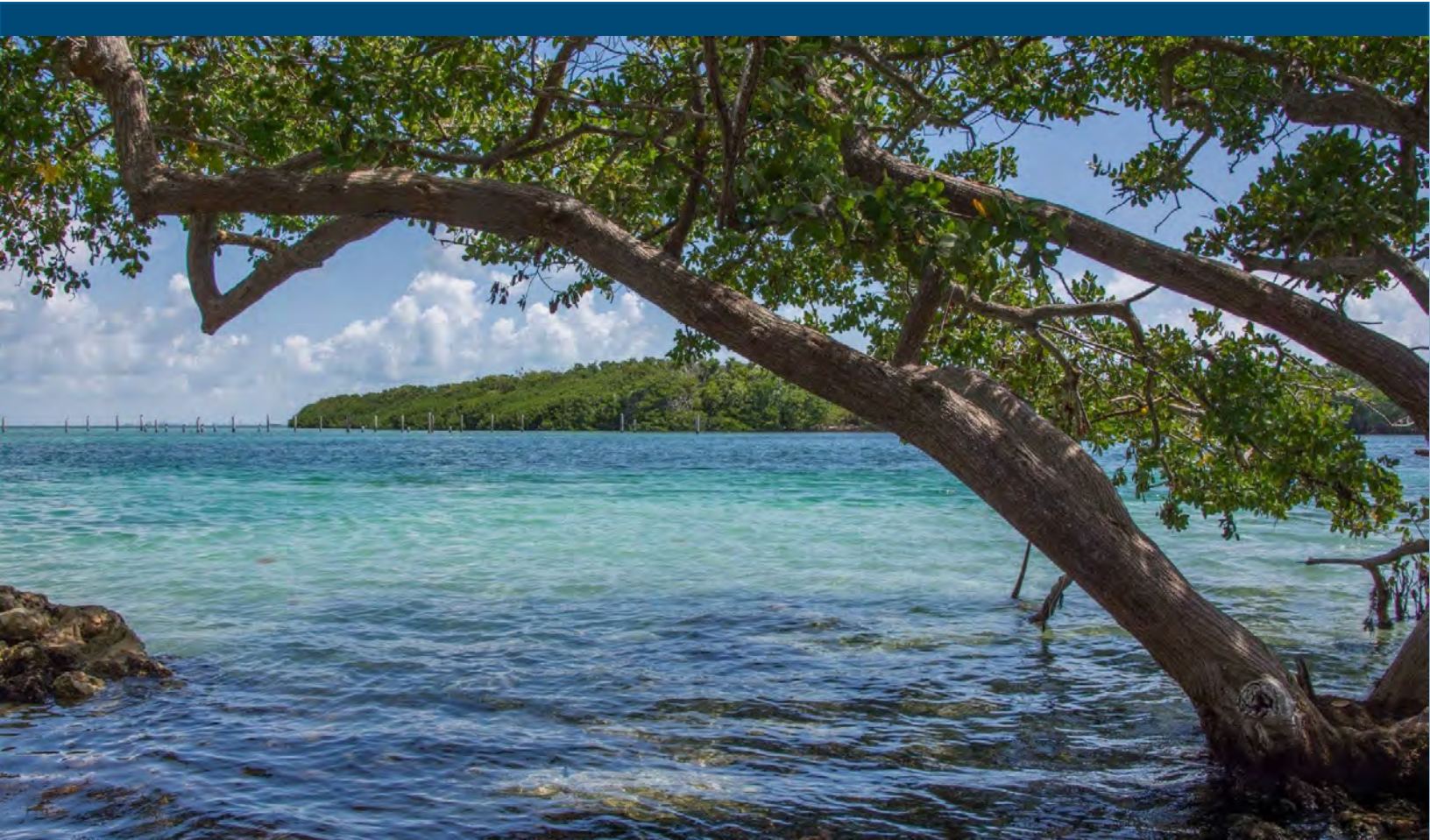


# BISCAYNE BAY WATERSHED MANAGEMENT ADVISORY BOARD

February 18<sup>th</sup>, 2022



# **Biscayne Bay Watershed Management Advisory Board**

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# AGENDA

BISCAYNE BAY WATERSHED MANAGEMENT

ADVISORY BOARD (BBWMAB) MEETING

February 18th, 2022 - 9:00am – 12:00pm

LOCATION – Stephen P. Clark Government Center, Commission Chambers, 2<sup>nd</sup> Floor

111 NW First Street, Miami, FL 33128

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1. **Roll Call**
2. **Reasonable Opportunity to be Heard**
3. **Approval of Agenda – Actionable item**
4. **Approval of Minutes – Actionable item**
  - a. BBWMAB Meeting - December 6, 2021
5. **Overview of the Biscayne Bay Watershed Management Advisory Board**  
Abbie Schwaderer Raurell, Miami-Dade County Attorney's Office
6. **Draft Ordinance for Onsite Treatment and Disposal Systems (OSTDS)**  
Rashid Istambouli, Senior Division Chief, RER-DERM
7. **Update on Florida Department of Environmental Protection (FDEP) Grants and Projects**  
Pamela Sweeney, Senior Water Scientist, RER-DERM
8. **Update on Biscayne Bay Water Quality Impairment | Overview of Reasonable Assurance Plans (RAP) & Basin Management Action Plans (BMAP)**  
Kevin O'Donnell, FDEP, Watershed Assessment Section Environmental Administrator
9. **Update on Biscayne Bay Task Force Recommendations & Announcements**  
Irela Bagué, Chief Bay Officer
10. **Board Member Update - Scavenger 2000 Decontamination Vessel**  
Brett Bibeau, Executive Director, Miami River Commission
11. **Discussion of Future Agenda Items**  
BBWMAB Chair, Commissioner Danielle Cohen Higgins
12. **Adjournment**  
BBWMAB Chair, Commissioner Danielle Cohen Higgins

# Biscayne Bay Watershed Management Advisory Board

Stephen P. Clark Government Center  
Commission Chambers, 2<sup>nd</sup> Floor  
111 NW First Street  
Miami, FL 33128

MINUTES      December 6, 2021      9:00 am

MEETING CALLED BY	9:00 am- Irela Bagué, Chief Bay Officer. The roll was taken. There were 18 members present with one member absent. Councilmember Crystal Wagar - Absent
MEMBER ATTENDEES	<div> Commissioner Rebeca Sosa  Commissioner Jean Monestime  Commissioner Danielle Cohen Higgins  Mayor Vince Lago  Mayor Tim Meerbott  Commissioner Rachel Streitfeld  Brett Bibeau  Todd Alan Crowl  Dr. Diego Lirman </div> <div> Dr. Joan Browder  Dr. Erik Stabenau  Julissa Kepner  T. Spencer Crowley, III, Esq.  Jannek Cederberg. PE  Gerald C. McGinley, Jr  John L. Alger  Roberto Torres  Dave Doeblor </div>
	Staff to Biscayne Bay Watershed Management Advisory Board in attendance: Irela Bagué, Pamela Sweeney, Ana Fiotte, Marie Bell, Larissa Aploks, Karina Castillo, Katie Hagemann, and Nichole Hefty.

## AGENDA TOPICS

### MAYORS WELCOME

Miami-Dade County Mayor Daniella Levine Cava

DISCUSSION	Mayor Daniella Levine Cava made opening remarks. The Mayor thanked the Advisory Board for their service in the recovery of Biscayne Bay. Mayor also mentioned the vision of the Florida Legislature and the leadership of Commissioner Sosa who has been at the forefront of protecting the bay for many years and sponsored the legislation creating the Biscayne Bay Watershed Management Advisory Board. The work of the Biscayne Bay Task Force including the appointment of the first ever Chief Bay Officer, Irela Bagué. Mayor Cava reiterated that Biscayne Bay is not only about the environment but a cornerstone to our economy.
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### BOARD INTRODUCTIONS

Irela Bagué, Chief Bay Officer

DISCUSSION	<p>Irela Bagué thanked Ana Fiotte, Marie Bell, and RER and DERM staff for their help setting up the meeting. She continued by acknowledging Commissioner Sosa who did not create the Biscayne Bay Task Force but who spearheaded the vision for the Biscayne Bay Watershed Management Advisory Board.</p> <p>Commissioner Sosa thanked Irela Bagué and the Mayor and the Advisory Board members. She stated, we have a diamond in the County that is Biscayne Bay. Commissioner Sosa continued that it is important to work with the State and to create a realistic plan that can be accomplished and not make promises that cannot be kept. She also thanked DERM and the Office of Resilience and all the professionals who work with the board.</p> <p>Irela Bagué continued by having the Miami-Dade Watershed Management Advisory Board members introduce themselves. Starting with Jannek Cederberg representing Florida Engineers Society, Julissa</p>
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	<p>Kepner representing Greater Miami Convention &amp; Visitors Bureau, John Alger representing Dade County Farm Bureau, Dave Doeblar representing the Biscayne Bay Marine Health Coalition, Dr. Joan Browder representing NOAA, Dr. Diego Lirman representing University of Miami, Dr. Erik Stabenau representing Biscayne National Park, Dr. Todd Crowl representing Florida International University and 103 scientists, County Commissioner Danielle Cohen Higgins representing South Dade in District 8, Mayor Tim Meerbott of the Town of Cutler Bay representing the League of Cities, Mayor Vince Lago of Coral Gables, representing the League of Cities, Commissioner Rachel Streitfeld of North Bay Village an island in the middle of the bay representing the League of Cities, Roberto Torres representing The Nature Conservancy, County Commissioner Jean Monestime representing District 2, Spencer Crowley representing Builders Association of South Florida, Joe McGinley representing the Miami Marine Council, and Brett Bibeau representing the Miami River Commission.</p>
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## BBWMAB PROCEDURAL ITEMS

Irela Bagué, Chief Bay Officer

DISCUSSION	<p>Ms. Bagué thanked them all. She asked the board if they could make changes to the agenda and move up the section for the nomination of Chair and Vice Chair and set the rules of order because Commissioner Sosa had to leave at 11:00 AM. Commissioner Sosa made a motion to appoint Commissioner Cohen Higgins as Chair and Mayor Lago as the Vice Chair. The motion was seconded by Mayor Meerbott and passed unanimously.</p> <p>Commissioner Cohen Higgins thanked Commissioner Sosa and stated she was honored to serve. She continued with the sentiments of Commissioner Sosa that the board needs to focus on things it can get done and deliver results.</p> <p>Ms. Bagué congratulated and thanked the Chair and the Vice Chair and returned to the order of the agenda by discussing the purpose of the board and the Watershed Action Plan.</p>
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## REVIEW PURPOSE BBWMAB & WATERSHED ACTION PLAN

Irela Bagué, Chief Bay Officer

DISCUSSION	<p>Ms. Bagué began her presentation by acknowledging the traditions of our ancestral tribes, the Miccosukee, Seminole and Tequesta people. She thanked the Biscayne Bay Task Force members and recognized the members in the audience, Steve Sauls, Jim Murley and Lee Hefty. She continued with a moment to honor the memory of Alyce Robertson, who we lost earlier this year and who helped draft the Biscayne Bay Recovery document. Ms. Bagué continued by providing a brief chronology of the past four years. At the Biscayne Bay Marine Health Summit in 2017 there was a call to action over concerns of the seagrass die-off. The recommendation was to create the Biscayne Bay Task Force to develop a set of recommendations. One of the recommendations was to create this board and a watershed management action plan. These recommendations are focused primarily on water quality and improving the water quality of the system. Another recommendation was the hiring of a chief bay officer so that someone could coordinate, advocate, and advise on these issues. Earlier this year, Ms. Bagué had the honor of accepting the position. The task force recommendations helped to identify some data gaps for nutrient reduction and habitat restoration planning. Other issues identified included septic to sewer conversion, storm water system management, wastewater projects and an aging infrastructure. Since the 1970s there has never been a unified and coordinated approach until now. The goal is to develop a new watershed management plan and implement the tasks from the Biscayne Bay Task Force Report. The Florida Legislature created the Biscayne Bay Commission earlier this year. It is very significant to see the State of Florida making Biscayne Bay a priority.</p> <p>Chair Cohen Higgins requested that Ms. Bagué clarify the dynamic between the BBWMAB and the Biscayne Bay Commission and to identify who is serving on both boards as well as to clarify the role of the two agencies. Will the BBWMAB do research and provide recommendations and the Biscayne Bay Commission will implement at the State level? Ms. Bagué agreed with the Chair and stated the members that will be serving on the Biscayne Bay Commission from this board included The Chair, Commissioner Monestime, Commissioner Sosa, Mayor Meerbott and Spencer Crowley. Ms. Bagué</p>
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	<p>continued with the first meeting of the Biscayne Bay Commission will be scheduled in early January in Miami-Dade County. Brett Bibeau mentioned a problem with the audio. Commissioner Sosa explained there had been a problem with an electrical outage in the building.</p> <p>Ms. Bagué concluded her presentation and introduced Mr. Robert Thompson from Miami-Dade Commission on Ethics &amp; Public Trust for a presentation on “Government in the Sunshine”.</p>
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## MIAMI-DADE COUNTY COMMISSION ON GOVERNMENT IN THE SUNSHINE

Robert Thompson, Miami-Dade  
Commission on Ethics & Public Trust

DISCUSSION	<p>Mr. Thompson gave a PowerPoint presentation on code of conflicts and code of ethics then the Sunshine Law and public records. He proceeded to explain the role the ethics office is three-fold. They conduct trainings, write opinions and conduct enforcement. Training is the most important. All members of boards in Miami-Dade County are required to take the training. He emphasized the importance of using the Commission on Ethics as a resource. The Chair asked if the board members could sunshine meetings among themselves, who would be responsible for scheduling? Ms. Bagué identified Marie Bell as the person responsible for sunshining the meetings.</p>
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## PUBLIC COMMENTS

Commissioner Danielle Cohen Higgins - Chair

DISCUSSION	<p>The Chair requested that the reasonable opportunity for the public to be heard be taken out of order on the agenda. She requested that it be put at the top of the agenda in the future. The Chair proceeded to request if any members of the public would like to address the board and for staff to keep the timer at two minutes.</p> <p><i>Adam Gelber, U.S. Department of the Interior lead on Everglades Restoration for South Florida, located at 7595 SW 33rd Street, Davie, FL 33314 on the Nova Southeastern University Campus.</i> He expressed his support of the work the board would be doing in contributing to the overall benefits of the Everglades with the central flow path of restoring and spending billions of dollars with their congressional mandate. The Chair thanked him for his comments.</p> <p><i>Albert Gomez, 3566 Vista Court, Miami, FL 33133. Mr. Gomez is a steering committee member for the Biscayne Bay Marine Health Coalition and Summit.</i> He thanked the board for their service. He advised the board that there was another summit scheduled for April with the one goal of supporting advancing this watershed board and helping to bring the recommendations of the task force to fruition. The workshops and events will be structured to help the watershed board be as impactful as possible. The group is here to support. Mr. Gomez made one suggestion to create an appendix of readily available municipal ordinances that could be enacted. Chair seeing no other speakers closed the public comments.</p> <p>Ms. Bagué asked the Chair if they could memorialize the first meeting by taking a group picture. The Chair agreed.</p>
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**STATUS OF BISCAYNE BAY RECOMMENDATIONS**

Irela Bagué, Chief Bay Officer

DISCUSSION	<p>The meeting reconvened, Ms. Bagué continued by providing an update on the Biscayne Bay Task Force recommendations with a PowerPoint presentation. She stated, the task force made 68 recommendations, and these are divided into seven different policy themes, with a key focus on improving water quality. On the slides, those recommendations highlighted in yellow have either been completed or are in progress. Ms. Bagué advised the board that there is a dedicated web page for the board and all the presentations will be uploaded. She concluded by stating that there is a dedicated email address (baywatch@miamidade.gov) to report any issues, pollution, algae blooms, and fish kills in Biscayne Bay.</p>
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**STATUS OF BISCAYNE BAY RECOMMENDATIONS: DISCUSSION / COMMENTS**

Commissioner Danielle Cohen Higgins - Chair

DISCUSSION	<p>The Chair recognized Commissioner Sosa. Commissioner Sosa expressed that she wanted the next meeting to talk about reality. Specifically, about the bridges that are not allowing the water to flow. What can be done to increase the oxygen in the water and the problems with the infrastructure?</p> <p>The Chair echoed the sentiment that the board needs to focus on action items, and this would be included in the next agenda. This recommendation falls under infrastructure and that the issues are many. The Chair proffered that at the next meeting a board member takes a leadership role in each of the seven categories. Therefore, at each meeting the board could be contributing to that category and achieve action items more expeditiously.</p> <p>The Chair recognized Spencer Crowley. Mr. Crowley would like staff to make a presentation on the status of State funds that have been appropriated. He believes a significant amount of money has been earmarked for Biscayne Bay.</p> <p>The Chair recognized Brett Bibeau. Mr. Bibeau requested a presentation on the Scavenger water decontamination vessel which is owned by Water Management Technologies. He continued with the County has a contract with them for the Miami River and the City of Miami has a contract with them for the bay. The Chair then asked if anyone had any other specific items for the next agenda?</p> <p>The Chair mentioned that there had been a lot of response from the community in reference to the Manatees and the Miami Boat Show. She wanted to know if there was an opportunity to have manatee ambassadors like the goodwill ambassadors and be strategically located in the water looking out for marine life. She asked if the Director of DERM, Lee Hefty could approach the podium.</p> <p>Mr. Hefty from DERM expressed to the Chair it was a great idea. He explained that staff had been involved with the State of Florida for decades tracking manatee populations in Miami-Dade County. He reiterated it would be great idea with the increased activity associated with the boat show to not only place the responsibility on the permittee but to also have outside spotters as well.</p>
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## DISCUSSION

The Chair asked Ms. Bagué to continue with the presentations. Ms. Bagué introduced Pamela Sweeney, Senior Manager and Senior Water Scientist from DERM who was instrumental in creating the Task Force recommendations. Ms. Sweeney thanked Ms. Bagué and stated her goal today was to provide a State of the Bay. She began her PowerPoint presentation by providing a natural history of the bay and the history of some of the management planning. So why are we here? Why are we having this conversation today? She continued we should start defining what is a watershed? According to the University of Florida's Institute of Food and Agriculture Services it is defined as an area of land that drains to a common endpoint. The Kissimmee-Okeechobee-Everglades (KOE) watershed originally encompassed and drained about 18,000 square miles. It took approximately two days for water to get from the chain of lakes about Lake Okeechobee down to the peninsula of Florida. Today, we have a highly engineered managed system. This system has allowed us to live here but comes with environmental impacts. As Mr. Gelber mentioned, we have been working hard over the past few decades to reengineer it in a different way to mitigate the nutrients going into the bay. Over the years, channeling of the water has facilitated water moving off the landscape faster, hardening of our shorelines, and protecting against saltwater intrusion.

Pamela Sweeney continued by showing the canal system that holds the water back for agricultural and practice reasons. The water has moved through the systems quickly. The conversation we've had is what is the water quality being received by the bay and what we doing to impact the water quality? This conversation has been had over the years at the local, state, and federal level with many management planning efforts. It is important to look at the history as a resource. There are some common themes that have occurred first and foremost are water quality, quantity, and clarity. The County's 1981 management plan was a large step in how the County regulates these natural resources. Miami-Dade County with our partners regulate coastal habitat restoration, offshore and artificial recreation, monitoring and management, surface water quality, groundwater monitoring, water quality and pollutions investigations, compliance, and enforcement. In addition to seagrass, coral, hardbottom community, wastewater infrastructure and storm water infrastructure. Together this helps to stabilize our shorelines, mangroves, and seagrasses. They help us to prevent or reduce the impact of storm surge.

Pamela Sweeney went on to explain of the importance of carbon sequestration and how the coastal wetlands become one of the most effective carbon sinks. She continued with the Miami-Dade County marine debris program, derelict vessels, and derelict fishing gear removal. She explained that the Biscayne Bay collapse is complicated and the road to recovery will be complicated as we look at seagrass loss, fish kills and algae blooms. When we look at the quality of the water in the bay, we must look at the pollutants that get into the bay through groundwater connection or canal or discharges to canals and surface water. The list of pollutants can include pet waste, gas and oil, landscape waste, trash, and industrial uses being adjacent or near the bay. In addition, there is potentially agricultural, construction, wastewater and making sure that our existing sewer lines and septic systems are maintained. The County has also addressed fertilizer and other chemicals by creating a fertilizer ordinance. Also being addressed are the illegal connections or discharges to the bay by the County's regulatory programs. All this leads to nutrient enrichment. The Biscayne Bay Task Force report addressed the significance of nitrogen and phosphorous. These things and others provide excess nutrients to the water that can lead to seagrass die-offs, algae blooms, and fish kills. Algae gets a bad rap, but phytoplankton is in every third breath we take, but too much of a good thing multiplies and becomes a bloom situation. Also, to be considered is the hypothesis of coastal construction and operation of vessels in shallow water environment leads to the loss of seagrass. Some of it is recouped through mitigation efforts, but the excess nutrients make it difficult for seagrass to do their job and oxygenate the water. This phenomenon has been occurring since the early 2000's. The biomass and increase in chlorophyll which how the bloom is measured has been growing in the water over the last 20 years. We have observed that approximately 76% of the seagrass has been lost. With all these elements happening simultaneously lower oxygen, higher water temperatures, higher air temperature and lower winds this confluence helps us to understand how the initial fish kill was manifested. Seagrass and mangroves provide ecosystems that can assimilate nutrients and tolerate a storm the bay has the ability. But recently we have seen a basin that has had very low primary productivity or the ability to oxygenate the water pond and synthesize nutrients. The basin is surrounded by construction



	<p>and the water flow from Little River and Biscayne Canal carry high nutrient levels and the low dissolved oxygen water created a perfect storm.</p> <p>Chair asked how much more time as left for the presentation and inquired when Pamela Sweeney would discuss funding? Pamela Sweeney responded she would move forward.</p> <p>Commissioner Sosa cautioned we are about to lose quorum. Chair continued she knew Commissioner Sosa had to leave and wanted to know if there were any questions from her colleagues regarding funding. She thanked Pamela Sweeney for her hard work and years of information however, not being a scientist she understood how important this education was for the members of the board.</p> <p>Commissioner Monestime asked to be excused. Chair asked Pamela Sweeney to discuss the DEP funding.</p> <p>Pamela Sweeney continued the State had provided \$10 million through their Coral Reef Protection grant fund last year. Four main areas had been identified. First, they are looking for the hot spots in Miami, Biscayne Canal, and Little River and identify the sources of pollution to eliminate or at the least reduce them. Second, are storm water projects including piloting new technology and testing. Third, is wastewater and they are working with their Water and Sewer Partners on sewer conversions to take residents off the septic system and smart covers which is a new technology in our manholes that allows us to predict and prevent sanitary sewer overflows in coastal Miami-Dade County thereby eliminating raw sewage from entering Biscayne Bay. Lastly, habitat restoration by creating a living shoreline document with a pilot sponge restoration project to see how effective sponges may be at filtering water quality in Miami-Dade County. The mayor has agreed that the County would match those funds with an additional \$10 million. This is a total of \$20 million of work being done. These projects are to begin with the next month or two. This concluded Pamela Sweeney's presentation.</p>
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#### DISCUSSION OF FUTURE MEETING DATES AND AGENDA ITEMS

Commissioner Danielle Cohen Higgins - Chair

DISCUSSION	<p>Chair asked if it answered her colleagues' question for funding from Tallahassee?</p> <p>Spencer Crowley asked if we could see those four different classifications of projects and if it could be shared with the BBWMAB? Pamela Sweeney agreed. Mr. Crowley continued it's important for the board to keep track of the money and make sure it is being spent the right way. Pamela Sweeney explained that they are working on the work plans and have had several rounds of edits. The final document should be ready soon. Mr. Crowley asked if the projects being developed are going to be led by Miami-Dade County? Pamela Sweeney agreed and stated the County would be working with subcontractors, academic institutions and infrastructure.</p> <p>Chair requested that for the next agenda that staff provide a more detailed analysis into the funding and a breakdown of the funds, where they are being distributed. She continued and asked if any other board member had a question or comment.</p> <p>Chair recognized the Vice Chair Lago. He explained that he as Mayor he advocates for the City of Coral Gables and planned to travel to Tallahassee at the start of session in January and would like to be an advocate for the board but wanted to make sure he followed the guidelines of the Chair and the board. The Vice Chair wanted to better understand the future goals and funding needs.</p> <p>Chair responded that she would be traveling to Tallahassee at the end of January and for Dade Days and for any board members to let her know so they could set the legislative priorities at the next meeting.</p> <p>Ms. Bagué agreed with Chair and Mr. Vice Chair and Stated she would be working with the County's office of intergovernmental affairs to make sure we align all our priorities. She continued if there was one thing, they should be advocating for it would be septic to sewer which did not receive adequate funding. Mr. Vice Chair continued that he would be advocating for a Master Plan for septic to sewer conversions. He would gladly advocate for the board while in Tallahassee by sending a cohesive message. Chair continued and suggested that the board set their legislative priorities now.</p> <p>Chair recognized Dave Doeblar. He would like to advocate for two specific things. First the repeal of Statewide preemptions that prevent local governments from regulating single use plastics, Styrofoam,</p>
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	<p>and plastic bans. Second, there are very few metrics and requirements around nutrient loads that are required to be measured and controlled. There are other components that also need to be metric and reduced that are managed by DEP. So, there are no metrics to reduce plastics entering the storm drain systems into Biscayne Bay.</p> <p>Chair clarified after conferring with the attorneys that the interplay between this board and the Board of County Commissioners becomes interesting, the BCC has already set its legislative priorities for the year in Tallahassee. Essentially the board's legislative priorities need to fold into the legislative priorities of the BCC. The BBWMAB cannot create its own legislative priorities. However, septic to sewer is the second priority for the BCC.</p> <p>Ms. Bagué reminded the board that with the Biscayne Bay Commission made of up of a few agencies so these ideas could be advocated internally.</p> <p>Chair thanked Ms. Bagué for clarifying and reiterated that this was a tremendous opportunity to take leadership, not only in Miami-Dade County, but in the State everybody in the State of Florida enjoys and is interested in protecting Biscayne Bay.</p>
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## ADJOURN

Commissioner Danielle Cohen Higgins - Chair

DISCUSSION	<p>Chair continued that it appeared the agenda was completed our unless there are any comments or questions from the board. The next meeting dates will be coordinated through staff and wished everyone a Merry Christmas, last evening of Chanukah, a Happy Kwanzaa, and a Happy New Year! The meeting was adjourned at 11:08 AM</p>
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Approved \_\_\_\_\_ Mayor

Agenda Item No.

Veto \_\_\_\_\_

Override \_\_\_\_\_

ORDINANCE NO. \_\_\_\_\_

ORDINANCE RELATING TO ENVIRONMENTAL PROTECTION; AMENDING SECTION 24-5 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA; CREATING AND REVISING DEFINITIONS RELATED TO AN ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEM (OSTDS); AMENDING SECTION 24-15; REQUIRING AND ESTABLISHING MINIMUM PLAN APPROVAL STANDARDS FOR OSTDS; AMENDING SECTION 24-28; REVISING CONDITIONS CONSTITUTING SANITARY NUISANCE; CREATING SECTION 24-42.7; PROVIDING REQUIREMENTS FOR NEW AND REPLACEMENT OSTDS; PROVIDING EFFECTIVE DATES FOR COMPLIANCE FOR NEW AND REPLACEMENT OSTDS; AMENDING SECTION 24-43.1; REVISING PERMIT REQUIREMENTS FOR LIQUID WASTE DISPOSAL FACILITY TO INCLUDE NEW OSTDS REQUIREMENTS; AMENDING SECTION 2-114.1; PROVIDING FOR ADMINISTRATIVE REVIEW OF TAKINGS AND VESTED RIGHTS CLAIMS FOR DECISIONS PURSUANT TO CHAPTER 24 AND PROVIDING FOR APPEALS TO COUNTY COMMISSION; AMENDING SECTION 8CC-10; PROVIDING FOR ENFORCEMENT BY CIVIL PENALTY; MAKING TECHNICAL CHANGES; PROVIDING SEVERABILITY, INCLUSION IN THE CODE, AND AN EFFECTIVE DATE

**WHEREAS**, this Board desires to accomplish the purposes outlined in the accompanying memorandum, a copy of which is incorporated herein by reference,

**BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA:**

**Section 1.** The memorandum referenced in the above recital is incorporated in this ordinance and is approved.

**Section 2.** Section 24-5 of the Code of Miami-Dade County, Florida, is hereby

amended to read as follows:<sup>1</sup>

#### **Sec. 24-5. - Definitions.**

In construing the provisions of this chapter, where the context will permit and no definition is provided herein, the definitions provided in ~~[[Chapter]]~~>>chapter<< 403, Florida Statutes, as may be amended from time to time, and in rules and regulations promulgated thereunder, as may be amended from time to time, shall apply. The following words and phrases when used in this chapter shall have the meanings ascribed to them in this section:

\* \* \*

- (74) *Department* shall mean the ~~[[Miami-Dade County Department]]~~>>Division<< of Environmental Resources Management >>of the Miami-Dade County Department of Regulatory and Economic Resources or successor department responsible for administration of this chapter<<.

\* \* \*

- (82) *Director* shall mean the ~~[[Director of the Miami-Dade County]]~~>>primary official that has been delegated responsibility to administer the<< Department~~[[of Environmental Resources Management]]~~, with duties created pursuant to >>section<<[[Section]] 24-6~~[[of the Code of Miami Dade County, Florida]]~~. >>Except where expressly provided or where context dictates otherwise, the term “Director” includes the Director’s designee.<<

\* \* \*

- (86) *Domestic sewage* shall mean >>human body waste and<< wastewater from toilets, showers, sinks, baths, >>laundry equipment, kitchen equipment,<< and other ~~[[facilities]]~~>>fixtures or equipment<< designed >>and used<< for human sanitation>>, as determined by the Director,<< whether located within residential or nonresidential land uses.

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<sup>1</sup> Words stricken through and/or [[double bracketed]] shall be deleted. Words underscored and/or >>double arrowed<< constitute the amendment proposed. Remaining provisions are now in effect and remain unchanged.



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>>(92) Drainfield or disposal system shall mean a system designed to distribute domestic sewage effluent for treatment and disposal onsite. This system is deemed to be a component of an OSTDS for purposes of this chapter.<<

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>>(183)<< [[(182)]] Liquid waste shall mean >>liquid or<< sludge >>waste materials<< resulting from[[;]] >>domestic, commercial, industrial, mining, institutional, agricultural, or governmental operations, including such materials to be recycled or otherwise beneficially reused, that would cause a nuisance or would otherwise cause a violation of this chapter if discharged to the ground or waters of Miami-Dade County. Liquid waste includes,<< but >>is<< not limited to, [[a]] >>solvents, sewage, industrial waste, hazardous waste, semisolid waste, and potentially infectious waste, as well as the materials resulting from or contained in any of the following:<< waste treatment works>>;<<[[;]] air pollution control facility[[,—domestic,—commercial,—mining,—institutional, agricultural, or governmental operations; or other waste materials, including materials to be recycled or otherwise beneficially reused; or septic tank,]]>>; onsite sewage treatment and disposal system; FOG control device;<< [[grease trap,]] sediment trap[[;]]>>;<< portable toilet[[;]]>>;<< or oil>>-water<< [[and—grease]] separator>>. Notwithstanding any other provision to the contrary, the following shall not constitute liquid waste for purposes of this definition:<< [[pump-outs, or solvents, sewage, industrial waste, hazardous waste, semisolid waste, or potentially infectious waste; or any similar materials which would cause a nuisance or would otherwise cause a violation of this chapter if discharged to the ground or waters of Miami-Dade County. However,sewage and industrial wastes which have been permitted by the Department to be discharged and which are discharged through a lateral connection to the sewerage system or on site treatment facility are not included in this definition. Furthermore,]] subsurface materials >>that are<< extracted as a result of rock mining >>and that<< [[which]] are not discharged to canals>>, wetlands,<< or other water bodies [[are not included in this definition]].

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~~[(219)]~~>>(220) Onsite sewage treatment and disposal system or OSTDS shall mean a system, and components thereof, to treat and dispose of domestic sewage that is decentralized and is located either on the site from which the domestic sewage is generated or on an adjacent or nearby site. The term includes all system components, including, without limitation, the following:<< ~~[[Onsite Sewage Treatment and Disposal System shall mean a sewage system that contains any of the following elements which is not connected to a utility or non-utility collection and transmission system:]]~~>>standard<< subsurface>>, filled, or mound<< drainfield ~~[[system]]~~; ~~[[an]]~~ aerobic treatment unit; ~~[[a]]~~ graywater system tank; ~~[[a]]~~ laundry wastewater system tank; ~~[[a]]~~ septic tank; ~~[[a]]~~ grease interceptor; ~~[[a]]~~ pump tank; ~~[[a]]~~ solids or effluent pump; >>solids separator; disposal system for hydraulic conveyance to the point of discharge, further treatment, or both; aerobic treatment unit or system; performance based treatment unit or system; wastewater treatment system not classified as a sewage treatment plant; or<< ~~[[a]]~~ waterless, incinerating, or organic waste-composting toilet. >>An OSTDS does not include an interim sewage treatment plant as defined herein.<< ~~[[The term includes all components and units required for the elements to function properly.]]~~

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>>(262) Reserved area shall mean the area on a property reserved for the installation or replacement of a drainfield or disposal system.<<

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>>(281)<< ~~[[ (279) ]]~~ Septic tank shall mean ~~[[any settling tank in which the settled sludge is in immediate contact with sewage flowing through the tank thereby allowing the organic solids to be partially decomposed by putrefaction, i.e., anaerobic bacterial action]]~~ >>a receptacle constructed to promote separation of solid and liquid components of wastewater, to provide limited digestion of organic matter, to store solids, and to allow clarified liquid to discharge for further treatment and disposal. For purposes of this chapter, a septic

tank is classified as an onsite sewage treatment and disposal system (OSTDS)<<.

\* \* \*

>>(289)<< [(287)] *Site plan* shall mean a drawing having a scale sufficient to provide the following information: >>property lines, relevant rights-of-way, and location<< [(Location)] of all proposed or existing buildings, [(septic tanks)] >>OSTDSs<<, utility easements, fences, walls, parking areas, driveways, access roads, setbacks, and any other site development.

\* \* \*

>>(333)<< [(331)] *Underground storage facility* shall mean a tank, pipe, vessel or other container, or any combination of the foregoing, used or designed to be used for the underground storage or underground transmission of hazardous materials[~~including~~].>>. This definition includes<< but >>is <<not limited to>>><< line leak detectors>>><<[(;)] monitoring wells>>><<[(;)] continuous automatic leak detection systems>>><< and secondary containment system associated therewith[~~excluding~~]>>>. This definition excludes<< hydraulic lift systems>>><<[(;)] oil-water separators>>><<[(~~excluding~~)] sanitary sewers[~~septic tanks, septic tank drainfields,~~]>>> OSTDSs<< the primary pipeline transmitting jet fuel from Port Everglades to Homestead Air Base>>><<[(;)] and any other primary pipeline transmitting hazardous materials from one[(4)] county to another county. Underground storage facilities have ten (10) percent or more of their total volume below the surface of the ground.

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**Section 3.** Section 24-15 of the Code of Miami-Dade County, Florida, is hereby

amended to read as follows:

### **Section 24-15. - Plan approval required.**

- (1) *Intent.* It is the intent and purpose of this section to require that all new facilities, equipment and processes constructed or operated after the dates delineated in >>section<<

~~[[Section]]~~ 24-4 >>or as otherwise provided in this chapter<< shall comply with the requirements herein contained, and that any enlargement, expansion>>,<< or addition to existing facilities also shall comply with the requirements herein contained. Any building permit issued by the County or a municipality in violation of the provisions of this chapter is hereby determined to be void.

\* \* \*

>>(7) Onsite Sewage Treatment and Disposal Systems (OSTDSs).

- (a) On and after January 1, 2023, it shall be unlawful for any person to install a new OSTDS or replace an entire existing OSTDS without first obtaining the prior written approval of the Director pursuant to section 24-42.7.
- (b) On and after January 1, 2023, no building permit or equivalent approval having the effect of approving a new OSTDS or replacement of an entire existing OSTDS shall be issued by the County or any municipality without first obtaining the prior written approval of the Director pursuant to section 24-42.7.
- (c) For the purposes of this section, replacement of both the septic or treatment tank and either the drainfield or other disposal system shall constitute replacement of the entire existing OSTDS.<<

**Section 4.** Section 24-28 of the Code of Miami-Dade County, Florida, is hereby amended to read as follows:

**Sec. 24-28. - Nuisances injurious to health (sanitary nuisances).**

- (1) The following conditions existing, permitted, maintained, kept or caused by any individual, municipal organization or corporation, governmental or private, shall constitute a sanitary nuisance:

\* \* \*



- (b) Improperly built or maintained>> overflowing, breached, or leaking OSTDS<< ~~[[septic tanks]]~~, water closets>><sub>i</sub><< or privies.
- (c) Discharging, or allowing the discharge of>> OSTDS<< ~~[[septic tank]]~~ pump-out wastes into streams, ~~[[or]]~~ surface waters>><sub>i</sub><< ~~[[or]]~~ underground aquifers>><sub>i</sub><< ~~[[or into]]~~ ditches, drainage structures>><sub>i</sub><< or on the ground surface.

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**Section 5.** Section 24-42.7 of the Code of Miami-Dade County, Florida, is hereby

created to read as follows:

**>>Sec. 24-42.7. – Onsite Sewage Treatment and Disposal Systems (including, without limitation, septic tank systems).**

- (1) Purpose and intent. The purpose and intent of this section is to safeguard public health, safety, and welfare and protect water quality by setting minimum requirements and standards for onsite sewage treatment and disposal systems as defined in this chapter.
- (2) OSTDS types and standards; definitions. OSTDSs are classified into the following types and contain the following features for purposes of this chapter:
  - (a) Type 1 OSTDS shall mean a standard or conventional onsite sewage treatment and disposal system designed consistent with section 62-6.008, Florida Administrative Code, that is not otherwise defined herein as a Type 2, 3 or 4 OSTDS. A Type 1 OSTDS does not require a remote telemetry unit. No new or replacement of an entire existing OSTDS may be a Type 1 OSTDS.
  - (b) Type 2 OSTDS shall mean an onsite sewage treatment and disposal system that is equipped with a remote telemetry unit and that produces an effluent that, prior to reaching the drainfield or disposal system, complies with Secondary Treatment

Standards established in chapter 62-6, Florida Administrative Code.

(c) Type 3 OSTDS shall mean an onsite sewage treatment and disposal system that is equipped with a remote telemetry unit and produces an effluent that, prior to reaching the drainfield or disposal system, complies with Advanced Secondary Treatment Standards established in chapter 62-6, Florida Administrative Code.

(d) Type 4 OSTDS shall mean an onsite sewage treatment and disposal system that is equipped with a remote telemetry unit and produces an effluent that, prior to reaching the drainfield or disposal system, complies with the Florida Keys nutrient reduction treatment standards established in chapter 62-6, Florida Administrative Code.

(e) A remote telemetry unit equipped for a Type 2, 3, or 4 OSTDS shall provide operational status of the system at a frequency of no less than 15 minutes. Operational status shall include, at a minimum, signal and connectivity, back-up battery, power, mechanical equipment, liquid levels, warnings, and alarms.<<

(3) General Requirements. The following requirements shall apply to all OSTDSs:

(a) No person shall cause, let, or permit an OSTDS to violate the water pollution standards set forth in section 24-42.

(b) No person shall install a new OSTDS, or replace an existing OSTDS in whole or in part, if an approved public gravity sanitary sewer or approved sanitary sewer force main is available and operative in a public right-of-way or easement abutting the property in accordance with section 24-43.1(7).

(c) It shall be unlawful for any person to use, operate, or maintain an OSTDS that:

(i) Causes a nuisance or sanitary nuisance as set forth in sections 24-5 or 24-28; or

- (ii) Was installed on or after January 1, 2023, and fails to comply with the applicable effluent standards pursuant to this section; or
    - (iii) Was installed on or after January 1, 2023, and has not been installed in conformance with plans approved by the Director; or
    - (iv) Was installed on or after January 1, 2023, and is not operated in conformance with plans approved by the Director.
  - (d) Nothing in this section shall be construed to preclude temporary measures, such as pumping and hauling of sewage, that are necessary to prevent or correct a sanitary nuisance.
- (4) Registration required.
  - (a) On and after January 1, 2023, as part of the plan approval process required by section 24-15 for a new OSTDS or replacement of an entire existing OSTDS, the new or replacement OSTDS shall be registered with the Department in the name of the property owner on a form acceptable to the Director.
  - (b) An OSTDS that was installed prior to January 1, 2023, and which has not otherwise been registered pursuant to subsection (a), shall be registered with the Department on a form acceptable to the Director by January 1, 2024.
- (5) Standards and procedures governing installation of an OSTDS. On and after January 1, 2023, the installation of a new OSTDS or replacement of an entire existing OSTDS shall comply with the following:
  - (a) Approval required.
    - (i) Prior to installation, an approval shall be obtained from the Department. Such approval may be obtained as part of the review of an application for building or other development permit.
    - (ii) Applications for approval shall be submitted to the Department on a form acceptable to the Director and shall include, at a minimum, engineering reports and plans that have been

signed and sealed by a professional engineer licensed in the State of Florida.

- (iii) The Director may issue the approval only upon demonstration that the applied-for OSTDS complies with the requirements of this section, as well as other applicable requirements of this chapter.

(b) General requirements applicable to the installation of all new OSTDS and replacements of an entire existing OSTDS.

- (i) Each OSTDS shall comply with sections 24-42.6, 24-43, and 24-43.1.
- (ii) Treatment units shall be certified by NSF International Standard/American National Standard (NSF/ANSI) as 40-2013, 245-2013, or 350-2013, latest edition, or shall have an equivalent certification by a third party approved by the Director.
- (iii) Each OSTDS, including the reserved area, shall be located no less than 100 feet from any surface water body. This minimum distance shall not apply to replacement of systems installed prior to January 1, 2023, when site conditions and physical constraints prohibit compliance with the minimum distance, provided that the existing distance from any surface water body shall not be reduced.
- (iv) Where public water is not available, each OSTDS, including the reserved area, shall be located no less than 50 feet from all property lines. This minimum distance shall not apply to replacement of systems installed prior to January 1, 2023, when site conditions and physical constraints prohibit compliance with the minimum distance, provided that the existing distance from all property lines shall not be reduced.
- (v) Each OSTDS shall serve only one lot.
  - 1. Sharing of OSTDSs by buildings or other users on separate lots is prohibited. For purposes of this section, lots that are joined by a unity of title shall be treated as a single lot,



but lots joined by a declaration of restrictive covenants in lieu of unity of title shall be treated as separate lots.

2. An OSTDS that was installed prior to January 1, 2023, and that serves two or more lots may remain, but if the entire existing OSTDS is replaced, then each parcel shall be required to be individually served by an OSTDS that complies with this section.

- (vii) The bottom of the drainfield or other disposal system shall be designed and installed no less than 36 inches above the wet season high water table as of the date of approval pursuant to this section. For purposes of this paragraph, the wet season high water table shall be the highest water level determined by either site-specific seasonal high water table soil indicators or the latest wet season high water table maps, which shall be maintained on file with the Department.

- (c) OSTDS requirements based on type of development.  
The following standards shall govern the use of an OSTDS based on the type of development.

- (i) For purposes of calculating the maximum domestic sewage flow set forth in subparagraphs (ii)-(v) below, sewage flow and loading shall be based on the unit flows set forth in section 24-43.1(5). However, notwithstanding any provision to the contrary, the foregoing calculation shall not be construed to determine any sewage flow rate calculations required by chapter 62-6, Florida Administrative Code, or other applicable laws; for example, the OSTDS shall be designed to meet the applicable unit flows for sewage flow and loading established in chapter 62-6, Florida Administrative Code, regardless of whether the calculation pursuant to chapter 62-6 results in a different unit flow than that calculated pursuant to section 24-43.1(5).
- (ii) Single-family and duplex residences that do

not generate a liquid waste other than domestic sewage and that meet the following criteria shall install a Type 2, 3, or 4 OSTDS:

1. Domestic sewage flow does not exceed 500 gallons per day; and
2. Minimum distance between any surface water body and the OSTDS, including reserved areas, is at least 1,000 feet; and
3. The residence is served or to be served by public water; and
4. The residence is located outside of all wellfield protection areas; and
5. Domestic sewage loading does not exceed 500 gallons per day per unsubmerged acre.

(iii) Single-family and duplex residences that do not meet the criteria set forth above shall install a Type 3 or 4 OSTDS.

(iv) Multi-family residences and other uses that meet the following criteria shall install a Type 3 or 4 OSTDS:

1. Domestic sewage flow does not exceed 1,000 gallons per day; and
2. Minimum distance between any surface water body and the OSTDS, including reserved areas, is at least 1,000 feet; and
3. The use is served or to be served by public water; and
4. The use is located outside of all wellfield protection areas; and
5. Domestic sewage loading does not exceed 500 gallons per day per unsubmerged acre.

(v) All other uses shall install a Type 4 OSTDS.

