HOUSE OF REPRESENTATIVES STAFF ANALYSIS

BILL #: CS/CS/HB 1135 Florida Red Tide Mitigation and Technology Development Initiative
SPONSOR(S): State Affairs Committee, Agriculture & Natural Resources Subcommittee, Grant, M., Gregory and others
TIED BILLS: **IDEN./SIM. BILLS:** SB 1552

REFERENCE	ACTION	ANALYST	STAFF DIRECTOR or BUDGET/POLICY CHIEF
1) Agriculture & Natural Resources Subcommittee	11 Y, 0 N, As CS	Melkun	Shugar
2) Agriculture & Natural Resources Appropriations Subcommittee	10 Y, 0 N	White	Pigott
3) State Affairs Committee	21 Y, 0 N, As CS	Melkun	Williamson

SUMMARY ANALYSIS

A red tide is a higher-than-normal concentration of a microscopic alga (plantlike organism). In Florida and the Gulf of Mexico, the species that causes most red tides is *Karenia brevis*, often abbreviated as *K. brevis*. Florida red tide blooms typically develop 10 to 40 miles offshore and occur in the Gulf of Mexico almost every year, generally in late summer or early fall. The red tide blooms produce toxic chemicals that affect both marine organisms and humans, which can greatly affect Florida's economy.

The Mote Marine Laboratory & Aquarium (Mote) and the Fish and Wildlife Research Institute (FWRI) within the Florida Fish and Wildlife Conservation Commission (FWC), work together in the Mote-FWRI Cooperative Red Tide Program (program), which helps to mitigate the adverse impacts of Florida red tide along the Florida Gulf coast. The program strives to protect public health, the economy, and living natural resources through increased education and outreach; mitigate the effects of red tide by monitoring and tracking algae; support bloom modeling and forecast efforts by providing information on the environmental factors that influence algae; and investigate the presence of toxins in recreationally harvested shellfish.

The bill creates the Florida Red Tide Mitigation and Technology Development Initiative (Initiative) and the Initiative Technology Advisory Council (TAC). The bill provides that the Initiative is a partnership between FWRI and Mote with a goal to develop, test, and implement innovative, effective, and environmentally sustainable technologies and approaches for controlling and mitigating the impacts of red tide. The bill provides that the purpose of the TAC is to review and provide recommendations regarding initiative strategies, priorities, and financial expenditures to the initiative.

The bill directs Mote to use funds to facilitate additional engagement with other pertinent organizations and directs the Initiative to leverage state-appropriated funds with additional funds from private and federal sources.

The bill requires the Initiative to submit a report containing an overview of accomplishments and priorities to the Governor, the Legislature, the Department of Environmental Protection (DEP), and the FWC beginning January 15, 2021, and each January 15 thereafter.

The bill provides that the Initiative and TAC expire June 30, 2025.

The bill may have an insignificant negative fiscal impact on DEP and FWC that can be absorbed within existing resources because it requires them to cover the expenses of their respective representatives on the TAC.

FULL ANALYSIS

I. SUBSTANTIVE ANALYSIS

A. EFFECT OF PROPOSED CHANGES:

Present Situation

Red Tide

A red tide, or harmful algal bloom, is a higher-than-normal concentration of a microscopic alga (plantlike organism). In Florida and the Gulf of Mexico, the species that causes most red tides is *Karenia brevis*, often abbreviated as *K. brevis*. To distinguish *K. brevis* blooms from red tides caused by other species of algae, researchers in Florida call the former the "Florida red tide."[1]

Florida red tide blooms typically develop 10 to 40 miles offshore and occur in the Gulf of Mexico almost every year, generally in late summer or early fall. Blooms are most common off the central and southwestern coasts of Florida between Clearwater and Sanibel Island but may occur anywhere in the Gulf. Most blooms last three to five months and affect hundreds of square miles, but they can continue sporadically for as long as 18 months, affecting thousands of square miles.[2] The duration of a bloom depends on physical and biological conditions that influence the growth and persistence of *K. brevis*, including sunlight, nutrient availability, salinity, and the speed and direction of wind and water currents. Although the occurrence of a bloom cannot be predicted, scientists can forecast its movement using wind and water current data once the bloom is located.[3]

Blooms develop in four stages. First, a *K. brevis* population accumulates and moves into an area. Then, the population steadily increases and may, within a few weeks, become concentrated enough to start affecting wildlife. In the third stage, the bloom population remains fairly constant and wind and currents control the bloom's movement. If the bloom moves inshore, nutrient runoff from land may promote bloom expansion. Lastly, the bloom will dissipate by winds and currents dispersing the cells and introducing new water masses that reduce the concentration of *K. brevis* cells, moving the bloom to a different area.[4]

