UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

SAVE THE MANATEE CLUB, CENTER FOR BIOLOGICAL DIVERSITY, and DEFENDERS OF WILDLIFE, Plaintiffs, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Defendant.	Case No. _____ **COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF**

INTRODUCTION

1. This case challenges the failure of the U.S. Environmental Protection Agency ("EPA") to reinitiate Endangered Species Act ("ESA") section 7 consultation with the U.S. Fish and Wildlife Service ("FWS") and the National Marine Fisheries Service ("NMFS") (together, the "Services") on water quality standards for Florida's Indian River Lagoon, where poor water quality has caused catastrophic mortality of Florida manatees.

2. The Indian River Lagoon (the "Lagoon") is one of the most biologically diverse estuaries in North America. Its seagrass ecosystem is home to thousands of plant and animal species. Sometimes called the "cradle of the ocean," the Lagoon features brackish waters that some predators avoid, leading young sea turtles, fish, crab, and shrimp to spend their juvenile stages there before they mature and move into the Atlantic Ocean. The iconic Florida manatee inhabits the Lagoon, alongside green sea turtles, loggerhead sea turtles, and smalltooth sawfish. The manatee and sea turtles are protected as "threatened" species under the ESA. The smalltooth sawfish is protected as an "endangered" species under the ESA.

3. The Indian River Lagoon is currently suffering ecologic collapse. More than a thousand manatees died in Florida in 2021, more than any other year on record, with more than half of the deaths occurring in the Lagoon. Manatee deaths in the Lagoon have continued into 2022 at a record pace.

4. The root of the problem is deteriorating water quality. Excess nitrogen and phosphorus pollution from human activities fuels harmful algal outbreaks that block sunlight from reaching seagrass, the manatee's main food source. As a result, tens of thousands of acres of seagrass have died, and hundreds of manatees have starved to death. Other ESA-listed species in the Lagoon are also harmed by the same pollution. Sea turtles develop deadly tumors in the dirty water, and smalltooth sawfish lose their mangrove habitat.

5. Congress passed the Clean Water Act ("CWA") and the ESA to prevent such harms.

6. The CWA charges the Florida Department of Environmental Protection ("FDEP") and EPA with the protection of Florida's waterbodies, including the beleaguered Indian River Lagoon. Pursuant to its CWA duty, FDEP has set pollution budgets known as "total maximum daily loads" ("TMDLs") for each pollutant impairing a waterbody. FDEP set TMDLs for nitrogen and phosphorus in the Indian River Lagoon in 2009 with a goal of preserving the natural balance of flora and fauna in the Lagoon, including maintaining seagrass. EPA approved FDEP's 2009 TMDLs as water quality standards for the Lagoon in 2013.

7. At the time EPA approved these TMDLs as water quality standards, it consulted with FWS and NMFS under section 7 of the ESA. The ESA consultation

process exists to ensure that EPA's actions—including its approval of a state's water quality standards—are not likely to jeopardize the survival and recovery of listed species or destroy or adversely modify designated critical habitat. Following consultation, FWS concurred in EPA's determination that the water quality standards would not likely adversely affect manatees. NMFS determined that the water quality standards would not jeopardize green sea turtles, loggerhead sea turtles, or smalltooth sawfish.

8. The ESA also requires that consultation be reinitiated in certain circumstances when new information reveals effects of an action on listed species or critical habitat that were not previously considered.

9. On August 10, 2021, FWS asked EPA to reinitiate consultation based on new information that harmful algal outbreaks have killed tens of thousands of acres of seagrass, leading manatees to starve to death in record numbers.

10. EPA refused to reinitiate consultation in response to FWS's request.

11. Plaintiffs Save the Manatee Club, Center for Biological Diversity, and Defenders of Wildlife notified the EPA, FWS, and NMFS of their intent to sue over EPA's failure to reinitiate consultation in violation of ESA section 7. Like FWS, Plaintiffs explained that new information shows that the mass die-off of manatees and harm to other protected species in the Indian River Lagoon is caused by nitrogen and phosphorus pollution subject to the 2009 TMDLs. Plaintiffs also

explained that new information shows that the TMDLs are not adequately followed or enforced, nor are there reasonable assurances that the state will meet the TMDLs in the absence of additional enforcement measures. Finally, Plaintiffs explained that new information demonstrates that the TMDLs fail to account for contributions from historic pollution sources, underestimate contributions from septic systems, and do not account for the impacts of climate change.

12. EPA did not reinitiate consultation in response to Plaintiffs' notice.

13. Manatees and other ESA-protected species in the Indian River Lagoon are suffering and will continue to suffer until water quality in the Lagoon improves. Plaintiffs therefore ask this Court to compel EPA to reinitiate consultation with the Services to protect ESA-listed species that depend on the Lagoon's fragile habitat, as the Endangered Species Act requires.

JURISDICTION AND VENUE

14. Plaintiffs bring this action pursuant to the citizen suit provision of the ESA, 16 U.S.C. § 1540(g), which waives EPA's sovereign immunity. Pursuant to this provision, Plaintiffs sent EPA and the Services two 60-day notice letters of their intent to sue for all ESA violations listed herein. *See id.* § 1540(g)(2)(A)(i). Plaintiffs sent the first notice letter—regarding consultation with FWS on impacts to manatees—on December 20, 2021, and the second letter—regarding consultation with NMFS on impacts to green sea turtles, loggerhead sea turtles,

and smalltooth sawfish—on February 7, 2022. [Attached as Exhibits 1 and 2]. EPA has not remedied the legal violations Plaintiffs identified in the 60-day notice letters and now allege in this Complaint.

15. This Court has jurisdiction over Plaintiffs' claims under 16 U.S.C. § 1540(g) and 28 U.S.C. § 1331 (federal question) and may issue a declaratory judgment and injunctive relief under 28 U.S.C. §§ 2201–02.

16. Venue lies in the Middle District of Florida pursuant to 28 U.S.C. § 1391(e)(1)(B) & (C), because a substantial part of the Indian River Lagoon and the species at issue occur in this District, and because Plaintiff Save the Manatee Club's office is in Maitland, Orange County, in this District. For these reasons, venue is further appropriate in the Orlando Division of the Middle District of Florida as this action is most directly connected with, and most conveniently advanced, in the Orlando Division. *See* Middle District of Florida Local Rule 1.04(a)–(b).

PARTIES

17. Plaintiff Save the Manatee Club is a nonprofit 501(c)(3) membership organization dedicated to the conservation of manatees. The organization was founded in 1981 by singer and songwriter Jimmy Buffett and Governor of Florida Bob Graham. Save the Manatee Club is located in Maitland, Florida. The organization currently has about 40,000 active members.

18. Save the Manatee Club brings this action on behalf of itself and its members, many of whom enjoy observing, photographing, and appreciating the Florida manatee in its natural habitat. Save the Manatee Club members regularly engage in these activities in the Indian River Lagoon and will continue to do so in the future.

19. For example, one of Save the Manatee Club's members and volunteers lives, works, and recreates on or around the Indian River Lagoon. She has lived in Indian River County since 2011 and has been an active volunteer with Save the Manatee Club since 2012. This member has authored a book about manatee evolution, physiology, mythology, and conservation based on her observations and enjoyment of the animals in their Lagoon habitat. In addition to her volunteer work with Save the Manatee Club, this member gives educational talks on manatees to various environmental organizations and boating and garden clubs. One of her favorite activities is leading guided walks and kayak tours at Round Island, a well-known manatee observation area. During these tours, she shares her knowledge about and experiences with manatees, and discusses the animals' interesting lifestyle and biological quirks with members of the public.

20. Plaintiff Center for Biological Diversity (the "Center") is a nonprofit 501(c)(3) organization incorporated in the State of California with offices across the country, including in Washington, D.C., Arizona, California, Florida, New

York, North Carlina, Oregon, and Washington, and in Baja California Sur, Mexico. The Center works through science and environmental law to advocate for the protection of endangered, threatened, and rare species and their habitats both in the United States and abroad. The Center has over 81,800 active members, including members who reside in and travel to areas where manatees feed, breed, and migrate.

21. The Center brings this action on behalf of itself and its members, many of whom enjoy observing, photographing, and appreciating the Florida manatee and other species in their natural habitat in the Indian River Lagoon. The Center's members regularly engage in these activities in the Indian River Lagoon from land and water and will continue to do so in the future.

22. For example, one of the Center's members moved near the Indian River Lagoon in 1978 and became involved in manatee protection shortly thereafter. She has been advocating for manatees since high school and interned at the Marine Mammal Pathobiology Laboratory in Saint Petersburg, Florida, while pursuing her undergraduate degree. She also has a graduate degree in Coastal Resource Management and has provided data that informed the Florida Fish and Wildlife Conservation Commission's manatee protection plans. This member drives within sight distance of the Lagoon every week and kayaks on the Lagoon several times a year. She also stops at the manatee observation deck at Haulover

Canal every month and has concrete plans to do so again in May and June 2022. She considers manatees a wonderful cultural resource for the state of Florida that residents have the right to enjoy.

23. Plaintiff Defenders of Wildlife ("Defenders") is a nonprofit 501(c)(3) membership organization dedicated to the protection and restoration of all native wild animals and plants in their natural communities and the preservation of the habitats on which these species depend. Headquartered in Washington, D.C., Defenders has regional and field offices in Alaska, Arizona, California, Colorado, Florida, Montana, New Mexico, North Carolina, Ohio, Oregon, Texas, Washington, and Wyoming. Defenders has nearly 2.2 million members and activists across the United States, including more than 124,000 members living in Florida where manatees live, feed, breed, and migrate.

24. Defenders brings this action on behalf of itself and its members, many of whom enjoy observing, photographing, and appreciating the Florida manatee and other species in their natural habitats. Defenders' members regularly engage in these activities in various locations within Florida, including the Indian River Lagoon, from land and water and will continue to do so in the future.

25. For example, one of Defenders' members enjoys viewing Florida manatees as often as she can. A key factor in her decision to live in Winter Park, Orange County, Florida, was that the city is near areas where she can regularly

view and enjoy manatees. She frequently enjoys visiting a manatee aggregation site in Blue Springs State Park in Orange City, Volusia County, Florida. This member also regularly visits the beach at Indialantic, a town between the Indian River Lagoon and the Atlantic Ocean, from which she can easily travel to the Indian River Lagoon to attempt to view manatees. This member has concrete plans to travel to the Indian River Lagoon to attempt to view manatees in May or June 2022. This member has also served as the Advocacy Committee Co-Chair of the Free the Ocklawaha River Coalition for Everyone, participated in the twice-yearly Manatee Forum meeting hosted by the Florida Fish and Wildlife Conservation Commission, and produced policy and outreach materials, comment letters, blog posts, and social media posts about manatees and the conservation challenges they face. Moreover, this member has engaged and will continue to engage in pro bono work to support manatee conservation.

26. Plaintiffs and their members are harmed by EPA's failure to reinitiate consultation with FWS and NMFS. This failure harms manatees, green sea turtles, loggerhead sea turtles, smalltooth sawfish, and other ESA-listed species that depend on the health of the ecosystem of the Indian River Lagoon, thereby decreasing Plaintiffs' members' opportunities to observe and enjoy them in their natural habitats.

27. An order from this Court declaring that EPA is in violation of the ESA and its implementing regulations, and directing EPA to reinitiate consultation with the Services, will remedy Plaintiffs' injuries. The ESA consultation process will help EPA protect and recover manatees, green sea turtles, smalltooth sawfish, and other ESA-protected species in the Indian River Lagoon where Plaintiffs' members observe and enjoy these species.

28. Defendant EPA is the federal agency charged with administering the Clean Water Act and ensuring that its actions under that statute do not jeopardize the survival and recovery of any ESA-listed species or destroy or adversely modify their critical habitat.

FACTUAL BACKGROUND

29. The Indian River Lagoon is an estuary on Florida's Atlantic Coast that includes the Mosquito Lagoon, the Banana River Lagoon, and the Indian River. The ecology of the Lagoon is defined by seagrass, a grass-like flowering aquatic plant that provides habitat and forage for many commercially, recreationally, and ecologically important species. The Lagoon sustains species protected under the Endangered Species Act, including the Florida manatee (*Trichechus manatus latirostris*), green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), and smalltooth sawfish (*Pristis pectinate*).

30. As human development has increased around the Indian River Lagoon, so has the input of nitrogen and phosphorus from wastewater treatment discharges, leaking septic systems, and stormwater runoff and leachate of fertilizer and manure, among other sources. These nutrients, in turn, feed harmful algal outbreaks, which block light from getting to the seagrass, causing it to die.

31. As a result of the seagrass die-off, manatees in the Lagoon, which depend on the seagrass as their primary source of food, have been starving to death. More than 1,100 manatees died in 2021 in Florida—in total, 2021 saw a nearly 19% loss of the Atlantic coast population. Manatees are continuing to die at a record pace this year and continue to be particularly impacted by the seagrass loss in the Lagoon.

32. Other protected species in the Indian River Lagoon are also suffering from the impacts of water pollution. Water pollution in the Indian River Lagoon has been recently linked to the development of fibropapillomatosis in sea turtles, a chronic and often lethal tumor-causing disease. Water pollution also harms red mangroves, which provide nursery habitat for smalltooth sawfish.

33. The Lagoon is now at its ecological tipping point. If pollution is not curbed, the Lagoon will no longer be defined by its seagrass habitat, but by toxic or harmful algal outbreaks. Manatees, sea turtles, smalltooth sawfish, and other ESA-

protected species that depend on clean water in the Indian River Lagoon will continue to suffer and die.

LEGAL BACKGROUND

I. The Clean Water Act

34. Congress passed the CWA fifty years ago to prevent the type of ecological collapse currently occurring in the Indian River Lagoon. The aim of this statute is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). To achieve this goal, the CWA requires states to set water quality standards protective of public health and the environment. *Id.* § 1313(c).

35. Water quality standards consist of two elements. The first is a waterbody's designated use—meaning the goals for the use of a particular waterbody. *See* 40 C.F.R. § 131.3(f), (i). For example, the highest surface water classification in Florida is Class I, for "potable water supplies," while the lowest classification is Class V, for "navigation, utility and industrial use." Fla. Admin. Code Ann. r. 62-302.400.

36. The second element of a water quality standard is the criteria, or qualities of a waterbody that, if met, will support a waterbody's designated use. *See* 40 C.F.R. § 131.3(b), (i). Criteria can be expressed in numeric or narrative form. *Id.* § 131.3(b). For example, Class I waterbodies in Florida cannot exceed a

total arsenic concentration of 10 µg/L, while Class V waterbodies cannot exceed a total arsenic concentration of 50 µg/L (numeric standard). *See* Fla. Admin. Code Ann. r. 62-302.530(5)(a). By contrast, the standard for undissolved "oils and greases" for all classes of Florida waterbodies is narrative: none "shall be present so as to cause taste or odor, or otherwise interfere with the beneficial use of waters." *Id.* § 62-302.530(50)(b).

37. Under the CWA, states also set pollution budgets, known as "total maximum daily loads" or "TMDLs," for particularly polluted waterbodies. 33 U.S.C. § 1313(d)(1)(A), (d)(1)(C). States must establish TMDLs for each pollutant impairing a waterbody. *Id.* § 1313(d)(1)(C). TMDLs set a numeric target reflecting the maximum amount of the pollutant that a waterbody can receive and still comply with applicable water quality standards. 33 U.S.C. § 1313(d)(1)(C).

38. With the numeric target as a starting point, states then allocate that total pollutant load among the various sources that contribute the pollutant to the waterbody. There are two categories of contributors to the total pollutant load: (1) "point source" contributors—single identifiable sources, such as a discharge pipe from a sewage treatment plant, *see* 33 U.S.C. § 1362(14); and (2) "nonpoint source" contributors—pollution sources that do not originate from a single identifiable source, such as fertilizer runoff from farms. 40 C.F.R. § 130.2(g)–(i).

39. EPA oversees states' development of water quality standards and TMDLs. 33 U.S.C. § 1313(c)(3), (d)(2). Among other things, this means EPA may not approve or continue to authorize a TMDL or water quality standard that is inadequate. EPA's TMDL guidance explains that TMDL submittals should identify all "point and nonpoint sources of the pollutant of concern, including [the] location of the source(s) and the quantity of the loading" to enable EPA to adequately review the load and wasteload allocations. *See* EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 at 1, 4 (May 20, 2002). The TMDL must also include a "margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." 33 U.S.C. § 1313(d)(1)(C). EPA is expected to closely scrutinize a TMDL and its component parts, including ensuring that the TMDL has a sufficiently protective margin of safety and that it provides "reasonable assurances" that point and nonpoint source control measures will achieve the expected load reductions. *See* EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 (May 20, 2002).

40. EPA has authority to revise water quality standards "in any case where the [EPA] Administrator determines that a revised or new standard is necessary to meet the requirements of [the CWA]." 33 U.S.C § 1313(c)(4)(B). EPA also has the authority to establish TMDLs itself, rather than waiting on the

state to do so, in the event EPA deems a state-submitted TMDL inadequate. 33 U.S.C § 1313(d)(2). If a TMDL fails to attain water quality standards, "a TMDL revision is required." EPA, Guidance for Water Quality-based Decisions: The TMDL Process 2 (April 1991).

II. The Endangered Species Act

41. In 1973, recognizing that certain species "ha[d] been so depleted in numbers that they are in danger of or threatened with extinction," Congress enacted the ESA, 16 U.S.C. §§ 1531–44, "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species." *Id.* § 1531(a)(2), (b). Congress declared that it is "the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this chapter." *Id.* § 1531(c)(1).

42. The ESA defines conservation as "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary." *Id.* § 1532(3). The ESA's goal is not simply to prevent endangered and threatened species from becoming extinct, but to recover these species to the point where they no longer require the statute's protections.

43. Considered "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation," the ESA embodies the "plain intent" of Congress to "halt and reverse the trend toward species extinction, whatever the cost." *Tenn. Valley Authority v. Hill*, 437 U.S. 153, 180, 184 (1978); *see also id.* at 185 (ESA section 7's legislative history "reveals an explicit congressional decision to require agencies to afford first priority to the declared national policy of saving endangered species" and "a conscious decision by Congress to give endangered species priority over the 'primary missions' of federal agencies").

44. Section 7(a)(2) of the ESA imposes on federal agencies such as EPA a substantive duty to ensure that actions they authorize or carry out—including approval of a state's water quality standards—are not likely to jeopardize listed species or destroy or adversely modify critical habitat designated for such species. 16 U.S.C. § 1536(a)(2); *see also* Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Service Regarding Enhanced Coordination Under the Clean Water Act and Endangered Species Act, 66 Fed. Reg. 11,202 (Feb. 22, 2001) ("EPA & Services MOU"). Such "action agencies" must discharge this obligation in consultation with the appropriate expert fish and wildlife agency—FWS in the case of the manatee; NMFS in the case of green sea turtles, loggerhead sea turtles, and

smalltooth sawfish. *See id.*; 50 C.F.R. § 402.01(b); *id.* §§ 17.11(h), 223.102(e), 224.101(h).

45. The action agency's ESA obligations do not end after completing an initial consultation. The ESA also requires that consultation be reinitiated in certain circumstances where "discretionary Federal involvement or control over the action has been retained or is authorized by law." 50 C.F.R. § 402.16(a).

