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 32
INTRODUCER:	Senators Garcia and Avila
SUBJECT:	Mangrove Replanting and Restoration
DATE:	December 5, 2023
REVISED:	

	ANALYST	STAFF DIRECTOR	REFERENCE	ACTION
1.	Barriero	Rogers	EN	**Pre-meeting**
2.			AEG	
3.			RC	

I. Summary:

SB 32 requires the Florida Department of Environmental Protection (DEP) to adopt rules for mangrove replanting and restoration. The bill requires the rules to address significant erosion in areas of critical state concern, protect barrier and spoil islands, assist Everglades restoration and Biscayne Bay revitalization efforts, promote public awareness, and identify vulnerable properties along the coastline and encourage partnerships with local governmental entities to create mangrove protection and restoration zone programs. The rules must also protect and maintain access to the navigation of the marked channel and the right-of-way of the Florida Intracoastal Waterway.

II. Present Situation:

Mangroves

Mangrove forests are a distinct saltwater woodland that thrive in tidal estuaries and low-energy shorelines throughout the tropics and sub-tropics. Florida is home to three types of native mangrove species—red (*Rhizophora mangle*), black (*Avicennia germinans*), and white (*Laguncularia racemosa*)—and has an estimated 600,000 acres of mangrove forests, the majority of which is found south of Cedar Key on the Gulf Coast and south of Cape Canaveral on the Atlantic Coast.[1]

[1] Florida Dep't of Environmental Protection (DEP), *Florida's Mangroves*, https://floridadep.gov/rcp/rcp/content/floridas-mangroves (last visited Nov. 16, 2023). However, mangroves are gaining ground along their northern Florida habitat limits, and as winter cold snaps decrease, mangroves are expected to expand further north into new territory. Kristen Minogue & Heather Dewar, Smithsonian Environmental Research Center, *With Fewer Hard Frosts, Tropical Mangroves Push North*, 1 (2013), *available at* https://sercblog.si.edu/with-fewer-hard-frosts-tropical-mangroves-push-north/.

Mangroves play an important ecological role as a habitat for various species of marine and estuarine vertebrates, invertebrates, and other wildlife,[2] including endangered and threatened species such as the manatee, hawksbill sea turtle, American crocodile, Key deer, and Florida panther—all of which rely on this habitat during some stage of their life cycle.[3] Mangrove branches act as bird rookeries and nesting areas for coastal wading birds, including egrets, herons, brown pelicans, and roseate spoonbills.[4] Their intricate root systems provide critical nursery habitats for fish, crustaceans, shellfish, and other marine life, allowing them to forage and grow while remaining protected from predators.[5] The roots also make ideal underwater perches for barnacles, oysters, crabs, and other marine organisms.[6] These organisms, in turn, provide food for juvenile fish, birds, reptiles, and other wildlife both above and below the water's surface.[7] Florida's important recreational and commercial fisheries would drastically decline without healthy mangrove forests.[8]

Mangroves also help maintain water quality and clarity by trapping sediments, absorbing nutrients, and removing pollutants that would otherwise end up in estuaries and coastal waters.[9] Their roots provide attachment surfaces for various marine organisms that filter water through their bodies and, in turn, trap and cycle nutrients.[10] Without natural filters like mangroves, dangerous conditions like red tide, sargassum, and algal blooms can proliferate.[11]

In addition, mangroves capture massive amounts of carbon dioxide emissions and other greenhouse gases from the atmosphere.[12] Wetlands primarily store carbon in the soils, where it can remain for centuries. This buried carbon is known as "blue carbon" because it is sequestered via photosynthesis and stored underwater in coastal ecosystems like mangrove forests, seagrass beds, and salt marshes.[13] Current studies suggest that mangroves and coastal wetlands annually sequester carbon at a rate 10 times greater than mature tropical forests, making them some of the most efficient natural carbon sinks in the world.[14]

