

2023 Consolidated Annual Report on Flood Resiliency

Central and Southern Florida Flood Resiliency Study

Sea Level Rise and Flood Resiliency Plan

October 2023



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Introduction

The South Florida Water Management District (SFWMD or District) manages the Central and Southern Florida Flood Control Project (C&SF Project) in the southern half of Florida, covering flood control from Kissimmee to Miami-Dade County and serving a population of over nine million residents. The C&SF Project consists of over 2,100 miles of canals & levees, 918 water control structures, and 89 pump stations, much of which is over 60 years old. The District routinely evaluates the status of this infrastructure and advances projects necessary to continue its critical function to sustain communities, in anticipation of future climate conditions.

The C&SF Project was designed to provide flood protection for 7 to 12 inches of rainfall over a 24-hour period, representing a 1-in-25-year storm event. This means that the risk of flooding in the area served by the C&SF system should be less than 4% each year. With land development, sea level rise, and changing rainfall conditions, system performance has decreased to a point where the risk of flooding in the most vulnerable portions of the system is more than 20% per year. Significant investments in Central & Southern Florida's aging water management infrastructure are necessary to address the risk of more frequent and significant flooding events.

Florida Statute 373.1501 (10) (a) instructed the District to submit a consolidated annual report regarding the status of the United States Army Corps of Engineers and the District's Southern Florida Flood Resiliency Study to the Office of Economic and Demographic Research, the Florida Department of Environmental Protection, the Governor, the President of the Senate, and the Speaker of the House of Representatives. The report must include:

1. *A summary of the findings in the district's annual sea level rise and flood resiliency plan.*
2. *A list of structures that are expected to fall below the expected service level in the next 5 years.*
3. *Initial recommendations for the refurbishment or replacement of the structures identified in subparagraph 2., including:*
 - a. *Future cost estimates and timelines for the refurbishment or replacement of the most vulnerable structures.*
 - b. *An estimate of project costs and current funds available to implement the recommendations for each vulnerable structure based on a 10-year horizon.*
4. *A summary of the state and federal funds expended toward the implementation of the United States Army Corps of Engineers Section 216 Central and Southern Florida Project Infrastructure Resiliency Study and other directly related flood control infrastructure resiliency projects of the district through June 30 of each year.*

This report addresses the information detailed in the subparagraphs above, and the summary of funds expended through June 30, 2023, pursuant to Section 373.1501, Florida Statutes. For additional information about the District Resiliency efforts, please visit [SFWMD.gov/resiliency](https://www.sfwmd.gov/resiliency).

SFWMD Sea Level Rise and Flood Resiliency Plan

The SFWMD Sea Level Rise and Flood Resiliency Plan, updated annually, is the District's initiative to compile a comprehensive list of priority resiliency projects to reduce the risks of flooding, sea level rise, and other climate impacts on communities and ecosystems in South Florida. This goal will be achieved by updating and upgrading aging water management infrastructure throughout the C&SF Project.

The priority resiliency projects are determined based on vulnerability assessments that have been ongoing for the past decade through the Flood Protection Level of Service (FPLOS) Program's comprehensive technical analyses and post-storm evaluations. These assessments utilize cutting edge hydrologic models to evaluate flood vulnerabilities under current and future conditions, consistent with the requirements of the Resilient Florida program.

The list of priority resiliency implementation projects (Table 1) includes recommendations for enhancing the structures that serve areas projected to have increased flooding risk and fall below the expected level of service in the next five years. Technically, these structures serve drainage basins that currently have a higher than 4% chance of flood risk every year. The list includes respective cost estimates and timelines for implementation and a summary of the state and federal funds expended toward the implementation of the related flood control infrastructure resiliency projects by the District through June 30, 2023. Cost assumptions and detailed information on project components are described in the SFWMD Sea Level and Flood Resiliency Plan, which is available at [SFWMD.gov/Resiliency](https://www.sfwmd.gov/Resiliency).

With respect to funds available to implement the recommendations for each vulnerable structure based on a 10-year horizon, the District is only able to invest a modest amount (currently around \$2 million annually, not accounting for in kind/staff hours) of ad valorem revenue to build funding partnerships with the following agencies and grant programs:

Agency	Funding Program
Florida Department of Environmental Protection	Resilient Florida Program
United States Army Corps of Engineers	C&SF Flood Resiliency Study (future appropriation)
Florida Division of Emergency Management / Federal Emergency Management Agency	Building Resiliency Infrastructure & Communities Local Mitigation Strategies Statewide Hazard Mitigation Plan
Florida Department of Commerce	Community Development Block Grant Program
Local Governments	Grant Partnerships / Agreements

It is important to recognize that the list of projects included in the plan is not comprehensive of all the flood resiliency needs within South Florida. The project recommendations are constantly evolving, as modeling assessments, design and post-storm hazard mitigation planning efforts are being advanced, in parallel to the annual resiliency plan update. The goal is to continue to incorporate resiliency strategies that include robust adaptation solutions, supported by integrated technical assessments and detailed analyses, and designed to address current and future conditions.

For additional information about the District's resiliency planning efforts, visit [SFWMD.gov/Resiliency](https://www.sfwmd.gov/Resiliency).

