

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 Environment and Natural Resources

BILL: CS/SB 1954

INTRODUCER: Environment and Natural Resources Committee and Senator Rodrigues

SUBJECT: Statewide Flooding and Sea-level Rise Resilience

DATE: March 16, 2021

REVISED: _____

	ANALYST	STAFF DIRECTOR	REFERENCE	ACTION
1.	<u>Schreiber</u>	<u>Rogers</u>	<u>EN</u>	<u>Fav/CS</u>
2.	_____	_____	<u>AP</u>	_____

Please see Section IX. for Additional Information:

COMMITTEE SUBSTITUTE - Substantial Changes

I. Summary:

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) that provides funding, subject to appropriation, to local governments for the costs of resilience planning such as vulnerability assessments and new plans or policies.
- The “Comprehensive Statewide Flood Vulnerability and Sea-Level Rise Data Set and Assessment,” to be updated every three years. 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, that identifies vulnerable areas and infrastructure, including “critical assets” as defined in the bill.
- The “Statewide Flooding and Sea-Level Rise Resilience Plan.” DEP must annually submit a plan proposing up to \$100 million in funding for projects that address risks from flooding and sea level rise. Local governments and regional entities may submit projects, water management districts must evaluate projects and annually submit lists to DEP, and DEP must implement a scoring system for assessing projects for inclusion in the plan.

The bill authorizes local governments to form regional resilience coalitions to assist with community resilience efforts, including utilization of the programs created by the bill. DEP is authorized, subject to appropriation, to provide funding to regional resilience coalitions.

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.

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 8–9 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

¹ See 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); 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 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.*; 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.

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.

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 In 2018, NOAA Technical Report NOS CO-OPS 086 established definitive numerical thresholds for minor (high tide flooding), moderate, and major coastal flooding.¹⁸

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.¹⁹ Sea level rise causes saltwater intrusion of both surface water and groundwater, threatening fresh water resources including coastal aquifers.²⁰ It causes coastal erosion and threatens coastal ecosystems which, when healthy and allowed space for landward migration, are critical for

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); 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 NOAA, *Patterns and Projections of High Tide Flooding Along the U.S. Coastline Using a Common Impacts Threshold*, vii, 4, 7, 31 (Feb. 2018), available at https://beta.tidesandcurrents.noaa.gov/publications/techrpt86_PaP_of_HTFlooding.pdf (last visited Mar. 3, 2021).

¹⁹ See *SFRCCC Update*, at 5.

²⁰ *SHMP*, at 106; *SFRCCC Update*, at 33-35.

resilience.²¹ Sea level rise also raises coastal groundwater tables and pushes salt water further inland.²² Many of these processes are exacerbated by Florida's porous limestone geology.²³

Future storms are generally expected to have increased average intensity and precipitation rates.²⁴ Storm intensity is a principal determinant of storm surge height.²⁵ Storm surges are water driven ashore by the wind during severe weather, and they are an especially dangerous aspect of coastal flooding.²⁶ Sea level rise is expected to increase the damage 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.²⁷

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.²⁸ 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.²⁹ By raising groundwater levels, sea level rise reduces the ability of rainfall to infiltrate the soil, and the reduced soil storage capacity causes flooding.³⁰

Florida's 35 coastal counties contain 76% of its population and 79% of its total economy as of 2012.³¹ One study found that 20.5% of properties in Florida were at substantial risk of flooding in 2020 and 24.3% will be at such risk by 2050.³² 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

²¹ *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.

²² *SHMP*, at 108.

²³ 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).

²⁴ *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).

²⁵ *SHMP*, at 141.

²⁶ *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).

²⁷ *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).

²⁸ *NCA4*, at 88, 97, 113, 745, 762, 1447; *SHMP*, at 106.

²⁹ *NCA4*, at 763; *SFRCCC Update*, at 5, 34.

³⁰ *SFRCCC Update*, at 33; *SHMP*, at 106, 181.

³¹ *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% of the state's population is less than 4.9 feet (1.5 meters) above sea level.