46. With regards to state water quality standards and TMDLs, EPA has continuing discretionary authority under 33 U.S.C. § 1313(c)(4)(B), which requires it to revise water quality standards "in any case where the [EPA] Administrator determines that a revised or new standard is necessary to meet the requirements of [the Clean Water Act]," and 33 U.S.C § 1313(d)(2) & (e)(2), which provides EPA with continuing discretionary authority over TMDLs. *See also* EPA & Services MOU at 11,206 ("EPA and the Services have agreed that where information indicates an existing standard is not adequate to avoid jeopardizing listed species, or destroying or adversely modifying designated critical habitat, EPA will work with the State/Tribe to obtain revisions in the standard or, if necessary, revise the standards through the promulgation of federal water quality standards under section 303(c)(4)(B) of the CWA.").

47. Where the action agency retains discretionary involvement or control over its action, it must reinitiate consultation:

> (1) If the amount or extent of taking specified in the incidental take statement is exceeded;
> (2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
> (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or
> (4) If a new species is listed or critical habitat designated that may be affected by the identified action.

50 C.F.R. § 402.16(a).

PROCEDURAL HISTORY

48. For decades, Florida's water quality standard for nutrients, including nitrogen and phosphorus, was a "narrative" criterion: "In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." Fla. Admin. Code Ann. r. 62-302.530(48)(b).

49. In 2008, environmental groups sued EPA, explaining that this vague narrative criterion was insufficient to protect Florida waters, and that "numeric" nutrient criteria were needed to control nitrogen and phosphorus pollution. The groups analogized the problem to highway speed limits. A numeric speed limit sign would read "Speed Limit 50 MPH" while a narrative speed limit sign would read "Don't Drive Too Fast." Nitrogen and phosphorus pollution in Florida could not be adequately controlled without specific numeric pollution limits in place.

50. Through a consent decree, EPA agreed to set revised standards. In 2010, EPA proposed and finalized rules establishing numeric nutrient criteria.

51. On June 13, 2012, Florida submitted its own revised water quality standards for EPA's approval under 33 U.S.C. § 1313(c) to supersede those adopted by EPA. Florida's revisions included a rule adopting a framework for developing numeric interpretations of the existing statewide narrative nutrient criterion.

52. The framework explains that where a site-specific TMDL has been adopted "that interpret[s] the narrative water quality criterion for nutrients," the TMDL shall be the numeric interpretation of the narrative nutrient criterion. Fla. Admin. Code Ann. r. 62-302.531.

53. For the Indian River Lagoon and its constituent Banana River Lagoon, FDEP set TMDLs for nitrogen and phosphorus in 2009 and submitted them for EPA's approval as numeric nutrient criteria. EPA approved these TMDLs as water quality standards in 2013. They are codified as "Estuary-Specific Numeric Interpretations of the Narrative Nutrient Criterion" under Fla. Admin. Code r. 62-302.532(aa) (referencing Fla. Admin. Code r. 62-304.520). In other words, while typically a TMDL is set in order to meet a water quality standard, here the water quality standards *are* the TMDLs for the Indian River Lagoon and the TMDLs *are* the water quality standards.

54. Under ESA section 7(a)(2), EPA consulted with FWS and NMFS on its approval of the Indian River Lagoon water quality standards/TMDLs in 2013.

55. In its informal consultation with the FWS, EPA concluded that its approval would not adversely affect Florida manatees. FWS concurred in that determination. In the biological opinion that NMFS issued to EPA following formal consultation on green sea turtles, loggerhead sea turtles, and smalltooth sawfish, NMFS concluded that EPA's approval would not likely jeopardize the continued existence of these species or destroy or adversely modify designated critical habitat for the smalltooth sawfish.

56. In March 2021, after more than 500 manatees had died since the beginning of the year, the Secretary of Commerce, in consultation with the Secretary of the Interior and with the guidance of the Working Group on Marine Mammal Unusual Mortality Events, officially declared an "Unusual Mortality Event" for the Atlantic Florida manatee under the Marine Mammal Protection Act, 16 U.S.C. § 1421c(a)(2)(B).

57. On August 10, 2021, FWS requested that EPA reinitiate ESA consultation. The letter explained that FWS "would like to make [EPA] aware of new information regarding an ongoing Unusual Mortality Event (UME) for manatees in the Indian River Lagoon (IRL) in Florida and recommend that EPA reinitiate consultation on the numeric nutrient criteria for water quality standards in

estuaries." FWS's letter alerted EPA that the Indian River Lagoon has reached an "ecological tipping point" and that the loss of "tens of thousands of acres of seagrass" due to excess nutrient pollution was causing the ongoing die-off of manatees.

58. On November 23, 2021, EPA responded by letter to FWS, declining to reinitiate consultation.

59. As required by the ESA citizen suit provision, 16 U.S.C. § 1540(g)(2)(A)(i), on December 20, 2021, Plaintiffs sent EPA and FWS a 60-day notice letter explaining that the agency is in violation of the Endangered Species Act for failing to reinitiate consultation with FWS. Plaintiffs sent EPA and NMFS a second 60-day notice letter on February 7, 2022, notifying EPA that it is in violation of the ESA for failing to reinitiate consultation with NMFS.

60. Plaintiffs' letters pointed out new information that requires EPA to reinitiate consultation with the Services under 50 C.F.R. § 402.16(a)(2) on the water quality standards/TMDLs for the Indian River Lagoon.

61. First, like FWS's request for reinitiation of consultation, Plaintiffs alerted EPA that the unprecedented die-off of manatees due to deteriorating water quality in the Lagoon requires reinitiation of consultation with FWS. Plaintiffs further explained to EPA how the same pollution adversely affecting manatees is also adversely affecting green sea turtles, loggerhead sea turtles, and smalltooth

sawfish, thus requiring reinitiation of consultation with NMFS. Plaintiffs explained that this new information, showing that continued deterioration of water quality is harming these species, calls into question the overall adequacy of the water quality standards/TMDLs.

62. Second, Plaintiffs explained that new information demonstrating lax enforcement and compliance for reductions of both point and nonpoint sources shows that the water quality standards/TMDLs lack reasonable assurances that point and nonpoint source reductions will achieve expected load reductions. Among other deficiencies, (1) the state of Florida has been routinely allowing harmful sewage spills as "wet weather discharges"; (2) the state is failing to inspect wastewater treatment facilities and fine them when they illegally pollute; and (3) the state is failing to ensure enrollment and oversight of a program aimed at curbing pollution from agricultural runoff.

63. Finally, Plaintiffs explained that new scientific information demonstrates that the water quality standards/TMDLs are insufficient at preventing seagrass loss because the models that underlie the TMDLs do not adequately account for all sources of pollution. In particular, (1) the models do not accurately account for ongoing inputs of nitrogen and phosphorus released from accumulated historic pollution in the Lagoon; (2) they underestimate nutrient loading from

septic tanks; and (3) they do not accurately account for the confounding role of climate change in driving nutrient loading.

64. To date, EPA has not reinitiated consultation with either FWS or NMFS.

FIRST CLAIM FOR RELIEF
(Failure to Reinitiate Consultation with FWS)

65. Plaintiffs hereby reallege, as if fully set forth herein, each and every allegation contained in paragraphs 1 through 64.

66. EPA is required to reinitiate consultation with FWS on a given action when "new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered." 50 C.F.R. § 402.16(a)(2).

67. New information reveals that EPA's approval of FDEP's water quality standards/TMDLs for the Indian River Lagoon has resulted in a manatee die-off without parallel in the ecosystem's recorded history. New information also demonstrates that the water quality standards/TMDLs are inadequate because they lack reasonable assurances that reduced discharges from point and nonpoint sources will achieve expected reductions in the total pollutant load, and because they fail to account for historic pollution sources, contributions from septic systems, and the impacts of climate change. Collectively, these deficiencies have

allowed excess nitrogen and phosphorus pollution to enter the Lagoon, creating harmful algal outbreaks that kill the seagrass manatees need to survive.

68. By refusing to reinitiate consultation with FWS on the impacts of the water quality standards/TMDLs on Florida manatees, EPA is in violation of the ESA and its implementing regulations. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.16(a)(2).

SECOND CLAIM FOR RELIEF
(Failure to Reinitiate Consultation with NMFS)

69. Plaintiffs hereby reallege, as if fully set forth herein, each and every allegation contained in paragraphs 1 through 64.

70. EPA is required to reinitiate consultation with NMFS on a given action when "new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered." 50 C.F.R. § 402.16(a)(2).

71. New information reveals that EPA's approval of water quality standards/TMDLs for the Indian River Lagoon has had significant adverse effects on green and loggerhead sea turtles and smalltooth sawfish. These species and/or their habitats are harmed by the same excess nutrient pollution that threatens manatees, caused by the above-named deficiencies in the water quality standards/TMDLs for the Indian River Lagoon that EPA approved.

72. By failing to reinitiate consultation with NMFS on the impacts of the water quality standards/TMDLs on green and loggerhead sea turtles and smalltooth sawfish, EPA is in violation of the ESA and its implementing regulations. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.16(a)(2).

REQUEST FOR RELIEF

Therefore, Plaintiffs respectfully request that this Court:

73. Declare that EPA is in violation of the ESA for failing to reinitiate consultation with FWS on the effects of the water quality standards/TMDLs for the Indian River Lagoon on the Florida manatee and with NMFS on the effects of the water quality standards/TMDLs for the Indian River Lagoon on green and loggerhead sea turtles and smalltooth sawfish;

74. Order EPA to reinitiate ESA consultation with the Services on EPA's approval of the water quality standards/TMDLs for the Indian River Lagoon;

75. Award Plaintiffs their reasonable costs, fees, and expenses, including attorney's fees, associated with this litigation; and

76. Grant Plaintiffs such further relief as the Court may deem just and proper.

Respectfully submitted this 10th day of May, 2022.

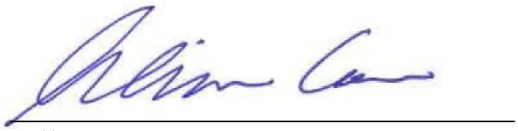

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EXHIBIT 1

EARTHJUSTICE

December 20, 2021

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VIA ELECTRONIC AND CERTIFIED MAIL

Re: Sixty-Day Notice of Violations of the Endangered Species Act for Failing to Reinitiate Consultation Concerning the Unusual Mortality Event for Manatees in the Indian River Lagoon

Dear Officials of the U.S. Environmental Protection Agency:

On behalf of Center for Biological Diversity, Defenders of Wildlife, and Save the Manatee Club, we hereby provide notice in accordance with the citizen suit provision of the Endangered Species Act ("ESA"), 16 U.S.C. § 1540(g), that the U.S. Environmental Protection Agency ("EPA") is in violation of the ESA for failing to reinitiate consultation under ESA section 7, *id.* § 1536, concerning water quality and the unprecedented mortality event for Atlantic Florida manatees (*Trichechus manatus latirostris*) ("manatees") in the Indian River Lagoon. Specifically, the EPA has unlawfully failed to reinitiate section 7 consultation with U.S. Fish and Wildlife Service ("FWS") in light of significant new information undermining EPA and FWS's conclusions that the Clean Water Act ("CWA") estuary-specific numeric nutrient criteria are not likely to adversely affect any federally listed species or their critical habitats, including the manatee and its habitat.

More than 1,000 manatees have died so far this year in Florida, as part of a catastrophic "Unusual Mortality Event." This represents roughly double the average number of deaths in years prior, and it is the most deaths ever recorded in a year. More than half of those deaths occurred in the northern Indian River Lagoon due to starvation and malnutrition caused by seagrass die-offs attributable to nutrient pollution and associated harmful algal outbreaks.

Congress enacted the ESA and CWA to prevent such harms. These statutes require that EPA-approved water quality standards ensure the protection of water quality and threatened species such as the manatee. However, the current estuary-specific numeric nutrient criteria fail to fulfill these mandates. New information shows that the current criteria suffer from lax enforcement, an inappropriately long trajectory to achieve compliance, and a failure to take into account the impact of legacy pollution. As a result, approximately 12% of the estimated Florida manatee population statewide has died, with the Atlantic subpopulation having lost approximately 19% of its population. In short, both the Indian River Lagoon and the manatee are presently in the midst of ecological collapse. Further, it appears likely that the 2021 Unusual Mortality Event will not be a one-time event, but rather portends a grim future of continued manatee deaths unless more effective actions are taken to address the key environmental factor driving them—nutrient pollution of key estuary habitats that is destroying habitat, including food for manatees and many other species. Together, the ESA and the CWA require such actions. This letter provides notice that your agency is violating the law by failing to take them.

I. LEGAL BACKGROUND

A. EPA's Obligations in Approving Water Quality Standards under the Clean Water Act

The Clean Water Act was enacted almost 50 years ago to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, § 2, 86 Stat. 816, codified as amended at 33 U.S.C. §§ 1251–1387 (2013) (the "Clean Water Act"). To achieve this goal, the CWA requires states to set water quality standards protective of public health and the environment, 33 U.S.C. § 1313(c), and to develop pollution budgets known as "total maximum daily loads" ("TMDLs") for each pollutant impairing a waterbody, *id*. § 1313(d); 40 C.F.R. §130.2(i). These TMDLs set a numeric target reflecting the maximum amount of the pollutant that a waterbody can contain and still be considered in compliance with water quality standards. 33 U.S.C. § 1313(d).

EPA oversees Florida's development of water quality standards and TMDLs. *Id*. § 1313(c)(3), (d)(2). Pursuant to guidance implementing EPA's CWA regulations, EPA is to carefully review the adequacy of TMDLs, including ensuring that the TMDLs have a margin of safety to account for lack of knowledge concerning the relationship between load and wasteload allocations and water quality and that the TMDLs provide "reasonable assurances" that point and nonpoint source control measures will achieve the expected load reductions.[1]

B. EPA's Consultation Obligations under the ESA

Congress enacted the Endangered Species Act in 1973 to provide "a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved" and "a program for the conservation of such endangered species and threatened species." 16

[1] *See* EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 (May 20, 2002), *available at* https://www.epa.gov/sites/default/files/2015-10/documents/2002_06_04_tmdl_guidance_final52002.pdf (last visited Nov. 30, 2021).

U.S.C. § 1531(b). The statute contains an array of provisions designed to afford imperiled species "the highest of priorities," so that they can recover to the point where federal protection is no longer needed. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 174 (1978).

Section 7(a)(2) of the ESA imposes on federal agencies such as EPA a substantive duty to ensure that actions they authorize or carry out—including approval of a state's water quality standards—are not likely to jeopardize listed species or destroy or adversely modify critical habitat designated for such species. 16 U.S.C. § 1536(a)(2); *see also* Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Service Regarding Enhanced Coordination Under the Clean Water Act and Endangered Species Act, 66 Fed. Reg. 11202 (Feb. 22, 2001) ("EPA & FWS MOU"). Such "action agencies" must discharge this obligation in consultation with the appropriate expert fish and wildlife agency—FWS in the case of the manatee. *See id.*; 50 C.F.R. § 402.01(b). If the action agency determines its action may adversely affect listed species or critical habitat, it must initiate formal consultation with FWS. 50 C.F.R. § 402.14(a). If the action agency determines, with written concurrence of FWS, that the proposed action is not likely to adversely affect any listed species or critical habitat, the action agency need not initiate formal consultation. *Id.* § 402.13(c).

The ESA also requires that consultation be reinitiated in certain circumstances where "discretionary Federal involvement or control over the action has been retained or is authorized by law." 50 C.F.R. § 402.16. With regards to state water quality standards, EPA has continuing discretionary involvement and control under 33 U.S.C. § 1313(c)(4)(B), which allows it to revise water quality standards "in any case where the [EPA] Administrator determines that a revised or new standard is necessary to meet the requirements of [the Clean Water Act]." *See also* EPA & FWS MOU at 11206 ("EPA and the Services have agreed that where information indicates an existing standard is not adequate to avoid jeopardizing listed species, or destroying or adversely modifying designated critical habitat, EPA will work with the State/Tribe to obtain revisions in the standard or, if necessary, revise the standards through the promulgation of federal water quality standards under section 303(c)(4)(B) of the CWA."); *Wild Fish Conservancy v. United States Env't Prot. Agency*, 331 F. Supp. 3d 1210, 1222–26 (W.D. Wash. 2018) (finding that EPA retains discretionary involvement and control over approved water quality standards for the purposes of reinitiating consultation). Reinitiation of consultation is required:

> (1) If the amount or extent of taking specified in the incidental take statement is exceeded;
> (2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
> (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or
> (4) If a new species is listed or critical habitat designated that may be affected by the identified action.

50 C.F.R. § 402.16(a).

II. HISTORY OF INDIAN RIVER LAGOON WATER QUALITY STANDARDS AND ESA CONSULTATION

On June 13, 2012, Florida submitted revised water quality standards for EPA's approval under 33 U.S.C. § 1313(c). *See* Decision Document of United States Environmental Protection Agency Determination Under § 303(c) of the Clean Water Act, Review of Amendments to Florida's Rule 62-302 and 62-303 (Nov. 30, 2012) (approving Fla. Admin. Code Ann. r. 62-302.531). EPA approved the revisions on November 30, 2012. *Id.* The revisions included a rule adopting a framework for developing criteria to numerically interpret the existing statewide narrative nutrient criterion that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." *Id.* at 18. The framework explains that where a site-specific nutrient analysis has been performed for a particular waterbody—including through development of a total maximum daily load—this site-specific analysis will be considered the applicable numeric interpretation of the narrative criterion for a particular waterbody. *Id.*; Fla. Admin. Code Ann. r. 62-302.531. For the Indian River Lagoon and its constituent Banana River Lagoon, Florida's Department of Environmental Protection ("FDEP") set TMDLs for nitrogen, phosphorus, and dissolved oxygen in 2009. *See* FDEP, TMDL Report, Nutrient and Dissolved Oxygen TMDLs for the Indian River and Banana River Lagoon (Mar. 2009). EPA approved these TMDLs as nutrient criteria on July 29, 2013, and they are codified as the "Estuary-Specific Numeric Interpretations of the Narrative Nutrient Criterion" under Fla Admin. Code r. 62-302.532(aa) (referencing Fla Admin. Code r. 62-304.520 (Indian River Lagoon TMDLs)).

Pursuant to section 7 of the ESA, EPA consulted with FWS—as well as with the National Marine Fisheries Service ("NMFS")[2]—multiple times under 50 C.F.R. § 402.13 on its approval of Florida's water quality standards. This included (1) consulting with FWS on EPA's approval of Florida's revisions in 2012;[3] (2) consulting with FWS on EPA's approval of amendments to these revisions in 2013—which among other things, approved the specific TMDLs for the Indian River Lagoon;[4] and (3) consulting with FWS on EPA's approval to changes made to Florida's statewide estuary-specific numeric nutrient criteria in 2017 (which did not alter the previously approved TMDLs for Indian River Lagoon).[5]

[2] *See* National Marine Fisheries Service, Biological Opinion on EPA Approval of Water Quality Standards Under Section 303 of the Clean Water Act 3–4 (July 29, 2016) (detailing consultation history with NMFS).
[3] Letter from Annie Godfrey, Chief of EPA Water Quality Standards Section, to Larry Williams, FWS Field Office Supervisor South Florida Ecological Services Office (Dec. 20, 2012).
[4] Letter from Joanne Benante, EPA Water Quality Planning Branch, to Larry Williams, FWS Field Office Supervisor South Florida Ecological Services Office (Oct. 25, 2013).
[5] Letter from Joanne Benante, EPA Chief Water Quality Planning Branch, to Dr. Heath Rauschenberger, FWS North Florida Ecological Services Office (Feb. 8, 2017).