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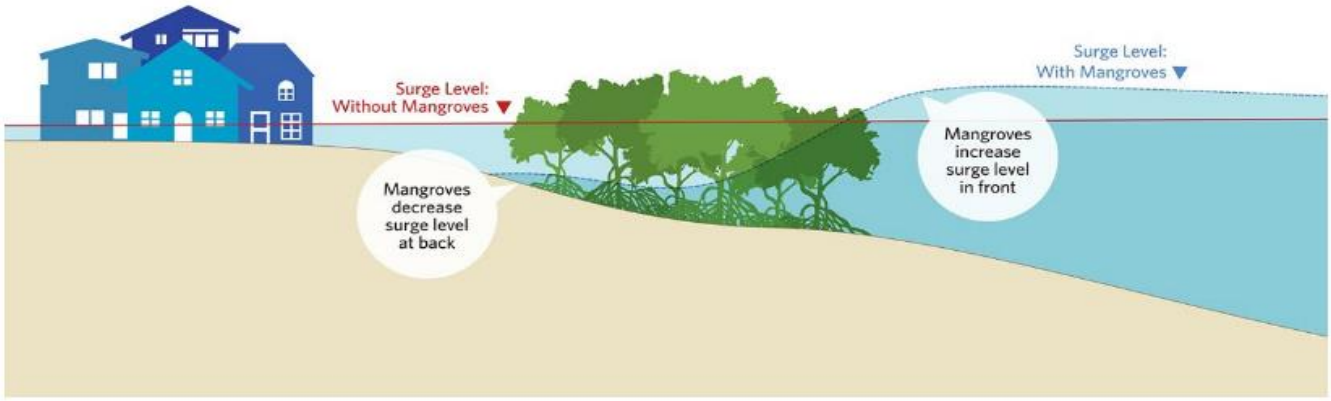
[2] Section 403.9322(2), F.S.
[3] Florida Museum, University of Florida, *South Florida Aquatic Environments: Mangrove Life*, https://www.floridamuseum.ufl.edu/southflorida/habitats/mangroves/mangrove-life/ (last visited Nov. 16, 2023). *See also* Teresa O'Reilly, University of Florida Institute of Food and Agricultural Sciences, *Mangroves in Florida*, https://blogs.ifas.ufl.edu/flaglerco/2018/02/09/mangroves-in-florida/ (last visited Nov. 16, 2023).
[4] Florida Museum, *South Florida Aquatic Environments: Mangrove Life*; DEP, *Florida's Mangroves*.
[5] Tiffany Duong, World Economic Forum, *Why planting mangroves can help save the planet* (2021), *available at* https://www.weforum.org/agenda/2021/08/planting-mangroves-helps-the-planet/.
[6] Hannah Waters, Smithsonian Institution, *Mangrove Restoration: Letting Mother Nature Do the Work* (2016), *available at* https://ocean.si.edu/ocean-life/plants-algae/mangrove-restoration-letting-mother-nature-do-work.
[7] *Id.*
[8] DEP, *Florida's Mangroves*, https://floridadep.gov/rcp/rcp/content/floridas-mangroves (last visited Nov. 16, 2023).
[9] Florida Fish and Wildlife Conservation Commission (FWC), *Mangrove Forests*, https://myfwc.com/research/habitat/coastal-wetlands/mangroves/ (last visited Nov. 16, 2023).
[10] DEP, *Florida's Mangroves*.
[11] Duong, *Why planting mangroves can help save the planet*.
[12] *See* Jean Brodeur et al., National Oceanic and Atmospheric Administration (NOAA), *NOAA Blue Carbon White Paper*, 1 (2022), *available at* https://repository.library.noaa.gov/view/noaa/40456; NOAA, *Coastal Blue Carbon*, https://oceanservice.noaa.gov/ecosystems/coastal-blue-carbon/ (last visited Nov. 16, 2023); Jessica Merzdorf, National Aeronautics and Space Administration (NASA), *NASA Study Maps the Roots of Global Mangrove Loss* (2020), *available at* https://www.nasa.gov/feature/goddard/2020/nasa-study-maps-the-roots-of-global-mangrove-loss.
[13] NOAA, *NOAA Blue Carbon White Paper* at 1.
[14] *Id.*

Mangroves' specialized root system can help prevent erosion by stabilizing shorelines.[15] They also protect against damage from storm surge by reducing wind and wave energy[16] in shallow shoreline areas.[17] According to one study by the Nature Conservancy, in Florida, mangroves prevented $1.5 billion in direct flood damages and protected over half a million people during Hurricane Irma in 2017, reducing damages by nearly 25 percent in counties with mangroves.[18] In Collier County, some regions immediately behind the county's mangroves receive annual risk reduction benefits of over $1 million.[19] Another study suggests that without the mangroves on Florida's coast, the storm surge of Hurricane Wilma would have extended up to 70 percent further inland.[20]



MANGROVE BENEFITS Surge is reduced behind mangroves, helping ease flooding to land and properties. © The Nature Conservancy