(vi) The infiltrative surface area of the drainfield or disposal system shall be sized as a standard subsurface drainfield system or larger as established in chapter 62-6, Florida Administrative Code, unless the Director approves a reduction in infiltrative surface area upon a finding that the following criteria are met:

1. The OSTDS with the infiltrative

- surface area reduction complies with chapter 62-6; and
2. Plans and calculations signed and sealed by a professional engineer licensed in the State of Florida demonstrate that, even with the reduced infiltrative area, the OSTDS provides overall pollutant reduction that is equal to or greater than an OSTDS with a standard infiltrative surface area.
- (vii) An OSTDS may utilize an in-ground nitrogen-reducing biofilter (INRB) to comply with the requirements of subparagraph (vi).
- (6) Administrative adjustments authorized.
- (a) Notwithstanding any provision to the contrary, the Director is authorized to approve an OSTDS that:
- (i) Discharges an effluent that, prior to reaching the drainfield or disposal system, is in compliance with the OSTDS Type required in paragraph (5)(c) above; or
- (ii) Produces concentrations of applicable constituents (e.g., CBOD5, TSS, TN, and TP) after reaching the drainfield or disposal system, but prior to reaching the groundwater, that are equal to or lower than the concentrations that would result from the OSTDS Type required in paragraph (5)(c) above.
- (b) Applications for approval of administrative adjustments shall be submitted to the Department on a form acceptable to the Director and shall include, at a minimum, modeling, plans, and calculations in an engineering report signed and sealed by a professional engineer licensed in the State of Florida demonstrating that the proposed OSTDS complies with all applicable requirements.
- (6) Conflicts with other regulations. In the event of a conflict with section 32-7 or any other provision of this code, this section shall govern. It is provided, however, that nothing in this section shall be construed to supersede any additional or more restrictive requirements in federal or state law.<<

**Section 6.** Section 24-43.1 of the Code of Miami-Dade County, Florida, is hereby amended to read as follows:

**Sec. 24-43.1. - Liquid waste disposal and potable water supply systems.**

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- (3) Notwithstanding any provision of this ~~[[Code]]~~ >>code to the contrary<<, no County or municipal officer, agent, employee ~~>>~~ >> ~~<<~~ or ~~>>~~ board<< ~~[[Board]]~~ shall approve, grant or issue any building permit, certificate of use ~~>>~~ or<< ~~[[and]]~~ occupancy (except for changes in ownership ~~>>~~ for facilities that do not require an operating permit pursuant to section 24-18<<), municipal occupational license (except for changes in ownership ~~>>~~ for facilities that do not require an operating permit pursuant to section 24-18<<), platting action (final plat, waiver of plat or equivalent municipal platting action) ~~>>~~ >> ~~<<~~ or zoning action (district boundary change, unusual use, use variance or equivalent municipal zoning action) for any residential land use served or to be served by ~~>>~~ an OSTDS<< ~~[[a septic tank]]~~ or any source of potable water supply until the County or municipal officer, agent, employee ~~>>~~ >> ~~<<~~ or ~~>>~~ board<< ~~[[Board]]~~ affirmatively determines that the residential land use will comply with ~~>>~~ section 24-42.7 and<< one ~~[[4]]~~ or more of the requirements as set forth in ~~[[Sections 24-43.1(3)(a), (b), (c), (d), (e), and (f) and Section]]~~ >>paragraphs (a), (b), (c), (d), (e), and (f) below and in section<< 24-43.2(1) ~~[[of this Code]]~~, and, additionally, that the property is not within a feasible distance for a public water main or public sanitary sewers.

Furthermore, notwithstanding any provision of this Code, no person shall construct, utilize, operate, occupy or cause, allow, let, permit or suffer to be constructed, utilized, operated or occupied any residential land use served or to be served by ~~>>~~ an OSTDS<< ~~[[a septic tank]]~~ or any source of potable water supply until the ~~>>~~ affirmative determination required by the foregoing provision has been made<< ~~[[County or municipal officer, agent, employee or Board~~

~~affirmatively determines that the residential land use will comply with one (1) or more of the requirements set forth in Sections 24-43.1(3)(a), (b), (c), (d), (e) and (f) and Section 24-43.2(1) of this Code, and, additionally, that the property is not within a feasible distance for a public water main or public sanitary sewers]].~~

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- (4) Notwithstanding any provision of this ~~[[Code]]~~ >>code to the contrary<<, no County or municipal officer, agent, employee~~>>~~<sub>1</sub>~~<<~~ or ~~>>board<<~~ ~~[[Board]]~~ shall approve, grant or issue any building permit, certificate of use ~~>>or<<~~ ~~[[and]]~~ occupancy (except for changes in ownership ~~>>for~~ facilities that do not require an operating permit pursuant to section 24-18<<), municipal occupational license (except for changes in ownership ~~>>for~~ facilities that do not require an operating permit pursuant to section 24-18<<), platting action (final plat, waiver of plat~~>>~~<sub>1</sub>~~<<~~ or equivalent municipal platting action)~~>>~~<sub>1</sub>~~<<~~ or zoning action (district boundary change, unusual use, use variance~~>>~~<sub>1</sub>~~<<~~ or equivalent municipal zoning action) for any nonresidential land use served or to be served by any source of potable water supply ~~>>or an OSTDS<<~~ ~~[[and a septic tank]]~~ without obtaining the prior written approval of the Director ~~>>pursuant to this paragraph<<~~ ~~[[or the Director's designee]]~~.

Furthermore, notwithstanding any provision of this Code, no person shall construct, utilize, operate, occupy, or cause, allow, let, permit or suffer to be constructed, utilized, operated or occupied any nonresidential land use served or to be served by any source of potable water ~~>>or an OSTDS<<~~ ~~[[and a septic tank]]~~ without obtaining the prior written approval of the Director ~~>>pursuant to this paragraph<<~~ ~~[[or the Director's designee]]~~.

~~The Director or the Director's designee shall issue the Director's or the Director's designee's written]]~~ >>Written<< approval ~~>>shall only be issued<<~~ if ~~>>it is demonstrated that<<~~ the only liquid waste (excluding liquid wastes associated with the processing of agricultural produce in agricultural packing houses and liquid wastes associated with ~~>>an<<~~ agricultural vehicle or, agricultural equipment maintenance facilities, stormwater and water used within a

self-contained water recycling car wash facility, provided said facility does not backwash the recycling filters) ~~[[which]]~~ >>that<< shall be generated, disposed of, discharged, or stored on the property shall be domestic sewage discharged into >>an OSTDS that complies with section 24-42.7<< ~~[[a septic tank and additionally]]~~, that the property is not within a feasible distance for public water mains and public sanitary sewers, and only:

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**Section 7.** Section 2-114.1 of the Code of Miami-Dade County, Florida, is hereby amended to read as follows:

**Sec. 2-114.1. - Administrative review of takings and vested rights claims.**

(a) *Documentation of claim.*

(1) Any applicant alleging that the Comprehensive Development Master Plan, as applied to a particular development order or action, constitutes or would constitute a temporary or permanent taking of private property or an abrogation of vested rights (taking or abrogation)>><sub>1</sub><< and any person or entity claiming a potential taking or abrogation under >>chapter 24 or chapter<< ~~[[Chapter]]~~ 33 ~~[[of this Code]]~~>><sub>1</sub><< must affirmatively demonstrate the legal requisites of the claim by exhausting the administrative remedy provided in this section.

(2) Claims of a taking or abrogation ~~[[of vested rights]]~~ are limited solely to extreme circumstances rising to the level of a potential denial of rights under the Constitutions of the United States and the State of Florida. The procedures provided herein for demonstrating such a taking or abrogation ~~[[of vested rights]]~~ are not intended to be utilized routinely or frivolously, but only in the extreme circumstances described above.

>>(3)<< The claimant or the attorney for the claimant shall exercise due diligence in the filing and argument of any sworn statement, notice of invoking administrative remedy>><sub>1</sub><< or other claim for a

taking or abrogation ~~[[of vested rights]]~~.

>>(4)<< The signature of the claimant or the attorney for the claimant upon any document in connection with a claim of taking or abrogation ~~[[of vested rights]]~~ shall constitute a certificate that the person signing has read the document and that to the best of his knowledge it is supported by good grounds and that it has not been presented solely for delay.

>>(5)<< The claimant and the >>claimant's<< attorney ~~[[for the claimant]]~~ shall have a continuing obligation throughout the proceedings to correct any statement or representation found to have been incorrect when made or which becomes incorrect by virtue of changed circumstances.

>>(6)<< If a claim ~~[[of taking or abrogation of vested rights]]~~ is: (1) based upon facts that the claimant or the >>claimant's<< attorney ~~[[for the claimant]]~~ knew or should have known were not true; or (2) frivolous or filed solely for the purposes of delay, the appropriate County board or agency shall make such a finding and may pursue any remedy or impose any penalty provided by law or ordinance.

>>(7) All claims filed pursuant to this section shall be subject to payment of an administrative fee established by implementing order approved by the Board of County Commissioners.<<

(b) *Definitions.*

(1) *Developmental permit defined.* For purposes of this section a "developmental permit" shall mean a developmental order or action which may be issued by an administrative official without the necessity of a hearing on the application for said developmental permit.

(2) *Developmental resolution defined.* For purposes of this section, a "developmental resolution" shall mean a developmental order or action which requires the approval of a County board or agency after a hearing on the application for said developmental resolution prior to its issuance.

(3) *Sworn statement defined.* For purpose of this section, "sworn statement" shall mean the sworn statement >>that is filed to initiate the taking or abrogation claim and includes<< ~~[[described in Section 2-114.1(a) together with]]~~ all accompanying

documents, witness lists, items>>\_<< and things supporting the applicant's claim ~~[[and—an administrative fee established by administrative order of the County Manager to be approved by the Board of County Commissioners]].~~

(c) *Invocation of administrative remedy.*

\* \* \*

- (2) Any applicant alleging that the action of the Board of County Commissioners or a Community Zoning Appeals Board upon an application for a zoning action under >>chapter<< ~~[[Chapter]]~~ 33>>, or the action of the Board of County Commissioners or the Environmental Quality Control Board pursuant to chapter 24,<< would constitute a >>taking or abrogation<< ~~[[temporary or permanent taking of private property or an abrogation of vested rights]]~~ shall file a complete sworn statement with the Developmental Impact Committee Coordinator not later than >>45<< ~~[[forty-five (45)]]~~ days before the first hearing on the developmental resolution.

>>(i)<< No oral testimony or written reports or documents in support of any argument that the denial of the developmental resolution would constitute a >>taking or abrogation<< ~~[[temporary or permanent taking of private property or would abrogate vested rights]]~~ shall be considered as evidence at the public hearing unless the complete sworn statement has been timely filed pursuant to this paragraph~~[[; provided, however]]~~>>, except as provided herein.

(ii) Notwithstanding any other provision to the contrary<<, ~~[[that]]~~ where >>the claimant<< ~~[[an applicant]]~~ has failed to timely file a sworn statement pursuant to this paragraph, the Board of County Commissioners, Environmental Quality Control Board, or any other board taking action on a developmental resolution may defer the hearing on an application for a developmental resolution to>>:

1.<< avoid a manifest injustice and to



provide adequate time for review of the sworn statement by the Developmental Impact Committee>>[;]<< or[;]<<

>>2.<< in the event of an application >>for developmental resolution<< initiated by a party other than the affected property owner, to provide adequate time for the >>affected<< property owner to invoke the administrative remedy and to adhere to the time schedules provided herein.

- (d) *Review by Developmental Impact Committee and County Boards.*

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- (4) The Executive Council of the Developmental Impact Committee shall prepare a written recommendation to the appropriate County board regarding sworn statements filed in connection with an application for a developmental resolution.

>>(5)<< With the exception of County boards whose decisions are directly reviewable by an appellate court, the Board of County Commissioners shall have exclusive jurisdiction to consider and take action upon all applications for developmental resolutions for which the applicant has invoked the administrative remedy set forth in this section.

>>(6)<< [~~(5)~~ The] >>Where the primary application is subject to a different review standard than the taking or abrogation claim, the<< appropriate County board may elect to first consider the primary application rather than concurrently conduct a hearing >>on the taking or abrogation claim<< [~~upon a claim of taking or abrogation of vested rights~~].

>>(7)<< If the >>board's<< [~~Board's~~] determination is that the primary application should be denied in whole or in part, such determination shall not be a final decision but shall be subject to a further determination of >>the<< [~~a claim of~~] taking or abrogation >>claim<< [~~of vested rights~~].

>>(8)<< The >>board<< [~~Board~~] may either hear directly the [~~claim of~~] taking or abrogation >>claim,<< [~~of~~

~~vested rights, may]]~~ defer consideration of the claim to a subsequent hearing, or ~~[[may]]~~ refer the same to the Executive Council of the Development Impact Committee for further review and recommendation prior to taking final action.

>>(9)<< If the >>board<< ~~[[Board]]~~ shall finally determine that denial of the primary application would result in a taking or abrogation of vested rights, the >>board<< ~~[[Board]]~~ shall grant appropriate relief which would avoid such result.

>>(10)<< Upon a determination by the >>board<< ~~[[Board]]~~ that denial of the primary application would not effect a taking or abrogate vested rights, the preliminary determination to deny shall become final>>, unless the decision on the taking or abrogation claim is appealed to the Board of County Commissioners pursuant to this section or as otherwise provided in this code<<.

(e) Notwithstanding any contrary provision of >>this code<< ~~[[the Code of Miami Dade County]]~~, a developmental resolution adopted by any County board other than the Board of County Commissioners shall not be deemed to be a final order for any purpose where: (1) the administrative remedy of this section has been invoked; and (2) >>either<< the Executive Council of the Developmental Impact Committee has appealed said developmental resolution>>, or the claimant has appealed the denial of the taking or abrogation claim,<< to the Board of County Commissioners. Said appeal shall be filed within >>14<< ~~[[fourteen (14)]]~~ days of the date of the adoption of the developmental resolution >>or denial of the taking or abrogation by the applicable board<<.

(f) *Exhaustion of administrative remedies.* A developmental order or action shall not be deemed a final order in any court or quasi-judicial proceeding challenging the denial of the developmental order or action as a >>taking or abrogation<< ~~[[temporary or permanent taking of private property or an abrogation of vested rights]]~~ unless the remedies set forth in this section have been exhausted.

## **Section 8.**

Section 8CC-10 of the Code of Miami-Dade County, Florida, is hereby

amended to read as follows:

**Sec. 8CC-10. Schedule of civil penalties.**

The following table shows the sections of this code, as they may be amended from time to time, which may be enforced pursuant to the provisions of this chapter; and the dollar amount of civil penalty for the violation of these sections as they may be amended.

The “descriptions of violations” below are for informational purposes only and are not meant to limit or define the nature of the violations or the subject matter of the listed sections of this code, except to the extent that different types of violations of the same section may carry different civil penalties. For each section listed in the schedule of civil penalties, the entirety of that section may be enforced by the mechanism provided in this chapter, regardless of whether all activities proscribed or required within that particular section are described in the “Description of Violation” column. To determine the exact nature of any activity proscribed or required by this >>code<<, the relevant section must be examined.

Code Section	Description of Violation	Civil Penalty
* * *		
24-42.1	Breach of effluent standards by new sewage treatment plants and industrial waste treatment facilities	100.00
24-42.2	Noncompliance with provisions regulating sanitary sewer collection and transmission systems	250.00
24-42.4	Discharging prohibited wastes or substances into sewers	300.00
24-42.5	Bypassing a waste treatment facility	200.00
>> <u>24-42.7</u>	<u>Violation of onsite sewage treatment and disposal system regulation</u>	<u>300.00</u> <<
24-43	Noncompliance with provisions and standards protecting public potable water supply wells	300.00
24-43.1	Noncompliance with provisions regulating wastewater disposal and	200.00

	treatment methods other than sanitary sewers	
>>24-43.1(7)	<u>Noncompliance with the requirement to connect to available, operative, and abutting public sanitary sewers</u>	<u>500.00</u> <<
* * *		

**Section 9.** Section 24-5 of the Code shall be renumbered pursuant to the revisions in section 2 above.

**Section 10.** If any section, subsection, sentence, clause or provision of this ordinance is held invalid, the remainder of this ordinance shall not be affected by such invalidity.

**Section 11.** It is the intention of the Board of County Commissioners, and it is hereby ordained that the provisions of this ordinance, including any sunset provision, shall become and be made a part of the Code of Miami-Dade County, Florida. The sections of this ordinance may be renumbered or relettered to accomplish such intention, and the word "ordinance" may be changed to "section," "article," or other appropriate word.

**Section 12.** This ordinance shall become effective ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED:

Approved by County Attorney as  
to form and legal sufficiency:

\_\_\_\_\_

Prepared by:

\_\_\_\_\_

Dennis A. Kerbel

Abbie S. Raurell

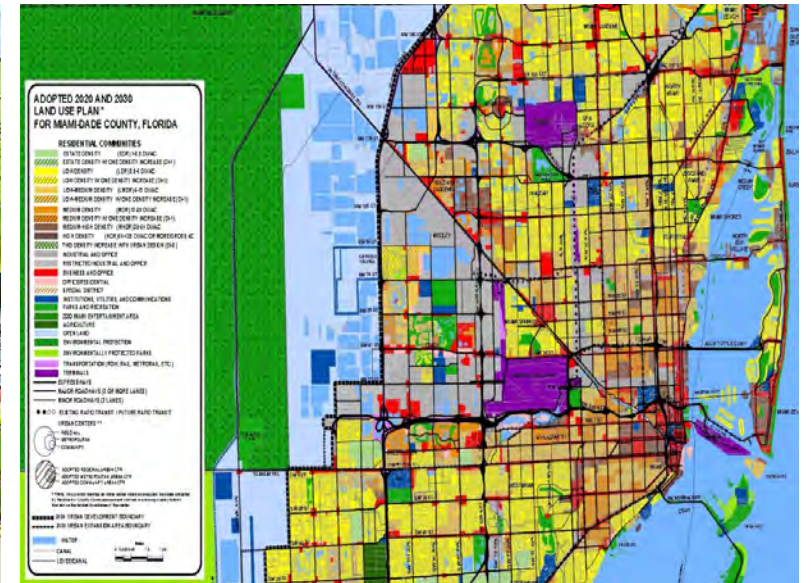
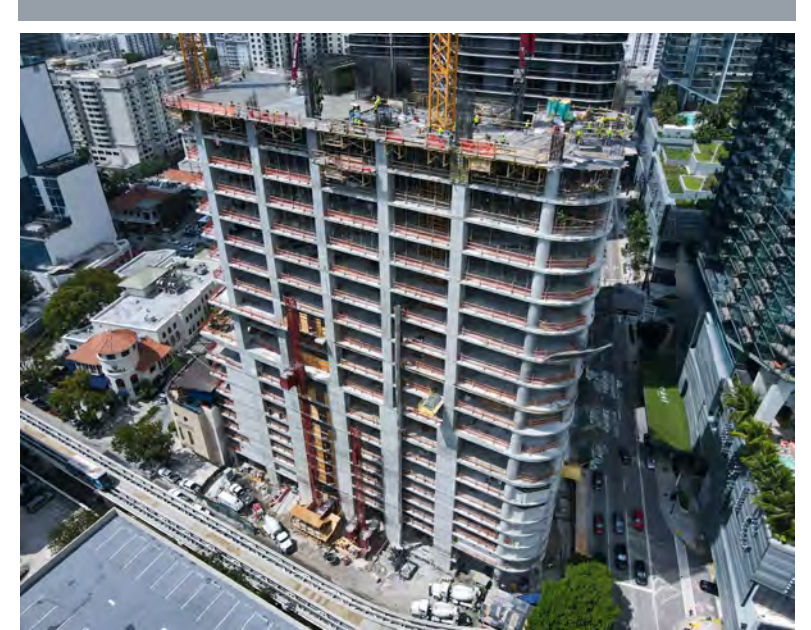
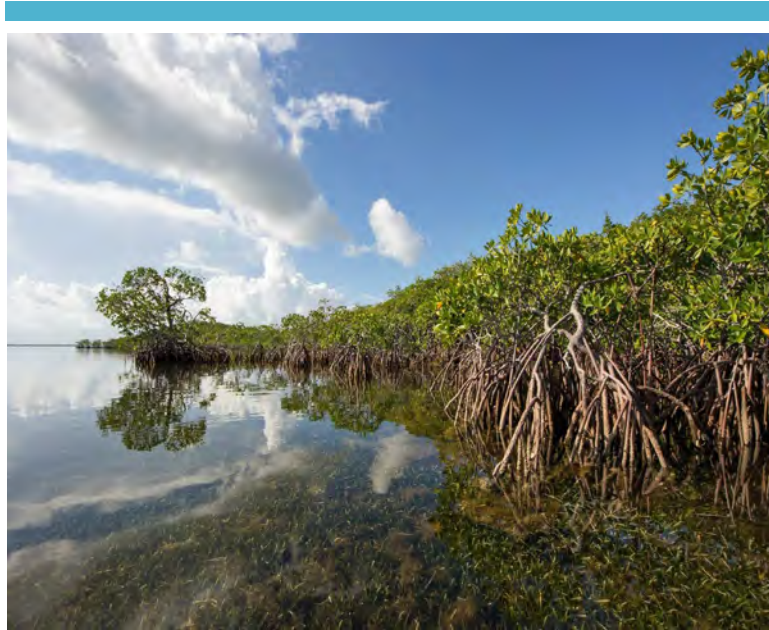
DRAFT





REGULATORY AND  
ECONOMIC RESOURCES

# ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (SEPTIC) ORDINANCE



# ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (SEPTIC) ORDINANCE

1

**BACKGROUND**

2

**CONVENTIONAL  
SEPTIC TANKS**

3

**PROPOSED CODE  
ENHANCEMENTS**

4

**POLICY  
OUTCOMES &  
PATH FORWARD**

# 1

## SEPTIC TANK OVERVIEW

- ~120,000 Septic Tanks Countywide
  - ~103,000 Septic Tanks within WASD Retail Service Area
  - ~12,000 within Volume Sewer Customer areas (municipalities)
  - ~5,000 located outside of the Urban Development Boundary

Category	Number of Parcels
Estimated Total Parcels on Septic Tank in Miami Dade County	120,000
<ul style="list-style-type: none"> <li>Estimated Number of Parcels on Septic Tanks within WASD Service Area</li> </ul>	103,000
<ul style="list-style-type: none"> <li>Estimated Number of Parcels on Septic Tanks within Volume Sewer Customer Areas</li> </ul>	12,000
<ul style="list-style-type: none"> <li>Estimated Parcels on Septic Tank Outside UDB</li> </ul>	5,000
<ul style="list-style-type: none"> <li>Estimated Number of Parcels on Septic Tanks which currently abut Sanitary Sewer Systems</li> </ul>	12,000
Estimated Number of Parcels on Septic Tanks <i>without immediate access to sanitary sewer infrastructure</i>	91,000



# 1

## SEPTIC TANK PLAN OF ACTION

- RER has evaluated the impact of septic tanks to the environment.
- A *Plan of Action Report* developed by multi-department working group was submitted to BCC in December of 2020.
- The report identifies and recommended actions through a risk-based approach intended to yield the most resource-effective and impactful outcomes for the environment and human health.
- ***Key recommendation included updating septic tank standards in Chapter 24 of the County Code.***
- ***Biscayne Bay Task Force Recommendation***



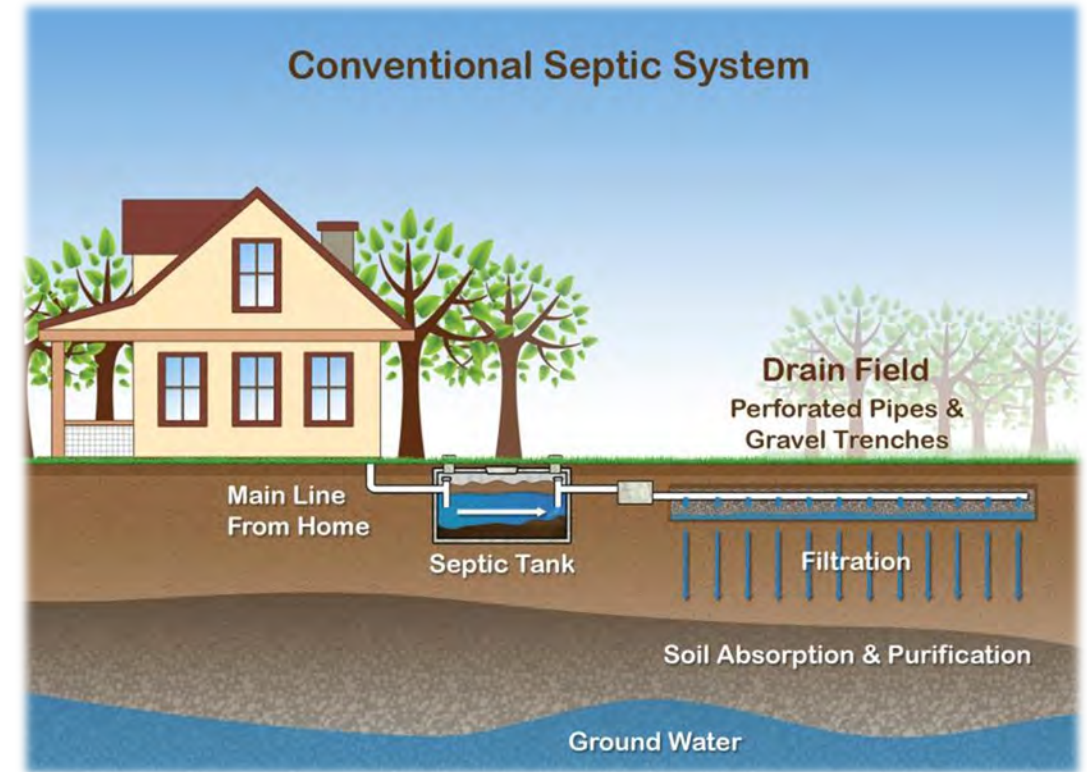
Risk Matrix

	Likelihood (probability) of occurrence		
	High	Medium	Low
	Low	Medium	High
	Consequence		

# 2

## CONVENTIONAL SEPTIC TANKS

- Discharge partially treated wastewater from homes and businesses into the ground water, our single source of potable water, and a link to surface waters and *Biscayne Bay* .
- Are a source of pollutants, including oxygen depleting organics, nitrogen and phosphorous.
- Rely greatly on the space between the bottom of the drainfield and water table to reduce pollutants, but this is threatened by *Sea Level Rise*.
- *Sea level rise and the health of Biscayne Bay* have further exacerbated the concern with relation to conventional septic tanks.



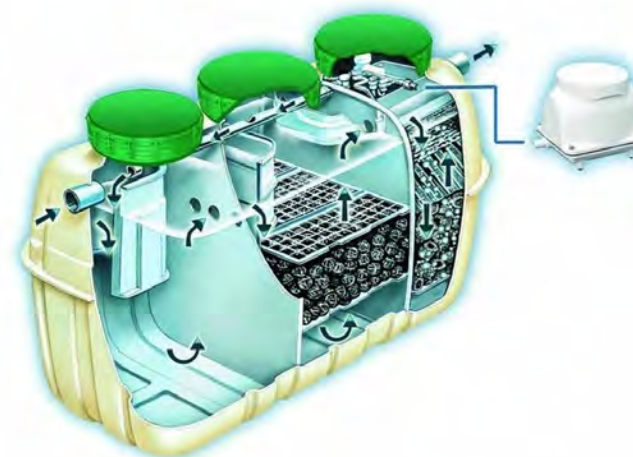
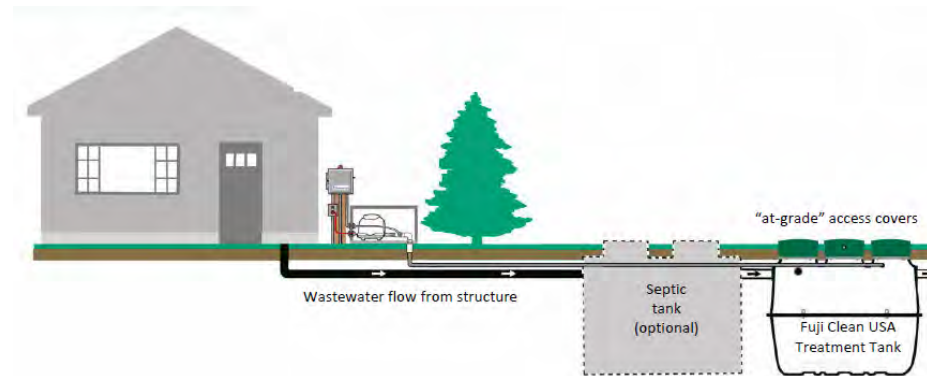
# 3

## PROPOSED CODE ENHANCEMENTS

- Establishes requirement for DERM review and approval of **new** and **complete replacement** Septic Tanks (Onsite Treatment and Disposal Systems -OSTDS)
- Requires that **new** and **replacement** OSTDS be performance-based treatment systems that achieve specific pollutant reductions before the drainfield.
- Type of system is based on land use and criteria to protect groundwater and surface waters.
- Four (4) Types of OSTDS's contemplated:

Type 1	Conventional
Type 2	Secondary Treatment Standards*
Type 3	Advanced Secondary Treatment Standards
Type 4	Florida Keys nutrient reduction treatment standards

\*Secondary Treatment is equivalent to what MDWASD's wastewater treatment plants achieve today at the NDWWTP and CDWWTP



2007  
STD 245  
Nitrogen  
Reduction  
Standard

1970  
Onsite WW  
STD 40

Example of NSF Certified Nitrogen Reducing OSTDS



# 3

## PROPOSED CODE ENHANCEMENTS

### ■ Type 2 OSTDS criteria:

- Single family homes or duplexes generating less than 500 gallons per day of wastewater at a rate of less than 500 gallons per acre.
- At least 1,000 feet of separation from surface water body
- Residence is served by public potable water supply and not within a wellfield protection area

### ■ Type 3 OSTDS criteria:

- Multifamily and other uses that do not generate more than 1,000 gallons per day of wastewater at a rate of less than 500 gallons per acre.
- Single family and duplex uses that do not meet type 2 criteria
- At least 1,000 feet of separation from surface water body
- Property is served by public potable water supply and not within a wellfield protection area

### ■ Type 4 OSTDS criteria

- All uses that do not meet the Type 2 and Type 3 criteria



# 3

## PROPOSED CODE ENHANCEMENTS

### ■ Effluent Water Quality for OSTDS Types

#### Type 1 OSTDS

Parameter	Concentration
(a) CBOD5	150 - 300 mg/l
(b) Suspended Solids	100-200 mg/l
(c) Fecal Coliform	2E <sup>6</sup> -2E <sup>7</sup> /100 ml
(d) Total Nitrogen	100-150 mg/l
(e) Total Phosphorus	18-25 mg/l

#### Type 2 OSTDS

Parameter	Effluent Limit (annual)
(a) CBOD5	20 mg/l
(b) Suspended Solids	20 mg/l
(c) Fecal Coliform	200 cfu/100 ml
(d) Total Nitrogen	-
(e) Total Phosphorus	-

#### Type 3 OSTDS

Parameter	Effluent Limit (annual)
(a) CBOD5	10 mg/l
(b) Suspended Solids	10 mg/l
(c) Fecal Coliform	200 cfu/100 ml
(d) Total Nitrogen	20 mg/l
(e) Total Phosphorus	10 mg/l

#### Type 4 OSTDS

Parameter	Effluent Limit (annual)
(a) CBOD5	10 mg/l
(b) Suspended Solids	10 mg/l
(c) Fecal Coliform	200 cfu/100 ml
(d) Total Nitrogen	10 mg/l
(e) Total Phosphorus	1 mg/l

Status Quo 

Improvement 

Better 

Best 



85-90% Reduction of CBOD5  
70-90% Reduction in Suspended Solids  
98+% Reduction in Bacteria



90-95% Reduction of CBOD5  
85-95% Reduction in Suspended Solids  
98+% Reduction in Bacteria  
30-80% Reduction in Nitrogen



90-95% Reduction of CBOD5  
85-90% Reduction in Suspended Solids  
98+% Reduction in Bacteria  
65-90% Reduction in Nitrogen  
80-90% Reduction in Phosphorous

# 3

## PROPOSED CODE ENHANCEMENTS

### ■ Incremental Cost Differential

- Performance based OSTDS's require a greater level of investment than conventional septic tanks.
- Cost differential on the order of \$10,000
- However, still more than \$50% less costly than connection to centralized sewer system

System	Conventional Septic Tank	Performance Based OSTDS	Sanitary Sewer Infrastructure
Cost per Parcel	\$10,000-\$15,000	\$20,000-\$25,000	\$50,000-\$55,000

# 3

## PROPOSED CODE ENHANCEMENTS

- Code provisions governing type of OSTDS to be installed become effective January 1, 2023, to allow for transition
- Performance based OSTDS *are commercially available* and system types align with Florida law governing these systems.
- Approved systems are certified by the National Sanitary Foundation (NSF) and the American National Standards Institute (ANSI)
- Ordinance update achieves other objectives including:
  - Requiring that bottom septic tank drain fields be installed no less than 36 inches above the wet season high water table
  - Clarification of code language for improved interpretation and application by staff





# 4

## POLICY OUTCOMES

- Enhanced pollutant reduction in areas where sanitary sewer infrastructure does not yet exist and OSTDS is the only feasible alternative.
- Improvement in water quality in areas where conventional systems are replaced with performance-based systems
- Higher level of treatment for septic tank installation within 1,000 feet of a surface water body, leading to improved Biscayne Bay water quality.
- Opportunity for further messaging of initiative under the “Connect to Protect/Check to Protect” Campaign.





# 4

## PATH FORWARD

- ✓ ■ Draft ordinance is completed
- ✓ ■ Acquire Commissioner Sponsorship (Sosa)
- Industry notification and outreach
- Target BCC Agenda: April 2022



The background image is a composite of three scenes. The top left shows a tall, modern skyscraper with a curved facade and many windows. The top right shows a beach with people and a city skyline in the distance. The bottom shows a park with a paved path, palm trees, and a rocky shoreline next to the ocean.

# Questions

Rashid Z. Istambouli, P.E. DERM-Senior Division Chief

Carlos L. Hernandez, P.E. DERM-Water & Wastewater Chief

Regulatory and Economic Resources



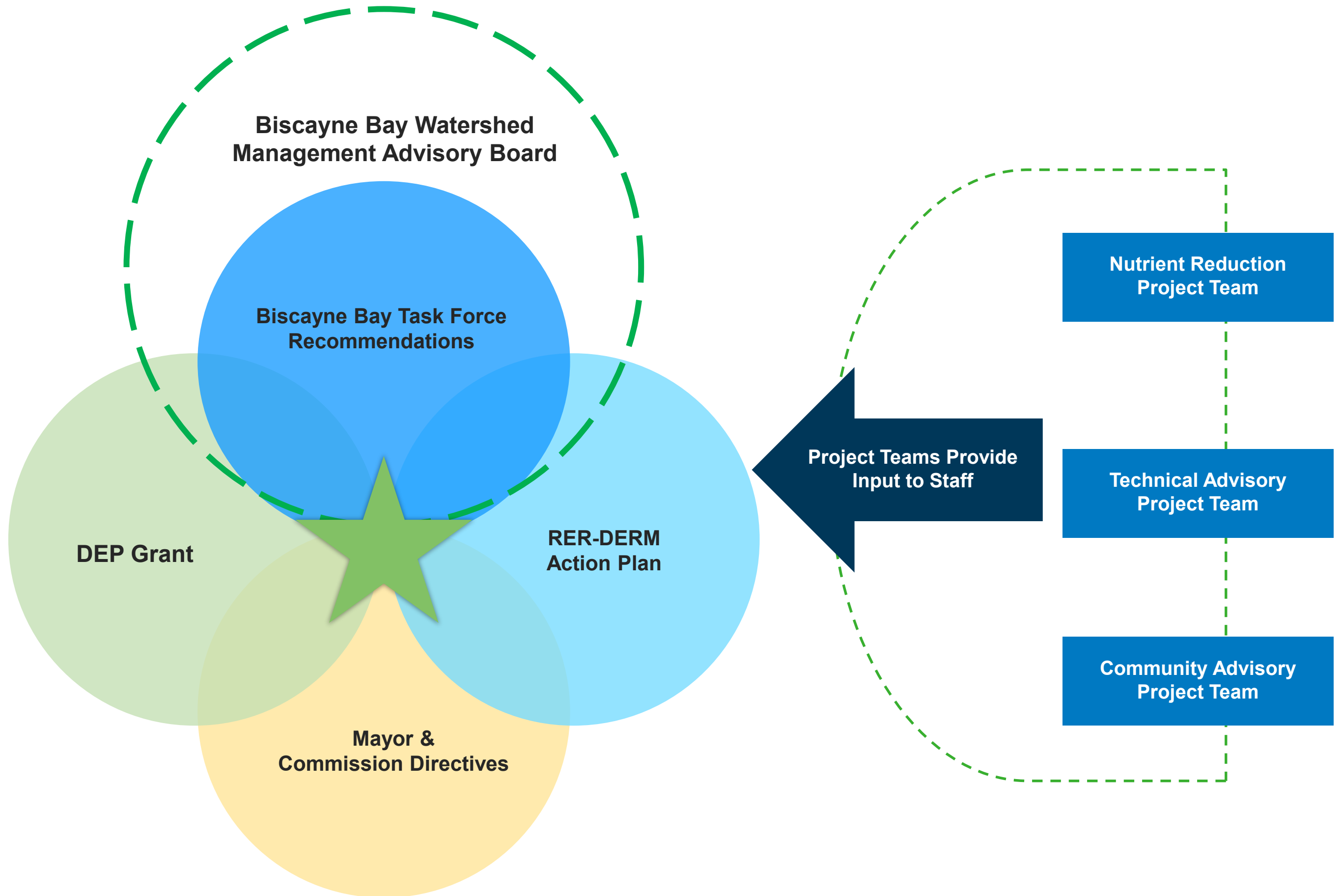


# Update on FDEP Grants & Project Status

Presented by  
**Pamela Sweeney**  
Senior Water Scientist, RER-DERM

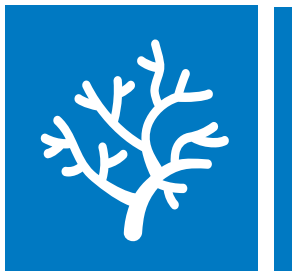


# Role of the BBWMAB & Importance of DEP Grant Funding





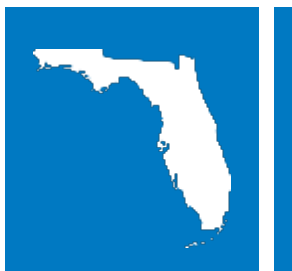
# FDEP Grant Funding



Coral Reef Protection Grant  
Fiscal Year 2020 - 2021  
**\$10M FDEP + \$10M MDC**



Biscayne Bay Grant Program  
Fiscal Year 2021-2022  
**\$12.9M Awarded to MDC**



Resilient Florida Grant Program  
Fiscal Year 2022-2023  
Match Required – 50%  
**State funding\*: \$10M ('22-'23)**  
**Federal funding\*: \$40M ('21-'22)**

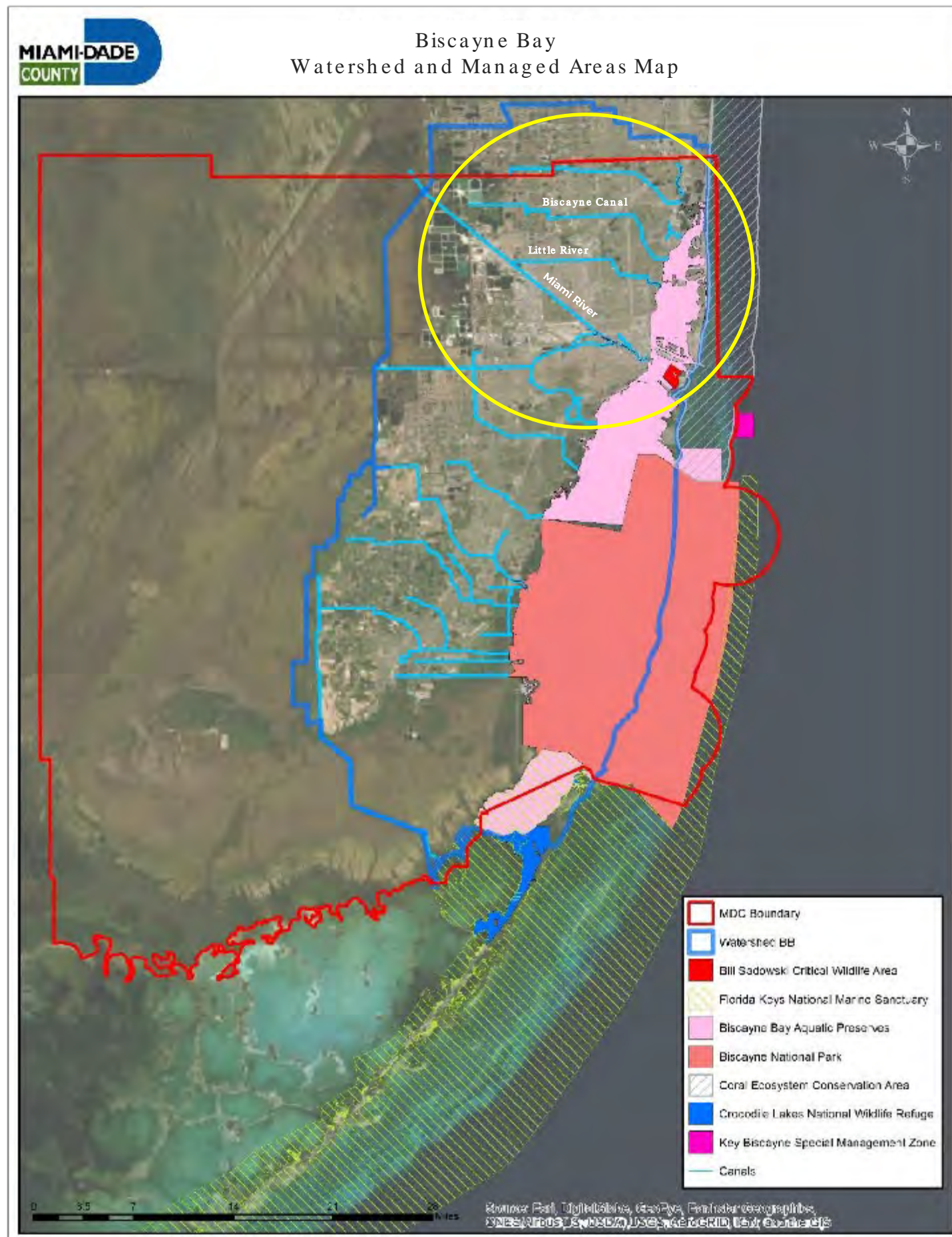
\* = Several County departments' projects were funded/considered for funding including PROS, ISD, Cultural Affairs, Fire Rescue







# Coral Reef Protection Grant FY 2020 -2021 - \$10M + \$10 MDC (Phase I)



## Northern Biscayne Bay Project Focus Areas

- Miami River
- Little River
- Biscayne Canal
- Biscayne Bay



# Coral Reef Protection Grant FY 2020 -2021 - \$10M + \$10 MDC (Phase I)

RELEVANCE TO BBTF REPORT	PROJECT NAME	PURPOSE	LEAD	FUNDING COST / SOURCE(S)
WATER QUALITY	Water Quality Characterization	Identify, reduce or eliminate sources of water quality pollution in north Biscayne Bay watersheds. <ul style="list-style-type: none"><li>• Miami River</li><li>• Little River</li><li>• Biscayne Canal</li></ul>	Miami-Dade County RER-DERM  Partners: FIU, UM RSMAS, NOAA/ CIMAS, NOAA AOML	\$2.,150,000
INFRASTRUCTURE	Septic to Sewer Conversion	Prioritization of the conversion of most vulnerable in the Little River Adaptation Action Area	Miami-Dade County WASD	\$4,400,000
INFRASTRUCTURE	Innovative Technology	Installation of Smart Covers and Smart Rain Gauges to analyze, predict and prevent Sanitary Sewer Overflows (SSOs)	Miami-Dade County RER-DERM	\$1,150,000
INFRASTRUCTURE	Stormwater Treatment	Design and implement engineering strategies including innovative Green Infrastructure and Low Impact Development.	Miami-Dade County RER-DERM & DTPW	\$1,300,000
HABITAT RESTORATION/ GREEN INFRASTRUCTURE	Biological Restoration to Enhance Water Quality	<ul style="list-style-type: none"><li>• Development of a Living Shoreline guidance document.</li><li>• Create a sponge nurseries that lead to increased filtration of Bay waters and reduction of nutrients and bacteria.</li></ul>	Miami-Dade County RER-DERM	\$500,000
EDUCATION/ OUTREACH	Education & Outreach Connect2Protect	Education efforts in Little River Adaptation Action Area for Connect2Protect – septic to sewer conversions.	Miami-Dade County WASD	\$500,000





## Water Quality Characterization

Identify, reduce or eliminate sources of water quality pollution in the north Biscayne Bay watersheds.

