**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 Infrastructure and Security

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|---|---|
| BILL: | CS/SR 1572 |
| INTRODUCER: | Infrastructure and Security Committee and Senator Stewart |
| SUBJECT: | Climate Change |
| DATE: | January 28, 2020 |
| REVISED: | |

| | ANALYST | STAFF DIRECTOR | REFERENCE | ACTION |
|---|---|---|---|---|
| 1. | Price | Miller | IS | **Fav/CS** |
| 2. | | | EN | |
| 3. | | | RC | |

**Please see Section IX. for Additional Information:**

COMMITTEE SUBSTITUTE - Substantial Changes

## I. Summary:

CS/SR 1572 expresses the Legislature's support for the adoption of policies that will prepare this state for the environmental and economic impact of climate change, sea-level rise, and flooding, and recognizes the important role that resiliency and infrastructure will play in fortifying this state.

The SR states that the Legislature intends to adopt:

- Policies focusing on resiliency efforts and appropriate infrastructure which prepare Florida for the environmental and economic impact of climate change, sea-level rise, and flooding, and
- Policies relating to clean and renewable energy, including the provision of adequate electric vehicle charging stations.

Legislative resolutions have no force of law and are not subject to the approval or veto powers of the Governor.

## II. Present Situation:

### Sea-Level Rise and Coastal Flooding

With 1,350 miles of coastline and relatively low elevations, Florida is particularly vulnerable to coastal flooding.[1] There are three primary ways that climate change influences coastal flooding: sea-level rise, storm surge intensity, and rainfall intensity and frequency.[2]

Sea-level rise is an observed increase in the average local sea level or global sea level trend.[3] The two major causes of global sea-level rise are thermal expansion caused by the warming of the oceans (water expands as it warms) and the loss of land-based ice (ice sheets and glaciers) due to melting.[4] Since 1880, the average global sea level has risen about eight to nine inches, and the rate of global sea-level rise has been accelerating.[5] The National Oceanic and Atmospheric Administration (NOAA) utilizes tide gauges to measure changes in sea level, and provides data on local sea-level rise trends.[6] Analysis of this data shows some low-lying areas in the southeastern U.S. experience higher local rates of sea-level rise than the global average.[7]

Florida's coastal communities are experiencing high-tide flooding events, sometimes referred to as "sunny day" or "nuisance" flooding, with increasing frequency because sea-level rise increases the height of high tides.[8] The areas of the state most at risk from sea-level rise include the 35 coastal counties that contain approximately 76 percent of Florida's population.[9] In the United States, sea-level rise and flooding threaten an estimated $1 trillion in coastal real estate value, and analyses estimate that there is a chance Florida could lose more than $300 billion in

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[1] Florida Division of Emergency Management, *Enhanced State Hazard Mitigation Plan, State of Florida*, 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 January 23, 2020). This measurement of Florida's coastline increases to over 8,000 miles when considering the intricacies of Florida's coastline, including bays, inlets, and waterways.
[2] *Id.* at 107.
[3] DEP, *Florida Adaptation Planning Guidebook*, Glossary (2018) [hereinafter *DEP Guidebook*], *available at* https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf; *see* NASA, Facts, *Vital Signs: Sea Level*, https://climate.nasa.gov/vital-signs/sea-level/ (last visited January 23, 2020).
[4] *DEP Guidebook*, at Glossary; NOAA, *Climate Change: Ocean Heat Content*, https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content (last visited January 23, 2020). More than 90 percent of the warming that has happened on Earth over the past 50 years has occurred in the ocean; IPCC, *The Ocean and Cryosphere in a Changing Climate*, SPM-8, SPM-10, SPM-19, SPM -21, SPM-23, 1-14, 4-3, 4-4, 4-14 (Sept. 2019) [hereinafter *IPCC Ocean and Cryosphere*], *available at* https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf (last visited January 23, 2020). Uncertainty regarding projected sea-level rise by 2100 is mainly determined by ice sheets, especially in Antarctica and Greenland, which are losing ice at increasing rates. The sum of glacier and ice sheet contributions is now the dominant source of global mean sea-level rise.
[5] U.S. Global Change Research Program, *Fourth National Climate Assessment*, 757 (2018)[hereinafter *NCA4*], *available at* https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (last visited January 23, 2020); *IPCC Ocean and Cryosphere*, at SPM-10, 4-3.
[6] NOAA, *What is a Tide Gauge?*, https://oceanservice.noaa.gov/facts/tide-gauge.html (last visited January 23, 2020); NOAA, Tides and Currents, *Sea Level Trends*, https://tidesandcurrents.noaa.gov/sltrends/ (last visited January 23, 2020); *see DEP Guidebook*, at 8, 16.
[7] *NCA4*, at 757.
[8] *SHMP*, at 108, 101, *available at* https://www.floridadisaster.org/globalassets/dem/mitigation/mitigate-fl--shmp/shmp-2018-full_final_approved.6.11.2018.pdf; NOAA, *High-Tide Flooding*, https://toolkit.climate.gov/topics/coastal-flood-risk/shallow-coastal-flooding-nuisance-flooding (last visited January 23, 2020).
[9] *DEP Guidebook*, at III, *available at* https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf (last visited January 23, 2020).

