

Research Phase of Indian River County Lagoon Management Plan

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PREPARED BY

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Executive Summary of Timeline

Outline Phase: In the outline phase, staff will be developing an outline that will guide the County through the development of the Lagoon Management Plan. The IRL Plan Outline provides a timeline for developing the comprehensive IRL Plan, a detailed bullet point framework for the phases of the Plan's development, a list of funding opportunities, and appendices that address County projects that either will or could occur simultaneously during the Plan's development. The three phases of the IRL Plan's development identified within the Outline are the Research Review Phase, Plan Development Phase, and Implementation Phase. The Outline Phase is currently ongoing and will continue until an Outline is officially adopted by the Board of County Commissioners.



Research Review Phase: In the Research Review Phase, staff will be reviewing data collected surrounding various topics that occur within the Lagoon. Using information already collected from multiple Lagoon stakeholders, including Florida Department of Environmental Protection, St. Johns River Water Management District, and Florida Fish and Wildlife Conservation Commission, staff will work with a consultant to assimilate data as it pertains to the County's portion of the Lagoon. Once data has been analyzed, staff will have a better understanding of knowledge gaps present in the Lagoon's estuary ecosystem and will recognize areas in need of more research. Information gathered and analyzed as part of this phase will drive the Plan Development Phase, including what will become measurable goals and objectives. The Research Review Phase will take approximately **12-18 months** to complete.



Plan Development Phase: In the Plan Development Phase, staff will work with a consultant and the public to identify multi-pronged objectives and measurable goals for the County's IRL Plan. This phase will also include the writing of the IRL Plan. The layout of the IRL Plan will be similar to the County's Beach Preservation Plan so it is reader-friendly, but recommendations for management strategies and projects identified will be strongly supported by the data analyzed during the Research Review Phase. The Plan Development Phase will take approximately **8-12 months** to complete.



Implementation Phase: The IRL Plan will work with all existing Indian River County Departments that have diverse skill sets and the knowledge, ability, and mission to affect change in the Lagoon. In the Implementation Phase, staff will use strategic adaptive management to continually update the plan to address and reevaluate goals, incorporate new knowledge, evaluate current projects, and create new recommendations for management strategies and project focus areas. Staff anticipates this phase will reoccur every **3 – 5 years**.

Draft IRL Plan Outline

Current Understanding

Concerns over a deteriorating lagoon system have been the focus of many stakeholders of the Indian River Lagoon, even with State and Federal regulation monitoring requirements in place for water quality standards throughout the estuary. In section 303(d) of the federal government's Clean Water Act, States are required to list waterbodies where water quality standards are not being achieved. Portions of the Lagoon were listed as impaired by the United States Environmental Protection Agency (USEPA) for dissolved oxygen concentrations. Through additional assessments from State government agencies (i.e., the St. Johns River Water Management District (SJRWMD) and the Florida Department of Environmental Protection (FDEP)), it was determined that all segments of the Indian River Lagoon were negatively impacted by nutrients in regards to seagrass growth and productivity. In March 2009, FDEP adopted nutrient standards for the Indian River Lagoon into their total maximum daily loads (TMDL) program. TMDLs were established for nitrogen and phosphorus levels to address seagrass losses in the Lagoon. The establishment of TMDLs required the creation of a basin management action plan (BMAP) for the Lagoon, which establishes enforceable, more detailed pollutant load allocations for impaired waterbodies. The Indian River Lagoon Basin: Central Indian River Lagoon BMAP was adopted in February 2013 and spans from Melbourne to Fort Pierce.

County departments are bound to nutrient loads and water quality monitoring because of these programs created to improve the Lagoon's water quality. Point source wastewater facilities with National Pollution Discharge Elimination permits were assigned wasteload allocations by the TMDL program, which are included in each facility's permit. Stormwater sources, including permitted municipal separate storm sewer systems, other urban nonpoint sources, and agricultural stormwater, were assigned nutrient allocations through the BMAP program. The County's Utilities and Stormwater Departments have to collect, analyze, and report nutrient levels for nitrogen and phosphorus to FDEP each year as part of their regulation requirements. With this in mind, the County actively creates projects with the goal of reducing nutrient pollution that enters into the Lagoon system.