Miami River | Little River | Biscayne Canal

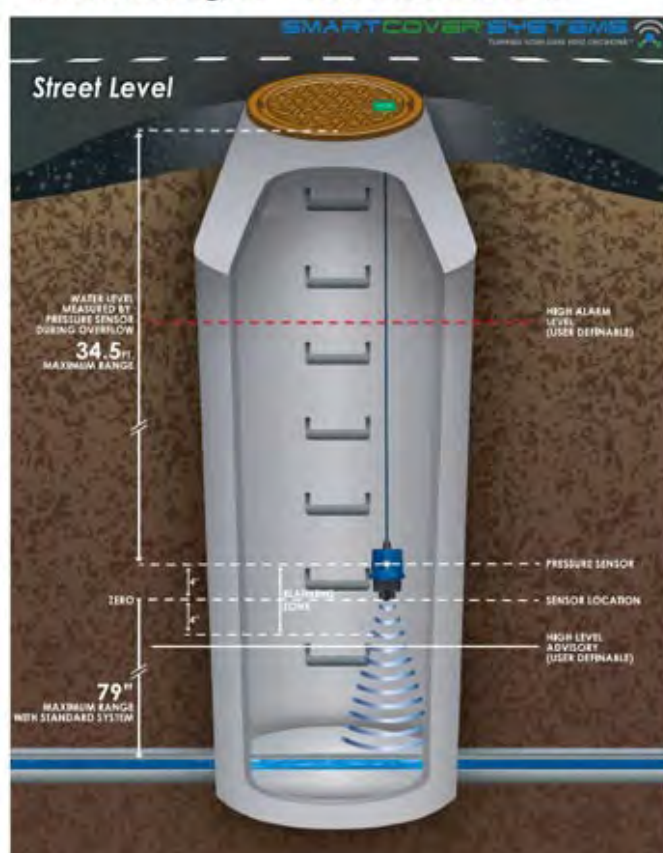


## Septic to Sewer Conversions

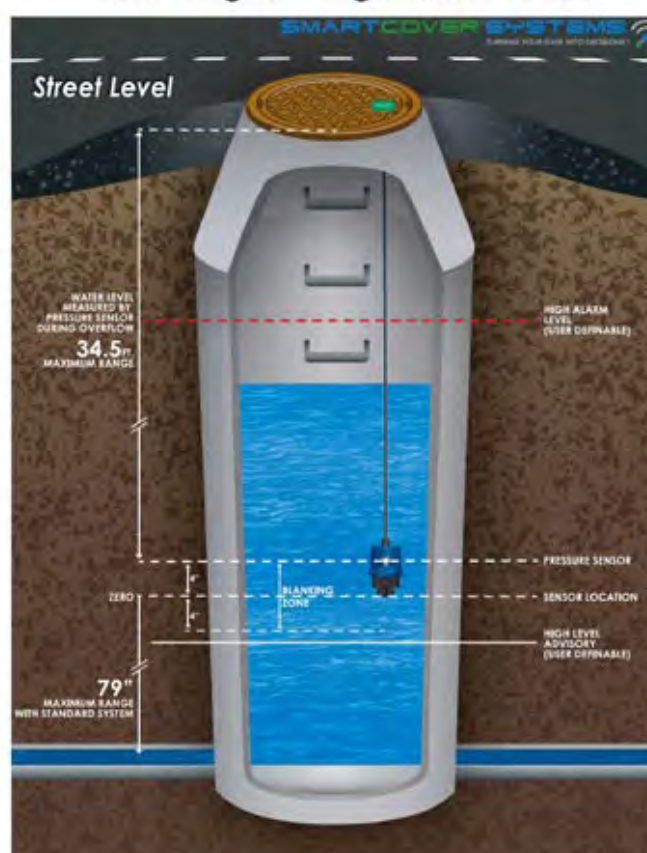
Prioritization connections of the most vulnerable septic systems in the Little River Adaptation Action Area.



Unsubmerged – low water levels



Submerged – high water levels



**NO SWIM ADVISORY**



## Innovative Technology - Wastewater

Installation of Smart Covers and Smart Rain Gauges to analyze, predict and prevent Sanitary Sewer Overflows (SSOs).



## Stormwater Treatment

Design implement engineering strategies including innovative Green Infrastructure and Low Impact Development (LID).





Dinner Key Islands B & C - Before



Dinner Key Islands B & C - After

## Biological Restoration to Enhance Water Quality

Development of a Living Shoreline guidance document.

Create a sponge nurseries that lead to increased filtration of Bay waters and reduction of nutrients and bacteria.



## Education & Outreach Connect2Protect

Education efforts in Little River Adaptation Action Area for Connect2Protect – septic to sewer conversions.





# Biscayne Bay Grant Program FY 21-22 - \$12.9M (Phase 2)



ENTITY	RELEVANCE TO BBTF REPORT	DEP FY 2021-22 FUNDING AWARD
Miami-Dade County	WATER QUALITY	\$12,940,463
City of Coral Gables	WATER QUALITY	\$900,000
City of Coral Gables	WATER QUALITY	\$2,750,000
Florida International University Institute of Environment	WATERSHED HABITAT RESTORATION AND NATURAL INFRASTRUCTURE	\$1,250,000
Miami Shores Village	INFRASTRUCTURE	\$300,000
Miami Waterkeeper	WATER QUALITY	\$600,000
North Bay Village	INFRASTRUCTURE	\$600,000
South Florida Water Management District with Tulane University	WATER QUALITY	\$500,000
Village of Key Biscayne	INFRASTRUCTURE	\$159,537



## Resilient Florida Grant- Federal Funding - \$40M (2021-2022)

Dept	Project Name	Grant funds
WASD	Schenley Park Septic to Sewer Conversion	\$27,500,000
RER-DERM	Secondary canal improvements in the Little River Basin to raise canal bank elevations to enhance storage, improve canal conveyance and outfalls to meet 2060 requirements with future sea level rise - Phase I	\$7,000,000
RER-DERM	Secondary canal improvements in the Little River Basin to raise canal bank elevations to enhance storage, improve canal conveyance and outfalls to meet 2060 requirements with future sea level rise - Phase II	\$5,200,000
RER-DERM	Buffering Lands Acquisition - Cutler Pit and Adjacent Wetlands (538 acres)	\$300,000
Total		\$40,000,000



# Resilient Florida Grant- State Funding - \$10M (2022-2023)

(Recommended to FL Legislature by Governor)

Miami-Dade County Department	Resilience Project Name	Grant Funds
RER-DERM	Lake Belmar new stormwater pump station infrastructure system	\$3,200,000
RER-DERM	Biscayne Shores 3 stormwater pump stations infrastructure retrofit and improvements	\$1,300,000
RER-DERM	Environmentally Endangered Lands Program Acquisition and Restoration Project	\$4,000,000
RER-DERM	Environmentally Endangered Lands Program Acquisition Project - Wink Eye Slough (152 acres)	\$350,000
RER-DERM	Buffering Lands Acquisition - Peters Wetlands (62 acres)	\$325,000
RER-DERM	Restoration Project - Goulds canal project	\$900,000
Total		\$10,075,000



# Much Gratitude and Many Thanks to:

- **FDEP: Joanna Walczak, Jennifer Coley, Jamie Monty, Laura Eldredge, and their teams!**
- **Dr. Piero Gardinali (FIU)**
- **Dr. Josefina Olascoaga (UM RSMAS)**
- **Dr. Peter Swart (UM RSMAS)**
- **Dr. Maribeth Gidley (UM RSMAS CIMAS)**
- **Dr. Christopher Sinigalliano (NOAA)**
- **Miami-Dade County: Lee Hefty, Rashid Istambouli, Craig Grossenbacher, Janet Gil, Lisa Spadafina, Marina Blanco-Pape, Debbie Griner, Liza Herrera, Katie Hagemann, Eugene Codner, Dr. Valentina Caccia, Sara Thanner, Omar Abdelrahman, Maurice Pierre, James Duncan, and our teams!**





## Resilient Florida Grant Program – Federal Funding

On Tuesday, February 1, Governor DeSantis announced resilience projects that his administration is awarding funding to support. Of the \$404 million available statewide \$160 million was allocated to projects in Miami-Dade County. Of that, \$77.9 million will support 13 County projects. The remaining \$73 million will support 20 municipal projects. Most projects are supported by 50/50 funding match with the local government. The 13 County projects recommended for funding cover many areas of the community and will help protect our drinking water infrastructure, septic to sewer projects, improving canals along the Little River, acquiring buffering lands in South Dade, protecting our parks, and critical facilities including key County buildings and fire stations. Many projects include components that rely upon natural infrastructure to adapt to rising sea levels.

### County Projects – supported by federal funding

announced 2/1/2022

	Dept	Project Name	Grant funds
18	WASD	Increasing the Resiliency of Drinking Water Infrastructure to Flooding and Storms	\$15,187,500
19	WASD	Schenley Park Septic to Sewer Conversion	\$27,500,000
20	RER-DERM	Secondary canal improvements in the Little River Basin to raise canal bank elevations to enhance storage, improve canal conveyance and outfalls to meet 2060 requirements with future sea level rise - Phase I	\$7,000,000
21	RER-DERM	Secondary canal improvements in the Little River Basin to raise canal bank elevations to enhance storage, improve canal conveyance and outfalls to meet 2060 requirements with future sea level rise - Phase II	\$5,200,000
22	RER-DERM	Roadway infrastructure improvements including building resilience by elevating roads to 2060 requirements with future sea level rise, and associated drainage improvements: NW 159th Street from NE 6th Ave to W Dixie HWY	\$7,500,000
23	RER-DERM	Buffering Lands Acquisition - Cutler Pit and Adjacent Wetlands (538 acres)	\$300,000
24	PROS	Haulover Park Western Shoreline Sea Level Rise and Flood Mitigation Project	\$670,140
25	PROS	Black Point Park and Marina Sea Level Rise and Flood Mitigation Shoreline Stabilization Project	\$765,000
26	PROS	Flooding and erosion control in the Lowland areas of Fairchild Tropical Botanic Garden	\$12,500,000
27	ISD	County Government Center (Stephen P. Clark Center) Stormwater Drainage Improvements	\$400,000
28	ISD	North Dade Chiller Plant - Critical Infrastructure Hardening	\$300,000
29	Cultural Affairs	Flood Resiliency for North Side of Vizcaya Museum and Gardens	\$260,615
30	Fire Rescue	Deployable Flood Barriers for Multiple Fire Stations	\$340,000

Last updated 2/1/2022

County Projects Total: | \$77,923,255

**Municipal Projects – supported by federal funding**  
**announced 2/1/2022**

	Municipality	Project Name	Grant funds	
1	Bal Harbour Village	Stormwater Pump Station Upgrades - Design/Construction	\$	2,000,100
2	Aventura	Seawall Hardening	\$	600,000
3	Doral	Stormwater Improvement Project Sub Basin NW 33 Street W	\$	150,822
4	Homestead	6th Avenue Drainage Improvements	\$	1,250,000
5	Miami	Design, Construction Brickell Bay Dr Seawall & Flood Improvements along Biscayne Bay	\$	17,170,650
6	Miami	Design, Permitting, Construction: Shorecrest South Flood Improvements	\$	8,033,930
7	Miami	Design, Permitting, Construction: East Flagami Flood Improvements Project	\$	14,438,495
8	Miami	Replace Seawalls - Morningside/Shorecrest/Biscayne Bay/Ademar Canal/Davis Canal	\$	1,510,896
9	Miami	Brickell and Coconut Grove Seawalls Project	\$	829,265
10	Miami Beach	North Beach Town Center	\$	10,000,000
11	Miami Beach	Dune Enhancements	\$	1,001,000
12	Miami Beach	Citywide Gravity Sewer Mains Replacement	\$	7,625,000
13	Sunny Isles Beach	Central Island Area Pump Stations and Drainage Improvements	\$	2,000,000
14	Miami Shores	Bayfront Park Seawall Elevation	\$	1,000,000
15	North Bay Village	North Bay Village Coastal Resiliency	\$	3,000,000
16	Bay Harbor Islands	Seawall Replacement	\$	225,000
17	Cutler Bay	Cutler Bay Canal Bank Restoration Project	\$	750,000
18	Golden Beach	Pump Station at Tweedle Park	\$	500,000
19	Surfside	Surfside's Collins Avenue Water Main Replacement Design Phase	\$	217,731
20	El Portal	El Jardin Storm Water Improvements	\$	926,963
Municipal Projects Total:			\$	73,229,852



## Resilient Florida Grant Program - Projects Recommended by Governor for State Funds

On Thursday, November 7, Governor DeSantis announced resilience projects that his administration is recommending to the state legislature for approval as part of the three year “Always Ready Florida” plan. Of the 76 recommended projects, 16 are for Miami-Dade County as well as 10 municipal projects within the County. Of the \$276 million recommended statewide the projects in Miami-Dade communities are slated to receive \$96.8 million. The next step is for the list to be reviewed by the legislature, but if approved it would mean an additional \$44 million for Miami-Dade County resilience projects.

The 16 County projects recommended for funding cover many areas of the community and if awarded the funds would help protect fire stations, critical data center, the County’s Integrated Command and Communication center, libraries, and others. Traditional stormwater projects, roadway elevation, and a shoreline stabilization project on Waggoner Creek were also recommended. Larger scale acquisition of buffering lands was also endorsed which could help protect more than 200 acres of natural areas, protect drinking water, and help support restoration efforts. Also worth noting are two Public Housing and Community Development proposals worth over \$15 million which would help provide many of our residents with more resilient housing.

### County Projects – supported by state funding (announced 11/7/2021)

	Miami-Dade County Department	Miami-Dade County Resilience Project Name	Funding recommended by FDEP
1	RER-DERM	Lake Belmar new stormwater pump station infrastructure system	\$3,200,000
2	RER-DERM	Biscayne Shores 3 stormwater pump stations infrastructure retrofit and improvements	\$1,300,000
3	RER-DERM	Roadway infrastructure improvements including building resilience by elevating roads to 2060 requirements with future sea level rise, and associated drainage improvements: SW 157 Ave from SW 42 Street to SW 8th Street	\$10,000,000
4	RER-DERM	Miami-Dade County Environmentally Endangered Lands Program Acquisition and Restoration Project	\$4,000,000
5	RER-DERM	EEL Acquisition Project - Wink Eye Slough (152 acres)	\$350,000
6	RER-DERM	Buffering Lands Acquisition - Peters Wetlands (62 acres)	\$325,000
7	RER-DERM	Restoration Project - Goulds canal project	\$900,000
8	Solid Waste	Design plan to improve stormwater management for South Dade Landfill	\$750,000
9	ISD	Critical Equipment Flood Resiliency for County Integrated Command and Communication Center	\$6,000,000
10	ISD	Resilient Shoreline Stabilization at Kristi House Children’s Center	\$450,000
11	ISD	Flood Mitigation Measures for Critical County-wide Data Processing and Communications Center	\$300,000
12	Libraries	Main Library Resiliency Grant	\$760,000
13	Libraries	Miami Beach Regional Library Resiliency Grant	\$400,000
14	Fire Rescue	Installation and Elevation of Generators at Multiple Fire Stations	\$392,500
15	PHCD	PHCD’s Ingram Terrace Apartment Affordable Housing Resilience Project	\$575,275
16	PHCD	Miami-Dade Public housing resiliency improvements in Little River Adaptation Action Area	\$15,000,000
<b>total</b>			<b>\$44,702,275</b>

### Municipal Projects – supported by state funding (announced 11/7/2021)

	Municipality	Municipal Resilience Project Name	Funding Recommended by FDEP
1	Town of Cutler Bay	Cutler Bay Buffer Land Restoration Project	\$ 250,000
2	City of Miami	Immediate Flood Control: Install 79 Backflow Valves Citywide (BVCW)	\$ 2,042,000
3	City of Miami	Replacement of 8 Seawalls in Edgewater Project (S-EW) between NE 22nd St. to NE 34th St. along Biscayne Bay	\$1,555,882
4	City of Miami	Design and Construction of Allapattah Flood Improvements (AFI) NW 7 Ave to 14 Ave, NW 23 St to 31 St	\$15,688,093
5	City of Miami Beach	First Street Flood Mitigation and Sea Level Rise Adaptation	\$20,110,259
6	City of Miami Beach	Fire Station #1	\$ 8,413,860
7	City of Miami Beach	Design, Permitting & Construction North Grapeland Heights Seawall at NW 13th Street & NW 32nd Avenue	\$ 145,527
8	Miami Shores Village	Miami Shores Village 93rd Street Pump Station Mitigation	\$ 400,000
9	North Bay Village	North Bay Village Stormwater Collection System	\$ 1,500,000
10	Town of Surfside	Town of Surfside's Abbott Avenue Stormwater Improvements	\$ 2,000,000
Total			\$ 52,105,621

**Combined total: \$96,807,896**



# Biscayne Bay Watershed Management Advisory Board Meeting

Feb. 18, 2022

# **Biscayne Bay Watershed Management Advisory Board**

## **CURRENT WATER QUALITY IN BISCAYNE BAY**



- **Waters not attaining standards.**
- **Land use in the Biscayne Bay watershed.**
- **Wastewater sources.**
- **Restoration activities.**
- **Pathway to Restoration – Next Steps.**








# Biscayne Bay Watershed Management Advisory Board

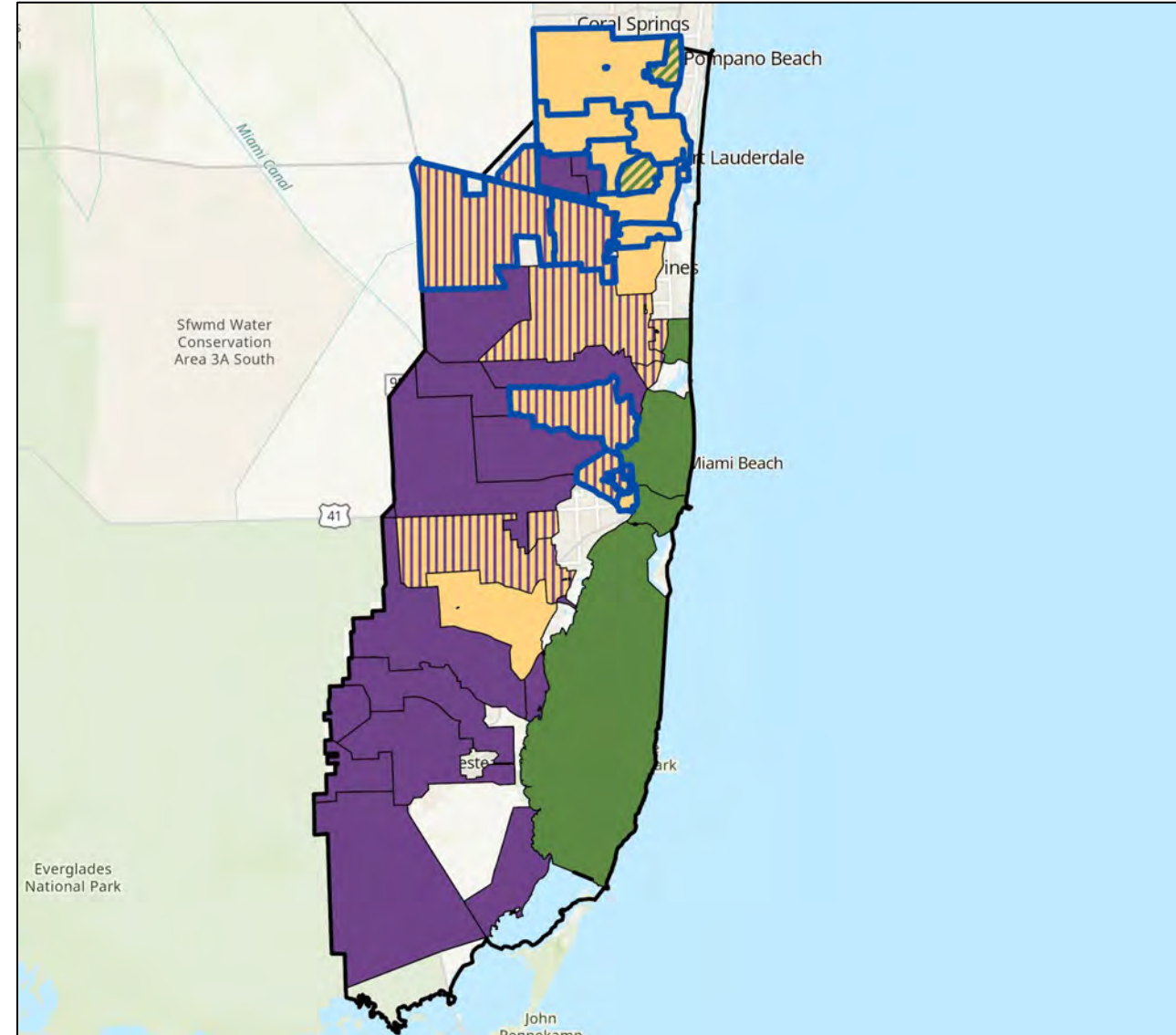
## CURRENT WATER QUALITY IN BISCAYNE BAY



### Biscayne Bay Waters Not Attaining Standards



-  Biscayne Bay Watershed
-  Waters with TMDLs
-  Bacteria Related Impaired
-  Dissolved Oxygen Impaired Study List
-  Nutrient Impaired



# Biscayne Bay Watershed Management Advisory Board

## CURRENT WATER QUALITY IN BISCAYNE BAY

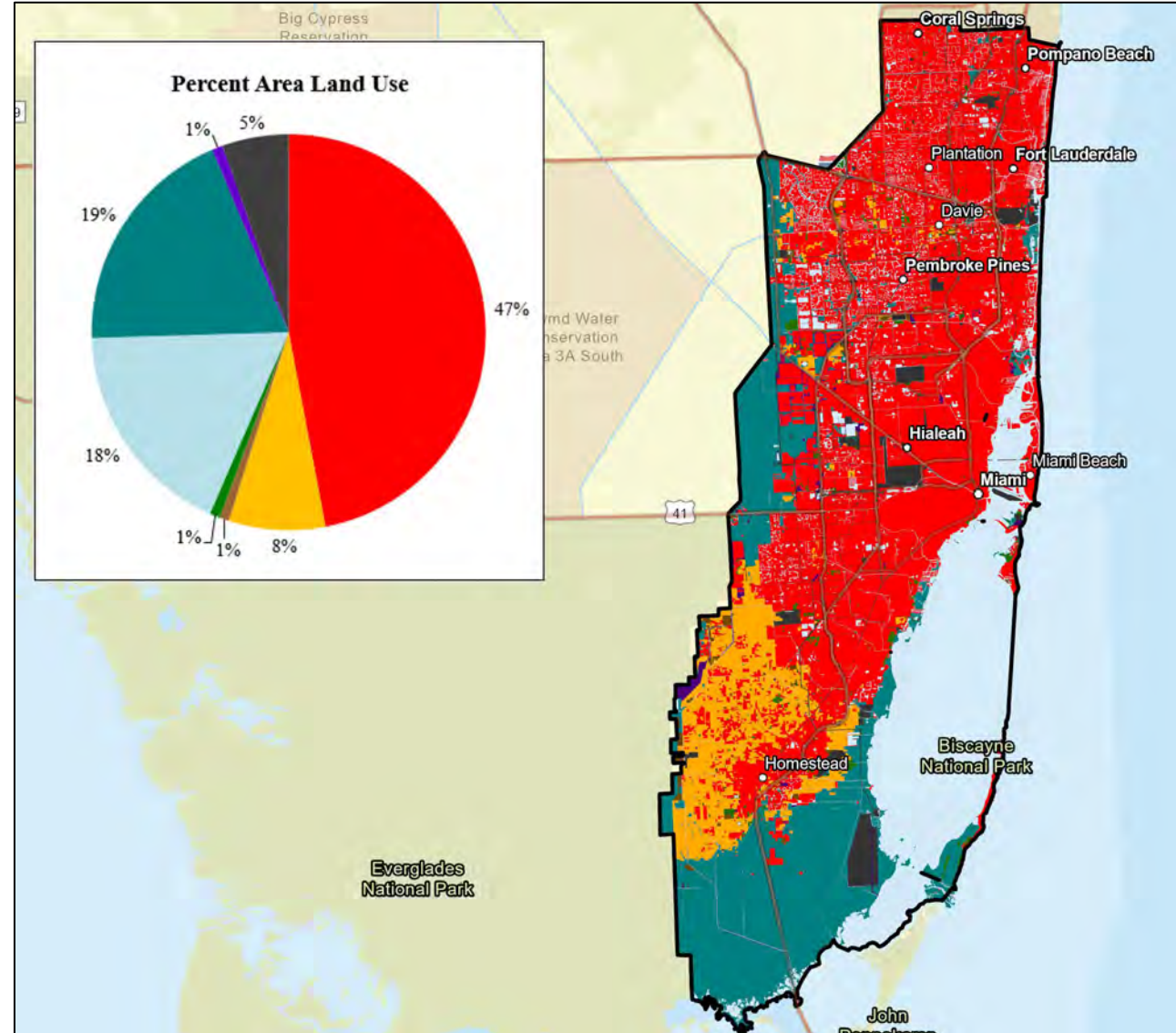


### Biscayne Bay Watershed Land Use



- Biscayne Bay Watershed**
- FLUCCS**
- 1000 - Urban and Built-Up
  - 2000 - Agriculture
  - 3000 - Rangeland
  - 4000 - Upland Forest

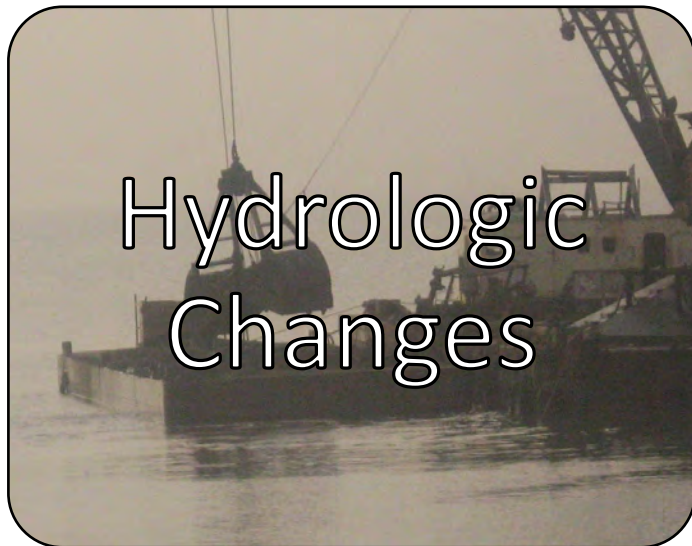
- 5000 - Water
- 6000 - Wetlands
- 7000 - Barren Land
- 8000 - Transportation, Communication, and Utilities





# Biscayne Bay Watershed Management Advisory Board

## CURRENT WATER QUALITY IN BISCAYNE BAY



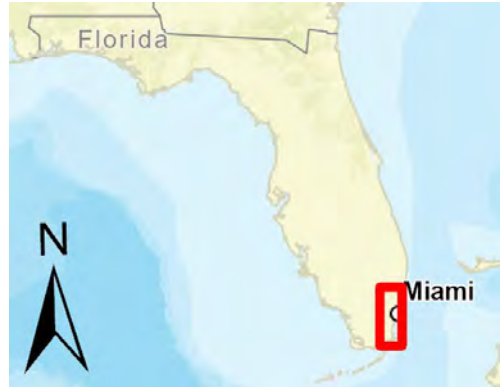


# Biscayne Bay Watershed Management Advisory Board

## CURRENT WATER QUALITY IN BISCAYNE BAY






### Biscayne Bay Wastewater







#### Biscayne Bay Watershed

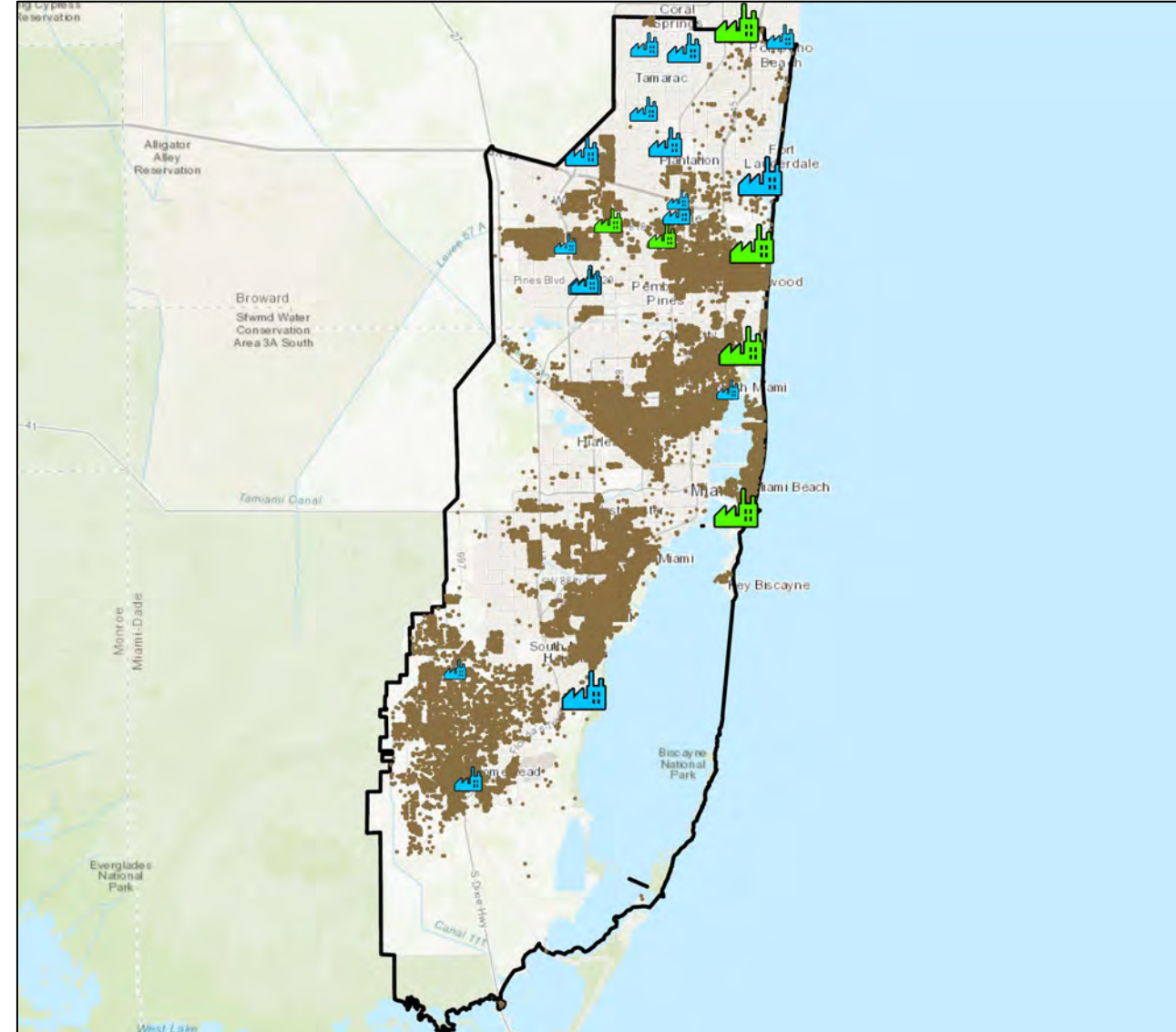
DOH Known and Likely Septic Properties (Count 141,960)

NPDES Surface Water Discharge WWTF Permitted Capacity

-  0.1 - 1 mgd (Count 0)
-  1 - 10 mgd (Count 2)
-  10 - 25 mgd (Count 0)
-  25 - 150 mgd (Count 4)

Non-Surface Water Discharge WWTF Permitted Capacity

-  0.1 - 1 mgd (Count 4)
-  1 - 10 mgd (Count 6)
-  10 - 25 mgd (Count 4)
-  25 - 150 mgd (Count 2)





# Biscayne Bay Watershed Management Advisory Board

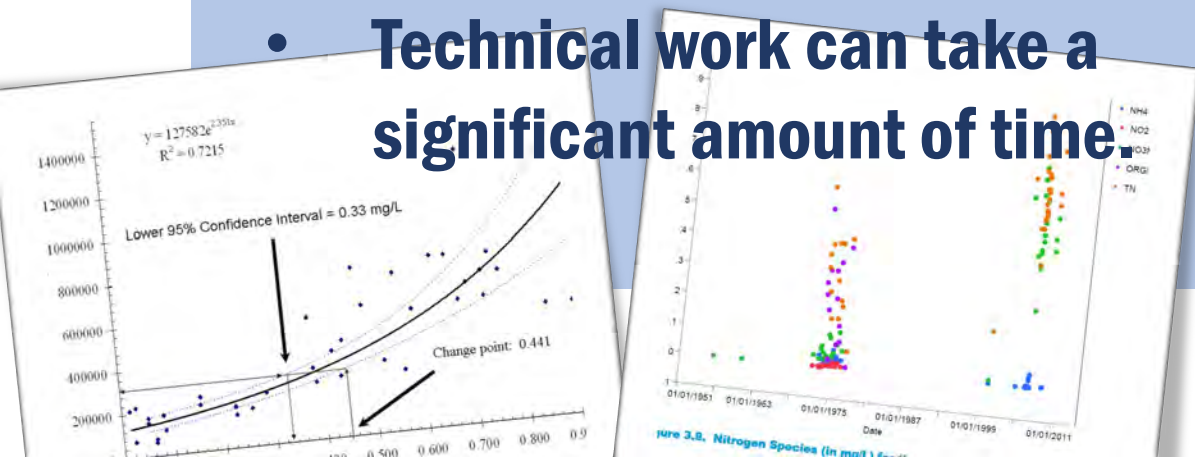
## TMDL DEVELOPMENT



- What sources contribute to the current loading?
- How much load must be reduced to achieve target?
- Public process with stakeholder involvement.
- Technical work can take a significant amount of time.

**Significant amounts of technical work needed.**

- Waterbody specific data collection (water quality).
- Water chemistry and biological response measures.
- Regression analyses.
- Computer modeling.



# Biscayne Bay Watershed Management Advisory Board

## BASIN MANAGEMENT ACTION PLANS (BMAPs)



- **Florida Watershed Restoration Act.**
- **TMDLs being addressed.**
- **Area addressed by the restoration plan.**
- **Future growth impacts.**
- **Projects to meet the TMDL.**
  - **Implementation timeline.**
  - **Commitment to project.**
  - **Expected water quality improvement.**

- **Process to assess progress towards achieving the TMDL.**
  - **Monitoring plan.**
  - **Project reporting.**
  - **Measure and report restoration progress.**
  - **Periodic follow-up meetings.**



# Biscayne Bay Watershed Management Advisory Board

## Water Quality Restoration Plans



### Stakeholder Driven Process

#### Assess

Waterbody identified as impaired by DEP or Stakeholder

Anytime\*

#### Alternative Restoration Plan

Restoration targets and projects/activities set

Replaces/Postpones a TMDL and BMAP

**Cleaner Water, Faster!!**



# Biscayne Bay Watershed Management Advisory Board

## Benefits of an Alternative Restoration Plan



Minimizes Regulatory  
Process

Stakeholders Control Their Pathway to  
Restoration

Acknowledges Proactive  
Efforts

Combines Many Restoration  
Steps

Funding Opportunities  
Available

Enhances Public  
Relations

**Cleaner Water, Faster!!**

# Biscayne Bay Watershed Management Advisory Board

## Reasonable Assurance Plan Examples



- There are currently 5 adopted Reasonable Assurance Plans throughout the state.
  - Florida Keys, Tampa Bay, Shell-Joshua-Prairie Creek, Lake Seminole, and Mosquito Lagoon



# Biscayne Bay Watershed Management Advisory Board

## ALTERNATIVE RESTORATION PLAN NEXT STEPS



1. Recommend identify a “Champion” to lead the effort.
2. Identify Key Stakeholders.
3. Identify restoration activities and develop framework for alternative restoration plan.
4. Submit documentation to the Department for approval.
  - Reasonable Assurance Plans are approved by the Department and EPA and are adopted by the Secretary.
5. Updates are provided to the Department based on the schedule established in the plan.
6. Updates are reviewed for confirmation of reasonable progress.
7. Implementation of plan continues until water quality targets are achieved.
  - Adaptive management.
  - TMDL-BMAP process remain an option if targets are not achieved.





Thank You!

Questions?





**Ken Weaver**  
**Program Administrator**  
**(850) 245-8414**  
**[Kenneth.Weaver@FloridaDEP.gov](mailto:Kenneth.Weaver@FloridaDEP.gov)**

**Benjamin Ralys**  
**Environmental Consultant**  
**(850) 245-8443**  
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**Environmental Administrator**  
**(850) 245-8469**  
**[Kevin.Odonnell@FloridaDEP.gov](mailto:Kevin.Odonnell@FloridaDEP.gov)**



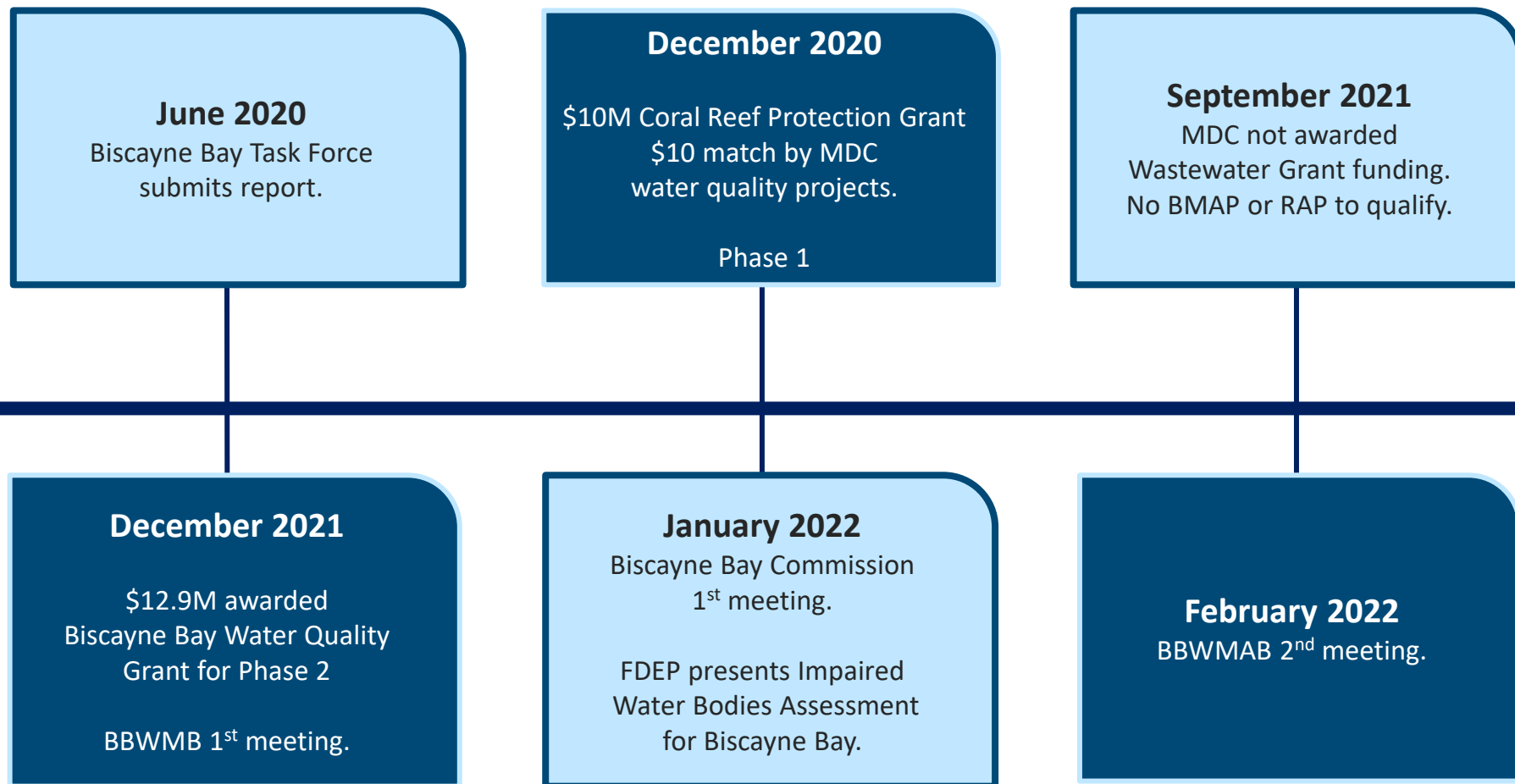


# **Update on Biscayne Bay Task Force Recommendations & Announcements**

**February 18<sup>th</sup>, 2022**

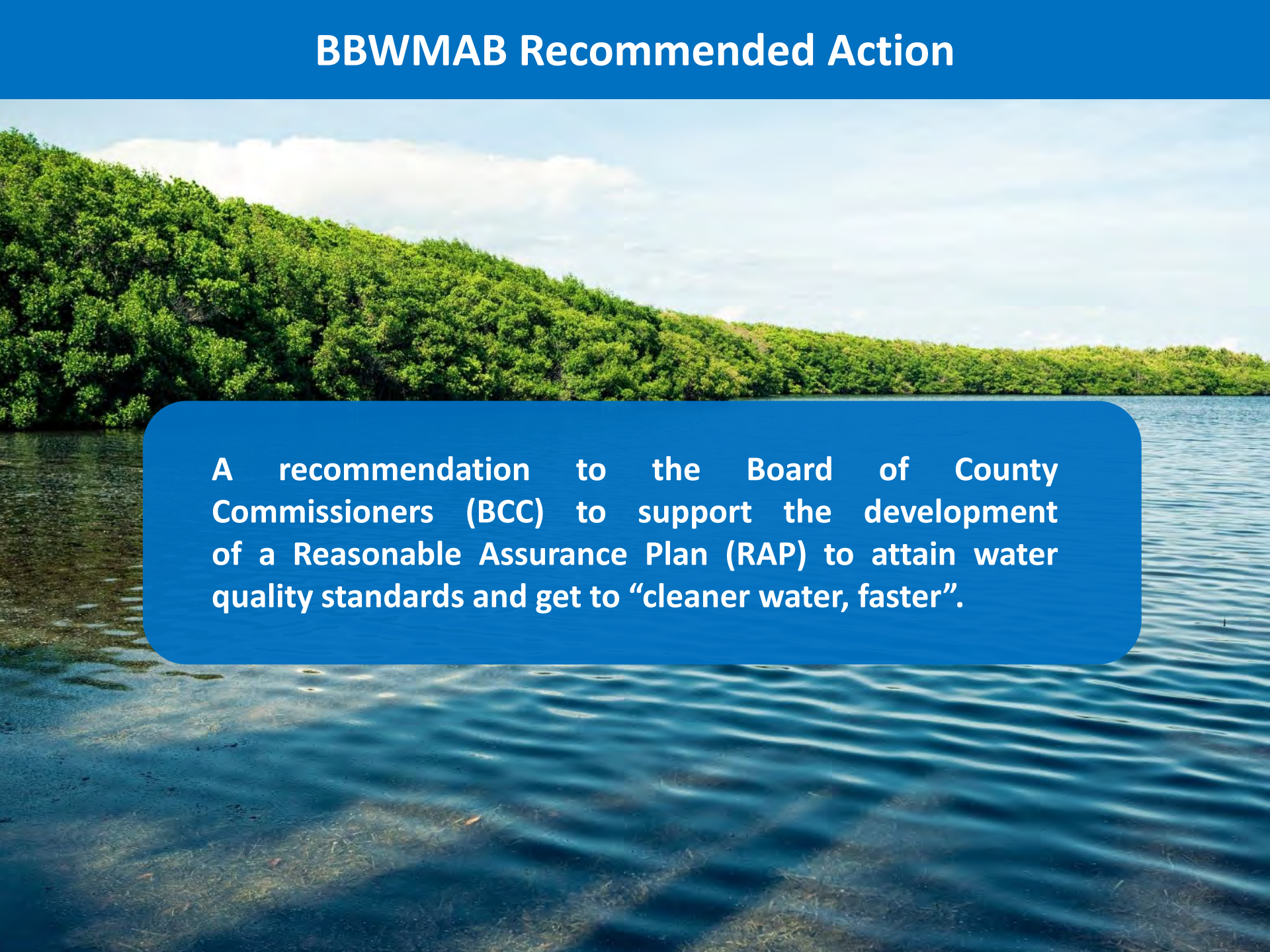
**Irela Bagué  
Chief Bay Officer**

# Miami-Dade County – Nutrient Pollution Reduction efforts for Biscayne Bay





# BBWMAB Recommended Action



A recommendation to the Board of County Commissioners (BCC) to support the development of a Reasonable Assurance Plan (RAP) to attain water quality standards and get to “cleaner water, faster”.



# What happens next?

**BBWMAB makes recommendation to BCC.**

**BCC adopts resolution to support development of a RAP.**

- ☐ **Identify key stakeholders (e.g. municipal partners, community groups, consultants).**
- ☐ **County staff and stakeholders identify projects, policies and funding sources to develop and implement framework for RAP as an alternative to TMDL and BMAP.**
- ☐ **County submits draft RAP to FDEP for review with EPA.**
- ☐ **Following agency review, FDEP Secretary adopts RAP through a Secretarial Order.**

# BBTF Recommendation (3E) - Infrastructure Highlight

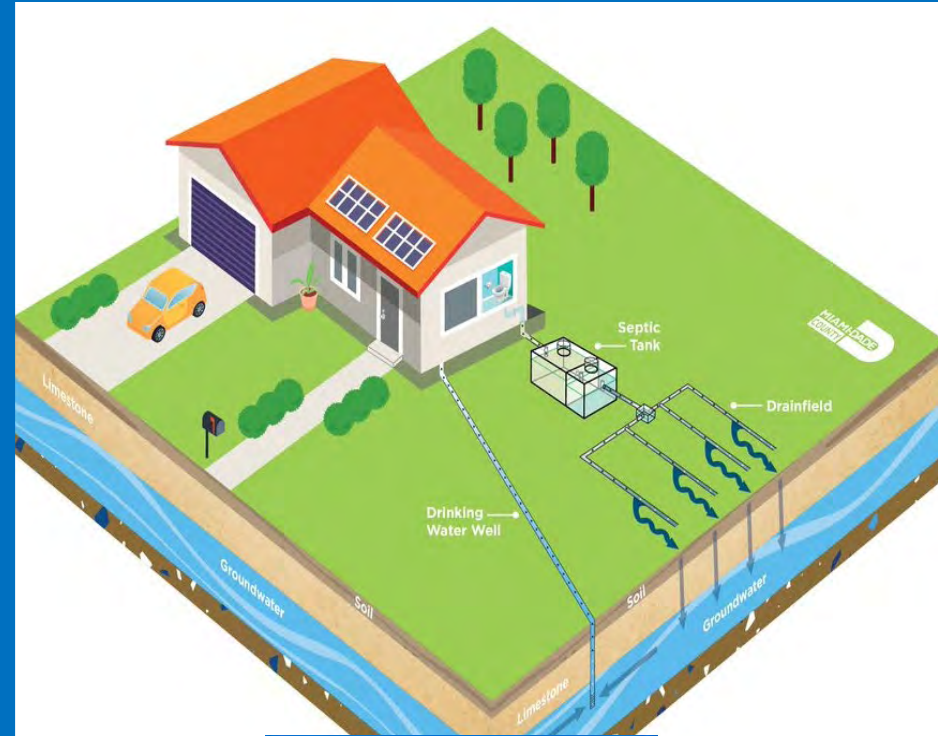


## Connect 2 Protect Program Launch

**Phase 1:** Lateral pipe installations for 12,000 properties with sanitary sewer infrastructure available for connection.