property value by 2100.[10] Sea-level rise affects the salinity of both surface water and groundwater through saltwater intrusion, posing a risk particularly for shallow coastal aquifers.[11] Sea-level rise also pushes saltwater further upstream in tidal rivers and streams, raises coastal groundwater tables, and pushes saltwater further inland at the margins of coastal wetlands.[12]

Storm surge intensity and the intensity and precipitation rates of hurricanes are generally projected to increase,[13] and studies suggest the overall extent of destruction from hurricanes is also rising.[14] Higher sea levels will cause storm surges to travel farther inland and impact more properties than in the past.[15] Stronger storms and sea-level rise are likely to lead to increased coastal erosion.[16]

Increases in evaporation rates and water vapor in the atmosphere increase rainfall intensity and extreme precipitation events, and the sudden onset of water can overwhelm stormwater infrastructure.[17] As sea levels and groundwater levels rise, low areas drain more slowly, and the combined effects of rising sea levels and extreme rainfall events are increasing the frequency and magnitude of coastal and lowland flood events.[18]

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[10] *NCA4*, at 324, 758; Zillow, *Climate Change and Housing: Will a Rising Tide Sink All Homes?* (2017), https://www.zillow.com/research/climate-change-underwater-homes-12890/ (last visited January 23, 2020) (stating that by 2100 $883 billion in U.S. homes are at risk of being underwater with the total value of potentially underwater properties in Florida at $413 billion); Union of Concerned Scientists, *New Study Finds 1 Million Florida Homes Worth $351 Billion Will Be At Risk From Tidal Flooding* (2018), https://www.ucsusa.org/about/news/1-million-florida-homes-risk-tidal-flooding (last visited January 23, 2020).

[11] *SHMP*, at 106, *available at* https://www.floridadisaster.org/globalassets/dem/mitigation/mitigate-fl--shmp/shmp-2018-full_final_approved.6.11.2018.pdf (last visited January 23, 2020).

[12] *Id.* at 108.

[13] *Id.* at 106, 141; *IPCC Ocean and Cryosphere*, at 6-21, *available at* https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf; *NCA4*, at 95, 97, 116-117, 1482, *available at* https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (last visited January 23, 2020).

[14] *See* Aslak Grinsted et. al., *Normalized US Hurricane Damage Estimates Using Area of Total Destruction, 1900-2018*, Proceedings of the National Academy of Sciences Nov. 2019, 116 (48) 23942-23946, *available at* https://www.pnas.org/content/116/48/23942 (last visited January 23, 2020).

[15] *NCA4*, at 758; *SHMP*, at 107; *see also* NOAA, *Florida Marine Debris Emergency Response Guide: Comprehensive Guidance Document* (Jan. 2019), *available at* https://marinedebris.noaa.gov/sites/default/files/publications-files/FL_Marine_Debris_Emergency_Response_Guide_2019.pdf (last visited January 23, 2020).

[16] *NCA4*, 331, 340-341, 833, 1054, 1495; *SHMP*, at 108, 221; IPCC, *Climate Change and Land*, 4-44–4-45 (Aug. 2019), *available at* https://www.ipcc.ch/site/assets/uploads/2019/08/Fullreport-1.pdf (last visited January 23, 2020).

