilient Coastline Program, is a critical component for the widespread implementation of resiliency projects like these across Florida's ports.

Florida seaports – and all ports – should be fully integrated into community resiliency planning. Through extensive pre-disaster planning collaborations with the U.S. Coast Guard (USCG), the U.S. Army Corps of Engineers (USACE), the National Oceanic and Atmospheric Administration (NOAA), and local governments, Florida ports have established a powerful support system to increase network redundancy and adaptivity. These increase the ports' capacities to continue operating during and after extreme events.

Overall, Florida's ports are critical infrastructure assets such that continuing to increase their resilience should be viewed as a strategic component for the state's disaster management planning.

## INNOVATION

Florida seaports lead the nation in utilizing alternative fuels with continued development and deployment of alternative fuels for cargo and cruise vessels. Jacksonville has the largest liquid natural gas (LNG) bunkering operation at a U.S. port. Other ports around the State are in position to receive LNG delivery by truck or rail for export, including PortMiami, Port Tampa Bay and Port Canaveral.

According to the Cruise Ship Order Book, 26 cruise ships are planned for delivery by 2026 that will be powered by LNG. As cruises make this shift, Florida's ports must invest in infrastructure to accommodate this new type of vessel. Carnival Cruise Line's Mardi Gras will be the first cruise ship in North America fully powered by LNG. With a homeport at Port Canaveral, the ship will be fueled by an LNG bunkering barge.

## LET'S RAISE THE PORTS GRADE

- Continue to invest in port infrastructure and channel upgrades that will provide Florida with the ability to be the first inbound and last outbound port-of-call for import and export shipments.
- Streamline the project approval and delivery process at the federal level, so that projects take years instead of decades.
- Continue to use and increase the minimum statutory amount allowable for seaport funding through the Florida Seaport Transportation and Economic Development (FSTED) Program.
- Ensure seaports are integrated into community resiliency planning at the local and regional level.

## FIND OUT MORE

- 2020-2024 Five-Year Florida Seaports Mission Plan, Florida Ports Council, Released August 27, 2020, [https://fla-ports-resources.s3.amazonaws.com/2020-08-27\\_FLPorts\\_Ports\\_SMP\\_spreads-v6.pdf](https://fla-ports-resources.s3.amazonaws.com/2020-08-27_FLPorts_Ports_SMP_spreads-v6.pdf)
- The Florida System of Seaports, Florida Ports Council, Tallahassee, Florida, [www.flaports.org/about/the-florida-system-of-seaports/](http://flaports.org/about/the-florida-system-of-seaports/)
- North American Free Trade Agreement (NAFTA) Region Port Cruise Traffic Calendar Year 2013 and 2014, American Association of Port Authorities (AAPA), [www.aapa-ports.org/Industry/content.cfm?ItemNumber=900](http://www.aapa-ports.org/Industry/content.cfm?ItemNumber=900) State of Florida Ports 2015, Florida Ports Council, March 11, 2015, [www.flaports.org/2015/04/07/2015sofs](http://www.flaports.org/2015/04/07/2015sofs)
- 1997 - 2014 U.S. Waterborne Container Trade by U.S. Customs Port (Series), U.S. Dept. of Transportation Maritime Administration, Released April 9, 2015, [www.marad.dot.gov/resources/data-statistics](http://www.marad.dot.gov/resources/data-statistics).
- Florida Ports Continue to Innovate with Use of Alternative Fuels, Florida System of Seaports, 2020. <https://flaports.org/2020/01/16/florida-ports-continue-to-innovate-with-use-of-alternative-fuels/>
- Seaports Resiliency Report, Florida Ports Council, 2019. [https://smhttp-ssl-63157.nexcesscdn.net/wp-content/uploads/2019-09\\_FPC\\_LittleJohnMann\\_Resiliency\\_Report-v6-web.pdf](https://smhttp-ssl-63157.nexcesscdn.net/wp-content/uploads/2019-09_FPC_LittleJohnMann_Resiliency_Report-v6-web.pdf)
- <https://www.ncsl.org/research/energy/hardening-the-grid-how-states-are-working-to-establish-a-resilient-and-reliable-electric-system.aspx>
- <https://flaports.org/about/florida-ports-financing-commission/>

**CONTAINER SHIP ENTERING PORT  
MIAMI, FLORIDA**





# Florida's Infrastructure ROADS

## EXECUTIVE SUMMARY

Florida's growing population contributes to challenges in congestion and time travel reliability, trends seen in many major cities nationwide. To address these challenges, the Florida Department of Transportation (FDOT) has made alleviating bottlenecks a top priority. Modest improvements in overall freight and personal travel time reliability have occurred due, in part, to the highly effective approach to asset management. The FDOT prioritizes the preservation and maintenance of its pavement assets prior to implementing capacity projects. Florida demonstrates efficient programming of increasing state resources, namely the state's fuel taxes which are indexed for inflation and state appropriations which have increased between 2019 and 2021 from \$9.7 billion to more than \$10.3 billion. While Florida keeps pace with its growing needs, the state is also planning for the future with an increased focus on building resilience, attention to the evolving transportation needs of its growing elderly population, and a willingness to integrate innovations across the transportation system. One area of innovation, connected vehicles, shows promise in addressing the state's increasing number of roadway fatalities which is up to nearly 3,200 deaths in 2019, a 28% increase from 2014. This translates into 1.42 fatalities per 100 million vehicle miles traveled, higher than the 2019 national average of 1.11 fatalities per 100 million vehicle miles traveled. With ongoing fiscal and planning priority given to critical areas of need, the Florida roadway system will continue to meet current needs and evolve to incorporate innovations in safety and efficiency.

## CONDITION

There are 123,000 centerline miles of public road in Florida, collectively owned and maintained by a variety of entities, including FDOT, counties, cities, and the federal government. The system includes 12,130 centerline miles of the State Highway System (SHS), 4,344 centerline miles of Strategic Intermodal System (SIS), and 12,358 bridges (7,007 maintained by FDOT).

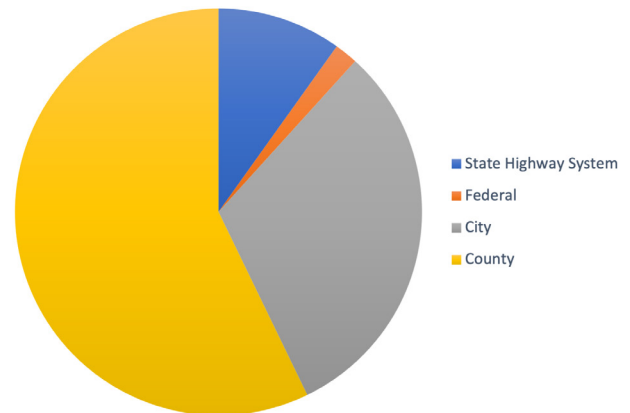
In 2019, the FDOT served a population of 21.2 million as well as 131 million visitors on 53,625 sq. miles of state land. Of note, the state highway system comprises just 10% of the roadway system but carries 55% of all traffic. 17.5 million registered motor vehicles operate over Florida roadways.

In general, the condition of roadways in Florida is better than the national average. Nationally, over 42% of major roadways are in poor or mediocre condition; in Florida, that drops to

31%. However, driving on deteriorating roads does have consequences, and the average driver loses \$425 a year in the form of additional repairs, increased fuel consumption, and accelerated vehicle depreciation, according to the national transportation research nonprofit, TRIP.<sup>1</sup>

The roadways managed by FDOT are generally well maintained. In 2019 and 2020, the agency reported that 87.5% of SHS miles were in excellent or good condition. In general, highway infrastructure performance trends are improving, although some targets have been missed. For example, in 2017, 44% of non-Interstate National Highway System (NHS) pavements were in good condition, but in 2019 that dropped slightly to 41%. However, non-interstate NHS pavements in poor condition also decreased, from 0.4% in 2017 to 0.3% in 2019. In January 2021, Federal Highway Administration (FHWA) determined Florida had made significant progress toward the two-year bridge and pavement targets. Specifically, the agency met the requirement that no more than 5% of the Interstate System was in poor condition.<sup>2</sup>

### PUBLIC ROAD MILEAGE BY OWNER



## CAPACITY

Many major Florida metropolitan areas are struggling with congestion and time travel reliability, a trend reflected nationally. Texas A&M University's (TAMU) 2021 Urban Mobility Report ranked Miami as the fifth most congested major urban area in the country. The same report found Orlando was the eighth most congested city, followed by Tampa-St. Petersburg and Jacksonville at 20th and 22nd, respectively.<sup>3</sup> The 2021 TAMU report does reflect decreased traffic levels a result of COVID-19. However, while vehicle travel in Florida dropped by 42% in April 2020 compared to April 2019, by March 2021 traffic was back to 97% of previous volumes across the state.

1 [https://tripnet.org/wp-content/uploads/2020/04/TRIP\\_Fact\\_Sheet\\_FL.pdf](https://tripnet.org/wp-content/uploads/2020/04/TRIP_Fact_Sheet_FL.pdf)

2 [https://spacecoasttpo.com/wp-content/uploads/2021/03/HO4\\_MAP21\\_PerfMgmt\\_PM2\\_Mar21.pdf](https://spacecoasttpo.com/wp-content/uploads/2021/03/HO4_MAP21_PerfMgmt_PM2_Mar21.pdf)

3 <https://static.tti.tamu.edu/tti.tamu.edu/documents/mobility-report-2021.pdf>



Even though Florida's population is growing, the state agency is making some progress on reducing congestion. Specifically, between 2017 and 2019, the reliability of personal vehicle miles traveled has improved 1.5% as mobility projects are being implemented across the state. At the same time, the Florida transportation plan reports that the truck travel time reliability also improved slightly between 2017 and 2018, but then marginally declined in 2019. According to the FHWA, the modest decrease in reliability is attributed to an increase in overall truck vehicle miles traveled, a parameter which sometimes increases the uncertainty of this calculation.<sup>4</sup>

## OPERATIONS & MAINTENANCE

Florida has a long-established and highly effective approach to preservation and maintenance of its pavement assets and the Florida 2020 Strategic Plan states the agency is prioritizing maintaining existing facilities in a state of good repair. The current practices for asset management are rooted in statutory requirements and implemented by FDOT's strong commitment to maintain the existing infrastructure before implementing capacity projects.

Cities across Florida are also focused on maintaining existing assets. There's a strong correlation between well maintained infrastructure and resilience in the face of increasingly frequent and severe storms. Cities like Miami and Tampa have hired chief resilience officers that spearhead a coordinated approach to assessing threats to critical infrastructure and prioritizing the leadership, resources, and skills necessary to effectively address those threats.

## FUNDING

State funding for roadways comes from a combination of federal, state, and local sources, as well as private tolls. For the 2017-2021 five-year work program, state funding provided 52% of total needs, federal aid provided 26% of total needs, tolls and turnpike funds supported 15%, while right of way and state infrastructure bank bonds and local funds provided 4% and 3%, respectively. Governor Ron DeSantis' total recommendation for the Fiscal Year 2021-2022 Florida Leads budget was \$101.5 billion overall. Within this total budget, \$10.3 billion will be invested in various transportation-related infrastructure sectors, a value that's up from the previous budget of \$9.7 billion. Particularly within this transportation section, \$2.8 billion will be invested in highway construction including 210 new lane miles and \$1 billion in resurfacing of nearly 2,700 lane miles.<sup>5</sup>

Florida's state-level transportation revenue streams include fuel taxes, motor vehicle fees, rental car taxes, and more.<sup>6</sup>

<sup>4</sup> <https://www.fhwa.dot.gov/tpm/reporting/state/reliability.cfm?state=Florida>

<sup>5</sup> <https://www.flgov.com/wp-content/uploads/2021/06/FY-21-22-Budget-Highlights-6.2.21-FINAL.pdf>

<sup>6</sup> <https://www.fdot.gov/docs/default-source/comptroller/pdf/GAO/RevManagement/TransportationFundingSources.pdf>

<sup>7</sup> <https://www.fdot.gov/docs/default-source/comptroller/pdf/GAO/RevManagement/TransportationFundingSources.pdf>

<sup>8</sup> [http://edr.state.fl.us/Content/presentations/population-demographics/DemographicTrends\\_1-28-20.pdf](http://edr.state.fl.us/Content/presentations/population-demographics/DemographicTrends_1-28-20.pdf)

<sup>9</sup> [https://www.whitehouse.gov/wp-content/uploads/2021/08/FLORIDA\\_Infrastructure-Investment-and-Jobs-Act-State-Fact-Sheet.pdf](https://www.whitehouse.gov/wp-content/uploads/2021/08/FLORIDA_Infrastructure-Investment-and-Jobs-Act-State-Fact-Sheet.pdf)

Transportation revenue receipts from fuel taxes make up over 50% of the revenue portfolio. Importantly, state fuel taxes are indexed to offset the impacts of inflation each January. Based on movement in the Consumer Price Index (CPI), Florida's State Highway Fuel Sales Tax and the State Comprehensive Enhanced Transportation System (SCETS) Tax are adjusted annually. The remaining revenue portfolio is comprised of motor vehicle registration fees, tag and title fees, documentary stamp taxes, and Turnpike and other FDOT owned toll facilities.

