HOUSE OF REPRESENTATIVES STAFF ANALYSIS

BILL #: CS/HB 421 Long-term Cleanup of Water Bodies
SPONSOR(S): Environment, Agriculture & Flooding Subcommittee, Truenow and others
TIED BILLS: **IDEN./SIM. BILLS:** SB 834

REFERENCE	ACTION	ANALYST	STAFF DIRECTOR or BUDGET/POLICY CHIEF
1) Environment, Agriculture & Flooding Subcommittee	17 Y, 0 N, As CS	Mamontoff	Moore
2) Agriculture & Natural Resources Appropriations Subcommittee			
3) State Affairs Committee			

SUMMARY ANALYSIS

Phosphorous and nitrogen are naturally present in water and are essential nutrients for the healthy growth of plant and animal life. The correct balance of both nutrients is necessary for a healthy ecosystem; however, excessive amounts can cause significant water quality problems and can cause algae to grow excessively or "bloom" and produce toxins that can harm human health, animals, aquatic ecosystems, and the economy. Harmful algal blooms are sometimes visible as green, yellow, red, or brown discolorations in the water that look like scums, paint-like slicks, clotted mats, or foam.

In 2019, Governor DeSantis directed the Department of Environmental Protection (DEP) to establish a Blue-Green Algae Task Force to expedite reduction of nutrient pollution and cyanobacteria blooms in the state. The task force provides guidance and specific, science-based recommendations with the goal of expediting the restoration of water bodies that have been adversely affected by cyanobacteria blooms. The task force has focused on source identification, nutrient reduction and remediation efforts, algal toxins and human health effects, and innovative technologies as they relate to the prevention, cleanup, and mitigation of harmful algal blooms.

DEP's Innovative Technology Grant Program (grant program) is available to local governmental entities for projects that evaluate and implement innovative technologies and short-term solutions to combat algal blooms and nutrient enrichment, restore and preserve Florida waterbodies, and implement certain water quality treatment technologies. As of June 2021, DEP allocated the funds in the grant program towards 20 innovative technology projects totaling $14.9 million.

The bill requires DEP to procure the best available innovative technology for the long-term cleanup for water bodies. The technology must:

- Remove harmful algal blooms, toxins, and nutrients from water bodies to address the growing threat to the public health;
- Provide resources to reduce harmful algal blooms, including tools to reduce, to monitor, and to provide predictive analysis;
- Provide emergency response action;
- Be scalable;
- Be proven to reduce nitrates and toxins that foster harmful algal blooms and improve water quality in fresh water bodies; and
- Provide a low-carbon or direct-air-capture benefit.

This bill does not appear to have a fiscal impact on the state or local governments.

FULL ANALYSIS

I. SUBSTANTIVE ANALYSIS

A. EFFECT OF PROPOSED CHANGES:

Background

Water Quality and Nutrients

Phosphorous and nitrogen are naturally present in water and are essential nutrients for the healthy growth of plant and animal life. The correct balance of both nutrients is necessary for a healthy ecosystem; however, excessive amounts can cause significant water quality problems. Phosphorous and nitrogen are derived from natural and human-made sources. Natural sources include the atmosphere, soils, and the decay of plants and animals. Human-made sources include sewage disposal systems (wastewater treatment facilities and septic systems), overflows of storm and sanitary sewers (untreated sewage), agricultural production and irrigation practices, and stormwater runoff.[1]

Harmful Algal Blooms

Algal communities naturally occur in healthy aquatic ecosystems. However, under certain conditions algae may grow excessively or "bloom" and produce toxins that can harm human health, animals, aquatic ecosystems, and the economy. Harmful algal blooms are sometimes visible as green, yellow, red, or brown discolorations in the water that look like scums, paint-like slicks, clotted mats, or foam. Visible signs of a bloom are not necessary for algal toxins to exist in quantities sufficient to cause harm.[2] The image below is an aerial view of a cyanobacteria bloom in Lake Okeechobee. [3]

[1] U.S. Environmental Protection Agency (EPA), *Sources and Solutions*, https://www.epa.gov/nutirentpollution/sources-and-solutions (last visited Jan 28, 2022).

[2] Congressional Research Service, *Freshwater Harmful Algal Blooms: Causes, Challenges, and Policy Considerations*, 1-2 (July 8, 2020) *available at* https://crsreports.congress.gov/product/pdf/R/R44871.

