

The Florida Senate
BILL ANALYSIS AND FISCAL IMPACT STATEMENT

(This document is based on the provisions contained in the legislation as of the latest date listed below.)

Prepared By: The Professional Staff of the Committee on Appropriations

BILL: CS/CS/SB 1954

INTRODUCER: Appropriations Committee; Environment and Natural Resources Committee; and Senator Rodrigues and others

SUBJECT: Statewide Flooding and Sea-level Rise Resilience

DATE: April 2, 2021

REVISED: _____

ANALYST	STAFF DIRECTOR	REFERENCE	ACTION
1. Schreiber	Rogers	EN	Fav/CS
2. Reagan	Sadberry	AP	Fav/CS

Please see Section IX. for Additional Information:

COMMITTEE SUBSTITUTE - Substantial Changes

I. Summary:

CS/CS/SB 1954 establishes statewide resiliency programs that assess and address inland and coastal flooding and sea level rise. The bill creates:

- The “Resilient Florida Grant Program” within the Department of Environmental Protection (DEP) which provides funding, subject to appropriation, to local governments for the costs of resilience planning and projects to adapt critical assets, as defined in the bill
- The “Comprehensive Statewide Flood Vulnerability and Sea Level Rise Data Set and Assessment,” to be updated every five years. The DEP must:
 - Develop a statewide data set necessary to determine the risks to inland and coastal communities, including statewide sea level rise projections; and
 - Develop a statewide assessment, based on the statewide data set, which identifies vulnerable areas, infrastructure, and critical assets.
- The “Statewide Flooding and Sea Level Rise Resilience Plan.” The DEP must annually submit a plan proposing up to \$100 million in funding for projects that address risks from flooding and sea level rise. The bill authorizes local governments, regional resilience entities, and water management districts to submit lists of proposed projects to the DEP for inclusion in the plan. The DEP must implement a scoring system, established in the bill, for assessing projects for inclusion in the plan.

The bill authorizes the DEP, subject to appropriation, to provide funding to regional resilience entities for providing technical assistance, coordinating multijurisdictional vulnerability assessments, and developing project proposals for the statewide resilience plan.

The bill requires the University of South Florida to create a hub to coordinate and lead statewide efforts for research and innovation regarding flooding and sea level rise.

The bill requires the Office of Economic and Demographic Research to add an analysis of flooding issues to its annual assessment of Florida's water resources and conservation lands.

The Senate proposed budget includes 25 positions and \$9 million from the Resilient Florida Trust Fund to operate the Resilient Florida Grant Program.

The bill takes effect upon becoming a law.

II. Present Situation:

Flooding and Sea Level Rise

The effects of climate change¹ include sea level rise, increasing storm intensity, and increasing frequency and severity of extreme rainfall events.² These trends result in increased flooding in inland and coastal areas.³ With 1,350 miles of coastline, relatively low elevations, and a porous geology, Florida is particularly vulnerable to coastal flooding.⁴ Coastal areas are facing the combined effects of sea level rise, storm surges, and extreme precipitation.⁵

Sea level rise is an observed increase in the average local sea level or global sea level trend.⁶ Climate change is causing global sea level rise through two primary factors: the loss of land-based ice (ice sheets and glaciers) due to melting and thermal expansion caused by the warming of the oceans (water expands as it warms).⁷ Global mean sea level has risen about eight to nine

¹ See National Aeronautics and Space Administration (NASA), Global Climate Change, Facts, *Effects*, <https://climate.nasa.gov/effects/> (last visited Feb. 6, 2021).

² U.S. Global Change Research Program, *Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States*, 31, 40-43, 97, 116-118, 745, 762, 1482 (2018) [hereinafter *NCA4*], available at https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (last visited Feb. 6, 2021); Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2014: Synthesis Report, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 7-8, 10, 42, 47-49, 53, 60, 74 (2014), available at https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf (last visited Mar. 8, 2021).

³ *NCA4*, at 757-768.

⁴ Florida Division of Emergency Management, *Enhanced State Hazard Mitigation Plan*, 107-108, 162 (2018) [hereinafter *SHMP*], available at https://www.floridadisaster.org/globalassets/dem/mitigation/mitigate-fl--shmp/shmp-2018-full_final_approved.6.11.2018.pdf (last visited Feb. 6, 2021). Florida has over 8,000 miles of coastline when considering intricacies such as bays, inlets, and waterways; McKinsey Global Institute, *Will Mortgages and Markets Stay Afloat in Florida?*, 10, 12, 27 (2020) [hereinafter *MGI Mortgages and Markets*], available at https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Will%20mortgages%20and%20markets%20stay%20afloat%20in%20Florida/MGI_Climate%20Risk_Case%20Studies_Florida_May2020.pdf (last visited Jan. 31, 2020). Florida's porous limestone foundation causes saltwater intrusion and seepage from underground.

⁵ See *SHMP*, at 107.

⁶ Department of Environmental Protection (DEP), *Florida Adaptation Planning Guidebook*, Glossary (2018) [hereinafter *DEP Guidebook*], available at <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf> (last visited Jan. 31, 2021).

⁷ *Id.*; National Oceanic and Atmospheric Administration (NOAA), *Climate Change: Ocean Heat Content*, <https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content> (last visited Jan. 31, 2021). More than 90 percent of the warming that has happened on Earth over the past 50 years has occurred in the ocean.

inches since 1880, and the rate of rise is accelerating: 0.06 inches per year throughout most of the twentieth century, 0.14 inches per year from 2006-2015, and 0.24 inches per year from 2018-2019.⁸

Sea level rise data is obtained through various scientific equipment: tide gauge stations record the local height of the surrounding water level relative to a reference point on land, and satellite laser altimeters measure the average height of the entire ocean.⁹ Data is incorporated into numerous online tools for visualization.¹⁰ Scientific projections for future sea level rise and precipitation vary based on modeling using different scenarios of future greenhouse gas emissions and atmospheric concentrations.¹¹ After 2050, the various projections for sea level rise and precipitation diverge significantly based on different scenarios of emissions trajectories.¹²

Rising sea levels result in gradual coastal inundation.¹³ Sea level rise raises the height of high tide.¹⁴ Since 2000, the frequency of “high tide flooding” in the U.S. has more than doubled, with data showing significant increases at tide gauge locations in Florida.¹⁵ For example, research shows that in Miami Beach, between 1998 and 2013, the frequency of recurrent tidal flooding events quadrupled.¹⁶ The frequency of such flooding is expected to continue to increase.¹⁷ Impacts of flooding from sea level rise in Florida include disruptions in transportation and impairment of infrastructure such as roads, stormwater systems, and wastewater systems.¹⁸ Sea level rise causes saltwater intrusion of both surface water and groundwater, threatening fresh water resources including coastal aquifers.¹⁹ It causes coastal erosion and threatens coastal ecosystems which, when healthy and allowed space for landward migration, are critical for

⁸ NOAA, *Climate Change: Global Sea Level*, <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level> (last visited Jan. 31, 2021). The melting of glaciers and ice sheets (such as the Greenland and Antarctic Ice Sheets) is accelerating, and from 2005-2013 melting caused nearly twice as much sea level rise as thermal expansion.

⁹ NOAA, *Tides and Currents, Sea Level Trends*, <https://tidesandcurrents.noaa.gov/sltrends/> (last visited Jan. 31, 2021). Showing trends in data from tide gauge stations around Florida; NOAA, *Is Sea Level Rising?*, <https://oceanservice.noaa.gov/facts/sealevel.html> (last visited Jan. 31, 2021); see *SHMP*, at 107. “Relative sea level” is measured locally using tide gauges. “Eustatic sea level” is measured globally based on the volume of water in earth’s oceans.

¹⁰ DEP, *Presentation to the Florida House of Representatives Environment, Agriculture, & Flooding Subcommittee* (Feb. 4, 2021), available at <https://www.myfloridahouse.gov/VideoPlayer.aspx?eventID=6697> (last visited Feb. 10, 2021).

¹¹ *NCA4*, at 1, 6, 40-43, 84-91, 338, 751, 758, 762.