In each of its informal consultations with FWS, EPA concluded that its approval would not adversely affect the manatee,[6] and FWS agreed.[7]

III. NEW INFORMATION REQUIRES REINITATION OF CONSULTATION

FWS has already recognized that reinitiation of consultation is required here, asking EPA on August 10, 2021, to reinitiate consultation. *See* Letter from Larry Williams, Florida State Supervisor of FWS, to Tony Able, Chief, Water Quality Planning Branch, U.S. EPA (Aug. 10, 2021). However, upon information and belief, no such consultation has been reinitiated.

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[6] *See* Letter from Annie Godfrey, Chief of EPA Water Quality Standards Section to Larry Williams, FWS Field Office Supervisor South Florida Ecological Services Office (Dec. 20, 2012) (transmitting Biological Evaluation concluding that "[t]he EPA has determined that its approval of the addition of numeric criteria for springs, lakes, streams, and estuaries, which are primarily outlined within Rule 62-302, as well as the procedure for developing alternative criteria will not likely adversely affect or will beneficially affect listed species, critical habitat and food sources"); Letter from Joanne Benante, EPA Water Quality Planning Branch, to Larry Williams, FWS Field Office Supervisor South Florida Ecological Services Office (Oct. 25, 2013) (transmitting Biological Evaluation concluding that "[o]verall, the EPA has determined that the chemical, physical, and biological data and the scientifically sound approaches used to develop the [numeric nutrient criteria ("NNC")] resulted in NNC that will provide for the protection of a healthy, well-balanced biological community and will ensure the protection of water quality and aquatic life. For all of these reasons, the EPA has determined that the NNC adopted by the State of Florida . . . are not likely to adversely affect listed species and that implementation of the NNC will avoid excessive concentrations of nutrients that can lead to the imbalance of flora and fauna"); Letter from Joanne Benante, EPA Chief Water Quality Planning Branch, to Dr. Heath Rauschenberger, FWS North Florida Ecological Services Office (Feb. 8, 2017) (noting that "EPA continues to arrive at a finding of [No Effect and Not Likely to Adversely Affect] for the unchanged list of FWS's species of concern[.]")

[7] *See* Letter from Larry Williams, FWS Florida State Supervisor, to Annie Godfrey, Chief of EPA Water Quality Standards Section 7 (July 31, 2013) ("the Service concurs with EPA's determination that the revised nutrient standards are not likely to adversely affect the West Indian manatee or its critical habitat"); Letter from Larry Williams, FWS Field Supervisor South Florida Ecological Services Office, to Joanne Benante, EPA Water Quality Planning Branch (Nov. 15, 2013) ("The adopted TMDLs in the Indian River Lagoon contain [Total Nitrogen ("TN")] and [Total Phosphorus ("TP")] loading targets that were established to support the restoration of seagrass beds. Historical seagrass coverage was evaluated in conjunction with historic estimates of point and nonpoint nutrient inputs to establish TMDLs suitable for seagrass proliferation. Implementation of the TMDLs would result in significant reductions in TN (51 percent) and TP (47 percent) loading in the central Indian River Lagoon, which includes the segments within the [FWS South Florida Ecological Services Office] area of responsibility (TMDL 2009b)"); Letter from Jay B. Herrington, FWS Field Supervisor, to Joanne Benante, EPA Water Quality Planning Branch (May 3, 2017) ("the Service concurs with EPA's determination that the changes made to the Florida's statewide estuary-specific numeric nutrient criteria under review is not likely to adversely affect any federally listed species or their critical habitats").

Three significant pieces of new information underscore the requirement for EPA to reinitiate consultation with FWS under 50 C.F.R. § 402.16 on Florida's estuary-specific numeric nutrient criteria. First, new information suggests mass die-offs of manatees in the Indian River Lagoon are due to deterioration in water quality as a result of continuing nitrogen and phosphorus pollution, calling into question the overall adequacy of the current TMDLs. As FWS has already recognized, this unprecedented die-off alone requires reinitiation of consultation. Second, new information suggests there is a lack of reasonable assurance that the current measures to reduce point and nonpoint source pollution will achieve expected load reductions. Third, and finally, new information indicates that the current TMDLs do not adequately take into account pollution from legacy muck, and therefore do not contain an adequate margin of safety.

A. New Information Suggests Mass Die-Offs of Manatees are Due to Continuing Deterioration in Water Quality

More than 1,000 manatees have died so far this year in Florida, with the majority on the Atlantic coast as part of an unprecedented die-off that has been officially declared an "Unusual Mortality Event" by the Working Group on Marine Mammal Unusual Mortality Events and FWS.[8] This represents roughly double the average number of deaths in years prior, and it is the most deaths ever recorded in a year.[9] The Florida Fish and Wildlife Conservation Commission estimates the total number of Florida manatees to have been 8,800 as of 2015–16, with roughly 4,000 on the Atlantic coast.[10] In other words, Florida has lost roughly 12% of its manatee population this year alone, and nearly 19% of the Atlantic population.[11]

[8] *See* Florida Fish and Wildlife Conservation Commission, Marine Mammal Pathobiology Laboratory, 2021 Preliminary Manatee Mortality Table with 5-Year Summary From 01/01/2021 to 12/03/2021, *available at* https://myfwc.com/media/25428/preliminary.pdf (last visited Dec. 16, 2021) (stating that a total of 1038 manatees have died in Florida from 01/01/2021 to 12/03/2021); Florida Fish and Wildlife Conservation Commission, Manatee Mortality Event Along The East Coast 2020-2021, *available at* https://myfwc.com/research/manatee/rescue-mortality-response/ume/ (last visited Dec. 15, 2021).

[9] *Id.*; *see also* Allen, As Seagrass Habitats Decline, Florida Manatees Are Dying Of Starvation, NPR (June 21, 2021), *available at* https://www.npr.org/2021/06/21/1006332218/as-seagrass-habitats-decline-florida-manatees-are-dying-of-starvation (last visited Dec. 1, 2021).

[10] Hostetler, et al., Updated Statewide Abundance Estimates for the Florida Manatee (2018), *available at* https://f50006a.eos-intl.net/ELIBSQL12_F50006A_Documents/TR23-18Hostetler-USAEF.pdf (last visited Dec. 1, 2021).

[11] *Id.*; *see also* Florida Fish and Wildlife Conservation Commission, Manatee Mortalities on the Florida Atlantic Coast, Staff Report (Aug. 4, 2021), *available at* https://www.wfla.com/wp-content/uploads/sites/71/2021/08/FWC-Manatee-Mortalities-Report.pdf (last visited Dec. 16, 2021).

The majority of these deaths have occurred in the Indian River Lagoon, where a die-off of seagrass has left the manatees to starve to death.[12] The Indian River Lagoon is an estuary that includes Mosquito Lagoon, Banana River Lagoon, and the Indian River. It has more species of plants and animals than any other estuary in North America. The lagoon's seagrass includes Johnson's seagrass, a rare seagrass found only in lagoons on the east coast of Florida that was the first marine plant species to be listed under the ESA.[13] The seagrass in the lagoon formerly provided habitat and forage for many commercially, recreationally, and ecologically important species, including manatees, sea turtles, spotted sea trout, redfish (red drum), snook, tarpon, mullet, sheepshead, pompano, seahorses, blue crabs, hermit crabs, pink shrimp, scallops, clams, marine worms, marine snails, and other crustaceans.[14] Seagrass health is therefore not only critical to the survival of the manatee, but to the persistence of other threatened and endangered species of plants and wildlife, the health of commercially and recreationally important species, and the functioning of the ecosystem overall.

The die-off of seagrass is directly related to deteriorating water quality in the Indian River Lagoon.[15] As human development has increased around the Indian River Lagoon, so has the input of nitrogen and phosphorus from wastewater treatment discharges, leaking septic systems, and stormwater runoff carrying nitrogen fertilizer, among other sources. These nutrients, in turn, feed algae super outbreaks, which block light from getting to the seagrass, causing it to die.[16]

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[12] *See* Memorandum from Gil McRae, Director, Fish and Wildlife Research Institute, to Florida Fish and Wildlife Conservation Commissioners re: Staff Report – Unusual Manatee Mortality along the Florida Atlantic coast (Aug. 4, 2021) ("This unusual mortality event has been attributed to the effects of starvation tied to lack of suitable forage availability associated with winter aggregation at warm water sites."); Lefebvre et al., Characterizing Manatee habitat use and seagrass grazing in Florida and Puerto Rico: implications for conservation and management, Pacific Conservation Biology Vol 5: 289–98 (2000) (explaining the importance of seagrass to manatee diets).

[13] National Marine Fisheries Service, Final Recovery Plan for Johnson's Seagrass (Sept. 2002).

[14] *See* U.S. Fish and Wildlife Service, Indian River Lagoon, *available at* https://www.fws.gov/refuge/pelican_island/wildlife_and_habitat/indian_river_lagoon.html (last visited Oct. 12, 2021); St. Johns River Water Management District, Indian River Lagoon: An Introduction to a National Treasure (2007).

[15] *See* Memorandum from Gil McRae, Director, Fish and Wildlife Research Institute, to Florida Fish and Wildlife Conservation Commissioners re: Staff Report – Unusual Manatee Mortality along the Florida Atlantic coast (Aug. 4, 2021) ("Seagrass losses in the Indian River Lagoon have been significant due to continuing water quality issues.").

[16] *See, e.g.*, Lapointe, et al., Nutrient Over-Enrichment and Light Limitation of Seagrass Communities in the Indian River Lagoon, an Urbanized Subtropical Estuary, Science of the Total Environment 699 (2020). This deteriorating water quality has also led to other effects on protected species. For instance, a 2021 article found a strong correlation between water pollution in the Indian River Lagoon and the prevalence of tumors in endangered green sea turtles. *See* Sposato, et al., Evaluation of Immune Function in Two Populations of Green Sea Turtles (*Chelonia mydas*) in a Degraded Versus a Nondegraded Habitat, J. Wildlife Diseases 57(4):761-772 (2021).

As FWS has already recognized, the continued deterioration in water quality—leading to algae outbreaks "that have increased in frequency and duration" and have caused the recent unusual manatee mortality event—require reinitiation of consultation under 50 C.F.R. § 402.16(a)(2) on EPA's approval of the numeric nutrient criteria for water quality standards in estuaries. *See* Letter from Larry Williams, Florida State Supervisor of FWS, to Tony Able, Chief, Water Quality Planning Branch, U.S. EPA (Aug. 10, 2021). Despite FWS's call for reinitiation, however, available information indicates that to date neither agency has formally reinitiated ESA consultation. *See id.* (asking EPA to reinitiate consultation, without itself formally reinitiating consultation). Given the continued water quality deterioration and increasing die-off of manatees, EPA must immediately reinitiate consultation to address the Unusual Mortality Event and to reconsider whether the current TMDLs are adequate to protect the manatee. As discussed below, significant new information indicates they are not.

B. New Information Suggests a Lack of Reasonable Assurances that Point and Nonpoint Source Reductions Will Achieve Expected Load Reductions

In addition to the recent unprecedented die-off of manatees, a growing record of inadequate efforts to comply with and enforce existing water-quality safeguards also necessitates reinitiation of consultation. For EPA to approve a TMDL, EPA must determine that the TMDL provides reasonable assurances that point and nonpoint source control measures will achieve expected load reductions.[17] Lax enforcement and compliance for both point and nonpoint sources suggests that the current TMDLs are ineffective at controlling nutrients into the Indian River Lagoon. EPA must therefore reinitiate consultation to consider this new information suggesting that the current TMDLs are not being effectively implemented and that the TMDLs lack reasonable assurances they will achieve load reductions. *See* 50 C.F.R. § 402.16(a)(1), (3).

1. Recent Reports Suggest Current Stormwater and Wastewater Treatment Facilities Fail to Meet the Presumption that they Achieve Expected Load Reductions

Several recent reports indicate that point source control measures and enforcement are inadequate, suggesting that the TMDLs must be revisited to ensure that they provide reasonable assurances that the wasteload allocation from point sources will be achieved.

First, in 2019, a "Blue-green Algae Task Force," appointed by Governor DeSantis to aid the Florida Department of Environmental Protection, concluded that "[t]he presumption that a stormwater treatment system constructed and permitted in compliance with [best management

[17] *See* 40 C.F.R. 122.44(d)(1)(vii)(B) (requiring effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL); EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 at 4 (May 20, 2002), *available at* https://www.epa.gov/sites/default/files/2015-10/documents/2002_06_04_tmdl_guidance_final52002.pdf (last visited Nov. 30, 2021) (explaining that when waters are impaired by both point and nonpoint sources, "the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable").

practice] design criteria will not cause or contribute to violations of surface water quality standards in adjacent and/or connected waterbodies has been evaluated and challenged. Available data suggest that a substantial number of stormwater treatment systems throughout the state fail to achieve their presumed performance standards." Blue-green Algae Task Force, DRAFT consensus Document #1 Final Draft – Revised 3 October 2019. The Task Force recommended "the development and implementation of a stormwater system inspection and monitoring program with the goal of identifying improperly functioning and/or failing systems so that corrective action can be taken to reduce nutrient pollution and other negative environmental impacts." *Id.* It further recommended "that stormwater design criteria be revised and updated to incorporate recent advances in stormwater treatment technologies and other practices that have demonstrated environmental benefits; nutrient reduction specifically." *Id.*

Second, a 2018 review of sewage pollution in the Indian River Lagoon suggested that harmful algae outbreaks are initiated and expanded by wet weather discharges from municipal wastewater treatment facilities. *See* Barile, Widespread Sewage Pollution of the Indian River Lagoon System, Florida (USA) Resolved by Spatial Analyses of Macroalgal Biogeochemistry, Marine Pollution Bulletin 128 (2018). The article explained that although direct surface water discharges of treated human wastewater effluent are prohibited, up to 90 days per year of "emergency wet weather" surface discharges are allowed when significant rain events overload the treatment system capacities. *Id.* at 559; *see also* Indian River Lagoon Act, Chapter 90-262 Laws of Florida, Sec. 2(c) (allowing wet weather discharges). The article posits that these poorly reported wet weather discharges—which can be several million liters per day per treatment plant during wet season events—may be a key factor supporting harmful algal outbreaks. Barile at 560, 572. The article suggests that significant wastewater treatment infrastructure upgrades, including conversion of municipal wastewater treatment plants to high nutrient removal advanced wastewater treatment, as well as mandatory septic-to-sewer conversion, are needed for seagrass regrowth in the Indian River Lagoon. *Id.* at 572.[18]

Finally, a 2020 Florida Public Employees for Environmental Responsibility ("Florida PEER") report disclosed that Brevard County had 38 instances of unpermitted sewage discharges, totaling 552,040 gallons discharged. *See* Florida PEER, Report on Enforcement Efforts by the Florida Department of Environmental Protection (2020), *available at* https://www.peer.org/2020-florida-enforcement-report/ (last visited Dec. 1, 2021). Florida PEER also reported that the Florida Department of Environmental Protection conducted fewer inspections in 2020 than in previous years, and that the severity of fines decreased. Moreover, the "the enforcement actions used by the FDEP were largely short-form consent orders that required nothing more than paying a penalty, i.e., the traffic ticket approach." *Id.* at 35. As Florida PEER Director Jerry Phillips explained, "[r]ather than seeking major reductions in our pollution load, DEP's reliance on small fines makes pollution an acceptable cost of doing business." *See* Florida PEER, Press Release, Florida Pollution Enforcement Fell into Covid Coma, (Sep. 15, 2021) *available at* https://www.peer.org/florida-pollution-enforcement-fell-

[18] *See also* Lapointe, et al., Evidence of Sewage-Driven Eutrophication and Harmful Algal Blooms in Florida's Indian River Lagoon, 43 Harmful Algae 82–102 (March 5, 2015) (suggesting that seagrass loss due to pollution from sewage indicates the need for improved sewage collection and treatment).

into-covid-coma/ (last visited Dec. 1, 2021). This information thus suggests that lax enforcement of unpermitted sewage discharges could be further contributing to nitrogen and phosphorous pollution in the Indian River Lagoon.[19]

EPA must thus reinitiate consultation with FWS under 50 C.F.R. § 402.16 to take into consideration these recent reports demonstrating the lack of reasonable assurances that point source discharge control measures will achieve required load reductions.

2. The TMDL Lacks Reasonable Assurances that the Agricultural Best Management Practices Designed to Control Nonpoint Source Pollution Are Sufficient and Achievable

In addition to recent information indicating that point source discharge controls do not provide reasonable assurances that load reductions will be achieved, further new information suggests that nonpoint sources present an additional source of pollution that is inadequately addressed. Agricultural nonpoint sources are a significant contributor of nitrogen and phosphorous into the Indian River Lagoon. *See* FDEP, Central Indian River Lagoon Basin Management Action Plan 17 (Feb. 2021) ("CIRL BMAP"). To address these nonpoint sources, the FDEP has created three Basin Management Action Plans ("BMAPs"), dividing up the Indian River Lagoon into three subbasins: (1) the Central Indian River Lagoon; (2) the North Indian River Lagoon ("NIRL BMAP"); and (3) the Banana River Lagoon ("BRL BMAP"). These BMAPs include agricultural best management practices ("BMPs") that are aimed at reducing nitrogen and phosphorus runoff from agricultural practices. Under Florida law, it is the agricultural landowner's responsibility to implement the BMPs, and landowners who do not enroll in the BMP Program are supposed to be referred to FDEP for enforcement action.

Unfortunately, however, current landowner enrollment in the BMP program is very low: only 25% of agricultural acres are currently enrolled in the Central Indian River Lagoon, *see* CIRL BMAP at 153; only 6% are enrolled in the North Indian River Lagoon, *see* NIRL BMAP at 27; and 0% are enrolled in the Banana River Lagoon, *see* BRL BMAP at 22. This is far below the current average of 62% enrollment in the BMP Program statewide, and 82% enrollment of irrigated agricultural acres statewide. *See* Florida Department of Agriculture and Consumer Services, Office of Agricultural Water Policy, Status of Implementation of Agricultural Nonpoint Source Best Management Practices 2 (July 1, 2021). Moreover, although Florida Department of Agriculture and Consumer Services ("FDACS") is required to verify that landowners are properly implementing BMPs, including by conducting site visits every two years, FDACS conducted relatively few site visits to the Indian River Lagoon in 2020: only 91 out of 2,824 total visits statewide. *See id*. at 17. Furthermore, of the more than 6,600 referrals statewide from FDACS to FDEP for enforcement for agricultural producers not following the

[19] *See also* Waymer and Vazquez, Sewage spill keep taxing Indian River Lagoon, other waters; state issues fines, but is that enough?, Florida Today (Aug. 15, 2019). In late 2020, more than seven million gallons of raw sewage spilled into a pond at Sand Point Park that flows directly into the Indian River Lagoon, resulting in a fish die-off. *See* Vazquez, Protestors call for action in Titusville after raw sewage spill into Indian River Lagoon, Florida Today (Jan 9, 2021); Waymer, Titusville sewage fallout could top half a million, Florida Today (May 7, 2021).

rules, none have faced penalties.[20] As Florida Agricultural Commissioner Nikki Fried described the situation in August, 2021, "[u]nfortunately we have not seen a hammer come down from FDEP. . . . There's a carrot and there's a stick. [FDACS] is the carrot, and FDEP is the stick. And the stick's not working."[21]

Finally, although the BMAPs intend to increase enrollment over time, the BMAPs do not aim to achieve full targeted load reductions until 2035, *see*, *e.g.*, CIRL BMAP at 16. This lengthy trajectory, coupled with the currently low enrollment by agricultural landowners in the BMP Program and lack of meaningful enforcement, is inappropriate and insufficient given the current ecological collapse of the Indian River Lagoon. EPA must therefore reinitiate consultation with FWS to consider new information demonstrating that the current enrollment and enforcement of BMPs, and planned trajectory of nitrogen and phosphorus reductions, has been insufficient to prevent seagrass and manatee die-offs, and that there are presently insufficient assurances that the measures to reduce nonpoint source pollution in the TMDLs will achieve expected load reductions.