Throughout the state, localities are also empowered to raise their own fuel taxes to help pay for needs on local roadways. In general, all counties have opted to raise gas taxes, with most around 12 cents.<sup>7</sup>

## FUTURE NEEDS

Florida has gained more than 2.7 million residents over the last decade, according to the 2020 Census, translating to a 14.6% population growth. The state's growing population contributes to congestion challenges, especially in the major cities. Alleviating bottlenecks for more efficient movement of freight and people is a top priority for the state, and a matter upon which FDOT has seen modest improvements overall.

Also of note is that while the median age of the state's residents is 41.7 years, there are seven counties with a median age of 50 or older. Older residents tend to have specialized mobility needs and frequently require access to transit to get to grocery stores, doctor offices, and other critical services.<sup>8</sup>

Fortunately, the Infrastructure Investment and Jobs Act (IIJA), passed recently by the Senate, would provide significant funding for the roadway system to augment existing state and local revenues. Specifically, the IIJA would provide \$13.1 billion for Florida's federal-aid highway apportioned program over the next five years.<sup>9</sup>

## PUBLIC SAFETY

FDOT works toward a vision of a fatality free roadway system through a multi-disciplinary approach that addresses engineering, education, enforcement, and emergency response. The Strategic Highway Safety Plan (SHSP) is the statewide plan focusing on ways to eliminate fatalities and reduce serious injuries on Florida's roadway system. The SHSP is updated at least every five years and focuses on 13 emphasis areas which reflect ongoing and emerging highway safety issues in Florida. The plan supports the following objectives: to prevent transportation related fatalities and serious injuries and to reduce the number of crashes on the transportation system.

Unfortunately, the fatality rate continues to increase slightly for all public roads in Florida. In calendar year 2019, 3,185 people



lost their lives on Florida’s state’s roads, up nearly 28% when compared to 2014. In 2019, there were 1.42 fatalities per 100 million vehicle miles traveled, which is higher than 1.11 fatalities per 100 million vehicle miles travelled nationally in 2019. These tragedies continue to place pressure on the safety objectives of the state’s roadway system.

## RESILIENCE

Natural hazards, cyberattacks, and other events can have significant and unexpected impacts on Florida’s critical infrastructure systems. Therefore, it is important to prepare Florida’s transportation system to be adaptive in the face of these events. Planning for resilience requires infrastructure leaders to leverage their understanding of potential hazards to mitigate risk and make wise investments that provide more reliable transportation options.

Among the safety and resilience-related goals of Florida’s Transportation Plan (FTP) are:

- Ensure Safety and Security for Residents, Visitors, and Businesses;
- Achieve Agile, Resilient, and Quality Infrastructure

These goals call for FDOT to provide transportation infrastructure and services to help prepare for, respond to, and recover from emergencies. Additionally, the goals contribute to the reduction and mitigation of transportation-related environmental and security risks through steps such as providing diversity and redundancy of the transportation system and developing and implementing comprehensive emergency and recovery plans.

Hurricane Irma emergency and evacuation planning was recognized as a significant case study that highlighted planning issues as they related to the SIS network’s function for disaster mitigation planning and response. Several policy and system management lessons have arisen regarding the SIS network resilience and performance. To address these challenges and further strengthen the resilience of the state’s transportation system, the FTP underscores the role of research, collaboration, and development of creative solutions. Two important objectives that are identified under this planning goal include:

- Adapt Transportation Infrastructure and Technologies to Meet Changing Customer Needs;
- Increase the Resiliency of Infrastructure to Risks, Including Extreme Weather and Other Environmental Conditions.

Amplifying this statewide approach, local municipalities are also focused on improving roadway resilience in their respective jurisdictions.

## INNOVATION

Florida is able to meet its growing needs and strategically integrate transportation innovations because the state focuses on operational enhancements and is willing to encourage groundbreaking ideas, research and accelerated

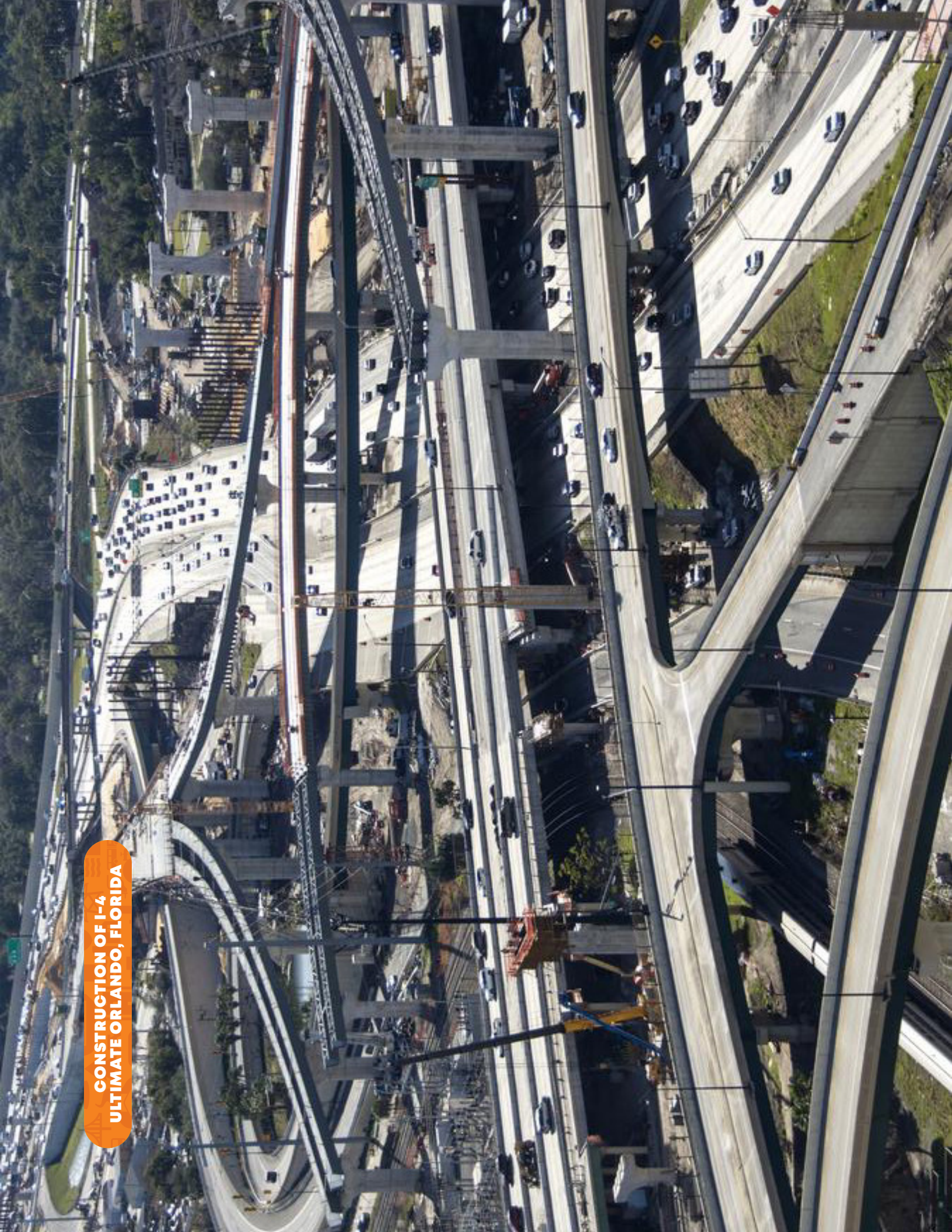
implementation. With quality roadways, the quickly evolving connected vehicles (CV) sector is able to implement pilot projects, collect real-time data, and improve hardware, software, and infrastructure systems. For instance, the Tampa Hillsborough Expressway Authority Connected Vehicle Pilot project is a partnership between the University of South Florida’s Center for Urban Transportation Research and the U.S. Department of Transportation. This Tampa-based project has worked with community volunteers to retrofit more than 1,000 personal vehicles that wirelessly communicate safety information between roadside infrastructure and other vehicles to inform researchers on ways to improve CV technology.<sup>10</sup> As CV technologies become safer and more reliable, they also stand to improve Florida’s goals to eliminate fatalities, reduce serious injuries, and improve roadway congestion.

## LET’S RAISE THE ROADS GRADE

- Enhancing critical transportation assets will boost the economy in the short-term by creating jobs in construction and related fields. In the long-term these improvements will enhance economic competitiveness and improve the quality of life for the state’s residents and visitors by reducing travel delays and transportation costs, improving access and mobility, improving safety, and stimulating sustained job growth. Florida will need additional funding to leverage investment in the overall transportation system.
- Reduce by five percent every year, the number of major roads in poor or mediocre condition.
- Reduce the congestion in Florida’s Urban Interstates experiencing congestion during peak hours by at least five percent per year starting in 2021.
- Traffic Fatalities should be reduced by 1% every year by strategically investing an additional \$200 million/year in safety improvements throughout the state transportation system.
- Increase the investment in the development of human resources needs to strengthen the state’s capacity to innovate and improve the transportation sector.

<sup>10</sup> <https://www.usf.edu/news/2021/auto-manufacturers-test-connected-vehicle-technology-implemented-in-tampa-bay-evaluated-at-usf.aspx>

**CONSTRUCTION OF I-4  
ULTIMATE ORLANDO, FLORIDA**







## Florida's Infrastructure **SCHOOLS**

### EXECUTIVE SUMMARY

Across Florida's 67 school districts, there are nearly 3,600 K-12 schools and about 180,000 permanent classrooms. As the average building age increases, currently at 31-years-old, the need for repairs and rehabilitation also grows. On a system-wide scale, facilities are not yet exceeding their ability to accommodate students. However, in some areas with significant population growth like Miami-Dade and Orange County, school districts are increasingly depending on portable classrooms. These portable facilities are also getting older as their average age is 25-years-old. To address aging facilities and looming capacity needs, state funding from motor vehicles licensing and gross receipt taxes has increased between 2016 and 2020 by a total of nearly \$40 million. However, the available funding is not sufficient to meet the scale of the needs.

### CAPACITY & CONDITION

As of December 2020, Florida's 67 school districts included nearly 3,600 traditional K-12 schools and nearly 180,000 permanent classrooms. K-12 educational facilities included 1,677 elementary schools, 486 middle schools, 615 high schools, and 544 combination schools. The largest school district, Miami-Dade, had 199 elementary schools, 72 middle schools, 96 high schools, and 97 combination schools, with only about 1% of relocatable classrooms. However, a February 2019 report of Orange County Schools, one of the fastest growing districts in the state, showed 51% of elementary schools, 62% of middle schools, and 60% of high school were over capacity.

According to the Florida Inventory of School Houses (FISH) 2020 report, a capacity need is emerging throughout the state as more than 3.3 million satisfactory classroom stations have a current capacity for about 3.1 million. Though not yet exceeding the overall capacity, locations like those in Miami-Dade and Orange County must increasingly depend on portable classrooms to accommodate students. Overall, a comprehensive understanding of the capacity needs for Florida's schools lags the most up-to-date growth projections. Additionally, meeting capacity needs is limited based upon the flexibility of using locally generated funding for expansions and new construction.

Determining the overall condition of school facilities in Florida is a cumbersome task. Condition assessments for this report depended upon data, typically average facility age, provided by FISH, updated at the end of 2020. The average age of Florida's schools is 31-years-old. These school buildings represent permanent facilities of over 400 million square feet of space, Florida's schools also have over 16 million square feet of portable classrooms with an average age of 25-years-old. During the 2016 regular session, Florida lawmakers passed legislation (CS/CS/HB 7029) that prohibited a school board from spending funds on construction of new educational facilities

that exceeded a particular ratio of cost per student. Prior to this legislation, school districts had more flexibility in utilizing sales surtaxes for site improvements, capacity expansions, and other educational necessities.

### OPERATION & MAINTENANCE

Florida has a regular, comprehensive, and extensive construction and maintenance program administered by the Office of Educational Facilities. The mission of the Office is to provide technical support and information for all issues related to educational facility planning, funding, construction, and operations throughout Florida's K-12 system. School districts receive a portion of Public Education Capital Outlay (PECO) funds for remodeling, renovations, maintenance, repairs, and site improvements. While the program's structure is effective, the scale of the work and the available funding is not sufficient to meet the needs.

### PUBLIC SAFETY & RESILIENCE

Schools serve the dual purpose of providing emergency shelter to communities impacted by hurricanes and other environmental threats. In 2019, the Florida Department of Education (FDOE) appointed a committee to develop a public shelter design criterion for use in new school facility construction projects. The committee developed a set of practical and cost-effective design criteria to ensure that new educational facilities can serve as public shelters for emergency management purposes. In 2019, 47% of schools in the state were designated hurricane shelters, up from 42% in 2016. As more of Florida's schools become accessible hurricane shelters providing resources to local communities, their ability to withstand and recover from a disaster also improves.

### FUNDING

According to the 2020-2021 FDOE report entitled "Funding for Florida School Districts", the state's K-12 facilities receive infrastructure-related support from state appropriated funding and locally generated revenues. Overall, Florida voters have a demonstrated track record of supporting efforts to control class sizes and increase education spending to extend the life of the state's educational infrastructure and meet the needs of their children.

#### STATE FUNDING

The overarching infrastructure funding "bucket" within FDOE's legislative budget request is called the "Fixed Capital Outlay". Under this heading, legislative appropriations include, but are not limited to, those from motor vehicles licensing called the Capital Outlay and Debt Service (CO&DS) fund, gross receipt taxes (PECO), and a Special Facility Construction Account.



