



Florida Bay Update and Restoration Progress

Florida Fish and Wildlife Conservation Commission (FWC)

July 10, 2017

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Presentation Outline

- Florida Bay overview
- Ecological conditions update
- Restoration components
- Project spotlight: *Moving Water to Florida Bay*



Florida Bay is large and diverse ecosystem any single component in our outline can fill an afternoon with good discussion. This presentation will provide our Commission a broad view of Florida Bay, a snapshot of the current ecological conditions, and an overview of restoration components that are important to the health of Florida Bay. Today's update will close with a "project spotlight" presentation highlighting implementation success of the "Moving Water to Florida Bay" project by our guest speaker, Ernie Marks, Director of Everglades Policy and Coordination at the South Florida Water Management District.

Florida Bay: An overview

- Located between mainland and FL Keys
- Roughly 544,000 acres
- Highly productive estuary
 - Seagrass and mangrove
 - Complex network of shallow mud banks, flats, and basins
- Important component of the much larger south Florida ecosystem
- Popular destination for recreation



Located at the extreme end of the Florida peninsula, Florida Bay is uniquely situated between the Florida mainland and the Florida Keys. Users can access the bay from the Intracoastal Waterway in the upper keys which shares a 40-mile boundary with the bay's eastern edge or from the Flamingo area of Everglades National Park.

The bay is a highly productive subtropical estuary characterized by vast seagrass meadows and mangrove ringed islands that support significant ecological resources. It's a world-class fishery and a popular destination for recreation, especially boating, fishing, paddling, wildlife viewing, and photography.

Within the bay there is a complex network of shallow mud banks, flats and basins that help create a rich and diverse lagoon system, but the mud banks and basins can also impede circulation, and contribute to salinity variation and the formation of hypersaline conditions.

Florida Bay is an important component in the restoration of the greater south Florida ecosystem and a focus of the Comprehensive Everglades Restoration Plan (CERP).

Florida Bay's Fisheries

- Crucial nursery grounds for recreationally and commercially important species
 - Examples: pink shrimp, spiny lobster, spotted seatrout, and reef fish
- Everglades National Park covers 85% of the bay supporting a large recreational fishery
- Diverse habitats throughout the bay provide many opportunities
 - Inshore fishery: snook, tarpon, red drum, spotted seatrout, mangrove snapper
 - Flats fishery: tarpon, bonefish, permit, great barracuda
 - Outer edge: snappers, groupers, stone crab, spiny lobster



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Florida Bay is essential to the fisheries of south Florida. Everglades National Park encompasses about 85% of the bay and supports a large recreational fishery. The bay also provides crucial nursery grounds, such as seagrasses and mangroves, for species harvested further offshore in both recreational and commercial fisheries, such as pink shrimp, stone crab, spiny lobster, and many reef fish such as snappers and groupers.

The diverse landscape throughout the bay provides many opportunities for anglers. Inshore and among the mangrove shorelines, anglers often target snook, tarpon, red drum, spotted seatrout, gray snapper, and others. On the grass flats, anglers often target species such as tarpon, bonefish, permit, and great barracuda. Near the outer boundary of the bay many snappers, groupers, stone crab, and spiny lobsters can be abundant.

As an example of the diverse opportunities provided, many of the fish in FWC's Saltwater Angler Recognition program and several of the recreational saltwater 'Grand Slams' can be caught within the bay proper.

Florida Bay: Agency involvement and partnerships

- Monitoring
- Research
- Management decisions
- Restoration planning
 - FWC's KOEBCC Team
 - Fish and Wildlife Research Institute (FWRI)
 - Office of Executive Director (OED)
 - Office of Strategic Initiatives (OSI)
 - Division Marine Fisheries Management (DMFM)
 - Division Freshwater Fisheries Management (DFFM)
 - Division Habitat and Species Conservation (HSC)
 - Office of Conservation Planning Services (OCPS)
 - Aquatic Habitat Restoration Section (AHRS)



There are a number of important relationships and partnerships that conduct the research and monitoring, make management decisions and participate in restoration project planning. In addition to the state and federal agencies presented here, there are a number of local governments, Universities, environmental organization and stakeholder groups are deeply invested in the ecological health and restoration of Florida Bay.