C. New Information Suggests the TMDLs Overlook, and Should Take into Account, Ongoing Contributions of Nitrogen and Phosphorous from Legacy Pollution

New information also highlights the important role that legacy pollution plays in the ecosystem collapse that is underway in the Indian River Lagoon, yet the existing TMDLs fail to account for this factor. Over time, the harmful levels of nutrients entering the Indian River Lagoon have led to muck accumulation on the lagoon bottom, which "fluxes" nutrients back into the lagoon. There are an estimated 5 million cubic yards of muck within the Indian River Lagoon, delivering roughly 30% of the total nutrient load.[22] Brevard County recently posited that "[n]itrogen and phosphorus released each year as muck decays are now larger than any current source of nutrient pollution to lagoon waters." Tetra Tech, Inc. and CloseWaters LLC. (2021) Save Our Indian River Lagoon Project Plan 2021 Update for Brevard County, Natural Resources Management Department Brevard County, Florida. Not only does legacy muck contribute to

[20] *See* Chesnes, Ag Commissioner Nikki Fried wants boots on the ground to measure, reduce pollution, TCPalm (Aug. 4, 2021), *available at* https://www.tcpalm.com/story/news/local/indian-river-lagoon/2021/08/04/nikki-fried-visits-sewalls-point-discuss-clean-water-initiative/5452933001/ (last visited Dec. 1, 2021).

[21] *Id. See also* MacLaughlin, Will Basin Management Action Plans Restore Florida's Impaired Waters?, 89 Fla. B. J. 31 (Feb. 2015) (suggesting that BMAPs "need more regulatory teeth if they are to succeed"); Blue-green Algae Task Force, DRAFT consensus Document #1 Final Draft – Revised (Oct. 3, 2019) ("[T]he [Blue-green Algae Task Force] recommends that the effectiveness of BMPs be supported by adequate data to justify the presumption of compliance granted upon enrollment and implementation").

[22] Fox and Tefry, Lagoon-wide Application of the Quick-Flux Technique to determine Sediment Nitrogen and Phosphorus Fluxes, Submitted to Brevard County, Fl. Natural Resources Management Department (June 2019); *see also* Tetra Tech, Inc. and CloseWaters LLC., Save Our Indian River Lagoon Project Plan 2021 Update for Brevard County, Natural Resources Management Department Brevard County, Florida (Feb. 2021), *available at* https://www.brevardfl.gov/SaveOurLagoon/ProjectPlan (last visited on Dec. 1, 2021).

nitrogen and phosphorus pollution, but it can result in resuspension of sediment which decreases light availability to seagrass and further contributes to seagrass loss.[23] It can also cover the natural bottom of the lagoon so that the seagrass is unable to grow.[24]

EPA's TMDL guidance explains that TMDL submittals should identify all "point and nonpoint sources of the pollutant of concern, including the location of the source(s) and the quantity of the loading" in order for EPA to adequately review the load and wasteload allocations and develop an adequate margin of safety "to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality." EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 at 1, 4 (May 20, 2002). But despite the outsize importance of this legacy muck as a pollution source, legacy inputs were not accounted for in the nitrogen and phosphorus TMDLs and the "Spatial Watershed Iterative Loading or 'SWIL' Model"—the model that calculates the load allocations for the Indian River Lagoon BMAPs—does not take this legacy muck into account. *See, e.g.,* NIRL BMAP at 39.

Without addressing legacy muck, it is likely that algal outbreaks and seagrass loss will continue.[25] EPA must therefore reinitiate consultation with FWS in light of evidence that the current TMDLs lack an adequate margin of safety that takes into account the nutrient and sediment contributions of legacy pollution.

IV. CONCLUSION

The ESA authorizes citizen suits to enjoin violations of the ESA. 16 U.S.C. § 1540(g)(1)(a). As set forth above, EPA is in violation of the ESA for failing to reinitiate formal consultation with FWS concerning EPA's approval of Florida's estuary-specific numeric nutrient criteria in light of recent manatee mortality and new information suggesting that the current numeric nutrient standards are insufficient to protect against the current manatee die-off as well as protect against future mortality events. If EPA is unwilling to take action within sixty days to reinitiate consultation, we plan to seek redress through litigation.

Sincerely,

Elizabeth Forsyth
Earthjustice Biodiversity Defense Program

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[23] Phlips, Factors Affecting the Abundance of Phytoplankton in a Restricted Subtropical Lagoon, The Indian River Lagoon, Florida, USA, Estuarine, Coastal and Shelf Science (Sep. 2002).
[24] Florida Tech, Florida Tech Scientists and Engineers Seek Answers for Muck in the Indian River Lagoon (Aug. 13, 2017); Waymer, Muck: The arch-enemy lurks deep in Indian River Lagoon – Muck problem expensive to solve, Florida Today (Nov. 24, 2013).
[25] *See* Missimer, et al., Legacy Phosphorus in Lake Okeechobee (Florida, USA) Sediments: A Review and New Perspective, Water (2021) (explaining that in Lake Okeechobee, "[d]espite major efforts to control external nutrient loading into the lake, the high frequency of algal blooms will continue until the muds bearing legacy nutrients are removed from the lake").

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EARTHJUSTICE

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VIA ELECTRONIC AND CERTIFIED MAIL

Re: Supplement to Sixty-Day Notice of Violations of the Endangered Species Act for Failing to Reinitiate Consultation Concerning the Unusual Mortality Event for Manatees in the Indian River Lagoon

Dear Officials of the U.S. Environmental Protection Agency:

On behalf of Center for Biological Diversity, Defenders of Wildlife, and Save the Manatee Club, we hereby provide a supplement to our December 20, 2021 notice that the U.S. Environmental Protection Agency is in violation of the Endangered Species Act ("ESA") for failing to reinitiate consultation with the U.S. Fish and Wildlife Service under ESA section 7, *id.* § 1536, concerning water quality and the unprecedented mortality event for Atlantic Florida manatees (*Trichechus manatus latirostris*) ("manatees") in the Indian River Lagoon. This supplement includes an expert report by Dr. Peter Barile detailing additional ways the current EPA-approved estuary-specific numeric nutrient criteria are inadequate to prevent seagrass die-off, harmful algal outbreaks, and further manatee mortality events in the Indian River Lagoon. Specifically, Dr. Barile's report explains that new information demonstrates that nutrient loads from septic tanks were underestimated in the approved numeric nutrient criteria and that the criteria do not account for the confounding role of climate change in driving nutrient loading.

The report concludes that based on this new information, the current estuary-specific numeric nutrient criteria are currently "an order of magnitude" above maximum concentrations that would support seagrass and should be revised accordingly to prevent eutrophication, loss of seagrass, and harm to the manatee.

Sincerely,

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Report on recent scientific evidence (post-2013) to compel the USEPA and FDEP to reassess Indian River Lagoon, FL Numerical Nutrient Criteria

Peter Barile, Ph.D. Senior Scientist
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This is an expert report by Peter Barile, Ph.D., Senior Scientist, Marine Research & Consulting, Inc. Melbourne, Florida, on the scientific description of the health of the Indian River Lagoon as it relates to the 2013 EPA-approved Numerical Nutrient Criteria for the Indian River Lagoon system, excess nutrient loading and concentrations, harmful algal blooms and subsequently to seagrasses die-off and loss of over 400 manatees in Brevard County in 2021.

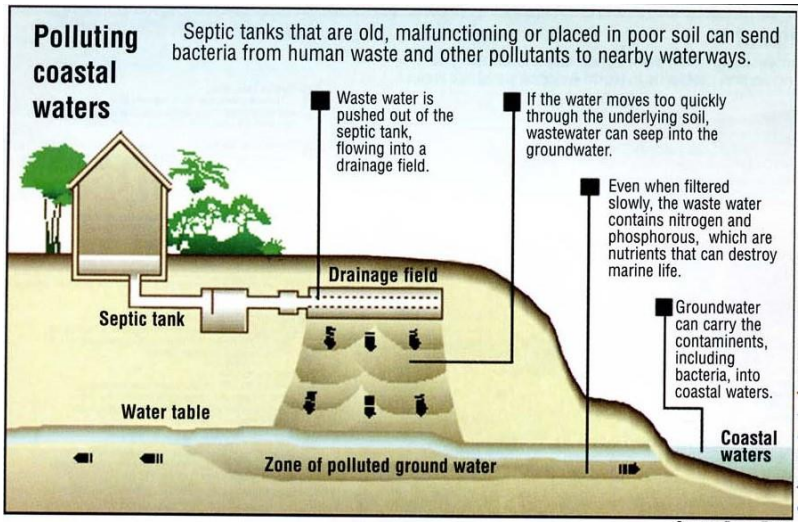
Dr. Barile has a Ph.D. in Environmental Sciences, a Master of Science degree in Marine Biology and a Bachelor's degree in Biological Sciences, all from Florida Tech in Melbourne, FL. Dr. Barile is a former Link Foundation Post Doctoral Fellow in the Division of Marine Science at Harbor Branch Oceanographic Institution in Ft. Pierce, FL. and a former NOAA Sea Grant- Knauss Marine Policy Fellow with residence in the US federal government's executive branch on ocean policy development at the National Science Foundation in Washington, D.C. Dr. Barile has 30 years of experience as a scientist and has authored over 20 peer-reviewed scientific articles, book chapters and public policy documents largely on Florida aquatic ecosystems, including the Indian River Lagoon. He has been relied upon to give expert consultation and testimony to the Florida legislature on the role of land-based sources of pollution to Florida's aquatic ecosystems and served on the Florida Senate's Consumer Fertilizer Task Force.

This report addresses new scientific information that may be used to compel the US Environmental Protection Agency (EPA) under the Clean Water Act to require the Florida Department of Environmental Protection (FDEP) to reassess its Numerical Nutrient Criteria (NNC) for Impaired Waters of the Indian River Lagoon. This analysis includes new scientific evidence, since adoption of the 2013 EPA-approved NNC, revising the understanding of nutrient loading sources to the IRL system and processes that now confound the models used to create the IRL NNC. Since the EPA's adoption of the 2013 NNC, the FDEP's TMDL nutrient reduction

regulatory program has resulted in 1) annual nutrient load and nutrient concentration exceedances that have resulted in 2) unprecedented high density phytoplankton blooms, 3) a 95% loss of historic seagrass coverage in the northern Indian River Lagoon (NIRL), and 4) subsequent die-off of nearly 400 manatees in the NIRL BMAP/TMDL area during 2021.

1) Florida DEP underestimated the contribution of nutrient loads from septic tanks

Recent modeling work in Florida indicates that nutrient loading from septic tanks (OSDS) is the second largest nutrient loading source to Florida's aquatic ecosystems (Badruzzaman et al. 2012). The University of Florida's Institute of Food & Agricultural Sciences estimates that there are 2.6 million septic tanks in the state that discharge nearly 426 million gallons of wastewater per day into Florida's ground and surface waters (UF-IFAS 2022). Nearly 300,000 OSDS are in the counties along the IRL system. The widespread pollution of OSDS effluent into the IRL is supported by the hydrogeological properties of the surficial aquifer along the Lagoon that mobilizes effluent downgradient to the IRL's surface waters.



From: Barile and Lapointe (1999)

The EPA's NNC are based upon a NIRL BMAP nutrient load estimate that there are 16,171 residences within this watershed basin that utilize Onsite Sewage Disposal Systems (OSDS) or septic tanks for human waste water treatment (FDEP 2021).

This value may be an underestimate, as Brevard County alone has nearly 90,000 residences on septic tanks, where the SJRWMD (1993) estimated that nearly 70% may be "problem tanks" where changing environmental conditions may directly mobilize effluent to nearby surface or groundwaters beyond those available in the TMDL estimates for the central (CIRL) and northern (NIRL) Indian River Lagoon BMAP areas.

Barile (2018) estimated that 43% of the residences and a total of 91,630 residences utilize septic tanks for human sewage disposal in Brevard County. With flooding conditions associated with heavy wet weather and tropical storm activity, steady state models of septic tank effluent loading to adjacent surface waters, such as the SWIL model used in the FDEP's NIRL BMAP nutrient loading estimates, are recognized to be conservative and an underestimate of this significant nutrient loading source.

In fact, a 2016 State of Florida South Florida Water Management District resolution (Resolution of the Governing Board #2016-0712, July 14, 2016) indicated that ***"human wastewater including septic tanks is the major source of excess nitrogen in the Indian River Lagoon and is underestimated in past nutrient loading models."***

Figure 2 to the right is the 2021 FDEP BMAP of the residential septic systems (OSDS) in the NIRL watershed.

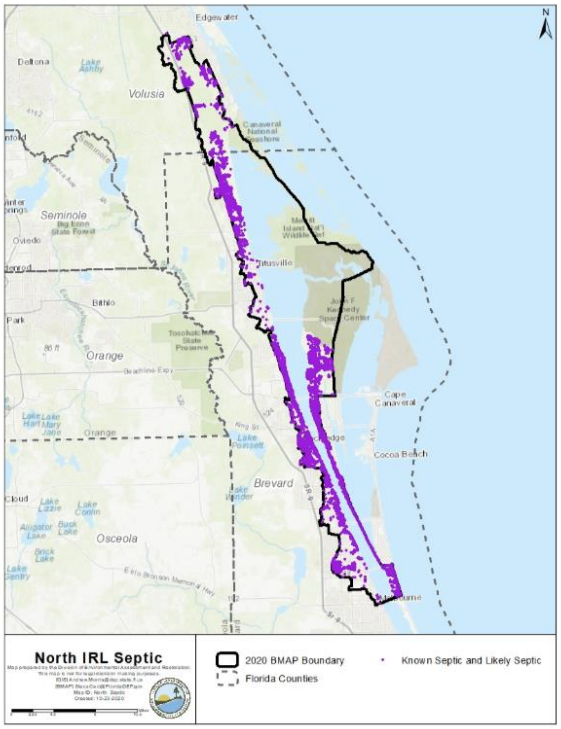


Figure 2. Location of septic systems in the NIRL

The process of mobilization of septic tank (OSDS) effluent, as a previously underestimated and significant nutrient loading source to the Indian River Lagoon, has been documented recently in several published peer-reviewed academic journal contributions.

In the counties along the ~150 mile long lagoon, nearly 50% of the residences utilize OSDS for wastewater treatment (Barile, 2018), which is significantly higher than the Florida or US national average.

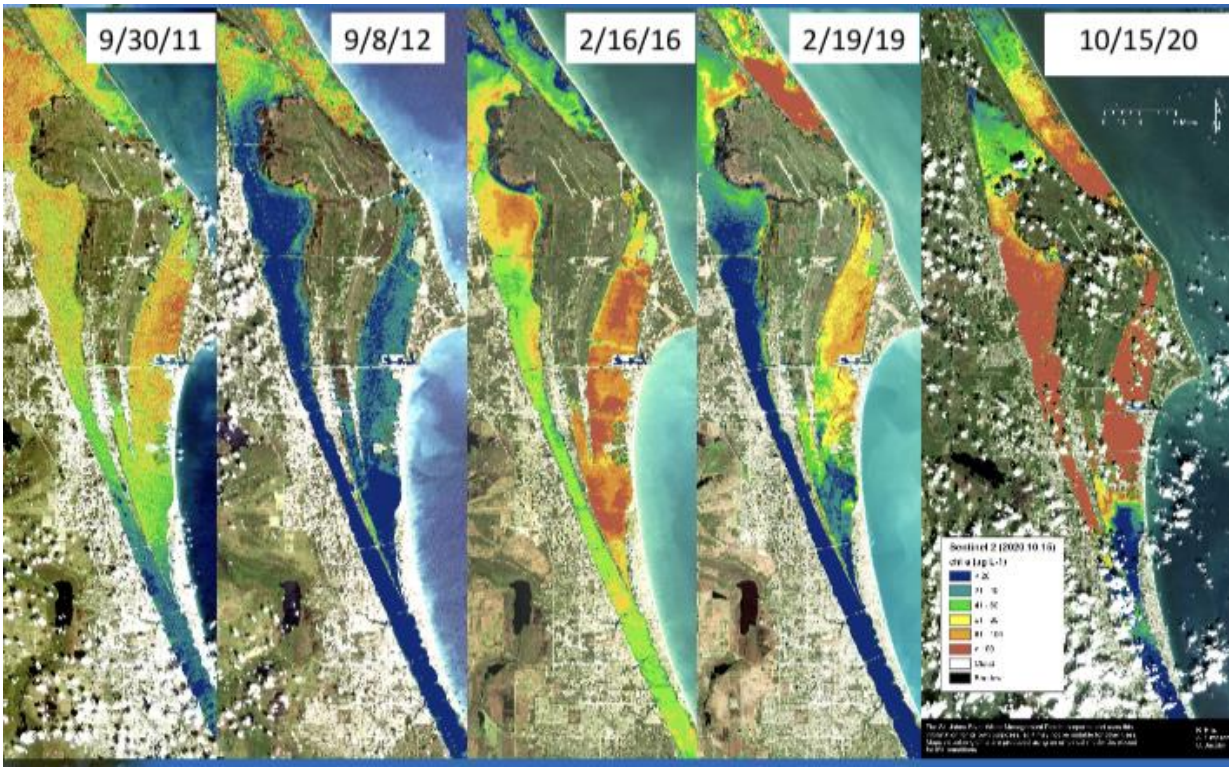
Lapointe et al. (2017) reported significantly high concentrations of septic tank (OSDS) inorganic nitrogen and phosphorus in groundwater monitor wells downgradient and adjacent to residential communities utilizing OSDS in the St. Lucie River, FL the primary tributary to the southern IRL. In adjacent surface waters evidence of significantly elevated wastewater nutrients were detected along with the conservative synthetic wastewater tracer, sucralose. Macroalgae and phytoplankton HAB blooms in both the St. Lucie River and southern Indian River Lagoon were enriched with OSDS wastewater nitrogen as a primary source, including the "green guacamole" *Microcystis* blooms that caused a public health crisis and international media attention in the summer of 2016.

Herren et al. (2021) reported the movement of septic tank (OSDS) effluent with high concentrations of reactive nitrogen and phosphorus into adjacent groundwaters and then into adjacent surface waters of the Sebastian River and Vero Beach lateral canal tributaries and into the CIRL. They traced OSDS as the dominant nitrogen source into macroalgae HABs in the downstream estuary. The study further used a conservative wastewater tracer, sucralose, as an additional line of evidence to trace OSDS loading from OSDS drainfields into adjacent ground and surface waters. There was significantly higher movement of OSDS nitrogen and phosphorus into adjacent ground and surface waters in the rainy "wet" season compared to the dry season.