The purpose of the CO&DS funds is for public school districts and Florida colleges to broadly improve educational facilities. However, pertinent projects to acquire, construct, remodel, enlarge, furnish, equip, maintain, renovate, or repair educational facilities must be included on a prioritized list approved by the FDOE. From 2016 to 2020, the CO&DS funds increased from about \$62.5 million to \$109 million, though this value reflects both K-12 and Florida college funding. PECO funds are authorized for constructing new facilities, performing maintenance, renovation and/or repairs on existing facilities, and for acquiring new sites. From 2016 to 2019, the K-12 portion of PECO funds increased from more than \$150 million to over \$167 million.

An additional funding stream for K-12 buildings is the Special Facility Construction Account which decreased from more than \$64 million in 2016 about \$41 million in 2021. This account provides funding for school districts that have urgent construction needs but lack sufficient resources in the near-term from their current revenue to meet those needs. The project must be deemed a critical need and recommended for funding by the Special Facility Construction Committee. FDOE's report further elaborates that each county gets an equal share of sales tax funding – 6% on goods and services. However, as the population grows and certain areas become more densely inhabited, efforts may need to focus on a new approach for distributing these resources.

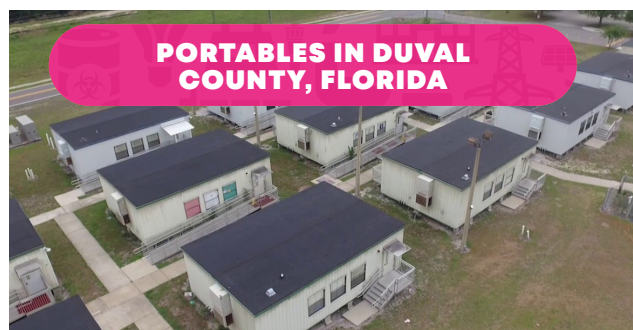
## LOCAL FUNDING

Local funding has traditionally provided the bulk of what is necessary for school infrastructure projects. Some local real estate revenue streams are capped at a specific tax rate or millage – 1.5 mills where 1 mill is a tenth of a cent – though modest discretionary flexibility at the local level exists. According to current law, authorized funds are used for construction, renovation, remodeling, maintenance, and repair of educational facilities. Districts are also authorized to share a portion of this revenue with charter schools. One challenge with revenue generation from property taxes is that some areas of the State with low property values will produce small funding streams for their schools which may lead to or perpetuate a system of underfunded infrastructure. This was especially true when home values plummeted after the 2008 recession.

Though Florida has one of the lowest overall tax rates in the country and no state income tax, a report released in 2016 showed that every county in the State benefited from sales tax increases or ad valorem taxes to support school funding. For instance, Orange County is the 5th largest county by population in the State and is home to one of the largest districts, Orange County Public Schools (OCPS). The OCPS system has a long-term construction plan thanks to a half-penny sales tax that was approved in 2003 and extended in 2014, in addition to impact fees that account for about 11% of the district's capital budget revenue. Most recently in June 2021, Orange County voted to raise transportation and school impact fees to fund infrastructure. The sustainability of the construction plan has allowed the District to open 59 new schools and renovate or replace 132 schools since 1999. This is just one example of the positive impacts of utilizing local funding to satisfy school construction and maintenance.

## FUTURE NEEDS

The Florida Legislature's cost per student value informs facilities budgeting and spending. However, subsequent information about that valuation method showed it included many incidentals, leading to an updated cost per square foot value. This approach also had its limitations, as the method did not sufficiently include architectural, engineering, and other critical construction-related fees. Finally, according to the 2020 FDOE Review and Adjustment for Florida's Cost per Student Station report, the cost per student thresholds were last updated in 2006. Therefore, as funding to meet growing capacity becomes more important and expensive, so too does the need for updating the methodology for determining this value.



## LET'S RAISE THE SCHOOLS GRADE

- Continue to increase local county sales tax and impact fee to adequately fund education facility construction and maintenance needs
- Increase federal grants for high-poverty, high-need school districts
- Improve the safety and security of the state's educational facilities to accommodate emergency shelter needs

## SOURCES

- The Office of Educational Facilities - Florida Inventory of School Houses
- 2015-2016 Funding for Florida School Districts – Statistical Report – Florida Department of Education
- Education Week-2012 “Quality Counts” report
- Public Education Capital Outlay Allocations Summary 2005-2015
- 2012 Florida Building Code-Public Shelter Design Criteria
- State Board of Education 2010-2011, Capital Projects Plan
- Florida Department of Education, 2010-2011 Appropriations from the Educational Enhancement (Lottery) Trust Fund
- Florida Department of Education Class Size Implementation Budget
- <https://www.fldoe.org/core/fileparse.php/18797/urlt/FY2021BR.pdf>



*Florida's Infrastructure*

# SOLID WASTE

## EXECUTIVE SUMMARY

In the State of Florida, Solid Waste is handled in one of three ways: It is either sent to a landfill, separated for recycling, or combusted for energy generation. Increased populations of both permanent residents and visiting tourists are contributing to the amount of municipal solid waste (MSW) generated, which is nearly triple the national per capita average of 4.51 pound per day. The capacity for handling this waste is adequate for both the current and future needs. Some major metropolitan areas are able to make significant progress in managing separate waste streams and innovating the means in which waste is managed. Still, other parts of the state are managing waste primarily through traditional landfill use, which leaves opportunities for improving the means of recycling and reusing waste. South Florida metropolitan area landfills are likely to reach capacity faster than other parts of the state and have displayed more innovative approaches to waste management. Average tipping fees for MSW are generally lower than the national average of \$53.72. The Florida Department of Environmental Protection (FDEP) has programs in place to adequately protect Florida's natural resources, while permitting and monitoring MSW handling. In general, the condition of the Solid Waste Infrastructure in the State of Florida is good, with opportunities to improve the State's recycling and reuse programs.

## CONDITION & CAPACITY

In the State of Florida, solid waste is handled in one of three ways: It is either sent to a landfill, separated for recycling, or combusted for energy generation. The FDEP reported the annual tonnage of MSW collected in 2019 to be slightly over 47 million tons, the majority of which is generated in three major metropolitan areas located in South Florida, Central Florida, and near the Tampa Bay. In 2017, Florida recycled 42% of its MSW, well above the 2018 national average of nearly 24%. Florida combusted around 9% of the reported MSW, closely tracking with the national average of approximately 12%. Florida maintained a higher per capita rate for MSW production, 12.46 pounds per day in 2018 compared to 4.51 pounds per day nationally in 2017, largely due to tourism. While Florida's overall population has increased by one million people in the latest four years of reporting, the discrepancy in the state's per capita generation is due to the nearly 130 million visitors received each year. Tourists accounts for nearly six times the 22 million Florida residents and significantly influence annual waste generation rates.

The State of Florida categorizes facilities into forty-one different types, including County-managed Class I and III facilities and privately-owned specialized processing facilities. Of these, the following types and numbers are currently reported as active:

CLASS DESCRIPTION	TOTAL
CLASS I LANDFILL	41
CLASS III LANDFILL	35
YARD TRASH DISPOSAL FACILITY	87
SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	306
WTE ASH MONOFILL	5
COAL ASH MONOFILL	12
OTHER DISPOSAL/PROCESSING FACILITY	7
CONSTRUCTION/DEMOLITION DEBRIS DISPOSAL	63
MATERIAL RECOVERY FACILITY - C & D	46
TREATMENT FACILITY	1
SOLID WASTE COMBUSTOR	1
SOIL TREATMENT	2
VOLUME REDUCTION/SHREDDER	2
CONTAINER TO CONTAINER OPERATION	15
WASTE TIRE PROCESSING FACILITY	43
WASTE TIRE MOBILE PROCESSOR	3
COMPOSTING FACILITY	4
TRANSFER STATION	100
WASTE TIRE COLLECTION CENTER	80
WASTE TIRE COLLECTOR	544
MATERIAL RECOVERY FACILITY - CLASS I & III	37
USED OIL RECYCLING	18
WASTE TO ENERGY FACILITY	11
ENERGY RECOVERY	1
RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	288
DISASTER DEBRIS MANAGEMENT SITE	12
<b>TOTAL OF SITES</b>	<b>1,764</b>



DIFFERENT WASTE TYPES RECEIVED BY FLORIDA FACILITIES

MATERIAL	MUNICIPAL SOLID WASTE COLLECTED <sup>1</sup> TONS PER YEAR	MUNICIPAL SOLID WASTE COLLECTED <sup>1</sup> PERCENT OF TOTAL TONS PER YEAR	MUNICIPAL SOLID WASTE RECYCLED TOTAL TONS RECYCLED	MUNICIPAL SOLID WASTE RECYCLED PERCENT OF TOTAL TONS RECYCLED	MUNICIPAL SOLID WASTE RECYCLED MATERIAL RECYCLING RATE <sup>2</sup> (PERCENT)
Glass	1,122,918	2.4	214,759	1.1	19%
Aluminum Cans	226,759	0.5	30,373	0.2	13%
Steel Cans	486,863	1.0	77,705	0.4	16%
Plastic Bottles	811,367	1.7	50,817	0.3	6%
Other Plastics	3,075,049	6.6	82,831	0.4	3%
C & D Debris	15,302,675	32.8	9,637,061	48.9	63%
Newspapers	701,386	1.5	93,449	0.5	13%
Corrugated Cardboard	3,046,045	6.5	1,241,131	6.3	41%
Office Paper	782,221	1.7	184,332	0.9	24%
Other Paper	3,855,220	8.3	428,301	2.2	11%
Yard Waste	5,297,864	11.4	3,419,002	17.4	65%
Food Wastes	3,211,619	6.9	69,433	0.4	2%
Ferrous Metals	2,515,612	5.4	2,021,582	10.3	80%
Non-Ferrous Metal	505,170	1.1	369,386	1.9	73%
White Goods	477,600	1.0	274,096	1.4	57%
Tires	239,825	0.5	97,982	0.5	41%
Textiles	1,171,492	2.5	97,170	0.5	8%
Miscellaneous	3,769,052	8.1	1,033,130	5.2	27%
Process Fuel <sup>3</sup>	N/A <sup>4</sup>	N/A	275,094	1.4	100%
<b>TOTAL</b>	<b>46,598,737</b>	<b>100.0</b>	<b>19,697,634</b>	<b>100</b>	<b>42%</b>

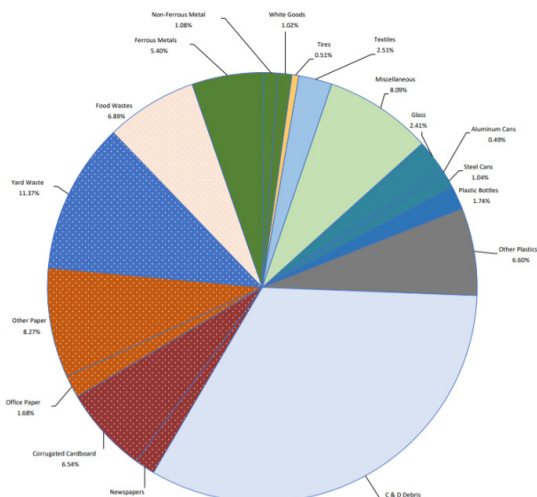
<sup>1</sup>Municipal solid waste collected is the total recycled, landfilled and combusted.

<sup>2</sup>Unadjusted traditional recycling rate.

<sup>3</sup>Process fuel is composed of yard, wood and paper waste used in process boilers.

<sup>4</sup>Process fuel is not included in the total. The tonnage collected has been counted in other material categories.

2019 FLORIDA MUNICIPAL SOLID WASTE COLLECTED (47.1M TONS)



The state has extended the life and capacity of Class I landfills by including recycling programs and other processing opportunities for MSW. The state has established a goal of 75% recycling, partly as recovered materials and waste-to-energy. In 2019, the state recycled nearly 20 million tons of waste, up almost 6 million tons from 2015, and combusted just over 4.2 million tons of MSW, over 300,000 tons more than in 2015. The state generated about 5 million megawatt hours of energy from biomass sources, ranking Florida as the second highest producer of energy from biomass combustion in the US. The FDEP has made this graphic publicly available to show the different waste types received by Florida facilities.

O&M, FUNDING, & FUTURE

Various solid waste facilities are operated by both public and private entities. The larger landfills are typically operated by either counties or municipalities, with a few larger private operators as well. The FDEP requires that any operator, whether private or public, must comply with all rules and regulations set forth in the Florida Administrative Code. As the water table in the state is very close to the surface, leachate is strictly managed using liners and reclamation systems. The FDEP reporting requirements cover all aspects of landfill



### TIPPING FEES (2019)

	<b>Class 1</b>	<b>WTE Facility</b>	<b>Yard Trash</b>	<b>White Goods</b>	<b>C&amp;D</b>
State Low	\$21.00	\$37.50	\$15.00	\$2.50	\$15.00
State High	\$75.00	\$72.11	\$123.50	\$123.50	\$123.50
State Average	\$48.00	\$54.81	\$69.25	\$63.00	\$69.25
National Average*	\$55.00	\$59.93			\$54.04
	<b>Passenger Tires</b>	<b>Asbestos</b>	<b>Out of County</b>	<b>Petroleum Contaminated Soils</b>	
State Low	\$6.50	\$42.00	\$29.87	\$20.00	
State High	\$300.00	\$282.05	\$138.00	\$150.00	
State Average	\$153.25	\$162.03	\$83.94	\$85.00	

management, including landfill gasses and surface and groundwater. Leachate and landfill gasses are either treated for disposal, reused for other purposes (such as methane captured for energy), or injected into deep wells.