The amount of protection afforded by mangroves depends on the width of the forest. A narrow fringe of mangroves offers limited protection, while a wide fringe can considerably reduce wave and flood damage to landward areas by enabling overflowing water to be absorbed into the expanse of forest.[21] Notably, the Legislature has found that in Florida, many areas of mangroves occur as narrow riparian fringes that do not provide all the functions of mangrove forests or provide such functions to a lesser degree.[22]

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[15] DEP, *Florida's Mangroves*, https://floridadep.gov/rcp/rcp/content/floridas-mangroves (last visited Nov. 16, 2023); NASA, *NASA Study Maps the Roots of Global Mangrove Loss*, *available at* https://www.nasa.gov/feature/goddard/2020/nasa-study-maps-the-roots-of-global-mangrove-loss.

[16] On average, mangroves reduce wave heights by 31 percent. Siddharth Narayan et al., *The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defenses*, 4 (2016), *available at* https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154735.

[17] United States Army Corp of Engineers, *Engineering with Nature: An Atlas*, 110 (2018), *available at* https://erdc-library.erdc.dren.mil/jspui/handle/11681/27929; DEP, *What is a Mangrove?*, https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/what-mangrove (last visited Nov. 16, 2023); NASA, *NASA Study Maps the Roots of Global Mangrove Loss*.

[18] Siddharth Narayan et al., The Nature Conservancy, *Valuing the Flood Risk Reduction Benefits of Florida's Mangroves*, 2, *available at* https://www.nature.org/content/dam/tnc/nature/en/documents/Mangrove_Report_digital_FINAL.pdf.

[19] *Id.* at 10. Worldwide, mangroves reduce risk to more than 15 million people and prevent more than $65 billion in property damages each year. Duong, *Why planting mangroves can help save the planet*, *available at* https://www.weforum.org/agenda/2021/08/planting-mangroves-helps-the-planet/.

[20] Keqi Zhang et al., *The role of mangroves in attenuating storm surges*, 11-23 (2012), *available at* https://www.sciencedirect.com/science/article/abs/pii/S0272771412000674.

[21] DEP, *Florida's Mangroves*.

[22] Section 403.9322, F.S.

Human activities such as coastal development are responsible for destroying more mangrove forests worldwide than any other type of coastal habitat.[23] Climate change, which results in higher sea levels and more intense droughts and storms, is increasing the rate of mangrove loss.[24] In Florida, mangrove loss is compounded by the regional water management system that was built in South Florida between the late 19th and mid-20th centuries, which has reduced the natural flow of water through the Everglades to Florida Bay and other coastal bays.[25] Drier conditions can slow or stop the natural buildup of organic peat soils like those in the Everglades and cause the peat soils to collapse.[26]

State Regulation of Mangroves

In 1996, the Florida Legislature passed the Mangrove Trimming and Preservation Act (the Act) in ss. 403.9321 - 403.9333, F.S., to protect mangroves from unregulated removal, defoliation, and destruction.[27] The Act is implemented by DEP as well as several delegated local governments, including Broward, Hillsborough, Miami-Dade, and Pinellas Counties, the City of Sanibel, and the Town of Jupiter Island.[28]

Under the Act, a permit is generally required to alter or trim mangroves,[29] though certain statutory exemptions exist.[30] Property owners do not need a permit to trim their mangroves when the mangroves are in a riparian mangrove fringe (RMF)[31] and are no more than 10 feet in height, so long as the homeowner does not trim the mangroves below six feet in height and does not defoliate any mangrove. If the mangroves are more than 10 feet in height, the homeowner will need to hire a professional mangrove trimmer,[32] but they still may be exempt from permit requirements. However, if the mangroves are not in an RMF, the property owner will need to get a permit and a professional mangrove trimmer.[33]

Riparian property owners can obtain a permit from DEP to trim mangroves if:

- The trimming is conducted in an area where DEP has not delegated the authority to regulate mangroves to a local government;
- The trimming is supervised or conducted exclusively by a professional mangrove trimmer;