³² 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% annual risk of 1 cm of inundation or more.

real estate losses during 100-year storm surge events could reach \$50–\$75 billion by 2050.³³ 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.³⁴ It is estimated that Florida has nine of the top ten counties in the nation for total annual risk of economic loss from flooding.³⁵ Despite the risks, people and capital continue to flow into exposed coastal areas in Florida.³⁶

As sea level rise continues, financial impacts may include increases in flood insurance costs,³⁷ decreases in property sales or property values, and increased risk for lenders.³⁸ 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.³⁹ Coastal flooding can cause displacement in frontline communities, and the burdens of adaptation are likely to disproportionately impact vulnerable populations.⁴⁰

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.⁴¹

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

³³ *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).

³⁴ *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.

³⁵ 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).

³⁶ *MGI Mortgages and Markets*, at 13.

³⁷ 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.

³⁸ *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).

³⁹ *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).

⁴⁰ *Id.*; *NCA4* at 333-335.

⁴¹ *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).

of scientific views.⁴² The National Oceanic and Atmospheric Administration (NOAA) operates tide gauges along the nation's coasts and satellites that measure changes in sea level. In 2012 and 2017, NOAA published sea level rise projections for the U.S.⁴³ NOAA's projections include six scenarios ranging from "low" to "extreme," with several intermediate scenarios.⁴⁴ NOAA's projections were used in the fourth national climate assessment by the U.S. Global Change Research Program, a program of thirteen federal agencies analyzing the changing global environment.⁴⁵ The U.S. 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.⁴⁶

Sea level rise is experienced differently in different areas, depending on many factors including ocean currents, changing land elevations, land use, and erosion.⁴⁷ 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.⁴⁸ 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.⁴⁹

⁴² IPCC, *About the IPCC*, <https://www.ipcc.ch/about/> (last visited Feb. 2, 2021).

⁴³ 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).

⁴⁴ 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).

⁴⁵ U.S. Global Change Research Program, *About USGCRP*, <https://www.globalchange.gov/about> (last visited Feb. 2, 2021).

⁴⁶ See USACE, *Policies*, https://www.usace.army.mil/corpsclimate/climate_policies/ (last visited Mar. 8, 2021).

⁴⁷ *NCA4*, at 757, 855, 1495.

⁴⁸ *SFRCCC Update*, at 8.

⁴⁹ 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 ⁵⁰	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 ⁵¹	Global	2040	0.43	1.35
		2070	0.72	3.94
		2100	.98	8.20
SFRCCC Unified Sea Level Rise Projection, 2019 Update ⁵²	Southeast Florida	2040	.83	1.42
		2070	1.75	3.33
		2120	3.33	7.67
Tampa Bay Climate Science Advisory Panel ⁵³	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.⁵⁴ 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).⁵⁵ NOAA’s National Geodetic Survey is currently in the process of replacing NAVD 88, with initial estimates for completion as soon as 2022.⁵⁶ The Florida State Plane Coordinate System is a system of coordinates for defining positions on the surface of the earth within the state.⁵⁷

⁵⁰ 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.

⁵¹ 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).

⁵² 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.

⁵³ 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).

⁵⁴ 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).

⁵⁵ NOAA, National Geodetic Survey, *Vertical Datums*, <https://www.ngs.noaa.gov/datums/vertical/> (last visited Mar. 3, 2021).

⁵⁶ 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).

⁵⁷ 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,⁵⁸ using funds appropriated from the state, must conduct a sea level impact projection (SLIP) study prior to commencing construction.⁵⁹ 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.⁶⁰ DEP must perform rulemaking to establish the specific standards for conducting the SLIP studies.⁶¹

DEP is currently developing a web-based tool to enable constructors to create and submit SLIP study reports pursuant to the legislation.⁶² 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.⁶³

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP), comprised of three interconnected parts: insurance, regulations, and mapping.⁶⁴ A Flood Insurance Rate Map (FIRM) is an official map FEMA provides to communities which delineates different zones used primarily for insurance rating purposes.⁶⁵ The “base flood” (or “100-year flood”) is a flood having a 1% chance of being equaled or exceeded in any given year.⁶⁶ The base flood elevation, used for regulatory purposes,⁶⁷ is the elevation to which floodwater is anticipated to rise during the base flood.⁶⁸ The land area covered by the floodwaters of the base flood is the base floodplain, which is called a Special Flood Hazard Area⁶⁹ on FIRM maps.⁷⁰ Special Flood Hazard Areas include “A Zones,” which are the regular base floodplain, and “V Zones,” which are coastal high hazard areas, subject to more stringent

⁵⁸ 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.