¹² *Id.* at 41-42, 109; IPCC, *The Ocean and Cryosphere in a Changing Climate*, 4-9–4-10 (Sept. 2019), available at https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf (last visited Jan. 31, 2021); Southeast Florida Regional Compact Climate Change (SFRCCC), *Unified Sea Level Rise Projection Southeast Florida - 2019 Update*, 7, 25, 29 (2019) [hereinafter *SFRCCC Update*], available at https://southeastfloridaclimatecompact.org/wp-content/uploads/2020/04/Sea-Level-Rise-Projection-Guidance-Report_FINAL_02212020.pdf (last visited Jan. 31, 2021).

¹³ *SHMP*, at 108; *SFRCCC Update*, at 17. Rapid pulses are possible.

¹⁴ *SHMP*, at 101, 108.

¹⁵ NOAA, *2019 State of U.S. High Tide Flooding with a 2020 Outlook*, v-3, 15-16 (2020), available at https://tidesandcurrents.noaa.gov/publications/Techrpt_092_2019_State_of_US_High_Tide_Flooding_with_a_2020_Outlook_30June2020.pdf (last visited Jan. 31, 2021). High tide flooding (also called “nuisance” or “sunny-day” flooding) begins to occur when coastal water levels reach heights between .5-.65 meters above the daily average highest tide.

¹⁶ *SFRCCC Update*, at 31.

¹⁷ NOAA, *2019 State of U.S. High Tide Flooding with a 2020 Outlook*, v, 11-12 (2020); *SFRCCC Update*, at 31-32.

¹⁸ See *SFRCCC Update*, at 5.

¹⁹ *SHMP*, at 106; *SFRCCC Update*, at 33-35.

resilience.²⁰ Sea level rise also raises coastal groundwater tables and pushes salt water further inland.²¹ Many of these processes are exacerbated by Florida's porous limestone geology.²²

Future storms are generally expected to have increased average intensity and precipitation rates.²³ Storm intensity is a principal determinant of storm surge height.²⁴ Storm surges are water driven ashore by the wind during severe weather, and they are an especially dangerous aspect of coastal flooding.²⁵ Sea level rise is expected to increase the impacts from storm surges as they will build on top of a higher base of water, travel farther inland, and impact more areas and properties than in the past.²⁶

A warmer atmosphere holds more water vapor, leading to more frequent and intense extreme rainfall events that are contributing to increased inland and coastal flooding.²⁷ Extreme rainfall events can stress or overwhelm stormwater infrastructure, while sea level rise impairs gravity-driven systems and reduces the discharge capacity of coastal water control structures.²⁸ By raising groundwater levels, sea level rise reduces the ability of rainfall to infiltrate the soil, and the reduced soil storage capacity causes flooding.²⁹

Florida's 35 coastal counties contain 76 percent of its population and 79 percent of its total economy as of 2012.³⁰ One study found that 20.5 percent of properties in Florida were at substantial risk of flooding in 2020 and 24.3 percent will be at such risk by 2050.³¹ Another study found tidal flooding could result in a total property devaluation of \$10-\$30 billion by 2030 and \$30-\$80 billion by 2050, and that real estate losses during 100-year storm surge events could

²⁰ *SFRCCC Update*, at 35; *SHMP*, at 106, 221; *NCA4*, at 340-341, 690, 775, 833. Coastal ecosystems reduce erosion, buffer against waves and storm surge, attenuate wave energy, maintain water quality, and provide habitat for wildlife.

²¹ *SHMP*, at 108.

²² See Urban Land Institute, *The Business Case for Resilience - Regional Economic Benefits of Climate Adaptation*, 20 (2020) [hereinafter *Business Case for Resilience*], available at https://knowledge.uli.org/-/media/files/research-reports/2020/the-business-case-for-resilience-in-southeast-florida_final.pdf?rev=81609c7f6b72479d89c49aff72fea446&hash=FB2E953B8A456CFE781169A0CAA82333 (last visited Jan. 31, 2021).

²³ *NCA4*, at 97, 116-118, 1482; see Knutson et al., *Tropical Cyclones and Climate Change Assessment, Part II: Projected Response to Anthropogenic Warming*, American Meteorological Society, E317-E318 (2020), available at <https://journals.ametsoc.org/bams/article/101/3/E303/345043/Tropical-Cyclones-and-Climate-Change-Assessment> (last visited Jan. 31, 2021).

²⁴ *SHMP*, at 141.

²⁵ *SHMP*, at 100; Emrich et al., *Climate-Sensitive Hazards in Florida, Identifying and Prioritizing Threats to Build Resilience against Climate Effects*, Storm Surge 1 of 37 (2014), available at <https://flbrace.org/images/docs/climate-sensitive-hazards-in-florida-final-report.pdf> (last visited Feb. 4, 2021).

²⁶ *SHMP*, at 100, 106-108, available at https://www.floridadisaster.org/globalassets/dem/mitigation/mitigate-fl--shmp/shmp-2018-full_final_approved.6.11.2018.pdf (last visited Jan. 31, 2021); *NCA4*, at 758, available at https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (last visited Jan. 31, 2021).

²⁷ *NCA4*, at 88, 97, 113, 745, 762, 1447; *SHMP*, at 106.

²⁸ *NCA4*, at 763; *SFRCCC Update*, at 5, 34.

²⁹ *SFRCCC Update*, at 33; *SHMP*, at 106, 181.

³⁰ *DEP Guidebook*, at III, available at <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf> (last visited Oct. 16, 2019); see *MGI Mortgages and Markets*, at 13. Almost 10 percent of the state's population is less than 4.9 feet (1.5 meters) above sea level.

³¹ First Street Foundation, *The First National Flood Risk Assessment: Defining America's Growing Risk*, 39 (2020), available at https://assets.firststreet.org/uploads/2020/06/first_street_foundation_first_national_flood_risk_assessment.pdf (last visited Oct. 8, 2020). The study calculates substantial risk as a 1 percent annual risk of 1 cm of inundation or more.

reach \$50-\$75 billion by 2050.³² A regional analysis found that in Southeast Florida alone, by 2040, \$4.2 billion in property value could be lost to daily tidal inundation and one 10-year storm tide event could cause \$3.2 billion in property damage.³³ It is estimated that Florida has nine of the top ten counties in the nation for total annual risk of economic loss from flooding.³⁴ Despite the risks, people and capital continue to flow into exposed coastal areas in Florida.³⁵

As sea level rise continues, financial impacts may include increases in flood insurance costs,³⁶ decreases in property sales or property values, and increased risk for lenders.³⁷ Coastal flooding can disrupt local economies and tourism, leading to lost revenues for the public and private sectors, and over time risks include loss or impairment of employment opportunities and public services and infrastructure.³⁸ Coastal flooding can cause displacement in frontline communities, and the burdens of adaptation are likely to disproportionately impact vulnerable populations.³⁹

Studies show significant positive returns on investment calculated for resilience measures, including the following benefit-cost ratios: \$6 for every \$1 spent through federal grants on natural hazard mitigation, and, for future resilience investments in Southeast Florida, \$4 for every \$1 on building-level adaptations and \$2 for every \$1 on community-wide adaptations.⁴⁰

Sea Level Rise Projections

Entities from the international to the local level use scientific data and modeling to create projections of future sea level rise for planning and decision-making. The Intergovernmental Panel on Climate Change (IPCC) includes 195 member countries compiling climate change science reviewed by thousands of experts around the globe and intended to reflect the full range of scientific views.⁴¹ The National Oceanic and Atmospheric Administration (NOAA) operates

³² *MGI Mortgages and Markets*, at 15–19, available at https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Will%20mortgages%20and%20markets%20stay%20afloat%20in%20Florida/MGI_Climate%20Risk_Case%20Studies_Florida_May2020.pdf (last visited Jan. 31, 2020).

³³ *Business Case for Resilience*, at 6. In 2070, the estimated potential harm in Southeast Florida increases to \$53.6 billion of lost property value from daily tidal inundation and \$16.5 billion of property damage from one 10-year storm.

³⁴ First Street Foundation, *The Cost of Climate, America's Growing Flood Risk*, 11 (Feb. 2021), available at https://assets.firststreet.org/uploads/2021/02/The_Cost_of_Climate_FSF20210219-1.pdf (last visited Mar. 3, 2021).

³⁵ *MGI Mortgages and Markets*, at 13.