1. Research Review Phase

Indian River County will continue to collaborate with organizations affiliated with the Indian River Lagoon to analyze data already collected from entities such as the St. Johns River Water Management District, Indian River Lagoon National Estuary Program, Florida Department of Environmental Protection, Indian River Farms Water Control District, local municipalities, and other organizations collecting data of known quality. This information will be used as part of our Research Review Phase to identify the knowledge that currently exists not only in our portion of the Indian River Lagoon, but for the system as a whole, and recognize areas that require more data collection.

- Data Analyzation
 - Annual Rainfall Data
 - Evaluate differences in dry years versus wet years.
 - Best Management Practices

- Identify current best management practices that contribute to the health of the Lagoon and how often they are being implemented.
- Biosolids
 - Identify potential impacts of biosolid land applications to the health of the Lagoon.
- Ecosystem Functions and Habitat Use
 - Identify current and historical populations and population trends for native and non-native species, including fisheries. Assess trends in the natural community structure and coverage.
 - Identify current and historical locations and coverage of benthic organisms including seagrass, clams, and oysters.
 - Identify areas to revitalize filter feeder bars, reefs, and aquaculture.
 - Identify emerging issues with new invasive species.
 - Evaluate available data on seagrass planting projects to assess the cost/benefit ratio and overall success. Identify what variables are present that may affect the successful establishment of seagrass.
 - Identify areas to revitalize the natural estuary ecosystem, including wetlands, marshes, seagrass beds, and living shorelines.
- Harmful Algal Blooms
 - Collaborate with other agencies to identify conditions for nutrient and carbon cycling to evaluate causes and effects of HABs in the Indian River Lagoon and other estuarine environments.
 - Identify possible responses to HABs, including emergency corrective action, education, hazard communication, and waste management for fish kills.
- Hydrology and Hydrodynamics
 - Work with water control and special districts to identify the natural hydroperiod (flow regime) of the lagoon, water management control structures, available models, and effects of enhanced circulation.
- Land Use Changes
 - Determine past land use changes throughout Indian River County's portion of the Lagoon and identify anticipated future land use changes.
- Marinas and Boat Ramps
 - Determine marina facilities that participate in the Clean Marina Program, which are required to provide marine sanitary pump out services.
 - Identify accesses to the IRL in existing and new parks wherever possible.
- Organic Material and Sediments
 - Identify areas that are contributing large quantities of organic material such as leaf litter and grass clippings, as well as sediments, to the lagoon system. Determine locations in tributaries and canals with large amounts of floating aquatic vegetation.
 - Evaluate existing database information to identify the location, aerial coverage, and nutrient flux rates for muck in Indian River County's portion of the Lagoon.
- Sea Level Rise
 - Identify issues associated with sea level rise, including stormwater infrastructure, wetland impacts, salinity, water temperature, and more frequent and severe storms to create a more resilient community.

- Septic Systems
 - Identify priority areas/neighborhoods and evaluate the potential for septic system removal or upgrade in the highest priority areas using the County Septic to Sewer conversion evaluation report and ArcGIS Nitrate Load Estimation Toolkit (ArcNLET).
- State and Federal Regulatory Review of Rules
 - Review and identify various rules and regulations the County follows in relation to protecting our section of the Lagoon.
- Stormwater
 - Evaluate each drainage basin to identify pollutant loadings.
 - Identify innovative projects and develop efficiencies in pounds reduced per year of TN, TP, and biomass for proposed projects. Evaluate projects in basins by priority ranking by loading and cost-effectiveness.
- Sustainability and Resiliency
 - Identify methods to increase the sustainability and resiliency of the Lagoon to assess cost/benefit ratios and overall success.
 - Identify vulnerable areas to long-term changes in the environment.
 - Identify projects that would enhance the Lagoon and increase chances for multi-pronged, long-term success.
- Total Nitrogen and Total Phosphorus
 - Use available data to evaluate nutrient loading from point and non-point sources.
- Water Consumption
 - Determine the volume of water used for irrigation, as well as household and commercial use, through education and outreach.
- Water Quality
 - Collaborate with other agencies to continuously monitor changes in various water quality parameters.
- Knowledge Gap Identification
 - After research has been completed and analyzed, the County will collaborate with other agencies to determine where knowledge gaps exist and work on better understanding those gaps through new collaborative research.
 - This identification will help in the goal making process.
- Information Dissemination
 - The County will create and share informational outreach items using the data collected in order to educate the public about the Lagoon and factors influencing the Lagoon.