⁵⁹ Section 161.551, F.S.; see ch. 2020-119, Laws of Fla.

⁶⁰ Section 161.551(3), F.S.

⁶¹ *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).

⁶² 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).

⁶³ *Id.*

⁶⁴ 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).

⁶⁵ *Id.* at 2-13, 3-29.

⁶⁶ *Id.* at 3-3-3-5.

⁶⁷ *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).

⁶⁸ *FEMA 480*, at 3-3-3-5.

⁶⁹ *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.

⁷⁰ *Id.* at 3-3-3-5.

regulatory requirements and different flood insurance rates, where structures must be protected from hazards such as waves, storm surges, hurricane-force winds, and erosion.⁷¹

Resilience

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.⁷² 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.⁷³

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.⁷⁴ 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.⁷⁵ Under the program, DEP has awarded funding to 129 local governments, including 86 planning projects and 11 implementation projects.⁷⁶

In 2018, DEP published the Florida Adaptation Planning Guidebook to be used by local governments to develop and update adaptation plans for sea level rise.⁷⁷ 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.
- **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:

⁷¹ *Id.* at 3-22–3-23, 3-29, 5-51, 7-59. The “V” in V Zone stands for “velocity wave action.”

⁷² DEP, *Florida Resilient Coastlines Program*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program> (last visited Feb. 2, 2021).

⁷³ DEP, *FRCP Resilience Grants*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program/content/frcp-resilience-grants> (last visited Feb. 2, 2021).

⁷⁴ *DEP Guidebook*, at 19, 131-167, available at <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf> (last visited Feb. 2, 2021).

⁷⁵ DEP, *FRCP Resilience Grants*, <https://floridadep.gov/rcp/florida-resilient-coastlines-program/content/frcp-resilience-grants> (last visited Feb. 2, 2021).

⁷⁶ 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).

⁷⁷ *DEP Guidebook*, at I.

- “Protection” strategies that are structurally defensive measures (e.g., seawalls, revetments, levees, beach nourishment, oyster reef restoration, and living shorelines⁷⁸);
- “Accommodation” strategies that alter the design of vulnerable structures so structures or land use can stay in place with modification (e.g., floodproofing, 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.⁷⁹

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.⁸⁰

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.⁸¹ 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.⁸² In 2020, the SFWMD appointed a District Resiliency Officer.⁸³

⁷⁸ DEP, *Living Shorelines*, <https://floridadep.gov/rcp/rcp/content/living-shorelines> (last visited Feb. 3, 2021); see NOAA and 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).

⁷⁹ *DEP Guidebook*, at 1-61.

⁸⁰ See ss. 373.019(24), 373.036(7), 373.536(6), and 373.709, F.S.; see NFWMD, *Consolidated Annual Report, Fiscal Year 2020-2021*, 5-1–5-14 (2021), available at <https://nfwwater.com/content/download/18775/126393/NFWMD%202021%20Consolidated%20Annual%20Report.pdf> (last visited Mar. 8, 2021); see generally 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).

⁸¹ 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).

⁸² 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).

⁸³ Dr. Carolina Maran, District Resiliency Officer, South Florida Water Management District, 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 Flood Resiliency Study*, video begins at 4:50:30 (Mar. 12, 2020), available at <http://sfwmd.igq2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=2008&Format=Agenda> (last visited Feb. 4, 2021).