³⁶ First Street Foundation, *The Cost of Climate, America's Growing Flood Risk*, 39 (Feb. 2021). The report finds that if insurance prices were adjusted to account for actual current flood risk premiums for many properties in Florida would increase significantly, by as much as 4.8 to 7.7 times the current rates (depending on location), impacting property values.

³⁷ *MGI Mortgages and Markets*, at 22-27 (lending risks involve not only banks investing in private homes and businesses, but also potential downgrades to bond ratings for local governments that do not implement adaptation strategies); *SFRCCC Update*, at 5, available at https://southeastfloridaclimatecompact.org/wp-content/uploads/2020/04/Sea-Level-Rise-Projection-Guidance-Report_FINAL_02212020.pdf (last visited Jan. 31, 2021).

³⁸ *Business Case for Resilience*, at 13, 14, 19, 20, available at https://knowledge.uli.org/-/media/files/research-reports/2020/the-business-case-for-resilience-in-southeast-florida_final.pdf?rev=81609c7f6b72479d89c49aff72fea446&hash=FB2E953B8A456CFE781169A0CAA82333 (last visited Jan. 31, 2021).

³⁹ *Id.*; *NCA4* at 333-335.

⁴⁰ *Business case for Resilience*, at 26; National Institute of Building Sciences, *Natural Hazard Mitigation Saves*, 1-2 (Dec. 2019), available at https://cdn.ymaws.com/www.nibs.org/resource/resmgr/reports/mitigation_saves_2019/mitigationsaves2019report.pdf (last visited Feb. 10, 2021).

⁴¹ IPCC, *About the IPCC*, <https://www.ipcc.ch/about/> (last visited Feb. 2, 2021).

tide gauges along the nation's coasts and satellites that measure changes in sea level. In 2012 and 2017, the NOAA published sea level rise projections for the U.S.⁴² The NOAA's projections include six scenarios ranging from "low" to "extreme," with several intermediate scenarios.⁴³ The NOAA's projections were used in the fourth national climate assessment by the U.S. Global Change Research Program, a program of 13 federal agencies analyzing the changing global environment.⁴⁴ The United States Army Corps of Engineers (USACE) has developed policies requiring consideration of specific scenarios of sea level change at every step in a project's life cycle.⁴⁵

Sea level rise is experienced differently in different areas, depending on many factors including ocean currents, changing land elevations, land use, and erosion.⁴⁶ The Southeast Florida Regional Climate Change Compact, a collaboration including Broward, Miami-Dade, Monroe, and Palm Beach counties, periodically assembles a technical work group of experts to produce sea level rise projections to assist planning and decision-making in Southeast Florida.⁴⁷ In 2019, the Tampa Bay Climate Science Advisory Panel recommended a common set of sea level rise projections for use throughout the Tampa Bay region.⁴⁸

⁴² NOAA, *Climate Change: Global Sea Level*, available at <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level> (last visited Feb. 2, 2021).

⁴³ Sweet et al., NOAA, *Global and Regional Sea Level Rise Scenarios for the United States*, 21–23 (2017), available at https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf (last visited Feb. 2, 2021).

⁴⁴ U.S. Global Change Research Program, *About USGCRP*, <https://www.globalchange.gov/about> (last visited Feb. 2, 2021).

⁴⁵ See USACE, *Policies*, https://www.usace.army.mil/corpsclimate/climate_policies/ (last visited Mar. 8, 2021).

⁴⁶ *NCA4*, at 757, 855, 1495.

⁴⁷ *SFRCCC Update*, at 8.

⁴⁸ Tampa Bay Climate Science Advisory Panel, *Recommended Projections of Sea Level Rise in the Tampa Bay Region*, 7 (Apr. 2019), available at http://www.tbrpc.org/wp-content/uploads/2019/05/CSAP_SLR_Recommendation_2019.pdf (last visited Feb. 2, 2021).

Sea Level Rise Projections				
Source	Scale	Years	Low (feet)	High (feet)
IPCC Assessment Report 5 ⁴⁹	Global	2046-2065	0.72	1.25
		2081-2100	1.48	2.69
		2100	1.71	3.22
NOAA (Sweet et al., 2017), Low–Extreme ⁵⁰	Global	2040	0.43	1.35
		2070	0.72	3.94
		2100	.98	8.20
SFRCCC Unified Sea Level Rise Projection, 2019 Update ⁵¹	Southeast Florida	2040	.83	1.42
		2070	1.75	3.33
		2120	3.33	7.67
Tampa Bay Climate Science Advisory Panel ⁵²	Tampa Bay Region	2050	1	2.5
		2100	2	8.5

Mapping

In addition to sea level rise projections, many other aspects of mapping are relevant to resilience planning and adaptation.⁵³ A vertical datum is a surface of zero elevation to which heights are referenced. The current vertical datum for the contiguous United States and Alaska is the North American Vertical Datum of 1988 (NAVD 88).⁵⁴ The NOAA’s National Geodetic Survey is currently in the process of replacing the NAVD 88, with initial estimates for completion as soon as 2022.⁵⁵ The Florida State Plane Coordinate System is a system of coordinates for defining positions on the surface of the earth within the state.⁵⁶

⁴⁹ IPCC, *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 23, 79-81, 1180, 1461 (2013), available at https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf (last visited Feb. 2, 2021). The range shown in the table represents the projections for the Representative Concentration Pathway 8.5 scenario.

⁵⁰ Sweet et al., NOAA, *Global and Regional Sea Level Rise Scenarios for the United States*, 21, 23 (2017), available at https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf (last visited Feb. 2, 2021).

⁵¹ SFRCCC Update, 9-10, available at https://southeastfloridaclimatecompact.org/wp-content/uploads/2020/04/Sea-Level-Rise-Projection-Guidance-Report_FINAL_02212020.pdf (last visited Feb. 2, 2021). The range in the table shows regional applications of the IPCC Representative Concentration Pathway 8.5 Median curve and the NOAA Intermediate High curve.

⁵² Tampa Bay Climate Science Advisory Panel, *Recommended Projections of Sea Level Rise in the Tampa Bay Region*, 7 (Apr. 2019), available at http://www.tbrpc.org/wp-content/uploads/2019/05/CSAP_SLR_Recommendation_2019.pdf (last visited Feb. 2, 2021).

⁵³ See USGS, *What Are Digital Elevation Models (DEMs)?*, https://www.usgs.gov/faqs/what-are-digital-elevation-models-dems?qt-news_science_products=3#qt-news_science_products (last visited Mar. 4, 2021).

⁵⁴ NOAA, National Geodetic Survey, *Vertical Datums*, <https://www.ngs.noaa.gov/datums/vertical/> (last visited Mar. 3, 2021).

⁵⁵ NOAA, National Geodetic Survey, *New Datums: Replacing NAVD 88 and NAD 83*, <https://geodesy.noaa.gov/datums/newdatums/index.shtml> (last visited Mar. 3, 2021); NOAA, National Geodetic Survey, *Delayed Release of the Modernized NSRS*, <https://geodesy.noaa.gov/datums/newdatums/delayed-release.shtml> (last visited Mar. 3, 2021).

⁵⁶ Sections 177.031(19) and 177.151, F.S.; NOAA, National Geodetic Survey, *State Plane Coordinate System*, <https://www.ngs.noaa.gov/SPCS/> (last visited Mar. 3, 2021).