2. Development Phase

- Write Plan
 - Create goals and objectives for the County to manage our section of IRL
 - Define impacts occurring in our section of IRL
 - Incorporate strategic management ideas by Lagoon stakeholders
- Workshops
 - Receive public input through public meetings

- Incorporate Research and Knowledge Gaps
 - Define clear priorities for County projects and collaborations
 - Identify research needs for IRL
- Create Recommendations for Innovative Projects
 - Multi-pronged objective projects
 - Partnership projects

3. Implementation phase

- Strategic adaptive management
- Plan updates
- Do projects based on recommendations
- Evaluate projects
- Address goals and reevaluate goals

Plan Funding Options

Indian River County voters approved a One-Cent Optional Sales Tax Fund. The Indian River County Board of County Commissioners approved an allocation of 20% of this fund for IRL protection and revitalization capital projects. This fund is estimated to be \$4 to \$5 million per year for five years starting in fiscal year 2019-2020. To implement the plan projects in a timely manner, the County will seek to use sales tax funds to leverage matching funding from grants and appropriations. Examples of other funding programs (many from DEP 2018) are:

- Funding for various IRL projects is currently planned in the County's 5-year Capital Improvement Program. As additional data are gathered through the research review phase of this plan, the information obtained will focus funding decisions for future IRL projects.
- Section 319 grant program – FDEP administers funds received from the United States Environmental Protection Agency to implement projects or programs that reduce nonpoint sources of pollution. Projects or programs must benefit Florida's impaired waters, and local sponsors must provide at least a 40% match or in-kind contribution. Eligible activities include demonstration and evaluation of urban and agricultural stormwater best management practices, stormwater retrofits, and public education.
- TMDL grants – Funding for projects related to the implementation of TMDLs may be available through periodic legislative appropriations to FDEP. When funds are available, the program prioritizes stormwater retrofit projects to benefit impaired waters, similar to the Section 319 grant program.
- SJRWMD – In general, projects considered for funding shall benefit one or more of the four district core mission areas, including: (1) water supply – to include water conservation, alternative water supply development or water resource development; (2) water quality – to include water quality/nutrient loading reduction; (3) natural systems restoration – for projects that show measurable resource benefits to streams, lakes, wetlands, springs or aquifers; and (4) flood protection – for projects that address flood protection issues on an intermediate or regional scale. Assistance may be provided from ad valorem tax revenues or from periodic legislative appropriations for alternative water supply development and Surface Water Improvement and Management projects. The amount of funding available, matching requirements, and types of assistance may vary from year to year.
- IRL NEP – The IRL Council funds projects each year through their work plan process (<http://www.irlcouncil.com/>).
- FDOT – FDOT funds projects through their Five Year Adopted Work Program. There may be opportunities to enhance projects included in the program to provide additional water quality treatment for FDOT roads, rights-of-way, and outfalls.
- Budget Appropriation – The Florida Legislature may solicit applications directly for projects, including water projects, in anticipation of upcoming legislative sessions. This process is an opportunity to secure legislative sponsorship of project funding through the state budget.
- Clean Water State Revolving Fund loan program – This program provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. Discounted assistance for small communities is available. Interest rates on loans are below market rates and vary based on the economic wherewithal of

the community. The Clean Water State Revolving Fund is Florida's largest financial assistance program for water infrastructure.