[17] *SHMP*, at 99, 106, 116, 141, 181; *NCA4*, at 88, 762-763; *see* Florida Senate, Committee on Infrastructure and Security, *Meeting Packet for October 14, 2019*, 16-20, 23, *available at* http://www.flsenate.gov/Committees/Show/IS/MeetingPacket/4649/8266_MeetingPacket_4649_2.pdf (last visited January 23, 2020).

[18] *SHMP*, at 106; *NCA4*, at 763.

***Sea-Level Rise Projections***

Below is a table of projections for future sea-level rise, globally and in regions of Florida:

| Sea-Level Rise Projections | | | | |
|---|---|---|---|---|
| **Source** | **Scale** | **Years** | **Low (feet)** | **High (feet)** |
| Intergovernmental Panel on Climate Change[19] | Global | 2046-2065 | 0.79 | 1.05 |
| | | 2081-2100 | 1.28 | 2.32 |
| | | 2100 | 1.41 | 2.76 |
| U.S. Global Change Research Program[20] | Global | 2030 | 0.3 | 0.6 |
| | | 2050 | 0.5 | 1.2 |
| | | 2100 | 1 | 4.3 |
| Southeast Florida Regional Climate Change Compact Sea Level Rise Work Group[21] (SFRCCC) | Southeast Florida | 2030 | 0.5 | 0.83 |
| | | 2060 | 1.17 | 2.83 |
| | | 2100 | 2.58 | 6.75 |
| Tampa Bay Climate Science Advisory Panel[22] | Tampa Bay Region | 2050 | 1 | 2.5 |
| | | 2100 | 2 | 8.5 |

As seen in these projections, there are considerable variations in estimates of future sea-level rise. In addition, certain research indicates that current sea-level rise projections significantly underestimate future coastal exposure to impacts associated with rising sea levels.[23] Although some local governments and state agencies have adopted sea-level rise estimates for planning purposes, the State of Florida has no officially-established estimates of projected sea-level rise for use by state agencies in developing, planning, and implementing their respective duties and responsibilities.[24] Senate Bill 7016 (2020) relating to the Statewide Office of Resiliency, would

[19] *IPCC Ocean and Cryosphere*, at SPM-7, 4-4, CCB9-21, AI-23. These projected ranges are based on climate models using "representative concentration pathways (RCPs)," which are scenarios of future emissions and concentrations of the full suite of greenhouse gases and aerosols and chemically active gases, as well as land use/land cover.

[20] *NCA4*, at 406, 758, *available at* https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (last visited January 23, 2020).

[21] Southeast Florida Regional Climate Change Compact Sea Level Rise Work Group, *Unified Sea Level Rise Projection, Southeast Florida*, 4-5 (2015), *available at* https://southeastfloridaclimatecompact.org/wp-content/uploads/2015/10/2015-Compact-Unified-Sea-Level-Rise-Projection.pdf (last visited January 23, 2020). These projections are compared to the mean sea level in 1992; *see* SFRCCC, *Unified Sea Level Rise Projections*, https://southeastfloridaclimatecompact.org/resources/unified-sea-level-rise-projections/ (last visited January 23, 2020). The SFRCCC will soon release updated projections.

[22] Tampa Bay Climate Science Advisory Panel, *Recommended Projections of Sea Level Rise in the Tampa Bay Region*, 1, 7 (Apr. 2019), *available at* http://www.tbrpc.org/wp-content/uploads/2019/05/CSAP_SLR_Recommendation_2019.pdf (last visited January 23, 2020).

[23] *See* Scott A. Kulp & Benjamin H. Strauss, *New Elevation Data Triple Estimates of Global Vulnerability to Sea-Level Rise and Coastal Flooding*, Nature Communications 10, 4844 (Oct. 2019), *available at* https://www.nature.com/articles/s41467-019-12808-z.pdf (last visited January 23, 2020).