Table 1: List of Resiliency Priority Water Control Structure Projects, including implementation and funding status

Project Name / Water Control Structures	Project Source	Project below the expected service level (25-year/4%)?	Total Cost Estimate ⁽¹⁾	Status of Implementation	Status of Funding	Funds Expended (through June 30 2023) ⁽²⁾
S-28 Coastal Structure and C-8 Basin Resiliency	FPLOS Phase II	Yes	\$261,446,031	Not Started (Conceptual Design Completed)	Staff, H&H and Design Funds Construction partially funded \$50M FEMA BRIC Award Recommendation + Match	\$665,325
S-29 Coastal Structure and C-9 Basin Resiliency	FPLOS Phase II	Yes ⁽³⁾	\$355,280,352	Ongoing Design Start: FY22 End: FY24	Staff, H&H and Design Funds Construction partially funded \$50M FEMA BRIC Award Recommendation + Match	\$1,648,560
S-27 Coastal Structure and C-7 Basin Resiliency	FPLOS Phase II (Pilot)	Yes	\$126,870,189	Ongoing Design. Start: FY22 End: FY24	Staff, H&H and Design Funds Construction partially funded \$50M FEMA BRIC Award Recommendation + Match	\$1,407,923
S-26 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 144,858,126	Not Started	Not yet funded	\$0
G-57 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 33,394,620	Not Started	Not yet funded	\$0
S-22 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$92,414,986	Not Started	Not yet funded	\$0
S-37A Coastal Structure Resiliency	FPLOS Phase I	No	\$ 149,094,074	Not Started	Not yet funded	\$0
G-58 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$20,927,917	Not Started	Not yet funded	\$0
S-123 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 104,958,469	Not Started	Not yet funded	\$0

Project Name / Water Control Structures	Project Source	Project below the expected service level (25-year/4%)?	Total Cost Estimate ⁽¹⁾	Status of Implementation	Status of Funding	Funds Expended (through June 30 2023) ⁽²⁾
S-20F Coastal Structure Resiliency	FPLOS Phase I	Yes	\$77,703,413	Not Started	Not yet funded	\$0
S-21 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$70,981,354	Not Started	Not yet funded	\$0
S-21A Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 70,303,527	Not Started	Not yet funded	\$0
G-93 Coastal Structure Resiliency	FPLOS Phase I	No	\$ 42,203,088	Not Started	Not yet funded	\$0
S-25B Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 93,660,490	Not Started	Not yet funded	\$0
G-56 Coastal Structure Resiliency	FPLOS Phase I	No	\$162,769,468	Not Started	Not yet funded	\$0
G-54 Coastal Structure Resiliency	FPLOS Phase I	No	\$ 83,451,585	Not Started	Not yet funded	\$0
S-25 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 28,748,435	Not Started	Not yet funded	\$0
S-33 Coastal Structure Resiliency	FPLOS Phase I	No	\$ 35,505,876	Not Started	Not yet funded	\$0
S-20G Coastal Structure Resiliency	FPLOS Phase I	Yes	\$34,861,279	Not Started	Not yet funded	\$0
S-13 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$48,474,453	Not Started	Not yet funded	\$0

Project Name / Water Control Structures	Project Source	Project below the expected service level (25-year/4%)?	Total Cost Estimate ⁽¹⁾	Status of Implementation	Status of Funding	Funds Expended (through June 30 2023) ⁽²⁾
S-36 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 38,835,405	Not Started	Not yet funded	\$0
S-197 Coastal Structure Resiliency	FPLOS Phase I	N/A	\$ 66,435,182	Not Started	Not yet funded	\$0
S-20 Coastal Structure Resiliency	FPLOS Phase I	Yes	\$ 25,394,727	Not Started	Not yet funded	\$0
L-31 Levee Improvements	FPLOS Phase I	Yes	\$42,000,000 (midpoint)	Not Started (Conceptual Design Recommendations)	Not yet funded (H&H Modeling & Staff time only)	\$325,573
C&SF Self-Preservation Mode Project	FPLOS Phase I /CIP / Post Storm	N/A	\$12,600,000	Ongoing Design	Fully Funded \$6.3M FDEP Resilient Florida + Match (District Revenue or State Funds)	\$0
Hardening Of S-2, S-3, S-4, S-7, S-8 Engine Control Panels	CIP	N/A	\$17,000,000	Construction Initiation	Fully Funded \$8.5M FDEP Resilient Florida + Match (District Revenue or State Funds)	\$871,036
L8 FEB / G-539 Pump Resiliency Upgrades	CIP	N/A	\$8,000,000	Not Started	Fully Funded \$4M FDEP Resilient Florida + Match (District Revenue or State Funds)	\$0
C-29, C-29A, C-29B and C29C Canal Conveyance Improvements	Post Storm / Event Response	N/A	\$ 8,879,664	Not Started	Not yet funded	\$0
S-59 Structure Enhancement and C-31 Canal Conveyance Improvements	Post Storm / Event Response	N/A	\$39,308,208	Not Started	Not yet funded	\$0
S-58 Structure Enhancement and Temporary Pump	Post Storm / Event Response	N/A	\$42,545,431	Not Started	Not yet funded	\$0