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[23] FWC, *Mangrove Forests*, https://myfwc.com/research/habitat/coastal-wetlands/mangroves/ (last visited Nov. 16, 2023).
[24] Miriam C. Jones et al., *Rapid inundation of southern Florida coastline despite low relative sea-level rise rates during the late-Holocene*, 1, 10 (2019), *available at* https://www.nature.com/articles/s41467-019-11138-4.
[25] United States Geological Survey, *Rising Sea Levels Could Accelerate Florida Bay Mangrove Loss* (2019), *available at* https://www.usgs.gov/news/national-news-release/rising-sea-levels-could-accelerate-florida-bay-mangrove-loss#:~:text=Florida%20has%20lost%20much%20of%20the%20mangrove%20forests,USGS%20research%20published%20in%20the%20journal%20Nature%20Communications.
[26] *Id.*
[27] Section 403.9322(1), F.S.
[28] *See* DEP, *Mangrove Trimming – Delegated Local Governments*, https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/mangrove-trimming-delegated-local (last visited Nov. 13, 2023).
[29] Section 403.9328(1), F.S.
[30] Section 403.9326, F.S.
[31] RMF is defined as mangroves growing along the shoreline on private property, property owned by a governmental entity, or sovereign submerged land, the depth of which does not exceed 50 feet. Section 403.9324(7), F.S.
[32] Section 403.9329, F.S., delineates the criteria for which persons may be considered a professional mangrove trimmer.
[33] DEP, *Mangrove Frequently Asked Questions*, no. 8, https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/mangrove-frequently-asked#whyimportant (last visited Nov. 16, 2023).

- The mangroves subject to trimming under the permit do not extend more than 500 feet waterward;
- No more than 65 percent of the mangroves along the shoreline which exceed six feet in pretrimmed height will be trimmed, and no mangrove will be trimmed so that the overall height of any mangrove is reduced to less than six feet; and
- No herbicide or other chemical will be used to remove the leaves of a mangrove.[34]

A general permit can also be obtained for the limited trimming of mangroves within existing navigational channels, basins, or canals to provide clearance for the navigation of watercraft if certain conditions are met.[35]

DEP may require mitigation if mangroves are to be trimmed or altered under a permit issued pursuant to s. 403.9238, F.S.[36] In such cases, DEP must establish reasonable mitigation requirements that allow the use of mitigation banks as an option, where appropriate.[37] Restoration or mitigation is required for any area in which five percent or more of the mangrove trees have been trimmed below six feet in height.[38] Restoration must be accomplished by replanting mangroves to achieve within five years a canopy area equivalent to the area destroyed.[39] Any replanting for restoration and mitigation must result in at least 80 percent survival of the planted mangroves one year after planting, otherwise additional mangroves must be planted and maintained until 80 percent survival is achieved.[40]

Where restoration or mitigation is not practicable, the impacts resulting from the destruction, defoliation, removal, or trimming of mangroves must be offset by donating an amount equivalent to the cost of creating mangrove wetlands at a 2-to-1 created versus affected ratio based on canopy area. The donation may not be less than $4 per square foot of created wetland area. Payments received as mitigation must be sufficient to offset impacts and be used for mangrove creation, preservation, protection, or enhancement.[41]

Any person who fails to obtain a permit before trimming or altering mangroves commits a first degree misdemeanor (or a second degree misdemeanor if the violation is due to reckless indifference or gross careless disregard), punishable by a fine of not more than $10,000 and/or 60 days in jail for each offense.[42] For second and subsequent violations, additional monetary penalties for each illegally trimmed mangrove are imposed as follows:

- Up to $100 for each mangrove illegally trimmed; or
- Up to $250 for each mangrove illegally altered.[43]

[34] Section 403.9327(1)(a), F.S.
[35] Section 403.9327(1)(b), F.S.
[36] Section 403.9332(1)(c), F.S.
[37] *Id.*
[38] Section 403.9332(1)(a), F.S.
[39] *Id.*
[40] Section 403.9332(1)(d), F.S.
[41] Section 403.9332(1)(c), F.S.
[42] Section 403.9332(2), F.S.
[43] Section 403.9332(3), F.S.