The Department of Environmental Protection (DEP) has recently begun statewide efforts involving sea level rise projections and mapping of coastal hazards. In 2020, the Legislature required that public entities commissioning or managing certain construction projects within the coastal building zone,⁵⁷ using funds appropriated from the state, must conduct a sea level impact projection (SLIP) study prior to commencing construction.⁵⁸ The study must assess the risks from potential sea level rise and storms over the expected life of the structure up to 50 years, and it must provide design and siting alternatives and assess costs for the structure.⁵⁹ The DEP must perform rulemaking to establish the specific standards for conducting the SLIP studies.⁶⁰

The DEP is currently developing a web-based tool to enable constructors to create and submit the SLIP study reports pursuant to the legislation.⁶¹ The innovative tool will also provide resources to educate the public. The public features of the tool will include an interactive statewide map for visualizing future scenarios of sea level rise and coastal flood hazards.⁶²

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP), comprised of three interconnected parts: insurance, regulations, and mapping.⁶³ A Flood Insurance Rate Map (FIRM) is an official map the FEMA provides to communities which delineates different zones used primarily for insurance rating purposes.⁶⁴ The “base flood” (or “100-year flood”) is a flood having a one percent chance of being equaled or exceeded in any given year.⁶⁵ The base flood elevation, used for regulatory purposes,⁶⁶ is the elevation to which floodwater is anticipated to rise during the base flood.⁶⁷ The land area covered by the floodwaters of the base flood is the base floodplain, which is called a Special Flood Hazard Area⁶⁸ on FIRM maps.⁶⁹ Special Flood Hazard Areas include “A Zones,” which are the regular

⁵⁷ Section 161.54(1), F.S. “Coastal Building Zone” is defined as “the land area from the seasonal high-water line landward to a line 1,500 feet landward from the coastal construction control line as established pursuant to s. 161.053, and, for those coastal areas fronting on the Gulf of Mexico, Atlantic Ocean, Florida Bay, or Straits of Florida and not included under s. 161.053, the land area seaward of the most landward velocity zone (V-zone) line as established by the Federal Emergency Management Agency and shown on flood insurance rate maps”; s. 161.55(4), F.S. Coastal barrier island requirements differ.

⁵⁸ Section 161.551, F.S.; see ch. 2020-119, Laws of Fla.

⁵⁹ Section 161.551(3), F.S.

⁶⁰ *Id.*; DEP, *Resilience and Coastal Protection Rules in Development*, <https://floridadep.gov/rcp/beaches-funding-program/content/resilience-and-coastal-protection-rules-development> (last visited Feb. 2, 2021).

⁶¹ DEP, *Presentation to the Florida House of Representatives Environment, Agriculture, & Flooding Subcommittee* (Feb. 4, 2021), available at <https://www.myfloridahouse.gov/VideoPlayer.aspx?eventID=6697> (last visited Feb 10, 2021).

⁶² *Id.*

⁶³ Federal Emergency Management Agency (FEMA), *National Flood Insurance Program (NFIP), Floodplain Management Requirements, FEMA 480, 2-6-2-8* (2005) [hereinafter *FEMA 480*], available at https://www.fema.gov/sites/default/files/documents/fema-480_floodplain-management-study-guide_local-officials.pdf (last visited Feb. 4, 2021).

⁶⁴ *Id.* at 2-13, 3-29.

⁶⁵ *Id.* at 3-3-3-5.

⁶⁶ *Id.* at 5-4. To participate in the NFIP, local governments must adopt and enforce floodplain management regulations meeting or exceeding minimum federal regulatory requirements; see 44 C.F.R. parts 59 and 60; see Building a Safer Florida, Inc., *Flood Resistant Construction and the 6th Edition Florida Building Code*, 1 (2017), available at https://floridabuilding.org/fbc/thecode/2017-6edition/BASF_2017_flood_061217.pdf (last visited Feb. 4, 2021).

⁶⁷ *FEMA 480*, at 3-3-3-5.

⁶⁸ *Id.* at 9-7-9-9. Buildings located in Special Flood Hazard Areas are required to have flood insurance to receive grants or loans from federal agencies or federally-related loan programs for purchasing, constructing, repairing, or improving buildings.

⁶⁹ *Id.* at 3-3-3-5.

base floodplain, and “V Zones,” which are coastal high hazard areas, subject to more stringent regulatory requirements and different flood insurance rates, where structures must be protected from hazards such as waves, storm surges, hurricane-force winds, and erosion.⁷⁰

Resilience

The DEP’s Florida Resilient Coastlines Program helps prepare coastal communities and habitats for the effects of climate change, especially rising sea levels, by offering technical assistance and funding to communities dealing with increasingly complex flooding, erosion, and habitat shifts.⁷¹ The program provides resilience grants to local governments of the 35 coastal counties and all municipalities within their boundaries required to include a coastal element in their comprehensive plans.⁷²

Currently, there are two types of grants provided under the program. Resilience Planning Grants promote community resilience planning, for projects such as vulnerability assessments, adaptation/resilience plans, and regional collaboration efforts. Vulnerability assessments help communities determine which structural and social assets are likely to be impacted by coastal flooding and sea level rise, and they can provide valuable data and mapping at the local level.⁷³ Resilience Implementation Grants assist with implementation of adaptation/resilience plans for projects such as nature-based erosion and flood control, elevation of public structures, and projects specifically included in existing plans.⁷⁴ Under the program, the DEP has awarded funding to 129 local governments, including 86 planning projects and 11 implementation projects.⁷⁵

In 2018, the DEP published the Florida Adaptation Planning Guidebook to be used by local governments to develop and update adaptation plans for sea level rise.⁷⁶ The comprehensive guidebook breaks down the adaptation planning process into four steps, summarized below:

- Context: organize and engage stakeholders, and delineate the geographic boundaries of the planning area, including the assets and structures contained therein.
- Vulnerability Assessment: conduct an exposure analysis to determine how much sea level rise will occur and where, conduct a sensitivity analysis to provide an inventory of community assets and features located in areas at risk, and assign focus areas that will receive attention in adaptation strategies.

⁷⁰ *Id.* at 3-22–3-23, 3-29, 5-51, 7-59. The “V” in V Zone stands for “velocity wave action.”

⁷¹ DEP, *Florida Resilient Coastlines Program*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program> (last visited Feb. 2, 2021).

⁷² DEP, *FRCP Resilience Grants*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program/content/frcp-resilience-grants> (last visited Feb. 2, 2021).

⁷³ *DEP Guidebook*, at 19, 131-167, available at <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf> (last visited Feb. 2, 2021).

⁷⁴ DEP, *FRCP Resilience Grants*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program/content/frcp-resilience-grants> (last visited Feb. 2, 2021).

⁷⁵ Florida Senate Environment and Natural Resources Committee, *Committee Meeting Expanded Agenda*, 46 (Jan. 1, 2021), available at https://www.flsenate.gov/Committees/Show/EN/MeetingPacket/4947/8845_MeetingPacket_4947.11.21.pdf (last visited Mar. 7, 2021).

⁷⁶ *DEP Guidebook*, at I.

- Adaptation Strategies: assess adaptive capacities such as planning capabilities and fiscal capacity, prioritize adaptation needs, and identify adaptation strategies, which may include strategies in the following categories:
 - “Protection” strategies that are structurally defensive measures (e.g., seawalls, revetments, levees, beach nourishment, oyster reef restoration, and living shorelines⁷⁷);
 - “Accommodation” strategies that alter the design of vulnerable structures so structures or land use can stay in place with modification (e.g., flood proofing, elevating structures, floodable development, floating structures, and increased stormwater infiltration through Low Impact Development/Green Infrastructure);
 - “Retreat” strategies; and
 - “Avoidance” strategies that guide development away from areas subject to coastal hazards, by implementing policies or offering incentives.
- Implementation: survey funding options; create a schedule of activities, actions, and actors; and monitor and evaluate adaptation strategies.⁷⁸

Regional Government Entities

The water management districts address flood protection as a core part of their respective missions, and many of their activities involve resilience issues. As part of their required strategic and financial planning and reporting, the districts annually prepare a five-year work program that includes lists of projects and related funding information.⁷⁹

The St. John’s River Water Management District is implementing the following activities for adaptation to climate change: utilizing its cost-share program for local government projects, providing technical assistance on water resources issues, and making water resource-related data available for use by communities in their resilience planning activities.⁸⁰ The South Florida Water Management District (SFWMD) is implementing comprehensive plans for addressing climate change, including a flood protection level of service program, incorporating sea level rise projections into planning efforts, conducting vulnerability assessments, and assisting local governments.⁸¹ In 2020, the SFWMD appointed a District Resiliency Officer.⁸²

⁷⁷ DEP, *Living Shorelines*, <https://floridadep.gov/rcp/rcp/content/living-shorelines> (last visited Feb. 3, 2021); see NOAA and U.S. Army Corps of Engineers (USACE), *Natural and Structural Measures for Shoreline Stabilization*, 3–6 (2015), available at http://www.sagecoast.org/docs/SAGE_LivingShorelineBrochure_Print.pdf (last visited Feb. 3, 2021).

