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:	SB 1238
INTRODUCER:	Senator Polsky
SUBJECT:	Saltwater Intrusion Vulnerability Assessments
DATE:	January 28, 2022
REVISED:	

	ANALYST	STAFF DIRECTOR	REFERENCE	ACTION
1.	Collazo	Rogers	EN	**Pre-meeting**
2.			GO	
3.			AP	

I. Summary:

SB 1238 amends s. 380.093, F.S., to require each coastal county in Florida to conduct a saltwater intrusion vulnerability assessment (Assessment) by September 1, 2022. The purpose of the Assessment is to analyze the effects of saltwater intrusion on the county's water supply and the preparedness of the county to respond to such threat. The bill identifies the information that must be included in the Assessment.

Each coastal county must provide the Department of Environmental Protection (DEP) and the respective water management districts (WMDs) with a copy of the county's Assessment. DEP must use the information to update the comprehensive statewide flood vulnerability and sea level rise data set that state law requires DEP to maintain. The WMDs must, in collaboration with their coastal counties, use the information detailed in the assessments to submit projects to DEP as provided by state law.

The bill also provides that for coastal counties with populations of 200,000 or less, DEP must provide 50 percent cost-share funding, up to $150,000, for each county's saltwater intrusion vulnerability assessment. DEP must make the vulnerability assessment information it receives from coastal counties accessible to the public on DEP's website.

II. Present Situation:

Saltwater Intrusion

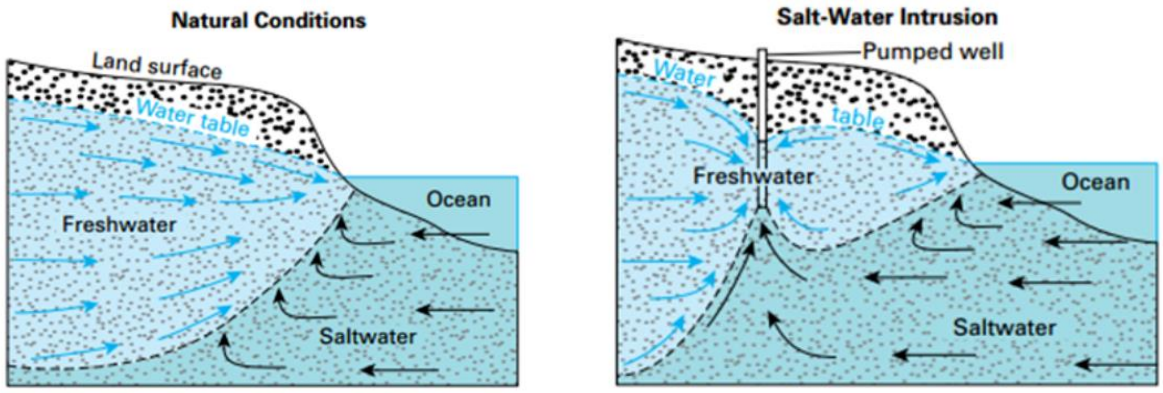
Drinking water in Florida comes primarily from water found within underground layers of water-bearing rock or sand called aquifers.[1] Aquifers can be thought of as vast underground, porous

[1] *See* South Florida Water Management District (SFWMD), *Saltwater Intrusion in Coastal Aquifers*, https://storymaps.arcgis.com/stories/3731671833e34567b783e9b881a8b36e (last visited Jan. 25, 2022); *see also* St. Johns River Water Management District (SJRWMD), *Florida's Aquifers,* https://www.sjrwmd.com/water-supply/aquifer/ (last visited Jan. 25, 2022).

rocks that hold water and allow water to move through the holes within the rock. They can be composed of different types of earthen materials, such as sand, shell, and limestone. Fresh and salt water fill the various sized holes in the rock; freshwater generally fills the uppermost part of aquifers, while saltwater is present at greater depths.[2] Where these aquifer layers meet the ocean (referred to as the freshwater/saltwater interface and depicted in the illustration below),[3] there is the possibility of saltwater moving inland and polluting the freshwater aquifers.[4]

Saltwater intrusion is the movement of saline water into freshwater aquifers resulting in contamination of drinking water resources.[5] It is caused by drilling wells too deep, excessive groundwater pumping, sea level rise, severe drought, and other factors.[6] It occurs in different ways, including lateral encroachment from coastal waters and vertical movement of saltwater near discharging wells.[7]

Under natural conditions, the seaward movement of freshwater prevents saltwater from encroaching on freshwater coastal aquifers. However, groundwater pumping can reduce freshwater flow toward coastal areas and cause saltwater to be drawn toward the freshwater zones of the aquifer.[8] Rising sea levels also push saltwater upstream in tidal rivers and streams, raise coastal ground water tables, and push saltwater further inland in soils at the margins of coastal wetlands causing wetland boundaries to expand where they are unimpeded.[9]