Florida is divided into ten Regional Planning Councils (RPCs). Membership to RPCs is required for counties and optional for municipalities.⁸⁴ 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.⁸⁵
- 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.⁸⁶
- 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.⁸⁷

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.⁸⁸

Local Governments

Florida's local governments are at the forefront of preparing for and addressing flooding and sea level rise.⁸⁹ Generally, every community will need to go through a process of planning and implementing adaptation strategies and projects.⁹⁰ Florida's coastal local governments must have a coastal management element in their comprehensive plans that advances objectives to protect public safety and coastal resources.⁹¹ 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.⁹²

Comprehensive plans' coastal management elements must contain a redevelopment component for eliminating inappropriate and unsafe development in coastal areas when opportunities arise.⁹³

⁸⁴ Sections 186.501-186.513, F.S.

⁸⁵ Northeast Florida Regional Council, *Resiliency Services*, <https://www.nefrc.org/resiliency> (last visited Feb. 4, 2021).

⁸⁶ East Central Florida Regional Planning Council, *East Central Florida Regional Resilience Collaborative*, <https://www.ecfrpc.org/resiliencecollaborative> (last visited Feb. 4, 2021).

⁸⁷ Tampa Bay Regional Planning Council, *Resiliency Planning*, <https://www.tbipc.org/resiliency-2/> (last visited Feb. 4, 2021).

⁸⁸ Southeast Florida Regional Climate Change Compact, *Regional Climate Action Plan*, <https://southeastfloridaclimatecompact.org/regional-climate-action-plan/> (last visited Feb. 4, 2021).

⁸⁹ See *DEP Guidebook*, at I, available at <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf> (last visited Jan. 31, 2021).

⁹⁰ 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).

⁹¹ 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..."

⁹² 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).

⁹³ Section 163.3178(2)(f), F.S.

In 2015, the Legislature passed the “Peril of Flood” law, which added new requirements for redevelopment components.⁹⁴ 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 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 Line⁹⁵ be consistent with ch. 161, F.S., which regulates coastal construction.
- Encourage local governments to participate in the NFIP’s Community Rating System⁹⁶ to achieve flood insurance premium discounts for their residents.⁹⁷

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.⁹⁸ The college’s research includes the core study areas of biological oceanography, geological oceanography, chemical oceanography, physical oceanography, and marine resource assessment.⁹⁹ 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 USF and NOAA for developing and implementing cutting-edge ocean and coastal mapping.¹⁰⁰

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.¹⁰¹ The College of Marine

⁹⁴ Ch. 2015-69, Laws of Fla.; s. 163.3178(2)(f), F.S. This is referred to as the “Peril of Flood” law.

⁹⁵ 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.

⁹⁶ *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.

⁹⁷ Section 163.3178(2)(f), F.S.

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

⁹⁹ USF College of Marine Science, *Research - Overview*, <https://www.usf.edu/marine-science/research/index.aspx> (last visited Mar. 3, 2021).

¹⁰⁰ 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).

¹⁰¹ 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).

Science faculty includes experts specializing in each of the many scientific components of oceanography.¹⁰²

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.¹⁰³ In 2016, the Legislature required EDR to conduct an annual assessment of Florida's water resources and conservation lands.¹⁰⁴ The law requires 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 EDR related to their respective areas of expertise.¹⁰⁵

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.¹⁰⁶ For conservation lands, the assessment must include expenditures, revenues, and tax implications related to government acquisition and maintenance of conservation lands in the state.¹⁰⁷

EDR must submit the assessment to the Legislature by January 1 of each year.¹⁰⁸ In 2021, EDR published the most recent edition of the Annual Assessment of Florida's Water Resources and Conservation Lands.¹⁰⁹

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 rainfall events, storm surge, and sea level rise. The legislative intent includes conducting a comprehensive statewide assessment of flood risk, coordinating a statewide approach to resilience, and allocating funding to effectively address the challenges of flood risk.

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.

¹⁰² USF College of Marine Science, *Faculty - Overview*, <https://www.usf.edu/marine-science/faculty/index.aspx> (last visited Mar. 3, 2021).

¹⁰³ EDR, *Welcome*, <http://edr.state.fl.us/Content/> (last visited Mar. 3, 2021); see s. 1.01(19), F.S.

¹⁰⁴ Section 403.928, F.S.

¹⁰⁵ Section 403.928(5), F.S.