**Phase 2:** Expand the sanitary sewer system to unserved areas based on risk of malfunction.

**Funding:** Exploring all available funding opportunities. Traditional and new funding mechanisms, will be required to accomplish system expansion.



**\$150 MILLION IN PROJECTS** underway in Commercial Corridors, Ojus Special Benefit District, Little River Adaptation Action Area.



# BBTF Recommendation (6D) – Education & Outreach Highlight

- Board of County Commissioners adopted resolution to create "Plastic Free 305" program
- Volunteer certification program for businesses
- Partner with local non-profit organizations
- Launch date Earth Month (April 2022)





# Working with our State Partners FWC



**FWC Speed Zone Signs Marine Stadium**

Florida Fish and Wildlife has added signage **“Slow Speed, Minimum Wake”** in the Marine Stadium to assist with enforcement & education boaters and personal watercrafts.



**Derelict Vessels Removed From Biscayne Bay**

2021 – Total 51 Removed

As of Today - 8 Removed

# Update - FDEP Biscayne Bay Commission

## Top Items for Support and Collaboration

### Septic to Sewer Legislative Priority

- Funding Opportunities

### Marine Law Enforcement

- Additional Staff Resources, Derelict Vessels & Gear, Manatee Protection, Signage, Illegal Charters

### Water Quality

- Increased monitoring stations
- Canal maintenance
- Innovative tech solutions

### Land Management

- Spoil Island Maintenance
- Land Acquisition for Green Infrastructure



## BISCAYNE BAY COMMISSION MEETING

### COMMISSION MEMBERS



**Noah Valenstein**  
Brightwater Strategies



**Danielle Cohen Higgins**  
Miami-Dade County  
Commission, District 8



**Adam Bialock**  
DEP



**Jean Monestime**  
Miami-Dade County  
Commission, District 2



**Tim Meerbott**  
Town of Cutler Bay



**Dr. Thomas Reinert**  
FWC



**Rebeca Sosa**  
Miami-Dade County  
Commission, District 6



**Charlie Martinez**  
South Florida Water  
Management District



**Spencer Crowley**  
Florida Inland  
Navigation District

- Commission agreed to work with the BBWMAB on projects, policies, and funding for Biscayne Bay recovery.
- **Comm. Monestime raised the need to invest in education for residents as a priority.**
- **Comm. Sosa requested a study on causeways & bridges impacting Biscayne Bay.**
- FDEP presented Biscayne Bay Impaired Water Bodies Assessment.
  - County can consider Reasonable Assurance Plan (RAP) vs. a Basin Management Plan (BMAP).
- Commission agreed to collaborate with federal agencies (DOI, BNP, NOAA).
- The first biannual Biscayne Bay report submitted. The second report is due July 15, 2022.
- Next Commission meeting scheduled for April 8 – location TBD

Visit [www.protectingfloridatogether.gov/BiscayneBayCommission](http://www.protectingfloridatogether.gov/BiscayneBayCommission) to learn more



# Public Reminders



Pre-order the **“Protect Biscayne Bay”**  
Specialty License Plate : 201 Sales as of 2/14

Help us reach 3,000 Pre-Sales!  
[miamifoundation.org/biscaynebay](http://miamifoundation.org/biscaynebay)



**Fertilizer Ordinance** goes into  
effect May 15 – October 31



You can now place  
an environmental complaint  
on the **311 App and Online**



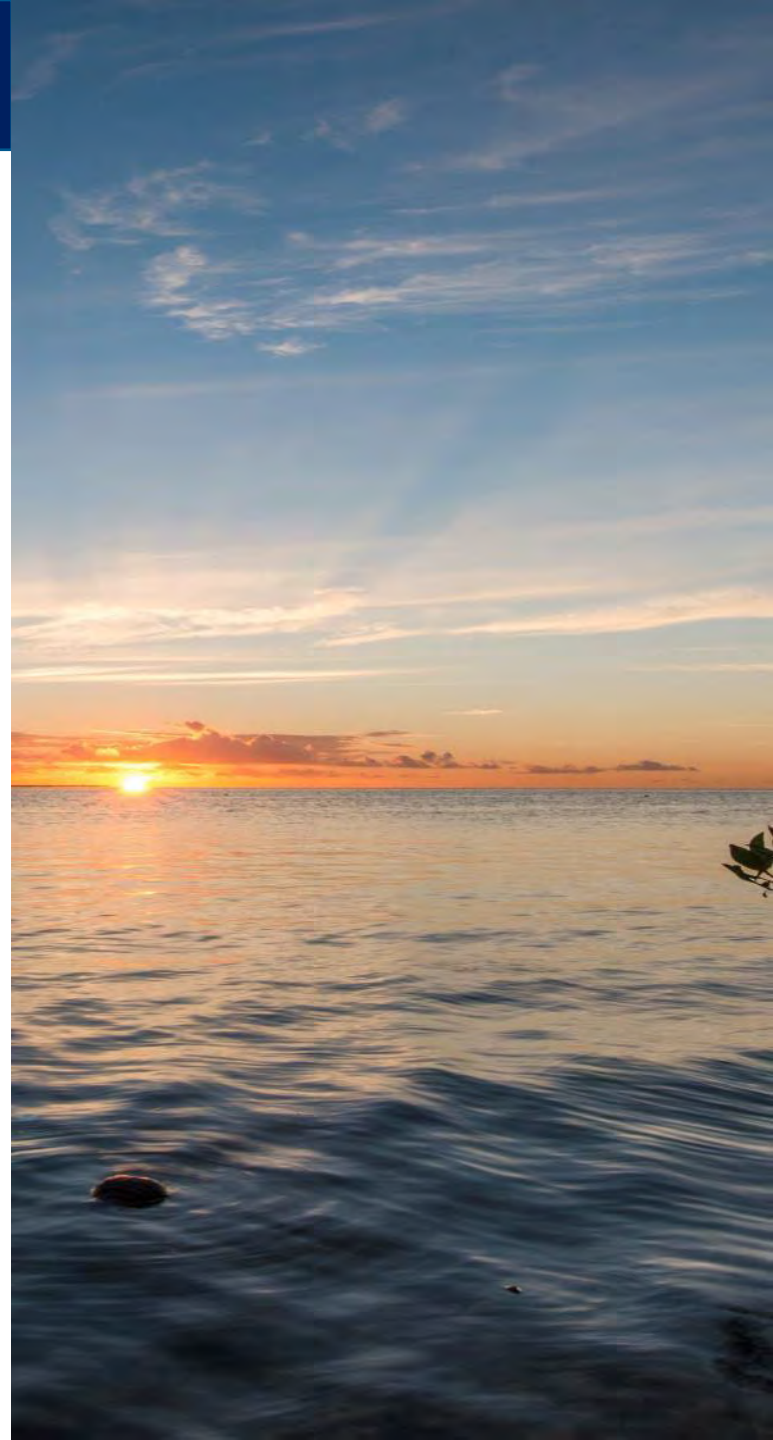
# Save the Dates

## BBWMAB Meeting Dates:

- April 20<sup>th</sup>
- June 10<sup>th</sup> or June 15<sup>th</sup>

## Upcoming Meetings:

- April 8 – Biscayne Bay Commission Meeting
- April 23 – 40<sup>th</sup> Annual Baynanza
- May 25 – Biscayne Bay Marine Health Summit





# Thank you Together We Can!

Biscayne Bay information & updates: [www.miamidade.gov/biscaynebay](http://www.miamidade.gov/biscaynebay)



Water Management Technologies® Presents  
The **Scavenger2000™** Water Decontamination Vessels

Your solution to  
**Clean Water**





# WHO WE ARE



- An Innovative Water Management Company
- Family owned Florida Corporation for over 20 years
- Patented Oxy-Plus decontamination system
- Manufactures Environmental Tools
- Proudly built in the USA
- Proven track record
- Sole source product in the world
- Under contract with DEP to remediate Cyanobacteria

Your solution to  
**Clean Water**

Your Logo

# City of Miami and Miami-Dade County Accomplishments From 06/05/2020 To 05/28/2021

1

AMOUNT OF DEBRIS REMOVED FROM 06/05/2020 TO 05/28/2021 = 8642 CUBIC FEET  
320 Cubic Yards = an approximate of 199 US Tons of trash

2

AMOUNT OF WATER DECONTAMINATED AT A RATE OF 10,000 GALLONS PER MINUTE  
1.060 Billion Gallons of water treated

3

AMOUNT OF OXYGEN INJECTED AT A RATE OF 150,000 LITERS PER HOUR.  
284 Million liters of oxygen

4

2372.5 NAUTICAL MILES TRAVELED

5

366 DONATED HOURS TOTALLING \$73,200 FROM Water Management Technologies

6

WE PICKED UP MANY NAVIGATIONAL HAZARDS SUCH AS DOCK PLANKS,  
55 GALLON OIL DRUMS, DOCK BOARDS, LARGE TIRES

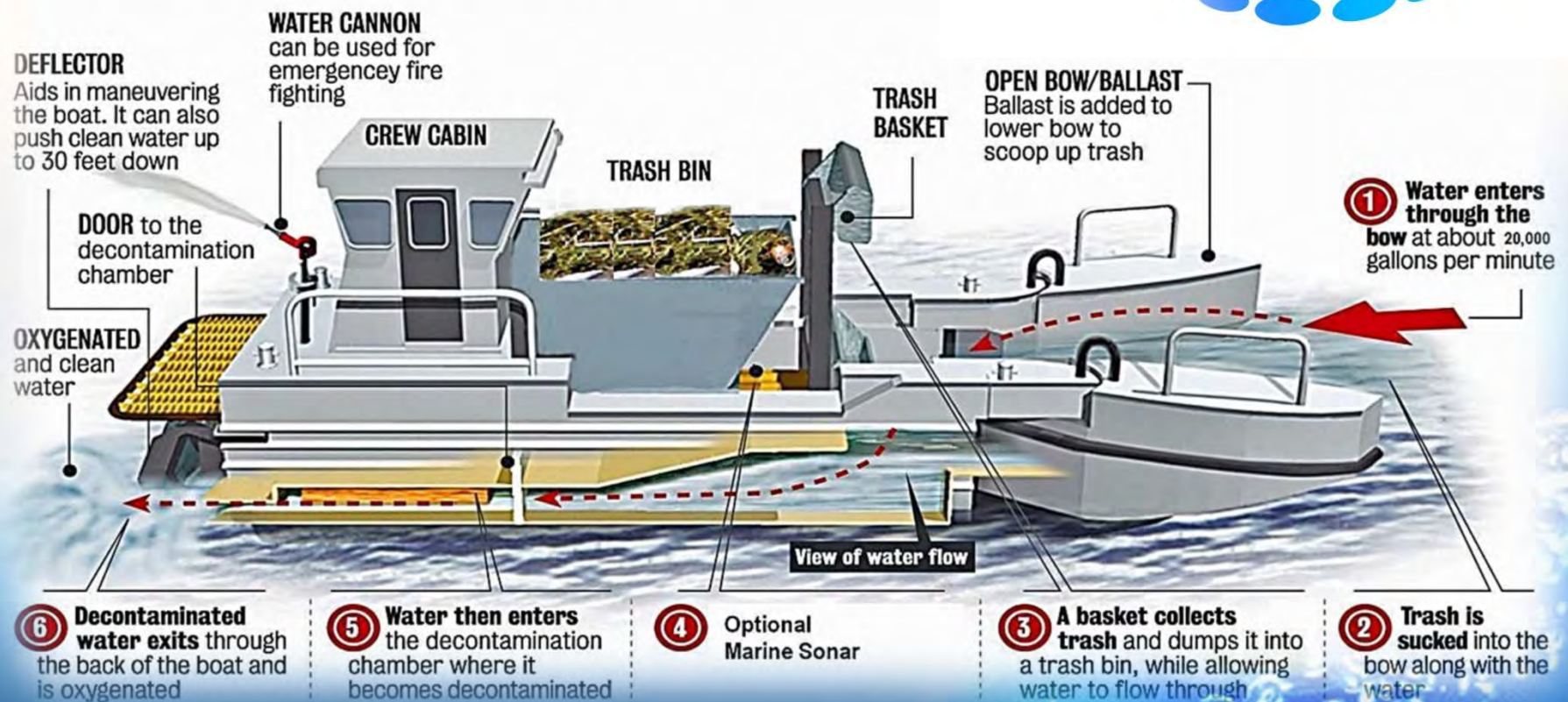


# HOW IT WORKS



## CLEANING THE WATER

How the 'Scavenger's' onboard water treatment system works:



Your solution to  
**Clean Water**



# Oxy-Plus™ BENEFITS



## Biological

- Destroys fecal coliform
- Destroys Cyanobacteria
- Kills Bacteria
- Neutralizes viruses Including but not limited to Covid-19 (SARS Corona virus)
- Balances Phosphates and Nitrates

## Physical

- Remove surface debris
- Reduces Turbidity
- Improves water quality
- Eliminates odors
- Destroys and Controls algae growth
- Remove Hazardous algae cakes

## Chemical

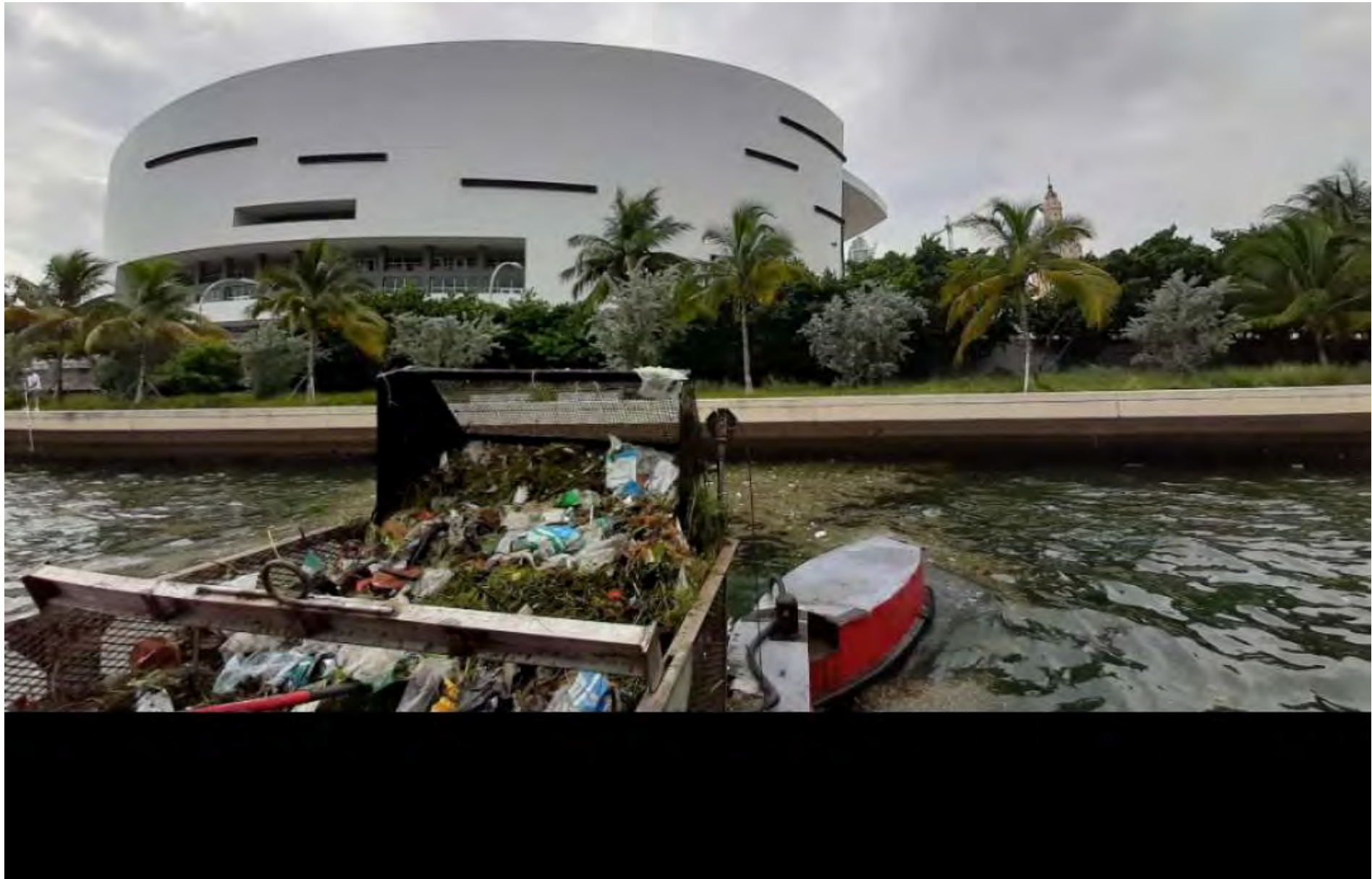
- Increases DO
- Removes some pesticides, herbicides, and fungicides that are washed into the watershed

Your solution to  
**Clean Water**

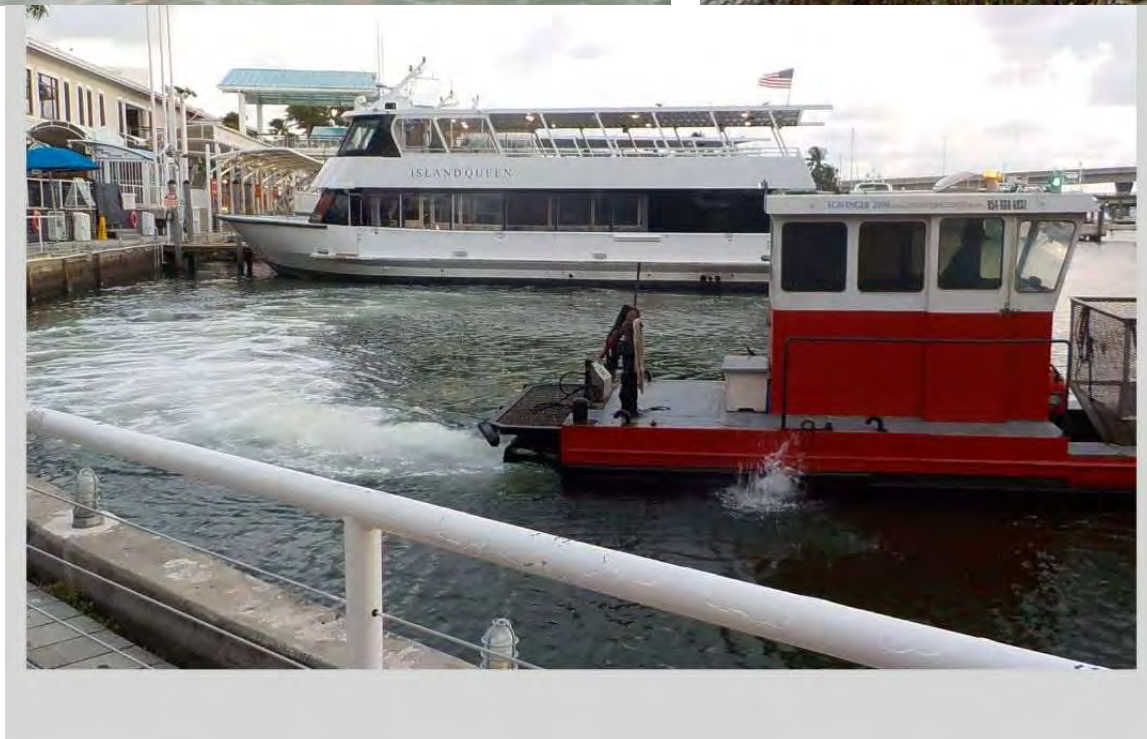




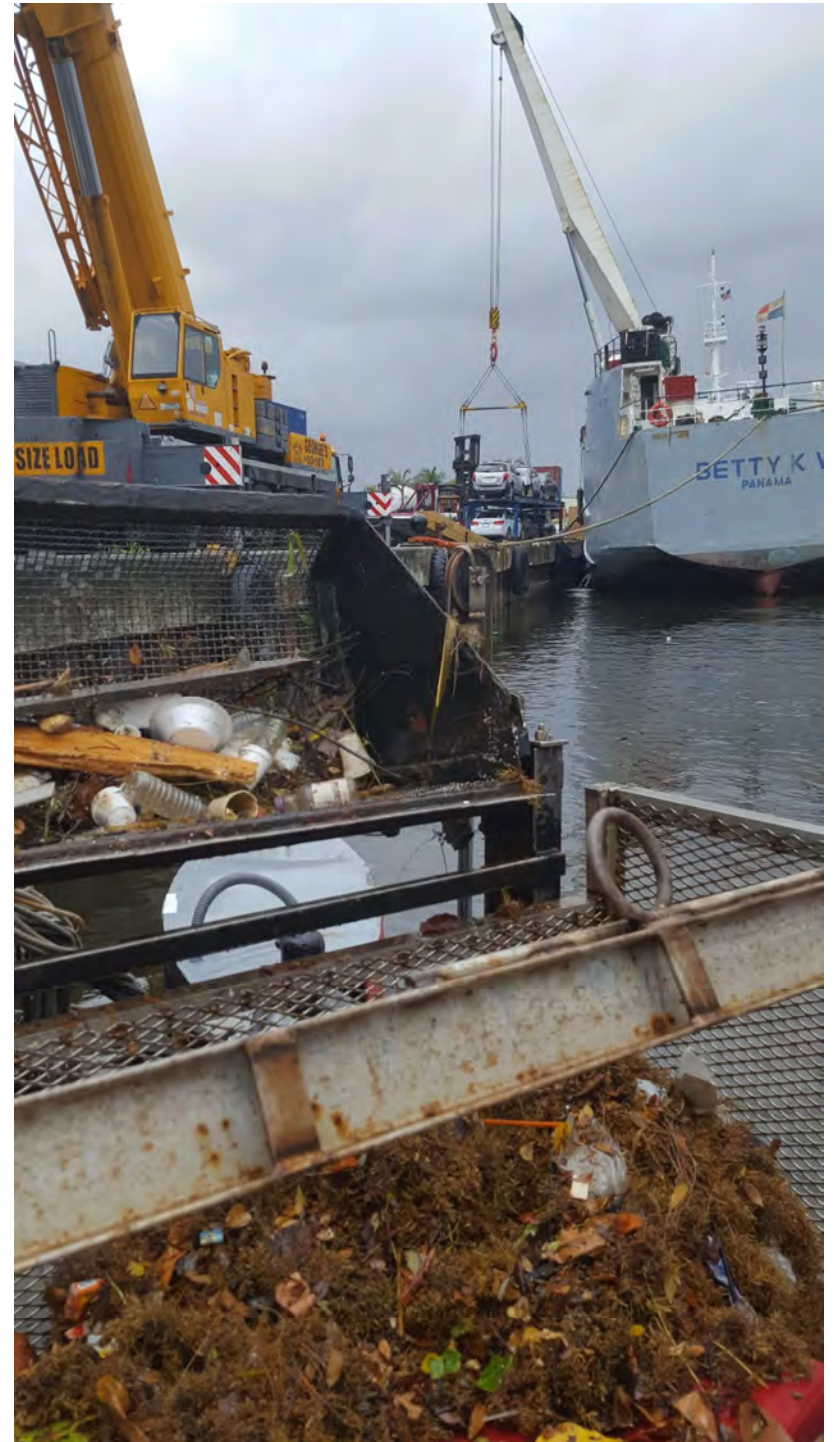
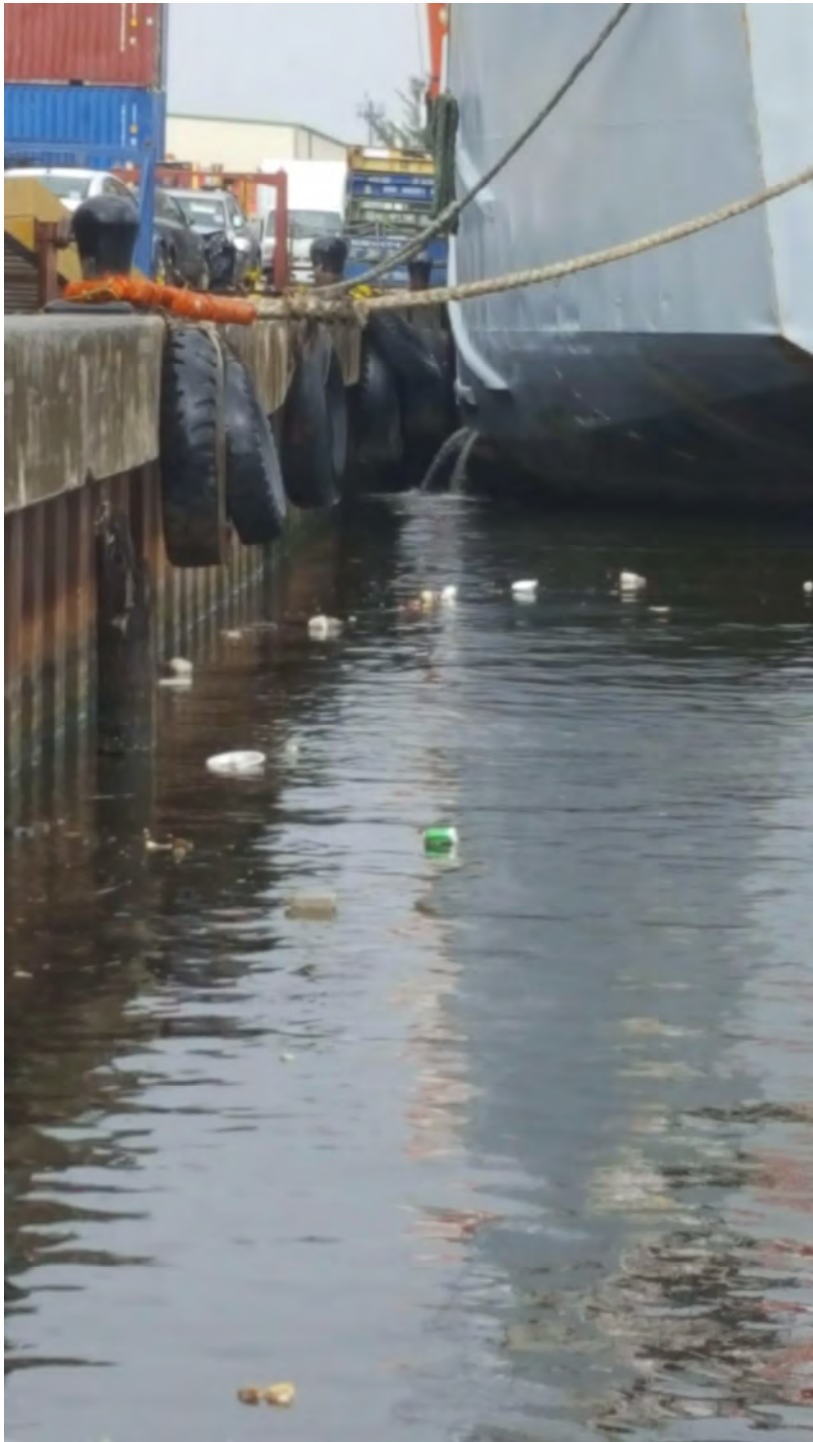




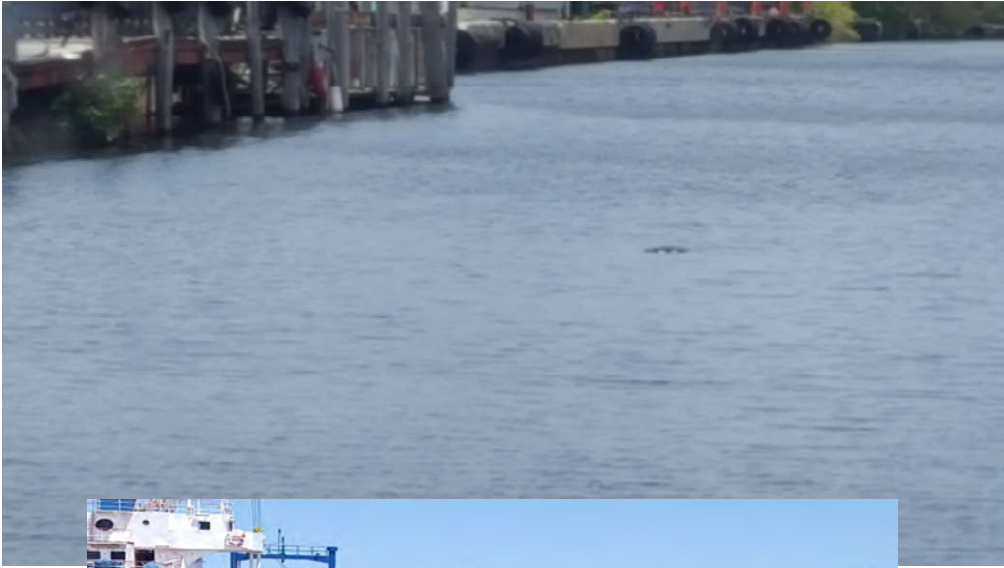


















# SCAVENGER VESSEL

## TECHNICAL SPECIFICATIONS

### Technical data

LOA:	40 ft.
Beam:	8 ft.
Height (from water line):	10 ft.
Optional retractable Bimini Top	5 ft.
Width at bow, when jaws are open:	16 ft.
Draft:	4 ft.
Freeboard:	2 ft.
Gross weight:	12.5 tons
Main power plant:	marine diesel engine
Water canon pump:	1,250 U.S.G.P.M. at 100 psi
Fuel tank capacity:	120 - 150 US gal
Crew required:	1 operator
Oxygen Injection:	up to 600,000 l.p.h.
Decontamination rate:	up to 20,000 g.p.m.

### Boat Performance

Normal cruising speed:	6 knots
Maximum cruising speed:	8 knots
Working speed:	1-3 knots
Rotates in place:	360 degrees
Hours of operation between refueling:	35 hours

The Scavenger Vessel is the most effective de-pollution vessel available in the world today.

#### Water Management Technologies, Inc.™

Water Management Technologies, Inc.™ holds the patent to the OxyPlus™ System, an advanced process that treats and revitalizes waterways by directly aerating the water with a combination of ozone and oxygen.

The 40-foot Scavenger Vessel is constructed from COR-TEN™ steel and built in accordance with internationally recognized marine vessel standards. It stands 10 feet tall from the water line, has 8-foot beam and weighs 12.5 tons. It is equipped with an opening bow and ballasting system and can be operated by one crewmember. The Scavenger Vessel can be easily transported by truck, train or ship.

Water Management Technologies, Inc. Presents:  
**THE SCAVENGER VESSELS**



Your Solution to  
**CLEAN WATER**

A Revolutionary Approach to Water Regeneration

[www.scavengervessel.com](http://www.scavengervessel.com)

[www.scavengervessel.com](http://www.scavengervessel.com)



**SEPTIMO INFORME DE SERVICIO, OPERACIÓN Y  
MANTENIMIENTO CORRESPONDIENTE AL CONTRATO  
DE ADQUISICIÓN DE EQUIPAMIENTO PARA EL  
SANEAMIENTO DE LA PRESA VALSEQUILLO**

**GESFAL-030-285/2018 CONTRATO NÚMERO: SDRSOT-  
011/2018**



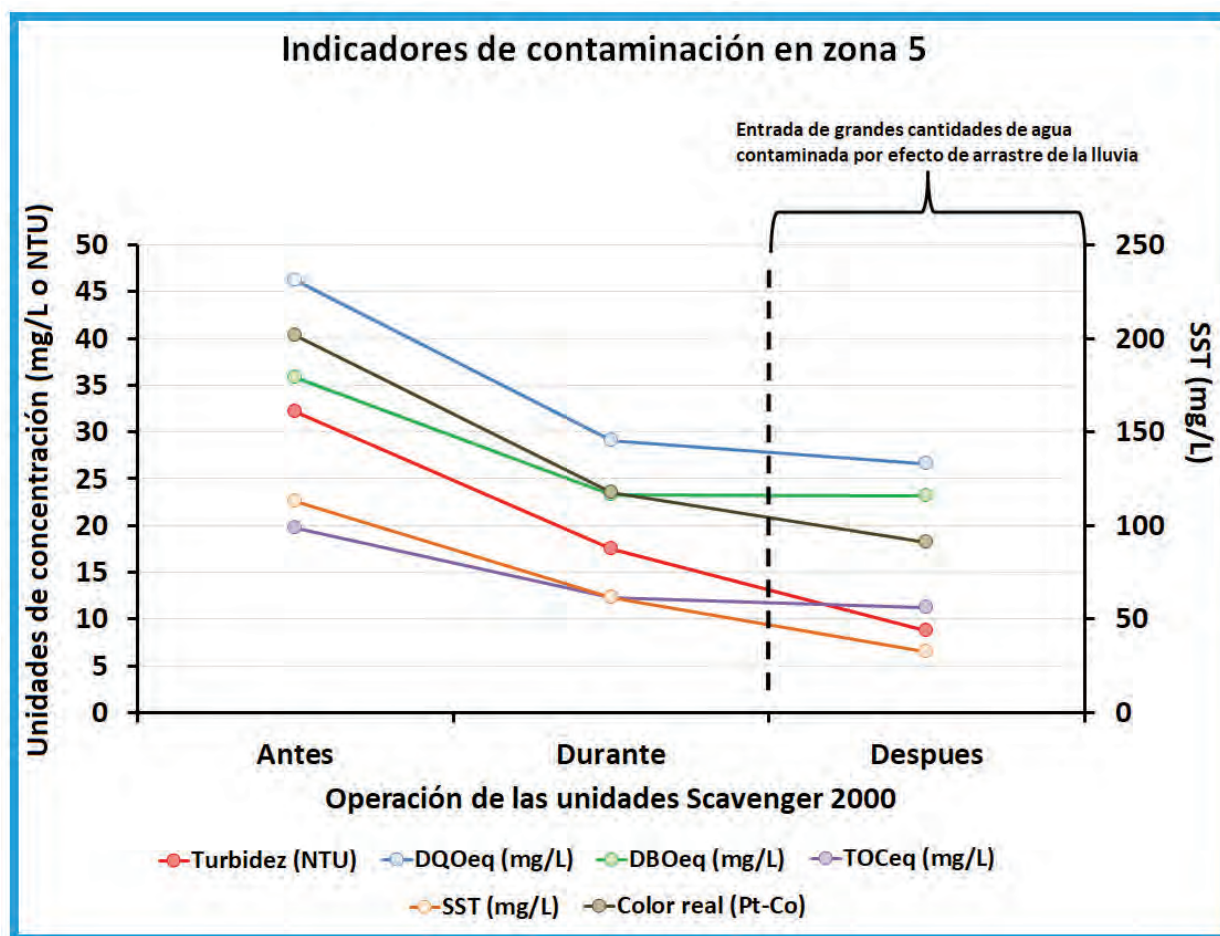
**Director general  
Alejandro Dellepere**

**10 de Octubre de 2019**





## RESUMEN GRAFICO





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## Capítulo 1 Introducción

El presente documento da cuenta de los avances en la implementación del programa del saneamiento de la presa Valsequillo de acuerdo a lo establecido en el contrato SDRSOT-011/2018 y sus correspondientes anexos hasta el día 3 de octubre del año 2019. Así mismo se hace una descripción del servicio llevado a cabo en términos de la operación de las tres unidades Scavenger 2000, mismas que al día de hoy y hasta el 23 de octubre continuarán trabajando en el saneamiento de la zona 5 de la presa Valsequillo, Puebla. También se hace un análisis de los resultados obtenidos en términos de la calidad del agua, para lo cual se llevaron a cabo mediciones de los parámetros fisicoquímicos en campo al tiempo que se contrató a un laboratorio acreditado para que tomaran muestras de agua y fueran enviadas para su respectivo análisis fisicoquímico y biológico. Al día de hoy, las unidades Scavenger 2000 continúan trabajando en la zona 5 de la presa Valsequillo y los resultados obtenidos corresponden a las mediciones registradas en dicha zona.

De manera general, se puede afirmar que el tratamiento mediante la operación de las unidades Scavenger 2000 ha probado ser efectivo en la eliminación de contaminantes y por consiguiente en alcanzar los niveles establecidos por la Declaratoria de clasificación de los ríos Atoyac y Xochiac o Hueyapan y sus afluentes (DCRAXA). De acuerdo a las mediciones obtenidas por el sistema de monitoreo en tiempo real S::can y en función de la cantidad de agua tratada durante el periodo de operación de las unidades Scavenger 2000, se calcula que se eliminaron [en toneladas], 1427 de  $DQO_{eq}$ , 922 de  $DBO_{eq}$ , 615 de  $TOC_{eq}$  y 1662 de SST. El porcentaje de remoción de la turbidez fue de 72.9 %, la cual está relacionada con los sólidos suspendidos totales, ya que ambos presentan una Correlación de Pearson de 0.99 ( $p < 0.05$ ). El nitrógeno total (NT) y el nitrógeno amoniacal ( $NH_4^+$ ) presentaron una reducción del 28.6 % y del 24.5 %, respectivamente, después de 11 meses de operación. Lo anterior implica una remoción de 124.1 y 93.3 toneladas de NT y  $NH_4^+$ , respectivamente. El color real se redujo hasta en un 70 % después de 11 meses de operación, dando lugar una mayor transparencia del agua de la presa Valsequillo. Las sustancias activas al azul de metileno (SAAM) se redujeron hasta en un 52 % al final del tratamiento con las unidades Scavenger 2000.

## Capítulo 2 (Descripción del servicio)

### 2.1 Operación de las Unidades Scavenger 2000 y dosificación diaria

Desde el 15 de Octubre las unidades SCAVENGER 2000 se han operado diariamente por 6 días a la Semana (de Lunes a Sábado) aplicando 250 kilos de oxígeno por hora y 60 gramos de ozono por hora de acuerdo a lo que se estableció en el contrato. Con la finalidad de mantener monitoreada la calidad del agua durante el tratamiento de muestreo se tomaron muestras de agua en los sitios señalados en la figura 1.



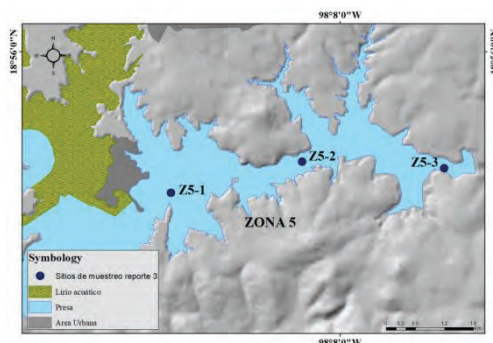


Figura 1. Sitios de muestreo al interior de la sub-zona Z5-F (flujo principal del agua)

De acuerdo a lo establecido al comenzar la operación de las unidades Scavenger 2000, el proveedor del servicio segmentó la zona 5 en 9 sub-zonas con el objetivo de garantizar y controlar la cobertura total del tratamiento en toda la superficie de dicha zona. Tal segmentación también sirve para mantener control sobre la operación de las unidades durante el servicio (Figura 2). Lo anterior se hizo basándose en las características propias de la presa en la zona 5, tales como cortos circuitos hidráulicos, flujo principal, asentamientos humanos alrededor de la presa Valsequillo, etc.

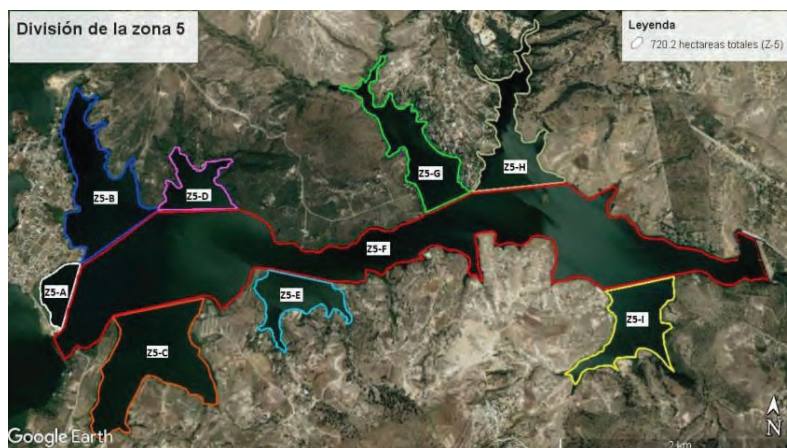


Figura 2. Segmentación de la zona 5 de la presa Valsequillo en 9 subzonas

Cabe destacar que, a la fecha, el proveedor continúa trabajando en la zona 5, después de un breve periodo de trabajo en la zona 3 y parte de la zona 4 de la presa Valsequillo. El proveedor continúa a la espera de que la Secretaría de Medio Ambiente y Ordenamiento territorial (SMAyOT) establezca en conjunto con el proveedor un plan de trabajo y recolección de las macrofitas acuáticas presentes en el resto de las demás zonas de la presa Valsequillo (Zona 4, Zona 3, Zona 2 y Zona 1). Como se ha venido enfatizando en reportes anteriores, la recolección de las plantas acuáticas es fundamental no solo para que el proveedor tenga acceso al resto a las zonas mencionadas, pero dicha acción permitirá remover de manera más eficiente algunos contaminantes que se encuentran absorbidos por el consorcio de macrofitas acuáticas.



## 2.2 Mantenimiento preventivo

Se ha llevado a cabo el mantenimiento preventivo de todos los sistemas de las unidades Scavenger 2000. A continuación, se enlistan las acciones realizadas desde el último reporte entregado a la SMAyOT (Tabla 1):

Tabla 1. Mantenimiento preventivo de las tres unidades Scavenger 2000

	MOTOR 1	MOTOR 2	GENERADOR ELECTRICO	SALA DE MAQUINAS
PUEBLA 1	Diariamente	Chequeo de los niveles de anticongelante y niveles de aceite	Chequeo de los niveles de anticongelante y niveles de aceite	Chequeo diario de los niveles de aceite y anticongelante
		Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel
	Periódicamente	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel
				Engrasado del cañón de agua y engrasado de la bomba de agua
PUEBLA 2	Diariamente	Chequeo de los niveles de anticongelante y niveles de aceite	Chequeo de los niveles de anticongelante y niveles de aceite	Chequeo diario de los niveles de aceite y anticongelante
		Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel
	Periódicamente	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel
				Engrasado del cañón de agua y engrasado de la bomba de agua
PUEBLA 3	Diariamente	Chequeo de los niveles de anticongelante y niveles de aceite	Chequeo de los niveles de anticongelante y niveles de aceite	Chequeo diario de los niveles de aceite y anticongelante
		Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel
	Periódicamente	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel	Cambio de aceite y filtro de aceite y filtro de diésel
				Engrasado del cañón de agua y engrasado de la bomba de agua

## 2.3 Solución a todas las fallas

A lo largo de todo el servicio de operación de las tres unidades, se han presentado algunas fallas propias del uso de las unidades. Tales fallos y sus respectivas acciones se presentan en la tabla 2.

Tabla 2. Lista de fallas y acciones realizadas a la fecha a las tres unidades Scavenger 2000.

No	Puebla 1		Puebla 2		Puebla 3	
	Falla	Estatus	Falla	Estatus	Falla	Estatus
1	Propelas del sistema de enfriamiento del generador dañadas	Ya se reemplazó por una nueva	Fuga de agua de la bomba del sistema de enfriamiento	Ya fue sellada	Propelas del sistema de enfriamiento del generador dañadas	Ya se reemplazó por una nueva
2	Bomba cebadora presentó desgaste en sus membradas	Ya colocó una nueva			Impeller de la bomba Johnson dañado	Ya se reemplazó por una nueva
3			Cesta de transferencia trabada	Ya se arregló y se engrasó	Bomba cebadora presentó desgaste en sus membradas	Ya reemplazó una nueva
4	Goteo de la bomba del motor secundario descalibrado	Ya se calibró				
5			Recubrimiento de calor de la sala de máquinas desgastado	Ya se colocó uno nuevo		

## 2.4 Dosificación diaria

Desde el 15 de octubre la primera unidad Scavenger 2000 viene dosificando 250 kilos de oxígeno por hora y 60 gramos de ozono por hora de acuerdo a lo que se estableció en el contrato (Figura 3).



Figura 3. Operación de las unidades Scavenger 2000 en la zona 5 de la presa Valsequillo (Tomadas el 29 de marzo de 2019)

En el Apéndice A se presentan las bitácoras de navegación donde se detalla la relación de las sub-zonas tratadas (de la Z5-A a la Z5-I).



## Capítulo 3 (Medición de la calidad del agua)

### 3.1 Metodología

La medición de la calidad del agua se llevó a cabo de dos diferentes manera: (1) Mediciones en campo y (2) Muestreo y determinación diferentes parámetros fisicoquímicos y biológicos en laboratorios acreditados ante la Entidad Mexicana de Acreditación A.C. (EMA).