Within the FWC, our Kissimmee-Okeechobee-Everglades-Big Cypress Coordination Team, or (KOEBCC) is our interdisciplinary agency team comprised of representatives from a number of Divisions and Offices and team members have reviewed and participated in many of the restoration efforts and projects that benefit Florida Bay.

Collectively, the team has the knowledge, skills and abilities to contribute to restoration of the South Florida Ecosystem in a positive and collaborative manner while protecting Florida's wildlife and wildlife habitats.

Florida Bay: Seagrasses

- Turtle Grass, shoal grass and manatee grass are the primary species
- Provide important habitat and ecological functions.
- Florida Bay Habitat Assessment Program (FHAP)
 - RECOVER system wide indicator
- 2015 Die-off event
 - 45,000-50,000 acres affected
 - Similarities with previous events
- Recently observed signs of recovery



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Seagrasses make up an important component of the ecosystem and cover much of the bay's bottom. Turtle Grass (*Thalassia testudinum*), shoal grass (*Halodule wrightii*) and manatee grass (*Syringodium filiforme*) are the three primary species that provide a highly productive base of the food web and serve as a principal habitat for higher trophic level species.

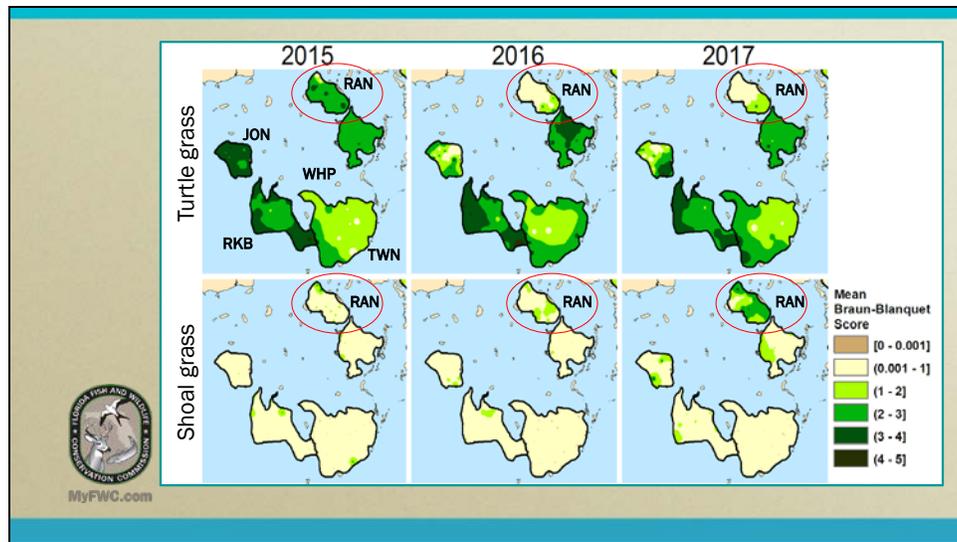
As a long lived plant species, seagrasses integrate changes in the environment and serve as biological indicators of the bay's ecological health. For these reasons seagrasses have been selected as a system wide indicator for assessing Everglades restoration by the RECOVER Group which stands for REStoration, COordination, and VERification. RECOVER is the scientific arm of the CERP and ensures science remains a strong component of restoration. FWRI's Florida Bay Habitat Assessment Program (FHAP) has been monitoring the seagrass and habitat conditions within Florida Bay as part of the RECOVER group since 1994 as part of the RECOVER Monitoring and Assessment Plan (MAP).

In 2015 there was a significant die-off of seagrasses in the Florida Bay and FWRI scientists were at the forefront of an interagency effort to document and understand the event.