⁷⁸ *DEP Guidebook*, at 1-61.

⁷⁹ See ss. 373.019(24), 373.036(7), 373.536(6), and 373.709, F.S.; see Northwest Florida Water Management District (NFWFMD), *Consolidated Annual Report, Fiscal Year 2020-2021*, 5-1–5-14 (2021), available at <https://nwfwmd.com/content/download/18775/126393/NFWFMD%202021%20Consolidated%20Annual%20Report.pdf> (last visited Mar. 8, 2021); see generally South Florida Water Management District (SFWMD), *2021 South Florida Environmental Report - Volume II, Chapter 5A: Fiscal Year 2021 Five-Year Water Resource Development Work Program* (2021), available at http://apps.sfwmd.gov/sfwmd/SFER/2021_sfer_final/v2/chapters/v2_ch5a.pdf (last visited Mar. 8, 2021).

⁸⁰ St. John’s River Water Management District, *Sea-Level Rise and Resiliency*, <https://www.sjrwmd.com/localgovernments/sea-level-rise/> (last visited Feb. 4, 2021).

⁸¹ Akintunde Owosina, Chief, Hydrology and Hydraulics Bureau, South Florida Water Management District, Governing Board Meeting, June 13, 2019, *Impact of Sea Level Rise on the SFWMD Mission, Focus on Flood Protection*, 2, 6-10 (June 13, 2019), available at <https://apps.sfwmd.gov/webapps/publicMeetings/viewFile/21964> (last visited Feb. 4, 2021).

⁸² Dr. Carolina Maran, District Resiliency Officer, SFWMD, Governing Board Meeting, March 12, 2020, *Central and Southern Florida Flood Resiliency Study*, 1, 6-10 (Mar. 12, 2020), available at <https://apps.sfwmd.gov/ci/publicmeetings/viewFile/25445> (last visited Nov. 4, 2021); Dr. Carolina Maran, District Resiliency Officer, South Florida Water Management District, Governing Board Meeting March 12, 2020, *Central and Southern*

Florida is divided into ten Regional Planning Councils (RPCs). Membership to the RPCs is required for counties and optional for municipalities.⁸³ Several RPCs are taking steps to advance regional resilience efforts in the state:

- The Northeast Florida Regional Council provides grant funding, technical support, and resources including an online mapping tool for determining risk.⁸⁴
- The East Central Florida Regional Planning Council has formed the East Central Florida Regional Resilience Collaborative, which includes 25 member counties and cities and six member organizations and agencies working to advance regional resilience and sustainability.⁸⁵
- The Tampa Bay Regional Planning Council has a range of initiatives, including a resiliency coalition, various projects and events, and development of a regional resiliency action plan.⁸⁶

In addition to scientific projections of future sea level rise, the Southeast Regional Climate Change Compact maintains a regional climate action plan that includes recommendations, guidelines for implementation, and shared best practices for local entities.⁸⁷

Local Governments

Florida's local governments are at the forefront of preparing for and addressing flooding and sea level rise.⁸⁸ Generally, every community will need to go through a process of planning and implementing adaptation strategies and projects.⁸⁹ Florida's coastal local governments must have a coastal management element in their comprehensive plans which advances objectives to protect public safety and coastal resources.⁹⁰ In 2011, the Legislature authorized local governments to establish an "adaptation action area" designation within their coastal management element for purposes of adaptation planning and prioritizing funding for infrastructure needs.⁹¹

Florida Flood Resiliency Study, video begins at 4:50:30 (Mar. 12, 2020), available at <http://sfwmd.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=2008&Format=Agenda> (last visited Feb. 4, 2021).

⁸³ Sections 186.501-186.513, F.S.

⁸⁴ Northeast Florida Regional Council, *Resiliency Services*, <https://www.nefrc.org/resiliency> (last visited Feb. 4, 2021).

⁸⁵ East Central Florida Regional Planning Council, *East Central Florida Regional Resilience Collaborative*, <https://www.ecfrpc.org/resiliencecollaborative> (last visited Feb. 4, 2021).

⁸⁶ Tampa Bay Regional Planning Council, *Resiliency Planning*, <https://www.tbrpc.org/resiliency-2/> (last visited Feb. 4, 2021).

⁸⁷ Southeast Florida Regional Climate Change Compact, *Regional Climate Action Plan*, <https://southeastfloridaclimatecompact.org/regional-climate-action-plan/> (last visited Feb. 4, 2021).

⁸⁸ See *DEP Guidebook*, at I, available at <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf> (last visited Jan. 31, 2021).

⁸⁹ See DEP, *Florida Resilient Coastlines Program Funded Projects*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program/content/florida-resilient-coastlines-program-funded> (last visited Feb. 3, 2021).

⁹⁰ Sections 380.24, 163.3177(6)(g), and 163.3178(2), F.S. Section 380.24, F.S., provides the description of which local governments are subject to these requirements: "[u]nits of local government abutting the Gulf of Mexico or the Atlantic Ocean, or which include or are contiguous to waters of the state where marine species of vegetation listed by rule as ratified in s. 373.4211 constitute the dominant plant community..."

⁹¹ Chapter 2011-139, Laws of Fla.; ss. 163.3164(1) and 163.3177(6)(g)10., F.S.; see *Adaptation Action Areas: A Planning Guidebook for Florida's Local Governments* (2014), available at https://floridadep.gov/sites/default/files/AAA-Planning-Guide_1.pdf (last visited Feb. 3, 2021).

Comprehensive plans' coastal management elements must contain a redevelopment component for eliminating inappropriate and unsafe development in coastal areas when opportunities arise.⁹² In 2015, the Legislature passed the "Peril of Flood" law, which added new requirements for redevelopment components.⁹³ The Peril of Flood law requires redevelopment components to:

- Include development and redevelopment principles, strategies, and engineering solutions that reduce the flood risk in coastal areas which results from high-tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea level rise.
- Encourage the use of best practices development and redevelopment principles, strategies, and engineering solutions that will result in the removal of coastal real property from flood zone designations established by the FEMA.
- Identify site development techniques and best practices that may reduce losses due to flooding and claims made under flood insurance policies issued in Florida.
- Be consistent with, or more stringent than, the flood-resistant construction requirements in the Florida Building Code and applicable federal flood plain management regulations in 44 C.F.R. pt. 60.
- Require that any construction activities seaward of the Coastal Construction Control Line⁹⁴ be consistent with ch. 161, F.S., which regulates coastal construction.
- Encourage local governments to participate in the NFIP's Community Rating System⁹⁵ to achieve flood insurance premium discounts for their residents.⁹⁶

University of South Florida College of Marine Science

The University of South Florida (USF) College of Marine Science is an interdisciplinary group implementing programs for research, education, and community engagement on a wide variety of ocean-related issues.⁹⁷ The college's research includes the core study areas of biological oceanography, geological oceanography, chemical oceanography, physical oceanography, and marine resource assessment.⁹⁸ Many of the college's research initiatives are fundamental to addressing issues of flooding and sea level rise. For example, the Center for Ocean Mapping and Innovative Technologies involves a partnership between the USF and the NOAA for developing and implementing cutting-edge ocean and coastal mapping.⁹⁹

⁹² Section 163.3178(2)(f), F.S.

⁹³ Chapter 2015-69, Laws of Fla.; s. 163.3178(2)(f), F.S. This is referred to as the "Peril of Flood" law.

⁹⁴ DEP, *Coastal Construction Control Line Program*, <https://floridadep.gov/rcp/coastal-construction-control-line> (last visited Feb. 3, 2021); s. 161.053, F.S.; Fla. Admin. Code Chapters 62B-33, 62B-34, and 62B-56.

⁹⁵ *FEMA 480*, at 9-22. The Community Rating System provides reductions in flood insurance premium rates of up to 45 percent for communities that implement certain activities above and beyond the minimum requirements of the NFIP.

⁹⁶ Section 163.3178(2)(f), F.S.

⁹⁷ University of South Florida (USF) College of Marine Science, *About Us*, <https://www.usf.edu/marine-science/about-us/index.aspx> (last visited Mar. 3, 2021).

⁹⁸ USF College of Marine Science, *Research - Overview*, <https://www.usf.edu/marine-science/research/index.aspx> (last visited Mar. 3, 2021).