The state requires that all operators provide financial assurances that the facilities are properly funded for operation, maintenance and closure/abandonment. All facilities report current capacities and any future plans for adding capacity. Closed landfills are required to maintain monitoring for a period of 30 years ensuring no impacts are seen in the surrounding areas. All facilities accepting MSW are funded through a combination of tipping fees and property assessments, depending on the facility and municipality/county. Various waste types have different tipping fees, and the average tipping fees for the state (as of 2019) vary between \$48 per ton for Class I landfills, slightly lower than the 2019 national average of \$55, to more than \$69 per ton for construction and demolition (C&D) debris.

## PUBLIC SAFETY

The FDEP is the governing agency in charge of the Solid Waste Program. The Division of Waste Management is responsible for the permitting and compliance monitoring of all waste programs throughout Florida, and is responsible for monitoring Financial Assurance, Hazardous and Solid Waste Management, Storage Tank Compliance, and Waste Registration. The Division of Water Resource Management is responsible for the permitting and compliance of the wells systems at landfill sites, as well as deep injection wells that are associated with some of the sites' operations. The Division of Air Resource Management oversees the emissions from landfills and waste-to-energy facilities to ensure that clean air regulations are met. The FDEP is responsible in some capacity for every stage of a solid waste-related facility's life, from planning and construction to post-closure and long-term monitoring requirements.

In 2010, the Florida Legislature established a statewide weight-based recycling goal of 75% by 2020. The State has since met the 40% by 2012 and 50% by 2014 goals, but has yet to meet any further goals. Four counties in Florida have achieved a 70% recycling benchmark while the statewide value climbed to 52% in 2019. Studies are currently being done at the Hinkley Center for Solid and Hazardous Waste Management, an independent institute at the University of Florida, to find opportunities for decreased landfill usage and increased recycling efforts. At this time, 15 of Florida's 67 Counties combust waste for energy, an opportunity that could benefit the population in two ways: energy generation and reduction in landfill use which preserves its capacity. A Hinkley Center study is also examining the ability to use the bottom ash bi-product from combusting operations for various applications, thereby reducing the need to store this product in a landfill.

## RESILIENCE & INNOVATION

The state has implemented a variety of programs to reduce waste and promote recycling in the tourism industry. For example in 2004, Florida launched the Green Lodging Program, which requires that facilities conduct a thorough eligibility assessment and implement multiple environmental practices in five areas of sustainable operations, including solid waste reduction, reuse and recycling. Similarly, the state launched the Florida Green School Designation in 2016 to assess Florida schools in the same methods, following the criteria set through the Green Lodging Program. Associations, like Florida Recycling Partnership and Recycle Florida Today, Inc., are also engaged in education and outreach to improve recycling rates in the state by providing studies, education and research related to recycling.

The state manages data through a variety of means, depending on the program in question. All permitting requirements and applications are filed electronically. The FDEP manages these



data repositories for everything from site usage to groundwater monitoring and reporting. While the State receives all data for permitting and compliance, the individual counties and municipalities are largely responsible for their own asset management and public outreach programs. Recycling efforts are managed in the municipal level, so counties that are better funded are able to have greater successes in recycling and sustainability efforts. As a whole, all facilities are required to adhere to regulations that would keep the facility safe and resilient, as Florida is prone to natural disasters, such as hurricanes.

## LET'S RAISE THE SOLID WASTE GRADE

- Florida should concentrate its efforts on making recycling and reusing waste more prevalent throughout all counties. While capacity is not an issue, meeting 75% recycling is a goal that should not be forgotten.
- Additional waste-to-energy facilities would help create an opportunity for reuse of waste and reduction of landfill capacity use.
- As tourism is a large waste generator in Florida, efforts should be made to work with businesses in the industry to reduce waste streams.

## FIND OUT MORE

- The Florida Department of Environmental Protection Division of Waste Management: <https://floridadep.gov/waste>
- The Hinkley Center for Solid and Hazardous Waste Management: <https://hinkleycenter.org/index.php>
- 2019 Solid Waste Management Annual Report: <https://floridadep.gov/waste/waste-reduction/content/2019-solid-waste-management-annual-report>

## REFERENCES

- FDEP Final Disposition of Municipal Solid Waste. (2019). Retrieved from [https://floridadep.gov/sites/default/files/2019\\_Final\\_Disposition\\_of\\_Municipal\\_Solid\\_Waste\\_0.pdf](https://floridadep.gov/sites/default/files/2019_Final_Disposition_of_Municipal_Solid_Waste_0.pdf)
- FDEP 2019 Florida Municipal Solid Waste Management. (2019). Retrieved from <https://floridadep.gov/sites/default/files/MSW%20Mgmt.pdf>
- FDEP County Municipal Solid Waste Collected Per Capita (2018). By Descending Population Rank. (2018). Retrieved from [https://floridadep.gov/sites/default/files/2018\\_MSW\\_Collected\\_Per\\_Capita.pdf](https://floridadep.gov/sites/default/files/2018_MSW_Collected_Per_Capita.pdf)
- National Overview: Facts and Figures on Materials, Wastes and Recycling. (2017). Retrieved from <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#NationalPicture>
- FDEP Active Sites. (2020). Retrieved from [https://fldeploc.dep.state.fl.us/www\\_wacs/Reports/SW\\_Facility\\_Count.asp](https://fldeploc.dep.state.fl.us/www_wacs/Reports/SW_Facility_Count.asp)

- FDEP Total Tons of MSW Managed in Florida Facilities. (2019). Retrieved from [https://floridadep.gov/sites/default/files/2019\\_Total\\_MSW\\_Managed\\_Florida\\_Facilities\\_5yr.pdf](https://floridadep.gov/sites/default/files/2019_Total_MSW_Managed_Florida_Facilities_5yr.pdf)
- 2019 Florida Municipal Solid Waste Collected. (2019). Retrieved from [https://floridadep.gov/sites/default/files/MSW\\_Composition%20Chart%20and%20Table\\_0.pdf](https://floridadep.gov/sites/default/files/MSW_Composition%20Chart%20and%20Table_0.pdf)
- EIA Table 3.19. Utility Scale Facility Net Generation from Biomass. (2018). Retrieved from [https://www.eia.gov/electricity/annual/html/epa\\_03\\_19.html](https://www.eia.gov/electricity/annual/html/epa_03_19.html)
- FDEP 2019 Florida Solid Waste Disposal Fees. (2019) Retrieved from [https://floridadep.gov/sites/default/files/2019\\_Florida\\_Solid\\_Waste\\_Disposal\\_Fees\\_0.pdf](https://floridadep.gov/sites/default/files/2019_Florida_Solid_Waste_Disposal_Fees_0.pdf)
- Feiock, R. (2109). "How effective are counties in communicating recycling messages to their citizens and are they effective?". Retrieved from <https://hinkleycenter.org/>
- Townsend, T. (2017). "Research Advances on the Use of Solid Wastes in Concrete and Asphalt". Retrieved from [https://hinkleycenter.org/search.php?category=public&sub=includes&page=projectview&no=299&title=Research\\_Advances\\_on\\_the\\_Use\\_of\\_Solid\\_Wastes\\_in\\_Concrete\\_and\\_Aspphalt\\_](https://hinkleycenter.org/search.php?category=public&sub=includes&page=projectview&no=299&title=Research_Advances_on_the_Use_of_Solid_Wastes_in_Concrete_and_Aspphalt_)
- [https://www.epa.gov/sites/default/files/2021-01/documents/2018\\_ff\\_fact\\_sheet\\_dec\\_searchphp?category=public&sub=includes&page=projectview&no=20&title=How\\_effective\\_are\\_counties\\_in\\_communicating\\_recycling\\_messages\\_to\\_their\\_citizens\\_and\\_are\\_they\\_effective](https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_searchphp?category=public&sub=includes&page=projectview&no=20&title=How_effective_are_counties_in_communicating_recycling_messages_to_their_citizens_and_are_they_effective)



## Florida's Infrastructure **STORMWATER**

### EXECUTIVE SUMMARY

Stormwater systems including drainage pipes, canals, pump stations, stormwater ponds, culverts, and runoff treatment devices which capture stormwater runoff and transport it for attenuation and/or treatment before releasing it to nearby waterbodies. Florida's stormwater management infrastructure plays a significant role in sustaining suitable conditions for tourists and residents alike through flood protection and water quality improvements. In 2018, approximately 35% of the state's local governing bodies reported having a stormwater program to fund and maintain the infrastructure. However, needs are significant, estimated at \$1.72 billion from 2019 – 2023, or about \$14 million per stormwater entity by 2023. Fortunately, Governor DeSantis signed into law Senate Bill 1954 in May 2021, which designates \$500 million to support the implementation of projects like these prescribed in the annual Statewide Flooding and Sea Level Rise Resilience Plan.

### INTRODUCTION

Maintaining a healthy natural ecosystem and clean waters for recreation is critical to sustaining the state's largest economic driver – tourism. Florida's stormwater management infrastructure plays a significant role in sustaining suitable conditions for tourists and residents alike through flood protection and water quality improvements. The state's climate conditions, topography, soil types, and coastal and groundwater resources create an inter-connected landscape that is highly sensitive to increased impervious area and pollutants from runoff. Therefore, the state's stormwater discharges are regulated under multiple water pollution control programs, including the US EPA's National Pollutant Discharge Elimination System (NPDES) stormwater permitting program.

The Florida Department of Environmental Protection (FDEP) is responsible for the administration of the water resources at the state level and exercises general supervisory authority over the state's five water management districts (WMD), which are responsible for administering water resources at the regional level. The state's five WMDs include the Northwest Florida Water Management District (NFWFMD), the Suwannee River Water Management District (SRWMD), the St. Johns River Water Management District (SJRWMD), the Southwest Florida Water Management District (SWFWMD), and the South Florida Water Management District (SFWM). The department exercises general supervisory authority over the districts through a cooperative working relationship and guidance memos.

### CAPACITY & CONDITION

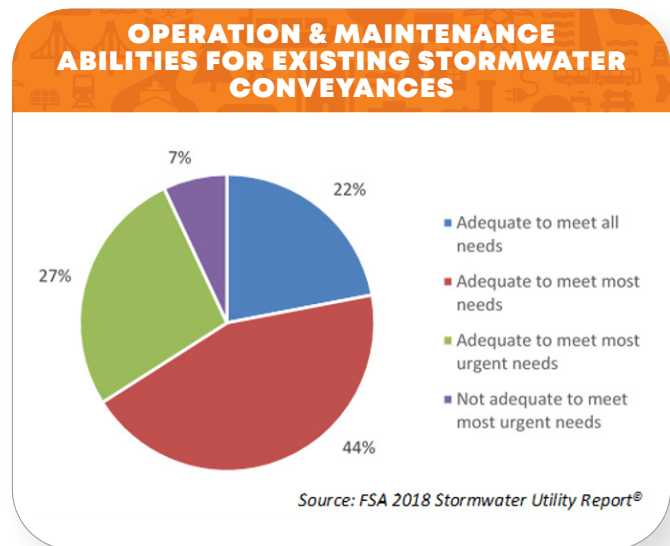
Florida's stormwater systems include drainage pipes, canals, pump stations, stormwater ponds, culverts, and runoff treatment devices which capture stormwater runoff and

transport it for attenuation and/or treatment before releasing it to nearby waterbodies. The comparison table on the following page shows differences between the five WMD's stormwater infrastructure.

In addition to the state's WMDs, the Florida Department of Transportation (FDOT) manages stormwater associated with construction and operation of its transportation system and facilities. FDOT and the WMDs are charged with ensuring there is adequate capacity within major stormwater conveyances and flood control structures. Similarly, localized management is also provided by counties, cities, or towns.

### OPERATIONS & MAINTENANCE

When operations and maintenance (O&M) programs are appropriately designed and utilized, stormwater systems maintain their expected performance, sometimes even over an extended service life. In 2018, of the 67 counties and over 410 cities in Florida, the Florida Stormwater Association (FSA) stated in their Stormwater Utility Report© (SUR) that 165 local governments, about 35% of the state's local governing bodies, have a stormwater program to fund and maintain the infrastructure. In the same report, 27% of the stormwater utilities stated that O&M capabilities were adequate to meet the area's most urgent needs, mostly a reduction in flooding, while 7% were not adequate to meet urgent needs. The remaining 66% of the entities stated their O&M capabilities enabled them to meet all or most of their stormwater conveyance needs.