Following some of the earliest observations and reports of die off in 2015, our scientists took an active approach to document the effects. The team expanded their sampling efforts from several key basins to a bay-wide sampling effort to record any observed signs of die-off. The red dots represent locations where die-off was observed and the green dots represent areas where no die-off was observed.

These data are very useful to assess the location and extent of the die-off. It is clear from these data that the greatest seagrass mortality was concentrated in the north-central and western areas of the bay; and although this was a large scale event, much of the bay was unaffected.



These are seagrass contour plots generated from our data for turtle grass and shoal grass in 2015, 2016 and 2017. I would like to draw attention into the Rankin Lake area which was one of the areas where seagrass mortality was most severe. Between 2015 and 2016 there was a very significant loss of turtle grass and this is seen as a change from the dark green colors to the lighter cream colors. In 2017 some turtle grass regrowth was observed.

The most significant finding of this analysis is the large increases of shoal grass in the same area. This can be seen in the shoal grass contour plot as a strong shift from cream coloration in 2015 to the deeper greens displayed in 2017.



These photos were collected before, during and after the die-off event and show the progression and regrowth that our scientists have observed. The photos are all collected from areas on the contour plots we just viewed. The first panel dated May 2015 in the upper left corner shows a healthy seagrass bed dominated by turtle grass. In this photo you can see the color and density of the grasses through the clear water.

The next panels in October 2015, and May 2016, you can see the effects of the die-off. The last photo collected in May of this year shows the observed re-growth of shoal grasses in Rankin Lake. I would like to point out the water clarity in this picture because that's an important ecological function that seagrasses provide in this ecosystem. Seagrasses not only stabilize the sediments, they collect and trap fine particles which helps maintain good water clarity and produce the "gin clear" water that Florida Bay is famous for.

These most recent data, and the photo documentation from this past May, are indications that a recovery is progressing. I must emphasize that we are very early in the recovery process and the future can hold great uncertainty, but right now things do look like they are going in the right direction.

Florida Bay: Salinity



High water column salinity was a significant contributing factor to the seagrass die-off in 2015, and remains a key component of seagrass recovery and the overall health of Florida Bay.

Recent data from the Buoy Key monitoring station is a good representation for the north-central bay where the recovery is being monitored. These data inform us that the salinities today are closer to the ecologically preferred level and considerably lower than the 2015 to 2016 period when the seagrass die-off occurred.

The little dip at the end of the data record is the response to the onset of the rainy season and I anticipate that bays overall salinity condition will continue to benefit from the wet seasons rainfall and overland flows from the Everglades.

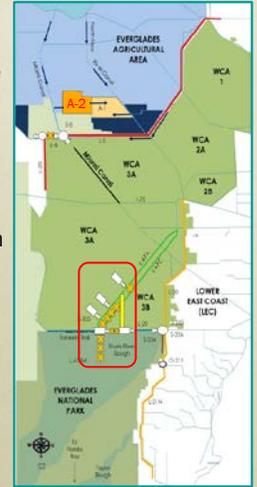
Overall, salinity balance in the bay is a factor of freshwater inputs from rainfall and overland flows from the Everglades. Many projects that bring restoration benefits to Florida Bay do so by delivering fresh water that can help maintain salinity in a ecologically preferred range which generally improves the bays overall health.

Restoration Projects: Central Everglades Planning Project

- 210,000 acre feet of additional water to the central Everglades and Florida Bay.
 - Storage, conveyance and seepage management features
 - Old Tamiami Trail removal (5.7 miles)
- Authorization Water Infrastructure Improvement for the Nation Act (WIIN Act, 2016)

Next steps

- Validation study on southern conveyance features
- Post-authorization change report for new northern storage features identified in Water Resources Law of 2017



The Central Everglades Planning Project (CEPP) provides a path forward to increase freshwater flows to the central portion of the Everglades and Florida Bay by capturing an average of 210,000 acre-feet of water, on an annual basis, and sending it south through the Everglades Wildlife Management Area and onto Florida Bay.