⁹⁹ USF and NOAA, *COMIT*, <https://www.marine.usf.edu/comit/> (last visited Mar. 3, 2021); USF College of Marine Science, *USF and NOAA to Launch World-Class Cooperative Ocean Mapping Center*, <https://www.usf.edu/marine-science/news/2020/usf-and-noaa-to-launch-world-class-cooperative-ocean-mapping-center.aspx> (last visited Mar. 3, 2021).

The college maintains partnerships with federal and state agencies, hosts many groups working on ocean-related issues, and aims to train a well-educated workforce.¹⁰⁰ The College of Marine Science faculty includes experts specializing in each of the many scientific components of oceanography.¹⁰¹

The Office of Economic and Demographic Research

The Legislature's Office of Economic and Demographic Research (EDR) is a research arm principally concerned with forecasting economic and social trends that affect policy making, revenues, and appropriations.¹⁰² In 2016, the Legislature required the EDR to conduct an annual assessment of Florida's water resources and conservation lands.¹⁰³ The law requires the DEP, the water management districts, the Department of Agriculture and Consumer Services, the Fish and Wildlife Conservation Commission, and local governments to provide assistance to the EDR related to their respective areas of expertise.¹⁰⁴

For water resources, the assessment must include historical, current, and estimated future expenditures associated with water supply and demand, water quality protection and restoration, and government revenues dedicated for such purposes.¹⁰⁵ For conservation lands, the assessment must include expenditures, revenues, and tax implications related to government acquisition and maintenance of conservation lands in the state.¹⁰⁶

The EDR must submit the assessment to the Legislature by January 1 of each year.¹⁰⁷ In 2021, the EDR published the most recent edition of the Annual Assessment of Florida's Water Resources and Conservation Lands.¹⁰⁸

III. Effect of Proposed Changes:

Section 1 creates s. 380.093, F.S., entitled "Statewide Flooding and Sea-Level Rise Resilience Plan."

The bill contains statements of legislative intent. The statements recognize that communities across Florida are vulnerable to the adverse impacts of flooding resulting from increasing frequency and duration of rainfall events, storm surge from more frequent and severe weather systems, and sea level rise. The Legislature intends to address the challenges of flooding and sea level rise by conducting a comprehensive statewide assessment of the risks, coordinating a

¹⁰⁰ USF College of Marine Science, *Partners and Groups*, <https://www.usf.edu/marine-science/research/partners-and-groups/index.aspx> (last visited Mar. 3, 2021); USF College of Marine Science, *Our Vision*, <https://www.usf.edu/marine-science/about-us/our-vision.aspx> (last visited Mar. 3, 2021).

¹⁰¹ USF College of Marine Science, *Faculty - Overview*, <https://www.usf.edu/marine-science/faculty/index.aspx> (last visited Mar. 3, 2021).

¹⁰² EDR, *Welcome*, <http://edr.state.fl.us/Content/> (last visited Mar. 3, 2021); see s. 1.01(19), F.S.

¹⁰³ Section 403.928, F.S.

¹⁰⁴ Section 403.928(5), F.S.

¹⁰⁵ Section 403.928(1), F.S.

¹⁰⁶ Section 403.928(2), F.S.

¹⁰⁷ Section 403.928(7), F.S.

¹⁰⁸ EDR, *Annual Assessment of Florida's Water Resources and Conservation Lands* (2021), available at http://edr.state.fl.us/Content/natural-resources/LandandWaterAnnualAssessment_2021Edition.pdf (last visited Mar. 3, 2021).

statewide approach to resilience, and allocating funding in a manner that prioritizes the most significant risks.

The bill contains a definitions section. As used in s. 380.093, F.S., the term:

- “Critical asset” includes:
 - Transportation assets and evacuation routes, including airports, bridges, bus terminals, ports, major roadways, marinas, rail facilities, and railroad bridges.
 - Critical infrastructure, including wastewater treatment facilities and lift stations, stormwater treatment facilities and pump stations, drinking water facilities, water utility conveyance systems, electric production and supply facilities, solid and hazardous waste facilities, military installations, communications facilities, and disaster debris management sites.
 - Critical community and emergency facilities, including schools, colleges, universities, community centers, correctional facilities, disaster recovery centers, emergency medical service facilities, emergency operation centers, fire stations, health care facilities, hospitals, law enforcement facilities, local government facilities, logistical staging areas, affordable public housing, risk shelter inventory, and state government facilities.
 - Natural, cultural, and historical resources, including conservation lands, parks, shorelines, surface waters, wetlands, and historical and cultural assets.
- “Department” means the Department of Environmental Protection.

Resilient Florida Grant Program

The bill creates the “Resilient Florida Grant Program” within the Department of Environmental Protection (DEP). The DEP is authorized to provide, subject to appropriation, grants to a county or municipality to fund the costs of community resilience planning and necessary data collection for such planning. Activities funded under the program will include:

- Comprehensive plan amendments and necessary corresponding analyses that address the requirements of the Peril of Flood law.¹⁰⁹
- Vulnerability assessments that identify or address risks of flooding and sea level rise.
- Development of projects, plans, and policies that allow communities to prepare for threats from flooding and sea level rise.
- Projects to adapt critical assets to the effects of flooding and sea level rise.

A vulnerability assessment that is conducted using grant funding from the program must include an analysis of the vulnerability of and risks to critical assets, including regionally significant assets, owned or managed by the county or municipality. The vulnerability assessment must: encompass an entire county or municipality, unless a smaller area is approved by DEP; include all assets owned or maintained by the grant applicant; and use the most recent publicly available Digital Elevation Model and dynamic modeling techniques, if available. Locally collected elevation data may also be included if appropriately submitted to DEP.

Upon completion of a vulnerability assessment, the county or municipality must submit to DEP the following:

- A report detailing the findings of the assessment.

¹⁰⁹ Section 163.3178(2)(f), F.S.

- All electronic mapping data used to illustrate flooding and sea level rise impacts identified in the assessment. When submitting such data, the county or municipality must include:
 - Geospatial data in an electronic file format suitable for input to DEP’s mapping tool.
 - Geographic Information System data that has been projected into the appropriate Florida State Plan Coordinate System and that is suitable for DEP’s mapping tool. Metadata must also be submitted, using standards prescribed by DEP.
- A list of critical assets, including regionally significant assets, impacted by flooding and sea level rise.

As applicable to the area where the vulnerability assessment is conducted, a vulnerability assessment conducted using grant funding from the program must also include:

- Peril of flood comprehensive plan amendments that address the Peril of Flood requirements, if the county or municipality is subject to such requirements and has not complied with such requirements as determined by the Department of Economic Opportunity.
- The depth of:
 - Tidal flooding, including future high tide flooding. The assessment must use thresholds published and provided by DEP. To the extent practicable, the analysis should geographically display the number of tidal flood days expected for each scenario and planning horizon.
 - Storm flooding, current and future, using publicly available National Oceanic and Atmospheric Administration (NOAA) or Federal Emergency Management Agency (FEMA) storm surge data. The initial storm surge event used must equal or exceed the current 100-year flood event. Higher frequency storm events may be analyzed to understand the exposure of a critical asset.
 - Rainfall-induced flooding, to the extent practical, using spatiotemporal analysis or existing hydrologic and hydraulic modeling results. Future boundary conditions should be modified to consider sea level rise and high tide conditions.
 - Compound flooding, to the extent practicable, or the combination of tidal, storm surge, and rainfall-induced flooding.
- The following scenarios and standards:
 - All analyses in the North American Vertical Datum of 1988.
 - At least two local sea level rise scenarios, which must include the 2017 NOAA intermediate-low and intermediate-high sea level rise projections.
 - At least two planning horizons that include planning horizons for the years 2040 and 2070.
 - Local sea level data that has been interpolated between the two closest NOAA tide gauges. Local sea level data may be taken from one such gauge if the gauge has a higher mean sea level. Data taken from an alternate tide gauge may be used with appropriate rationale and DEP approval, as long as it is publicly available or submitted to DEP under the program.