#### 3.1.1 Mediciones en campo

Las mediciones en campo se llevaron a cabo mediante un equipo espectrómetro (Spectrolyser ) marca S::can basado en un principio de medición de tipo óptico. Este equipo tiene la capacidad de medir Demanda química de Oxígeno equivalente (DQOeq), Demanda bioquímica de oxígeno equivalente (DBOeq), Carbono Orgánico Total equivalente (TOCeq). Color, nitratos, Turbidez, Oxígeno disuelto (OD), Potencial Oxido reducción (ORP). Potencial de Hidrogeno (pH), Conductividad eléctrica, Solidos suspendidos totales (SST) y temperatura. Los sensores de campo (Oxi::Lyser, Condu::Lyser, pH::lyser, Redo::Lyser y el Spectrolyser se encuentran conectados a una interfase marca S::can modelo Con::cube (Figura 4).



Figura 4. Equipos de medición marca S::can (a) Condu::Lyser, (b) pH::lyser, (c) Redo::Lyser, (d)Oxi::Lyser, (e) Spectrolyser y (f) Con::cube.

El equipo fue montado por el proveedor en la unidad Scavenger 2000 Puebla 3. Para ello se instaló un *Open Tank* en el puente de mando en la parte de popa de unidad. El *open tank* fue suministrado con agua de la presa de manera constante mediante una bomba sumergible que se instaló a 2.5 metros de profundidad. El equipo se programó para que midiera cada 2 o 3 minutos. El muestreo se llevó a con la unidad Puebla 3 mediante la realización de transeptos cubriendo cada una de las sub-zonas mediante. Durante el recorrido de la unidad Puebla 3 se tomaron entre 20 y 30 muestras a las cuales se les hicieron mediciones de calidad de agua.

#### 3.1.2 Mediciones en laboratorio

Para determinar la calidad del agua se llevó a cabo el muestreo en los sitios descritos en la figura 1, los cuales forman parte de la subzona F, ya que ésta es la del flujo principal de la presa Valsequillo. Para ello



se contrató a un laboratorio acreditado con un signatario acreditado para tomar las muestras. De manera particular, en el sitio Z5-1, se midieron todos los parámetros fisicoquímicos y biológicos especificados en la declaratoria de clasificación de los ríos Atoyac y Xochiac o Hueyapan y sus afluentes (DCRAXA). Por otro lado en los sitios Z5-2 y en el sitio Z5-3 se llevaron a cabo determinaciones de varios parámetros fisicoquímicos y biológicos de calidad de agua, a saber: Nitrógeno total (NT), nitrógeno amoniacal ( $\text{NH}_4^+/\text{NH}_3$ ), Nitrogeno total Kjeldahl (NTK), Demanda química de Oxígeno (DQO), Fosforo total (FT), Nitratos ( $\text{NO}_3^-$ ), Sustancias Activas de Azul de Metileno (SAAM), Nitritos ( $\text{NO}_2^-$ ), Coliformes fecales (CF), Demanda Bioquímica de Oxígeno (DBO), Color real (Pt-Co) y Grasas y Aceites (GyA). Algunos de los métodos estandarizados utilizados en la medición de los parámetros se encuentran descritos en la tabla 3.

Tabla 3. Métodos empleados para medir los parámetros fisicoquímicos y biológicos contenidos en la DCRAXA

Parametro	Unidades	Equipo	Metodo
Color real (CR)	Pt-Co	Aqua tester, Orbeco/Hellige (Model C611A)	NMX-AA-045-SCFI-2001
Grasas y aceites (GyA)	mg/L	Extraction by using hexane as solvent	NMX-AA-005-SCFI- 2013
Fosforo total (PT)	(mg/L)	FA'S OI Analytical - Flow Solution IV	NMX-AA-029-SCFI-2001
Nitrogeno amoniacal ( $\text{NH}_3\text{-N}$ )	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-026-SCFI-2010
Nitratos $\text{NO}_3^-$	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-079-SCFI-2001
Sulfatos ( $\text{SO}_4^-$ )	mg/L	FA'S OI Analytical - Flow Solution IV	US EPA 9036-1986
Cloruros ( $\text{Cl}^-$ )	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-073-SCFI-2001
Cianuros totales ( $\text{CN}^-$ )	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-058-SCFI-2001
Al, Cr, Cu, Fe, Zn, Mn and Ni	$\mu\text{g} / \text{L}$	ICP-OES CID Thermo Scientific-6500	NMX-AA-051-SCFI-2001
Hg	$\mu\text{g} / \text{L}$	Mercury analyzer Hydra IIAA	NMX-AA-051-SCFI-2001
Dimethyl phthalate (DMP), Diethyl phthalate (DEP), Dibutyl phthalate (DBP), Di(2-ethylhexyl) phthalate (DEHP) and Di(n-octil)ftalato (DINP)	$\mu\text{g} / \text{L}$	Gas chromatography (GC / MSD) Agilent technologies 7890B-5977 A MSD	US EPA 8270D 2007
Isoforona (IP)	$\mu\text{g} / \text{L}$	Gas chromatography (GC / MSD) Agilent technologies 7894 B / 5977 A MSD	US EPA 8270D 2007
Fenoles totales (TPh)	$\mu\text{g} / \text{L}$	FA'S OI Analytical - Flow Solution IV	US EPA 8270D 2007
Demanda Química de Oxígeno	mg/L	Reactor de digestion para DQO Hach DRB200	NMX-AA-030/1-SCFI-2012
Demanda Bioquímica de Oxígeno	mg/L	Botellas winkler 300 ml. Incubadora para DBO	NMX-AA-030/1-SCFI-2012

### 3.1.3 Análisis Estadístico

El índice de correlación de Pearson se aplicó para encontrar posibles interacciones entre las concentraciones de algunos parámetros fisicoquímicos. Los análisis estadísticos se llevaron a cabo utilizando Sigma Plot 12.0 (Systat Software Inc., San José, CA, EE. UU.).



## Capítulo 4 (Resultados)

### 4.1 Mediciones en campo

En la presente sección se presenta una comparación de los resultados correspondientes a las 9 sub-zonas (desde Z5-A hasta Z5-I) obtenidos a lo largo del periodo de operación de las unidades Scavenger 2000 con el equipo S::can montado en la unidad Puebla 3. A lo largo del tiempo de operación de las unidades Scavenger 2000 se registró un aumento en la concentración de oxígeno disuelto en las distintas sub-zonas tratadas de la zona 5, desde el 20 de febrero de 2019 hasta el 28 de agosto de 2019. Sin considerar el oxígeno aparente (fotosintético) de la sub-zona C y H, se calculó que la concentración de oxígeno disuelto en toda la zona 5 alcanzó una concentración promedio de  $1.83 \pm 1.10$  mg/L; después de casi 50 días de tratamiento se incrementó a  $4.15 \pm 2.04$  mg/L y posteriormente pasó a  $2.66 \pm 1.46$  mg/L.

Esto representa un aumento con respecto al 20 de febrero de 2019, de 226 % y de 45.3 %, respectivamente. Cabe destacar que este aumento no representa la totalidad del incremento de este parámetro, ya que al 20 de febrero de 2018 ya se contaban con alrededor de 4 meses de tratamiento en la presa, sugiriendo que incluso podría ser mayor que lo calculado.

Es de notarse que a pesar de que las lluvias traen consigo una cantidad importante de contaminantes (materia orgánica, fósforo, nitrógeno, etc.) los cuales tienden a generar una disminución de oxígeno disuelto en el cuerpo de agua, la concentración de oxígeno disuelto en la zona 5 de la presa Valsequillo no disminuyó y por el contrario aumentó; lo que da cuenta de la labor llevada a cabo por las unidades Scavenger 2000 durante este periodo de operación fue de gran importancia para contener esa caída esperada en la concentración de oxígeno disuelto.

El aumento del oxígeno disuelto durante todo el tiempo de operación de las unidades Scavenger 2000 también tuvo un impacto en el incremento del potencial de oxidación-reducción (ORP), el cual pasó de  $-28.44 \pm 84.99$  mV en febrero de 2019 a  $81.34 \pm 26.10$  mV en abril de 2019; y posteriormente el ORP se registró en  $52.43 \pm 23.64$  mV en agosto del mismo año (Figura 5).



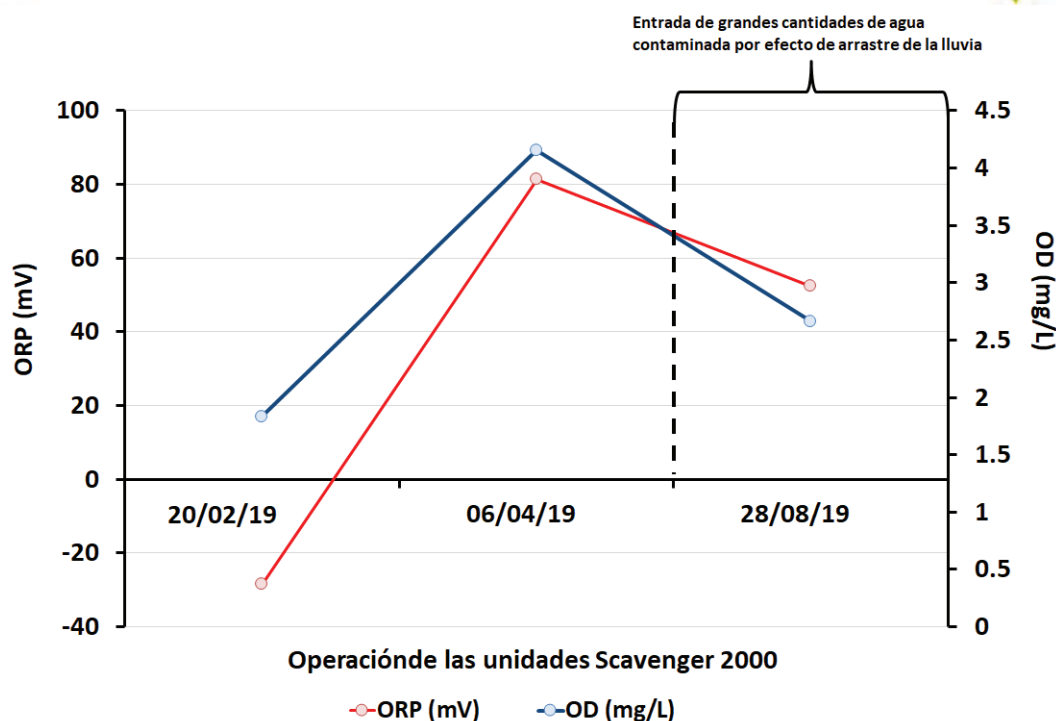


Figura 5. Valores de concentraciones promedio de ORP y OD medidos en distintas fechas

Tales valores reflejan que el ambiente pre-existente químicamente reductor pasó a ser oxidante, dando lugar a la predominancia de organismos consumidores de oxígeno (bacterias aerobias), los cuales no generan malos olores y tienden a ser de naturaleza menos patógena que los primeros. Durante todo el periodo de operación, el pH no presentó variaciones importantes a lo largo del tratamiento con las unidades Scavenger 2000.

Así mismo, la conductividad presenta una reducción del 8.2 % de febrero a agosto de 2019 y de 19.3 % de abril a agosto de 2019. Los sólidos suspendidos se redujeron en promedio un 45.6 % de febrero de 2019 a abril del mismo año y al mes de agosto la reducción fue de 71.1 % (Figura 6).

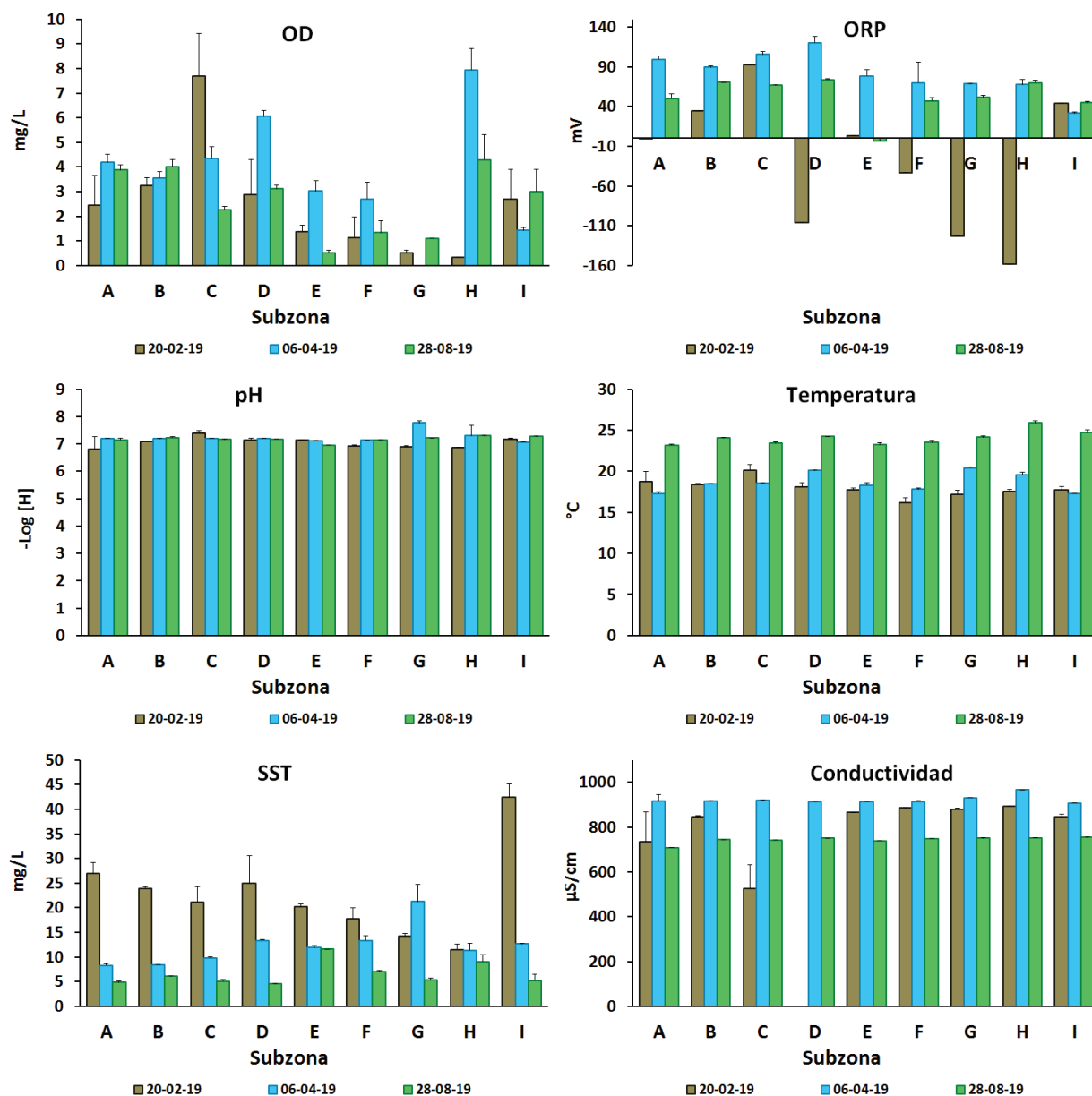


Figura 6. Parámetros fisicoquímicos convencionales de campo

El tratamiento con el Scavenger 2000 también fue exitoso en la reducción de la materia orgánica, ya que de acuerdo con los valores registrados con el sistema de monitoreo en tiempo real S::can, la  $DQO_{eq}$ , la  $DBO_{eq}$  y el  $TOC_{eq}$  registraron una reducción de 42.6 %, 35.5 % y de 42.9 %, respectivamente (Figura 7).

## Indicadores de contaminación en zona 5

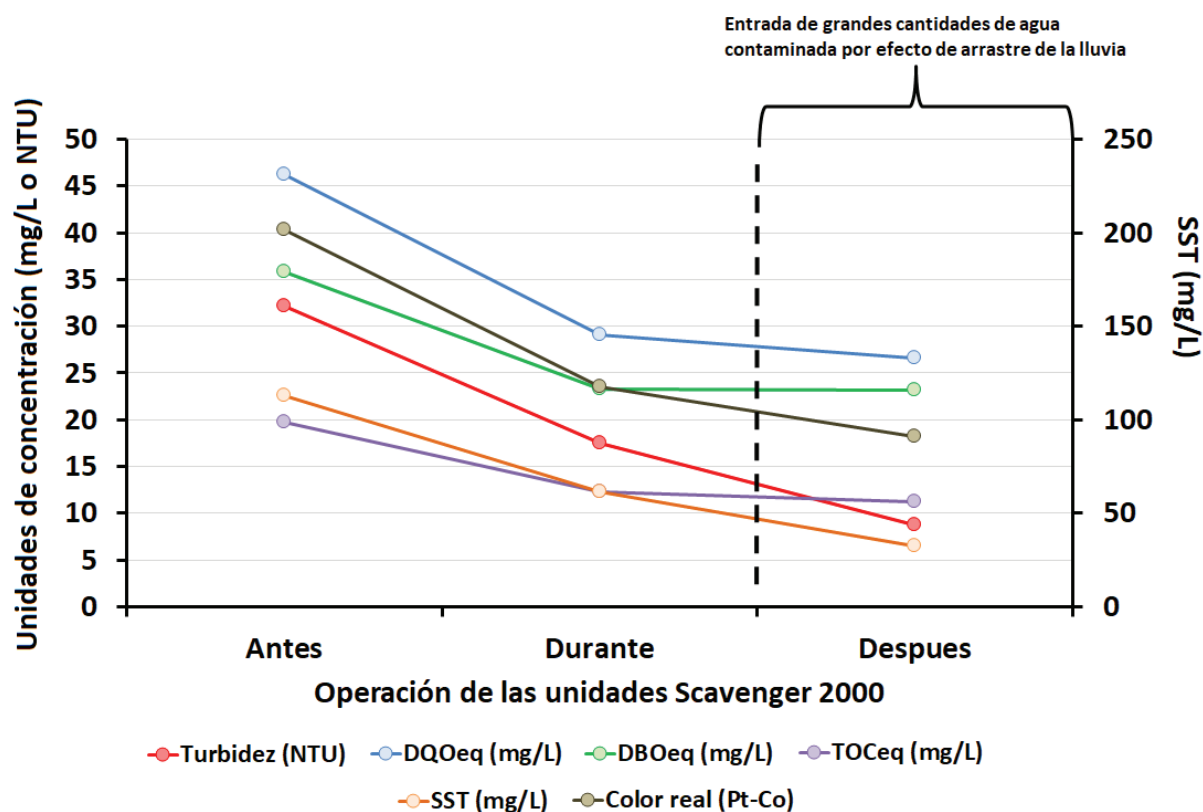


Figura 7. Niveles de concentración de distintos parámetros fisicoquímicos durante el tratamiento

Más aun, la relación  $DBO_{eq}/DQO_{eq}$  pasó de 0.77 a 0.87 lo cual implica que la materia orgánica presente en la zona 5 de la presa Valsequillo se volvió más biodegradable a lo largo del periodo de operación con las unidades Scavenger 2000.

Los sólidos suspendidos totales presentan una Correlación de Pearson de 0.99 ( $p < 0.05$ ) con la turbidez. Es por ello que el porcentaje de remoción de la turbidez (72.9 %) fue muy similar al de los sólidos totales. Este parámetro es muy importante ya que es una medición indirecta de la transparencia del agua, misma que al ser mayor, permite la penetración de la luz a lo largo de la columna de agua (Figura 8).



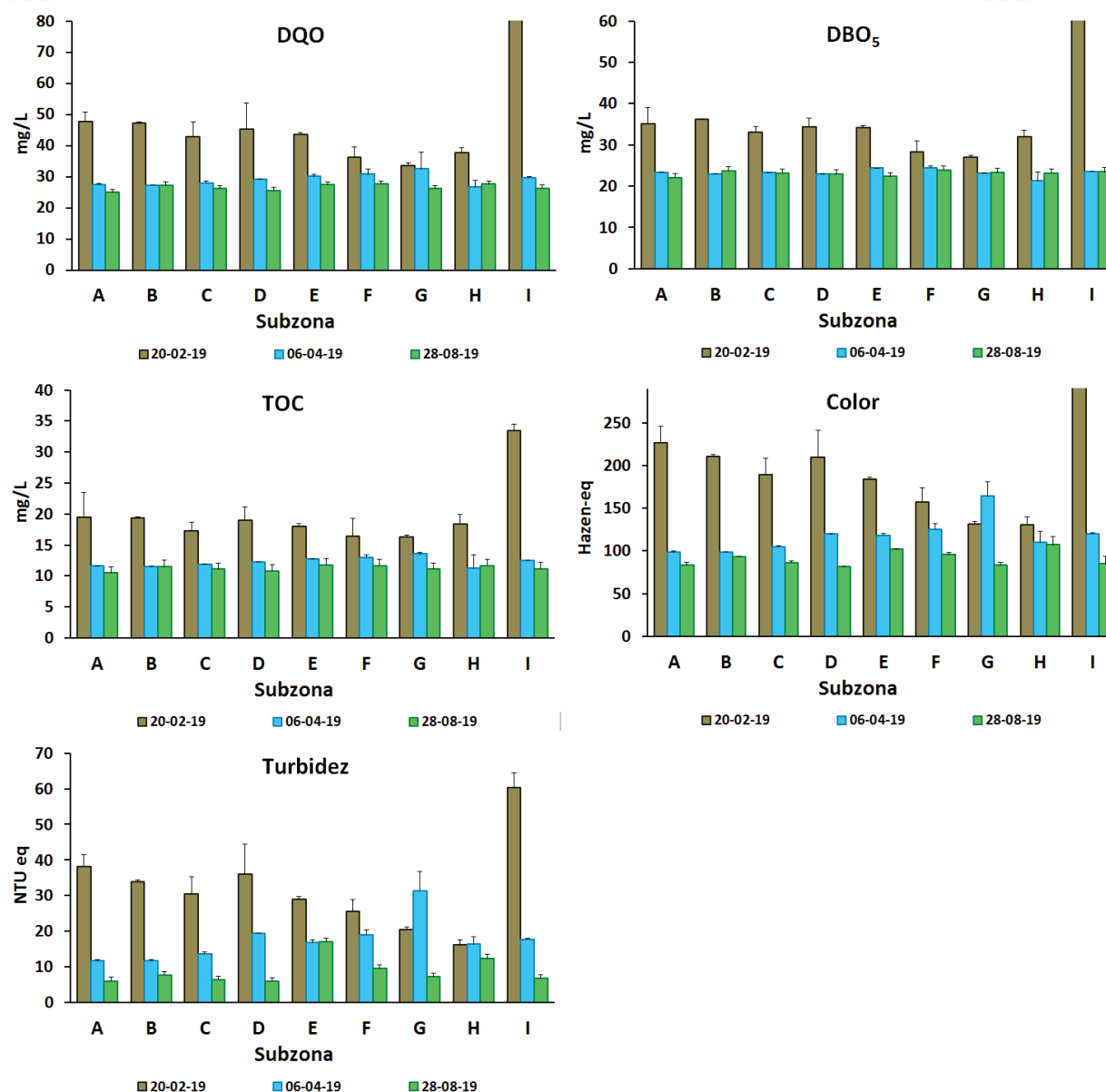


Figura 8. Parámetros fisicoquímicos no-convencionales de campo

De acuerdo a las mediciones obtenidas por el sistema de monitoreo en tiempo real S::can y en función de la cantidad de agua tratada durante el periodo de operación de las unidades Scavenger 2000, se calcula que se eliminaron [en toneladas], 1427 de DQO<sub>eq</sub>, 922 de DBO<sub>eq</sub>, 615 de TOC<sub>eq</sub> y 1662 de SST. Cabe destacar que estos valores solo son los correspondientes al periodo que comprende entre el 20 de febrero de 2019 al 28 de agosto del 2019. Debido a que las unidades Scavenger 2000 comenzaron a dosificar a finales del mes de octubre, durante los 4 meses comprendidos entre octubre y febrero se presume que debió existir una reducción de estos parámetros, la cual no se encuentra cuantificada en el presente reporte.

## 4.2 Mediciones en laboratorio

En el presente capítulo se presentan los resultados correspondientes a varios parámetros físico-químicos y biológicos obtenidos en laboratorios acreditados. Así mismo, se ha realizado una comparación con los límites máximos permisibles establecidos por la norma mexicana NOM-001-ECOL-1996 y por la Declaratoria de Clasificación de los ríos Atoyac y Xochiac o Hueyepan, y sus afluentes (DCRAXA).

Los resultados obtenidos antes (31/10/2018), durante (24/01/2019) y después del tratamiento (11/09/2019) con las unidades Scavenger 2000 en la presa Valsequillo. El 93 % de los parámetros establecidos por la DCRAXA después del tratamiento se encuentran por debajo de los límites establecidos. De entre los resultados más destacados se encuentran los coliformes fecales, los cuales se redujeron en un 99.6 % después de 4 meses de tratamiento y un 87 % después de 11 meses de tratamiento (Figura 9). Cabe mencionar que durante todo el periodo de operación con las unidades Scavenger 2000, se mantuvieron por debajo de los límites máximos permitidos.

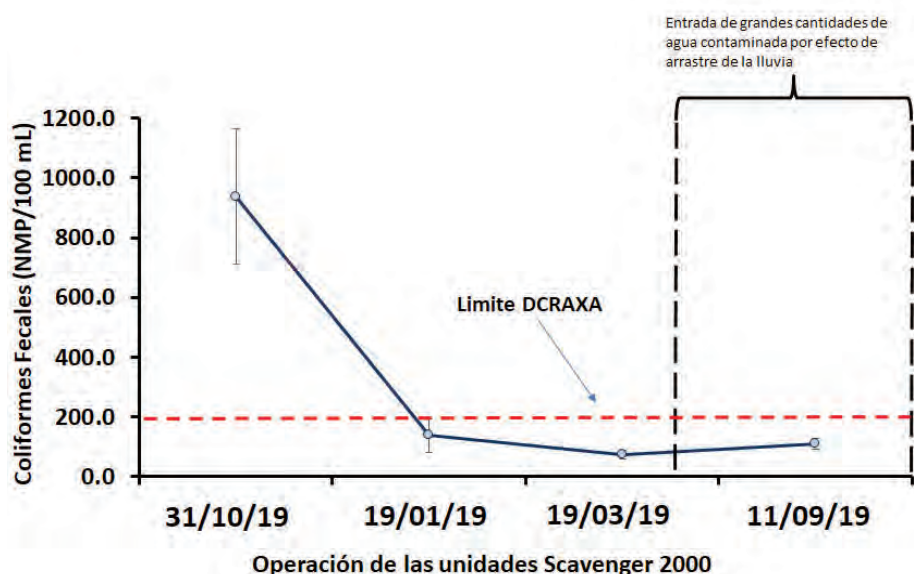


Figura 9. Concentración de Coliformes Fecales a lo largo del periodo de operación

El nitrógeno total (NT) y el nitrógeno amoniacal ( $\text{NH}_4^+$ ) presentaron una reducción del 28.6 % y del 24.52 %, respectivamente después de 11 meses de operación. Lo anterior implica una remoción de 124.1 y 93.3 toneladas de NT y  $\text{NH}_4^+$ , respectivamente.

El color real se redujo hasta en un 70 % después de 11 meses de operación de las unidades Scavenger 2000 dando lugar una mayor transparencia del agua de la presa Valsequillo. Las sustancias activas al azul de metileno (SAAM) se redujeron hasta en un 52 % al final del tratamiento con las unidades SCavenger 2000.



La reducción de la materia orgánica medida como  $\text{DBO}_5$  fue de 55.6 %, lo que se traduce en una remoción de la materia orgánica biodegradable de hasta 241 toneladas después de 11 meses de operación. Todos los metales pesados contenidos en la DCRAXA se encuentran por debajo de los límites permisibles. El incremento en la concentración de sulfatos de 61.5 a 74.32 mg/L refleja un cambio de las condiciones reductoras de la presa a oxidantes.

La totalidad de los compuestos orgánicos semi-volátiles se encuentran por debajo de los límites establecidos por la DCRAXA. Durante todo el periodo de operación de las unidades, la toxicidad vibrio fischeri (UT) y la Toxicidad daphnia magna (UT) (48H) se mantuvieron por debajo de los límites de detección. Los compuestos orgánicos asociados a los plásticos como son los ftalatos se encontraron por debajo de los límites máximos permisibles durante todo el periodo de operación (Tabla 4).

Tabla 4. Resultados correspondientes a la DCRAXA antes, durante y después del tratamiento

Numero	Parámetro (mg/L ó µg/L)	Límite máximo permisible		Resultados		
		NOM-001- SEMARNAT-1996	DCRAXA	31-10-18 <sup>+</sup>	24-01-19 <sup>+</sup>	11-09-2019 <sup>+</sup>
1	As	0.49	0.05	ND	ND	0.0020
2	Cd	0.10	0.004	ND	ND	<0.0030
3	CN	3.00	0.01	0.0011	0.0023	0.0016
4	Cu	6.00	0.05	ND	0.001	0.00241
5	Cr	1.00	0.05	ND	ND	<0.020
6	Hg	0.01	0.001	ND	ND	<0.0005
7	Ni	4.00	0.6	ND	ND	<0.1
8	Pb	10.00	0.03	ND	ND	<0.005
9	Zn	20.00	0.12	0.005	ND	<0.08
10	SST	125.00	56.4	ND	11	<15
11	DBO5 +	150.00	20	12	6.2	5.32
12	DQO +	320.00	40	14	38	36
13	S Sed.	2.00	<1	ND	ND	<1
14	G y A	25.00	5.0	ND	ND	<6
15	CF (NMP)	2000.00	<200	930	3	150
16	Fosforo T	30.00	0.73	2.1	2.5	2.1
17	NT	60.00	5.0	11.97	12.34	8.54
18	SDT	N/A	500	488	549	504
19	N (NH <sub>3</sub> )	N/A	0.66	10.52	11.6	7.94
20	Fenoles totales	N/A	0.01	0.013	0.08	<0.01
21	Sulfatos	N/A	150	61.5	61.7	74.32
22	Fe	N/A	0.32	0.089	0.065	0.11
23	Cloruros	N/A	250	64	0.023	56.3
24	Benceno	N/A	0.01	ND	ND	<0.001
25	Tolueno	N/A	0.20	ND	ND	<0.001
26	Etilbenceno	N/A	0.1	ND	ND	<0.001
27	Toxicidad vibrio fischeri (UT)	N/A	<1	<1	<1	<1
28	Toxicidad daphnia magna (UT) (48H)	N/A	<1	<1	<1	<1





29	Sulfuros	N/A	0.002	ND	ND	0.163
30	Al	N/A	0.05	0.026	ND	0.027
31	Mn	N/A	0.1	0.32	0.2761	0.21
32	Cloruro de metilo	N/A	0.0002	ND	ND	<0.001
33	Cloroformo	N/A	0.03	ND	ND	<0.001
34	Cloruro de vinilo	N/A	0.002	ND	ND	<0.001
35	1,2 Diclorobenceno	N/A	0.01	ND	ND	<0.001
36	1,3 Diclorobenceno	N/A	0.01	ND	ND	<0.001
37	1,4 Diclorobenceno	N/A	0.01	ND	ND	<0.001
38	1,2 Dicloroetano	N/A	0.069	ND	ND	<0.001
39	Tetracloroetileno	N/A	0.05	ND	ND	<0.001
40	Bis 2 (etil hexil) Ftalato	N/A	0.003	ND	ND	<0.001
41	Nitrobenceno	N/A	0.03	ND	ND	<0.0005
42	Color real (Pt-Co)	N/A	<15	100	60	30
43	SAAM	N/A	0.10	0.21	0.72	<0.1
44	Huevos de helminto	N/A	0-1			0
45	Materia flotante	N/A	Ausente	-	-	Ausente
46	pH		6.5-8.5	-	-	7.6
47	Temperatura	< 40 °C	-35 °C	-	-	22 °C

<sup>+</sup>Z5-2, <sup>\*</sup>Z5-3

Cabe mencionar que el proveedor no se limitó a medir solamente los parámetros contenidos en la DCRAA; en el presente documento se reportan una serie de compuestos aromáticos semi-volátiles que también son de importancia para los cuerpos de agua. Todos estos compuestos se encuentran por debajo de los límites de cuantificación (Ver Apéndice B).

Adicionalmente, se llevaron a cabo mediciones en los sitios de muestreo Z5-2 y Z5-3 (Tabla 5). Cabe destacar que los valores de concentración de nitratos en el sitio de muestreo Z5-2 sugieren que se está llevando a cabo un proceso de nitrificación (oxidación del nitrógeno amoniacal), el cual es benéfico, ya que este proceso (nitrificación del nitrógeno) es el primer paso para que el nitrógeno presente en el agua de la presa se convierta a nitrógeno gaseoso. Esto se relaciona directamente con la reducción del nitrógeno amoniacal desde el inicio del tratamiento y hasta la fecha.

De la misma forma que con la muestra de agua Z5-1, los coliformes fecales se mantuvieron por debajo del límite de detección (200 NMP/100 ml). Por su parte el fósforo total presentó una ligera reducción de 16.36 % con respecto al valor registrado en el mismo sitio (Z5-2) en la línea base (antes del tratamiento). La concentración de grasas y aceites se mantuvo por debajo de los límites de detección en todos los sitios de muestreo. La DQO más baja se registró en el sitio Z5-3 con un valor inferior a los 19 mg/L, lo cual da cuenta de que el agua que se exporta al distrito de riego # 30 tiene una mejor calidad que cuando entra a la presa Valsequillo (Tabla 5).



**SECOND REPORT CONCERNING THE SERVICE,  
OPERATION AND MAINTENANCE CORRESPONDING TO  
THE EQUIPMENT ACQUISITION AGREEMENT FOR THE  
SANITATION OF THE VALSEQUILLO DAM**

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**GESFAL-030-285/2018 CONTRACT NUMBER: SDRSOT-  
011/2018**



**Managing Director  
Alejandro Dellepere**

**February 20<sup>th</sup>, 2018**

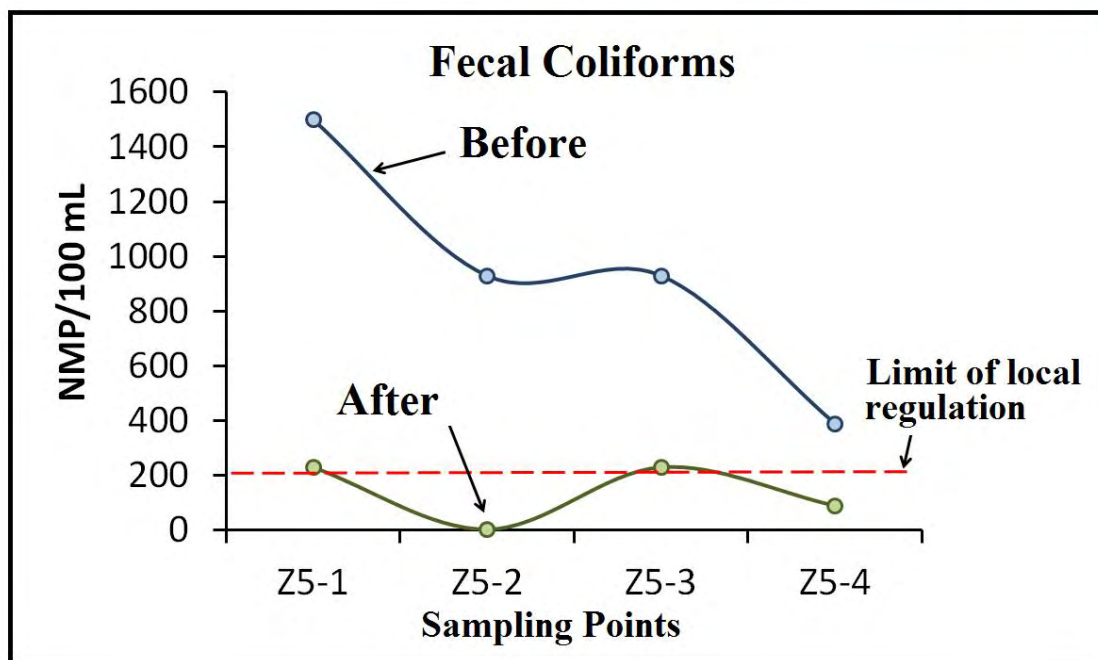
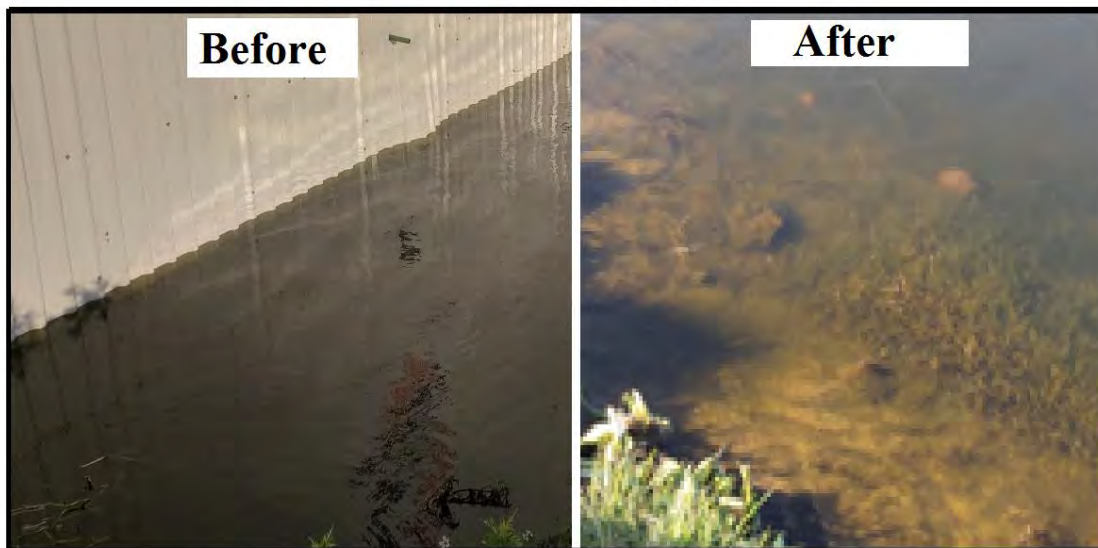


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## Graphical Abstract





## Chapter 1 Introduction

This document gives an account of the progress in the implementation of the sanitation program in the Valsequillo dam, in accordance with the provisions in the SDRSOT-011/2018 contract and its related annexes. Likewise, a description is given of the service carried out in terms of the operation of the three Scavenger 2000 units, which are currently working on the sanitation of the Valsequillo dam, Puebla. In terms of water quality, an analysis of the results obtained is also carried out, for which on-site measurements of physical-chemical parameters were carried out, while water samples were taken and sent to certified laboratories for their respective physicochemical and biological analysis.

The results obtained from the certified laboratories showed that the treatment with the Scavenger 2000 lead to a 40% reduction in water color which allows an increase of sunlight penetration in the water column setting the required conditions for a greater development of aquatic fauna. The presence of odors in the dam has disappeared in its entirety, which indicates an increased oxygenation in the Valsequillo dam promoting the growth of aerobic bacteria. Chemical Oxygen Demand (COD) decreased by 68% in a site near the town of San Baltasar Tetela, while in another place the Biochemical Oxygen Demand (BOD<sub>5</sub>) decreased by 48%. Iron (Fe), Zinc (Zn), Aluminum (Al) and Mn (Mn) decreased in quantity after the treatment. Turbidity is also reducing considerably from 38.2 to 16.1 NTU from the area of the dam called "La Panga" until its curtai.

The treatment proved efficient in the disinfection of Zone 5, obtaining reductions ranging from 75.2% to 99% in 4 sites throughout the work area. Overall, the Classification Declaration of the Atoyac and Xochiac or Hueyapan Rivers and its Tributaries (CDAXRT) is evidently fulfilled; and since the fecal coliforms are the criterion parameter in zone 5 of the Valsequillo dam, it can be asserted that to date the treatment delivered by the Scavenger 2000 units has been successful.

## Chapter 2 (Service description)

### 2.1 Scavenger 2000 Units Operation and daily dose

Since October 15<sup>th</sup> the SCAVENGER 2000 units have been operated daily for 6 days a week (from Monday to Saturday) applying 250 kilos of oxygen per hour and 60 grams of ozone per hour according to what was established in the agreement. Prior to dosing and in collaboration with the Ministry of Rural Development, Sustainability and Land Management (MRDSL), a plan was defined that included the selection of the sampling sites; which are shown below in figure 1.

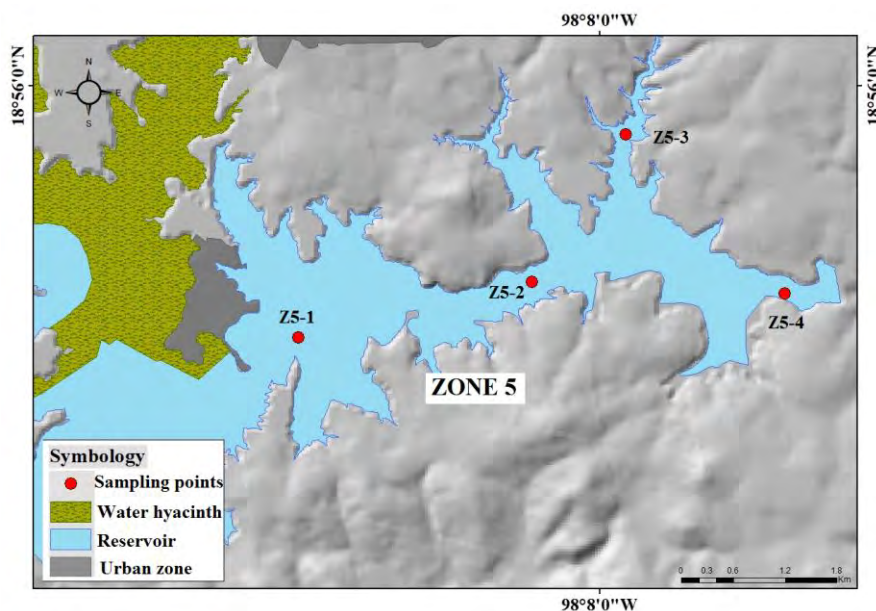


Figure 1. Sampling sites inside sub-zone Z5-F (main water flow)

Likewise, the service provider has segmented zone 5 into 9 sub-zones aiming to guarantee and control the total coverage of the treatment throughout the surface of that particular area, as well as maintaining control of the areas worked on during the period of time in which the service was to last. (Figure 2) This was done based upon the characteristics of the dam in zone 5, such as short hydraulic circuits, main flow, human settlements around the Valsequillo dam, etc. It should be noted that the sub-zone Z5-A is the closest one to a community called San Baltazar Tetela (the panga) while the zone Z5-I is the closest one to the curtain of the dam.

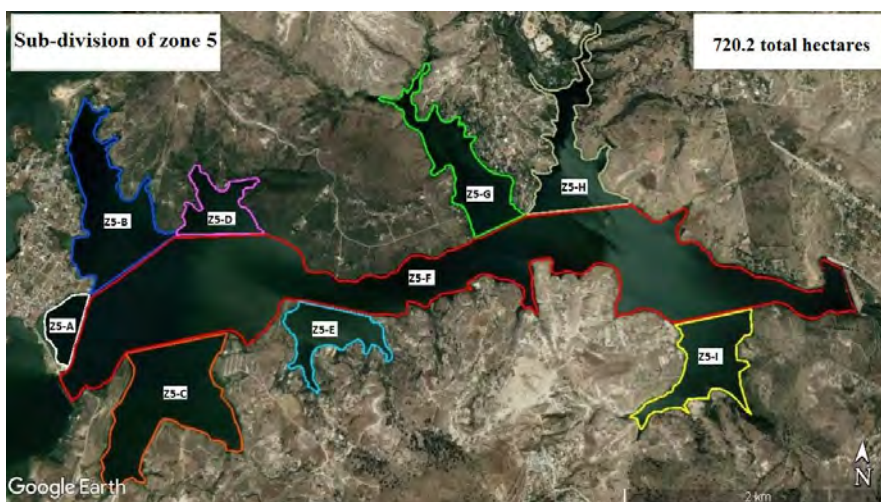


Figure 2. Segmentation of zone 5 of the Valsequillo dam into 9 subzones

As part of the service provided and attempting to know the contours of zone Z5 zone, 90% of the bathymetry of zone Z5 has been built which allows the Scavenger 2000 units to navigate safely around



the area. The bathymetry has prevented possible stranding of the units and has also been useful to find out the different depths that the treatment can reach (Figure 3). It should be noted that this bathymetry will only be useful when the dam is found at its maximum ordinary storage capacity (MOSC). Once the first agricultural cycle of the year has begun; that is, when the floodgates of the dam are opened, the bathymetry must be reconstructed if not adjusted.