Project Name / Water Control Structures	Project Source	Project below the expected service level (25-year/4%)?	Total Cost Estimate ⁽¹⁾	Status of Implementation	Status of Funding	Funds Expended (through June 30 2023) ⁽²⁾
S-61 Spillway Enhancement and Erosion Control	Post Storm / Event Response	N/A	\$40,027,611	Not Started	Not yet funded	\$0
Corbett - Water Control Structures along L8	Post Storm / Event Response	N/A	\$17,771,277	Not Started	Not yet funded	\$0
Total Estimated Costs (High-Level Cost Estimates)			\$2,396,705,237			

Notes: ⁽¹⁾ The values reported under the Column “Total Cost Estimates” do not include staff time. ⁽²⁾ The values reported under the Column “Funds Expended” includes expenses since the start of FY20 through June 30, 2023. The total expended funds reported for each individual project includes in kind/staff time and planning funds. An additional \$12,409,933 was spent within the same period for overall projects planning (FPLOS H&H modeling, data analyses, resiliency plan formulation, and other related planning efforts). ⁽³⁾ Expected service level is currently greater than a 25-year return period (less than 4% chance of occurrence), however the respective structure inspection report presents priority level for infrastructure refurbishment.

USACE/ SFWMD C&SF Flood Resiliency Study

The C&SF Flood Resiliency Study, being conducted under the authority in Section 216 of the Flood Control Act of 1970, Public Law 91-611 (33 U.S.C. 549a), authorizes the Secretary of the Army, acting through the Chief of Engineers, to review the operation of the C&SF Flood Control Project due to significantly changed physical, economic or environmental conditions and to report to Congress with recommendations on the advisability of modifying the structures or their operation. SFWMD is the Non-Federal Sponsor (NFS) for the Study. The United States Army Corps of Engineers (USACE) Jacksonville District and the SFWMD entered into a Feasibility Cost Share Agreement (FCSA) on September 21, 2022.

The C&SF Flood Resiliency Study is necessary due to significantly altered physical, hydrological, climatological, demographic, and economic conditions within the landscape served by the C&SF system; the increasing flood risks to its communities; saltwater intrusion hazards to the Biscayne Aquifer (the main source of water supply in the region) and the surrounding environment affected by the system; and for maintaining recreation and any other water-related resources needs.

Available vulnerability assessment results completed by both USACE and the District show that the C&SF system has some basins currently experiencing flooding from a 5-year rainfall event, representing a 20% chance of flood risk every year. These studies identify the C&SF structures with significant reduction in capacity based in a pre-established set of flood risk performance measures including peak canal stages, discharge capacity, overland flood extension, depth and duration. According to these results, around 77% of the project area, calculated at basin level, currently is performing under a 10-year rainfall event (10% chance). In a future condition with two feet of sea level rise, more than 82% of the project area will be performing under a 5-year rainfall event (20% chance of occurrence).

The C&SF Flood Resiliency Study will identify technically feasible, environmentally acceptable, and economically justified project recommendations for federal participation, in collaboration with the project local sponsor – SFWMD. This flood risk management (FRM) study aims to build flood resiliency, now and into the future, and reduce flood risks that affect population, property (e.g. buildings, roads), critical infrastructure (e.g. hospitals, shelters, airports, ports, utilities and other lifelines) and any other systems, in the communities served by the C&SF water management system within the lower southeast coast of Florida in Palm Beach, Broward and Miami-Dade Counties.

The goal of this study is to develop, evaluate and recommend flood risk management measures and adaptation strategies to build flood resiliency in the communities served by the C&SF system, now and in the future, and contribute to national economic development. The study objective is to enhance aging C&SF water control system and salinity control structure's functionality and capacity to enhance flood risk management and improve resiliency caused by inland inundation and changed conditions over a 50-year period of analysis from 2035-2085.

A feasibility level planning analysis will be conducted focused on increasing the resilience and function of vulnerable coastal structures and the conveyance of the primary canals, culminating in a final Integrated Report, which assesses potential impacts (both adverse and beneficial) in accordance with the National Environmental Policy Act (NEPA). The results of the study will allow the immediate authorization of subsequent design and construction phases. The Integrated Report will require authorization by United States Congress before proceeding with design and construction.

On July 20, 2023, the study completed its Alternative Milestone, with the initial approval for the expanded study scope and schedule. This documentation has been submitted to USACE Headquarters for final execution. Following the scoping phase, the current study phase is plan formulation, with the identification of projects and modeling assumptions for future condition simulations and selection of performance measures to support the determination of alternatives benefits and the selection of a Tentative Selected Plan, expected to occur in April 2025. The final Chief's Report is scheduled for completion in September 2026, and targeted for authorization in the Water Resources Development Act in 2026.

For additional information about the C&SF Flood Resiliency Study, please visit www.sfwmd.gov/C&SF and read [FAQs](#) about how the SFWMD Sea Level Rise and Flood Resiliency Plan is integrated to the C&SF Flood Resiliency Study and supported by the Flood Protection Level of Service Program.