[24] Senate Committee on Infrastructure and Security, *Bill Analysis and Fiscal Impact Statement* for Senate Bill 7016 (January 22, 2020), available at http://www.flsenate.gov/Session/Bill/2020/7016/Analyses/2020s07016.pre.ap.PDF (last visited January 24, 2020).

create a task force process to develop consensus baseline projections of expected coastal sea-level rise and flooding impacts.[25]

***State, Regional, and Local Programs***

Many state, regional, and local programs and policies are in place that address issues relating to sea-level rise and coastal flooding. Examples include the following:

- The Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection implements numerous programs related to sea-level rise and coastal issues, including the Coastal Construction Control Line Program and the Beach Management Funding Assistance Program.[26]
- The DEP's Florida Resilient Coastlines Program helps prepare coastal communities and habitats for the effects of climate change, especially sea-level rise, by offering technical assistance and funding to communities dealing with coastal flooding, erosion, and ecosystem changes.[27]
- Other state agencies are working on coastal resilience in Florida, including the following examples. The Department of Transportation plans for resilience to prepare Florida's transportation system for potential hazards.[28] The Department of Economic Opportunity assists communities with adaptation planning and works with the DEP on the Community Resiliency Initiative.[29] The Fish and Wildlife Conservation Commission is Florida's lead agency on addressing the impacts of climate change on fish and wildlife, including adaptation strategies for Florida's coastal ecosystems.[30] The Department of Agriculture and Consumer Services develops Florida's energy policy and works on climate change issues.[31] The Division of Emergency Management in the Executive Office of the Governor maintains a statewide emergency management program, and its roles include administering federal mitigation grant programs and serving as Florida's state coordinating agency for the National Flood Insurance Program.[32]
- The water management districts address flood protection as a core part of their respective missions, and many of their activities are related to resilience efforts. For example, the St. John's River Water Management District provides resources and cost-sharing to increase community resilience.[33] The South Florida Water Management District is implementing

[25] Senate Bill 7016 (2020), available at http://www.flsenate.gov/Session/Bill/2020/7016/?Tab=BillText (last visited January 24, 2020).
[26] DEP, *Beaches*, https://floridadep.gov/rcp/beaches (last visited January 23, 2020).
[27] DEP, *Florida Resilient Coastlines Program*, https://floridadep.gov/rcp/florida-resilient-coastlines-program (last visited January 23, 2020).
[28] DOT, *Florida Transportation Plan (FTP): Resilience*, http://www.floridatransportationplan.com/resilience.htm (last visited January 23, 2020); DOT, *Florida Transportation Plan (FTP): Resilience Subcommittee Members*, http://www.floridatransportationplan.com/resilience_committee.htm (last visited January 23, 2020).
[29] DEO, *Adaptation Planning*, http://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/adaptation-planning (last visited January 23, 2020).
[30] FWC, *What FWC is Doing*, https://myfwc.com/conservation/special-initiatives/climate-change/fwc/ (last visited January 23, 2020); FWC, *A Guide to Climate Change Adaptation for Conservation*, 6-81–6-108, 9-35–9-51 (2016), *available at* https://myfwc.com/media/5864/adaptation-guide.pdf (last visited January 23, 2020).
[31] DACS, *Office of Energy*, https://www.fdacs.gov/Divisions-Offices/Energy (last visited January 23, 2020).
[32] DEM, *Mitigation*, https://www.floridadisaster.org/dem/mitigation/ (last visited January 23, 2020); DEM, *State Flood Plain Management Program*, https://www.floridadisaster.org/dem/mitigation/floodplain/ (last visited January 23, 2020).
[33] St. John's River Water Management District, *Sea-Level Rise*, https://www.sjrwmd.com/localgovernments/sea-level-rise/#projects (last visited January 23, 2020).

comprehensive plans for addressing sea-level rise, including a flood protection level of service program, incorporating sea-level rise projections into planning, conducting vulnerability assessments, and assisting local governments.[34]

- In 2010, through a proactive regional collaboration to address climate change, the four counties of Broward, Miami-Dade, Monroe, and Palm Beach formed the Southeast Florida Regional Climate Change Compact.[35] The Compact's innovative work includes developing a Regional Climate Action Plan and developing a Unified Sea-Level Rise Projection.[36] Many local governments in southeast Florida have incorporated the Compact's projections into their planning documents and policies.[37]
- Florida's local governments in coastal areas must have in their comprehensive plans a coastal management element that uses principles to reduce flood risk and eliminate unsafe development in coastal areas.[38] In certain coastal areas, local governments are authorized to establish an "adaptation action area" designation in their comprehensive plan, to develop policies and funding priorities that improve coastal resilience and plan for sea-level rise.[39]