Lapointe et al. (2015) reported wastewater nitrogen from OSDS as the primary loading source supporting macroalgae HABs at sites along the ~150 mi. IRL system. Sewage nitrogen from OSDS was also reported as a primary source of nitrogen supporting "super bloom" and "brown tide" phytoplankton blooms in the Indian River Lagoon. Total dissolved nitrogen and phosphorus concentrations were also measured above EPA's NNC nutrient thresholds despite high concentration phytoplankton blooms and macroalgae blooms that should deplete water column nutrient concentrations.

Kang et al. (2015) reported for the 2012-2013 "brown tide" *Aureoumba lagunensis* bloom event in the NIRL and Mosquito Lagoon that this HAB species was supported by a sewage nitrogen source from OSDS in the adjacent watersheds. This brown tide in 2012-2013 was a driver in the loss of ~95% of the seagrasses in the NIRL where the 2021 manatee UME occurred.

Barile (2018) documented widespread incorporation of wastewater nitrogen into macroalgal biomass at > 70 sites within tributaries and among the IRL system from Volusia to Palm Beach County. The study indicates that macroalgae HAB species incorporate elevated nitrogen and phosphorus from wastewater into their biomass more significantly during the rainy "wet season" when both elevated mobilization of nearby OSDS effluent sources and where dilapidate wastewater infrastructure either leaks or spills occur. Higher macroalgae tissue nitrogen contents in the rainy season also suggest that nitrogen loads are "externally" derived, and not supplied by "internal" cycling from the sediments or muck deposits.



SJRWMD (2021) Composite image of 2011-2020 HAB chlorophyll levels in the NIRL, all color shades lighter than blue (green, yellow, orange and red) are indicative of excessive HAB chlorophyll levels with higher concentrations from green to red. For reference, any shade darker than "purple" is an NNC exceedance. The HABs in "red" are >20x over the NNC concentration threshold for chlorophyll.

2) The 2013 EPA NNC for the IRL may not be adequate to mitigate harmful algal blooms

The northern and central IRL, Banana River and Mosquito River Lagoons, all "Impaired Waters" portions of the Indian River Lagoon system subject to Clean Water Act and subsequent EPA NNC regulatory action, experienced historically unprecedented and significant "Super blooms" of phytoplankton in 2011-2012 as the FDEP's NNC & TMDL's were going through review and adoption by the EPA. Since the adoption of the 2013 EPA-approved NNCs, nearly every rainy season since has caused excessive external nutrient loads (still ~50% above 2021 NIRL BMAP threshold nitrogen and phosphorus loading estimates) that have resulted in unprecedented phytoplankton and macroalgal HABs.

Whitehouse and Lapointe 2015 reported that widespread macroalgae HABs, *Chaetomorpha* sp. and *Ulva* sp., in the NIRL that overgrow and shade out seagrasses as they have high uptake affinities for low levels of inorganic nitrogen and phosphorus. These macroalgae HAB species, through this physiological ecology study, are demonstrated to reach maximum photosynthetic rates (e.g. *Ulva* sp. doubling biomass every 2 days) at very low level nutrient concentrations, well below the 2013 EPA-approved NNC's for nitrogen and phosphorus. This peer-reviewed scientific study concludes that the current NNC's are not sufficient to limit HABs in the northern IRL where >95% seagrass die-off has occurred and >400 manatees died in 2021.

3) The 2013 EPA-approved NNC for the IRL may not be adequate to mitigate seagrass die-off

The process of seagrass loss in estuaries is directly related to water quality declines. Specifically, these processes have been well documented for the northern Indian River Lagoon. Lapointe et al. (2015) reported the relationship between human sewage nitrogen, blooms of phytoplankton and macroalgae cover and their relation to seagrass loss in the NIRL. The 2021 FDEP BMAP TMDL report for the NIRL has acknowledged the relationships between poor water quality and seagrass demise, and that water quality has been "non-compliant" to support seagrass growth since 2007, per the statement below.

"The mean depth limits of seagrass coverage in the IRL decreased over the years because of changes in water quality resulting from anthropogenic influences. As polluted runoff reaches the Lagoon, it contributes to conditions that prevent the seagrass from growing in deeper water."

Since the 2013 BMAP, further evaluations of the seagrass depth limits in the NIRL have been conducted to reassess whether the NIRL project zones have continued to be compliant. **Table 23** and **Table 24** list the results of both steps of these evaluations since 2013, including the number of years that passed Step 2 of the evaluation. In 2020, the evaluation was conducted using the 2013, 2015, 2017, and 2019 seagrass mapping data, which were the latest datasets available at that time. **Figure 15** and **Figure 16** show the results of both steps of the 2020 evaluation for Project Zones A and B, respectively. Neither of the project zones was compliant. As indicated in the 2013 BMAP, DEP assigns detailed allocations in project zones where compliance is not maintained.

Table 23. Summary of seagrass compliance results, Step 1

Step 1	North A	North B
2007 – 2013	Fail	Fail
2009 – 2015	Fail	Fail
2011 – 2017	Fail	Fail
2013 – 2019	Fail	Fail

Table 24. Summary of seagrass compliance results, Step 2

Note: Parentheses indicate number of years passing of those assesed for the compliance period of record.

Step 2	North A	North B
2007 – 2013	Fail (0 of 4)	Fail (0 of 4)
2009 – 2015	Fail (0 of 4)	Fail (0 of 4)
2011 – 2017	Fail (0 of 4)	Fail (0 of 4)
2013 – 2019	Fail (0 of 4)	Fail (0 of 4)

Lapointe et al. 2020 reported that excessive nutrient loads during the rainy "wet season," which coincides with the period of peak seagrass growth, causes phytoplankton HABs that reduced downwelling light levels (Kd) below scientifically recognized thresholds known to support seagrass growth or seagrass ecosystem restoration. This study detailed the relationships of excess nitrogen loading from sewage, high water column ammonium concentrations, high levels of downwelling light attenuation (Kd) to seagrasses, and biochemical evidence of light limitation to remaining seagrass tissue, indicating stress from low light availability that results in seagrass loss. Carbon isotope analysis, coupled with other

biochemical and environmental data indicate severe light limitation of seagrass growth, even in seagrasses that have survived mortality events during "super bloom" HABs or low dissolved oxygen events resulting from macroalgae and phytoplankton HABs. Furthermore, the current 2013 EPA-approved NNC for nitrogen concentrations found in the NIRL are an order of magnitude above maximum concentrations, reported in Lapointe et al. 2020, for sustaining growth of some seagrass species found in the Indian River Lagoon system. Excess nutrient concentrations reported for the IRL can be directly toxic or indirectly lethal to seagrasses in the IRL system. NNC for the IRL should be revised to address these effects on seagrasses.

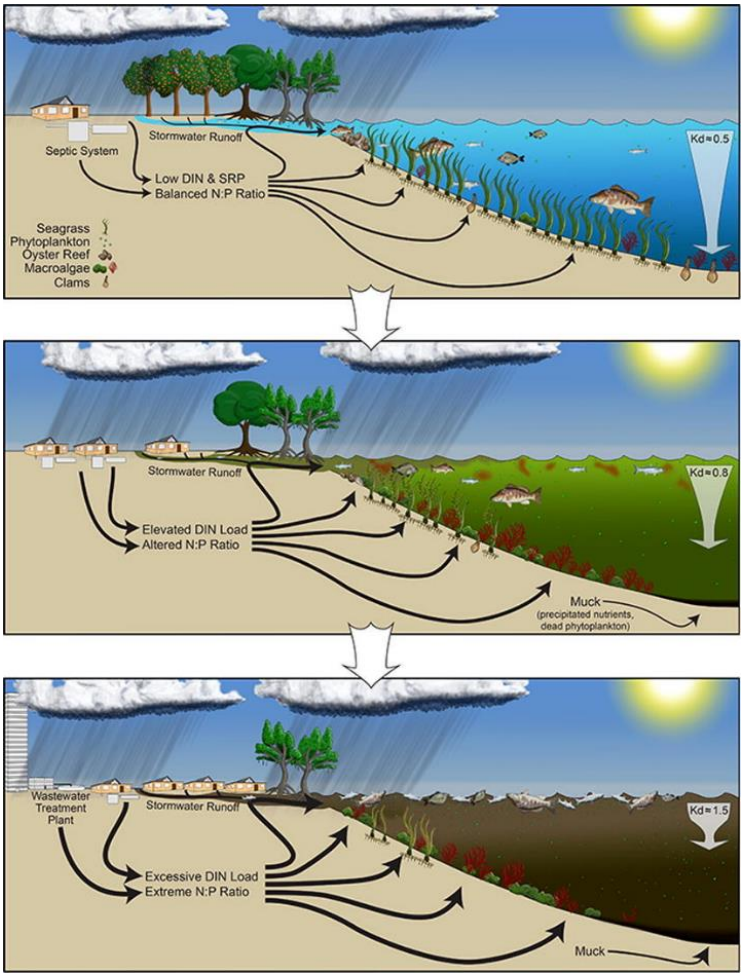


Figure from: Lapointe et al. (2020)

Escalating IRL eutrophication, resulting from low to elevated to excessive nutrient loads and the ecological consequences, including phytoplankton and macroalgae algal blooms, lower downwelling light, seagrass loss, fish kills and muck accumulations. Under elevated nutrient enrichment, the bottom of large portions of the IRL become a "dead zone" devoid of oxygen or light.

4) The 2013 EPA-approved NNC for the IRL does not account for the confounding role of climate change driven nutrient loading and responses of IRL HABs and seagrass communities.

In an invited presentation to then Gubernatorial candidate Congressman Ron DeSantis in August 2018, I provided the case study, based upon the peer-reviewed and published Barile (2018) article, on how human-induced climate change significantly increased nutrient loading into the Indian River Lagoon which resulted in a historically significant "brown tide" event in 2017-2018 and continued seagrass loss. Specifically, I described to the soon to be elected Governor how an intense Category 4 hurricane in September 2017 named Irma, strengthened by anthropogenically induced warming of the Caribbean Sea, resulted in storm conditions that caused the dumping of 30 million gallons or untreated sewage into an already beleaguered Indian River Lagoon. The direct nutrient loading from this event resulted in several tons on "new" nitrogen not accounted for in the EPA-NNC of FDEP TMDL.

In fact, climate change impacts are causing serious impacts to the sustainability of coastal estuaries for several reasons. Most directly, increasing human populations in watersheds results in increasing nutrient loading rates to estuaries such as the IRL. The population growth rate in east-central Florida is one of the fastest in the US, conferring necessary re-estimates of non-point source nutrient loading to the IRL. Increased nutrient loading rates should be updated in FDEP TMDL models as increasing human population density occurs in the IRL BMAP watersheds. Other climate change related phenomena in the southeast US, include warming temperatures in aquatic ecosystems, increased precipitation resulting from more intense and frequent tropical storms and hurricanes and El Nino/La Nina cycling, increase in stochastic rainfall events resulting in increased nutrient loading to Florida's estuaries. Further, warming water temperatures, increased aquatic ecosystem acidification, and consequently, increased dissolved CO2 in aquatic systems, etc. all confer advantages to HABs and disadvantages to seagrass communities, further confounding the calibration of NNCs/TMDLs As increased stochastic nutrient loading to the IRL system continues and increasing periodicity and intensity of HABs have occurred since the 2013 EPA NNC approval, the scientific community has taken notice and reported the following.

Sinha et al. (2017) reported that climate change induced increases in precipitation in the US will increase nutrient loading to coastal waters in the 21st century by 19%. Offsetting this increase will require a 33% reduction in nitrogen loads, presenting a significant management challenge.

Phlips et al (2020) reported how increases in intensity and frequency of El Nino events and hurricanes, resulting in increased precipitation and nutrient loads, and have subsequently increased HAB events in the IRL system.

Phlips et al. (2021) reported that over the past 23 years of record, an increase in physical factors, such as El Nino cycling and tropical storm events has resulted in increased nutrient concentrations, and an ecological "regime shift" with a dramatic increase in peak biomass of phytoplankton HABs that has coincided with seagrass loss in the Indian River Lagoon system.

Barile (2018) reported that recent intense rainfall events have resulted in significant mobilization of human wastewater from OSDS in the IRL BMAP watersheds and from wastewater treatment plant dumping into the IRL, both increasing nutrient loadings and resulting increased incorporation of wastewater nutrients into macroalgal HABs in the IRL system.

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EXHIBIT 2

EARTHJUSTICE

February 7, 2022

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VIA ELECTRONIC AND CERTIFIED MAIL

Re: Sixty-Day Notice of Violations of the Endangered Species Act for Failing to Reinitiate Consultation Concerning Water Pollution in the Indian River Lagoon and Effects on Species Under National Marine Fisheries Service Jurisdiction

Dear Officials of the U.S. Environmental Protection Agency:

On behalf of Center for Biological Diversity, Defenders of Wildlife, and Save the Manatee Club, we hereby provide notice in accordance with the citizen suit provision of the Endangered Species Act ("ESA"), 16 U.S.C. § 1540(g), that the U.S. Environmental Protection Agency ("EPA") is in violation of the ESA for failing to reinitiate consultation under ESA section 7, *id*. § 1536, concerning water quality in the Indian River Lagoon and its effect on species under the jurisdiction of the National Marine Fisheries Service ("NMFS"). Specifically, EPA has unlawfully failed to reinitiate section 7 consultation with NMFS in light of significant new information undermining EPA and NMFS's conclusions that the current estuary-specific numeric nutrient criteria are not likely to adversely affect any federally listed species or their critical habitats, including the threatened green turtle, the threatened loggerhead turtle, the endangered smalltooth sawfish, and the threatened Johnson's seagrass.

On December 20, 2021, we provided notice that EPA is in violation of the ESA for failing to reinitiate consultation with the U.S. Fish and Wildlife Service ("FWS") in light of the recent catastrophic die-off of manatees in the Indian River Lagoon caused by nutrient pollution.[1] We explained that new evidence shows that the current estuary-specific numeric nutrient criteria suffer from lax enforcement, an inappropriately long trajectory to achieve compliance, and a failure to account for the impact of legacy pollution. Recent scientific evidence shows that this same pollution currently devastating the manatee causes tumors in green and loggerhead turtles, contributes to loss of key habitat for the smalltooth sawfish, and is leading to the disappearance of Johnson's seagrass. EPA must therefore reinitiate consultation with NFMS to address the harms from nutrient pollution to these species.

I. LEGAL BACKGROUND

A. EPA's Obligations in Approving Water Quality Standards under the Clean Water Act

The Clean Water Act ("CWA") was enacted almost 50 years ago to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, § 2, 86 Stat. 816, codified as amended at 33 U.S.C. §§ 1251–1387 (2013) (the "Clean Water Act"). To achieve this goal, the CWA requires states to set water quality standards protective of public health and the environment, 33 U.S.C. § 1313(c), and to develop pollution budgets known as "total maximum daily loads" ("TMDLs") for each pollutant impairing a waterbody, *id*. § 1313(d); 40 C.F.R. §130.2(i). These TMDLs set a numeric target reflecting the maximum amount of the pollutant that a waterbody can contain and still be considered in compliance with water quality standards. 33 U.S.C. § 1313(d).

EPA oversees Florida's development of water quality standards and TMDLs. *Id*. § 1313(c)(3), (d)(2). Pursuant to guidance implementing EPA's CWA regulations, EPA is to carefully review the adequacy of TMDLs, including ensuring that the TMDLs have a margin of safety to account for lack of knowledge concerning the relationship between load and wasteload allocations and water quality and that the TMDLs provide "reasonable assurances" that point and nonpoint source control measures will achieve the expected load reductions.[2]

B. EPA's Consultation Obligations under the ESA

Congress enacted the Endangered Species Act in 1973 to provide "a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved" and "a program for the conservation of such endangered species and threatened species." 16

[1] *See* Letter from Center for Biological Diversity et al. to EPA re Sixty-Day Notice of Violations of the Endangered Species Act for Failing to Reinitiate Consultation Concerning the Unusual Mortality Event for Manatees in the Indian River Lagoon (Dec. 20, 2021).
[2] *See* EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 (May 20, 2002), *available at* https://www.epa.gov/sites/default/files/2015-10/documents/2002_06_04_tmdl_guidance_final52002.pdf (last visited Nov. 30, 2021).

U.S.C. § 1531(b). The statute contains an array of provisions designed to afford imperiled species "the highest of priorities," so that they can recover to the point where federal protection is no longer needed. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 174 (1978).

Section 7(a)(2) of the ESA imposes on federal agencies such as EPA a substantive duty to ensure that actions they authorize or carry out—including approval of a state's water quality standards—are not likely to jeopardize listed species or destroy or adversely modify critical habitat designated for such species. 16 U.S.C. § 1536(a)(2); *see also* Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Service Regarding Enhanced Coordination Under the Clean Water Act and Endangered Species Act, 66 Fed. Reg. 11202 (Feb. 22, 2001) ("EPA & NMFS MOU"). Such "action agencies" must discharge this obligation in consultation with the appropriate expert fish and wildlife agency—NMFS in the case of the green and loggerhead turtles, the smalltooth sawfish, and Johnson's seagrass. *See id.*; 50 C.F.R. § 402.01(b). If the action agency determines its action may adversely affect listed species or critical habitat, it must initiate formal consultation with NMFS. 50 C.F.R. § 402.14(a). If the action agency determines, with written concurrence of NMFS, that the proposed action is not likely to adversely affect any listed species or critical habitat, the action agency need not initiate formal consultation. *Id*. § 402.13(c).

The ESA also requires that consultation be reinitiated in certain circumstances where "discretionary Federal involvement or control over the action has been retained or is authorized by law." 50 C.F.R. § 402.16. With regards to state water quality standards, EPA has continuing discretionary involvement and control under 33 U.S.C. § 1313(c)(4)(B), which allows it to revise water quality standards "in any case where the [EPA] Administrator determines that a revised or new standard is necessary to meet the requirements of [the Clean Water Act]." *See also* EPA & NMFS MOU at 11206 ("EPA and the Services have agreed that where information indicates an existing standard is not adequate to avoid jeopardizing listed species, or destroying or adversely modifying designated critical habitat, EPA will work with the State/Tribe to obtain revisions in the standard or, if necessary, revise the standards through the promulgation of federal water quality standards under section 303(c)(4)(B) of the CWA."); *Wild Fish Conservancy v. United States Env't Prot. Agency*, 331 F. Supp. 3d 1210, 1222–26 (W.D. Wash. 2018) (finding that EPA retains discretionary involvement and control over approved water quality standards for the purposes of reinitiating consultation). Reinitiation of consultation is required:

> (1) If the amount or extent of taking specified in the incidental take statement is exceeded;
> (2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
> (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or
> (4) If a new species is listed or critical habitat designated that may be affected by the identified action.