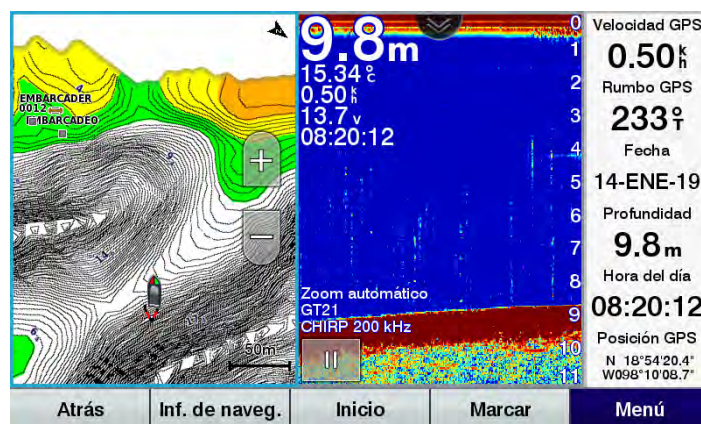


Figure 3. Construction of the bathymetry of zone 5 in the Valsequillo dam

## 2.2 Preventive maintenance

The preventive maintenance of all the systems of the Scavenger 2000 units has been carried out. The following actions are listed below:

- Maintenance service of the Northern Lights, model OM673L3, electric generators; Change of oil and filters.
- Daily cleaning of the marine Strainer filters (main and secondary motor) of the three Scavenger 2000 units
- Cleaning and emptying of the Racor type diesel filters of the three Scavenger 2000 units
- Daily check of the oil and antifreeze levels of the three Scavenger 2000 units.
- Change of oil and filters of both John Deere Model 4045TFM85 engines (main and secondary) of the three units Scavenger 2000

## 2.3 Solution to all flaws

Throughout the operation service of the three units, there have been some flaws inherent to the use of the units. Such flaws and their respective actions are presented in table 1.

Table 1. List of flaws and actions carried out to date to the three Scavenger 2000 units.

No	Trial 1		Trial 2		Trial 3	
	Flaw	Status	Flaw	Status	Flaw	Status
1	Locked transfer basket	To be fixed	Intermittent rudder sensor	To be fixed	Lights in the machine room do not turn on	Fuses were changed
2	Slight leakage of	Sealed	Slow transfer	Tuned	Transmission	Replaced

	oil in the transmission		basket		drips oil	and fixed
3	Hydraulic oil filter drip	Fixed	Poor contact air extractor	Fixed	Inverter cube has a loose bolt	Bolt was adjusted
4	Ballast pump drops the set screws	Set screws were changed	Leakage in secondary motor pump	Corrected	Port solenoid activates both doors	Adjusted
5	Leakage in secondary motor pump	Getting fixed	Port solenoid activates both doors	Adjusted	Rudder handle has an oil leak	Clamps were tightened
6			Reflectors stopped turning on	Changed		
7			No-current hydraulic pump	Fused was changed		
8			Leak found in the cooling system filter	The piece has been requested to the board and is about to be changed		

## 2.4 Daily dose

Since October 15<sup>th</sup>, the first Scavenger 2000 unit has been dosing 250 kilos of oxygen per hour and 60 grams of ozone per hour according to what was established in the agreement (Figure 4).

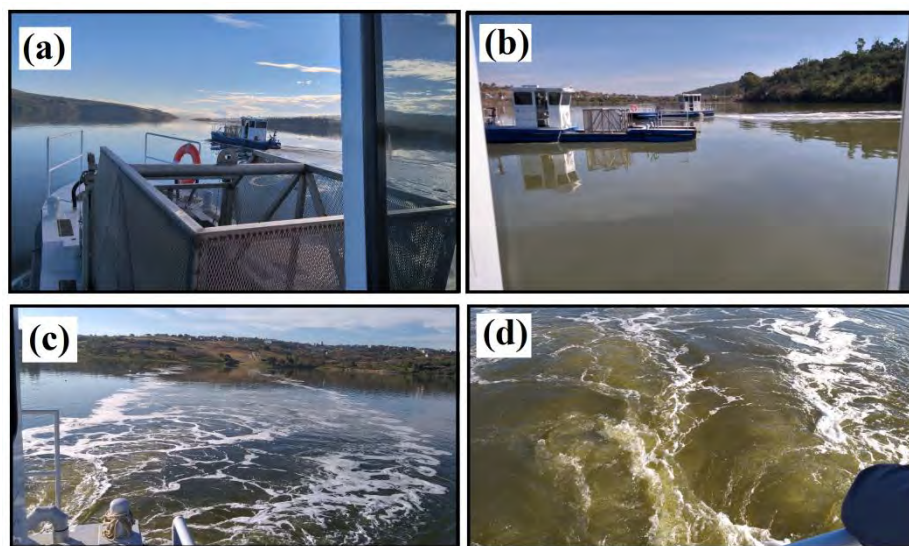


Figure 4. Operation of Scavenger 2000 units. (A) Navigation mode, (b) Treatment mode (c) Treatment trail and (d) Ozone and oxygen microbubbles

As previously stated, the selection of the sampling sites (figure 1) was fixed prior to dosing and in collaboration with the Ministry of Rural Development, Sustainability and Land Management (MRDSL). The relation of the treated sub-zones (from Z5-A to Z5-I) are thoroughly described in the navigation logs (Appendix A).

## Chapter 3 (Water quality measurement)

### 3.1 Methodology

The water quality measurements were carried out in two different ways: (1) On-site measurements and (2) Sampling and determination of different physicochemical and biological parameters in certified laboratories in accordance to the Mexican Accreditation Entity A.C. (MAE)

#### 3.1.1 On-site measurements

The on-site measurements were carried out using an S::can spectrometric (Spectrolyser) equipment based on an optical type measurement principle. This equipment has the ability to measure Equivalent Chemical Oxygen Demand (CODeq), Equivalent Biochemical Oxygen Demand Equivalent (BODeq), Total Equivalent Organic Carbon (TOCeq), Color, Nitrates, Turbidity, Dissolved Oxygen (DO), Oxide Potential Reduction (OPR), Potential Hydrogen (pH), Electrical Conductivity, Total Suspended Solids (TSS) and Temperature. The field sensors (Oxi::Lyser, Condu::Lyser, pH::lyser, Redo::Lyser and the Spectrolyser) are all connected to an S::can interface model Con::cube (Figure 5).

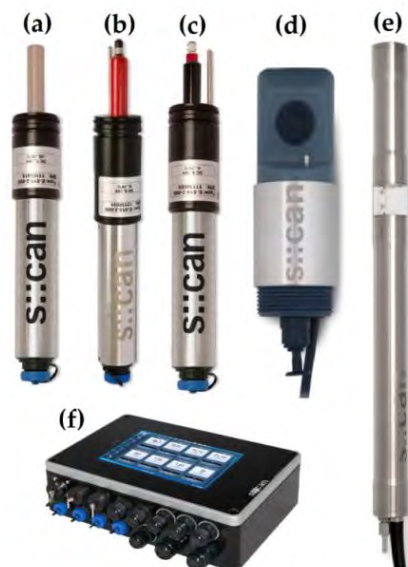


Figure 5. Measurement equipment with brand S::can (a) Condu::Lyser, (b) pH::lyser, (c) Redo::Lyser, (d) Oxi::Lyser, (e) Spectrolyser y (f) ) Con::cube.



The equipment was assembled by the supplier in the Scavenger 2000 Puebla 3 unit. To do this, an Open Tank was installed on the bridge in the aft part of the unit. The open tank was fed with water from the dam continually using a submersible pump that was placed at a 2.5 meter depth (Figure 6). The equipment was programmed to measure every 2 or 3 minutes.

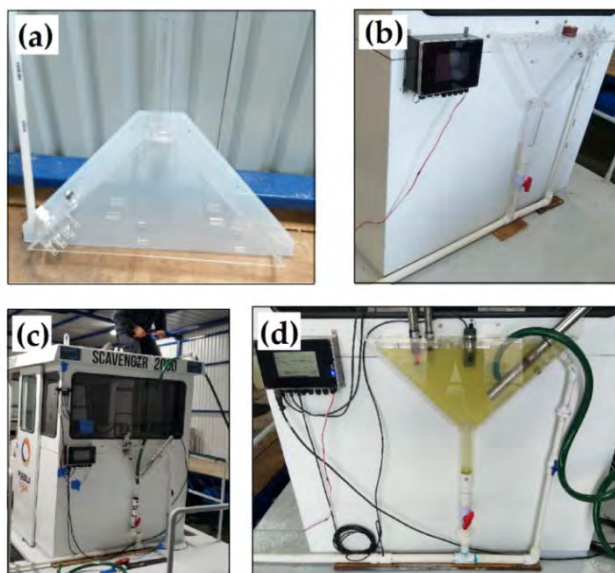


Figure 6. Installation of field equipment in Puebla 3. (a) Open Tank, (b) Assembly of Con:: cube and open tank, (c) Set up of submersible pump and (d) Running equipment

### 3.1.2 Measurement of physicochemical and biological parameters in the laboratory

To determine the quality of the water, sampling was carried out in the sites described in Figure 1. To this end, a certified laboratory with an accredited signatory was hired to take the samples. In site Z5-2 particularly, all the physicochemical and biological parameters stated in the Classification Declaration of the Atoyac and Xochiac or Hueyapan Rivers and its Tributaries (CDAXRT) were measured. Some of the standardized methods used in the measurement of the parameters are described in Table 2.

Table 2. Methods used to measure the physicochemical and biological parameters contained in the CDAXRT

Parameter	Units	Equipment	Method
Real color (RC)	Pt-Co	Aqua tester, Orbeco/Hellige (Model C611A)	NMX-AA-045-SCFI-2001
Oils and fats	mg/L	Extraction by using hexane as solvent	NMX-AA-005-SCFI-2013
Total phosphorus (TP)	(mg/L)	FA'S OI Analytical - Flow Solution IV	NMX-AA-029-SCFI-2001
Ammoniacal nitrogen( $\text{NH}_3\text{-N}$ )	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-026-SCFI-2010
Nitrates ( $\text{NO}_3^-$ )	mg/L	FA'S OI Analytical - Flow	NMX-AA-079-SCFI-

		Solution IV	2001
Sulfates ( $\text{SO}_4^-$ )	mg/L	FA'S OI Analytical - Flow Solution IV	US EPA 9036-1986
Clorines ( $\text{Cl}^-$ )	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-073-SCFI- 2001
Total cyanide ( $\text{CN}^-$ )	mg/L	FA'S OI Analytical - Flow Solution IV	NMX-AA-058-SCFI- 2001
Al, Cr, Cu, Fe, Zn, Mn and Ni	$\mu\text{g} / \text{L}$	ICP-OES CID Thermo Scientific- 6500	NMX-AA-051-SCFI- 2001
Hg	$\mu\text{g} / \text{L}$	Mercury analyzer Hydra IIAA	NMX-AA-051-SCFI- 2001
Dimethyl phthalate (DMP), Diethyl phthalate (DEP), Dibutyl phthalate (DBP), Di(2-ethylhexyl) phthalate (DEHP) and Di(n- octil)ftalato (DINP)	$\mu\text{g} / \text{L}$	Gas chromatography (GC / MSD) Agilent technologies 7890B-5977 A MSD	US EPA 8270D 2007
Isophorone (IP)	$\mu\text{g} / \text{L}$	Gas chromatography (GC / MSD) Agilent technologies 7894 B / 5977 A MSD	US EPA 8270D 2007
Total phenols (TPH)	$\mu\text{g} / \text{L}$	FA'S OI Analytical - Flow Solution IV	US EPA 8270D 2007

Being a criterion parameter in zone 5, fecal coliforms were measured in 4 different sites, which are referenced in figure 1. Samples were taken and sent to a certified laboratory [Figure 7 (a), (b), (d) and (e)] and regarding site Z5-2 being an important site (centroid of Zone 5), a certified laboratory with a signatory was hired [Figure 7 (c)].

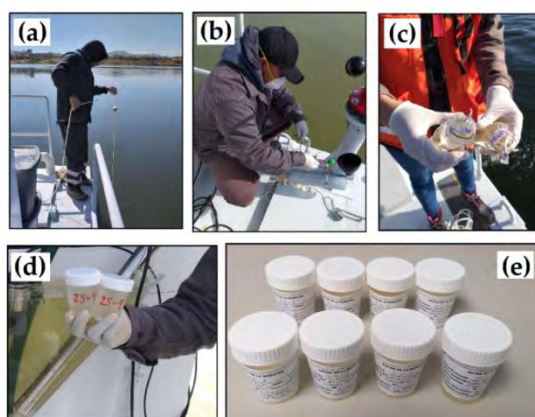


Figure 7. Fecal coliforms sampling at different sites along zone 5 of the Valsequillo dam



### 3.1.3 Statistic Analysis

All data groups were tested to determine homogeneity of variance and normality before statistical processing by employing the Levene and Shapiro-Wilk tests, respectively. In case of acceptance, the differences between the concentration values between one group and another were determined through the one-way analysis of variance (ANOVA). In case of non-acceptance of normality and homogeneity of variance, the Kruskal-Wallis test was performed. To identify the source of significant differences between the groups, Tukey post hoc tests and the Dunn method were performed with a  $p=0.05$  significance level for the parametric and nonparametric data, respectively. Statistical analyzes were performed using Sigma Plot 12.0.

## Chapter 4 (Results)

### 4.1.1 Criterion parameter for zone 5 (Fecal Coliforms)

Fecal coliforms were a criterion parameter in the engineering design for zone 5 of the present project. This is because the ozone treatment carried out by the Scavenger 2000 tends to be more efficient in terms of disinfection when it operates under conditions of low concentrations of organic matter. The results obtained from the certified laboratories showed that the treatment with the Scavenger 2000 unit was efficient in the disinfection of Zone 5, obtaining fecal coliforms reductions of 84.6%, 99%, 75.2% and 76.9% in the sampling sites Z5- 1, Z5-2, Z5-3 and Z5-4, respectively (Table 3).

Table 3. Fecal coliform concentrations before and after the treatment with SCAVENGER 2000 in 4 sampling sites in zone 5 of the Valsequillo dam at a 2.5 meters depth

Sample site	Fecal coliforms (MPN/100 mL.)		Removal percentage
	Initial value <sup>^</sup>	Final value	
Z5-1	1500	230 <sup>+</sup>	84.6 %
Z5-2	930	3 <sup>*</sup>	99 %
Z5-3	930	230 <sup>+</sup>	75.2 %
Z5-4	390	90 <sup>+</sup>	76.9 %

<sup>^</sup>31/October/2019 <sup>+</sup>29/January/2019; <sup>\*</sup>15/February/2019

The results obtained comply with what is established by the NOM-001-SEMARNAT-1996 norm in all sampling sites. The same applies for CDAXRT at sites Z5-2 and Z5-4 (see appendix B). Regarding sites Z5-1 and Z5-3, fecal coliform concentration values were obtained very close to the CDAXRT established limits (Figure 8).



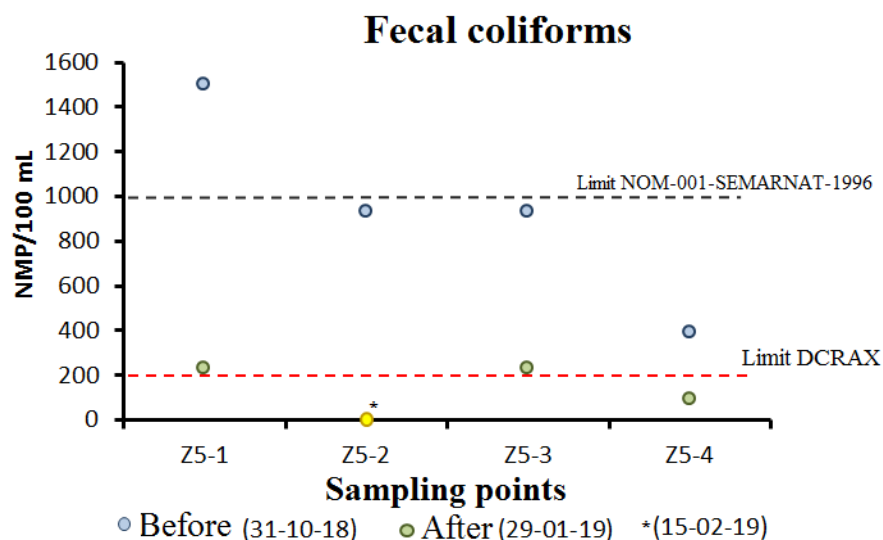


Figure 8. Concentration of fecal coliforms in 4 sampling sites before and after the Scavenger 2000 operation

Such results show that the goal of eliminating the criterion parameter is practically under compliance by what is established in the agreement specified in this document. It is expected that in the next measurements the values that are above 200 MPN / 100 mL will drop.

#### 4.1.2 On-site measurements

The results pertaining to the 9 sub-zones (from Z5-A to Z5-I) showed that there is a decreasing trend of essentially all on-site parameters. The pH values range from 6.8 to 7.4 throughout the sampling areas, complying with what is established in the CDAXRT (6.5-8.5). Dissolved Oxygen presented values between 0.33 and 7.7 mg / L, Z5-H being the place where the lowest value was found and Zone Z5-C where the highest value was found followed by zone Z5-I ( near the curtain). The DO is in agreement with the OPR, since the sites where the highest OD values were recorded, positive OPR values were also observed, with zones Z5-C and Z5-I being the highest (Figure 9). The water temperature did not show significant variations (between 17 and 20°C) nor did the conductivity. It should be noted that in the zone Z5-D no conductivity values are reported because the sensor was missing at the time when the measurements were carried out. Notwithstanding the above, the conductivity presents similar values to the 8 remaining work zones with the exception of site Z5-C, where a value of 525  $\mu\text{S} / \text{cm}$  is observed (Figure 9).

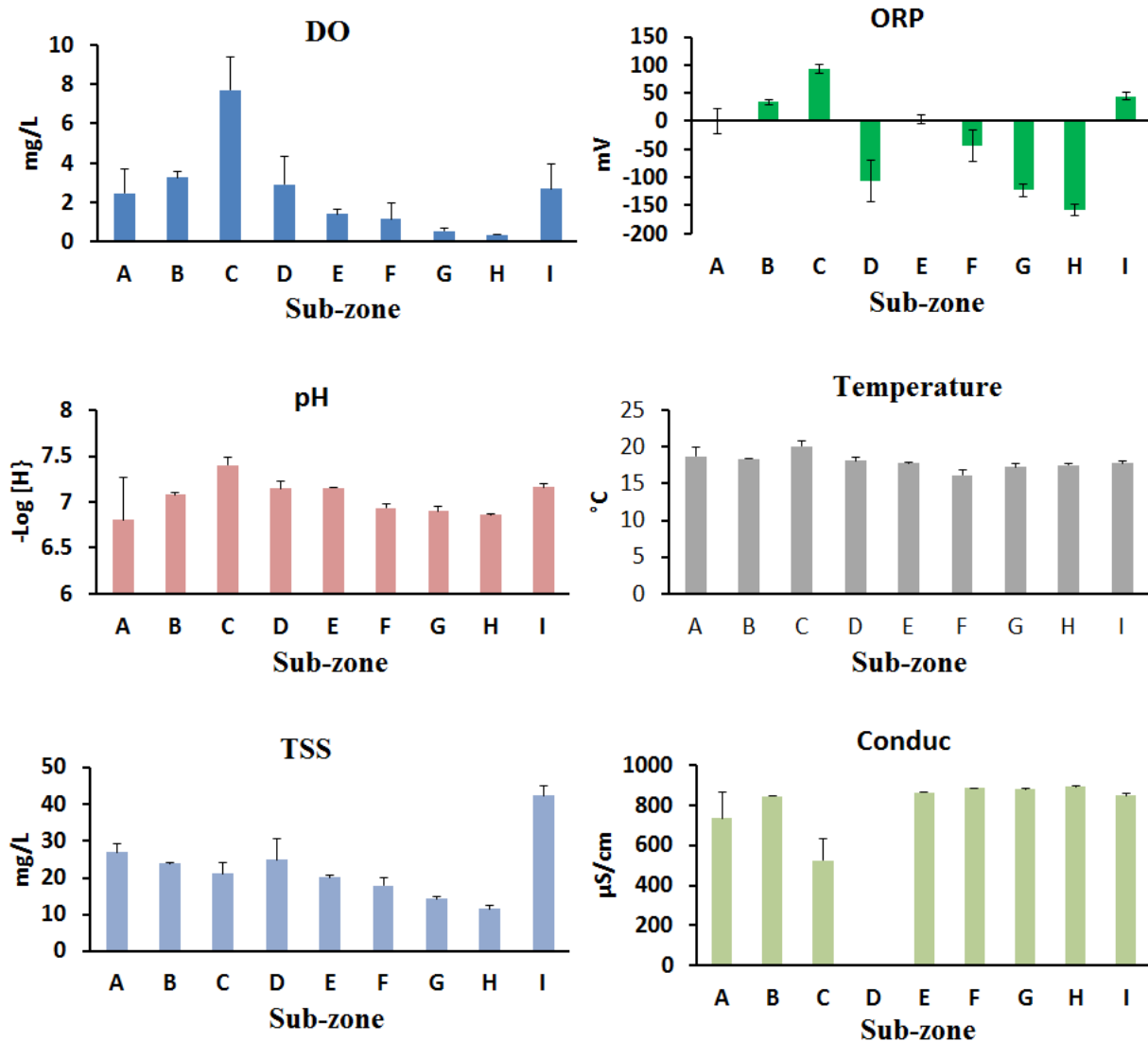


Figure 9. Conventional physical-chemical on-site parameters

The CODEq, BODEq, TOCeq, Color and Turbidity values showed a very similar pattern, that is, a decreasing tendency from zone Z5-A to Z5-H. In all these parameters, however, a sudden increase was observed in the zone Z5-I with a statistically significant difference ( $p < 0.05$ ) between zone Z5-I zone and the rest of the zones (Figure 10).

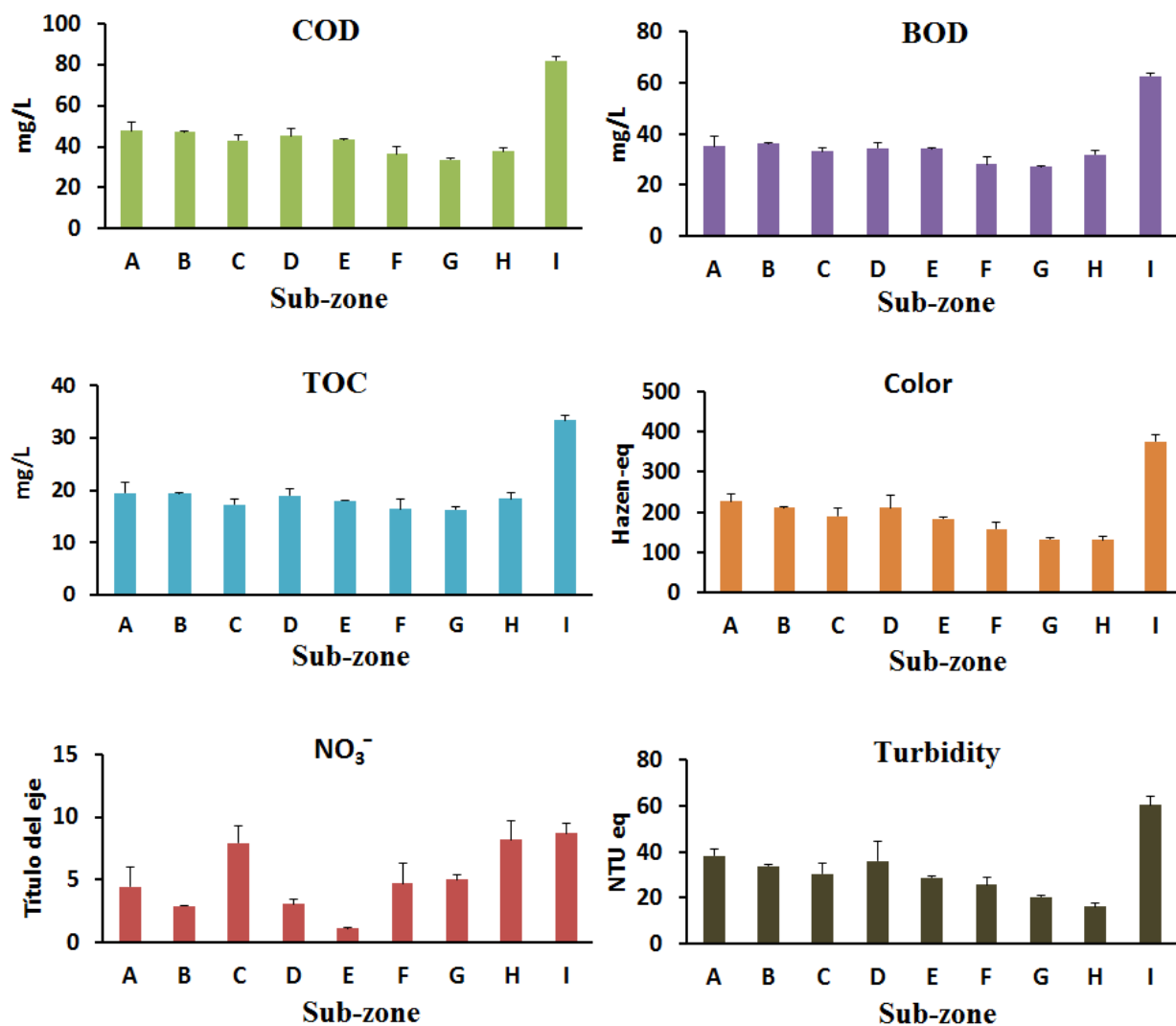


Figure 10. Non-conventional on-site physicochemical parameters

The increase of the COD<sub>eq</sub> and the BOD<sub>eq</sub> values in zone Z5-I may be associated with the presence of a greater quantity of photosynthetic organisms (mainly algae). This argument gains strength when compared to the increase in the DO in this area, since it is greater than in the rest of the zones (except zone Z5-C). Notwithstanding the foregoing, the injection of ozone by the Scavenger 2000 proved to be effective in those areas with high levels of organic matter. Such is the case of the sampling site Z5-1 (See figure 1 to identify the site), where a COD concentration of 120 mg/L was recorded before the Scavenger 2000 treatment, hereinafter, the COD decreased to  $38 \pm 0.8$  mg/L at the same site (Table 4).



Table 4. Initial and current concentrations of COD and BOD<sub>5</sub>

SAMPLING SITE	COD		BOD <sub>5</sub>	
	INITIAL (Laboratory)	CURRENT (Scan)	INITIAL (Laboratory)	CURRENT (Scan)
Z5-1	120	38 ± 0.8	5	28.12 ± 0.03
Z5-2	12	36.9 ± 0.8	12	28.17 ± 0.02
Z5-3	ND	37.3 ± 0.9	3	30.2 ± 0.3
Z5-4	13	38.4 ± 0.1	9	30.7 ± 0.1

Regarding sites Z5-2, Z5-3 and Z5-4, the COD levels increased with respect to the initial values. One possible explanation is that some recalcitrant compounds are not digested by the potassium permanganate at the time of the COD determination, once the ozone acts, the structure of these compounds changes to a simpler one which can then be digested by the permanganate and therefore gives out a higher signal than the original. Another possibility is that more phytoplankton and/or zooplankton has been produced than the original one, in which case its presence could result in an increase in the measurement of this parameter. In the present work, the concentration of algae and/or chlorophyll that would have allowed to confirm this hypothesis was not measured. On-site observations, however, presented green patches that could indicate the presence of algae and/or cyanobacteria whose coloration was dark green. This phenomenon was observed particularly at the sites closer to the curtain (Z5-H, Z5-I and Z5-4) (Figure 11).

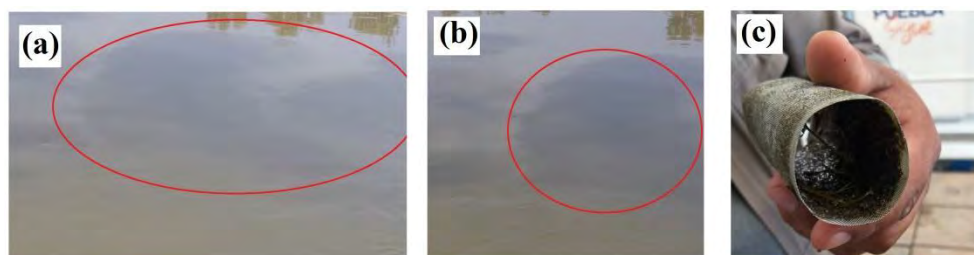


Figure 11. Patches of presumed phytoplankton. (a) Zone Z5-I, (b) Sampling site Z5-4 and (c) Water filter of the hydraulic system of Scavenger 2000 (Puebla 2) during treatment in Zone Z5-I

With respect to the nitrate ion concentration, when statistically comparing the values with the rest of the treated areas, it can be observed that the values in zone Z5-I are greater than in the rest of the zones ( $P < 0.05$ ), which could account for the nitrification process that may be enhanced by the oxygen being injected by the Scavenger 2000 in the Valsequillo dam. This occurs in the 9 sites in which area 5 was segmented in as well as in the 4 sites in which Zone Z5-F was segmented (Figure 12). In both cases an increase of the nitrate ion is observed from the "Panga" to the curtain of the dam.

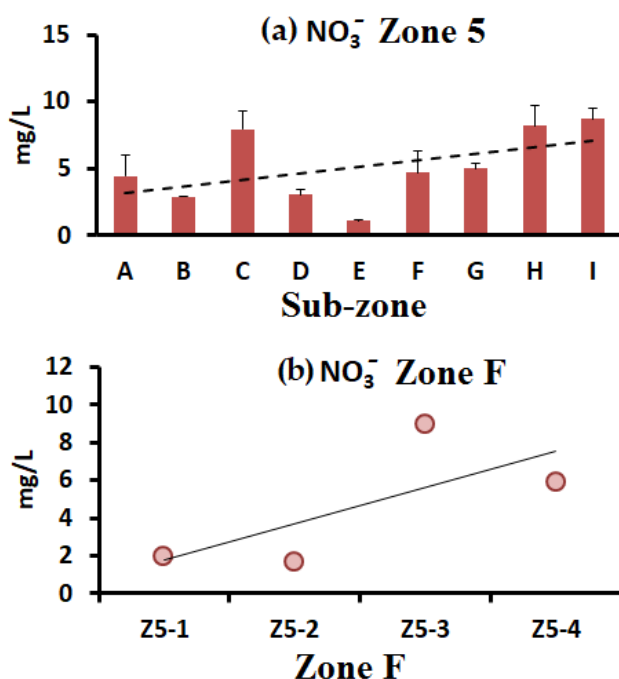
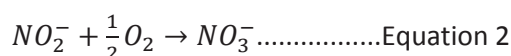
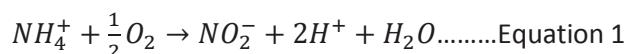
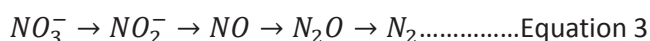


Figure 12. Nitrate ion concentration values (a) sub-zones of zone 5 and (b) sampling sites of sub-zone Z5-F

Likewise, it can be observed that the pH decreases slightly in zone Z5-H with respect to the water flow (from Z5-A to Z5-I) (see figure 9). This could be explained by the fact that during the nitrification process, two hydrogen atoms are produced for each molecule of ammonium present (Equations 1 and 2).



This process (enhanced by the oxygenation produced by the Scavenger 2000) likewise favors the denitrification process (Equation 3).



This process is carried out under anoxic and/or facultative conditions. Such conditions are found mainly at the bottom of the water column or in the sediments. Therefore, the surface oxygenation (up to 10 m) carried out by the Scavenger 2000 along with the biological processes that occur at the bottom of the dam, can completely eliminate the nitrogen. This process, however, is slow and will depend to a large extent on the conditions forged by human use (openings of the floodgates) and on the natural conditions of the Valsequillo dam.

The parameters observed in the 9 sub-zones of zone 5 (from Z5-A to Z5-I) have a similar behavior than those observed in the sampling sites within sub-zone Z5-F (Z5-1, Z5-2, Z5-3 and Z5-4). There is a



decrease in the CODeq and a subsequent rise beginning at site Z5-3. The same goes for the BODeq and the equivalent TOC. Color shows a significant decrease from Z5-1 to Z5-4, going from 185 beam units to 145 at the site Z5-3. Turbidity also decreases from 33 to 23 NTUeq from Z5-1 to Z5-4 (Figure 13).

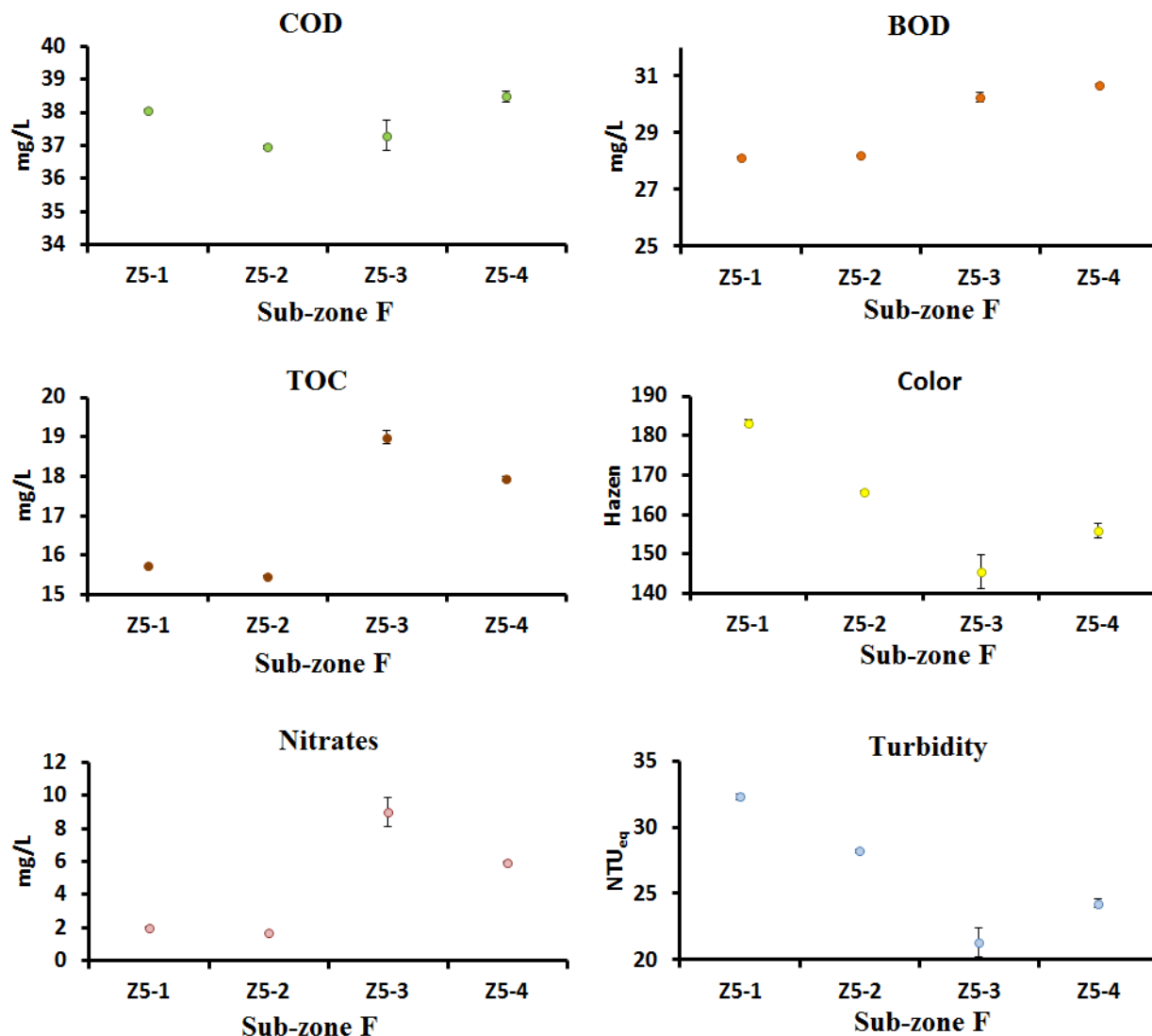


Figure 13. Concentration values of unconventional parameters at the sampling sites along sub-zone Z5-F

The suspended solids' concentration drops around 8 units from Z5-1 to Z5-3. The treatment performed by the Scavenger 2000 units has proven to be effective when oxygenating, since the concentration values range from  $0.59 \pm 0.12$  to  $1 \pm 0.37$  from site Z5-1 to Z5-4. (Figure 14). This correlates with the operation strategy of the Scavenger 2000 units, because ever since the beginning of operations, the treatment has been favoured in the area where the main water flow of the dam is found (ZONE Z5-F and Z5-A)) (without neglecting the rest of the areas). This is the reason why it is assumed that the water that flows to the curtain passing through all the areas and intermediate sites tends to have better quality.



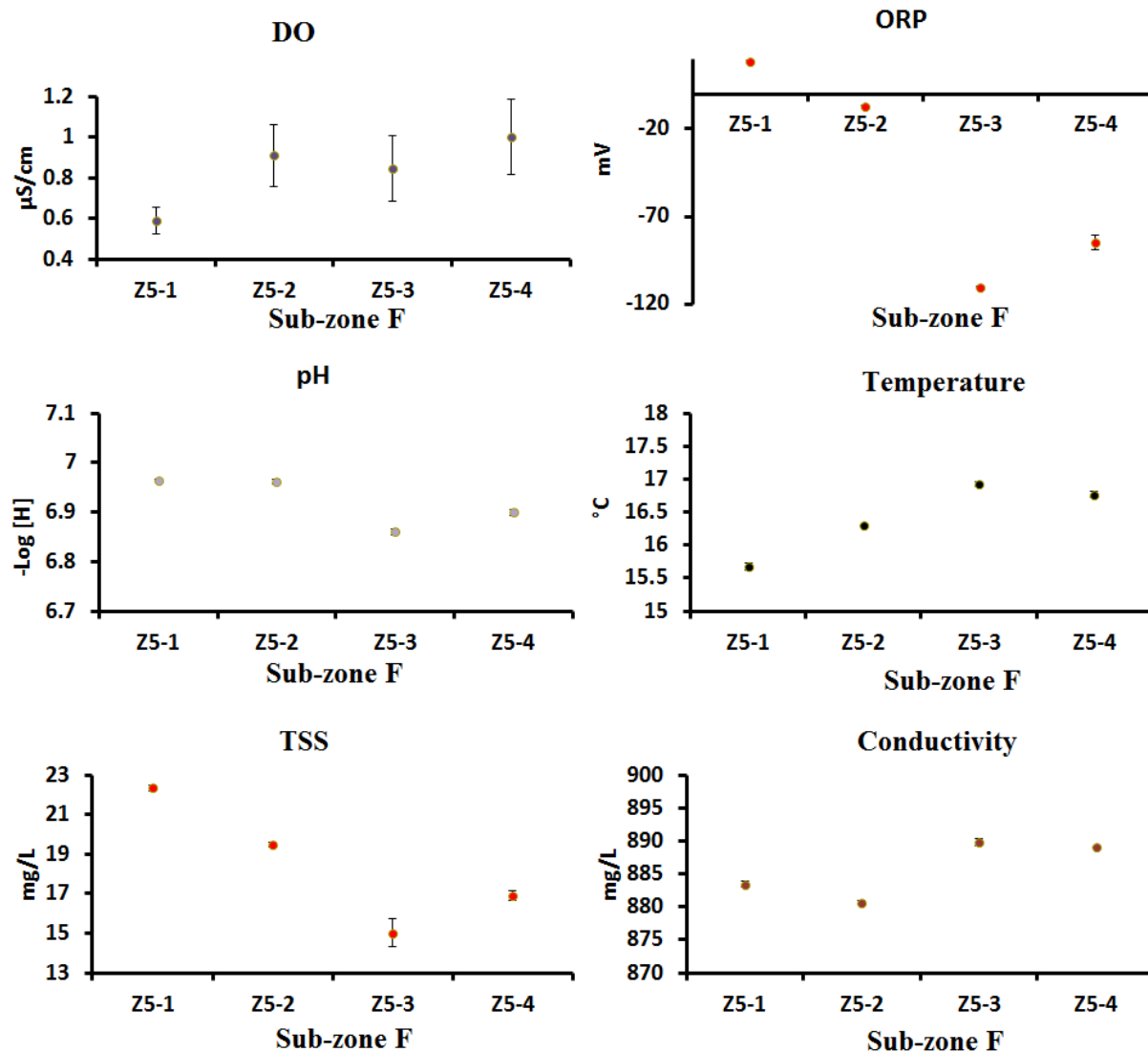


Figure 14. Concentration values of conventional on-site parameters at the sampling sites along sub-zone Z5-F

#### 4.1.3 Measurement in certified laboratories

To comply with the established agreement, the supplier has hired certified laboratories to measure all the parameters of the declaration (see Appendix B). For this, a baseline was measured with 4 complete declarations (CDAXRT) in 4 different sampling sites (Z5-1, Z5-2, Z5-3 and Z5-4), which are addressed in the previous report (FIRST REPORT CONCERNING THE SERVICE, OPERATION AND MAINTENANCE CORRESPONDING TO THE EQUIPMENT ACQUISITION AGREEMENT FOR THE SANITATION OF THE VALSEQUILLO DAM). In the present report, the results which correspond to the measured parameters of the CDAXRT are accounted for in the site Z5-2 (see Appendix B), which are compared with the previously measured results (previous to the treatment) with the current ones. Table 5 contains the results of the



parameters contained in the CDAXRT as well as the maximum limits established by the NOM-001-SEMARNAT-1996 norm and by CDAXRT itself. (Table 5).

Table 5. Results corresponding to CDAXRT before and after treatment

Number	Parameter (mg/L ó µg/L)	MAXIMUM PERMISSIBLE LEVEL		DATE OF SAMPLING ON SITE (Z5-2)		% compliance	
		NOM-001- SEMARNAT- 1996	CDAXRT	31-10- 18	24-01-19	NOM-001- SEMARNAT- 1996	CDAXRT
1	As	0.49	0.05	NA	NA	100 %	100 %
2	Cd	0.10	0.004	NA	NA	100 %	100 %
3	CN	3.00	0.01	0.0011	0.0023	100 %	100 %
	Cu	6.00	0.05	NA	0.001	100 %	100 %
5	Cr	1.00	0.05	NA	NA	100 %	100 %
6	Hg	0.01	0.001	NA	NA	100 %	100 %
7	Ni	4.00	0.6	NA	NA	100 %	100 %
8	Pb	10.00	0.03	NA	NA	100 %	100 %
9	Zn	20.00	0.12	0.005	NA	100 %	100 %
10	SST	125.00	56.4	NA	11	100 %	100 %
11	BOD	150.00	20	12	6.2	100 %	100 %
12	COD	320.00	40	14	38	100 %	100 %
14	SS	2.00	<1	NA	NA	100 %	100 %
15	Fats and Oils	25.00	9.1	NA	NA	100 %	100 %
16	FC (MPN)	2000.00	<200	930	3	100 %	100 %
19	Total phosphorus	30.00	0.73	2.1	2.5	100 %	0 %
20	TN	60.00	14.5	11.97	12.34	100 %	100 %
21	TDS	N/A	500	488	549	-	0 %
22	N (NH <sub>3</sub> )	N/A	0.66	10.52	11.6	-	0 %
23	Total phenols	N/A	0.01	0.013	0.08	-	100 %
24	Sulfates	N/A	150	61.5	61.7	-	100 %
26	Fe	N/A	0.32	0.089	0.065	-	100 %
27	Chlorides	N/A	250	64	0.023	-	100 %
28	Benzene	N/A	0.01	NA	NA	-	100 %
29	Toluene	N/A	0.20	NA	NA	-	100 %
30	Ethylbenzene	N/A	0.1	NA	NA	-	100 %
31	Vibrio fischeri toxicity (UT)	N/A	<1	<1	<1	-	100 %
	Toxicity daphnia magna(UT) (48H)	N/A	<1	<1	<1	-	100 %
32	Sulfides	N/A	0.002	NA	NA	-	100 %
33	Al	N/A	0.05	0.026	NA	-	100 %
34	Mn	N/A	0.1	0.32	0.2761	-	100 %
35	Methyl chloride	N/A	0.0002	NA	NA	-	100 %
36	Chloroform	N/A	0.03	NA	NA	-	100 %



37	Vinyl chloride	N/A	0.002	NA	NA	-	100 %
38	1,2 Dichlorobenzene	N/A	0.01	NA	NA	-	100 %
39	1,3 Dichlorobenzene	N/A	0.01	NA	NA	-	100 %
40	1,4 Dichlorobenzene	N/A	0.01	NA	NA	-	100 %
41	1,2 Dichloroethano	N/A	0.069	NA	NA	-	100 %
42	Tetrachlorethylene	N/A	0.05	NA	NA	-	100 %
43	Bis 2 (ethyl hexyl) Phthalate	N/A	0.003	NA	NA	-	100 %
44	Nitrobenzene	N/A	0.03	NA	NA	-	100 %
45	Real Color (Pt-Co)	N/A	<15	100	60	-	47 %
46	MBAS	N/A	0.10	0.21	0.72	-	0 %

The cases in which the declaration is not fulfilled are discussed below:

The total phosphorus is a parameter of great importance that plays an essential role in the eutrophication of the Valsequillo dam. Phosphorus is an element that is found in great abundance in detergents. Wastewater from agricultural runoff has gained relevance because they carry fertilizers which contain phosphorus in their currents. The treatment carried out by Scavenger 2000 has two purification routes, the first is through direct oxidation with ozone and/or the hydroxyl radicals produced as by-products (particularly when there is ultraviolet radiation). The second route of purification is through water oxygenation that in turn allows the generation of aerobic microorganisms capable of consuming phosphorus. This effect is expected to be achieved in a greater amount of time than the current value.

Another important factor to consider is the fact that the Water hyacinths present in the Valsequillo dam trap a significant amount of phosphorus brought in by the Atoyac and Alseseca rivers. Notwithstanding the foregoing, phosphorus is also released by this plant its time of death. This phenomenon could be causing a considerable rise in the amount found inside the dam. For all the above it is expected that once you move to the next stage of the service remove the Water hyacinths from the dam), this parameter will begin to decrease.

Regarding the ammoniacal nitrogen, this parameter should continue to be monitored. Nonetheless, it is expected that once a higher level of oxygenation is reached in the dam, the nitrification process (previously discussed) will be enhanced and therefore allow the reduction of this parameter .