Stormwater infrastructure O&M is supported through utility fees that are sometimes shared among other infrastructure sectors. For instance, FDOT is responsible for maintenance along the transportation infrastructure while the WMDs and the local municipalities focus on systems within their respective limits. However, O&M for on-site stormwater facilities on private land such as residential subdivisions or businesses is the responsibility of the private owners, such as a homeowners associations. About 56% of stormwater entities responding



## SUMMARY COMPARISON OF FLORIDA WATER MANAGEMENT DISTRICTS

Summary Comparison of Florida Water Management Districts					
Statistic	SFWMD	SWFWMD	SJRWMD	SRWMD	NFWWMD
Area Served (sq. mi.)	~17,900	~10,000	~12,300	~7,700	~11,300
Population Served	~8.7 million	~5 million	~5.2 million	~0.3 million	~1.4 million
Counties Served	16	16	18	15	16
O&M Responsibilities	Operates and Maintains 2,200 miles of canals; 2,100 miles of levee/berms; 1,400 water control structures and 80 pump stations	Operates and maintains the District's 86 water control structures, 63 miles of canals, 7 miles of dam embankments, and over 170 secondary drainage culverts	Operates and maintains more than 100 major and minor water control structures, including 11 spillways, 3 navigational locks, and ~300 miles of levees and canals	Operates and maintains facilities, flood control and water supply structures, lands, and other works including more than 160,000 acres	Operation and maintenance of District owned lands
FY2019/2020 projected revenues	~\$990 million	~\$200 million	~\$160 million	~\$71 million	~\$74 million
Primary Funding Sources	Ad valorem taxes and other state/federal/local funding sources				
FY2019/2020 Public Works / Capital Project / Land Acquisition Budget	~\$564 million	~\$110 million	~\$94 million	~\$47 million	~\$57 million
FW2019/2020 O&M Budget	~\$310 million	~\$25 million	~\$23 million	~\$5 million	~\$4 million
Data Sources: Water management district websites ( <a href="http://www.sfwmd.gov">www.sfwmd.gov</a> , <a href="http://www.swfwmd.state.fl.us">www.swfwmd.state.fl.us</a> , <a href="http://www.sjrwmd.com">www.sjrwmd.com</a> , <a href="http://www.srwmd.state.fl.us">www.srwmd.state.fl.us</a> , <a href="http://www.nfwwater.com">www.nfwwater.com</a> ) and FY2019/2020 preliminary or adopted budget documents available from websites.					

to FSA's 2018 SUR use operation and maintenance permits or other enforcement methods to ensure the privately-owned facilities are maintained. However, it is notable that some types of properties are often exempt from stormwater utility fees and these include government, public parks, undeveloped land, roadways, and agriculture.

To manage their assets, a majority of the respondents to the FSA 2018 SUR have adopted a stormwater master plan, but about 36% report having no master plan in place. Of those that have adopted a stormwater master plan, 70% of the stormwater entities make an effort to coordinate their stormwater master plan with their Local Government Comprehensive Plan and National Pollution Discharge Elimination Systems (NPDES). However, 29% stated they made a moderate effort and 1% made no effort to coordinate with other programs. In addition to master plans, stormwater infrastructure maintenance and inspection relies on having qualified employees. Based on FSA's 2018 SUR, the average number of full-time staff funded with stormwater fee revenue is about 16, which was down from 17 in 2016.

## PUBLIC SAFETY

The original focus for WMDs was flood control but, in recent decades, it has expanded to include water use regulation, conservation planning, water resource and supply development, water quality, and more. The four core mission areas of the WMDs are listed below.

- Flood Protection and Floodplain Management. The districts construct, operate and maintain flood protection structures throughout their region to prevent increases in flooding events.
- Water Quality. The districts perform a significant amount of water quality monitoring and assessment. For waterbodies within their regions, the districts construct or help fund the construction of water quality projects to protect public health and the environment.
- Water Supply. The district develops a Regional Water





## ADDITIONAL STORMWATER MANAGEMENT FACTS

Summary of FDOT Stormwater Management Facts	
Statistic	Value
Area Served	54,136 square miles
Population Served	20.8 million served
Counties Served	67
Licensed Drivers Served	17 million
O&M Responsibilities	~12,130 centerline miles of State roadway with associated stormwater management systems (storm sewer, ditches, wales, stormwater ponds, etc.)
Primary Funding Sources	Primary revenue sources from state taxes and fees include fuel taxes and motor vehicle license related fees

Data Sources: FDOT Fast Facts - [fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/fastfactsdce18ce94ae1462e927016f398c543b3.pdf](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/fastfactsdce18ce94ae1462e927016f398c543b3.pdf)

### Municipal Stormwater by the Numbers

- Municipalities provide ground zero attention to stormwater management issues
- 87% of stormwater municipal programs are city-only
- 69% of stormwater municipal programs utilize impervious area to estimate fees
- 66% of stormwater municipal programs generate revenue via user fee
- 61% of stormwater municipal programs are combined with the Department of Public Works
- 59% of stormwater municipal programs have mapped and inventoried all their stormwater management facilities
- 88% of stormwater municipal programs monitor improvements in flood protection
- 70% of stormwater municipal programs monitor improvements in water quality

Supply Plan setting forth projects, costs and projections over a 20-year period that are needed to meet all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems.

- Natural Systems. The districts evaluate and protect natural systems through the implementation of the Minimum Flows and Levels program and through reservations of water.

## FUNDING

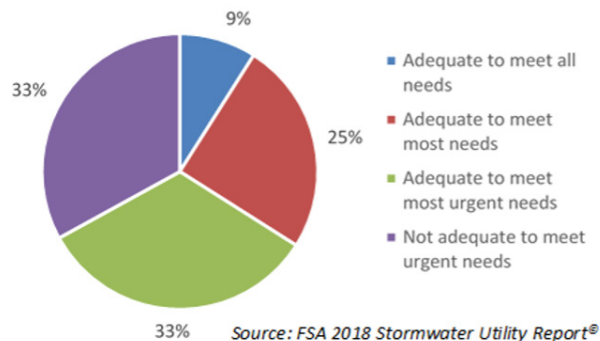
State-level agencies such as FDOT or organizations like the WMDs often receive dedicated funding from the state legislature. FDOT receives funding to address stormwater management within its portfolio of transportation infrastructure, while the WMDs receive dedicated funding to address stormwater management planning, capital projects, and O&M. Stormwater utilities receive funding from both residential and nonresidential users. Based on FSA's 2018 SUR,

stormwater utility fees provide Florida municipalities a reported average of \$3.63 million in revenues to upkeep their systems with total revenues from reporting municipalities exceeding \$469 million across the State.

Stormwater capital construction programs are funded by stormwater fee revenue and non-fee funds. Of the 165 respondents to the FSA's 2018 Stormwater Utility Report®, 43% reported only having a stormwater fee for capital construction programs, while the remaining 57% reported the ability to use both stormwater fees and non-fee funds to do capital projects. Furthermore, the non-fee funds were identified primarily as "other" at 48%, ad valorem (e.g., local, specialized tax) was 26%, gas tax was 11%, and sales tax was 15%. Of the jurisdictions that charge stormwater fees separate from the stormwater utility fee, 73% of the municipalities explained that the funds collected are not directly received by the stormwater section. Therefore, the funding is not necessarily dedicated solely to stormwater infrastructure, but may be partially diverted into the "general fund" for the broader utilization.



### EVALUATION OF MUNICIPALITIES ABILITY TO FUND CRITICAL CAPITAL IMPROVEMENT PROJECTS



## FUTURE NEED

In 2018, approximately 90% of the municipal stormwater entities surveyed in FSA's 2018 SUR revealed an inability to address all capital improvement needs. Stormwater entities identified 26% of capital improvement programs were not adequate to meet "urgent" needs, and an additional 41% were only adequate to meet "most urgent". Based on FSA's 2018 SUR, Florida's capital improvement needs for stormwater management are estimated to be \$1.72 billion over the next five years (2019-2023). This overall value translates into an average need of approximately \$14 million per stormwater entity by 2023. The FSA 2018 SUR also notes that over the next decade, the capital improvement needs for stormwater management will approximately double to \$3.37 billion, and long-term planning for each stormwater entity would require \$35.1 million per entity. Considering the public sector, FDOT and the WMDs regularly plan and budget for their own future stormwater management needs and receive funding from the state legislature.

## RESILIENCE

Future resiliency of stormwater infrastructure is an evolving goal based on political will and agency leadership. This is considered critical as projection of future conditions such as sea level rise and changes to rainfall intensities threaten our state and create additional challenges for stormwater management. One example of a WMD embracing such resiliency concerns is the SFWMD who recently created the position of District Resiliency Officer to address these challenges. Many of the WMDs are making future resiliency considerations part of grant and other funding opportunities they provide to local municipalities. In May 2021, Governor DeSantis signed into law Senate Bill 1954, a new funding source for resilient stormwater projects across the state. The bill designated \$500 million to support the implementation of projects like these prescribed in the annual Statewide Flooding and Sea Level Rise Resiliency Plan.

Planning-focused resilience projects, like the detailed flood risk assessments of Tampa residents and infrastructure in the city's Regional Resiliency Action plan, aim more to inform future efforts to increase redundancy and adaptive capacity across the state's stormwater systems. Another example includes the \$26.6 million Watershed Planning Initiative which helps standardize the development of Watershed Master Plans across the state. These non-structural projects provide Florida with a strong foundation in stormwater resilience that the state can continue to build upon in the coming years.

## INNOVATION

FDOT, WMDs and municipalities have recognized the need to adapt to the use of more innovative stormwater practices to address increasing needs for proactive flood management, water quality improvements and embracing resiliency goals. Much of this innovation has been through the adoption of low impact development principals and/or the application of green infrastructure practices that can work in conjunction with or instead of more traditional stormwater management practices. For example, the King Tide and Tidal Valve program in Miami has installed 103 tidal valves across the city since 2019. These improve the existing stormwater system's capacity to withstand the high but short-term pressures of tidal events. The advancement of these and similarly innovative practices is being supported at the state level in the form of current updates to statewide stormwater quality regulatory criteria led by the FDEP.

FDOT and the WMDs also promote innovative stormwater management strategies through funding of water quality programs and projects to address surface waters and springs. Many municipalities likewise promote innovation in stormwater practice design and implementation through local programs and land development codes.

## LET'S RAISE THE STORMWATER GRADE

- Increase education geared toward public acceptance and understanding of stormwater, the role it plays in development, and the critical importance of treating it to protect receiving water bodies.
- Increase funding to stormwater programs to address current capacity issues, National Pollution Discharge Elimination System permit compliance, Total Maximum Daily Load compliance, and future needs of the municipality.
- Organize a comprehensive information survey for the state's stormwater needs; a survey could be conducted by the State, associations, or private entities to assess the needs and operations of Florida's stormwater facilities.

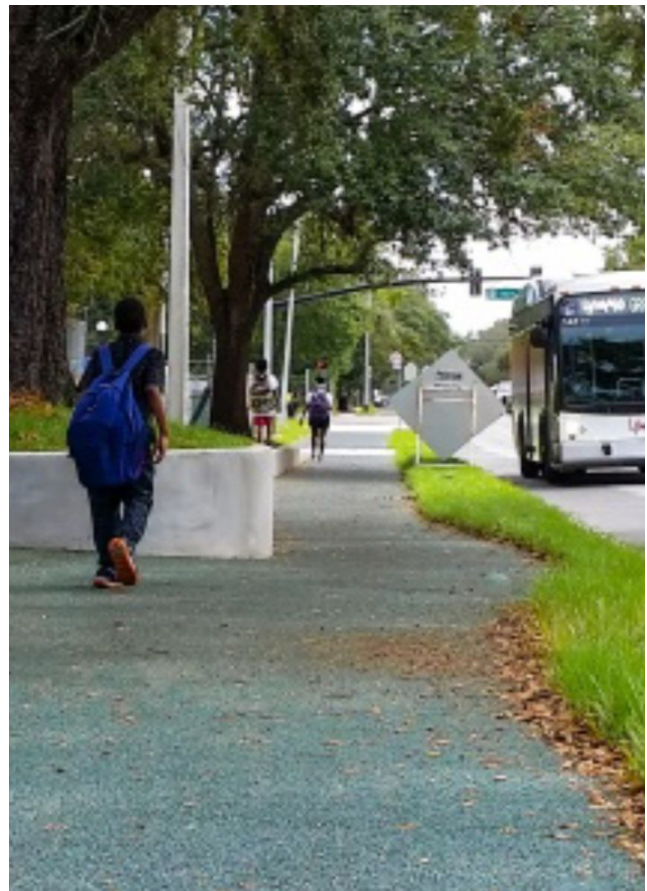


## FIND OUT MORE

References and Additional Resources:

- Florida Department of Transportation: [www.fdot.gov](http://www.fdot.gov)
- Florida Water Management Districts:
  - SFWMD: [www.sfwmd.gov](http://www.sfwmd.gov)
  - SWFWMD: [www.swfwmd.state.fl.us](http://www.swfwmd.state.fl.us)
  - SJRWMD: [www.sjrwmd.com](http://www.sjrwmd.com)
  - SRWMD: [www.srwmd.state.fl.us](http://www.srwmd.state.fl.us)
  - NFWFMD: [www.nfwwater.com](http://www.nfwwater.com)
  - FDEP: [www.floridadep.gov](http://www.floridadep.gov)
- Florida Stormwater Association: [www.florida-stormwater.org](http://www.florida-stormwater.org)
- 2018 Stormwater Utility Report, Florida Stormwater Association, 2018.
- U.S. EPA, National Pollutant Discharge Elimination System, [www.epa.gov/npdes/npdes-stormwater-program](http://www.epa.gov/npdes/npdes-stormwater-program)
- [www.floridadep.gov/water-policy/water-policy/content/water-management-districts](http://www.floridadep.gov/water-policy/water-policy/content/water-management-districts)
- <https://flgov.com/2021/05/12/governor-ron-desantis-signs-bill-to-further-strengthen-floridas-resiliency-efforts/>
- <https://www.flsenate.gov/Committees/billsummaries/2021/html/2327>
- <https://www.tbrpc.org/resiliencyplan/resiliency-action-plan-draft/d>
- <https://www.florida-stormwater.org/assets/MemberServices/AwardsProgram/2021/City%20of%20Miami%20-%20website.pdf>

## TWO-MILE SHARED PATH WITH POROUS PAVE IN ORLANDO FLORIDA





## Florida's Infrastructure

# TRANSIT

### EXECUTIVE SUMMARY

Florida's transit occurs on 30 urban fixed-route and 18 rural public transportation systems which provide millions of people with automobile, bus, paratransit, rail, and ferry services. Over the last decade the state's public transit ridership fell from more than 245 million to about 217 million, or more than a 10% decline. The drop in ridership also contributed to lower fare revenues. Florida's local funds and multi-regional expansions have tracked with the changing operational needs while state and federal funds have increased to fill some gaps and contribute to capital investments. However, a modest transit funding shortfall likely remains. In 2019, many of the system's assets, though aging, were reported to be within their useful life benchmark. Operation and management of the transit system is enhanced by the Florida Department of Transportation's asset management approach that is streamlined across the state. The FDOT Transportation Asset Management Plan (TAMP) prioritizes assets at the upper range of the condition spectrum, to efficiently program limited resources to enhance the system's quality and reliability. Florida's transit system, though experiencing a growing number of challenges – first and last mile options, population growth, impacts from climate change, and increased dependence on digital systems – benefits from adaptive planning that considers the diversity of communities across the state, innovative technologies, and safety-focused funding.