[3] USGS, *Tracking the Bad Guys: Toxic Algal Blooms*, https://www.usgs.gov/center-news/tracking-bad-guys-toxic-algal-blooms#:~:text=An%20aerial%20view%20of%20Lake%20Okeechobee%20in%20Florida,inhabit%20water%20in%20every%20corner%20of%20the%20world (last visited Jan. 28, 2021).

Many factors may influence the occurrence and prevalence of harmful algal blooms in freshwater, including water temperature, nutrient concentration, pH, water circulation, and availability of light. Nutrient enrichment, especially nitrogen and phosphorous enrichment, is one of the key causes of harmful algal blooms. When high levels of nutrient enter a body of water, they stimulate plant and algal growth, which can lead to depletion of dissolved oxygen, reduced transparency, changes to the biological community, and degradation of the aesthetic appeal of the water. This process is called eutrophication.[4]

Studies also indicate that increased temperatures and changes in frequency and intensity of rainfall associated with climate change may favor harmful algal bloom formation. Some studies have found that swings between flooding and drought may result in more harmful algal blooms. For example, if intense rainfall is followed by drought, nutrients washed into receiving water bodies may remain there longer, increasing the potential for a harmful algal bloom.[5]

While many types of harmful algal blooms can occur in bodies of freshwater, cyanobacteria (sometimes called blue-green algae) blooms are most frequent and severe. Some species of cyanobacteria produce cyanotoxins, which can cause hepatic (liver-related), neurologic, respiratory, dermatologic, and other symptoms in humans and other animals. Exposure to cyanotoxins may occur by consuming tainted drinking water, fish or shellfish; swimming in waters with certain concentrations of cyanotoxins; and inhaling aerosolized cyanotoxins.[6] Long-term health effects from cyanotoxin exposure is unclear.[7]

Blue-Green Algae Task Force

In 2019, Governor DeSantis directed the Department of Environmental Protection (DEP) to establish a Blue-Green Algae Task Force to expedite reduction of nutrient pollution and cyanobacteria blooms in the state.[8] The task force provides guidance and specific, science-based recommendations with the goal of expediting the restoration of water bodies that have been adversely affected by cyanobacteria blooms.[9] The task force has focused on source identification, nutrient reduction and remediation efforts, algal toxins and human health effects, and innovative technologies as they relate to the prevention, cleanup, and mitigation of harmful algal blooms.[10]

Nutrient and Algae Removal Technologies

There are three key elements to managing cyanobacteria blooms: monitoring, mitigation, and prediction. Mitigation, especially through nutrient reduction, is likely to be most effective in the long term.[11] Mitigation methods that are commonly used to reduce nutrient loads generally include: upgrading sewage treatment plants; more effectively managing stormwater; controlling erosion; reducing excess fertilizer in agriculture; and utilizing retention ponds and wetlands to intercept and assimilate nutrient loads.[12] Because many of these strategies may take decades to have a sustained effect on algal blooms, it is important to have reactive options.[13]

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[4] *Id*. at 6.
[5] *Id.*
[6] *Id.* at 3. Common cyanotoxins that can cause illness in people and animals include: microcystin, cylindrospermopsin, anatoxin, saxitoxin, nodularin, and lyngbyatoxins. CDC, *Illness and Symptoms: Cyanobacteria in Fresh Water*, https://www.cdc.gov/habs/illness-symptoms-freshwater.html (last visited Feb. 4, 2021).
[7] CDC, *Illness and Symptoms*.
[8] State of Florida, Office of the Governor, *Executive Order Number 19-12 (2019)*, available at https://www.flgov.com/wp-content/uploads/orders/2019/EO_19-12.pdf; DEP, *Blue-Green Algae Task Force*, https://protectingfloridatogether.gov/state-action/blue-green-algae-task-force (last visited Feb. 4, 2021).
[9] DEP, *Blue-Green Algae Task Force Consensus Document #1* (Dec. 2, 2019), *available at* https://floridadep.gov/sites/default/files/Final%20Consensus%20%231_0.pdf.
[10] *Id.*
[11] Intergovernmental Oceanographic Commission/UNESCO, *Solutions for Managing Cyanobacterial Blooms*, 6 (2019), *available at* http://www.globalhab.info/files/Cyano_mitigation_GlobalHAB2019.pdf.
[12] In Florida, these types of mitigation methods are often adopted through regulatory practices such as Basin Management Action Plans (BMAPs). BMAPs are the primary method that DEP uses to address pollutant loading for impaired waterbodies. Section 403.067, F.S.
[13] *Solutions for Managing Cyanobacterial Blooms* at 6.