(Effects on Coastal Waters)[10]

[2] SJRWMD, *Florida's Aquifers,* https://www.sjrwmd.com/water-supply/aquifer/ (last visited Jan. 25, 2022).
[3] *Id.*
[4] SFWMD, *Saltwater Intrusion in Coastal Aquifers,* https://storymaps.arcgis.com/stories/3731671833e34567b783e9b881a8b36e (last visited Jan. 25, 2022).
[5] University of Pennsylvania, The Water Center, *Salt Instrusion: A Threat to Source Water Quality,* https://watercenter.sas.upenn.edu/salt-intrusion-a-threat-to-source-water-quality/ (last visited Jan. 25, 2022).
[6] *Id.;* U.S. Geological Survey (USGS), *Seawater Intrusion,* https://www.usgs.gov/mission-areas/water-resources/science/saltwater-intrusion (last visited Jan. 25, 2022); SJRWMD, *Florida's Aquifers,* https://www.sjrwmd.com/water-supply/aquifer/ (last visited Jan. 25, 2022).
[7] USGS, *Seawater Intrusion,* https://www.usgs.gov/mission-areas/water-resources/science/saltwater-intrusion (last visited Jan. 25, 2022).
[8] *Id.*
[9] Dep't of Emergency Management, *Enhanced State Hazard Mitigation Plan*, 107-108 (2018), *available at* https://www.floridadisaster.org/globalassets/dem/mitigation/mitigate-fl--shmp/shmp-2018-full_final_approved.6.11.2018.pdf (last visited Jan. 20, 2022).
[10] USGS, *Seawater Intrusion,* https://www.usgs.gov/mission-areas/water-resources/science/saltwater-intrusion (last visited Jan. 25, 2022).

Water for drinking, irrigation, and most industrial uses needs to be potable.[11] Contamination from ocean saltwater moving into the aquifer means users must find another source of freshwater or treat the water to remove the salt, which is costly.[12] Public water supply utilities may shut down a well if it becomes too salty.[13] Utilities with wellfields near the freshwater/saltwater interface that do not have an inland wellfield, have not developed alternative water supply sources, and have limited ability during a drought to meet user needs through interconnects with other utilities are considered more vulnerable.[14]

Saltwater intrusion can cause flooding.[15] Because saltwater is denser than freshwater, the aquifer becomes stratified with a layer of freshwater that sits atop a layer of denser saltwater below. When sea level rise acts upon an aquifer like this, it can cause the freshwater layer to rise in response. This causes flooding as the top of the water, called the water table, gets closer to ground surface.[16]

Saltwater intrusion can also cause a decline in forest and agricultural productivity. Saltwater degrades coastal wetlands and barrier islands, which buffer inland areas from storm surge, by killing less salt-tolerant species and leaving behind "ghost forests" or wetland areas with only standing dead trees.[17] Over time, saltwater intrusion, along with rising sea levels, convert these diverse wetland ecosystems into grass marshes and eventually into open water. The loss in forest and agricultural productivity due to increased soil salinity results in decreased ecosystem diversity and habitat for birds, fish, and the animals that prey on them.[18]

Coastal counties exhibiting the following characteristics are particularly susceptible to lateral saltwater intrusion:[19]

- Proximity to the ocean, inlets, and lagoons.
- A large number of coastal wellfields.
- Low land surface elevations (less than 10 feet above mean sea level).
- Drainage canals that lower the water table, which reduce the water pressure exerted against the saltwater interface.
- Canals without coastal water control structures to inhibit inland movement of seawater.
- Rising sea levels.[20]

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[11] *Id.; see also* Scott Jasechko et al., *Groundwater Level Observations in 250,000 Coastal US Wells Reveal Scope of Potential Seawater Intrusion*, 11 NATURE COMMUNICATIONS 3229 (2020), *available at* https://www.nature.com/articles/s41467-020-17038-2 (last visited Jan. 25, 2022).
[12] SFWMD, *Saltwater Intrusion in Coastal Aquifers*, https://storymaps.arcgis.com/stories/3731671833e34567b783e9b881a8b36e (last visited Jan. 25, 2022).
[13] *Id.;* USGS, *Seawater Intrusion*, https://www.usgs.gov/mission-areas/water-resources/science/saltwater-intrusion (last visited Jan. 25, 2022).
[14] SFWMD, *Saltwater Intrusion in Coastal Aquifers*, https://storymaps.arcgis.com/stories/3731671833e34567b783e9b881a8b36e (last visited Jan. 25, 2022).
[15] *Id.*
[16] *Id.*
[17] U.S. Dep't of Agriculture, Climate Hubs, *Saltwater Intrusion*, https://www.climatehubs.usda.gov/taxonomy/term/399 (last visited Jan. 25, 2022).
[18] *Id.*
[19] *See* SFWMD, *Saltwater Intrusion in Coastal Aquifers*, https://storymaps.arcgis.com/stories/3731671833e34567b783e9b881a8b36e (last visited Jan. 25, 2022).
[20] *Id.*