In regard to the methylene blue active substances (MBAS), it is a parameter that is related to the surfactants, which are molecules that are formed by a hydrophobic group and a hydrophilic group. These compounds tend to be located between the interfaces amid the aqueous medium and the other phases of the system, such as air, oily liquids and particles. This feature gives it the ability to generate foam, emulsification and/or particle suspension. The treatment with the Scavenger 2000 tends to stir the waters that it treats by oxygenating it and therefore generating turbulence along with foam when





the water has a high content of these substances. It is likely that taking water samples in the area of influence of the treatment will result in higher than expected concentrations due to the physical effect of the agitation, which does not necessarily imply an increase per se of this parameter.

#### 4.1.4 Organoleptic properties

The organoleptic properties of water are those properties that are related to the human senses, namely: temperature, taste, smell, color, turbidity, etc. While it is true that such properties are difficult to measure in this type of water; that is, it is not recommended to drink the water from the Valsequillo dam, they can be perceived and in some cases they can be related to the parameters of water quality measured and reported in this document.

The turbidity was not originally measured in the baseline (since it is not contained in the declaration), so the current measurements have no previous reference; a reduction, however, is presumed since a greater sunlight penetration in the water column is observed after treatment with the Scavenger 2000 units (Figure 15). While it is true that the clarity of water varies from day to day (the wind patterns plays an important role), the observed trend is a greater clarification from the beginning of the treatment and to date.

Likewise, a 40% decrease was observed in the color measurements carried out by the certified laboratories, which also explains the greater daylight penetration in the water column (see Table 5, parameter 45).

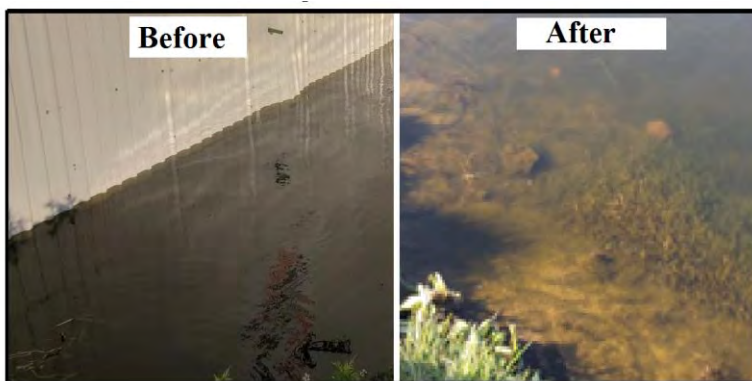


Figure 15. Appearance of water on the shore of the peninsula of San Baltazar Tétela, Valsequillo, Puebla

Another property in which a great improvement has been noticed is precisely the smell. Prior to the Scavenger 2000 units operation, a foul odor was perceived, as described by the signatory sent by the certified laboratory in the baseline sampling dated October 31, 2018 (see Annex 3 of the FIRST REPORT CONCERNING THE SERVICE, OPERATION AND MAINTENANCE CORRESPONDING TO THE EQUIPMENT ACQUISITION AGREEMENT FOR THE SANITATION OF THE VALSEQUILLO DAM). In contrast, as observed on February 15<sup>th</sup>, 2019 by the signatory of the certified laboratory at the time of sampling (See Appendix B of this document), the odor at the Valsequillo dam was absent.



The foregoing relates to the same observations that operators of the Scavenger 2000 units make daily in addition to the identical comments received by the inhabitants of the zones surrounding area 5 of the Valsequillo dam show.

## 4.2 Conclusions

The treatment through the operation of the Scavenger 2000 units (Puebla 1, Puebla 2 and Puebla 3) of the waters of the Valsequillo dam in zone 5, has proven to be effective in reaching the desired levels established by the Classification Declaration of the Atoyac and Xochiac or Hueyapan Rivers and its Tributaries (CDAXRT). The criterion parameter (fecal coliforms) removed of up to 99% (site Z5-2). It is expected that over time, some parameters in which there was no reduction, will result in time reduce. The removal of Water hyacinths will be fundamental not only for the removal of phosphorus but also for other parameters.

In general terms (qualitative and quantitative), the water from the Valsequillo dam has shown an improvement and the operation of the units must be continued in order to continue improving the quality of the water.

## NOTICE OF INTENT TO NEGOTIATE

SOLICITATION NUMBER: 2018032

SOLICITATION TITLE: HARMFUL ALGAL BLOOM MANAGEMENT SERVICES INVITATION TO NEGOTIATE  
(ITN)

OPENING DATE: AUGUST 7, 2018 @ 10:00 A.M. ET

POSTING TIME/DATE:  
TUESDAY, SEPTEMBER 11, 2018 @ 4:35 P.M. ET

### NORTHWEST DISTRICT

RESPONDENT NAME	RAW POINTS RECEIVED	RANKING
Water Management Technologies (1)	188.01	1
Gator Dredging (1)	148.66	2
<b>Notes:</b> (1) Respondent(s) per District recommended for participation in negotiations with the Department.		

### NORTHEAST DISTRICT

RESPONDENT NAME	RAW POINTS RECEIVED	RANKING
Water Management Technologies (1)	188.01	1
Gator Dredging (1)	148.66	2
<b>Notes:</b> (1) Respondent(s) per District recommended for participation in negotiations with the Department.		

### SOUTHWEST DISTRICT

RESPONDENT NAME	RAW POINTS RECEIVED	RANKING
Water Management Technologies (1)	188.01	1
Gator Dredging (1)	148.66	2
Shoreline Slime & Algae Removal, LLC (1)	140.28	3
<b>Notes:</b> (1) Respondent(s) per District recommended for participation in negotiations with the Department.		



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**CENTRAL DISTRICT**

RESPONDENT NAME	RAW POINTS RECEIVED	RANKING
Water Management Technologies (1)	188.01	1
Gator Dredging (1)	148.66	2
Shoreline Slime & Algae Removal, LLC (1)	140.34	3
<b>Notes:</b> (1) Respondent(s) per District recommended for participation in negotiations with the Department.		

**SOUTH DISTRICT**

RESPONDENT NAME	RAW POINTS RECEIVED	RANKING
Water Management Technologies (1)	188.01	1
Gator Dredging (1)	148.66	2
Shoreline Slime & Algae Removal, LLC (1)	140.34	3
<b>Notes:</b> (1) Respondent(s) per District recommended for participation in negotiations with the Department.		

**SOUTHEAST DISTRICT**

RESPONDENT NAME	RAW POINTS RECEIVED	RANKING
Water Management Technologies (1)	188.01	1
Gator Dredging (1)	148.66	2
Shoreline Slime & Algae Removal, LLC (1)	141.26	3
<b>Notes:</b> (1) Respondent(s) per District recommended for participation in negotiations with the Department.		

The following Replies listed below were deemed Non-Responsive:

- Martha M. Topps, Save the Gulf Now
- Robert Charles
- BBC Solar and More

Failure to file a protest within the time prescribed in Section 120.57(3), Florida Statutes, or failure to post the bond or other security required by law within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120, Florida Statutes. Written notices, formal requests and proceedings must conform with the requirements set forth in Chapter 28-110, Florida Administrative Code. Protests must be filed with the Agency Clerk, Office of General Counsel, Department of Environmental Protection, 3900 Commonwealth Boulevard, Douglas Building, MS#35, Tallahassee, Florida 32399-3000 or via email to [Agency\\_Clerk@dep.state.fl.us](mailto:Agency_Clerk@dep.state.fl.us) within the time prescribed by Section 120.57(3), Florida Statutes.

Any person who files an action protesting a decision or intended decision pertaining to contracts administered by the Florida Department of Environmental Protection (Department), pursuant to Chapter 287.042(2)(c), Florida Statutes, shall post with the Department at the time of filing the formal written protest a bond payable to the Department in an amount equal to 1% of the Department's estimated contract amount. The return of the bond shall be conditioned upon the payment of all costs which may be adjudged against the protestor in an administrative hearing in which the action is brought and in any subsequent appellate court proceeding. In lieu of a bond, the Department may except a cashier's check or money order in the amount of the bond. FAILURE TO FILE THE PROPER BOND AT THE TIME OF FILING THE FORMAL PROTEST WILL RESULT IN A DENIAL OF THE PROTEST.



Laboratories, Inc.

FORT LAUDERDALE • SAVANNAH

Water Management Technologies  
1510 SW 13th Street  
Ft. Lauderdale, FL 33312

A final test of your upgraded OXY-PLUS as applied to SCAVENGER 2000 floating marine platform that you designed to rejuvenate polluted bodies of water by reducing the levels of microbial contaminants was conducted Monday March 26, 2001. A sample of surface water from Twin Lakes in Fort Lauderdale was brought to the vessel. A sample was taken before treatment. The remaining lake water was placed in an open container and treated with your system. An additional sample was removed after three minutes of treatment and another removed after five minutes. The three samples were taken to the Nova Southeastern University Oceanographic Center for analysis.

A direct microscopic examination was conducted at one of the NSU microbiology laboratories. Bacterial analyses were performed. The following are results from the direct examination:

- 1) The pretreatment sample had a distinctive green color. Microscopic examination revealed the presence of more than a dozen species of algae and protozoa. The algae observed were highly mobile with three to four organisms present in each field. Forty fecal coliform bacteria per 100 ml and a total bacterial count of 360 bacteria per 1 ml were determined.
- 2) The sample that was treated for three minutes had lost most of the green color. Microscopic examination showed no active moving algal organisms. There appeared to be a 50% reduction in algal cells. Fecal coliform bacteria were not detectable. The total bacteria count was reduced to 160 per 1 ml.
- 3) The five minute minute treated sample was also clear with no color and showed no mobile algal organisms. No fecal organisms were detected and the total bacterial count was reduced to 140 per 1 ml.

Monday afternoon at approximately 1:00 PM the vessel made its way to a polluted site in a Fort Lauderdale live aboard canal area. The water temperature was 77 degrees F. And the measured flow rate of water through the vessel was 30,400 liters per minute.

Two untreated samples were taken. Two additional samples were taken, 1) immediately after treatment and 2) after one pass of thirty meters and return through pass.



Microscopic analyses by Dr. Andrew Rogerson of Nova Southeastern University was performed without his knowledge of sample origin (blind study):

Both untreated sample showed a variety of species of algae and protozoa. Motile algal cells and chains of diatoms were observed. Several types of dinoflagellate algae were observed swimming in the samples.

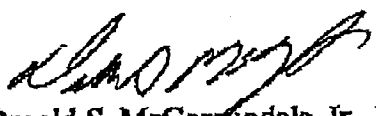
The sample taken immediately after treatment showed at least a 50% reduction in motile algae and deterioration of diatoms. One swimming dinoflagellate was seen.

The sample taken after one pass back and forth showed a reduction of about 75%. No swimming or living algae was observed. Many ruptured cells were seen.

The samples will be cultured to determine more quantitative results which may take a week to ten days.

The results indicate that the OXY-PLUS treatment system on your vessel is quite effective for treatment of contaminated of surface waters. Significant reduction of algae and fecal and total bacterial counts occurred and the kill is increased by multiple passes in the same area. Please contact me if you have additional questions.

Regards,



Donald S. McCosquodale, Jr., Ph.D.  
President/Microbiologist - Spectrum Laboratories, Inc.  
Affiliated Faculty - Oceanography - Nova Southeastern University.

NOVA SOUTHEASTERN UNIVERSITY  
Oceanographic Center



Dr D. McCorquodale  
Spectrum Laboratories  
Fort Lauderdale, Florida 33309

*Re: testing of treated and untreated water*

Dear Dr. McCorquodale,

I have performed light microscopical analyses of the four samples you provided (2 controls and 2 treatments). Please note that the results below are not quantitative, rather they are subjective assessments based on observations of living versus dead algal cells.

The two control samples were rich in both motile algae (i.e. flagellates) and non-motile algae (e.g. diatoms). The first treated sample (collected immediately after treatment) showed a greater than 50% reduction in motile cells. In other words, this implies that about 50 % of all algae were killed. Diatoms, being non-motile, were difficult to score as living or dead however many showed evidence of some cell damage (i.e. cell lysis). The second treatment (taken after several passes) showed greater algal damage and it is estimated that around 75% of the algae were killed. Again, this assessment was based mainly on the effect on motile algae.

I stress that these results are tentative and are solely based on subjective observations. However, they are encouraging and definite cell damage was evident in the treated samples. In the meantime, I am culturing the four samples in the laboratory to see if the control samples respond (i.e. grow) faster than the treated samples. If growth is more pronounced in the controls, it will help to substantiate the above observations.

Sincerely yours,

Andrew Rogerson Ph.D  
Professor Marine Microbiology and Director of Graduate Programs



Laboratories, Inc.

FORT LAUDERDALE • SAVANNAH

Water Management Technologies  
1510 SW 13th Street  
Ft. Lauderdale, FL 33312

This letter is a follow-up to the initial report of the results of samples taken from your OXY-Plus SCAVENGER 2000 floating marine platform on Monday afternoon March 26, 2001.

Two untreated samples were taken. Two additional samples were taken, 1) immediately after treatment and 2) after one pass of thirty meters and return through pass.

Microscopic analyses by Dr. Andrew Rogerson of Nova Southeastern University was performed on cultures set up for each of the four samples. These cultures contained nutrients and were incubated under normal environmental conditions for eight days.

Both untreated samples showed a variety of species of algae. These samples were rated as "\*\*\*\*" or 100% growth.

The sample taken immediately after treatment showed between a "\*\*\*" and "\*\*\*\*" growth. This indicates between a 25% and 50% reduction.

The sample taken after one pass back and forth showed a "\*" growth. This indicates a 75% reduction.

The growth results substantiate the initial observations that indicate that the OXY--PLUS treatment system on your vessel is quite effective for treatment of contaminated of surface waters.

Regards,

A handwritten signature in dark ink, appearing to read "Donald S. McCorquodale, Jr.", is written over the signature line.

Donald S. McCorquodale, Jr., Ph.D.  
President/Microbiologist - Spectrum Laboratories, Inc.  
Affiliated Faculty - Oceanography - Nova Southeastern University.



*Principal Investigator***Biographical Sketch****Name:** Donald McCorquodale**Position title:** Affiliate Faculty NSU**Education/Training**

Institution	Degree	Year	Field of study
Florida Atlantic University	B.S.	1969	Biology (minor Chem)
Florida Atlantic University	M.S.	1971	Microbiology
Nova Southeastern University	Ph.D.	1987	Microbiology

**Research and Professional Experience**

- 1987-2000     Affiliate Faculty, Nova Southeastern University, Oceanographic Center, Florida. Conducts research and teaches a graduate course in Water Pollution Monitoring.
- 1973-2000     President, Spectrum Laboratories, Inc., Fort Lauderdale, Florida  
Dr. McCorquodale founded Spectrum Laboratories, Inc. in 1973 and has developed a broad-based analytical laboratory to handle a variety of analytical and consulting problems. He serves as president and senior microbiologist with combined management and technical duties. He is consultant to various drainage districts and the Life Science program of the National Aeronautics and Space Administration. His company is currently developing methods for indicators of fecal pollution in marine waters including coliphage and toxicity testing.

**Selected Professional Activities**

- 1967 - 1969 - Microbiology section chief for Quincore Laboratories, Deerfield Beach, Florida. Supervising and conducting microbiological testing of germicidal products.
- 1969 - 1971 - Principal investigator (microbiologist) on a fellowship from the Equine Research Foundation.
- Between 1971 and 1974 - Staff member in the Department of Biological Science at FAU, Boca Raton, Florida.
- 1971 - 1973 - Project microbiologist for U.S. EPA research grant entitled 'Biological Control of Aquatic Vegetation'.
- 1973 - 1995 Taught membrane filter techniques for Florida Water and Pollution Control Operators Association.
- 1998 - 2000 - Serves on the Technology Advisory Group of Harmful Algal Bloom Task Force.
- 1998 - 2000 - Member of the Mayor of Fort Lauderdale, Florida's Blue Ribbon Committee on Water Quality.

*Principal Investigator***Biographical Sketch**

**Name:** Andrew Rogerson . . . **Position title:** Professor and Director of Graduate Programs

**Education/Training**

Institution	Degree	Year	Field of study
Paisley College of Technology, Scotland	BSc (honors)	1975	Biology
University of Stirling, Scotland	PhD	1979	Microbial Ecology

**Research and Professional Experience**

1979-1982	Postdoctoral Research Fellow, University of Toronto, Canada
1981-1982	Assistant Professor, University of Toronto, Canada
1982-1984	Visiting Research Fellow, Atlantic Research Lab NRCC, Canada
1984-1986	Research Associate, Atlantic Research Lab NRCC, Canada
1986-1988	Higher Scientific Officer, CCAP, England
1988-1989	Research Associate, UCSB, California, U.S.A.
1989-1992	Lecturer grade B, University of London, England
1992-1996	Senior Lecturer, University of London, England
1996-1998	Associate Professor, South Dakota School of Mines & Technology, U.S.A.
1998-1999	Associate Professor, Oceanographic Center of NSU, Florida, U.S.A.
1999-2000	Professor and Director, Oceanographic Center of NSU, Florida, U.S.A.

**Selected Professional Activities**

1990-2000	supervised 6 PhD students (5 completed, one ongoing) and 3 MS students (ongoing)
1997-2000	Member of Editorial Board of Journal of Eukaryotic Microbiology
1993-1996	External Examiner for PhD candidates at University of Glasgow, Scotland and University of Lancaster, England
1991	External Examiner for Biology Program, University of Strathclyde, Scotland
1990-1996	Head of SEM and TEM facility, University Marine Biological Station Millport, Scotland
1990-2000	Invited Keynote Speaker: Taxonomy Workshop, Australia; Congress of Protozoology, Sardinia, Italy

**Grants and Contracts**

1981-2000	18 awards as PI or coPI. Dollar amounts ranging from \$1,500 to \$400,000 (total value, \$1,030,000)
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### Selected Recent Publications (95 in total)

- 1) Rogerson, A., Hannah, F., Hauer, G. and C  wie, P. 2000. Numbers of naked amoebae inhabiting intertidal zone of two geographically separate sandy beaches. J. Mar. biol. Ass. U.K. in press.
- 2) Rogerson, A. and Hauer, G. 2000. Naked amoebae of the Salton Sea, California. Hydrobiologia. in press.
- 3) Rogerson, A. and Gwaltney, C. 2000. The numerical importance of naked amoebae in the planktonic waters of a mangrove stand in Southern Florida. J. Euk. Microbiol. in press.
- 4) Armstrong, E., Rogerson, A. and Leftley, J.W. 2000. First recording of *Nitzschia alba* from UK coastal waters with notes on its growth potential. J. Mar. biol. Ass. U.K. in press.
- 5) Armstrong, E., Rogerson, A. and Leftley, J.W. 2000. The abundance of heterotrophic protozoa associated with macroalgae. Estuar. Coast. Shelf Sci. 50: 415-424.
- 6) Armstrong, E., Rogerson, A. and Leftley, J.W. 2000. Utilization of macroalgal carbon by marine protists. Aquatic Microbial Ecol. 21: 49-57.
- 7) Bulter, H. and Rogerson, A. 2000. Naked amoebae from benthic sediments in the Clyde Sea area, Scotland. Ophelia, in press.
- 8) Rogerson, A. and Patterson, D.J. 2000. The naked ramicristate amoebae (gymanamoebae). In: Illustrated Guide to the Protozoa, edition 2. Allan Press, Kansas, in press.
- 9) Patterson, D.J., Simpson, A.G., and Rogerson, A. 2000. Amoebae of uncertain affinities. In: Illustrated Guide to the Protozoa, edition 2. Allen Press, Kansas, in press.
- 10) Patterson, D.J., Rogerson, A. and Vors, N. 2000. The heterolobosea. In: Illustrated Guide to the Protozoa, edition 2. Allen Press, Kansas, in press.
- 11) Hobson, P.R., Lampitt, R.S., Rogerson, A., Watson, J., Fang, X. and Krantz, E.P. 2000. True three-dimensional spatial coordinates of individual plankton determined using underwater hologrammetry. Limnol. Oceanogr. in press.
- 12) Sims, G.P., Rogerson, A. and Aitken, R. 1999. Primary and secondary structure of the small-subunit ribosomal RNA of the naked, marine amoeba *Vannella anglica*: phylogenetic implications. J. Mol. Evol. 48: 740-749.
- 13) Rogerson, A. and Detwiler, A. 1999. Abundance of airborne heterotrophic protists in Rapid City, South Dakota. Atmospheric Res. 51: 35-44.
- 14) Pinn, E.H., Nickell, L.A., Rogerson, A. and Atkinson, R.J.A. 1999. Comparison of the mouthpart setal fringes of seven species of mud-shrimp (Crustacea:Decapoda:Thalassinidea). J. Nat. Hist. 33: 1461-1485.
- 15) Pinn, E.H., Nickell, L.A., Rogerson, A. and Atkinson, R.J.A. 1999. Comparison of the gut morphology and gut microflora of seven species of mud-shrimp (Crustacea: Decapoda: Thalassinidea). Mar. Biol. 133: 103-114.
- 16) Rogerson, A., Hannah, F. and Anderson, O.R. 1998. A redescription of *Rhobdamoeba marina* DUNKERLY 1921, an inconspicuous marine amoeba from benthic sediments. Invertebrate Biology 117: 261-270.
- 17) Rogerson, A., Williams, A.G. and Wilson, P.C. 1998. Utilization of macroalgal carbohydrates by the marine amoeba *Trichosphaerium sieboldi*. J. Mar. biol. Assoc. U.K. 78: 733-744.



### **Affiliations**

American Society for Microbiology  
American Chemical Society (Chair-elect of the South Florida Branch)  
American Water Works Association  
International Oceanographic Society  
American Society for Testing and Materials  
American Association for the Advancement of Science

### **Selected Recent Publications (relevant to proposal)**

- 1) McCorquodale, D.S. 1988. Coliphage as an indicator of fecal pollution in marine waters: Assay, validation and application. 136 pp., Diss. Abst. Int., pt. B-Sci & Eng., vol. 48.
- 2) McCorquodale, D.S. 1987. An assessment of indicator bacteria and bacteriophage in surface waters and sediments of Biscayne Bay. 89 pp., Metro Dade Technical Report, DERM.
- 3) McCorquodale, D.S. 1987. An assessment of indicator bacteria and bacteriophage in surface waters and sediments of Biscayne Bay - Phase II. 22 pp., Metro Dade Technical Report, DERM.
- 4) McCorquodale, D.S. 1987. An assessment of indicator bacteria and bacteriophage in surface waters and sediments of Biscayne Bay - Phase II, Iia, Iib. 56 pp., Metro Dade Technical Report, DERM.
- 5) McCorquodale, D.S., and Burney, C.M. 1993. Biscayne Bay sewage pollution indicators final report, contract No. C-3242, 82 pp. South Florida Management District.
- 6) McCorquodale, D.S. 1996. Indicators for determining the sources and extent of fecal contamination in coastal waters: an annotated bibliography. Technical Report 96-06, 56 pp., Broward County Department of Natural Resource Protection.

# City of Miami



EMILIO T. GONZALEZ, Ph.D.  
City Manager

April 3, 2018

To Gobernador del Estado de Puebla, Mexico  
Honorable Senor Jose Antonio Gali Fayad


**RE:** Water Management Technologies, Inc. for the Scavenger 2000 Vessel  
Letter of Recommendation

Estimado Honorable Jose Antonio Gali Fayad:

This letter serves as a reference towards the work provided by Water Management Technologies, Inc. to the City of Miami Public Works Department and have the following information.

This company has been employed since 2003. They perform cleaning and oxygenation of our navigable waterways on a daily basis. Their work has been praised by several citizens and elected officials. Our Department is satisfied with their day to day performance and hope to continue with their services for years to come. If you have any question, please contact me at (305)416-1295.

Sincerely,

  
Elyrosa Estevez, PE III  
NPDES Section Head

MIAMI-DADE COUNTY  
BISCAYNE BAY WATERSHED  
MANAGEMENT ADVISORY  
BOARD



Sec. 2-2440. - Creation.

- There is hereby created and established the Miami-Dade County Biscayne Bay Watershed Management Advisory Board.
- (Ord. No. 21-72, § 1, 7-20-21)

Sec. 2-2441. - Composition; membership.



- a) *Composition.*
  - (i) The Biscayne Bay Watershed Management Advisory Board shall be composed of 21 voting members, all of whom shall have expertise and familiarity with issues related to Biscayne Bay and Miami-Dade County, as follows:
    - 1. Three Miami-Dade County Commissioners;
    - 2. Four representatives from municipalities that border Biscayne Bay, appointed by the Miami-Dade League of Cities;
    - 3. One representative from the Miami River Commission, recommended by the Miami River Commission;
    - 4. Three representatives with scientific expertise from each of, and as recommended by, the following institutions: one from the Florida International University Institute of Environment, one from the University of Miami Rosenstiel School of Marine and Atmospheric Science, and one from the National Oceanic and Atmospheric Administration;
    - 5. One representative from Biscayne National Park, as recommended by the Superintendent of Biscayne National Park;
    - 6. One representative from the Greater Miami Visitors and Convention Bureau, as recommended by the Greater Miami Visitors and Convention Bureau;
    - 7. One representative of the development industry, as recommended by the South Florida Builders Association;
    - 8. One representative who is a coastal engineer working in Miami-Dade County, as recommended by the Florida Engineering Society;
    - 9. One representative who works in banking and finance in Miami-Dade County, as recommended by the Greater Miami Chamber of Commerce;
    - 10. One representative of the marine or boating industry, as recommended by the Miami Marine Council;
    - 11. One representative of the agricultural industry, recommended by the Dade County Farm Bureau;
    - 12. One representative of the Miccosukee Tribe, as recommended by the Miccosukee Tribe; and
    - 13. Two representatives from environmental groups, one recommended by the Nature Conservancy and one recommended by the Biscayne Bay Marine Health Coalition.

- (ii) Approval process.
  - 1. The designated organizations and entities listed above in subsections 3-13 shall recommend at least one nominee from their respective organizations, including (a) the nominee's resume and (b) either the minutes of the meeting approving the nominee or, for entities such as Biscayne National Park, official correspondence from said entity, to the County Mayor, who shall forward the nominee to the Board of County Commissioners in a timely manner.
  - 2. The Board of County Commissioners may then appoint such nominee to the Biscayne Bay Watershed Advisory Board via resolution.
  - 3. Where a designated organization or entity fails to propose a nominee within 45 days of notification of a vacancy, the Biscayne Bay Watershed Advisory Board may recommend a nominee at a meeting of the Board, and the Board shall forward the minutes approving such nominee, together with the nominee's resume, to the County Mayor, who shall forward the nominee to the Board of County Commissioners in a timely manner. The Board of County Commissioners may then appoint such nominee via resolution.
- (iii) The three Miami-Dade County Commissioners who serve on the Biscayne Bay Watershed Management Advisory Board shall be as follows: (1) one County Commissioner appointed by the Chair of the Board of County Commissioners; (2) one County Commissioner appointed by a vote of the Board of County Commissioners, which may be by motion; and (3) the Chair of the Commission committee with jurisdiction over Biscayne Bay and resilience matters.

- (b) *Qualifications.*
  - (i) Members of the Biscayne Bay Watershed Management Advisory Board shall have experience and familiarity with issues related to Biscayne Bay and Miami-Dade County.
  - (ii) Each member of the Biscayne Bay Watershed Management Advisory Board shall be a permanent resident and duly qualified elector of Miami-Dade County, unless the Board of County Commissioners waives the residency requirement by a two-thirds vote of its membership, and shall be of an outstanding reputation of integrity, responsibility, and commitment to serving the community.
  - (iii) Unless the Board of County Commissioners by a two-thirds vote of its membership waives the residency requirement, any member of the Biscayne Bay Watershed Management Advisory Board who ceases to be a resident of Miami-Dade County during the term of his or her office shall immediately advise the Clerk of the Board of County Commissioners, and upon being advised by the Clerk of such circumstances, the position shall be deemed vacant.
  - (iv) To ensure that members of the Biscayne Bay Watershed Management Advisory Board are as familiar as possible with Biscayne Bay and Miami-Dade County, every effort shall be made to appoint members who are permanent residents and duly qualified electors of Miami-Dade County.
- (c) *Compensation.* Biscayne Bay Watershed Management Advisory Board members shall serve without compensation.
- (d) *Vacancies.* Vacancies shall be filled in the same manner by which the original members were appointed.
- (e) *Attendance.* Attendance requirements for members shall be in accordance with Section 2-11.39.
- (f) *Terms.* Each member shall be appointed for a term of four years. A member may serve until his or her successor has been duly appointed and qualified.
- (Ord. No. 21-72, § 1, 7-20-21)



# Sec. 2-2442. - Organization.

- (a) *Bylaws, Rules, and Regulations.* The Biscayne Bay Watershed Management Advisory Board shall establish, adopt, and amend bylaws, rules, and regulations for its own governance. In the event that the Biscayne Bay Watershed Management Board does not adopt rules or policies, or its adopted rules or policies do not address a particular situation, then the applicable provisions of the Board of County Commissioners' Rules of Procedure, as such may be amended from time to time, shall apply.

- (b) *Officers.* The Biscayne Bay Watershed Management Advisory Board shall elect a chairperson and a vice-chairperson from among its members, who shall serve at the will of the Biscayne Bay Watershed Management Advisory Board. The chairperson shall preside at all meetings at which he or she is present. The vice-chairperson shall act as chairperson in the absence of the chairperson.



- (c) *Staff Support.* The Biscayne Bay Watershed Management Advisory Board shall have assistance from staff, which may include the Chief Bay Officer, Department of Regulatory and Economic Resources, or such other staff as may be designated by the County Mayor or the County Mayor's designee. The staff shall:
  - (i) Maintain and keep the records of the Biscayne Bay Watershed Management Advisory Board;
  - (ii) Prepare, in cooperation with the chairperson, the agenda for each meeting;
  - (iii) Be responsible for the preparation of such reports, minutes, documents, resolutions, or correspondences as the Biscayne Bay Watershed Management Advisory Board may direct;
  - (iv) Organize, facilitate, provide critical support for, and actively participate in summits, conferences or other similar events that are open to the public and focused on Biscayne Bay and for which, on at least an annual basis, the following Biscayne Bay topics must be addressed at such events:
    - 1. Technical and science matters;
    - 2. Community awareness, education, and engagement;
    - 3. Nutrient reduction; and
  - (v) Report to the Biscayne Bay Watershed Management Board as to ideas and concerns discussed and presented at summits, conferences, and other similar events related to Biscayne Bay; and
  - (vi) Generally administer the business and affairs of the Biscayne Bay Watershed Management Advisory Board, subject to budgetary limitations.

- (d) *Quorum*. A quorum shall be required to transact any business or exercise any power vested in the Biscayne Bay Watershed Management Advisory Board. A quorum of the Biscayne Bay Watershed Management Advisory Board shall consist of a majority of those duly appointed to the board, provided that at least half of the full board membership has been appointed.
- (Ord. No. 21-72, § 1, 7-20-21)

# Sec. 2-2443. - Meetings.



- The Biscayne Bay Watershed Management Advisory Board shall hold meetings as it deems necessary. A special meeting may be called by the chairperson or by a written request of the majority of those persons duly appointed to the board.
- (Ord. No. 21-72, § 1, 7-20-21)

Sec. 2-2444. - Powers and duties.

- The Biscayne Bay Watershed Management Advisory Board shall have the following powers, duties, functions, and responsibilities:
  - (a) Develop recommendations to the Board of County Commissioners and the County Mayor as to a detailed Watershed Restoration Plan, with the goals of achieving water quality and seagrass restoration and Biscayne Bay health, recovery, and resilience;
  - (b) Make recommendations to the Board of County Commissioners and the County Mayor as to proposed improvements to infrastructure and operations which may impact or otherwise be related to Biscayne Bay;
  - (c) Make recommendations to the Board of County Commissioners and the County Mayor as to proposed revisions to County regulations which may impact or otherwise be related to Biscayne Bay;
  - (d) Make recommendations to the Board of County Commissioners and the County Mayor as to public information campaigns and education; restoration projects; and water quality monitoring and targets;
  - (e) Make recommendations to the Board of County Commissioners and the County Mayor as to any matter related to the protection and restoration of Biscayne Bay;
  - (f) Make recommendations to the Board of County Commissioners and the County Mayor as to funding strategies, including water quality projects which should be funded and how to best prioritize water quality restoration in the County's annual budgets;
  - (g) Consult and communicate with the County's Chief Bay Officer, the Office of Resilience, and the Division of Environmental Resources Management, or other County staff as may be designated by the County Mayor;

- (h) Consult and communicate with other governmental entities and agencies, including, as appropriate, municipalities within Miami-Dade County, the South Florida Water Management District, the Florida Department of Environmental Protection, the United States Department of the Interior, the United States Army Corps of Engineers, the National Oceanic and Atmospheric Administration, the Florida Fish and Wildlife Conservation Commission, the Florida Inland Navigational District, the Biscayne Bay Regional Restoration Coordination Team, academic institutions, and relevant non-profit organizations, so that the Biscayne Bay Watershed Management Advisory Board's recommendations build upon and consider the knowledge, strategies, and projects of such governmental entities, agencies, academic institutions, and non-profit organizations;
  - (i) Participate in summits and conferences related to Biscayne Bay to promote the sharing of information and ideas and to raise community consciousness as to the importance of Biscayne Bay, and where critical support for the creation of these summits and conferences shall be provided by the County's Chief Bay Officer and the Office of Resilience, or other County staff as may be designated by the County Mayor;
  - (j) Serve as a forum at which individuals and groups can express concerns and provide suggestions related to the protection and restoration Biscayne Bay;
  - (k) Strengthen communication on Biscayne Bay issues between the County and municipalities and other governmental agencies and entities; and
  - (l) Perform such other duties as may from time to time be assigned to it by the Board of County Commissioners.
- (Ord. No. 21-72, § 1, 7-20-21)



Sec. 2-2445. - Applicability of County  
rules and procedures.

- (a) All proceedings of the Biscayne Bay Watershed Management Advisory Board shall be conducted in accordance with Florida's open government laws, including but not limited to, the Government in the Sunshine Law and the Citizens' Bill of Rights of the Miami-Dade Home Rule Charter.
- (b) Members of the public shall be given a reasonable opportunity to be heard on any proposition before the Biscayne Bay Watershed Management Advisory Board.
- (c) The Biscayne Bay Watershed Management Advisory Board shall be deemed an "agency" for the purposes of the State's public records laws and shall be governed by all State and County conflict of interest laws, as applicable, including the Miami-Dade County Conflict of Interest and Code of Ethics Ordinance, Section 2-11.1 of this code.
- (Ord. No. 21-72, § 1, 7-20-21)

Sec. 2-2446. - Reports.

- The chairperson or vice-chairperson shall present to the Board of County Commissioners on an annual basis a written report describing the Biscayne Bay Watershed Management Advisory Board's activities and shall appear as needed before the Board of County Commissioners to present any matters pertinent to the Biscayne Bay Watershed Management Advisory Board. The completed reports required by this section shall be placed on an agenda of the Board of County Commissioners pursuant to Ordinance No. 14-65.
- (Ord. No. 21-72, § 1, 7-20-21)





# **BISCAYNE BAY COMMISSION**

## **Semi-Annual Report**

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**Jan. 14, 2022**

## ABOUT THE BISCAYNE BAY COMMISSION

On June 3, 2021, Governor Ron DeSantis took a major step forward in protecting vital natural resources within Biscayne Bay through the creation of the Biscayne Bay Commission. While Biscayne Bay is protected in its entirety by either a national park or state aquatic preserve, it faces global, regional and local stressors, including sea level rise, impaired water quality, habitat loss and human activity that conflicts with the bay's well-being. This legislation signed into law by Governor DeSantis enables direct action to address these issues in the bay.

The Biscayne Bay Commission will monitor the strategic plan and create an associated financial plan to ensure its priorities are funded, using agencies representing the commission.

Commission meetings will provide a forum for exchange and serve as a clearinghouse for public information on all plans, programs and projects being conducted.

On Jan. 4, 2022, the Biscayne Bay Commission held its inaugural meeting in North Miami. The commission's first order of business was to review and consolidate existing programs and projects into a strategic plan for bay improvement.

*Per Committee Substitute/House Bill (CS/HB) 1177: "(7) The commission shall submit a semiannual report describing the accomplishments of the commission and each member agency, as well as the status of each pending task, to the Miami City Commission, the Miami-Dade County Board of County Commissioners, the Mayor of Miami, the Mayor of Miami-Dade County, the Governor, and the chair of the Miami-Dade County Legislative Delegation. The first report shall be submitted by January 15, 2022. The report shall also be made available on the Department of Environmental Protection's website and Miami-Dade County's website."*

## COMMISSION MEMBERS

**Commission members were appointed to their seats between July and November 2021.**

Commission members include Noah Valenstein, Jean Monestime, Rebeca Sosa, Danielle Cohen Higgins, Tim Meerbott, Charlie Martinez, Adam Blalock, Thomas Reinert and Spencer Crowley (Table 1 and Figure 1).

CB/HB 1177 Appointment Requirements	Commission Member	Position Title
1. One member appointed by the Governor.	Noah Valenstein	Founder, Brightwater Strategies
2. Three members of the Miami-Dade Board of County Commissioners, appointed by the board.	Jean Monestime	Commissioner District 2 (represents northern coastal bay)
	Rebeca Sosa	Commissioner District 6 (represents inland surrounding Miami River)
	Danielle Cohen Higgins	Commissioner District 8 (represents southern coastal bay)
3. One member of the Miami-Dade County League of Cities who resides within the boundaries of a city that borders Biscayne Bay, nominated by the league and appointed by the secretary of the Florida Department of Environmental Protection. To the extent practicable, the league must nominate a member from each city that borders Biscayne Bay on a rotating basis.	Tim Meerbott	Mayor, Town of Cutler Bay
4. One member of the South Florida Water Management District Governing Board who resides in Miami-Dade County, appointed by the board.	Charlie Martinez	Governing Board Member representing Miami-Dade County
5. One representative of the Florida Department of Environmental Protection, appointed by the secretary of Environmental Protection.	Adam Blalock	Deputy Secretary of Ecosystem Restoration
6. One representative of the Fish and Wildlife Conservation Commission, appointed by the commission.	Thomas Reinert	South Regional Director
7. One representative of the Florida Inland Navigation District, appointed by the district.	Spencer Crowley	Commissioner representing Miami-Dade County

**Table 1.** Biscayne Bay Commission member composition per establishing legislation.



**Figure 1.** Biscayne Bay Commission members, from left: **Dr. Tom Reinert**, Florida Fish and Wildlife Conservation Commission (FWC) South Region Director; **Spencer Crowley**, Florida Inland Navigation District (FIND) Commissioner for Miami-Dade County (MDC); **Noah Valenstein**, governor's appointee and Brightwater Strategies founder; **Adam Blalock**, Florida Department of Environmental Protection (DEP) Deputy Secretary of Ecosystems Restoration; **Jean Monestime**, Miami-Dade County District 2 Commissioner; and **Charlie Martinez**, South Florida Water Management District (SFWMD) Governing Board Member for Miami-Dade County. Members who attended the meeting via webinar: **Rebecca Sosa**, Miami-Dade County District 6 Commissioner; **Danielle Cohen Higgins**, Miami-Dade County District 8 Commissioner; and **Tim Meerbott**, Town of Cutler Bay Mayor and League of Cities representative.



## INAUGURAL MEETING

Jan. 4, 2022

The Biscayne Bay Commission held its inaugural meeting on Jan. 4, 2022, at the Florida Fish and Wildlife Conservation Commission's South B Regional Law Enforcement Office and via GoTo webinar, welcoming nearly 150 participants. The Florida Department of Environmental Protection Secretary Shawn Hamilton kicked off the meeting thanking the commissioners for answering the call for public service and encouraged them to remain action orientated.

The commission elected Noah Valenstein as chair and Adam Blalock as vice-chair; reviewed the commission's charge outlined in CS/HB 1177; defined the difference between the state's Biscayne Bay Commission and Miami-Dade County's Biscayne Bay Watershed Advisory Board; and reviewed Florida Sunshine and Public Records Law.

Commissioners viewed presentations on the *Current Water Quality in Biscayne Bay* by DEP acting director for the Division of Environmental Assessment and Restoration Greg DeAngelo, and *Work to Date in Biscayne Bay* and *Current Efforts in Biscayne Bay* by MDC's Chief Bay Officer Irela Bague and Chief Water Scientist Pamela Sweeney. The commission discussed the presentations as they relate to the commission's purpose; reviewed future meeting logistics; discussed and provided feedback on a draft of this report; heard oral public comments (two in person and 11 via webinar); and adjourned.

One written comment was provided in-person and 58 questions/comments were made using the chat function on the webinar; 20 were answered during the meeting and the remainder were answered after the meeting. Commissioners were provided a full meeting summary including all questions and comments, and that document is also available at

[ProtectingFloridaTogether.gov/BiscayneBayCommission](https://ProtectingFloridaTogether.gov/BiscayneBayCommission).

## WORK IN THE BAY TO DATE

### Member agencies' Biscayne Bay Updates for 2021

#### ACCOMPLISHMENTS OF EACH MEMBER AGENCY

This first report includes information that benefits Biscayne Bay provided by each member's agency, conducted within calendar year 2021.

Current aggregated list of accomplishments provided by member agencies. Future reports will include both these overall activities as well as actions each agency has taken to assist with implementation of the charge included in the establishing legislation.

#### Miami-Dade County

Biscayne Bay plays a fundamental role in the quality of life in Miami-Dade County. The bay provides endless recreational opportunities, supports the local economy, and helps drive the area's tourism industry. However, recent changes in the bay's health led to a massive seagrass die-off, algal blooms and fish kills in August 2020 and September 2021.

The county commission has acted on these concerns by directing the mayor and their administration to establish the position of chief bay officer and called for implementation of the comprehensive set of recommendations in the recently completed Biscayne Bay Task Force Report (*Figure 4 and Table 2*).

The following information provides an update on Biscayne Bay issues and progress made to date.



**Figure 4.** MDC accomplishment overview during 2020 and 2021 for the Biscayne Bay Task Force report.

### Additional Biscayne Bay Accomplishments

Recommendation	Action
Water Quality	Activate additional MDC Department of Regulatory and Economic Resources' resource management functions.
Water Quality	Pass a county-wide fertilizer ordinance.
Water Quality	Continue to monitor the progress of the Oct. 7, 2015, Consent Agreement between FP&L and Miami-Dade County.
Governance	Establish by ordinance a Biscayne Bay Watershed Management Board.
Governance	The mayor should appoint a chief bay officer and request funding for the position.
Watershed Habitat Restoration and Natural Infrastructure	Continue to work with SFWMD and have the state of Florida allocate the funds necessary to ensure the timely commencement of construction of the Cutler Flow Way in accordance with the project timeline in the Integrated Delivery Schedule.
Watershed Habitat Restoration and Natural Infrastructure	Continue to advocate for funding to support the Biscayne Bay Southern Everglades Ecosystem Restoration project (also known as the BBCW/C-111).
Marine Debris	Create a comprehensive marine debris prevention, reduction and removal program within Miami-Dade County Environmental Resources Management and adequately fund and staff the program.
Marine Debris	Through the Miami-Dade County Police Department, direct the Marine Patrol Unit to prioritize its commitment to the enforcement of all applicable laws having a nexus to the environmental health of the bay and its tributaries.
Funding	Collaborate with Miami-Dade legislative and congressional delegation to secure annually appropriated funds to support Biscayne Bay watershed restoration.
Funding	Immediately engage in the legislative process to designate a Biscayne Bay license plate.
Funding	Immediately enter into a cost-share partnership with SFWMD.

**Table 2.** Specific MDC accomplishments from the Biscayne Bay Task Force report, which includes 68 recommendations organized into seven policy themes.

## **Miami-Dade League of Cities**

By coordinating and working with our partners at Miami-Dade County, we were able to control our land use and zoning and advocate for the provision of critical infrastructure that protects our environmental and economic resources. It is critical to maintain an open line of communication with all other governments to foster a productive, collaborative process. We are the closest level of government to the people, and we are committed to doing what it takes to maintain the character and quality of life in our cities.

Listed below are a few examples of the cities that have acted in 2021 to improve the health of Biscayne Bay.

### **Miami Beach**

- Passed a plastic free ordinance, [a plastic straw ordinance](#) and [an expanded polystyrene ordinance](#), becoming the first municipality in Florida to do so and was the inspiration for county-wide passage of the [Plastic 305 initiative](#).
- Established a climate action goal to reach net zero emissions by 2050.
- Adopted DEP's model ordinance for fertilizer use for urban landscapes, alongside additional and more stringent standards related to the use of nitrogen and phosphorus-based fertilizers.

### **Cutler Bay**

- Participates in the Biscayne Bay Coastal Wetlands Project, which is currently underway, and is a member of the Project Delivery Team for the Biscayne Bay Southeastern Everglades Restoration Project, the newest combined Everglades Restoration project that will benefit Biscayne Bay.
- The town has taken an active role in preventing incompatible development that would conflict with restoration plans, including purchasing land and passing resolutions to protect the Biscayne Bay Coastal Wetlands Project and Biscayne Bay Southern Everglades Ecosystem Restoration footprints.
- Purchased 8.45 acres of buffer land for conservation purposes adjacent to Biscayne Bay restoration projects.
- Replenishing funding for the [Environmentally Endangered Lands Program](#).
- Rated FEMA CRS Class 4 for improving the town's ability to mitigate potential flooding and set aside approximately \$4 million for stormwater management.
- Working to restore a 53-acre wetland adjacent to Biscayne Bay Coastal Wetlands in partnership with SFWMD.