- Florida Rural Water Association Loan Program – This program provides low-interest bond or bank financing for community utility projects in coordination with the DEP's State Revolving Fund program. Other financial assistance may also be available.
- Small Cities Community Development Block Grant Program – The Florida Department of Economic Opportunity makes funds available annually for water and sewer projects that benefit low and moderate-income persons.
- State Housing Initiatives Partnership Program – Florida Housing administers the program, which provides funds to local governments as an incentive to create partnerships that produce and preserve affordable homeownership and multifamily housing. The program is designed to provide very low, low- and moderate-income families with assistance. Funding may be used for emergency repairs, new construction, rehabilitation, down payment and closing cost assistance, impact fees, construction and gap financing, mortgage buy-downs, acquisition of property for affordable housing, matching dollars for federal housing grants and programs, and homeownership counseling (<http://www.floridahousing.org>).
- Rural Development Funding – The U.S. Department of Agriculture's program provides a combination of loans and grants for water, wastewater, and solid waste projects to rural communities and small incorporated municipalities. The funds will also cover the repair and maintenance of private septic systems. The amount of funds available, as well as the specific purposes for which grants are intended, changes from year to year. Additional details are posted on the Department of Agriculture's website (<https://www.rd.usda.gov/programs-services>).
- Florida Inland Navigation District – FIND Waterways Assistance Program provides grant funding for waterway related projects including navigation channel dredging, channel markers, navigation signs or buoys, boat ramps, docking facilities, fishing and viewing piers, waterfront boardwalks, inlet management, environmental education, law enforcement equipment, boating safety programs, beach re-nourishment, dredge material management, environmental mitigation, and shoreline stabilization.
- National Oceanic and Atmospheric Administration – The Coastal Partnership Initiative was developed to promote the protection and effective management of Florida's coastal resources in four specific priority areas: (1) resilient communities, (2) coastal resource stewardship, (3) access to coastal resources, and (4) working waterfronts.
- FWC – FWC provides funding through grants such as the Florida Boating Improvement Program, Boating Infrastructure Grant, and Florida's State Wildlife Grants Program that promote recreational boating or improve wildlife habitat.

Appendix A: Operational Projects and Projects Under Construction

Projects that are currently operational or are under construction by Indian River County were designed and constructed based on our current understanding of impacts to the Lagoon and attempts to minimize those impacts. Many of these projects focus on minimizing nutrient runoff to the Lagoon because of permitting requirements set forth by State permitting agencies. Many of these projects fall under traditional nutrient removal methods of enhancing the Lagoon, but many also enhance natural habitats within the Lagoon system through restoration which directly affects ecosystem functions. These projects are funded by various sources. Projects listed as operational are facilities or programs that are active. Projects listed as under construction are projects that are currently not operational.

- **Operational Projects**

- Utilities

- Sebastian Septic to Sewer – Phase 1
 - This project will connect the existing septic systems to the sewer system which will allow for environmentally sound infrastructure growth to the area and lagoon. It will include an area of 73 acres with an assumption of one septic system per acre. There is an estimated concentration of 30 pounds of TN per year per system and 5 pounds of TP per year per system removed from the environment, with a total estimated reduction of 2,190 pounds per year of TN and 365 pounds per year of TP will result from this project.
- Spoonbill Marsh Wetland Treatment System
 - This 67-acre man-made habitat uses nature’s own treatment techniques for the removal of both nitrogen and phosphorus from the demineralization concentrate by-product and from the waters of the Indian River Lagoon itself. The vegetation and aquatic organisms seen throughout the marsh play an active role in efficiently removing the nitrogen and phosphorus from the blended waters.
- Osprey Marsh Stormwater and Demineralization Treatment System
 - This project is an algal nutrient removal facility system that removes dissolved nutrients from up to 10 million gallons per day (mgd) of stormwater and from up to 1.5 mgd of reverse osmosis reject water known as demineralization concentrate. The algal turf scrubber system uses a water treatment technology that was developed specifically to enhance water quality of polluted waters through the active cultivation of attached algae upon an engineered surface.