50 C.F.R. § 402.16(a).

II. HISTORY OF INDIAN RIVER LAGOON WATER QUALITY STANDARDS AND ESA CONSULTATION

On June 13, 2012, Florida submitted revised water quality standards for EPA's approval under 33 U.S.C. § 1313(c). *See* Decision Document of United States Environmental Protection Agency Determination Under § 303(c) of the Clean Water Act, Review of Amendments to Florida's Rule 62-302 and 62-303 (Nov. 30, 2012) (approving Fla. Admin. Code Ann. r. 62-302.531). EPA approved the revisions on November 30, 2012. *Id.* The revisions included a rule adopting a framework for developing criteria to numerically interpret the existing statewide narrative nutrient criterion that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." *Id.* at 18. The framework explains that where a site-specific nutrient analysis has been performed for a particular waterbody—including through development of a total maximum daily load—this site-specific analysis will be considered the applicable numeric interpretation of the narrative criterion for a particular waterbody. *Id.*; Fla. Admin. Code Ann. r. 62-302.531. For the Indian River Lagoon and its constituent Banana River Lagoon, Florida's Department of Environmental Protection ("FDEP") set TMDLs for nitrogen, phosphorus, and dissolved oxygen in 2009. *See* FDEP, TMDL Report, Nutrient and Dissolved Oxygen TMDLs for the Indian River and Banana River Lagoon (Mar. 2009). EPA approved these TMDLs as the numeric nutrient criteria on July 29, 2013, and they are codified as the "Estuary-Specific Numeric Interpretations of the Narrative Nutrient Criterion" under Fla Admin. Code r. 62-302.532(aa) (referencing Fla Admin. Code r. 62-304.520 (Indian River Lagoon TMDLs)).

Pursuant to section 7 of the ESA, EPA consulted with NMFS—as well as with the FWS[3]—multiple times under 50 C.F.R. § 402.13 on its approval of Florida's water quality standards.[4] NMFS concluded that EPA's approval of the estuary-specific numeric nutrient criteria would not likely jeopardize any species under NMFS jurisdiction.[5]

III. NEW INFORMATION REQUIRES REINITATION OF CONSULTATION

Three significant pieces of new information underscore the requirement for EPA to reinitiate consultation with NMFS under 50 C.F.R. § 402.16 on Florida's estuary-specific numeric nutrient criteria. First, new information indicates harm to the green and loggerhead turtles, the smalltooth sawfish, and Johnson's seagrass, due to deterioration in water quality resulting from continuing nitrogen and phosphorus pollution in the Indian River Lagoon, calling into question the overall adequacy of the current TMDLs. Second, new information demonstrates there is a lack of reasonable assurance that the current measures to reduce point and nonpoint source pollution will achieve expected load reductions. Third, new information indicates that the

[3] *See* Letter from Center for Biological Diversity et al. to EPA re Sixty-Day Notice of Violations of the Endangered Species Act for Failing to Reinitiate Consultation Concerning the Unusual Mortality Event for Manatees in the Indian River Lagoon (Dec. 20, 2021) (detailing FWS consultation history).

[4] *See* National Marine Fisheries Service, Biological Opinion on EPA Approval of Water Quality Standards Under Section 303 of the Clean Water Act 3–4 (July 29, 2016) (detailing consultation history with NMFS).

[5] *See id.* at 186.

current TMDLs do not adequately take into account pollution from legacy muck, and therefore do not contain an adequate margin of safety. Finally, new information suggests that the TMDLs underestimated the role of septic systems and climate change in nutrient loading in the Indian River Lagoon and that the TMDLs are therefore inadequate to prevent harmful algal blooms.

A. New Information Demonstrates Harm to Green and Loggerhead Turtles, Smalltooth Sawfish, and Johnson's Seagrass Due to Continuing Deterioration in Water Quality

Manatees are not the only species suffering from the collapse of the Indian River Lagoon. Nutrient pollution causes harm to green and loggerhead turtles, smalltooth sawfish, and Johnson's seagrass. EPA must therefore reinitiate consultation with NMFS to consider whether the current water quality standards are adequate to protect these species.

1. *Green Turtle (Chelonia mydas) and Loggerhead Turtle (Caretta caretta)*

Green turtles (*Chelonia mydas*) were listed under the Endangered Species Act on July 28, 1978, with breeding populations in Florida and along the Pacific Coast of Mexico listed as endangered and all other populations listed as threatened.[6] In 2007, 11 distinct population segments ("DPS") were identified by NMFS and FWS, and in 2015 the listing status of each DPS was reevaluated. The North Atlantic DPS is now listed as threatened and includes the green turtle population that resides in the Indian River Lagoon.[7] "Historically, green turtles were exploited for their fat, meat and eggs, causing global population declines."[8] Bycatch, direct harvest, vessel strikes, loss of nesting habitat, pollution, climate change and disease continue to plague the species.[9] The Indian River Lagoon serves as an important foraging and developmental habitat for juvenile turtles in this DPS, and "[d]evelopmental habitats require the same intensity of protection as nesting beaches. If we fail to protect these habitats and their juvenile turtle residents, there will be no need to preserve nesting beaches."[10]

Loggerhead turtles (*Caretta caretta*) were listed as threatened throughout their range under the Endangered Species Act on July 28, 1978.[11] In 2011, the listing was revised to reflect nine DPSs. Five DPSs were listed as endangered and four were listed as threatened. Loggerhead turtles found in the Indian River Lagoon are in the Northwest Atlantic Ocean DPS which is listed

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[6] Seminoff et al., Status Review of the Green Turtle (*Chelonia mydas*) Under the Endangered Species Act (March 2015).
[7] *Id.*
[8] NOAA, Green Turtle (*Chelonia mydas*), *available at* https://www.fisheries.noaa.gov/species/green-turtle (last visited Jan. 6, 2022).
[9] *Id.*
[10] Zug and Glor, Estimates of Age and Growth in a Population of Green Sea Turtles (*Chelonia mydas*) from the Indian River lagoon system, Florida: A Skeletochronological Analysis (Aug. 1998); NOAA, Green Turtle (*Chelonia mydas*), *available at* https://www.fisheries.noaa.gov/species/green-turtle (last visited Jan. 6, 2022).
[11] NOAA, Loggerhead Turtle (*Caretta caretta*), *available at* https://www.fisheries.noaa.gov/species/loggerhead-turtle (last visited Jan. 10, 2022).

as threatened.[12] Threats to loggerheads include pollution, bycatch, loss of nesting habitat, vessel strikes, direct harvest, and climate change.[13] The Indian River Lagoon provides important developmental habitat for loggerhead subadults.[14]

One of the greatest threats to the green turtles in the Indian River Lagoon is the debilitating effects of fibropapillomatosis, "a chronic and often lethal tumor-forming disease in sea turtles."[15] It is characterized by tumor growth that occurs on the skin, eyes, conjunctiva, and visceral organs. The severity of the disease is determined by the size and location of the tumor growths, with mobility and organ function frequently impeded, leading to the stranding of turtles on beaches and subsequent death.[16] Since "[c]ancers have the potential to drive already threatened wildlife towards extinction" fibropapillomatosis is an exceptionally concerning issue[17]—so much so that the National Oceanic and Atmospheric Administration (NOAA) and FWS convened an expert workshop in 2017 to determine how to deal with the high prevalence of tumors in Florida turtles and the resulting high mortality rate.[18] Unfortunately, the workshop addressed current ineffective rehabilitation practices without addressing the root cause of the issue.

A 2021 study found a recent increase in the prevalence of fibropapillomatosis in green turtles, with the prevalence of fibropapillomatosis in the Indian River Lagoon particularly high.[19]

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[12] *Id*.
[13] *Id.*
[14] Ehrhart, Marine Turtles of the Indian River Lagoon System (1983).
[15] Van Houtan, et al., Eutrophication and the Dietary Promotion of Sea Turtle Tumors (Sep. 30, 2014).
[16] Herbst and Klein, Green Turtle Fibropapillomatosis: Challenges to Assessing the Role of Environmental Cofactors (1995); Perrault, et al., Insights on Immune Function in Free-Ranging Green Sea Turtles (*Chelonia mydas*) with and without Fibropapillomatosis (Mar. 18, 2021); Dujon, et al., Sea Turtles in the Cancer Risk Landscape: A Global Meta-Analysis of Fibropapillomatosis Prevalence and Associated Risk Factors (Oct. 8, 2021); Stacy, et al., Report of the Technical Expert Workshop: Developing Recommendations for Field Response, Captive Management, and Rehabilitation of Sea Turtles with Fibropapillomatosis (Sep. 6, 2017).
[17] Dujon, et al., Sea Turtles in the Cancer Risk Landscape: A Global Meta-Analysis of Fibropapillomatosis Prevalence and Associated Risk Factors (Oct. 8, 2021).
[18] Stacy, et al., Report of the Technical Expert Workshop: Developing Recommendations for Field Response, Captive Management, and Rehabilitation of Sea Turtles with Fibropapillomatosis (Sep. 6, 2017).
[19]Sposato, et al., Evaluation of Immune Function in Two Populations of Green Sea Turtles (*Chelonia mydas*) in a Degraded versus a Nondegraded Habitat (Oct. 2021); Herbst and Klein, Green Turtle Fibropapillomatosis: Challenges to Assessing the Role of Environmental Cofactors (1995); Perrault, et al., Insights on Immune Function in Free-Ranging Green Sea Turtles (*Chelonia mydas*) with and without Fibropapillomatosis (Mar. 18, 2021); Stacy, et al., Report of the Technical Expert Workshop: Developing Recommendations for Field Response, Captive Management, and Rehabilitation of Sea Turtles with Fibropapillomatosis (Sep. 6, 2017).

The article explained that there was a strong correlation between the increased numbers of green turtles suffering from tumors and eutrophication of coastal waters caused by nutrient pollution.[20]

It was originally thought that only green turtles acquire fibropapillomatosis but studies now show that all marine turtles, including the loggerhead turtle, are susceptible to these debilitating tumors, "raising concerns about disease impacts on these species."[21] Fibropapillomatosis is not widely researched in loggerhead turtles and its exact impact on loggerhead turtle populations is not fully understood, but the tumors are associated with heavily polluted coastal waters in all turtles.[22] It can therefore be assumed that the effects of fibropapillomatosis could be equally detrimental to the loggerhead turtle in the Indian River Lagoon. EPA must therefore reinitiate consultation with NMFS to consider new information demonstrating harm to green and loggerhead turtles from nutrient pollution in the Indian River Lagoon.

2. *Smalltooth sawfish (Pristis pectinata)*

Smalltooth sawfish (*Pristis pectinata*) were once commonly found in waters from Texas to North Carolina. Now they are only found in the waters of southern Florida, and it is thought that their population is less than 5% of its size at the time of European settlement.[23] This decline is due to bycatch and habitat loss, especially the loss of red mangrove habitats. NOAA listed the U.S. DPS of smalltooth sawfish as endangered in 2003.[24] It was the first marine fish to receive federal protection.[25]

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[20] Sposato, et al., Evaluation of Immune Function in Two Populations of Green Sea Turtles (*Chelonia mydas*) in a Degraded versus a Nondegraded Habitat (Oct. 2021; Van Houtan, et al., Land Use, Macroalgae, and a Tumor-Forming Disease in Marine Turtles (Sep. 29, 2010); Van Houtan, et al., Eutrophication and the Dietary Promotion of Sea Turtle Tumors (Sep. 30, 2014); Dujon, et al., Sea Turtles in the Cancer Risk Landscape: A Global Meta-Analysis of Fibropapillomatosis Prevalence and Associated Risk Factors (Oct. 8, 2021); Sposato, et al., Evaluation of Immune Function in Two Populations of Green Sea Turtles (*Chelonia mydas*) in a Degraded versus a Nondegraded Habitat (Oct. 2021).

[21] Herbst and Klein, Green Turtle Fibropapillomatosis: Challenges to Assessing the Role of Environmental Cofactors (1995); Aguirre and Lutz, Marine Turtles as Sentinels of Ecosystem Health: Is Fibropapillomatosis and Indicator (May 13, 2004).

[22] Aguirre and Lutz, Marine Turtles as Sentinels of Ecosystem Health: Is Fibropapillomatosis and Indicator (May 13, 2004).

[23] NMFS and NOAA, Smalltooth Sawfish Recovery Plan (*Pristis pectinata*) (Jan. 2009)

[24] *Id*.

[25] NOAA, Smalltooth Sawfish (*Pristis pectinate*), *available at* https://www.fisheries.noaa.gov/species/smalltooth-sawfish (last visited Jan. 10, 2022).

Sawfish rely primarily on red mangroves as nurseries.[26] Red mangroves are one of the primary mangrove species in the Indian River Lagoon.[27] Nurseries provide food for maturing sawfish as well as protection from predators.[28]

Mangrove loss worldwide has been catastrophic ranging from 20% to 35% since 1980, at a 1-8% rate of loss per year.[29] This rate of loss exceeds that of tropical rainforests and coral reefs.[30] The Indian River Lagoon alone has seen an 86% loss in its mangrove population since the 1940s.[31] "If special management needs aren't addressed, the functional elimination of nurseries through habitat destruction could push populations [of smalltooth sawfish] to a tipping point where suitable nursery areas become a limiting factor to recovery."[32] This is especially relevant in the Indian River Lagoon where the Florida Fish and Wildlife Conservation Commission states that a fisherman in the late 1800s caught 300 smalltooth sawfish in one season.[33] In comparison, only seven sawfish have been caught in the Indian River Lagoon since 2016.[34]

The loss of mangrove habitats is due primarily to anthropogenic threats including logging for timber and fuel, and removal for coastal development and aquaculture.[35] But research shows

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[26] Brame, et al., Biology, Ecology, and Status of the Smalltooth Sawfish *Pristis pectinata* in the USA (May 23, 2019); NMFS and NOAA, Smalltooth Sawfish Recovery Plan (*Pristis pectinata*) (Jan. 2009); Norton, et al., Designating Critical Habitat for Juvenile Endangered Smalltooth Sawfish in the United States (Aug. 13, 2012).

[27] SJWMD, Indian River Lagoon: An Introduction to a Natural Treasure (2007).

[28] Brame, et al., Biology, Ecology, and Status of the Smalltooth Sawfish *Pristis pectinata* in the USA (May 23, 2019); NMFS and NOAA, Smalltooth Sawfish Recovery Plan (*Pristis pectinata*) (Jan. 2009); Norton, et al., Designating Critical Habitat for Juvenile Endangered Smalltooth Sawfish in the United States (Aug. 13, 2012); Norton, et al., Designating Critical Habitat for Juvenile Endangered Smalltooth Sawfish in the United States (Aug. 13, 2012).

[29] Polidoro, et al., The loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern (April 8, 2010); FAO, Status and Trends in Mangrove Area Extent Worldwide (Dec. 2003), *available at* https://www.fao.org/3/j1533e/j1533e00.htm (last visited Jan. 5, 2022); Valiela, et al., Mangrove Forests: One of the World's Threatened Major Tropical Environments (Oct. 2001).

[30] Valiela, et al., Mangrove Forests: One of the World's Threatened Major Tropical Environments (Oct. 2001).

[31] FDEP, Florida's Mangroves (Feb. 11, 2021).

[32] Norton, et al., Designating Critical Habitat for Juvenile Endangered Smalltooth Sawfish in the United States (Aug. 13, 2012).

[33] FFWCC, General Information on Smalltooth Sawfish, *available at* https://myfwc.com/research/saltwater/fish/sawfish/general-information/ (last visited Jan. 6, 2022).

[34] Galoustian, Endangered Juvenile Smalltooth Sawfish found in St. Lucie River (Nov. 19, 2020).

[35] Polidoro, et al., The loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern (April 8, 2010); Valiela, et al., Mangrove Forests: One of the World's Threatened Major Tropical Environments (Oct. 2001).

that mangroves are also sensitive to the effects of eutrophication. High nutrient water content causes an increase in above-ground production, creating an appearance of high productivity and proliferation, but this comes at the cost of root production. Without a solid root foundation, mangroves are at risk to changes in weather and habitat conditions.[36] Nutrient pollution may thus continue to exacerbate the loss of mangrove habitats in the Indian River Lagoon, causing further loss of habitat for the smalltooth sawfish. EPA must therefore reinitiate consultation with NMFS to consider new information suggesting that nutrient pollution in the Indian River Lagoon may be contributing to loss of habitat, or causing other harmful impacts, for the smalltooth sawfish.

3. *Johnson's Seagrass (Halophila johnsonii Eiseman)*

Johnson's Seagrass (*Halophila johnsonii Eiseman*) is a rare seagrass found only in lagoons on the east coast of Florida and was the first marine plant species to be listed under the ESA.[37] In the Indian River Lagoon, Johnson's seagrass is found between Sebastian and Jupiter Inlets.[38]

Eutrophication is considered "a major cause of seagrass disappearance worldwide."[39] Its impact has been highly detrimental on the seagrass in the Indian River Lagoon.[40] Seagrass loss in the Indian River Lagoon has been disastrous with a 58% loss in the last decade.[41] Phytoplankton blooms caused by high nutrient loads resulted in "a 95% loss of seagrass cover" between 2011 and 2017 in the northern and central segments of the Indian River Lagoon.[42] Johnson's Seagrass is especially susceptible to the effects of these blooms.[43] EPA must therefore reinitiate consultation with NMFS to consider new information suggesting that nutrient pollution in the Indian River Lagoon may be contributing the loss of Johnson's seagrass.

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[36] Lovelock, et al., Nutrient Enrichment Increases Mortality of Mangroves (May 19, 2009); Reef, et al., Nutrition of Mangroves (June 21, 2010).
[37] NMFS is currently reevaluating the listing status of Johnson's seagrass based on new genetic information suggesting it is not a unique taxon. *See* 86 Fed. Reg. 72,908 (Dec. 23, 2021). However, unless and until that process concludes in the delisting of Johnson's seagrass from the endangered species list, EPA and NMFS have a duty to ensure its protection.
[38] Dawes et al., Seagrass Biodiversity in the Indian River Lagoon (1995).
[39] Burkholder, et al., Seagrass and Eutrophication (2007); *see also* Schmdt, et al., Regional-Scale Effects of Eutrophication on Ecosystem Structure and Services of Seagrass Beds (2012); Herren, et al., Septic Systems Drive Nutrient Enrichment of Groundwaters and Eutrophication in the Urbanized Indian River Lagoon, Florida (Oct. 9, 2021).
[40] Herren, et al., Septic Systems Drive Nutrient Enrichment of Groundwaters and Eutrophication in the Urbanized Indian River Lagoon, Florida (Oct. 9, 2021); SJRWMD, Recognizing the Importance of Seagrass, Working to Improve Water Quality (Mar. 4, 2021).
[41] Moore, Can this Seagrass Restoration Method Work even Before Indian River Lagoon Gets Clean? (Oct. 7, 2021); *see also* Herren, et al., Septic Systems Drive Nutrient Enrichment of Groundwaters and Eutrophication in the Urbanized Indian River Lagoon, Florida (Oct. 9, 2021).
[42] Herren, et al., Septic Systems Drive Nutrient Enrichment of Groundwaters and Eutrophication in the Urbanized Indian River Lagoon, Florida (Oct. 9, 2021).
[43] NMFS and NOAA, Final Recovery Plan for Johnson's Seagrass (*Halophila johnsonii* Eiseman) (Sep. 2002).

B. New Information Suggests a Lack of Reasonable Assurances that Point and Nonpoint Source Reductions Will Achieve Expected Load Reductions

In addition to the recent information detailing harms to federally-protected species from nutrient pollution, a growing record of inadequate efforts to comply with and enforce existing water-quality safeguards also necessitates reinitiation of consultation. For EPA to approve a TMDL, EPA must determine that the TMDL provides reasonable assurances that point and nonpoint source control measures will achieve expected load reductions.[44] Lax enforcement and compliance for both point and nonpoint sources suggests that the current TMDLs are ineffective at controlling nutrients into the Indian River Lagoon. EPA must therefore reinitiate consultation to consider this new information suggesting that the current TMDLs are not being effectively implemented and that the TMDLs lack reasonable assurances they will achieve load reductions. *See* 50 C.F.R. § 402.16(a)(1), (3).