The average Florida worker has access to

**617,632 JOBS**

within a  
**40 MINUTE DRIVE**



but only

**18,249 JOBS**

within a  
**40 MINUTE TRANSIT TRIP**



### CAPACITY

The FDOT takes a decentralized approach to managing the state's transit system. The state is subdivided into 7 districts comprised of a few to more than a dozen counties, each one overseen by a District Secretary. Across all districts, there are a total of 30 urban fixed route and 18 rural public transportation systems that are operated and maintained by a variety of local or regional transit organizations. According to the American Public Transportation Association (APTA), Florida's largest public transit organization is the South Florida Regional Transportation Authority serving approximately 5.5 million residents of

Broward, Miami-Dade and Palm Beach counties. Furthermore, APTA estimates that Florida's transit footprint includes upwards of 1,700 automobiles, nearly 4,900 buses, 260 rail cars, more than a dozen pieces of maintenance equipment, at least 48 transit facilities, and 260 ferries.

Whether the transit system is based in an urban or rural setting, Florida has not been immune to the nationwide trend of decreasing ridership. From 2010 to 2019, the state saw its public transit ridership fall from more than 245 million to about 217 million, or more than a 10% decline. In 2019, the US Census Bureau reported that only 1.6% of Floridians' trips to work were made by public transit, down slightly from 2% reported in 2016. The FDOT has identified a large disparity in transit access, noting that the current system does not provide sufficient access to connect riders to employment centers. The FDOT 2020 Long Range Transportation Plan found that the average Florida worker has access to about 18,000 jobs within a 40-minute transit trip while that same employee would have access to more than 617,000 jobs within a 40-minute drive in a personal vehicle. Due to the importance of this issue, a statewide goal of enhancing transportation choices to improve transit equity, capacity, and accessibility was created in the FDOT 2020 Long Range Transportation Plan.

### FLORIDA'S MAJOR PUBLIC TRANSIT SYSTEMS AND POPULATION SERVED

POPULATION	FLORIDA TRANSIT SYSTEM
5.5 million	South Florida Regional Transportation Authority
3.3 million	Tampa Bay Area Regional Transit Authority
2.5 million	Miami-Dade Transit
2.1 million	Central Florida Regional Transportation Authority
1.9 million	Broward County Transit Division
1.3 million	Palm Beach County Palm Tran Public Transportation

Source: American Public Transportation Association (APTA) [https://footprint.apta.com/map/STATE\\_SUM-FL---](https://footprint.apta.com/map/STATE_SUM-FL---)

### CONDITION

To ensure the inventory of Florida's transit assets remain in a state of good repair or are appropriately targeted for improvements, the FDOT's Group TAMP for Fiscal Year (FY) 2018-2022 used two measures to assess infrastructure performance – useful life benchmark (ULB) and condition rating. The ULB is the expected lifecycle of a capital asset or the acceptable period of use determined by a particular transit



### TRANSIT ECONOMIC REQUIREMENTS MODEL (TERM) CONDITION RATING DESCRIPTIONS

Source: FDOT's Group Transit Asset Management Plan (TAMP) for Fiscal Year (FY) 2018-2022

Condition	Description	Mileage	Rating
Excellent	New asset; no visible defects		4.8 - 5.0
Good	Asset showing minimal signs of wear; some (slightly) defective or deteriorated component(s) but is overall functional		4.0-4.7
Adequate	Asset has reached its mid-life; some moderately defective or deteriorated component(s)	50-99% of Useful Life	3.0-3.9
Marginal	Asset reaching or just past the end of its useful life; increasing number of defective or deteriorated component(s) and increasing maintenance needs	100-124% of Useful Life	2.0-2.9
Poor	Asset is past its useful life and is in need of immediate repair or replacement; may have critically damaged component(s)	125% or more of Useful Life	1.0-1.9

provider. When determining the ULB of an asset, unique factors such as a provider's geographic setting and service frequency are also taken into consideration. When assessing transit facilities, the Federal Transit Administration (FTA) Transit Economic Requirements Model (TERM) outlines a condition rating scale from poor (1.0-1.9) to excellent (4.8-5.0). When an asset's TERM rating is marginal (2.0-2.9) or poor (described in the table above), replacement efforts must be coordinated.

In recent years, the amount of revenue miles driven between transit failures has followed an overall upward trajectory, from slightly more than 4,000 miles in 2016 to nearly 5,000 miles in 2019. This trend is the benefit of steady maintenance and some condition improvements across the sector. In 2019, most of the state's transit assets were reported to be within their ULB. However, some transit categories exceeded those values including vans, automobiles, and school buses. These assets all had similar average ages between 7 and 8 years old. Vans had the largest portion past the ULB with 30%, while automobiles and buses had slightly lower portions exceeding the ULB with 27% and 25%, respectively. Looking ahead, 63% of rail cars and 50% of ferries are projected to exceed their ULB in the next 5 years. From 2018-2019, some small transit providers retired older equipment and acquired newer models which led to significant progress in the ULB of transit sector equipment. Finally, when considering transit facilities, local providers have continuously maintained these areas in satisfactory condition.

## OPERATION & MAINTENANCE

The Florida Transportation Plan (FTP) outlines long-range asset planning and management strategies that emphasize the identification and mitigation of risks to proactively manage transit infrastructure. For instance, this TAMP operation and maintenance (O&M) framework promotes an investment strategy that prioritizes the maintenance and improvement of

assets in adequate or better condition. By targeting assets at the upper range of the condition spectrum, transit providers are efficiently programming limited resources to enhance the quality and reliability of their stock. The remaining transit infrastructure is prioritized with the goal of eliminating or, at very least, minimizing assets in poor or marginal condition. On a continuous basis, the FDOT and transit providers monitor all assets for safety concerns, and when an unacceptable safety risk is identified, the ranking of the asset is adjusted to ensure it has a higher investment prioritization. Finally, acting as the "eyes, ears, and voice" of the state's transit maintenance departments, the Florida Transit Maintenance Consortium provides professionals with a community for sharing best practices on critical O&M-related issues. This statewide consortium serves not only to improve the industry's performance but also to inform policymakers and agencies.

## FUNDING & FUTURE NEEDS

To meet the state's funding needs, transit system budgets typically rely on fare revenues, locally generated funds, and support from state and federal programs. Between 2016 and 2020, Florida's transit sector saw operating expenses increase from \$1.23 billion to more than \$1.35 billion while revenues declined from \$311 million to about \$300 million. This means that the farebox recovery ratio, a measure of revenues as a percentage of total transit costs, decreased from nearly 22% to about 17%. Essentially, transit fares have become a less dependable funding stream, shifting more of the financial burden onto other sectors like local municipalities. In a report from the Florida Center for Urban Transportation Research, local governments across the state spent more than \$1.28 billion on transit in FY 2017. This is a significant investment towards meeting the sector's operating funding needs but provides few additional resources for long-term capital improvements.



### FLORIDA'S REGIONAL SOURCES OF FUNDING

TYPE OF FUNDING	PERCENTAGE IN 2016	PERCENTAGE IN 2020
Fares	15%	12%
Local	45%	53%
State	15%	16%
Federal	25%	19%

Source: American Public Transportation Association (APTA) [https://footprint.apta.com/map/STATE\\_SUM-FL---](https://footprint.apta.com/map/STATE_SUM-FL---)

To help meet some of the longer-term needs, Florida's transportation budget has seen an increase from 2016 to 2021 where it grew from approximately \$9 billion to more than \$10 billion. The 2021 Florida Leads budget includes over \$704 million for rail and transit projects and more than \$172 million for safety initiatives across various transportation sectors. Similarly, the federal government has also increased its support of Florida's transportation infrastructure through the Fixing America's Surface Transportation Act or "FAST Act" which has grown from approximately \$1.8 billion in FY 2015 to nearly \$2.1 billion in 2020.

Following is a list of examples of recent funding initiatives to support the transit transportation mode in the state:

- Bus Rapid Transit in Jacksonville for an approximate funding of \$15.3 million.
- SunRail Commuter Rail Expansion in Orlando for an approximate funding of \$25.1 million.
- Tampa Bay Area Regional Transit Authority – Bus Rapid Transit. Total of 41 miles planned, with 5 first miles completed in 2021 within Pinellas County.
- Hillsborough Area Regional Transit – Tampa Street Car for an approximate funding of \$67.3 million.
- Miami Dade Bus Rapid Transit - 6 planned routes. South Corridor is the first route under construction; East-West Corridor for an approximate funding of \$300 million.

High Speed Rail Expansion construction was completed from Miami to West Palm Beach while the portion from West Palm Beach to Orlando is under construction. Additionally, the segment from Orlando to Tampa is in the planning phase. Across the Bay, the Pinellas Suncoast Transit Authority's (PSTA) first bus rapid transit project is currently under construction of 20 miles in Pinellas County and Downtown St. Petersburg.

According to recent reporting from APTA, the table above shows the shift in the state's sources of funding and highlights the increased dependence on locally generated resources. While local funding is tracking with operational needs, state and federal funding has increased to fill in some of those gaps and to provide resources towards capital investments and system

upgrades. At the same time, ongoing resources from statewide fares have decreased, potentially leaving some transit funding shortfalls.

## RESILIENCE & PUBLIC SAFETY

There are a growing number of factors to which Florida's transit systems are becoming increasingly vulnerable including threats from climate change and the sector's reliance on digital technology.

The 2017 hurricane seasons provided a significant test for the resilience of Florida's transit system. A record of 6.5 million Floridians evacuated due to Hurricanes Irma and Maria. Emergency shoulder use was opened on Florida's interstate system to allow drivers and transit vehicles to access additional lane space rather than deploying a counterflow method. Until that point, FDOT had not made Emergency Shoulder Use a top priority for transit evacuation routes, but, due to its success, this adaptive approach was identified as a way to improve transit evacuations across the state. During the 2017 evacuation periods, transit networks quickly changed from regular service to emergency service plans, effectively routing evacuees to designated shelter facilities. The transit sector's resilience is particularly important to the public safety of Florida's growing older population. By 2045, Florida's population of individuals 65 and older is projected to grow by 60%, meaning the population of those transitioning from driving and dependent upon public transit options will also grow. Accordingly, FDOT has identified the need for providing a range of transportation options to support a diverse population, especially one that is aging.

Furthermore, as an increased dependence on digital connectivity brings challenges like cybersecurity and data privacy to the forefront, the Florida Leads FY 2021 budget invests \$37.5 million across various state agencies to protect against the evolving nature of cyber threats. Accordingly, FDOT envisions a transit system that is adaptive in the face of risk and resilient to potential cybersecurity hazards, effectively removing or limiting any service disruptions and ensuring the system continues to provide safe and reliable mobility options.

## INNOVATION

Many public transit systems have challenges with the "first and last mile" problem where services and infrastructure are too expensive to extend to all residents' initial and final miles of public transit use. Therefore, residents outside of a specified footprint must depend on digital solutions such as smartphone applications for assistance. However, these services are usually only available in urban areas, still not meeting all needs. Needless to say, they do provide assistance including:

- Carpooling, sharing rides and cost of rides with other users.
- Driver service, being picked-up and dropped-off by a private vehicle.
- Vehicle share, renting different types of vehicles on-demand at the street level. These vehicles can be passenger vehicles, bicycle, electric bicycles, and electric scooters.



These solutions require smartphone and credit/debit card services which may be barriers to economically disadvantaged portions of the population. As such, several areas in Florida have partnered with private companies to provide a system of electronic vouchers to assist users that may not be able to access these digitally-dependent services. For example, the Pinellas Suncoast Transit Authority has developed a Transportation Disadvantaged Program to provide door-to-door service to Pinellas County residents that have incomes below the 2020 Federal Poverty Guidelines.

## LET'S RAISE THE TRANSIT GRADE

Transit is a critical component of Florida's transportation infrastructure and one that will need increasing focus as the population ages and grows. Transit supports resource efficiency, social equity, sustainable urban development, and reduces traffic congestion. Transit is also a more efficient use of public road space; forty people travelling in a bus occupy 60 feet of road space compared to 1,000 feet if they were all driving individually.

Florida has the ability to become a leader in transit by taking three steps: Develop, Connect, and Invest.