Florida red tide blooms can also produce toxic chemicals that affect both marine organisms and humans. *K. brevis* produces toxins that can affect the central nervous system of fish and other vertebrates, causing these animals to die. Wave action can also break open *K. brevis* cells and release these toxins into the air, leading to respiratory irritation. For people with severe or chronic respiratory conditions, such as emphysema or asthma, red tide can cause serious illness. The toxins can also accumulate in filter-feeders such as oysters and clams, which can lead to Neurotoxic Shellfish Poisoning[5] in people who consume contaminated shellfish.[6]

Florida red tide blooms also affect Florida's economy. Coastal communities that rely on tourism lose millions of dollars when dead fish wash up on beaches or beachgoers experience eye and respiratory irritation, and shellfish-harvesting businesses lose income when shellfish beds are closed. A study of three blooms that occurred in the 1970s and 1980s estimated losses from each to be between $15 and $25 million.[7] Currently, there is no practical and acceptable way to control or kill Florida red tide blooms.[8]

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[1] Florida Fish and Wildlife Conservation Commission (FWC), *Red Tide FAQ*, available at https://myfwc.com/research/redtide/faq/ (last visited Mar. 13, 2019).
[2] FWC, *About Florida Red Tides*, available at https://myfwc.com/research/redtide/general/about/ (last visited Mar. 13, 2019).
[3] FWC, *Red Tide FAQ*, available at https://myfwc.com/research/redtide/faq/ (last visited Mar. 13, 2019).
[4] FWC, *About Florida Red Tides*, available at https://myfwc.com/research/redtide/general/about/ (last visited Mar. 13, 2019).
[5] Neurotoxic shellfish poisoning (NSP) is caused by a marine toxin called brevetoxin which is present in contaminated shellfish; *see* Florida Department of Health, *Shellfish Poisonings*, available at http://www.floridahealth.gov/environmental-health/aquatic-toxins/shellfish-poisoning.html (last visited Mar. 13, 2019).
[6] FWC, *About Florida Red Tides*, available at https://myfwc.com/research/redtide/general/about/ (last visited Mar. 13, 2019).
[7] *Id*.
[8] FWC, *Red Tide FAQ*, available at https://myfwc.com/research/redtide/faq/ (last visited Mar. 20, 2019).

Fish and Wildlife Research Institute

In 2004, the Legislature approved an agency-wide reorganization of the Florida Fish and Wildlife Conservation Commission (FWC) that integrated parts of the Division of Wildlife, Division of Freshwater Fisheries, and the Florida Marine Research Institute to create the Fish and Wildlife Research Institute (FWRI). FWRI provides the scientific foundation for management of Florida's fish and wildlife resources and is organized into five broad, interrelated science sections: marine fisheries research, freshwater fisheries research, ecosystem assessment and restoration, wildlife research, and information science and management. These programs are funded from user fees,[9] grants, state general revenue, and specialty license plates. FWRI's annual operating budget of approximately $50 million supports about 300 research projects.[10]

FWRI is a national leader in Florida red tide research and response and maintains a number of programs that contribute to Florida red tide monitoring, including the Fish Kill Hotline,[11] the Wildlife Alert Hotline,[12] Shellfish Harvesting Closures,[13] and the Red Tide Offshore Monitoring Program.[14]

Mote Marine Laboratory

Mote Marine Laboratory & Aquarium (Mote) is an independent, nonprofit marine research organization based in Sarasota focused on research and education. Originally focused on sharks, Mote has expanded research to include studies of human cancer using marine models, the effects of man-made and natural toxins on humans and on the environment, the health of wild fisheries, developing sustainable and successful fish restocking techniques and food production technologies, and the development of ocean technology.[15] Mote utilizes a variety of funding from agencies including the United State Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the state of Florida,[16] the Southwest and South Florida Water Management Districts, the Tampa Bay Estuary Program, the Sarasota Bay Estuary Program, the Charlotte Harbor National Estuary Program, the Florida Department of Environmental Protection (DEP), the Florida Department of Health, FWC,[17] as well as local counties and cities.[18]

A main area of focus for Mote is statistical analyses of the nutrient regimes associated with blooms of *K. brevis*. Mote is examining the variations in the supply of nutrients from the major southwest Florida estuaries and is studying the responses of *K. brevis* to selected nutrient additions under more controlled laboratory experiments.[19] Mote also regularly updates a Beach Conditions Report, which