Shorter-term, within-lake management options can be either physical, biological, or chemical. Physical methods include ultrasonics, booms and curtains, surface mixers, fountains, oxygenation (including nanobubbles), destratification, withdrawal of bottom waters, light exclusion technology, and flow manipulation.[14] Chemical methods include hydrogen peroxide, geochemical compounds (e.g., alum, Phoslock™, Aqual-P, etc.), sediment capping, and plant extracts.[15] Biological methods include biological treatments (e.g., bacterial seeding), biomanipulation of the food web, and aquatic plants.[16]

DEP's Innovative Technology Grant Program (grant program) is available to local governmental entities for projects that evaluate and implement innovative technologies and short-term solutions to combat algal blooms and nutrient enrichment, restore and preserve Florida waterbodies, and implement certain water quality treatment technologies.[17] Project proposals must prevent, mitigate, or clean up harmful algal blooms, with an emphasis on nutrient reductions, or must improve the ability to predict and monitor harmful algal blooms.[18] Key funding considerations include whether the project is innovative, avoids environmental harm, is scalable, has water quality benefits, is ready to construct, and is geographically located in an area with a water quality restoration plan (reasonable assurances plan or BMAP).[19]

As of June 2021, DEP allocated the funds in the grant program towards 20 innovative technology projects totaling $14.9 million. DEP has given the grants to local governments, universities, and water management districts to develop and test the technologies in locations throughout the state.[20] Of the 20 projects, seven are dedicated to nutrient reductions; nine are focused on addressing algae in waterways through algicides, nanobubble technology, soundwaves, and mechanical harvesting; and four are designed to identify how to better predict formation of algal blooms.[21]

Effect on the Bill

The bill requires DEP to procure the best available innovative technology for the long-term cleanup of water bodies. The technology must:

- Remove harmful algal blooms, toxins, and nutrients from water bodies to address the growing threat to the public health;
- Provide resources to reduce harmful algal blooms, including tools to reduce, to monitor, and to provide predictive analysis;
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- Be scalable;
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- Provide a low-carbon or direct-air-capture benefit.

B. SECTION DIRECTORY:

Section 1. Creates an unnumbered section of law relating to the long-term cleanup of water bodies.

Section 2. Provides an effective date of July 1, 2022.

[14] *Id.* at 14.
[15] *Id.* at 14.
[16] *Id.* at 14.
[17] DEP, *Grants*, https://protectingfloridatogether.gov/state-action/grants-submissions (last visited Feb. 4, 2021).
[18] DEP, *Blue Green Algae Task Force*, https://www.protectingfloridatogether.gov/sites/default/files/documents/210623_BGATF-Materials-Web.pdf (last visited Feb. 4, 2021).
[19] *Id.*
[20] *Id.*
[21] DEP, *Innovative Technologies*, https://www.protectingfloridatogether.gov/sites/default/files/documents/DEP%20Innovative%20Tech%20Presentation.pdf (last visited Feb. 4, 2021).

II. FISCAL ANALYSIS & ECONOMIC IMPACT STATEMENT

A. FISCAL IMPACT ON STATE GOVERNMENT:

1. Revenues:

None.

2. Expenditures:

None.

B. FISCAL IMPACT ON LOCAL GOVERNMENTS:

1. Revenues:

None.

2. Expenditures:

None.

C. DIRECT ECONOMIC IMPACT ON PRIVATE SECTOR:

There may be a positive economic impact on private sector entities that provide innovative solutions to harmful algal blooms.

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 February 8, 2022, the Environment, Agriculture & Flooding Subcommittee adopted an amendment and reported the bill favorably as a committee substitute. The amendment revises two of the criteria that innovative technologies must meet in order to qualify for procurement by DEP.

This analysis is drafted to the committee substitute as approved by the Environment, Agriculture & Flooding Subcommittee.