Several assessments have been prepared relevant to the impact of sea level rise on water supplies. For example, the South Florida Water Management District has evaluated saltwater intrusion in the surficial aquifer system of the Big Cypress Basin and southwest Florida[21] and documented and mapped the saltwater interface in coastal aquifers within St. Lucie, Martin, Palm Beach, Broward, Collier, and Lee counties.[22] The U.S. Geological Survey conducts saltwater interface mapping for Miami-Dade and Monroe counties.[23] At least one evaluation of Florida's saltwater intrusion monitoring network has been performed.[24] The Northwest Florida Water Management District has commissioned a report evaluating saltwater intrusion in the Floridan Aquifer in Walton, Okaloosa, and Santa Rosa counties.[25] There is also research more directly considering the potential effects to human health from sea level rise and saltwater intrusion impacts on water supplies.[26]

Statewide Resilience Programs

In 2021, the Legislature, recognizing that Florida is vulnerable to flooding from increasing rainfall, storm surge, and sea level rise, established several statewide resilience programs.[27] Those programs include the following:

- The Department of Environmental Protection's (DEP's) Resilient Florida Grant Program provides grants to counties or municipalities for community resilience planning, such as vulnerability assessments, plan development, and projects to adapt critical assets.[28] The findings of the assessments must be reported to DEP.
- The Comprehensive Statewide Flood Vulnerability and Sea Level Rise Data Set and Assessment, which must be updated at least every five years.[29] DEP must:
    - By July 1, 2022, develop a statewide data set, including statewide sea level rise projections, containing information necessary to determine the risks of flooding and sea level rise to inland and coastal communities.
    - By July 1, 2023, develop a statewide assessment, using the statewide data set, identifying vulnerable infrastructure, geographic areas, and communities. The statewide assessment must include an inventory of critical assets.[30]

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[21] USGS, *Saltwater Intrusion in the Surficial Aquifer System of the Big Cypress Basin, Southwest Florida, and a Proposed Plan for Improved Salinity Monitoring: U.S. Geological Survey Open-File Report 2013-1088* (2013), *available at* http://pubs.usgs.gov/of/2013/1088/ (last visited Jan. 27, 2022).
[22] SFWMD, *Saltwater Interface Monitoring and Mapping Program, Technical Publication WS-58 (Dec. 2020)*, 1, *available at* https://www.sfwmd.gov/sites/default/files/documents/ws-58_swi_mapping_report_final.pdf (last visited Jan. 27, 2022).
[23] *Id.*
[24] Scott T. Prinos, *Saltwater Intrusion Monitoring in Florida*, 79 FLORIDA SCIENTIST 4, 269 (Fall 2016), *available at* https://www.jstor.org/stable/44113190 (last visited Jan. 27, 2022).
[25] HydroGeoLogic, Inc., *Saltwater Intrusion in the Floridan Aquifer in Walton, Okaloosa and Santa Rosa Counties, Florida, Eastern Model Domain, Final Report* (Sept. 2007), *available at* https://nwfwater.com/content/download/19030/127812/2007_09_HGL_R2_ED_model_final.pdf (last visited Jan. 27, 2022).
[26] Meagan L. Weisner, Florida Atlantic University Dep't of Geosciences, *Sea-Level Rise in South Florida: Impacts to Drinking Water and Human Health, available at* http://www.ces.fau.edu/arctic-florida/pdfs/meagan-weisner.pdf (last visited Jan. 27, 2022).
[27] *See* ch. 2021-28, Laws of Fla., codified in ss. 380.093, 380.0933, 403.928(4), F.S.
[28] Section 380.093(2)(a), F.S. "Critical asset" is defined to include broad lists of assets relating to transportation, critical infrastructure, emergency facilities, natural resources, and historical and cultural resources.
[29] Section 380.093(4), F.S.
[30] *Id.*

- The Statewide Flooding and Sea Level Rise Resilience Plan.[31]
  - By each December 1, DEP must develop the plan on a three-year planning horizon and submit it to the Governor and Legislature for funding of ranked projects. These projects must address risks of flooding and sea level rise to coastal and inland communities in the state.[32]
  - By each September 1, counties and municipalities may submit to DEP a list of proposed projects that address risks of flooding or sea level rise identified in vulnerability assessments meeting the requirements of the Resilient Florida Grant Program.[33]
  - By each September 1, each water management district and flood control district may submit to DEP a list of any proposed projects that mitigate the risks of flooding or sea level rise on water supplies or water resources of the state and a corresponding evaluation of each project.[34]