The next steps to implementation include completing a validation study on the southern conveyance features and the State sponsor has requested a post-authorization change report to revise the shallow storage component on the A-2 parcel with the goal of increasing water storage capacity to a minimum of 240,000 acre-feet as envisioned in the Water Resources Law of 2017.

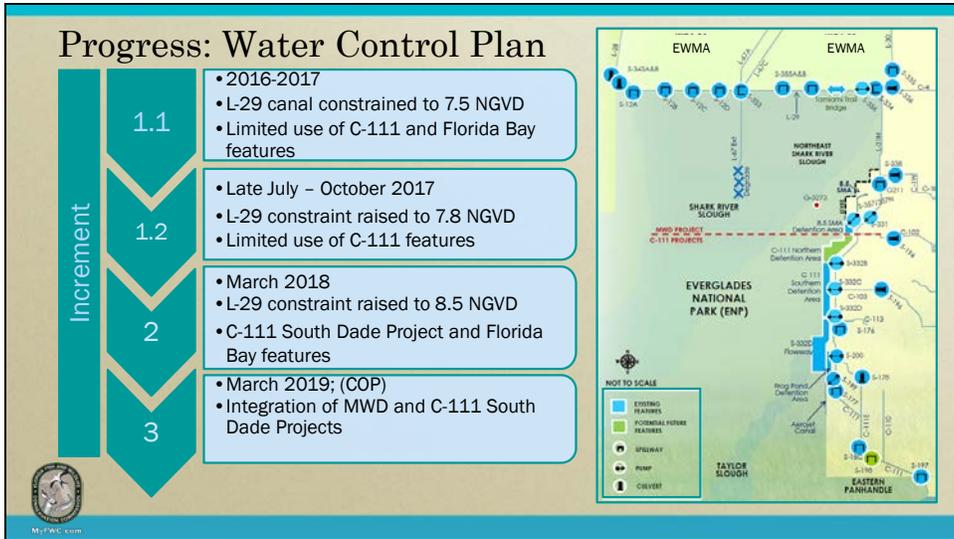
Restoration Projects: Continued

- Modified Water Deliveries
 - 1-mile bridge
 - S-356 Pump Station
 - 8 1/2 Square Mile are flood protection
- Tamiami Trail Next Steps
 - 2.6 mile increment under construction
- C-111 South Dade projects
 - Contract 8, 8A and 9
- Incremental approach to water management



Projects at the southern end of the system all contribute to the restoration of Florida Bay and are at various stages of completion. The Modified Water Deliveries projects are near completion and under the Tamiami Trail Next Steps, the next 2.6 mile increment of bridging is being constructed and will remove significant barriers to flow.

Many of the C-111 South Dade Project components are completed, or are very near completion and together they restore more natural flows to eastern Florida Bay. Critical components of the C-111 projects have been identified as necessary to incrementally raise canal stages in the L-29 canal which maximizes the delivery of water from the central Everglades to Everglades National Park and onto Florida Bay.



An in increment approach to modifying the Water Control Plan is being used to gain project benefits as soon as the constructed features become available. As we progress through the increments between now and 2019, each increment brings additional feature online and their associated benefits to the regional system, and Florida Bay.

Taken collectively, these projects and operations help deliver fresh water to Florida Bay in a more natural manner that supports healthy wildlife habitats and robust wildlife populations.

Project Spotlight : Moving Water to Florida Bay



One particular theme that has woven its way throughout this presentation, and our knowledge of Florida Bay, is that the bay needs fresh water to maintain the characteristic estuarine habitat. The Commission was first briefed on the states Moving Water to Florida Bay project during the November 2016 Commission meeting as a project that could provide benefit by delivering water to Taylor Slough. At that time, the Commission looked favorably upon the project benefits and sent a letter to the state and federal partners seeking cooperation.

At this time I would like to invite our guest speaker Mr. Ernie Marks, Everglades Policy Director for the South Florida Water Management District to the podium to provide an overview of the projects implementation.