[9] User fees include charges from items such as hunting and fishing licenses.
[10] FWC, *Fish and Wildlife Research Institute*, available at https://myfwc.com/about/inside-fwc/fwri/ (last visited Mar. 13, 2019).
[11] The Fish Kill Hotline allows the public to report directly to researchers the locations of fish kills and diseased or abnormal fish; *see* FWC, *Fish Kill Hotline*, available at https://myfwc.com/research/saltwater/health/fish-kills-hotline/about/ (last visited Mar. 13, 2019).
[12] The Wildlife Alert Hotline allows the public to report dead, sick, or injured manatees or sea turtles directly to FWC staff; *see* FWC, *Red Tide-Related Hotlines and Information Sources*, available at https://myfwc.com/research/redtide/contact/ (last visited Mar. 13, 2019).
[13] FWRI provide technical support to the Florida Department of Agriculture and Consumer Services, which can order the closure of shellfish harvest areas; *see* FWC, *Red Tide-Related Hotlines and Information Sources*, available at https://myfwc.com/research/redtide/contact/ (last visited Mar. 13, 2019).
[14] The Red Tide Offshore Monitoring Program is a volunteer program for citizens to help collect water samples from routine collection points and sites reported for suspected red tide blooms. The sampling by volunteers allows researchers to provide an early warning of offshore blooms and investigate reported events as they occur. Because of limited state personnel, boats, and other resources, the program relies on volunteers of all kinds, such as charter boat captains, commercial fishers, divers, and other citizens; *see* FWC, *Volunteer Monitoring Program*, available at https://myfwc.com/research/redtide/monitoring/offshore-monitoring/ (last visited Mar. 13, 2019).
[15] Mote, *About Mote*, available at https://mote.org/about-us (last visited Mar. 13, 2019).
[16] The proceeds of the annual use fee for the "Protect Our Reefs" license plates are distributed to Mote; *see* s. 320.08058(39), F.S.
[17] FWC is authorized to expend certain money through grants and contracts to fund research with Mote.
[18] Mote, *Chemical & Physical Ecology*, available at https://mote.org/research/program/chemical-physical-ecology (last visited Mar. 13, 2019).
[19] Mote, *Chemical & Physical Ecology*, available at https://mote.org/research/program/chemical-physical-ecology (last visited Mar. 13, 2019).

provides up-to-date information about the effects of Florida red tide on Florida Gulf coast beaches, including reports of dead fish, respiratory irritation among beachgoers, water color, and wind direction.[20] The Beach Conditions Report is updated twice daily, seven days a week, 365 days a year.[21]

In 2018, Mote announced the establishment of the Red Tide Institute at Mote. The Red Tide Institute will apply the knowledge gained on the ecological dynamics of red tide blooms to develop and test innovative, science-based technologies for attacking red tide blooms and reducing their impacts.[22]

Mote-FWRI Cooperative Red Tide Program

Mote and FWRI often collaborate on the research needs of the state of Florida. The Mote-FWRI Cooperative Red Tide Program helps to mitigate the adverse impacts of Florida red tide along the Florida Gulf coast. The program strives to protect public health, the economy, and living natural resources through increased education and outreach; mitigate the effects of Florida red tide by monitoring and tracking *K. brevis*; support bloom modeling and forecast efforts by providing information on the environmental factors that influence *K. brevis*; and investigate toxin persistence in recreationally harvested shellfish.[23]

The partnership has resulted in the regular collection of water samples for analysis in southwest Florida and the Florida Keys and routine coastal surveys from Tampa Bay south to Estero Bay. These human-conducted surveys are amplified with autonomous missions conducted by underwater robots that provide continuous sampling along the coast. By combining these on-the-ground efforts with imagery from satellites and modeling of water currents in the Gulf of Mexico developed by the University of South Florida, FWRI is able to develop regular red tide status updates to inform the public about red tide events.[24]

Effect of Proposed Changes

The bill creates the Florida Red Tide Mitigation and Technology Development Initiative (Initiative). The bill provides the intent of the Legislature is to establish an independent and coordinated effort among public and private research entities to develop prevention, control, and mitigation technologies and approaches to address the impacts of red tide on coastal environments and communities in Florida.

The bill provides that the Initiative is a partnership between FWRI and Mote with a goal to develop, test, and implement innovative, effective, and environmentally sustainable technologies and approaches for controlling and mitigating the impacts of red tide.