1. Recent Reports Suggest Current Stormwater and Wastewater Treatment Facilities Fail to Meet the Presumption that they Achieve Expected Load Reductions

Several recent reports indicate that point source control measures and enforcement are inadequate, suggesting that the TMDLs must be revisited to ensure that they provide reasonable assurances that the wasteload allocation from point sources will be achieved.

First, in 2019, a "Blue-green Algae Task Force," appointed by Governor DeSantis to aid the Florida Department of Environmental Protection, concluded that "[t]he presumption that a stormwater treatment system constructed and permitted in compliance with [best management practice] design criteria will not cause or contribute to violations of surface water quality standards in adjacent and/or connected waterbodies has been evaluated and challenged. Available data suggest that a substantial number of stormwater treatment systems throughout the state fail to achieve their presumed performance standards." Blue-green Algae Task Force, DRAFT consensus Document #1 Final Draft – Revised 3 October 2019. The Task Force recommended "the development and implementation of a stormwater system inspection and monitoring program with the goal of identifying improperly functioning and/or failing systems so that corrective action can be taken to reduce nutrient pollution and other negative environmental impacts." *Id.* It further recommended "that stormwater design criteria be revised and updated to incorporate recent advances in stormwater treatment technologies and other practices that have demonstrated environmental benefits; nutrient reduction specifically." *Id.*

[44] *See* 40 C.F.R. 122.44(d)(1)(vii)(B) (requiring effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL); EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 at 4 (May 20, 2002), *available at* https://www.epa.gov/sites/default/files/2015-10/documents/2002_06_04_tmdl_guidance_final52002.pdf (last visited Nov. 30, 2021) (explaining that when waters are impaired by both point and nonpoint sources, "the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable").

Second, a 2018 review of sewage pollution in the Indian River Lagoon suggested that harmful algae outbreaks are initiated and expanded by wet weather discharges from municipal wastewater treatment facilities. *See* Barile, Widespread Sewage Pollution of the Indian River Lagoon System, Florida (USA) Resolved by Spatial Analyses of Macroalgal Biogeochemistry, Marine Pollution Bulletin 128 (2018). The article explained that although direct surface water discharges of treated human wastewater effluent are prohibited, up to 90 days per year of "emergency wet weather" surface discharges are allowed when significant rain events overload the treatment system capacities. *Id.* at 559; *see also* Indian River Lagoon Act, Chapter 90-262 Laws of Florida, Sec. 2(c) (allowing wet weather discharges). The article posits that these poorly reported wet weather discharges—which can be several million liters per day per treatment plant during wet season events—may be a key factor supporting harmful algal outbreaks. Barile at 560, 572. The article suggests that significant wastewater treatment infrastructure upgrades, including conversion of municipal wastewater treatment plants to high nutrient removal advanced wastewater treatment, as well as mandatory septic-to-sewer conversion, are needed for seagrass regrowth in the Indian River Lagoon. *Id.* at 572.[45]

Finally, a 2020 Florida Public Employees for Environmental Responsibility ("Florida PEER") report disclosed that Brevard County had 38 instances of unpermitted sewage discharges, totaling 552,040 gallons discharged. *See* Florida PEER, Report on Enforcement Efforts by the Florida Department of Environmental Protection (2020), *available at* https://www.peer.org/2020-florida-enforcement-report/ (last visited Dec. 1, 2021). Florida PEER also reported that the Florida Department of Environmental Protection conducted fewer inspections in 2020 than in previous years, and that the severity of fines decreased. Moreover, "the enforcement actions used by the FDEP were largely short-form consent orders that required nothing more than paying a penalty, i.e., the traffic ticket approach." *Id.* at 35. As Florida PEER Director Jerry Phillips explained, "[r]ather than seeking major reductions in our pollution load, DEP's reliance on small fines makes pollution an acceptable cost of doing business." *See* Florida PEER, Press Release, Florida Pollution Enforcement Fell into Covid Coma, (Sep. 15, 2021) *available at* https://www.peer.org/florida-pollution-enforcement-fell-into-covid-coma/ (last visited Dec. 1, 2021). This information thus suggests that lax enforcement of unpermitted sewage discharges could be further contributing to nitrogen and phosphorous pollution in the Indian River Lagoon.[46]

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[45] *See also* Lapointe, et al., Evidence of Sewage-Driven Eutrophication and Harmful Algal Blooms in Florida's Indian River Lagoon, 43 Harmful Algae 82–102 (March 5, 2015) (suggesting that seagrass loss due to pollution from sewage indicates the need for improved sewage collection and treatment).

[46] *See also* Waymer and Vazquez, Sewage spill keep taxing Indian River Lagoon, other waters; state issues fines, but is that enough?, Florida Today (Aug. 15, 2019). In late 2020, more than seven million gallons of raw sewage spilled into a pond at Sand Point Park that flows directly into the Indian River Lagoon, resulting in a fish die-off. *See* Vazquez, Protestors call for action in Titusville after raw sewage spill into Indian River Lagoon, Florida Today (Jan 9, 2021); Waymer, Titusville sewage fallout could top half a million, Florida Today (May 7, 2021).

EPA must thus reinitiate consultation with NMFS under 50 C.F.R. § 402.16 to take into consideration these recent reports demonstrating the lack of reasonable assurances that point source discharge control measures will achieve required load reductions.

2. The TMDLs Lack Reasonable Assurances that the Agricultural Best Management Practices Designed to Control Nonpoint Source Pollution Are Sufficient and Achievable

In addition to recent information indicating that point source discharge controls do not provide reasonable assurances that load reductions will be achieved, further new information suggests that nonpoint sources present an additional source of pollution that is inadequately addressed. Agricultural nonpoint sources are a significant contributor of nitrogen and phosphorous into the Indian River Lagoon. *See* FDEP, Central Indian River Lagoon Basin Management Action Plan 17 (Feb. 2021) ("CIRL BMAP"). To address these nonpoint sources, the FDEP has created three Basin Management Action Plans ("BMAPs"), dividing up the Indian River Lagoon into three subbasins: (1) the Central Indian River Lagoon; (2) the North Indian River Lagoon ("NIRL BMAP"); and (3) the Banana River Lagoon ("BRL BMAP"). These BMAPs include agricultural best management practices ("BMPs") that are aimed at reducing nitrogen and phosphorus runoff from agricultural practices. Under Florida law, it is the agricultural landowner's responsibility to implement the BMPs, and landowners who do not enroll in the BMP Program are supposed to be referred to FDEP for enforcement action.

Unfortunately, however, current landowner enrollment in the BMP program is very low: only 25% of agricultural acres are currently enrolled in the Central Indian River Lagoon, *see* CIRL BMAP at 153; only 6% are enrolled in the North Indian River Lagoon, *see* NIRL BMAP at 27; and 0% are enrolled in the Banana River Lagoon, *see* BRL BMAP at 22. This is far below the current average of 62% enrollment in the BMP Program statewide, and 82% enrollment of irrigated agricultural acres statewide. *See* Florida Department of Agriculture and Consumer Services, Office of Agricultural Water Policy, Status of Implementation of Agricultural Nonpoint Source Best Management Practices 2 (July 1, 2021). Moreover, although Florida Department of Agriculture and Consumer Services ("FDACS") is required to verify that landowners are properly implementing BMPs, including by conducting site visits every two years, FDACS conducted relatively few site visits to the Indian River Lagoon in 2020: only 91 out of 2,824 total visits statewide. *See id*. at 17. Furthermore, of the more than 6,600 referrals statewide from FDACS to FDEP for enforcement for agricultural producers not following the rules, none have faced penalties.[47] As Florida Agricultural Commissioner Nikki Fried described the situation in August, 2021, "[u]nfortunately we have not seen a hammer come down from

[47] *See* Chesnes, Ag Commissioner Nikki Fried wants boots on the ground to measure, reduce pollution, TCPalm (Aug. 4, 2021), *available at* https://www.tcpalm.com/story/news/local/indian-river-lagoon/2021/08/04/nikki-fried-visits-sewalls-point-discuss-clean-water-initiative/5452933001/ (last visited Dec. 1, 2021).

FDEP. . . . There's a carrot and there's a stick. [FDACS] is the carrot, and FDEP is the stick. And the stick's not working."[48]

Finally, although the BMAPs intend to increase enrollment over time, the BMAPs do not aim to achieve full targeted load reductions until 2035, *see, e.g.*, CIRL BMAP at 16. This lengthy trajectory, coupled with the currently low enrollment by agricultural landowners in the BMP Program and lack of meaningful enforcement, is inappropriate and insufficient given the current ecological collapse of the Indian River Lagoon. EPA must therefore reinitiate consultation with NMFS to consider new information demonstrating that the current enrollment and enforcement of BMPs, and planned trajectory of nitrogen and phosphorus reductions, has been insufficient to prevent seagrass loss, and that there are presently insufficient assurances that the measures to reduce nonpoint source pollution in the TMDLs will achieve expected load reductions.

C. New Information Suggests the TMDLs Overlook, and Should Take into Account, Ongoing Contributions of Nitrogen and Phosphorous from Legacy Pollution

New information also highlights the important role that legacy pollution plays in the ecosystem collapse that is underway in the Indian River Lagoon, yet the existing TMDLs fail to account for this factor. Over time, the harmful levels of nutrients entering the Indian River Lagoon have led to muck accumulation on the lagoon bottom, which "fluxes" nutrients back into the lagoon. There are an estimated 5 million cubic yards of muck within the Indian River Lagoon, delivering roughly 30% of the total nutrient load.[49] Brevard County recently posited that "[n]itrogen and phosphorus released each year as muck decays are now larger than any current source of nutrient pollution to lagoon waters." Tetra Tech, Inc. and CloseWaters LLC. (2021) Save Our Indian River Lagoon Project Plan 2021 Update for Brevard County, Natural Resources Management Department Brevard County, Florida. Not only does legacy muck contribute to nitrogen and phosphorus pollution, but it can result in resuspension of sediment which decreases

[48] *Id. See also* MacLaughlin, Will Basin Management Action Plans Restore Florida's Impaired Waters?, 89 Fla. B. J. 31 (Feb. 2015) (suggesting that BMAPs "need more regulatory teeth if they are to succeed"); Blue-green Algae Task Force, DRAFT consensus Document #1 Final Draft – Revised (Oct. 3, 2019) ("[T]he [Blue-green Algae Task Force] recommends that the effectiveness of BMPs be supported by adequate data to justify the presumption of compliance granted upon enrollment and implementation").

[49] Fox and Tefry, Lagoon-wide Application of the Quick-Flux Technique to determine Sediment Nitrogen and Phosphorus Fluxes, Submitted to Brevard County, Fl. Natural Resources Management Department (June 2019); *see also* Tetra Tech, Inc. and CloseWaters LLC., Save Our Indian River Lagoon Project Plan 2021 Update for Brevard County, Natural Resources Management Department Brevard County, Florida (Feb. 2021), *available at* https://www.brevardfl.gov/SaveOurLagoon/ProjectPlan (last visited on Dec. 1, 2021).

light availability to seagrass and further contributes to seagrass loss.[50] It can also cover the natural bottom of the lagoon so that the seagrass is unable to grow.[51]

EPA's TMDL guidance explains that TMDL submittals should identify all "point and nonpoint sources of the pollutant of concern, including the location of the source(s) and the quantity of the loading" in order for EPA to adequately review the load and wasteload allocations and develop an adequate margin of safety "to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality." EPA, Guidelines for Reviewing TMDLs under Existing Regulations Issued in 1992 at 1, 4 (May 20, 2002). But despite the outsize importance of this legacy muck as a pollution source, legacy inputs were not accounted for in the nitrogen and phosphorus TMDLs and the "Spatial Watershed Iterative Loading or 'SWIL' Model"—the model that calculates the load allocations for the Indian River Lagoon BMAPs—does not take this legacy muck into account. *See, e.g.*, NIRL BMAP at 39.

Without addressing legacy muck, it is likely that algal outbreaks and seagrass loss will continue.[52] EPA must therefore reinitiate consultation with NMFS in light of evidence that the current TMDLs lack an adequate margin of safety that takes into account the nutrient and sediment contributions of legacy pollution.

D. New Information Suggests the TMDLs Underestimate the Role of Septic Systems and Climate Change in Nutrient Loading in the Indian River Lagoon

The attached expert report by Dr. Peter Barile compiles additional new scientific evidence indicating that the current TMDLs in the Indian River Lagoon are insufficient at preventing harmful algal blooms and seagrass loss. Specifically, Dr. Barile's report explains that nutrient loads from septic tanks were underestimated in the approved numeric nutrient criteria and that they do not account for the confounding role of climate change in driving nutrient loading. He concludes that the current numeric nutrient criteria for nitrogen "are an order of magnitude above the maximum concentrations reported . . . for sustaining growth of some seagrass species found in the Indian River Lagoon system." Barile Report at 8. EPA must therefore reinitiate consultation in light of evidence that the current TMDLs are insufficient to protect ecosystem health in the Indian River Lagoon.

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[50] Phlips, Factors Affecting the Abundance of Phytoplankton in a Restricted Subtropical Lagoon, The Indian River Lagoon, Florida, USA, Estuarine, Coastal and Shelf Science (Sep. 2002).
[51] Florida Tech, Florida Tech Scientists and Engineers Seek Answers for Muck in the Indian River Lagoon (Aug. 13, 2017); Waymer, Muck: The arch-enemy lurks deep in Indian River Lagoon – Muck problem expensive to solve, Florida Today (Nov. 24, 2013).
[52] *See* Missimer, et al., Legacy Phosphorus in Lake Okeechobee (Florida, USA) Sediments: A Review and New Perspective, Water (2021) (explaining that in Lake Okeechobee, "[d]espite major efforts to control external nutrient loading into the lake, the high frequency of algal blooms will continue until the muds bearing legacy nutrients are removed from the lake").

IV. CONCLUSION

The ESA authorizes citizen suits to enjoin violations of the ESA. 16 U.S.C. § 1540(g)(1)(a). As set forth above, EPA is in violation of the ESA for failing to reinitiate formal consultation with NMFS concerning EPA's approval of Florida's estuary-specific numeric nutrient criteria in light of recent new information about harms to federally-protected species under NMFS jurisdiction and new information indicating that the current numeric nutrient standards are insufficient. If EPA is unwilling to take action within sixty days to reinitiate consultation, we plan to seek redress through litigation.

Sincerely,

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Report on recent scientific evidence (post-2013) to compel the USEPA and FDEP to reassess Indian River Lagoon, FL Numerical Nutrient Criteria

Peter Barile, Ph.D. Senior Scientist
Marine Research & Consulting, Inc., Melbourne FL

This is an expert report by Peter Barile, Ph.D., Senior Scientist, Marine Research & Consulting, Inc. Melbourne, Florida, on the scientific description of the health of the Indian River Lagoon as it relates to the 2013 EPA-approved Numerical Nutrient Criteria for the Indian River Lagoon system, excess nutrient loading and concentrations, harmful algal blooms and subsequently to seagrasses die-off and loss of over 400 manatees in Brevard County in 2021.

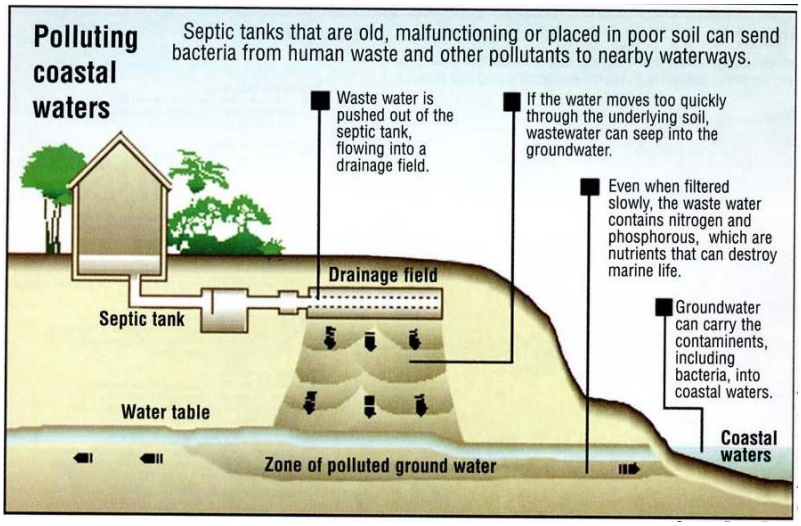
Dr. Barile has a Ph.D. in Environmental Sciences, a Master of Science degree in Marine Biology and a Bachelor's degree in Biological Sciences, all from Florida Tech in Melbourne, FL. Dr. Barile is a former Link Foundation Post Doctoral Fellow in the Division of Marine Science at Harbor Branch Oceanographic Institution in Ft. Pierce, FL. and a former NOAA Sea Grant- Knauss Marine Policy Fellow with residence in the US federal government's executive branch on ocean policy development at the National Science Foundation in Washington, D.C. Dr. Barile has 30 years of experience as a scientist and has authored over 20 peer-reviewed scientific articles, book chapters and public policy documents largely on Florida aquatic ecosystems, including the Indian River Lagoon. He has been relied upon to give expert consultation and testimony to the Florida legislature on the role of land-based sources of pollution to Florida's aquatic ecosystems and served on the Florida Senate's Consumer Fertilizer Task Force.

This report addresses new scientific information that may be used to compel the US Environmental Protection Agency (EPA) under the Clean Water Act to require the Florida Department of Environmental Protection (FDEP) to reassess its Numerical Nutrient Criteria (NNC) for Impaired Waters of the Indian River Lagoon. This analysis includes new scientific evidence, since adoption of the 2013 EPA-approved NNC, revising the understanding of nutrient loading sources to the IRL system and processes that now confound the models used to create the IRL NNC. Since the EPA's adoption of the 2013 NNC, the FDEP's TMDL nutrient reduction

regulatory program has resulted in 1) annual nutrient load and nutrient concentration exceedances that have resulted in 2) unprecedented high density phytoplankton blooms, 3) a 95% loss of historic seagrass coverage in the northern Indian River Lagoon (NIRL), and 4) subsequent die-off of nearly 400 manatees in the NIRL BMAP/TMDL area during 2021.

1) Florida DEP underestimated the contribution of nutrient loads from septic tanks

Recent modeling work in Florida indicates that nutrient loading from septic tanks (OSDS) is the second largest nutrient loading source to Florida's aquatic ecosystems (Badruzzaman et al. 2012). The University of Florida's Institute of Food & Agricultural Sciences estimates that there are 2.6 million septic tanks in the state that discharge nearly 426 million gallons of wastewater per day into Florida's ground and surface waters (UF-IFAS 2022). Nearly 300,000 OSDS are in the counties along the IRL system. The widespread pollution of OSDS effluent into the IRL is supported by the hydrogeological properties of the surficial aquifer along the Lagoon that mobilizes effluent downgradient to the IRL's surface waters.



From: Barile and Lapointe (1999)

The EPA's NNC are based upon a NIRL BMAP nutrient load estimate that there are 16,171 residences within this watershed basin that utilize Onsite Sewage Disposal Systems (OSDS) or septic tanks for human waste water treatment (FDEP 2021).