### **Palmetto Bay**

- Adopted the [Florida DEP Model Ordinance](#) for fertilizer use for urban landscapes, alongside additional and more stringent standards related to the use of nitrogen and phosphorus-based fertilizers.
- in support of the proposed county septic-to-sewer taskforce.

### **North Bay Village**

- First municipality to pass the Florida Friendly Fertilizer Ordinance.
- Set aside \$500,000 for stormwater management.
- Developed a partnership with Florida International University and the University of Miami to find innovative research to help improve the health of Biscayne Bay and has set aside a [marine park](#) within its jurisdiction.
- Is working on rapid derelict vessel removal in partnership with the county.



### **Coral Gables**

- Identified sustainability and climate resiliency as a [top priority](#) in 2021.
- Passed a new [Fertilizer Ordinance](#) establishing restrictions on the application of fertilizers.
- Allocated more than \$6 million to a sea-level rise mitigation fund and expects to set aside \$100 million by 2040.

### **Pinecrest**

- Secured \$11.4 million in American Rescue Plan Act funding for the [Potable Water Project](#), which will connect 700 homes previously reliant on well water to the county water and sewer system.
- [Passed a resolution](#) urging the Florida Legislature to expand the list of qualifying improvements that may be financed through the city's Clean Energy Program to include septic-to-sewer conversion.
- [Passed a resolution](#) in support of the proposed county septic-to-sewer taskforce.

### **South Miami**

- Added grates on storm drains to prevent trash from reaching Biscayne Bay.
- [Passed a resolution](#) to protect Biscayne Bay Southern Everglades Ecosystem Restoration from any industrial development that conflicts with current restoration alternatives.
- Funded a plan to get all residents on city water and is working to find funding to implement the septic-to-sewer plan, which already has the engineering component completed.

**The Green Corridor Cities** (Cutler Bay, Palmetto Bay, Pinecrest, South Miami, Coral Gables, Miami and Miami Shores) all support using [PACE Program](#) funding for water and sewer infrastructure improvements and are working toward bringing this to fruition. Collectively, the League of Cities recognizes there is a lot of collective action and support is needed in 2022 and beyond for implementing the recommendations of the Biscayne Bay Task Force.

As a league member, will encourage the passage of support for the task force recommendations collectively and individually; the passage of a local fertilizer ordinance individually; the passage of Plastics 305 initiatives within each municipality and supporting efforts to go plastic-free statewide; local protection of green space and purchase of conservation lands within each municipality; and helping find the to replenish our local land-buying program, the [Environmentally Endangered Lands Program](#) to help improve water quality and timing and distribution of water to Biscayne Bay. In addition, Commissioner Meerbott will work with other cities to urge the state to allocate more funds across the board for aging water and sewer infrastructure, tracking pollution, cleaning storm drains and canals, and supporting and expediting SEER, which is the Everglades project that would benefit Biscayne Bay.

### **South Florida Water Management District (SFWMD)**

- **CERP-Biscayne Bay Coastal Wetlands** – The Biscayne Bay Coastal Wetlands (BBCW) project, a part of the Comprehensive Everglades Restoration Plan (CERP), was authorized by Congress in 2014. In 2021, the district continued to work with the U.S. Army Corps of Engineers to design and implement the components of this project to bring fresh water to the coastal wetlands along Biscayne Bay and improve timing and water quality within the bay.
  - Contract 4: S-709 Pump station – Under construction by the Corps. Construction completion expected late 2022.
  - Contract 5A: S-705 Pump station – Under construction by the Corps. Construction completion expected mid-2023.
  - Contract 5B: S-703 pump station and spreader – Contract awarded by the Corps in 2021. Completion expected mid-2023.
  - Contract 5C: S-710 and S-711 pump stations and North Canal Wetland restoration – Contract awarded by the Corps in 2021. Construction expected through 2024.
  - Contract 6: Cutler Wetlands Flow Way – Intermediate design completed. Final design, contract award and construction expected in 2022 with completion in 2025.
- **CERP-Biscayne Bay and Southeastern Everglades Ecosystem Restoration** – Biscayne Bay and Southeastern Everglades Ecosystem Restoration is a CERP study with multiple components to bring fresh water and improve timing of deliveries to Biscayne Bay, the Model Lands, Southern Glades and other areas, building on the work of the BBCW project. In 2021, the Project Delivery Team – consisting of the SFWMD, the Corps, Miami-Dade County, the U.S. Department of the Interior, and other federal state and local agencies – developed 10 alternatives that could yield benefits while adapting to sea level rise.
- **Biscayne Bay Economic Study Update** – In 2021, the SFWMD and Miami-Dade County drafted a memorandum of understanding and a statement of work for an update to the 2005 Biscayne Bay Economic Study that was conducted for the water management district. The purpose of the Biscayne Bay Economic Study Update is to estimate the economic contribution of Biscayne Bay as it is used for recreation, shipping, cruises and commercial fishing. Economic contribution is the output, resident income, employment and tax revenue generated from these activities. The study will also update the recreational uses and intensity of Biscayne Bay. This update of the economic role of Biscayne Bay in Florida could be used to justify investments and programs to protect the bay and its contributions to economic activity and community well-being.
- **Model Lands Restoration Project** - Miami-Dade County in cooperation with the SFWMD and DEP is implementing a concept for the construction, operation and monitoring of environmental pump stations to divert excess stormwater from the Florida City Canal and improve hydrology and reduce saltwater intrusion in the Model Lands. In 2021, the district facilitated development and documentation of the project benefits, design and regulatory requirements, including the project operating and monitoring plans.

### Florida Department of Environmental Protection (DEP)

- The **Division of Environmental Assessment and Restoration** (DEAR) has been providing technical and analytical support in response to significant Biscayne Bay seagrass losses. Over the past year, DEP's laboratory has performed almost 10,000 analyses in support of this effort. DEAR staff have also participated in Biscayne Bay fish kill and algal bloom response coordination calls. The Water Quality Standards Section has proposed revised turbidity criterion language as part of the department's triennial review of the water quality standards. The proposed revised turbidity criterion would provide additional protections for corals and coral habitats. DEAR has additionally in recent years presented information on alternative restoration plans to various stakeholders surrounding the Bay and is continuing that direct outreach in 2022.
- The **Coral Protection and Restoration Program** (CPR) within DEP's Office of Resilience and Coastal Protection administers state funds appropriated for the protection and restoration of Florida's Coral Reef – including reduction of local stressors like land-based sources of pollution. In Fiscal Year (FY) 2020-21, \$10 million in grant funding was awarded to Miami-Dade County to support identification of pollution hotspots; construction solutions leading to reduced stormwater and wastewater-related nutrient inputs to surface waters of the Biscayne Bay Aquatic Preserves; and biological restoration in support of protecting Florida's Coral Reef.
  - The Biscayne Bay Water Quality Improvement Grant was created in FY 2021-22. A total of \$20 million in Biscayne Bay Water Quality Improvement grant funding will support ongoing county efforts as well as priority nutrient reduction projects.

Project Number	Partner	Project Name	DEP FY 2021-22 Funding Award
1	City of Coral Gables	Coral Gables Waterway / Biscayne Bay Water Quality Improvements - Construction	\$900,000
2	City of Coral Gables	King's Bay Septic-to-Sewer Conversion	\$2,750,000
3	Florida International University - Institute of Environment	Biscayne Bay and Reef Observation, Interpretation and Prediction System (B-BROIPS)	\$1,250,000
4	Miami-Dade County	Phase 2 - Implementation of Biscayne Bay Task Force Recommendations	\$12,940,463
5	Miami Shores Village	Miami Shores-NE 8th Avenue Drainage Improvement Project	\$300,000
6	Miami Waterkeeper	Improving Water Quality in Biscayne Bay through Coordination, Outreach, Monitoring and Source Tracking	\$600,000
7	North Bay Village	North Bay Village Stormwater Pump Station	\$600,000
8	South Florida Water Management District with Tulane University	Biscayne Bay Water Quality Model Development and Application	\$500,000
9	Village of Key Biscayne	Stormwater Sustainability Pilot Project	\$159,537
<b>Total</b>			<b>\$20,000,000</b>

- **Oleta River State Park**

Oleta River State Park has performed 2.3 acres of seagrass restoration. A time zero benthic survey report is on file including the collected data in tabular format and a GIS map for visual representation of the existing seagrass resources within the project area. Park staff have also participated in Biscayne Bay cleanups. Three park facilities have been taken off septic and connected to sewer. In addition, staff are partnering with the Florida Fish and Wildlife Conservation Commission to restore two remnant mangrove systems in the park. These wetlands were impounded within the landscape during large-scale dredging and filling associated with coastal development in the 1950s and have been stressed due to failure of hydrologic connections to tidal flow. This project proposes to improve the function of the two die-off areas, totaling 26.7 acres of mangrove habitat, by reestablishing tidal flow through the maintenance or replacement of culverts.

- **Bill Baggs Cape Florida State Park**

Bill Baggs Cape Florida State Park is situated between Biscayne Bay and the Atlantic Ocean and is committed to the preservation and stewardship of the surrounding waters. The park's ongoing efforts to maintain native ecosystems through targeted invasive species removal and beneficial native species planting have helped create buffer habitat vital to shoreline stabilization. A post-Hurricane Andrew mangrove restoration area is maintained, serving as a bird rookery and fish nursery within the bay. Park rangers maintain trails and interpretive signage that have contributed to the preservation of vital dune habitat, even with the more than 1 million guests that visit park beaches annually. Over 4,000 volunteers have participated in coastal cleanups in the past year, removing tons of marine debris from the shorelines. The park harbor is a DEP designated Clean Boating/Clean Marina, offering free waste disposal, sewage pump-out and fresh water, as well as interpretive signs encouraging visitors to practice responsible boating and help improve water quality in Biscayne Bay. A deployable marine spill kit is available at the harbor in the event of a marine-related environmental accident. Parking lot and roadway stormwater controls are maintained throughout the park to provide safe drainage during storm events. The park has nurtured numerous partnerships with local universities, environmental organizations and governmental regulatory agencies to facilitate ongoing research on the bay, including subjects as varied as coral spawning, beach health, marine debris and water quality. Park rangers take every opportunity possible to educate visitors on the importance of Biscayne Bay and the role it has in Florida's past, present and future.

- **Barnacle Historic State Park**

The Barnacle Historic State Park conducted many natural resource and educational programs benefiting Biscayne Bay during 2021, including:

- Annual discussion with park district biologists to identify natural and cultural resource needs and goals for the park.
- Exotic plant removal.
- Coastal cleanups.
- Native plantings.
- The park's citizen support organization (CSO) hired a landscape architect to create a stormwater runoff and erosion plan. The Barnacle is now working with the Florida Park Service Bureau of Design and Construction and the city of Miami on permitting.
- From January to September, a dedicated exotic removal ranger worked to meet the park's removal goals. Upon his departure, rangers continued work on exotic removal.
- Park staff and the CSO worked with partners on educational programs and events.
- Park staff members routinely remove litter that floats in on the tide and hauls it to landfill.



- The CSO cut plastic usage. The majority of water and soft drinks sold at events is in aluminum cans.
- Researching installation of a water-bottle filling station to cut down single-use plastic.
- **Biscayne Bay Aquatic Preserves**
  - Biscayne Bay Aquatic Preserves (BBAP) within DEP's Office of Resilience and Coastal Protection operates as the managing and partial owning entity for almost 70,000 acres of submerged lands and emergent islands within Biscayne Bay. For the last 48 years, BBAP has managed the health of the aquatic preserves through four programmatic goals: restoration to natural condition; protection of ecological integrity; promoting public use and stewardship; and management through research-based sound science.
  - Restoring BBAP to its natural condition is being achieved via a multitude of programs. Assistance in derelict vessel reporting and illegal crab pot removals during the FWC 2021 crab pot closure assisted the restoration of submerged lands, while the bay's islands were targeted through three major efforts. BBAP continued its decades-long history of hosting an International Coastal Cleanup site, which has removed 1,000 pounds of marine debris. Secondly, BBAP's Adopt-an-Island Program saw 16 cleanups from its adopters, who removed almost 2,000 pounds of debris from the bay's islands. This past fall, BBAP initiated a NOAA Marine Debris grant funded contract to remove Hurricane Irma debris from 13 of BBAP's islands. Six islands have been cleaned with the removal of almost 10 tons of debris with the remaining seven to be completed in early 2022.
  - Protection of ecological integrity and promoting public use and stewardship included the permit review and meeting attendance for project planning totaling over 100 hours. Stakeholder engagement on the health of the bay, technical document review, report writing, grant application reviews, public outreach, and public presentations all contributed to hundreds of hours of dissemination of BBAP achievements and efforts to the public in support of these programmatic goals. BBAP staff also serve the public by representing DEP in the Comprehensive Everglades Restoration Plan's Biscayne Bay Coastal Wetlands and Biscayne Bay and Southeastern Everglades Ecosystem Restoration planning processes, on the Southeast Florida Coral Reef Initiative team, and providing assistance and guidance to BBAP's citizen support organization, the Friends of Biscayne Bay Inc. Planning for construction and environmental response efforts led to the completion of emergency response training under NOAA's Natural Resource Advisor Training certification program to prepare for future storm events, oil spill events and derelict vessel removals.
  - DEP continues as a leading agency in the monitoring and assessment of the Biscayne Bay area via BBAP's six main research programs. The central focus for BBAP is the study of the stressors and preceding ecological status after an expansive seagrass loss event a few years ago in northern Biscayne Bay. Benthic habitat mapping of 31 sites in northern Biscayne Bay has linked nearshore, human-induced nutrient levels to the eutrophication of the waters of BBAP, resulting in enhanced stressors and a large die off of economically and environmentally important submerged aquatic resources. Furthermore, seagrasses and macroalgae were collected to study the uptake of water quality nutrients to further link eutrophication to the seagrass loss event. Sediments were collected in association with seagrass areas to define the potential of sulfide intrusion

linking poor water quality and low oxygenation to the health of the bay and the seagrass losses.

- With an EPA funded grant in 2021, BBAP expanded its datasonde network into the Miami River, establishing two more sites along with the three existing datasonde sites in the Little River watershed. Across the five deployed continuously monitoring water quality sites, over 175,000 water quality data points were collected in 2021. Three more sites are planned in the Rickenbacker and Venetian basins for a programmatic total of eight continuously collecting water quality sites in the bay and its estuarine tributaries. With the current datasonde network, BBAP has attained the largest continuously monitoring network by an aquatic preserve in the state. DEP's Office of Environmental Accountability and Transparency is also providing funds for a staff position and water quality equipment to support this important effort.
- Understanding the water quality of the bay requires source tracking of nutrients through the watershed, which is achieved by BBAP's monthly water quality bottle grab sampling of 24 sites for tracking of 39 nutrients, septic tracers, pharmaceuticals, herbicides, insecticides and fungicides. Supported by DEAR, this sampling effort totaled over 11,000 water quality analyte data points in 2021.
- Newly implemented and established monitoring projects in 2021 included the only island-based bird count, BBAP's Rookery Island Bird Monitoring Program, which counted over 10,000 birds on 36 islands. BBAP staff also conducted emergency response monitoring for the September 2021 fish kill.
- In 2022, the implementation of an EPA funded water quality restoration project achieved via sponge propagation will provide examples of water quality benefits from expanding the ecosystem services of a group of species that currently exist in the bay and provide benefits to other protected species, such as seagrasses and corals. This project, the first of its kind in Biscayne Bay, will be executed without disturbing seagrass habitat by utilizing existing bay resources and salvaging sponges removed during construction projects.

- **DEP Southeast District (SED)**

The Miami-Dade Water and Sewer Department (MDWASD) completed a treatment and collection system over the past seven years via a 2014 consent decree between the U.S. Department of Justice, DEP and MDWASD. The treatment plants and collection system are near Biscayne Bay and are one of the surface waters that benefits from these improvements. The following has been completed during the past five years as part of this consent decree:

- Rehabilitation of a chlorine contact chamber at the South District treatment plant.
- Miscellaneous electrical improvements at the Central District treatment plant.
- Replacement of pumps at one of the effluent pump stations at the Central District treatment plant.
- Rehabilitation of digesters at treatment plant 2 clusters 1-4 at the Central District treatment plant.
- Construction of two 80-ton oxygen production units at the Central District treatment plant.
- Add standby pumps and rehab outfall pump station wet well for effluent disposal at the North District treatment plant.
- Rehabilitation of 3.5 miles of the south Dade 54-inch force main (collection system).
- Rehabilitation of a 54-inch force main in city of Miami (collection system).

- Replacement of 30 miles of asbestos cement force main transmission system (collection system).
- Replacement of 231,731.01 linear feet (43.89 miles) of force mains (collection system).

### **Fish and Wildlife Conservation Commission (FWC)**

The mission of the Florida Fish and Wildlife Conservation Commission is “managing fish and wildlife resources for their long-term well-being and the benefit of people.” Toward that end, the FWC has five divisions, the Fish and Wildlife Research Institute and multiple offices dedicated to furthering its mission. Multiple divisions and the research institute contribute to protecting, studying and preserving natural resources in Biscayne Bay. Examples from 2021 include:

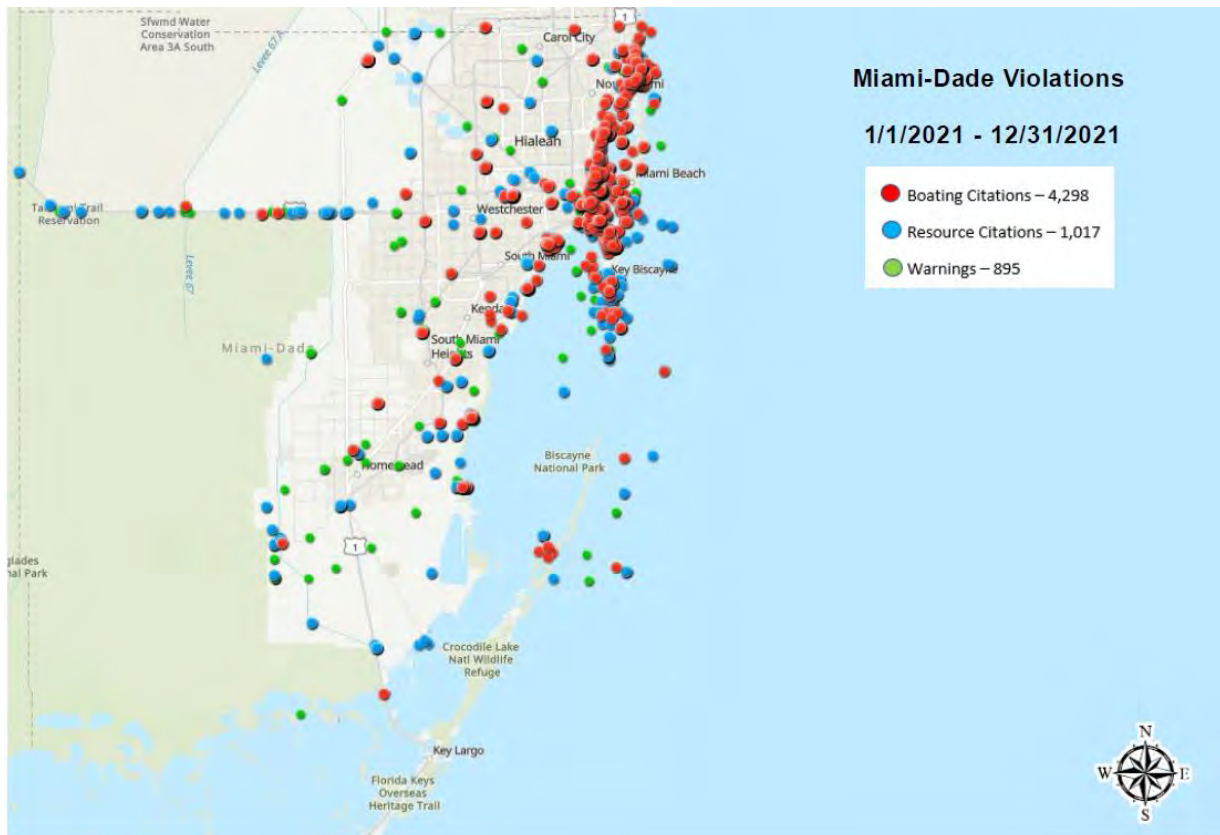
**Resource Management** – The Division of Habitat and Species Conservation, Division of Marine Fisheries Management, Fish and Wildlife Research Institute, and Office of Strategic Initiatives all participated in resource management and enhancement or coordinated on interagency teams to benefit Biscayne Bay in 2021. Highlights include:

- FWC staff and scientists serve on many interagency teams and serve as subject matter experts engaged in Everglades restoration, marine fisheries, marine and estuarine resources, manatees and climate change, among other topics. Teams that FWC has served on or engaged with include:
  - Biscayne Bay and Southeastern Everglades Ecosystem Restoration (BBSEER).
  - Miami-Dade Back Bay Coastal Storm Risk Management Feasibility Study, promoting use of nature-based features (e.g., mangrove restoration and living shorelines).
  - U.S. Army Corps of Engineers South Atlantic Coastal Study.
  - Biscayne Bay science coordination calls, led by the Miami Waterkeeper, in response to 2019 fish kills in the northern bay.
- FWC staff monitor and maintain the Bill Sadowski Virginia Key Critical Wildlife Area, which protects approximately 700 acres of foraging habitat for shorebirds, wading birds, manatees and other marine life. It includes a no entry zone to ensure manatee and seagrass protection [Florida Administrative Code 68C-22.025(1)(e)1].
- Oleta River State Park Mangrove Restoration Project (total of 26.7 acres): Project engineering and design plans are 100% complete. Construction should be complete in 2022.
- FWC is a partner in the stony coral tissue loss disease response. Efforts include coral rescue, intervention experiments, coral restoration trials, coral disease monitoring, strategic sampling and laboratory analyses, and data management.
- FWC has multiple state-wide or regional programs that intersect with Biscayne Bay. These include:
  - Manatee Rescue and Carcass Salvage.
  - Sea Turtle Stranding and Salvage Network.
  - Statewide Nuisance Alligator Program: Crocodile Response Agents.
  - Nonnative Fish and Wildlife Program including early detection rapid response efforts and lionfish removal programs
  - Fisheries Dependent Monitoring, tracking recreational and commercial fisheries landings throughout the state.
  - Artificial Reef Program, providing annual financial grants to local governments and others for new reef construction and monitoring.

**Law Enforcement** – FWC’s Division of Law Enforcement patrols, protects and preserves Florida’s natural environment, with officers constantly “in the woods and on the water.” FWC law enforcement has a strong presence on the waters of Biscayne Bay.



- The Office of Boating and Waterways oversees and coordinates statewide regulatory waterway markers, manages the derelict vessel removal program, and coordinates certain marine debris response (e.g., derelict trap removal, hurricane debris).
  - Waterway markers are routinely surveyed for accuracy and for damage. Missing, damaged or incorrect signage can be reported to 866-405-BUOY or by emailing [Waterway.Management@MyFWC.com](mailto:Waterway.Management@MyFWC.com).
  - The Derelict Vessel (DV) Removal Program provides a means for counties and municipalities to apply for grant funds to be used for removing such vessels from the waters of their communities. More information on the grants can be found at [FWC Derelict Vessel Removal Grant Program](#). In 2021 for Miami-Dade County, FWC grant funds helped close 45 DV cases, with 41 currently open. Most DV cases are in Biscayne Bay or attached waterways.
- In Miami-Dade County, through calendar year 2021, FWC officers issued the following boating and resource citations and warnings, a large portion of which were in Biscayne Bay (**Figure 5**):
  - 4,298 boating citations.
  - 1,017 resource citations.
  - 895 warnings



**Figure 5.** Boating and resource violations issued by FWC in Miami-Dade County during 2021, a large portion of which were in Biscayne Bay.

## **Florida Inland Navigation District (FIND)**

- **Waterways Assistance Program**

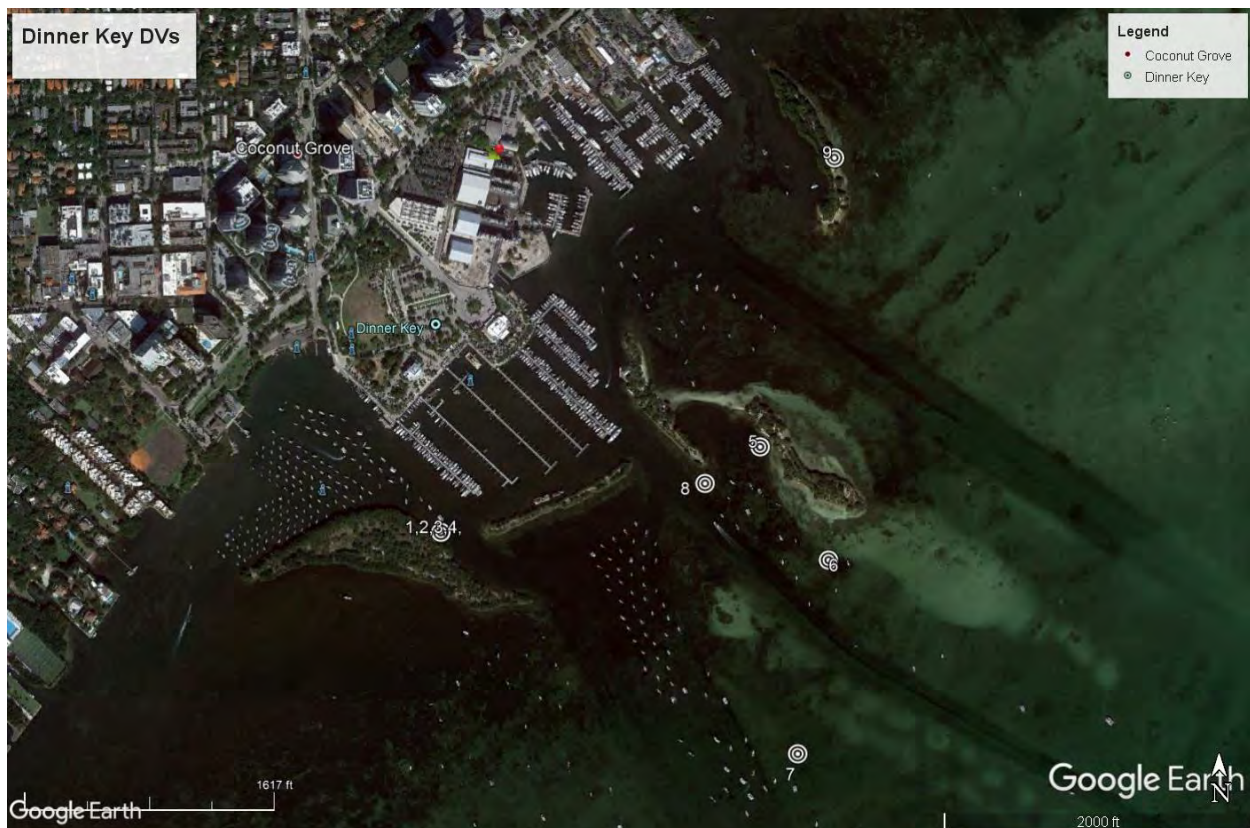
Since 1986, the Florida Inland Navigation District has provided over \$86 million in Waterways Assistance Program funding to 267 projects in the county, with a total constructed value of \$229 million. The county and 14 cities have participated in the program. Notable projects include several spoil island management projects; the Marjorie Stoneman Douglas Biscayne Nature Center; Bicentennial Park improvements; improvement to most major public marinas (Dinner Key, Virginia Key, Crandon, Haulover, Pelican, Black Point, etc.); notable repairs to public facilities following several hurricanes; South Pointe Pier project; Alice Wainwright Park; and Parcel B Public Shoreline Stabilization.

In 2021, FIND awarded nine grants with a value of \$4.4 million, including Haulover Marina boat ramps, piers, parking renovations, Bal Harbour marine patrol boat engines replacement; Maurice Gibb Memorial Park seawall, living shoreline, overlook; Miami Beach mooring field near Belle Isle; civic park in North Bay Village; North Bay Village marine patrol vessel; dockage at the James L. Knight Center/Miami River Hyatt; and city of Miami Legion Park shoreline stabilization and kayak launch.

In 2021 the city of Miami completed three significant grant projects that have been in process – the [Virginia Key](#) seawall, dock and kayak launch at Shrimper's Lagoon; [Spring Garden Park](#) seawall and kayak launch; and [Dinner Key Marina](#) redevelopment.

- **Small-Scale Derelict Vessel Removal Program**

Miami-Dade County and its municipalities have previously participated in the Small-Scale Derelict Vessel Removal Program with \$275,000 in district funding contributing for roughly 125 vessels removed. In 2021, FIND awarded \$100,000 in grants for derelict vessel removal in the city of Miami (**Figure 6**).



**Figure 6.** Derelict vessel locations within the city of Miami for which FIND grant funding has been awarded for removal.

- **Waterfront Recreational Access Plan**

In 2018, FIND awarded Miami-Dade County a \$100,000 grant to develop a master plan for public access to county waterways. The plan's purpose is to "provide an interconnected blueways system with improved public access and recreational opportunities to Biscayne Bay and Miami-Dade County's waterways in order to encourage residents and visitors to enjoy, responsibly use and protect these unique natural ecosystems." The plan is nearing conclusion and will be finished in calendar year 2022. When complete, the access plan will provide local, state and regional governmental interests with a roadmap to increase public access to the bay.

- **Flood Shoal and IWW Channel at Haulover Inlet**

The Bal Harbor Shore Protection project includes 90k cy obtained from dredging and approximately 110k cy from truck haul. Material will be placed on the beach between R-27 and R-31.3. Out of the 90k cy being dredged, approximately 25% will be dredged from the Bakers Haulover reach of the Intracoastal Waterway. This material is located within a problematic flood shoal that is north of the inlet. The removal of this material from the flood shoal has multiple benefits. First, material removal from the flood shoal will act as advance maintenance, lessening the shoaling that would be expected to be deposited into the IWW. Second, the dredging of material from the IWW and placement on the beach is a prime example of beneficial use, removing material at the benefit of one project to benefit another.

- **Cooperative Assistance Program**

The district's Cooperative Assistance Program has provided funding assistance for the following projects with elements in Miami-Dade County: Blue Marlin construction at Oleta River State Park; No-Name Harbor boater access; Bill Baggs shoreline and fishing platform project; Florida Marine Patrol office building; Florida Marine Patrol officer funding; Miami River dredging; and the manatee acoustic study. The district's funding assistance for the Miami-Dade County portion of these projects has been over \$4.5 million.

- **Interlocal Agreement Program**

The district's Interlocal Agreement Program (a subset of the WAP and CAP programs) has provided funding assistance for the following projects with elements in Miami-Dade County: Miami River dredging; Clean Marina Program; Clean Vessel Act Program; and the Miami Circle Shoreline Rehabilitation Project. The district's funding assistance for the Miami-Dade County portion of these projects has been approximately \$5 million.

- **Waterway Cleanup Program**

Since 1998, the district has consistently partnered with Miami-Dade County in its annual Baynaza waterway cleanup event, providing up to \$10,000 per year.

- **Small-Scale Spoil Island Enhancement and Restoration Program**

To date, four spoil island enhancement or restoration projects have been funded in Miami-Dade County, including docks on Spoil Islands E and C plus Pelican Island signage.

- Participated in Biscayne Bay tour with U.S. Rep. Maria Elvira Salazar.
- Participated in tour of Merrill Stevens boatyard with the Miami River Commission.
- Participated in design meetings related to Sewell Park shoreline restoration.



## STATUS OF EACH PENDING TASK

Prior to the commission's inaugural meeting, initial steps were taken to make progress on the six tasks outlined below, taken from the establishing legislation. Additionally, at its first meeting, the commission discussed these tasks and planned how to address each, and they continue to make progress on each between their meetings. Tasks include:

- (a) Consolidate existing plans, programs and proposals, including the recommendations outlined in the June 2020 Biscayne Bay Task Force report, into a coordinated strategic plan for improvement of Biscayne Bay and the surrounding areas, addressing environmental, economic, social, recreational and aesthetic issues. The commission shall monitor the progress on each element of such plan and shall revise the plan regularly.
  - Each commissioner is tasked with bringing policy, ordinance and project ideas to their next meeting for discussion.
  - The commission discussed looking at the project lists provided by the MDC Watershed Advisory Board and determining where combinations of the two groups' ideas are effective or creating policies for MDC's ideas.
  - As a potential project, the commission discussed and will coordinate with the former Biscayne Bay Task Force members and current MDC Watershed Advisory Board to reach consensus on applying either the DEP Total Maximum Daily Load (TMDL)/Basin Management Action Plan (BMAP) or Reasonable Assurance Plan (RAP) process to the existing water quality impairments in Biscayne Bay.
  - A suggestion was made at the inaugural meeting to include a library (or link to one already existing) to provide access to the documents (e.g., Biscayne Bay Aquatic Preserve Management Plan, Biscayne Bay Task Force Recommendations, etc.) that the commission will consolidate on their website. Options are being explored by DEP's website developers.
- (b) Prepare a consolidated financial plan using the projected financial resources available from the different jurisdictional agencies. The commission shall monitor the progress on each element of such plan and revise the plan regularly.
  - The commission decided at its first meeting to bring information to the next meeting on the resources each member agency can bring to bear or is otherwise aware of (e.g., grant programs they don't administer).
  - A suggestion was made at the inaugural meeting for member agencies to coordinate their lobbying efforts in order to make their individual requests more effective. Members with lobbyists will follow up.
- (c) Provide technical assistance and support as needed to help implement each element of the strategic and financial plans.
  - After hearing the presentations at their first meeting, commissioners requested additional technical support and data from DEP DEAR regarding Biscayne Bay impairments, water quality hotspots maps, and analyses by basin.
  - Commissioner discussion at their inaugural meeting resulted in a request to the Florida Department of Transportation for technical support regarding the agency's plans to address sea level rise along the causeways transiting Biscayne Bay and discussion of ways to build resilience (e.g., living shorelines) and restoration (e.g., improved water flow) into their plans.
  - Commissioners also discussed calling upon the state of Florida's Clean Waterways Act Stormwater Rulemaking Technical Advisory Committee for technical assistance.
- (d) Work in consultation with the U.S. Department of the Interior.

- The commission has requested an update (similar to what is provided in Section 2 of this report) from Department of the Interior representatives for Biscayne National Park (BNP) and the Office of Everglades Restoration Initiatives. Their update includes:
  - The Department of Interior (DOI) and the National Park Service (NPS) are key partners in the Comprehensive Everglades Restoration Program, an effort to restore and improve the quantity, quality, timing, and distribution of freshwater flow to South Florida, including flows to Biscayne Bay and Biscayne National Park. During 2021, DOI and the NPS were partners to, consulted on, and otherwise guided, the operations of the South Florida Water Management District water management system, and multiple other projects meant for the benefit of the regional ecosystem. Specific projects for 2021 include:
    - The Working Group and the Science Coordination Group facilitated various briefings and updates to other government agencies and the public on various matters related to Biscayne Bay and connectivity to other restoration projects. The updates related to restoration construction progress, coral reef disease update, Biscayne Bay and Southeastern Everglades Restoration (BBSEER) project and fisheries.
    - Updates to the Lake Okeechobee System Operating Manual. DOI and NPS consulted on the selection of alternatives that maximize freshwater flow south while meeting water quality and other water use constraints. Increased flow south is anticipated to improve water availability to Biscayne Bay and BNP, particularly during the dry season.
    - Elevation of the Tamiami Trail roadbed. DOI and NPS consulted on and engaged in permitting and monitoring for a project to increase the elevation and improve flow structures under Tamiami Trail. Improved flow south and increased stage in the L29 canal allows for improved flow to Everglades National Park and increased availability of water for Biscayne Bay and BNP.
    - Consulting on water management operations. NPS scientists regularly consult on regional freshwater management operations to improve flows south and to the coast for the benefit of the contiguous Florida Bay and Biscayne Bay system.
    - Tracking installation of Biscayne Bay Coastal Wetlands Phase 1 implementation. NPS scientists regularly provide review and feedback on the operational changes that have been implemented to improve water levels in L31E, flow at the S-700 structure, and other actions that improve flow into the coastal wetlands of Biscayne Bay including features within Deering Estate.
    - Participating in the project delivery teams for the Biscayne Bay and Southeastern Everglades Restoration (BBSEER) project. DOI and NPS contributed to the process, providing input and suggesting features to be included in initial alternatives for the
    - BBSEER project. DOI has contributed to the selection of models, the development of performance metrics, and the initial array of features that may be built to improve flow through the Model Lands region and other coastal zones of Biscayne Bay and BNP.
    - Coordinated on construction of culverts to improve flow to the coast in Taylor Slough. This project, while not directly improving flow to Biscayne Bay, will increase freshwater flow across the connected coastal wetlands system in eastern Florida Bay, adjacent to southern Biscayne Bay and may have indirect benefits to the regional system.

- Seepage Barrier consultation, permitting, and construction monitoring. DOI and NPS have engaged on the installation of a seepage barrier along the 8.5 Square Mile Area along the border of Everglades National Park. This project was evaluated by NPS staff to assure that Biscayne Bay would experience no adverse impacts. The project is anticipated to provide a net benefit to the region, including Biscayne Bay, by allowing water levels to increase in Northeastern Shark Slough, thus increasing regional water availability.
- Miscellaneous consultation on regional issues. DOI and NPS have addressed multiple smaller regional issues, such as evaluating the potential benefits of acquiring donated lands adjacent to Biscayne National Park, that either benefit the Biscayne Bay now or set the stage to provide additional benefits to the bay in the future.

(e) Provide a forum for exchange of information.

- The forum occurred among commission members at their inaugural meeting, and with the public in the formal comment period and the webinar chat.
- A suggestion was made at the inaugural meeting for the commission to plan a site visit to Biscayne Bay.
- Each commissioner is tasked with providing their member agency's feedback on the items discussed at the first meeting (e.g., law enforcement capacity, septic-to-sewer conversions, etc.).
- The commission decided to exchange information with the MDC Watershed Advisory Board by linking to each other's websites and providing each other's meeting summaries to the other group. Options are being explored by DEP and MDC's website developers.
- The commission discussed the two groups using the same talking points for projects where all levels of government aggregate actions that focus on one basin in order to magnify awareness of the issue at hand and amplify the potential for environmental change.

(f) Act as a clearinghouse for public information.

- The Biscayne Bay Commission website serves as a clearinghouse of information on the bay and the commission.
- This and future reports will be posted on the commission's website. These reports serve as a clearinghouse for all work the member agencies are conducting regarding Biscayne Bay.

The Biscayne Bay Commission Meeting will meet again in Spring 2022.

# Glossary/ Acronyms

## **Adaptation Action Area (AAA)**

An Adaptation Action Area is known as a designation in the coastal management element of a local government's comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning.

## **Basin Management Action Plans (BMAPs)**

A basin management action plan (BMAP) is a framework for water quality restoration that contains local and state commitments to reduce pollutant loading through current and future projects and strategies. BMAPs contain a comprehensive set of solutions, such as permit limits on wastewater facilities, urban and agricultural best management practices, and conservation programs designed to achieve pollutant reductions established by a total maximum daily load (TMDL). These broad-based plans are developed with local stakeholders and rely on local input and commitment for development and successful implementation. BMAPs are adopted by Florida Department of Environmental Protection Secretarial Order and are legally enforceable.

## **Clean Water Act (CWA)**

The Clean Water Act (CWA) is the primary federal law in the United States governing water pollution. Its objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters; recognizing the responsibilities of the states in addressing pollution and providing assistance to states to do so, including funding for publicly owned treatment works for the improvement of wastewater treatment; and maintaining the integrity of wetlands. The Clean Water Act was one of the United States' first and most influential modern environmental laws. Its laws and regulations are primarily administered by the U.S. Environmental Protection Agency (EPA) in coordination with state governments, though some of its provisions, such as those involving filling or dredging, are administered by the U.S. Army Corps of Engineers. Its implementing regulations are codified at 40 C.F.R. Subchapters D, N, and O (Parts 100-140, 401-471, and 501-503).

## **Enhanced Nutrient Reducing (ENR)**

Enhanced Nutrient Reducing is the use of technologies that will allow wastewater treatment plants to provide an advanced level of treatment.

## **Green infrastructure (GI)**

Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray stormwater infrastructure conventional piped drainage and water treatment systems is designed to move urban stormwater away from the built environment. Green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

## **Impaired Water Rules (IWR)**

The Florida Impaired Waters Rule (IWR) establishes a methodology to identify those waters that will be included on the State's "Section 303(d) list" of impaired waters that is required to be reported to EPA.

[https://www.epa.gov/sites/default/files/2015-11/documents/1.5.3\\_epa\\_iwr\\_decision\\_2008.pdf](https://www.epa.gov/sites/default/files/2015-11/documents/1.5.3_epa_iwr_decision_2008.pdf)

## **Low-impact development (LID)**

Describes a land planning and engineering design approach to manage stormwater runoff as part of green infrastructure. LID emphasizes conservation and use of on-site natural features to protect water quality.

## **Numeric Nutrient Criteria (NNC)**

Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll a. For open ocean coastal waters, numeric criteria are established for chlorophyll a that are derived from satellite remote sensing techniques.

## **Pollutant Reduction Plan (PRP)**

A plan developed to identify and then reduce a baseline amount of a specific pollutant by some preset percentage (using various facilities, BMP's and programs). Total Maximum Daily Load (TMDL)

## **Reasonable Assurance Plans (RAPs)**

The development of a Reasonable Assurance Plan (RAP) is a process that can be undertaken to improve a water body where a Total Maximum Daily Load (TMDL) has not been established. The process is similar to the Basin Management Action Plan (BMAP) that is undertaken where a TMDL has been established to indicate the impairment of the water body. The RAP will provide more local



control over development and implementation of prevention and restoration activities for the water body. The RAP will also make grant funding more available.

### **Statewide Biological Database (SBIO)**

The DEP Laboratory administers the Statewide Biological Database (SBIO). The SBIO database was developed in the early 1990's in response to the need for centralization of biological data collected by DEP and its predecessor agencies.

Some macroinvertebrate taxa attributes may be used to calculate the Stream Condition Index (DEP SOP SCI 2100(5)). For clinger taxa, include only those taxa whose sole habit is listed as "clinger." Calculate percent filter feeders as the number of individuals that are filter feeders divided by the total number of individuals in the aliquot. Count an individual of a taxon for which filter feeding is one of two feeding strategies as 0.5 individuals.

<https://geodata.dep.state.fl.us/datasets/FDEP::biological-stations-from-statewide-biological-database-sbio/about>

### **Total Maximum Daily Loads (TMDL)**

A TMDL is a scientific determination of the maximum amount of a given pollutant that a surface water can absorb and still meet the water quality standards that protect human health and aquatic life. Water bodies that do not meet water quality standards are identified as "impaired" for the particular pollutants of concern - nutrients, bacteria, mercury, etc. - and TMDLs must be developed, adopted and implemented to reduce those pollutants and clean up the water body.

The threshold limits on pollutants in surface waters - Florida's surface water quality standards on which TMDLs are based - are set forth primarily in rule 62-302, Florida Administrative Code (F.A.C.), and the associated table of water quality criteria.

### **Water Body Identification number (WBID)**

A Water Body Identification number (WBID) is an assessment unit that is intended to represent Florida's waterbodies at the watersheds or sub-watershed scale. WBIDs have a unique identification number that is tracked by the department and have a geographic delineation as a polygon layer. The assessment units are drainage basins, lakes, lake drainage areas, springs, rivers and streams, segments of rivers and streams, coastal, bay and estuarine waters in Florida. The polygons roughly delineate the drainage basins surrounding the waterbody assessment units. The WBIDs are used in the annual impaired waters assessment, implementation of Total Maximum Daily Loads (TMDLs) and Basin Management Action Plans (BMAPs) as well as other applications.

### **Watershed Information Network (WIN)**

WIN, the Watershed Information Network, provides a modernized centralized environmental data management platform (excluding regulatory databases) as a successor to Florida STORET (STORage and RETrieval).

WIN provides front-end quality assurance, data input, storage, and reporting of surface water (and including sediment and fish tissue) and ground water data. WIN provides a platform for data providers to submit their data and perform data quality checking interactively prior to allowing the data to be migrated into the published WIN environment. WIN is used to store and manage data, and to report data to interested users and the U.S. Environmental Protection Agency.

### **Sanitary sewer overflow (SSO)**

A sanitary sewer overflow (SSO) is any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. A sanitary sewer overflow can spill domestic wastewater out of manholes and onto streets and into storm water systems, surface water bodies or into toilets, sinks and drains before it can reach a treatment facility.

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### **Sources:**

*Florida Department of Environmental Protection:* <https://floridadep.gov/>

*Howard County, Maryland:* <https://www.howardcountymd.gov/public-works/lpwrp-enhanced-nutrient-removal>

*Miami Beach Rising Above:* <https://www.mbrisingabove.com/climate-adaptation/adaptation-action-areas/#:~:text=An%20Adaptation%20Action%20Area%20is%20known%20as%20a,prioritizing%20funding%20for%20infrastructure%20needs%20and%20adaptation%20planning.>

*Wikipedia:* [https://en.wikipedia.org/wiki/Low-impact\\_development\\_\(U.S.\\_and\\_Canada\)#:~:text=Five%20principles%20of%20low-impact%20development%20%20Conserve%20natural,the%20water%20leave%20the%20site%29.%20More%20items...%20](https://en.wikipedia.org/wiki/Low-impact_development_(U.S._and_Canada)#:~:text=Five%20principles%20of%20low-impact%20development%20%20Conserve%20natural,the%20water%20leave%20the%20site%29.%20More%20items...%20)

*EPA:* <https://www.epa.gov/research/epa-enterprise-vocabulary>