


Memorandum



Date: June 17, 2022

To: Honorable Chairman Jose “Pepe” Diaz
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor 

Subject: DERM Monitoring of Current Water Quality Status Ahead of Potential Fish Kills

Executive Summary

This memorandum serves to advise the Board of recent data collection conducted as part of the Division of Environmental Resources Management’s (DERM) ongoing ambient surface water quality monitoring program in light of Tropical Cyclone One. While nutrient analyses are still pending, it provides information comparing the physical parameters of these sampling results to those found during the fish kills of 2020 and 2021. The fish kills in Biscayne Bay were mostly driven by lack of oxygen; certain factors such as temperature, salinity and winds impact the presence of oxygen in the water column. While we cannot predict fish kills based on sampling and monitoring environmental conditions alone, results from DERM’s recent sampling do not point to critically low levels of dissolved oxygen in the Bay at this time. However, changing weather patterns and conditions in Biscayne Bay could present deteriorated conditions as the season progresses and will continue to be monitored by our staff to identify those triggers. The memorandum also explains the measures in place to respond to fish kills should such an event occur this summer, and future projects and actions that will improve water quality and eliminate or minimize sources of pollution impacting Biscayne Bay.

Fish Kills and DERM Ambient Surface Water Quality Monitoring

Over several days in August 2020 and again in September 2021, fish kills were documented in northern Biscayne Bay. The onset of certain environmental conditions is linked to deteriorated water quality conditions that can cause drops in dissolved oxygen, sometimes for extended periods of time. Dissolved oxygen is the form of oxygen gas in the water column that is most available for marine organisms like fish. Levels of dissolved oxygen can be reduced as water temperatures and salinity increase but temperature and salinity alone are often not the reason why dissolved oxygen levels may drop, particularly near the bay bottom, causing perilous conditions for fish and other marine life.

There are several existing conditions within the various basins of the Bay that impact the resilience of the ecosystem to withstand the onset of environmental conditions such as changing temperatures, salinity and pH, and stormwater inputs from storm events. Notably, the significant loss of seagrasses in northern Biscayne Bay along with continued nutrient loading into the basins from various sources has reduced the Bay’s resilience. Coastal resilience is defined by the National Oceanic and Atmospheric Administration as *the ability to adapt to changing conditions and withstand—and rapidly recover from—disruption due to emergencies*. Biscayne Bay’s loss of primary oxygen producers (seagrasses) that assimilate nutrients and oxygenate the water column as well as elevated nutrient concentrations contribute to conditions that make it difficult for the Bay to bounce back from stormwater impacts, higher temperatures, extreme tides, variable winds, storm events, and other

environmental factors. These existing conditions and the onset of such environmental factors combined with reduced tidal exchange in the northern basins with little flushing and circulation can lead to periods of low oxygen in the water column, and in turn cause fish kills, and can contribute to algal blooms.

Staff conducted monitoring of key areas within northern Biscayne Bay and its tributaries ahead of the onset of the rainy season as well as conducted monitoring at specific locations during the recent weather event, Tropical Cyclone One. The northern end of the Bay received 8 to 10 inches of rain with localized intensities of up to 25 inches in 24 hours. The southern end of the Bay received up to 25 inches but was less localized and more widespread than what was observed in the north portion of the Bay.

Beginning the Monday following the storm, DERM staff conducted its monthly ambient surface water quality monitoring activities at more than 100 sites across the Bay and its watershed. This surface water quality monitoring is a long-standing program that began in the late 1970s. While results from various analyses such as nutrients are still pending, physical parameters taken at the sites such as temperature, pH, salinity, and dissolved oxygen indicate that during the storm and subsequent ambient monitoring, dissolved oxygen levels in the canals across the Bay’s watershed are low, as are temperatures and salinity. However, dissolved oxygen levels across Biscayne Bay sites largely remain above minimum levels required for a healthy aquatic environment (i.e., >5 mg/L), with temperatures generally below 85 degrees Fahrenheit. Lower salinities in the Bay are indicative of rainfall as well as canal waters reaching the Bay. To compare, temperatures during each fish kill incident was above 90 degrees Fahrenheit with low wind conditions that can create conditions for low dissolved oxygen, particularly on the Bay bottom. Staff will continue to monitor conditions in both Biscayne Bay and canals with particular focus on dissolved oxygen, nutrients, temperature, and rainfall as well as track weather and water management patterns.