- Develop walkability with new urbanism; also retrofit the suburbs to enhance walking and cycling connectivity to transit stops. This will improve transit usage and assist in solving the first/last mile problem.
- Connect regional rail, commuter rail, and local transit. Connected transit networks support greater availability and productivity.
- Invest in transit projects that improve quality of life, social equity and, combined with housing, transport affordability. Investing an additional \$150 per person (\$3 billion) could make Florida's entire transit system one of the best in the country. Additional investment in transit needs to be provided through all levels of government, local, state and federal.

## SOURCES

- [http://floridatransportationplan.com/pdf/REPORT\\_FDOT\\_Vision2020\\_final\\_Apr20\\_spreads.pdf](http://floridatransportationplan.com/pdf/REPORT_FDOT_Vision2020_final_Apr20_spreads.pdf)
- [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/transit/documents/2020-florida-transit-information-and-performance-handbook.pdf?sfvrsn=a2d91c1a\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/transit/documents/2020-florida-transit-information-and-performance-handbook.pdf?sfvrsn=a2d91c1a_2)
- U.S. Census Bureau - 2016 Population Estimates: Means of Transportation to Work by Selected Characteristics - <https://data.census.gov/>
- U.S. Census Bureau - 2019 Population Estimates: Means of Transportation to Work by Selected Characteristics - <https://data.census.gov/>
- <http://floridatransportationplan.com/performanceelement2020.pdf>
- <https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/transit/documents/fdotgrouptamplanfinal10312018.pdf>
- <https://www.fl-counties.com/sites/default/files/2020-02/Transportation%20Talk%20Sheet.pdf>
- <https://www.flgov.com/wp-content/uploads/2021/06/FY-21-22-Budget-Highlights-6.2.21-FINAL.pdf>
- <https://www.fhwa.dot.gov/fastact/comptables/table1p1.cfm>
- <https://www.flgov.com/wp-content/uploads/2021/06/FY-21-22-Budget-Highlights-6.2.21-FINAL.pdf>
- Pinellas Suncoast Transit Authority – Transportation Disadvantaged Program. <https://www.psta.net/programs/td-transportation-disadvantaged/>
- Florida Department of Transportation - 2020 Transit Technology Assessment Framework Tool - <https://www.fdot.gov/transit/pages/newtransitandtechnology.shtm>
- National Transportation Safety Board - Agricultural Labor Bus and Truck-Tractor Collision at US-98-SR-363 Intersection Near St. Marks, Florida July 2, 2016 – HAR1705 - <https://www.nts.gov/investigations/AccidentReports/Pages/HAR1705.aspx>
- National Highway Traffic Safety Administration - Fatality Analysis Reporting System. <https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars>
- American Public Transportation Association – 2019 Public Transportation Vehicle Database - <https://www.apta.com/research-technical-resources/transit-statistics/vehicle-database/>
- Federal Transit Administration – 2018 National Transit Database – <https://www.transit.dot.gov/ntd/ntd-data>
- U.S. Census Bureau - 2018 Population Estimates- <https://data.census.gov/>

BRIGHTLINE RAILWAY



brightline

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Dedicated to the team,  
Committed to the dream.





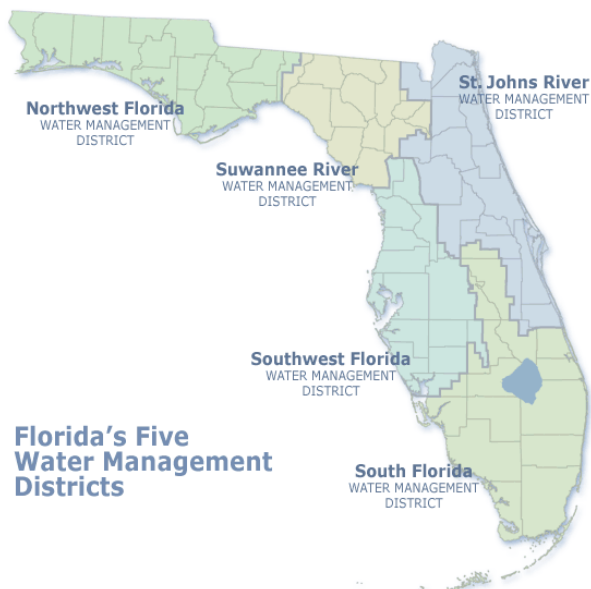
## Florida's Infrastructure

# WASTEWATER

### EXECUTIVE SUMMARY

Florida is a national leader in reclaimed wastewater and climate adaptation frameworks thanks to partnerships among utilities, universities, and industry leaders. Further leadership has come from Florida lawmakers who have prioritized environmental protection by focusing on improvements to onsite systems, consolidating wastewater oversight to one state agency, and expanding grant funding programs. However, the impacts of that leadership and planning are taking time to influence change. Therefore, the design capacity for the largest wastewater treatment plants and conveyance networks are currently sufficient, but smaller systems are increasingly overwhelmed by the frequent and extreme weather events which cause public health issues like sanitary sewer overflows. As Florida infrastructure ages, recent legislation has directed utilities to institutionalize asset management to improve efficient and effective resource use to maintain reliable service to customers. However, as new technologies are integrated, the sector cannot become complacent due to growing threat caused by vulnerable cyber security networks.

**FIGURE 1: FLORIDA'S FIVE WATER MANAGEMENT DISTRICTS**



<sup>1</sup> <https://floridadep.gov/districts>

<sup>2</sup> <https://floridadep.gov/water/onsite-sewage/content/program-transfer>

<sup>3</sup> <https://floridadep.gov/water/domestic-wastewater/content/general-facts-and-statistics-about-wastewater-florida>

<sup>4</sup> <https://infrastructurereportcard.org/cat-item/wastewater/>

### INTRODUCTION

The Florida Department of Environmental Protection (FDEP) is responsible for wastewater policymaking, maintaining consistent adherence to state and federal regulations, and providing technical assistance to district offices throughout the state. The FDEP's five district offices perform permitting, compliance, and enforcement activities for domestic and industrial wastewater systems within their boundaries. <sup>1</sup> During the 2020 Legislative Session in the Clean Waterways Act (Senate Bill 712), the agency responsible for septic tanks, the Florida Department of Health's Bureau of Onsite Sewage Program, was proposed to be transferred to FDEP. The bill passed in June 2020, was signed by Governor DeSantis, and, as of July 2021, resulted in onsite systems also being aligned under FDEP's jurisdiction. <sup>2</sup>

### CAPACITY & CONDITION

Florida's wastewater portfolio includes centralized and onsite systems. The infrastructure within a centralized system includes a network of collection and transmission pipelines, manholes, and pumping stations that move domestic and industrial effluents to treatment plants. After multiple physical and chemical processes, the treated effluent is discharged underground or to nearby surface water. Onsite system infrastructure is less extensive due to the smaller footprint and includes conveyance lines, a septic tank or more advanced treatment unit, sometimes a pump, and an underground drainage area called a leach field.

According to FDEP's most recent reports, the state has more than 4,100 active wastewater treatment facilities, of which approximately 2,100 are classified as industrial while the remaining 2,000 are domestic systems. All of Florida's domestic wastewater systems have a combined treatment capacity of 2.7 billion gallons per day, though only about 1.5 billion gallons is used, leaving adequate capacity to accommodate some future population growth.

Florida's largest domestic wastewater treatment systems, those with a capacity of at least 1 million gallons per day, are adequately treating upwards of 95% of the state's overall domestic wastewater needs. However, most of the state's permitted domestic wastewater systems are much smaller, less than 100,000 gallons per day, and serve only about 1% of the state's total domestic wastewater needs. <sup>3</sup> Florida's increasing dependence on larger capacity, centralized wastewater treatment facilities is driven by urbanization and is consistent with nationwide wastewater trends. <sup>4</sup> Fortunately, at this point, Florida's wastewater treatment systems have enough capacity to provide an adequate level of service to users.

When considering onsite wastewater systems, though much smaller in capacity, typically less than 5,000 gallons per day, they are no less important to the state's wastewater treatment



portfolio. Approximately one-third of Florida's population uses onsite wastewater treatment which means an estimated 2.6 million systems are currently in operation. Because the state depends on groundwater as a source of drinking water and Florida's tourism industry relies upon pristine surface water for fishing, boating, snorkeling, and other watersports, these systems have garnered significant attention as an avenue for protecting the state's environmental resources.<sup>5</sup>

Like many states, Florida has no comprehensive statewide database that tracks the average age of centralized wastewater systems, onsite units, or collection networks, so levels of deterioration and aging are assessed by local utilities. In older and increasingly urbanized counties, like Miami-Dade, efforts to replace pipes that were installed in the 1950s or earlier are underway to improve service reliability and reduce the frequency of costly emergency repairs.<sup>6,7</sup>

## OPERATION & MAINTENANCE

Wastewater treatment plants and collection systems encompass a significant amount of assets that require routine operation and maintenance (O&M) to protect public health and the environment while delivering efficient and affordable service to customers.<sup>8</sup> Recognizing the challenges that come from prioritizing limited funds and directing them to critical projects, utility leaders and the Florida legislature have streamlined asset management through the Clean Waterways Act of 2020. Utilities must now develop a 5-year pipe assessment, repair, and replacement action plan and implement proactive pipe surveys throughout their collection and conveyance networks. The goal of this initiative is to reduce the occurrence of leaks, sanitary sewer overflows, and chronic issues of inflow and infiltration (I&I). Utilities across the state vary in their ability to integrate asset management; some are just beginning while others are implementing advanced asset management using real-time data to inform O&M and capital investment decisions by optimizing resource use and service levels.<sup>9</sup> Unlike centralized systems, the O&M for septic tanks and advanced onsite systems is the responsibility of

the homeowner. Because the systems are out-of-sight and out-of-mind, the minimal amount of maintenance – periodic inspections and pumping recommended – oftentimes goes unperformed, potentially causing failures.<sup>10,11</sup> To mitigate septic failures which can threaten Florida's surface water, to raise homeowners' awareness about O&M needs, and to save money over the lifespan of the system, FDEP has instituted regular inspections and maintenance by state-licensed contractors for advanced onsite systems, those installed in environmentally sensitive areas, and developed homeowner informational resources and contractor certification programs.<sup>12,13</sup>

## FUNDING

Florida's wastewater infrastructure is funded by a combination of local user fees, state-level grants, municipal bonds, and federal grants or financing mechanisms. In 2020, according to the Florida Water and Wastewater Rates Dashboard, the state's average monthly wastewater bill was \$33.95, nearly \$10 less per month than the nationwide average.<sup>14,15</sup> However, a survey of more than 200 Florida utilities reveals that the rates, albeit less than the national average, produced higher operating revenues than expenses pointing to their sufficiency in supporting day-to-day operations.

While operating expenses are being met, a significant funding challenge is the large amount of capital that is required for constructing, upgrading, or expanding centralized wastewater treatment plants. One source of low-interest loans and grant funding comes from the Clean Water State Revolving Fund (CWSRF) Program which is annually resourced by federal contributions and a state match.<sup>16</sup> Figure 2 shows that Florida's CWSRF program saw an increase in federal funding from more than \$47 million in 2016 to nearly \$61 million in 2021. Over the same timeframe, the state match also kept pace increasing from more than \$9 million to over \$12 million.<sup>17</sup> Figure 3 depicts statewide project locations and the range of CWSRF funds distributed.

Finally, onsite system owners pay the full cost of installation, O&M, and, where applicable, decommissioning to connect to a centralized system. Until 2018, DEP spearheaded the Septic

5 <https://floridadep.gov/water/onsite-sewage>

6 <https://www.miamidade.gov/water/improvements/home.html>

7 <https://www.epa.gov/sites/production/files/2013-08/documents/miami-dade-cd.pdf>

8 *Changing the Infrastructure Equation: Using Asset Management to Optimize Investments* <https://infrastructurereportcard.org/the-impact/asset-management-report/>

9 Celine Hyre and Eric Bindler (2020) *Demystifying Intelligent Water: Realizing the Value of Change with Advanced Asset Management* pp. 50-55 [https://issuu.com/fwrj/docs/0520\\_fwrj\\_web/50](https://issuu.com/fwrj/docs/0520_fwrj_web/50)

10 *Comparison of Sewer and Onsite Sewage Treatment and Disposal Systems* [http://www.floridahealth.gov/environmental-health/onsite-sewage/\\_documents/sewer-vs-onsite.pdf](http://www.floridahealth.gov/environmental-health/onsite-sewage/_documents/sewer-vs-onsite.pdf)

11 *Septic System Owner's Guide* [http://www.floridahealth.gov/environmental-health/onsite-sewage/\\_documents/septic-folder-8x11-link2.pdf](http://www.floridahealth.gov/environmental-health/onsite-sewage/_documents/septic-folder-8x11-link2.pdf)

12 <https://floridadep.gov/water/onsite-sewage/content/information-septic-system-owners-and-buyers>

13 <https://floridadep.gov/water/onsite-sewage>

14 *Florida Water and Wastewater Rates Dashboard* <https://dashboards.efc.sog.unc.edu/fl>