¹⁰⁶ Section 403.928(1), F.S.

¹⁰⁷ Section 403.928(2), F.S.

¹⁰⁸ Section 403.928(7), F.S.

¹⁰⁹ 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).

- Critical infrastructure, including wastewater treatment facilities, stormwater treatment facilities, drinking water facilities, 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). DEP is authorized to provide, subject to appropriation, grants to a county or municipality to fund the costs of community resilience planning. Such planning may include projects that address the requirements of the Peril of Flood law,¹¹⁰ vulnerability assessments that identify or address risks of flooding and sea level rise, and the development of plans and policies that allow communities to prepare for threats from flooding and sea level rise.

Vulnerability assessments funded through the Resilient Florida Grant Program must meet the following conditions, as specified in the bill:

- Encompass an entire county or municipality.
- Use the most recent publicly available Digital Elevation Model and dynamic modeling techniques, if available.
- Include an analysis of the vulnerability of and risks to critical assets, including regionally significant assets, owned or managed by the county or municipality.
- Upon completion of the vulnerability assessment, the county or municipality must submit to DEP:
 - A report detailing the findings of the assessment.
 - All electronic mapping data used to illustrate flooding and sea level rise impacts identified in the assessment. Such data must include: geotechnical data in an electronic file format suitable for input to DEP’s mapping tool, and Geographic Information System data that has been projected into the appropriate Florida State Plane Coordinate System and that is suitable for DEP’s mapping tool. The county or municipality must also submit metadata using standards prescribed by DEP.
 - A list of critical assets, including regionally significant assets, impacted by flooding and sea level rise.

Vulnerability assessments funded through the Resilient Florida Grant Program for a county or municipality subject to the Peril of Flood requirements¹¹¹ must meet the following additional conditions, as specified in the bill:

¹¹⁰ Section 163.3178(2)(f), F.S.

¹¹¹ Sections 380.24, 163.3177(6)(g), 163.3178(2), F.S. The coastal local governments subject to these additional conditions are those described in s. 380.24, F.S.: “[u]nits of local government abutting the Gulf of Mexico or the Atlantic Ocean, or

- A peril of flood analysis that addresses the requirements of s. 163.3178(2)(f), F.S.
- The depth of sea level rise, calculated using the North American Vertical Datum of 1988 (NAVD 88), expected for the county or municipality using, at a minimum, all of the following:
 - Two local sea level rise scenarios, which must equal or exceed the 2017 National Oceanic and Atmospheric Administration (NOAA) intermediate-low and intermediate-high sea level rise projections.
 - At least two planning horizons that must be, at a minimum, 20 years and 50 years from the date of the assessment.
 - Local sea level rise data that has been interpolated between the two closest coastal tide gauges with NOAA sea level rise data.
- The depth of expected storm surge flooding using Federal Emergency Management Agency (FEMA) storm surge data. The storm surge flood depth used must equal or exceed the 100-year flood event and must be calculated using NAVD 88.
- The depth of potential future flooding from combinations of sea level rise, storm surge, and high tides using, at a minimum, all of the following:
 - Two local sea level rise scenarios, which must equal or exceed the 2017 NOAA intermediate-low and intermediate-high sea level rise projections.
 - At least two planning horizons that must be, at a minimum, 20 years and 50 years from the date of the assessment.
 - Local sea level rise data that has been interpolated between the two closest coastal tide gauges with NOAA sea level rise data.
 - The depth of expected storm surge flooding using FEMA storm surge data. The storm surge flood depth used must equal or exceed the 100-year flood event and must be calculated using NAVD 88.
 - Future high tide flooding, which must be derived using NOAA Technical Report NOS CO-OPS 086.

The bill requires DEP to submit written notification to the President of the Senate and the Speaker of the House of Representatives when any scientific source or standard specifically referenced in the subsection establishing the Resilient Florida Grant Program is updated or replaced with a subsequent source or standard. The written notification must be submitted within 30 days of DEP learning of an update or replacement.

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

The bill requires 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, such as elevation, tidal levels, and precipitation. The data set must be sufficient to conduct a comprehensive statewide flood vulnerability and sea level rise assessment. The bill requires 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.