This value may be an underestimate, as Brevard County alone has nearly 90,000 residences on septic tanks, where the SJRWMD (1993) estimated that nearly 70% may be "problem tanks" where changing environmental conditions may directly mobilize effluent to nearby surface or groundwaters beyond those available in the TMDL estimates for the central (CIRL) and northern (NIRL) Indian River Lagoon BMAP areas.

Barile (2018) estimated that 43% of the residences and a total of 91,630 residences utilize septic tanks for human sewage disposal in Brevard County. With flooding conditions associated with heavy wet weather and tropical storm activity, steady state models of septic tank effluent loading to adjacent surface waters, such as the SWIL model used in the FDEP's NIRL BMAP nutrient loading estimates, are recognized to be conservative and an underestimate of this significant nutrient loading source.

In fact, a 2016 State of Florida South Florida Water Management District resolution (Resolution of the Governing Board #2016-0712, July 14, 2016) indicated that ***"human wastewater including septic tanks is the major source of excess nitrogen in the Indian River Lagoon and is underestimated in past nutrient loading models."***

Figure 2 to the right is the 2021 FDEP BMAP of the residential septic systems (OSDS) in the NIRL watershed.

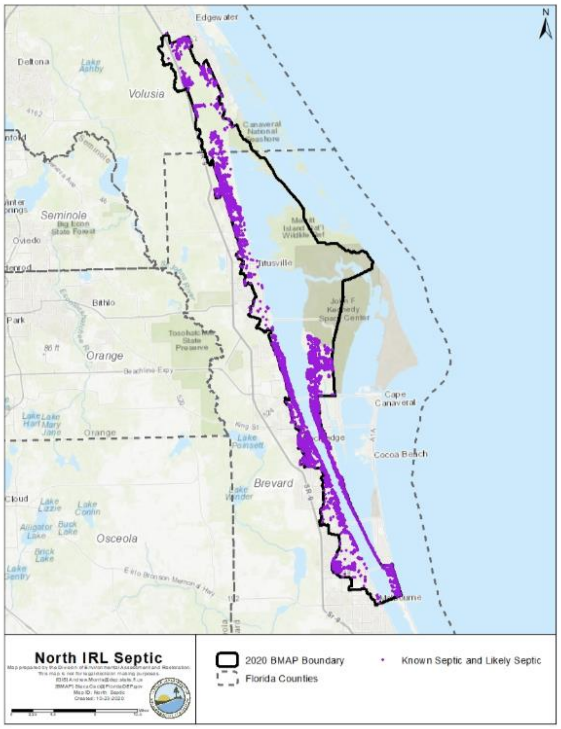


Figure 2. Location of septic systems in the NIRL

The process of mobilization of septic tank (OSDS) effluent, as a previously underestimated and significant nutrient loading source to the Indian River Lagoon, has been documented recently in several published peer-reviewed academic journal contributions.

In the counties along the ~150 mile long lagoon, nearly 50% of the residences utilize OSDS for wastewater treatment (Barile, 2018), which is significantly higher than the Florida or US national average.

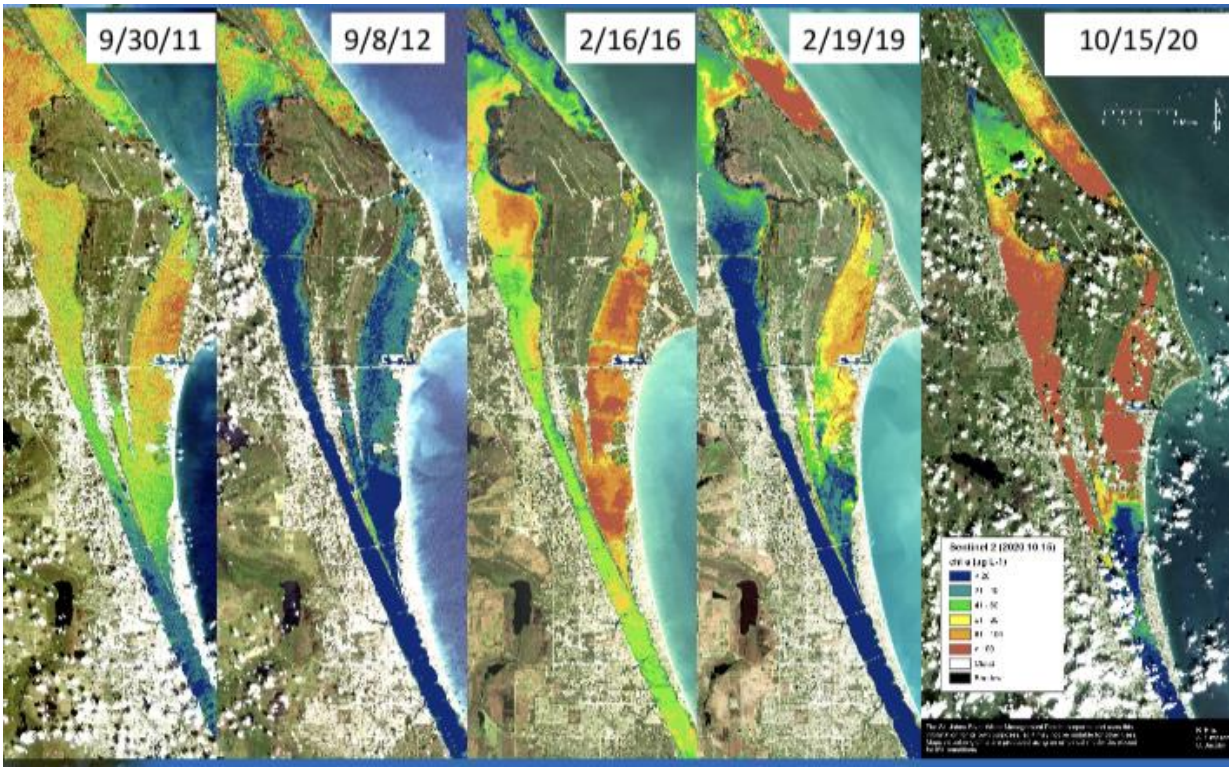
Lapointe et al. (2017) reported significantly high concentrations of septic tank (OSDS) inorganic nitrogen and phosphorus in groundwater monitor wells downgradient and adjacent to residential communities utilizing OSDS in the St. Lucie River, FL the primary tributary to the southern IRL. In adjacent surface waters evidence of significantly elevated wastewater nutrients were detected along with the conservative synthetic wastewater tracer, sucralose. Macroalgae and phytoplankton HAB blooms in both the St. Lucie River and southern Indian River Lagoon were enriched with OSDS wastewater nitrogen as a primary source, including the "green guacamole" *Microcystis* blooms that caused a public health crisis and international media attention in the summer of 2016.

Herren et al. (2021) reported the movement of septic tank (OSDS) effluent with high concentrations of reactive nitrogen and phosphorus into adjacent groundwaters and then into adjacent surface waters of the Sebastian River and Vero Beach lateral canal tributaries and into the CIRL. They traced OSDS as the dominant nitrogen source into macroalgae HABs in the downstream estuary. The study further used a conservative wastewater tracer, sucralose, as an additional line of evidence to trace OSDS loading from OSDS drainfields into adjacent ground and surface waters. There was significantly higher movement of OSDS nitrogen and phosphorus into adjacent ground and surface waters in the rainy "wet" season compared to the dry season.

Lapointe et al. (2015) reported wastewater nitrogen from OSDS as the primary loading source supporting macroalgae HABs at sites along the ~150 mi. IRL system. Sewage nitrogen from OSDS was also reported as a primary source of nitrogen supporting "super bloom" and "brown tide" phytoplankton blooms in the Indian River Lagoon. Total dissolved nitrogen and phosphorus concentrations were also measured above EPA's NNC nutrient thresholds despite high concentration phytoplankton blooms and macroalgae blooms that should deplete water column nutrient concentrations.

Kang et al. (2015) reported for the 2012-2013 "brown tide" *Aureoumba lagunensis* bloom event in the NIRL and Mosquito Lagoon that this HAB species was supported by a sewage nitrogen source from OSDS in the adjacent watersheds. This brown tide in 2012-2013 was a driver in the loss of ~95% of the seagrasses in the NIRL where the 2021 manatee UME occurred.

Barile (2018) documented widespread incorporation of wastewater nitrogen into macroalgal biomass at > 70 sites within tributaries and among the IRL system from Volusia to Palm Beach County. The study indicates that macroalgae HAB species incorporate elevated nitrogen and phosphorus from wastewater into their biomass more significantly during the rainy "wet season" when both elevated mobilization of nearby OSDS effluent sources and where dilapidate wastewater infrastructure either leaks or spills occur. Higher macroalgae tissue nitrogen contents in the rainy season also suggest that nitrogen loads are "externally" derived, and not supplied by "internal" cycling from the sediments or muck deposits.



SJRWMD (2021) Composite image of 2011-2020 HAB chlorophyll levels in the NIRL, all color shades lighter than blue (green, yellow, orange and red) are indicative of excessive HAB chlorophyll levels with higher concentrations from green to red. For reference, any shade darker than "purple" is an NNC exceedance. The HABs in "red" are >20x over the NNC concentration threshold for chlorophyll.

2) The 2013 EPA NNC for the IRL may not be adequate to mitigate harmful algal blooms

The northern and central IRL, Banana River and Mosquito River Lagoons, all "Impaired Waters" portions of the Indian River Lagoon system subject to Clean Water Act and subsequent EPA NNC regulatory action, experienced historically unprecedented and significant "Super blooms" of phytoplankton in 2011-2012 as the FDEP's NNC & TMDL's were going through review and adoption by the EPA. Since the adoption of the 2013 EPA-approved NNCs, nearly every rainy season since has caused excessive external nutrient loads (still ~50% above 2021 NIRL BMAP threshold nitrogen and phosphorus loading estimates) that have resulted in unprecedented phytoplankton and macroalgal HABs.

Whitehouse and Lapointe 2015 reported that widespread macroalgae HABs, *Chaetomorpha* sp. and *Ulva* sp., in the NIRL that overgrow and shade out seagrasses as they have high uptake affinities for low levels of inorganic nitrogen and phosphorus. These macroalgae HAB species, through this physiological ecology study, are demonstrated to reach maximum photosynthetic rates (e.g. *Ulva* sp. doubling biomass every 2 days) at very low level nutrient concentrations, well below the 2013 EPA-approved NNC's for nitrogen and phosphorus. This peer-reviewed scientific study concludes that the current NNC's are not sufficient to limit HABs in the northern IRL where >95% seagrass die-off has occurred and >400 manatees died in 2021.

3) The 2013 EPA-approved NNC for the IRL may not be adequate to mitigate seagrass die-off

The process of seagrass loss in estuaries is directly related to water quality declines. Specifically, these processes have been well documented for the northern Indian River Lagoon. Lapointe et al. (2015) reported the relationship between human sewage nitrogen, blooms of phytoplankton and macroalgae cover and their relation to seagrass loss in the NIRL. The 2021 FDEP BMAP TMDL report for the NIRL has acknowledged the relationships between poor water quality and seagrass demise, and that water quality has been "non-compliant" to support seagrass growth since 2007, per the statement below.

"The mean depth limits of seagrass coverage in the IRL decreased over the years because of changes in water quality resulting from anthropogenic influences. As polluted runoff reaches the Lagoon, it contributes to conditions that prevent the seagrass from growing in deeper water."

Since the 2013 BMAP, further evaluations of the seagrass depth limits in the NIRL have been conducted to reassess whether the NIRL project zones have continued to be compliant. **Table 23** and **Table 24** list the results of both steps of these evaluations since 2013, including the number of years that passed Step 2 of the evaluation. In 2020, the evaluation was conducted using the 2013, 2015, 2017, and 2019 seagrass mapping data, which were the latest datasets available at that time. **Figure 15** and **Figure 16** show the results of both steps of the 2020 evaluation for Project Zones A and B, respectively. Neither of the project zones was compliant. As indicated in the 2013 BMAP, DEP assigns detailed allocations in project zones where compliance is not maintained.

Table 23. Summary of seagrass compliance results, Step 1

Step 1	North A	North B
2007 – 2013	Fail	Fail
2009 – 2015	Fail	Fail
2011 – 2017	Fail	Fail
2013 – 2019	Fail	Fail

Table 24. Summary of seagrass compliance results, Step 2

Note: Parentheses indicate number of years passing of those assesed for the compliance period of record.

Step 2	North A	North B
2007 – 2013	Fail (0 of 4)	Fail (0 of 4)
2009 – 2015	Fail (0 of 4)	Fail (0 of 4)
2011 – 2017	Fail (0 of 4)	Fail (0 of 4)
2013 – 2019	Fail (0 of 4)	Fail (0 of 4)

Lapointe et al. 2020 reported that excessive nutrient loads during the rainy "wet season," which coincides with the period of peak seagrass growth, causes phytoplankton HABs that reduced downwelling light levels (Kd) below scientifically recognized thresholds known to support seagrass growth or seagrass ecosystem restoration. This study detailed the relationships of excess nitrogen loading from sewage, high water column ammonium concentrations, high levels of downwelling light attenuation (Kd) to seagrasses, and biochemical evidence of light limitation to remaining seagrass tissue, indicating stress from low light availability that results in seagrass loss. Carbon isotope analysis, coupled with other

biochemical and environmental data indicate severe light limitation of seagrass growth, even in seagrasses that have survived mortality events during "super bloom" HABs or low dissolved oxygen events resulting from macroalgae and phytoplankton HABs. Furthermore, the current 2013 EPA-approved NNC for nitrogen concentrations found in the NIRL are an order of magnitude above maximum concentrations, reported in Lapointe et al. 2020, for sustaining growth of some seagrass species found in the Indian River Lagoon system. Excess nutrient concentrations reported for the IRL can be directly toxic or indirectly lethal to seagrasses in the IRL system. NNC for the IRL should be revised to address these effects on seagrasses.

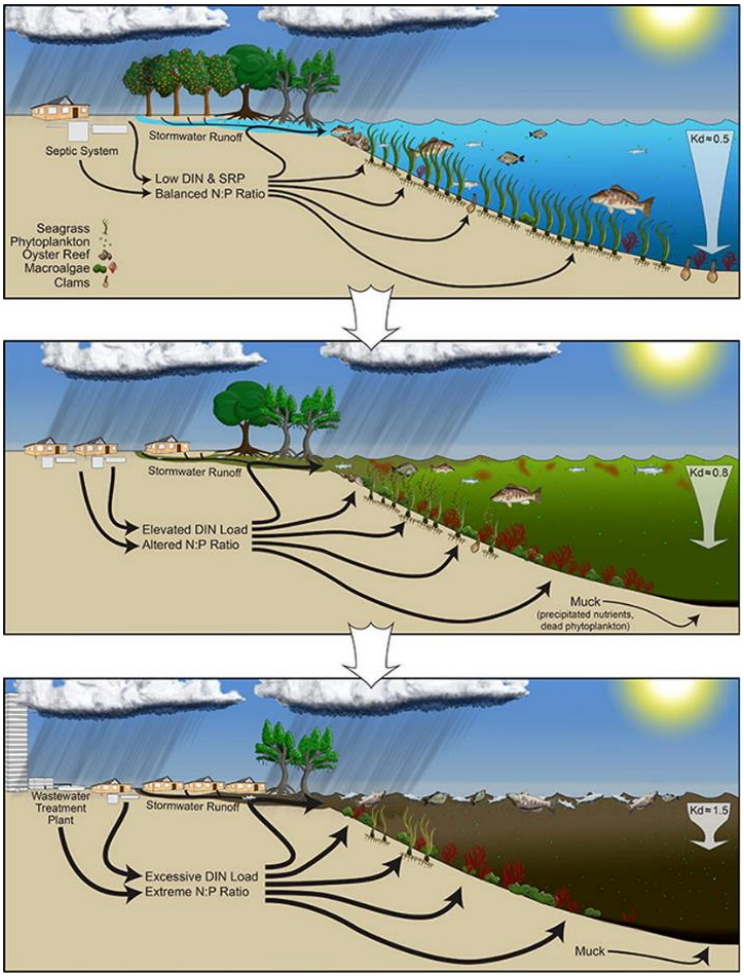


Figure from: Lapointe et al. (2020)

Escalating IRL eutrophication, resulting from low to elevated to excessive nutrient loads and the ecological consequences, including phytoplankton and macroalgae algal blooms, lower downwelling light, seagrass loss, fish kills and muck accumulations. Under elevated nutrient enrichment, the bottom of large portions of the IRL become a "dead zone" devoid of oxygen or light.

4) The 2013 EPA-approved NNC for the IRL does not account for the confounding role of climate change driven nutrient loading and responses of IRL HABs and seagrass communities.

In an invited presentation to then Gubernatorial candidate Congressman Ron DeSantis in August 2018, I provided the case study, based upon the peer-reviewed and published Barile (2018) article, on how human-induced climate change significantly increased nutrient loading into the Indian River Lagoon which resulted in a historically significant "brown tide" event in 2017-2018 and continued seagrass loss. Specifically, I described to the soon to be elected Governor how an intense Category 4 hurricane in September 2017 named Irma, strengthened by anthropogenically induced warming of the Caribbean Sea, resulted in storm conditions that caused the dumping of 30 million gallons or untreated sewage into an already beleaguered Indian River Lagoon. The direct nutrient loading from this event resulted in several tons on "new" nitrogen not accounted for in the EPA-NNC of FDEP TMDL.

In fact, climate change impacts are causing serious impacts to the sustainability of coastal estuaries for several reasons. Most directly, increasing human populations in watersheds results in increasing nutrient loading rates to estuaries such as the IRL. The population growth rate in east-central Florida is one of the fastest in the US, conferring necessary re-estimates of non-point source nutrient loading to the IRL. Increased nutrient loading rates should be updated in FDEP TMDL models as increasing human population density occurs in the IRL BMAP watersheds. Other climate change related phenomena in the southeast US, include warming temperatures in aquatic ecosystems, increased precipitation resulting from more intense and frequent tropical storms and hurricanes and El Nino/La Nina cycling, increase in stochastic rainfall events resulting in increased nutrient loading to Florida's estuaries. Further, warming water temperatures, increased aquatic ecosystem acidification, and consequently, increased dissolved CO2 in aquatic systems, etc. all confer advantages to HABs and disadvantages to seagrass communities, further confounding the calibration of NNCs/TMDLs As increased stochastic nutrient loading to the IRL system continues and increasing periodicity and intensity of HABs have occurred since the 2013 EPA NNC approval, the scientific community has taken notice and reported the following.

Sinha et al. (2017) reported that climate change induced increases in precipitation in the US will increase nutrient loading to coastal waters in the 21st century by 19%. Offsetting this increase will require a 33% reduction in nitrogen loads, presenting a significant management challenge.

Phlips et al (2020) reported how increases in intensity and frequency of El Nino events and hurricanes, resulting in increased precipitation and nutrient loads, and have subsequently increased HAB events in the IRL system.

Phlips et al. (2021) reported that over the past 23 years of record, an increase in physical factors, such as El Nino cycling and tropical storm events has resulted in increased nutrient concentrations, and an ecological "regime shift" with a dramatic increase in peak biomass of phytoplankton HABs that has coincided with seagrass loss in the Indian River Lagoon system.

Barile (2018) reported that recent intense rainfall events have resulted in significant mobilization of human wastewater from OSDS in the IRL BMAP watersheds and from wastewater treatment plant dumping into the IRL, both increasing nutrient loadings and resulting increased incorporation of wastewater nutrients into macroalgal HABs in the IRL system.

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