Areas of Critical State Concern

The Areas of Critical State Concern Program was created by the Florida Environmental Land and Water Management Act of 1972.[44] The program is intended to protect resources and public facilities of major statewide significance within designated geographic areas from uncontrolled development that would cause substantial deterioration of such resources.[45]

Designated areas of critical state concern include:
- Big Cypress Area (portions of Collier, Miami-Dade, and Monroe Counties);[46]
- Green Swamp Area (portions of Polk and Lake Counties);[47]
- City of Key West and the Florida Keys (Monroe County);[48]
- Apalachicola Bay Area (Franklin County).[49]

Biscayne Bay Aquatic Preserve

Biscayne Bay is the largest estuary in Florida, and the only large, subtropical, protected bay within the continental United States. Biscayne Bay is home to two state aquatic preserves, collectively known as Biscayne Bay Aquatic Preserves. The first, Biscayne Bay Aquatic Preserve, was established in 1974 and runs the length of Biscayne Bay proper, from the headwaters of the Oleta River down to Card Sound near Key Largo. Biscayne Bay Aquatic Preserve is about 64,607 submerged acres. This aquatic preserve is split in half by what is now called Biscayne National Park.[50] The second aquatic preserve within the Biscayne Bay area—Biscayne Bay-Cape Florida to Monroe County Line Aquatic Preserve—was established in 1975.[51]

Biscayne Bay provides habitat for a variety of juvenile and adult marine species, as well as several of Florida's imperiled species, including the Florida manatee, the smalltooth sawfish, the American crocodile, and Johnson's seagrass. Johnson's seagrass is the first and only marine plant to be listed as threatened on the Endangered Species List and lives in northern Biscayne Bay Aquatic Preserve.[52]

Living Shorelines

"Living shoreline" is a broad term that encompasses a range of shoreline stabilization techniques along estuarine coasts, bays, sheltered coastlines, and tributaries. A living shoreline has a footprint made up mostly of native material. It incorporates vegetation or other living, natural

[44] *See* section 380.05, F.S.
[45] Florida Department of Commerce, *Area of Critical State Concern Program*, https://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/areas-of-critical-state-concern (last visited Nov. 16, 2023).
[46] Section 380.055, F.S.
[47] Section 380.0551, F.S.
[48] Section 380.0552, F.S.
[49] Section 380.0555
[50] DEP, *Biscayne Bay Aquatic Preserves*, https://floridadep.gov/rcp/aquatic-preserve/BiscayneBayAquaticPreserves (last visited Nov. 16, 2023).
[51] *Id.*; section 258.397, F.S.
[52] DEP, *Biscayne Bay Aquatic Preserves.*

"soft" elements alone or in combination with some type of harder shoreline structure (e.g. oyster reefs or rock sills) for added stability.[53]

There is evidence that living shorelines with intact natural coastal habitats (e.g., wetlands, dunes, mangroves, and coral reefs) experience less damage from severe storms and are more resilient than hardened shorelines. Areas with natural coastal habitats also have higher populations of fish and other living organisms important for shorebirds and for recreation and commercial purposes.[54]

Living shorelines provide several benefits:
- Cost efficiency for structural stabilization in low-energy environments;
- Increased wildlife access in critical habitat areas;
- A natural buffer that reduces coastal erosion by absorbing wave energy;
- Decrease in harmful nutrients/pollutants entering coastal waters; and
- Increased aesthetic value and privacy.[55]

III. Effect of Proposed Changes:

Section 1 amends s. 403.9324, F.S., to require the Department of Environmental Protection (DEP) to adopt rules for mangrove replanting and restoration. The rules must:
- Address significant erosion in areas of critical state concern;
- Protect barrier and spoil islands;
- Assist Everglades restoration and Biscayne Bay revitalization efforts, including the development of living shoreline design options for the Biscayne Bay Aquatic Preserve that are ecologically acceptable and consistent with s. 258.397, F.S., which establishes the Biscayne Bay Aquatic Preserve and sets requirements for its maintenance;
- Promote public awareness of the value of mangroves statewide and support mangrove education campaigns conducted by local governmental entities;
- Identify vulnerable public and private properties along the coastline and encourage partnerships with local governmental entities to create local mangrove protection and restoration zone programs for implementing the rules developed by DEP; and
- Protect and maintain access to the navigation of the marked channel and the right-of-way of the Florida Intracoastal Waterway.

Section 2 provides an effective date of July 1, 2024.

[53] NOAA, *Guidance for Considering the Use of Living Shorelines*, 5 (2015), *available at* https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf.
[54] *Id.*
[55] DEP, *Resilient Florida Program – Living Shorelines*, https://floridadep.gov/rcp/resilient-florida-program/content/resilient-florida-program-living-shorelines (last visited Nov. 16, 2023).

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:

The bill may have an indeterminate negative fiscal impact on the Department of Environmental Protection related to the costs associated with the rulemaking requirements of the bill.

VI. Technical Deficiencies:

None.

VII. Related Issues:

None.

VIII. Statutes Affected:

This bill substantially amends s. 403.9324 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.