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...”

The bill requires 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. DEP must use the statewide data set to conduct the assessment. The assessment must incorporate local and regional analyses of vulnerability and risks.

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

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

The assessment must identify and analyze the vulnerability of and risks to such critical assets.

The bill requires DEP to update both the data set and the assessment every three years. 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 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.

Each project included in the plan must have a minimum 50 percent cost share. The total amount of funding proposed in the plan 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.

The bill requires each plan submitted by 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 bill requires the water management districts (WMDs) to submit to DEP a list of proposed projects for inclusion in the plan by September 1, 2021, and each September 1 thereafter. The bill authorizes local governments, and regional entities whose responsibilities include addressing

flooding or sea level rise, to submit to the WMDs proposed projects for such purposes. The projects submitted by the WMDs to DEP must mitigate or eliminate risks of flooding or sea level rise. The WMDs must include for each project the aforementioned project-specific information required for DEP's plan. In addition to the list of proposed projects, the WMDs must submit to DEP a corresponding evaluation for each proposed project. The evaluation must assess the degree to which the project addresses the following:

- Threats to critical assets, including regionally significant assets, and reductions of future damage costs.
- Risks identified in local government vulnerability assessments or the statewide assessment, as applicable.

For a project to be eligible for inclusion in DEP's plan, it must address risks to a critical asset identified in a local government vulnerability assessment or the statewide assessment, as applicable. The bill states that projects ineligible for inclusion in the plan include, but are not limited to, the following:

- Aesthetic vegetation.
- Recreational structures such as piers, docks, and boardwalks.
- Water quality components of stormwater and wastewater management systems, except projects to prevent saltwater intrusion.
- Maintenance and repair of over-walks.
- Park activities and facilities, except projects to control flooding or erosion.
- Navigation construction, operation, and maintenance activities.
- Projects that provide only recreational benefits.

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

- Tier 1 must account for 50 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.
- Tier 2 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 cost-share percentage, 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 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 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 current condition of the project area, including any recent impacts from storm damage.
 - The use of practices that reduce losses due to flooding and claims made under flood insurance policies issued in Florida.
 - 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.
 - The exceedance of the flood-resistant construction requirements of the Florida Building Code and applicable floodplain 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 environmental habitat enhancement or the inclusion of nature-based options for resilience, prioritizing state or federal critical habitat areas for threatened or endangered species.
 - The assistance to 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 thereafter, must address risks of flooding and sea level rise identified in the statewide assessment.

Regional Resilience Coalitions

The bill authorizes counties and municipalities to enter into agreements to form regional resilience coalitions. The purpose of these coalitions is planning for the resilience needs of communities and coordinating intergovernmental solutions to mitigate the adverse impacts of flooding and sea level rise. Regional resilience coalitions may provide technical assistance to counties and municipalities for:

- Preparing and conducting vulnerability assessments and developing plans and policies funded by the Resilient Florida Grant Program.
- Developing project proposals to be submitted for inclusion in the Statewide Flooding and Sea-Level Rise Resilience Plan and implementing projects that are approved for funding.

The bill authorizes DEP, subject to specific legislative appropriation, to provide funding to regional resilience coalitions for the purpose of carrying out the requirements under section 1 of the bill.

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. USF's College of Marine Science 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 this state and to support ongoing flood research.
- Coordinate with agencies, including, but not limited to, DEP and WMDs.
- Share its resources and expertise.
- Assist in the development of training and a workforce in this 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 the bill 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 establishes requirements for the Office of Economic and Demographic Research (EDR) to conduct an annual assessment of Florida's water resources and conservation lands.

The bill requires EDR to include in its annual assessment an analysis of inland and coastal flood control, beginning with the assessment due by January 1, 2022. 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 recurring

expenditures are made, 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 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 DEP. 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 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 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.

VI. Technical Deficiencies:

None.

VII. Related Issues:

None.

VIII. Statutes Affected:

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

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 by Environment and Natural Resources Committee 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.

This Senate Bill Analysis does not reflect the intent or official position of the bill's introducer or the Florida Senate.