The bill specifies that funds appropriated for red tide mitigation technology must be awarded by FWRI to Mote to achieve the Initiative's goals. The bill directs Mote, with the concurrence of FWRI, to use a portion of the funds to facilitate additional engagement with other pertinent organizations but provides that FWRI may not use more than 5 percent of awarded funds for direct annual administration coordination costs. The bill further specifies that the Initiative must leverage state-appropriated funds with additional funds from private and federal sources.

The bill requires the Initiative to submit a report containing an overview of accomplishments to date and priorities for subsequent years to the Governor, the Legislature, DEP, and the FWC beginning January 15, 2021, and each January 15 thereafter until its expiration.

[20] *Id*.
[21] Mote, *Red Tide Research,* available at https://mote.org/news/red-tide-research (last visited Mar. 13, 2019).
[22] Mote, *Mote Launches Red Tide Institute for Mitigation and Control, Thanks to Founding Donor* (Oct. 23, 2018), available at https://mote.org/news/article/mote-launches-red-tide-institute-for-mitigation-and-control-thanks-to-found (last visited Mar. 20, 2019).
[23] Mote, *Mote-FWRI Cooperative Red Tide Program,* available at https://mote.org/pages/mote-fwri-cooperative-red-tide-program (last visited Mar. 13, 2019).
[24] *Id*.

The bill creates the Initiative Technology Advisory Council (TAC) to review and provide recommendations to the initiative regarding initiative strategies, priorities, and financial expenditures for developing, testing, and implementing innovative, effective, and environmentally sustainable technologies and approaches for controlling and mitigating the impacts of red tide.

The bill specifies that the TAC must consist of the chief executive officer of Mote, who serves as the chair; a member of a private commercial enterprise, appointed by the Governor; a member of a public or private university, appointed by the President of the Senate; a member of a non-university public or private marine environmental organization, appointed by the Speaker of the House of Representatives; a member of DEP who has expertise in red tide, appointed by the Secretary of DEP; a member of FWRI who has expertise in red tide appointed by the executive director of FWRI; and a member of the Department of Agriculture and Consumer Services who has expertise in water quality, appointed by the Commissioner of Agriculture.

The bill specifies that TAC members serve staggered two-year terms, serve without compensation, and members may be reappointed. The bill directs TAC members to meet at least twice per year. Each organization is required to cover all expenses of its respective representative.

The bill provides that the Initiative and TAC expires June 30, 2025.

B. SECTION DIRECTORY:

Section 1 creates s. 379.2273, F.S., to establish the Initiative and TAC.

Section 2 provides an effective date of July 1, 2019.

II. FISCAL ANALYSIS & ECONOMIC IMPACT STATEMENT

A. FISCAL IMPACT ON STATE GOVERNMENT:

1. Revenues:

None.

2. Expenditures:

The bill may have an insignificant negative fiscal impact on DEP and FWC that can be absorbed within existing resources because it requires the agencies to cover the expenses of their respective representatives on the TAC.

B. FISCAL IMPACT ON LOCAL GOVERNMENTS:

1. Revenues:

None.

2. Expenditures:

None.

C. DIRECT ECONOMIC IMPACT ON PRIVATE SECTOR:

The bill may have an indeterminate insignificant impact on the private sector because it requires certain private entities to cover the expenses of their respective representatives on the TAC.

Red tide negatively impacts Florida's economy by harming industries such as commercial fisheries, recreation, and tourism. If the Initiative and the TAC create technologies or approaches that prevent or mitigate red tide and its impacts, it may reduce the negative impacts to such industries. Therefore, this bill may have an indeterminate positive fiscal impact on the private sector.

D. FISCAL COMMENTS:

None.

III. COMMENTS

A. CONSTITUTIONAL ISSUES:

1. Applicability of Municipality/County Mandates Provision:

Not applicable. The bill does not appear to affect county or municipal governments.

2. Other:

None.

B. RULE-MAKING AUTHORITY:

None.

C. DRAFTING ISSUES OR OTHER COMMENTS:

None.

IV. AMENDMENTS/ COMMITTEE SUBSTITUTE CHANGES

On April 2, 2019, the Agriculture & Natural Resources Appropriations Subcommittee adopted an amendment and reported the bill favorably as a committee substitute. The amendment removed the appropriation from the bill.

On April 18, 2019, the State Affairs Committee adopted an amendment and reported the bill favorably as a committee substitute. The amendment specified the purpose of the TAC and added a member to the TAC. The member must be from the Department of Agriculture and Consumer Services, with expertise in water quality, appointed by the Commissioner of Agriculture.

This analysis is drafted to the committee substitute as approved by the State Affairs Committee.