Should a fish kill occur this summer, DERM staff stands prepared with a vendor procured through the County’s competitive bid process to assist in both landside and bayside retrieval of fish carcasses to try to reduce nuisance conditions and mitigate the size and intensity of any algae blooms. In coordination with the Chief Bay Officer, we have and will continue to communicate with municipalities on response protocols and will continue to remind the public, in coordination with stakeholder organizations, that fish kills and other environmental emergencies can now be reported to the County by calling 3-1-1 or emailing Baywatch@miamidade.gov.

Future Projects and Actions to Improve Water Quality

As we face significant weather events, extreme tides and temperatures and other factors beyond our control, we are actively working on solutions and acting on what we can control. As highlighted in the Biscayne Bay Task Force Report and now a priority of the Biscayne Bay Watershed Management Advisory Board, protecting water quality is the County’s main priority. The County, with support from state grant funding, is investing in the tools and resources needed to improve our ability to effectively investigate sources of water pollution and develop policies and projects that will eliminate and reduce those sources. For example, the County has developed and publicly workshopped new recommended Flood Criteria which will set future design standards to protect property from flooding while improving stormwater designs to provide enhanced pollution prevention for our roadways and secondary canals. Impervious surface standards are also being developed for the Commission’s consideration to ensure that individual properties do not create a flooding and pollution nuisance for the community and help the County prevent localized flooding, and unnecessary loads to our stormwater management system. Furthermore, we are piloting innovative stormwater treatment systems as well as testing new tools to help better predict and prevent sanitary sewer overflows into Biscayne Bay.

Due to localized flooding, the County experienced significantly increased inflows into the wastewater system -flows beyond the existing wastewater treatment plant’s designed capacity. These inflows were due in part to the illegal opening of manhole covers in some neighborhoods in an ill-conceived effort to relieve flooding. This “opening” of the sewer system compounded the problem of existing infiltration of groundwater into the sewer system, overwhelming our ability to take in such a tremendous volume of water. Infiltration occurs when groundwater elevation is higher than the sewer pipes and groundwater enters the sewer system (or vice versa) through existing system defects. The County is spending tens of millions of dollars per year to find such defects and seal off pipes from groundwater. Sewage, and all biological material including vegetative debris, can contribute to deteriorated dissolved oxygen values in the water column as well as create human health and safety hazards. The County has committed to a significant capital program to improve its sewer system, with my priority being eliminating the potential for the discharge of sewage into Biscayne Bay and our groundwater. DERM is also working with the fifteen Municipal Utilities to prioritize investment in reducing inflow and infiltration that also impacts the County’s sewer system. The County has also committed significant resources to septic to sewer conversions in areas most vulnerable to failure from sea level rise conditions in the most impacted Bay basins first as an important step in removing a significant chronic source of pollution that leads to fish kills and algae blooms.

Lastly, the County is drafting its first ever Reasonable Assurance Plan in coordination with the Florida Department of Environmental Protection (DEP). This plan, often referred to as a “RAP”, serves as a water quality restoration plan for basins across the watershed. While we are starting with a RAP in the northern basins where seagrass loss and fish kills have occurred, our goal is to have a RAP for all of Biscayne Bay and its watershed. We will have our first RAP completed for submission to the state for its review and approval by September of this year, making us eligible to apply for and receive funding from the state for wastewater and related projects.

We are committed to restoring the health of Biscayne Bay for this and future generations, and we appreciate the support provided by the Board for this significant undertaking. Please do not hesitate to contact Lourdes Gomez, Director, Department of Regulatory and Economic Resources (RER), Rashid Istambouli, Interim Director, RER-DERM, or Irela Bague, Chief Bay Officer, should you have any further questions.

c: Geri Bonzon-Keenan, County Attorney

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