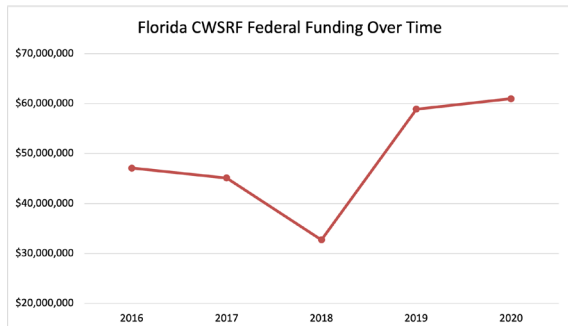
15 *ASCE Report Card for America's Infrastructure: Wastewater (2021)* <https://infrastructurereportcard.org/wp-content/uploads/2020/12/Wastewater-2021.pdf>

16 *State Revolving Fund* <https://floridadep.gov/WRA/SRF>

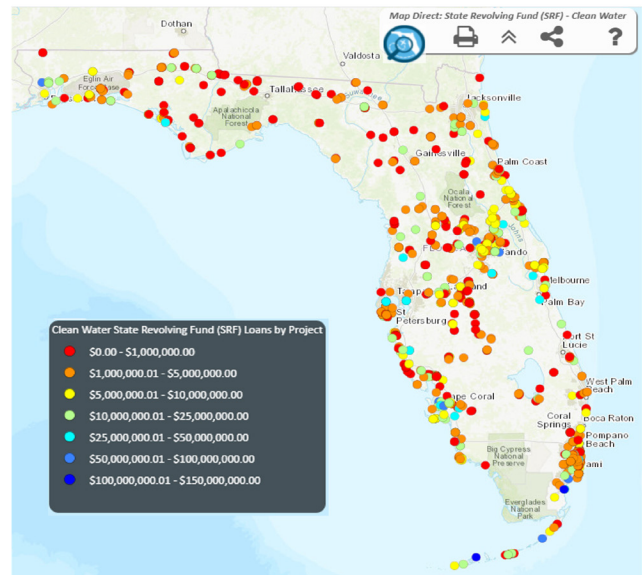
17 *State Revolving Fund Resources and Documents* <https://floridadep.gov/wra/srf/content/state-revolving-fund-resources-and-documents>



**FIGURE 2: FLORIDA CLEAN WATER STATE REVOLVING FUND (CWSRF) FEDERAL FUNDING OVER TIME**



**FIGURE 3: CLEAN WATER STATE REVOLVING FUND PROJECTS & RANGES OF FUNDING AMOUNTS**



Upgrade Incentive Program, an initiative that no longer accepts new applications because the funding has been exhausted.<sup>18</sup> Fortunately, filling this gap, the Clean Waterways Act of 2020 adds state-level resources to onsite needs. One mechanism is a newly created Wastewater Grant Program that prioritizes areas with significant water quality challenges and requires a 50% local match.<sup>19</sup>

## FUTURE NEEDS

The wastewater sector is becoming increasingly innovative and data-driven which is fueling the demand for a more technically skilled workforce. As such, Florida's utilities, universities, and professional organizations are broadening access to educational materials for wastewater treatment plant operators, engineers, and other clean water professionals regarding changes in environmental regulations, evolving security considerations, new technologies, and public health concerns.<sup>20 21 22</sup> Though helpful in expanding the technical training of the state's current wastewater practitioners, it does not address the long-term need of an aging workforce, a large portion of which is nearing retirement. To encourage the next generation of industry leaders, Florida educational institutions

have sharpened their career development and workforce readiness programs to fill the forecasted gap.<sup>23</sup>

## INNOVATION

Some wastewater utilities, like Pinellas County Utilities in Clearwater, are implementing innovative O&M practices that reduce the public's construction-related inconveniences during conveyance system inspections. The utility has implemented ground-penetrating radar in combination with ultrasonic thickness testing. These minimally invasive assessment techniques enable the utility to determine the condition of its system and proactively plan repairs and rehabilitations before breaks occur.<sup>24</sup>

Furthermore, Florida's wastewater sector remains a national leader in treatment technologies reclaiming water, energy, and nutrients from treated wastewater. Reclaimed water is wastewater that has undergone at least secondary treatment and basic disinfection that is productively reused for activities including irrigation, groundwater recharge, aesthetic architectural features like fountains, and cooling towers used in energy production.<sup>25 26</sup> As reclaimed water becomes the "norm"

<sup>18</sup> <https://floridadep.gov/springs/restoration-funding/content/septic-upgrade-incentive-program>

<sup>19</sup> <https://www.flsenate.gov/Session/Bill/2020/712/BillText/er/PDF>

<sup>20</sup> <https://cwde.aaf.edu/water-wastewater/>

<sup>21</sup> [https://www.fwea.org/florida\\_water\\_resources\\_journa.php](https://www.fwea.org/florida_water_resources_journa.php)

<sup>22</sup> <https://floridadep.gov/water/certification-restoration>

<sup>23</sup> <https://cwde.aaf.edu/>

<sup>24</sup> Haggen et al. (2020) Utilizing Nondestructive Testing for Large Ductile Iron Force Main and Air Release Valve Evaluation pp. 24-33 [https://issuu.com/fwrj/docs/0520\\_fwrj\\_web/50](https://issuu.com/fwrj/docs/0520_fwrj_web/50)

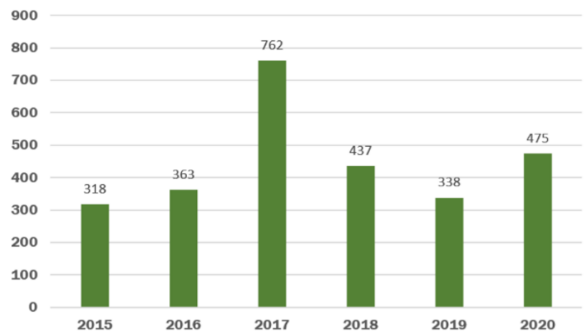
<sup>25</sup> <https://floridadep.gov/water/domestic-wastewater/content/reuse-facts>

<sup>26</sup> <https://floridadep.gov/water/domestic-wastewater/content/uses-reclaimed-water>



**FIGURE 4: SOUTHERN DISTRICT (SD) SANITARY SEWER OVERFLOWS (SSOs) BY VOLUME AND NUMBER PER COUNTY**

### Reported SD Spills



### Reported SD Spills by Month



for reducing freshwater demand and productively reusing treated wastewater for other purposes, DEP's Long Range Program Plan anticipates a modest increase in the portion of domestic wastewater treated for reuse, up from 64% in 2021 to 65% by 2023.<sup>27</sup>

## PUBLIC SAFETY

To protect public safety and advance Florida's leadership in wastewater reuse initiatives, recent state legislation directed FDEP to promote the public health rules regarding the use of reclaimed water as a source for public supply. Under this direction, utilities are expected to address contaminants of emerging concern, meet or exceed federal and state drinking water quality standards, and adhere to other applicable, stringent water quality standards.<sup>28</sup> Another public safety threat to which the state's wastewater sector is attentive is the level of cyber security vulnerabilities at Florida's wastewater treatment plants. While some utilities have technical capacity and resources to prioritize system updates to protect the physical and chemical security of the system, other, smaller, rural, and less fiscally capable utilities lag in this priority area.<sup>29</sup>

When wastewater treatment systems underperform due to equipment failures or blockages and/or are overtaxed due to extreme weather events, sanitary sewer overflows (SSOs) can occur. Florida DEP defines an SSO as any overflow, spill, release,

discharge, or diversion of untreated and/or partially treated wastewater due to an obstruction, system failure, or capacity exceedance at the wastewater facility or in the collection system. SSOs can cause wastewater to back-up in toilets, sinks and drains before it can reach a treatment facility, highlighting the direct public health and safety implication.<sup>30</sup>

FDEP requires all spills under 1,000 gallons to be reported to the local district office while those over 1,000 gallons must be reported to the State Watch Office as a formal public notice of pollution which is published online.<sup>31 32</sup> Figure 4 depicts the South District's total annual SSOs (or spills) over time (2015-2020) and monthly SSOs in 2020. Aside from the large spike in 2017 due to an extremely active hurricane season, the SSOs have increased in recent years.

Considering a statewide perspective, Figure 5 comes from a 2019 FDEP report which shows the total volumes and number of SSOs that occurred by county between 2017 and 2018, the largest occurrences being in Polk County (53 million gallons) and Brevard County (33 million gallons).<sup>33</sup>

## RESILIENCE

Much of Florida's wastewater infrastructure is close to the state's 2,000 miles of coastline which makes the systems vulnerable to increasingly frequent and severe weather events,

<sup>27</sup> <http://floridafiscalportal.state.fl.us/Document.aspx?ID=21187&DocType=PDF>

<sup>28</sup> <https://www.flsenate.gov/Session/Bill/2020/712/BillText/er/PDF>

<sup>29</sup> <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/03/10/florida-hack-exposes-danger-to-water-systems>

<sup>30</sup> <https://floridadep.gov/sites/default/files/sanitary-sewer-overflows.pdf>

<sup>31</sup> <https://fwwatertracker.com/>

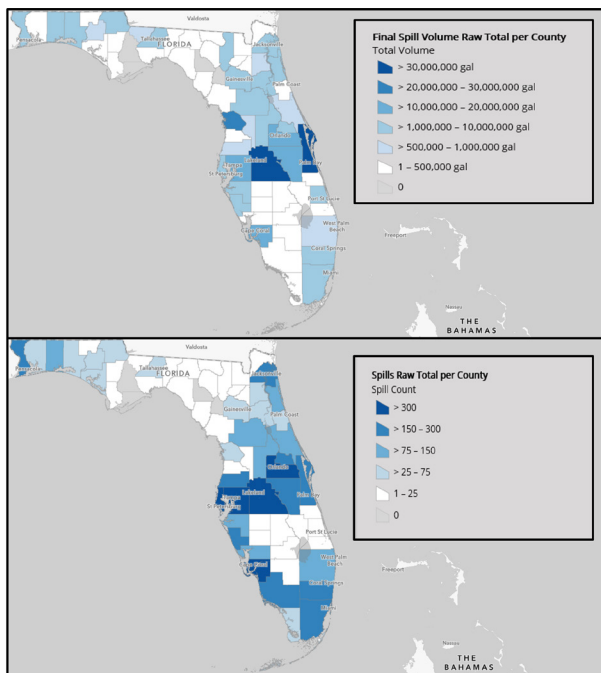
<sup>32</sup> <https://fddep.maps.arcgis.com/apps/View/index.html?appid=90072bb50dab41e68a51419353d5d40f>

<sup>33</sup> <https://floridadep.gov/comm/comm/documents/sanitary-sewer-overflows>



sea level rise, coastal flooding, and erosion.<sup>34</sup> Researchers, engineers, and other sector experts with the Southeast Florida Regional Climate Change Compact have developed a framework to institutionalize the use of climate projections in the siting and design of critical infrastructure, like wastewater systems, with a long design life (more than 50 years). However, this type of initiative has not been comprehensively adopted by Florida's wastewater sector due to limitations in technical and financial capacities.<sup>35 36</sup>

**FIGURE 5: TOTAL VOLUMES & NUMBER OF SSOs BY COUNTY FROM 2017 TO 2018**



To address the growing need for resilience-related infrastructure assistance, FDEP has developed a coastal resilience program that focuses on assisting local governments with resilience and adaptation planning. The mission of the Resilient Coastlines Program is to synergize the use of tools, funding, and technical assistance for community resilience planning and mitigation efforts and to ensure a coordinated approach among state, regional, and local agencies.<sup>37</sup>

## LET'S RAISE THE WASTEWATER GRADE

- Incorporate geographically specific projected impacts of climate change into wastewater infrastructure planning and long-term funding decisions.
- While Florida's wastewater infrastructure grade compares favorably with the national grade, population growth, urbanization, and climate threats have major technical and financial implications for utilities' abilities to prepare for the future.
- Complete a climate change related vulnerability assessment to help each utility understand how their facility may be impacted and to prioritize capital improvements.
- Aging septic systems in environmentally sensitive areas require significant investment. New treatment technologies must be implemented to protect Florida's impaired waters, to avoid ecosystem degradation.
- Establish a program for 21st century technical career training in the wastewater sector that retains Florida's young talent and mainstreams innovative tools for data-driven decision-making, such as asset management software and life-cycle cost analysis.
- While design capacity is not a day-to-day issue for most of the state's wastewater treatment plants and conveyance systems, some smaller systems are increasingly overwhelmed due to extreme weather events resulting in SSOs. Impacted systems must be prioritized for upgrades.
- Encourage a comprehensive statewide database that tracks the average age of centralized wastewater systems, onsite units, or collection networks, so levels of deterioration and aging are assessed by local utilities

<sup>34</sup> <http://floridafiscalportal.state.fl.us/Document.aspx?ID=21187&DocType=PDF>

<sup>35</sup> <https://southeastfloridaclimatecompact.org/wp-content/uploads/2015/10/2015-Compact-Unified-Sea-Level-Rise-Projection.pdf>

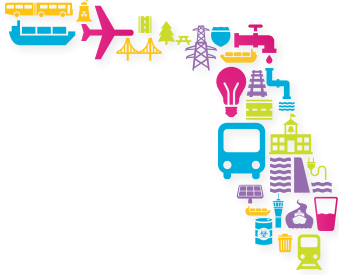
<sup>36</sup> <https://www.epa.gov/arc-x/southeast-florida-compact-analyzes-sea-level-rise-risk>

<sup>37</sup> <http://floridafiscalportal.state.fl.us/Document.aspx?ID=21187&DocType=PDF>

**2021**

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**A COMPREHENSIVE ASSESSMENT  
OF FLORIDA'S INFRASTRUCTURE**



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