Comprehensive Statewide Flood Vulnerability and Sea-Level Rise Data Set and Assessment

The bill requires the DEP to complete the development of a “comprehensive statewide flood vulnerability and sea level rise data set” by July 1, 2022. The data set must include information necessary to determine the risks to inland and coastal communities, including, but not limited to, elevation, tidal levels, and precipitation. The data set must be sufficient to conduct a

comprehensive statewide flood vulnerability and sea level rise assessment. In developing the data set, the DEP must compile, analyze, and incorporate, as appropriate, information related to vulnerability assessments submitted to the DEP under the Resilient Florida Grant Program, or any previously completed assessments meeting the program's requirements.

The bill requires the DEP's Chief Science Officer to develop, in coordination with necessary experts and resources, statewide sea level rise projections for inclusion in the data set. To the extent practicable, the projections must incorporate temporal and spatial variability.

The bill requires the DEP to complete a "comprehensive statewide flood vulnerability and sea level rise assessment" by July 1, 2023. The assessment must identify inland and coastal infrastructure, geographic areas, and communities in Florida that are vulnerable to flooding and sea level rise and the associated risks. The DEP must use the statewide data set to conduct the assessment. The assessment must incorporate local and regional analyses of vulnerability and risks, including, as appropriate, local mitigation strategies and post-disaster redevelopment plans.

The statewide assessment must include an inventory of critical assets, including regionally significant assets, which are essential for the following sectors:

- Critical government and business functions.
- National security.
- Public health and safety.
- The economy.
- Flood and storm protection.
- Water quality management.
- Wildlife habitat management.

The statewide assessment must identify and analyze the vulnerability of and risks to critical assets that are essential to the sectors listed above. The DEP must also, when identifying critical assets for inclusion in the assessment, take into consideration the critical assets identified by local governments and submitted to the DEP under the Resilient Florida Grant Program. The bill requires the DEP to update both the data set and the assessment every five years. The DEP may update the data set and assessment more frequently if it determines updates are necessary to maintain their validity.

Statewide Flooding and Sea-Level Rise Resilience Plan

The bill requires the DEP to develop a "Statewide Flooding and Sea-Level Rise Resilience Plan" and submit it to the Governor and the Legislature by December 1, 2021, and each December 1 thereafter. The plan must consist of ranked projects that address risks of flooding and sea level rise to coastal and inland communities in the state and must be on a three-year planning horizon.

The total amount of funding proposed in the plan each year may not exceed \$100 million. Upon review, and subject to appropriation, the Legislature will approve funding for the projects as specified in the plan. Multiyear projects that receive funding for the first year of the project must be included in subsequent plans and funded until the project is complete, provided that the project sponsor has complied with all contractual obligations and funds are available.

Each project included in the plan must have a minimum 50 percent cost share, unless the project assists or is within a financially disadvantaged small community. The bill defines the term “financially disadvantaged small community” as follows:

- A municipality that has a population of 10,000 or fewer, according to the most recent April 1 population estimates posted on the Office of Economic and Demographic Research’s website and a per capita annual income that is less than the state’s per capita annual income as shown in the most recent release from the Bureau of the Census of the United States Department of Commerce that includes both measurements; or
- A county that has a population of 50,000 or fewer, according to the most recent April 1 population estimates posted on the Office of Economic and Demographic Research’s website and a per capita annual income that is less than the state’s per capita annual income as shown in the most recent release from the Bureau of the Census of the United States Department of Commerce that includes both measurements.

The bill requires each plan submitted by the DEP to include the following information for each recommended project:

- A description of the project.
- The location of the project.
- An estimate of how long the project will take to complete.
- An estimate of the cost of the project.
- The cost-share percentage available for the project.
- A summary of the priority score assigned to the project.
- The project sponsor.

The bill authorizes counties, municipalities, and regional resilience entities to submit to the DEP, by September 1, 2021, and each September 1 thereafter, a list of proposed projects that address the risks of flooding and sea level rise identified in vulnerability assessments meeting the requirements of the grant program. The bill authorizes water management districts and flood control districts to submit to the DEP, by September 1, 2021, and each September 1 thereafter, a list of proposed projects that mitigate the risks of flooding or sea level rise on water supplies or water resources of the state, as well as a corresponding evaluation of each project. Each project submitted to the DEP for inclusion in the statewide resilience plan must include the information listed above, as applicable. For a project to be eligible for inclusion in the statewide resilience plan, the project must have been submitted by a county, municipality, regional resilience entity, water management district, or flood control district, or it must have been identified in the statewide assessment, as applicable.

The bill specifies types of expenses that are ineligible for inclusion in the statewide resilience plan. These include, but are not limited to, expenses associated with:

- Aesthetic vegetation.
- Recreational structures such as piers, docks, and boardwalks.
- Water quality components of stormwater and wastewater management systems. Expenses to prevent saltwater intrusion may be eligible, but not if such expenses are used to mitigate water quality impacts caused by the project.
- Maintenance and repair of over-walks.
- Park activities and facilities, except expenses to control flooding or erosion.

- Navigation construction, operation, and maintenance activities.
- Projects that provide only recreational benefits.

The bill requires the DEP to implement a scoring system for assessing each project eligible for inclusion in the plan. The scoring system must include the following tiers and associated criteria:

- Tier 1 must account for 40 percent of the total score and consist of all of the following criteria:
 - The degree to which the project addresses the risks posed by flooding and sea level rise identified in the local government vulnerability assessments or the statewide assessment, as applicable.
 - The degree to which the project addresses risks to regionally significant assets.
 - The degree to which the project reduces risks to areas with an overall higher percentage of vulnerable critical assets.
 - The degree to which the project contributes to existing flooding mitigation projects that reduce upland damage costs by incorporating new or enhanced structures or restoration and revegetation projects.
- Tier 2 must account for 30 percent of the total score and consist of all of the following criteria:
 - The degree to which flooding and erosion currently affect the condition of the project area.
 - The overall readiness of the project to proceed in a timely manner, considering the project's readiness for the construction phase of development, the status of required permits, the status of any needed easement acquisition, and the availability of local funding sources.
 - The environmental habitat enhancement or inclusion of nature-based options for resilience, with priority given to state or federal critical habitat areas for threatened or endangered species.
 - The cost-effectiveness of the project.
- Tier 3 must account for 20 percent of the total score and consist of all of the following criteria:
 - The availability of local, state, and federal matching funds, considering the status of the funding award, and federal authorization, if applicable.
 - Previous state commitment and involvement in the project, considering previously funded phases, the total amount of previous state funding, and previous partial appropriations for the proposed project.
 - The exceedance of the flood-resistant construction requirements of the Florida Building Code and applicable flood plain management regulations.
- Tier 4 must account for 10 percent of the total score and consist of all of the following criteria:
 - The proposed innovative technologies designed to reduce project costs and provide regional collaboration.
 - The extent to which the project assists financially disadvantaged communities.

The bill establishes that the plan submitted by December 1, 2021, which will be submitted before the first statewide assessment is completed on July 1, 2023, will be a preliminary plan that addresses risks of flooding and sea level rise identified in local government vulnerability assessments. The plan submitted by December 1, 2022, will be an update to the preliminary plan.

The plan submitted by December 1, 2023, and each plan submitted annually thereafter, must address risks of flooding and sea level rise identified in the statewide assessment.

The bill requires DEP to initiate rulemaking by August 1, 2021, to implement s. 380.093, F.S.

Regional Resilience Entities

The bill authorizes the DEP, subject to specific legislative appropriation, to provide funding to regional resilience entities that are established by general purpose local governments and whose responsibilities include planning for the resilience needs of communities and coordinating intergovernmental solutions to mitigate adverse impacts of flooding and sea level rise. The DEP is authorized to provide funding to regional resilience entities for the following purposes:

- Providing technical assistance to counties and municipalities.
- Coordinating multijurisdictional vulnerability assessments.
- Developing project proposals to be submitted for inclusion in the statewide resilience plan.

Section 2 creates s. 380.0933, F.S., entitled “Florida Flood Hub for Applied Research and Innovation.”

The bill establishes within the University of South Florida (USF) College of Marine Science the Florida Flood Hub for Applied Research and Innovation (Hub) to coordinate efforts between the academic and research institutions of the state. The USF’s College of Marine Science, or its successor entity, must serve as the lead institution and engage other academic and research institutions, private partners, and financial sponsors to coordinate efforts to support applied research and innovation to address the flooding and sea level rise challenges of the state.