In January of 2019, Governor DeSantis issued Executive Order 19-12, creating the Office of Resilience and Coastal Protection to help prepare Florida's coastal communities and habitats for impacts from sea-level rise by providing funding, technical assistance, and coordination among state, regional, and local entities.[40] In August of 2019, the Governor appointed Florida's first Chief Resilience Officer, which will report to the Executive Officer of the Governor and collaborate with state agencies, local communities, and stakeholders to prepare for the impacts of sea-level rise and climate change.[41]

## III. Effect of Proposed Changes:

The CS/SR contains "Whereas" clauses stating that:

- The State of Florida has 1,350 miles of low-elevation coastline, and 75 percent of this state's population are living in coastal counties that generate a significant portion of this state's economic output;[42]

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[34] Akintunde Owosina, South Florida Water Management District, Governing Board Meeting, June 13, 2019, Chief, Hydrology and Hydraulics Bureau, *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 January 23, 2020).

[35] Regional Climate Leadership Summit, *Southeast Florida Regional Climate Change Compact* (2010), *available at* http://southeastfloridaclimatecompact.org/wp-content/uploads/2014/09/compact.pdf; SFRCCC, *What is the Compact?*, http://southeastfloridaclimatecompact.org/about-us/what-is-the-compact/ (last visited January 23, 2020).

[36] SFRCCC, *Regional Climate Action Plan*, http://southeastfloridaclimatecompact.org/regional-climate-action-plan/ (last visited January 23, 2020).

[37] *See* SFRCCC, *ST-1: Incorporate Projections Into Plans*, http://southeastfloridaclimatecompact.org/recommendations/incorporate-projections-into-plans/ (last visited January 23, 2020).

[38] *See* ss. 380.24, 163.3177(6)(g), and 163.3178(2)(f), F.S.; *see* Ch. 2015-69, Laws of Fla.

[39] *See* ss. 163.3177(6)(g)10. and 163.3164(1), F.S.; *see* Ch. 2011-139, Laws of Fla.

[40] State of Florida, Office of the Governor, *Executive Order Number 19-12*, 5 (2019), *available at* https://www.flgov.com/wp-content/uploads/2019/01/EO-19-12-.pdf (last visited January 23, 2020).

[41] Governor Ron DeSantis, News Releases, *Governor Ron DeSantis Announces Dr. Julia Nesheiwat as Florida's First Chief Resilience Officer* (Aug. 1, 2019), https://flgov.com/2019/08/01/governor-ron-desantis-announces-dr-julia-nesheiwat-as-floridas-first-chief-resilience-officer/ (last visited January 23, 2020).

[42] *Supra* note 1.

- The residents and the economy of this state, and the State of Florida itself, would benefit from the development of an established estimated consensus projection of the anticipated sea-level rise and flooding impacts to these communities in developing future projects, plans, and programs;
- Clean and renewable energy is a tool that combats climate change, and the provision of adequate electric vehicle charging stations along our main transportation infrastructure will make a cleaner fuel source more readily available and reduce carbon dioxide emissions; and
- Appropriate infrastructure will continue to fortify and protect this state.

The SR states that the Legislature intends to adopt:

- Policies focusing on resiliency efforts and appropriate infrastructure which prepare Florida for the environmental and economic impact of climate change, sea-level rise, and flooding, and
- Policies relating to clean and renewable energy, including the provision of adequate electric vehicle charging stations.

Legislative resolutions have no force of law and are not subject to the approval or veto powers of the Governor.

## 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:

None.

C. Government Sector Impact:

None.

## VI. Technical Deficiencies:

None.

## VII. Related Issues:

None.

## VIII. Statutes Affected:

This Senate resolution does not amend the Florida Statutes. If enacted, it will become an undesignated chapter law codified in the Laws of Florida.

## 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 Infrastructure and Security on January 26, 2020:**
The committee substitute revises the "whereas" clauses contained in the Senate Resolution to focus on the benefit to the state and its residents of established estimated consensus projections of sea-level rise and flooding with respect to developing future projects, plans, and programs in coastal communities; and on clean and renewable energy with respect to reducing carbon dioxide emissions as a tool for combating climate change, including the provisions of adequate electric vehicle charging stations along Florida's main infrastructure.

The Senate Resolution is also revised to provide the Legislature's intent to adopt policies focusing on resiliency efforts and appropriate infrastructure which prepare Florida for the environmental and economic impact of climate change, sea-level rise, and flooding and policies relating to clean and renewable energy, including the provision of adequate electric vehicle charging stations.

B. Amendments:

None.