Coastal Counties

There are a total of 35 coastal counties in Florida, which are depicted in the following illustration:[35]

[31] Section 380.093(5), F.S.
[32] Section 380.093(5)(a)-(c), F.S.
[33] Section 380.093(5)(d)1., F.S.
[34] Section 380.093(5)(d)2., F.S.
[35] Dep't of Environmental Protection, *Map of Florida's Coastal Counties*, https://floridadep.gov/rcp/fcmp/documents/map-floridas-coastal-counties and https://floridadep.gov/sites/default/files/CPI-coastal-Florida-map.pdf (last visited Jan. 25, 2022).

Of these 35 counties, the following 18 counties are estimated to have populations that are less than 200,000 as of April 1, 2021:[36]

- Santa Rosa (191,911)
- Walton (77,941)
- Bay (178,282)
- Gulf (14,824)
- Franklin (12,364)
- Wakulla (34,311)
- Jefferson (14,590)
- Taylor (20,957)
- Dixie (16,804)
- Levy (43,577)
- Citrus (155,615)
- Hernando (196,540)
- Charlotte (190,570)
- Monroe (83,411)
- Martin (159,053)
- Indian River (161,702)
- Flagler (119,662)
- Nassau (93,012)

III. Effect of Proposed Changes:

The bill amends s. 380.093, F.S., to provide that by September 1, 2022, each coastal county in Florida must conduct a vulnerability assessment analyzing the effects of saltwater intrusion on the county's water supply and the preparedness of the county to respond to such a threat, including water utility infrastructure, wellfield protection, and freshwater supply management.

Each saltwater intrusion vulnerability assessment must include all of the following information:

- The county's primary water utilities.
- Current maps of the county's freshwater wellfields and latest saltwater intrusion impact lines.
- Projections of saltwater intrusion over the next decade, including specific wells that may be impacted during that timeframe.
- An analysis of the costs necessary to relocate freshwater wellfields that are anticipated to be impacted, including current projects that are underway to relocate them.

Each coastal county must provide the Department of Environmental Protection (DEP) and the respective water management districts (WMDs) with a copy of the county's saltwater intrusion vulnerability assessment. DEP must use the information to update the comprehensive statewide flood vulnerability and sea level rise data set that state law requires DEP to maintain. The WMDs must, in collaboration with their coastal counties, use the information detailed in the assessments to submit projects to DEP as provided by state law.

[36] Office of Economic and Demographic Research, *Florida Population Estimates by County and Municipality as of April 1, 2021, available at* http://www.edr.state.fl.us/Content/population-demographics/data/2021_pop_estimates.pdf (last visited Jan. 25, 2022).

DEP must make the vulnerability assessment information it receives from coastal counties accessible to the public on DEP's website.

The bill also provides that for coastal counties with populations of 200,000 or less, DEP must provide 50 percent cost-share funding, up to $150,000, for each county's saltwater intrusion vulnerability assessment.

The bill takes effect upon becoming a law.

IV. Constitutional Issues:

A. Municipality/County Mandates Restrictions:

Under Article VII, s. 18(a), Florida Constitution, a mandate includes a general bill requiring counties or municipalities to spend funds. One exemption from the mandates requirement is if the bill has an "insignificant fiscal impact." This bill requires coastal counties to spend funds to prepare the required saltwater intrusion vulnerability assessment. The fiscal impact is unknown at this time. The cost of the assessments may be offset by available state funds and existing research on the impacts of saltwater intrusion. If the bill does contain a mandate, the Florida Constitution requires the bill to fulfill an important state interest and be approved by a two-thirds vote of each house of the Legislature.

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:

Both DEP and all coastal counties will likely experience an increase in costs associated with preparing the required saltwater intrusion vulnerability assessments. Unless a coastal county has a population of 200,000 or less – in which case, DEP must share 50 percent of the costs with the county up to $150,000 – coastal counties are responsible for paying the full cost of preparing the assessments. However, Resilient Florida Grant Program funds may be available to fund some or all of these costs.

VI. Technical Deficiencies:

None.

VII. Related Issues:

None.

VIII. Statutes Affected:

This bill substantially amends section 380.093 of the Florida Statutes.

IX. Additional Information:

A. Committee Substitute – Statement of Changes:
(Summarizing differences between the Committee Substitute and the prior version of the bill.)

None.

B. Amendments:

None.