The Hub must employ an executive director. At a minimum, the Hub must:

- Organize existing data needs for a comprehensive statewide flood vulnerability and sea level rise analysis and perform a gap analysis to determine data needs.
- Develop statewide open source hydrologic models for physically based flood frequency estimation and real-time forecasting of floods, including hydraulic models of floodplain inundation mapping, real-time compound and tidal flooding forecasts, future groundwater elevation conditions, and economic damage and loss estimates.
- Coordinate research funds from the state, the federal government, or other funding sources for related hub activities across all participating entities.
- Establish community-based programs to improve flood monitoring and prediction along major waterways, including intracoastal waterways and coastlines, of the state and to support ongoing flood research.
- Coordinate with agencies, including, but not limited to, the DEP and water management districts.
- Share its resources and expertise.
- Assist in the development of training and a workforce in the state that is knowledgeable about flood and sea level rise research, prediction, and adaptation and mitigation strategies.
- Develop opportunities to partner with other flood and sea level rise research and innovation leaders for sharing technology or research.
- Conduct the activities under this subsection in cooperation with various local, state, and federal government entities as well as other flood and sea level rise research centers.

The bill requires the Hub to provide an annual comprehensive report to the Governor and the Legislature by July 1, 2022, and each July 1 thereafter. The report must outline the Hub's clearly defined goals and its efforts and progress on reaching such goals.

Section 3 amends s. 403.928, F.S., which requires the Office of Economic and Demographic Research (EDR) to conduct an annual assessment of Florida's water resources and conservation lands.

The bill requires the EDR to include in its annual assessment an analysis of inland and coastal flood control, beginning with the assessment due by January 1, 2022. The EDR must analyze future expenditures by federal, state, regional, and local governments required to achieve the Legislature's intent of minimizing the adverse economic effects of inland and coastal flooding, thereby decreasing the likelihood of severe dislocations or disruptions in the economy and preserving the value of real and natural assets to the extent economically feasible. To the extent possible, the analysis must evaluate the cost of resilience efforts necessary to address inland and coastal flooding associated with sea level rise, high tide events, storm surge, flash flooding, stormwater runoff, and increased annual precipitation over a 50-year planning horizon. Additionally, when dedicated revenues are provided in law for these purposes or when recurring expenditures are made, the EDR's analysis must identify the gap, if any, between the estimated revenues and the projected expenditures.

Section 4 states that the act shall take effect upon becoming a law.

IV. Constitutional Issues:

A. Municipality/County Mandates Restrictions:

None.

B. Public Records/Open Meetings Issues:

None.

C. Trust Funds Restrictions:

None.

D. State Tax or Fee Increases:

None.

E. Other Constitutional Issues:

None.

V. Fiscal Impact Statement:**A. Tax/Fee Issues:**

None.

B. Private Sector Impact:

The bill may have an indeterminate, positive fiscal impact on the private sector. The bill creates programs to help fund local government projects that plan for and address flooding and sea level rise. Increased resilience planning and implementation may reduce the short- and/or long-term financial loss or risk of loss for the private sector, such as impacts to local economies or private properties.

C. Government Sector Impact:

The bill may result in increased costs for the Department of Environmental Protection (DEP). The bill requires the DEP to create a new grant program, conduct statewide scientific studies that are updated every three years, and create a statewide plan proposing up to \$100 million in project funding that is developed annually based on a new scoring system implemented by the DEP. The DEP may need to engage in rulemaking to implement the bill.

The bill may result in increased costs for the water management districts. The bill requires water management districts to receive and evaluate projects from local governments, and submit project lists and corresponding evaluations annually to the DEP.

The bill may result in increased costs for the University of South Florida. The bill requires the University of South Florida to create a program to coordinate and lead certain statewide efforts on flooding and sea level rise.

The bill may result in increased costs for the Office of Economic and Demographic Research. The bill requires the office to add another complex subject to its annual assessment of Florida's water resources and conservation lands.

The bill may have an indeterminate, positive fiscal impact on local governments. The bill creates a grant program for counties and municipalities to fund the costs of community resilience planning. It creates a statewide plan which may propose up to \$100 million dollars in annual funding for local government projects addressing flooding and sea level rise. The bill also authorizes local governments to form regional resilience coalitions to facilitate efforts, and authorizes the DEP, subject to specific legislative appropriation, to provide funding to regional coalitions. Furthermore, by providing funding and resources for resilience planning and addressing flood risk and sea level rise, the bill may reduce the short- and/or long-term financial loss or risk of loss for local governments.

The Senate proposed budget includes 25 positions and \$9 million from the Resilient Florida Trust Fund to operate this program.

VI. Technical Deficiencies:

None.

VII. Related Issues:

None.

VIII. Statutes Affected:

This bill creates the following sections of the Florida Statutes: 380.093 and 380.0933.

This bill amends section 403.928 of the Florida Statutes.

IX. Additional Information:**A. Committee Substitute – Statement of Substantial Changes:**
(Summarizing differences between the Committee Substitute and the prior version of the bill.)**CS/CS by Appropriations on March 31, 2021:**

The committee substitute:

- Revises the definition of “critical asset” to broaden the specified critical infrastructure.
- Authorizes funding from the Resilient Florida Grant Program to be spent on: projects that adapt critical assets to the effects of flooding and sea level rise, and data collection necessary for resilience planning.
- Authorizes vulnerability assessments to include areas smaller than a local government, if approved by DEP, and to include locally collected elevation data.
- Requires vulnerability assessments to include all assets owned or maintained by the grant applicant.
- Revises the specific technical requirements for coastal vulnerability assessments conducted using funding from the Resilient Florida Grant Program.
- Requires DEP, as appropriate, to compile, analyze, and incorporate information from local vulnerability assessments into the statewide data set, and to incorporate local mitigation plans and post-disaster redevelopment plans into the statewide assessment.
- Clarifies that the statewide sea level rise projections do not supersede regional projections.
- Requires the inventory of critical assets in the statewide assessment to take into consideration critical assets identified in local vulnerability assessments.
- Requires the statewide data set and assessment to be updated at least every 5 years instead of at least every 3 years.
- Requires the statewide resilience plan to include the project sponsor for each project.
- Authorizes local governments and regional entities to submit to DEP proposed projects for inclusion in the statewide resilience plan that address risks of flooding or sea level rise identified in vulnerability assessments meeting the requirements of the grant program.

- Authorizes water management districts and flood control districts to submit to DEP proposed projects for inclusion in the statewide resilience plan that address impacts to water supplies or water resources, along with project evaluations. This is instead of requiring water management districts to receive projects from local and regional government entities and submit them in lists to DEP with evaluations.
- Requires that, to be eligible for inclusion in the statewide resilience plan, a project must have been submitted by a local government, regional resilience entity, water management district, or flood control district; or have been identified in the statewide assessment.
- Lists types of expenses that are not eligible for inclusion in the statewide resilience plan, instead of types of projects. Expenses to prevent saltwater intrusion may be eligible unless such expenses are used to mitigate water quality impacts caused by the project.
- Does not require a 50 percent match for projects in the statewide resilience plan that assist or are within a financially disadvantaged small community, as defined in the bill for both counties and municipalities.
- Revises the scoring system DEP must use for including eligible projects in the statewide resilience plan.
- Revises the resilience plan scoring system criteria, including emphasizing assessment of upland damage costs, erosion, and environmental benefits or nature-based solutions.
- Requires DEP to initiate rulemaking implementing s. 380.093, F.S., by August 1, 2021.
- Changes “Regional Resilience Coalitions” to “Regional Resilience Entities,” and slightly broadens the description of the entities and the purposes for which DEP may provide funding.
- Clarifies that the University of South Florida College of Marine Science, or its successor entity, will serve in the role described in the bill.

CS by Environment and Natural Resources on March 15, 2021:

- Defines “department” as the Department of Environmental Protection throughout section 1 of the bill.
- Requires the department to notify the Legislature when scientific sources or standards specifically referenced in the subsection establishing the Resilient Florida Grant Program are updated or replaced.
- Spells out the name of the Department of Environmental Protection in section 2 of the bill.

B. Amendments:

None.