- Stormwater

- Egret Marsh Stormwater Park and Wildlife Sanctuary
 - This project removes nutrients from approximately 10 mgd of canal stormwater. The filtered stormwater flows through a large polishing pond and shallow marsh and returns to the canals and flows through the Main Relief Canal, eventually emptying into the Lagoon.
- PC Main Screening System

- This project removes freshwater plants and trash from the Main Relief Canal before the canal empties into the Lagoon.
 - System Maintenance
 - The Road & Bridge Division provides maintenance throughout the county in support of a healthy Indian River Lagoon. This maintenance includes street sweeping and a ditch cleaning program.
- **Projects Under Construction**
 - Utilities
 - West Wabasso Septic to Sewer – Phase 2
 - The Utilities Department plans to convert 57 septic systems to central sewer and construct stub-outs for 47 vacant properties for future connection.
 - Stormwater
 - Osprey Acres Floway and Nature Preserve
 - The floway continues to filter water from Osprey Marsh along with unfiltered water from the South Relief Canal. Filtering occurs through a system of treatment cells using aquatic plants to remove nutrients and then to a serpentine floway for final polishing, eventually released further down the canal and into the Lagoon.
 - Conservation Lands
 - Jones' Pier Conservation Area
 - The County purchased this area in 2011 and committed to implementing a management plan for the site that revitalizes ecological value, while utilizing the site for public access and display of educational and historical exhibits.
 - Coastal Engineering
 - Jungle Trail Shoreline Enhancement
 - This site offers the opportunity for living shoreline projects which naturally protect the historical Jungle Trail.
 - Round Island Living Shoreline Educational Demonstration Site
 - This demonstration site is an example of one type of living shoreline which naturally protects the shoreline of Round Island from erosion and provides water quality and habitat benefits to the Indian River Lagoon.

Appendix B: Upcoming and Funded Projects

- **Upcoming and Funded Projects**

Indian River County has three projects that qualify as upcoming and funded projects. These projects are budgeted capital enhancement projects anticipated to begin over the next two to three years. They will adhere to current reporting requirements and rules set forth by the State, and will benefit the Lagoon's ecosystem using various techniques.

- Stormwater
 - Moorhen Marsh Low Energy Aquatic Plant System (LEAPS™)
 - The unique LEAPS™ will remove nutrients through a system of plants that absorb nutrients from the canal water, filtering the stormwater before returning it to the canal and the Lagoon.
- Conservation Lands
 - Indian River Lagoon Greenway
 - The County hopes to develop a flow-way marsh which would incorporate several different elements including: a natural buffer to adjacent development; allowing for increased water quality treatment of the by-product of dredging; potential treatment of stormwater from a large FDOT ditch; creation of a high marsh to provide wildlife habitat, water quality improvements, and additional attenuation improvements; and augmenting the existing trail network to provide additional wetland viewing.
 - Lost Tree Island Conservation Area
 - The County hopes to design a fully engineered habitat enhancement plan for the site. This design will provide a site that is resilient and sustainable; creates diverse natural wetland and upland habitat; provide water quality benefits through the creation of flow-way wetlands; eliminate nuisance and exotic species; and provide educational and recreation opportunities for the public.

Appendix C: Potential Projects

- **Potential Projects**

Potential projects were identified by staff as projects that ideally would be completed in the future as funding sources are available. These projects would benefit the Lagoon based on current research and understanding of the system, with required rules and regulations in mind. Some of these projects are partially funded and have received feedback from the public.

- Utilities

- Sebastian Septic to Sewer – Phase 2

- The County hopes to conduct ArcNLET modeling for the City of Sebastian area. This model determines the load at the receiving waterbody, not the load from the septic system.

- Stormwater

- North and South Relief Canal Mechanical Water Lettuce Removal Systems

- This project will use a long reach excavator to remove water lettuce from the North and South Relief canals to prevent excess nutrient loading to the Lagoon.

- Baffle Boxes

- Baffle boxes capture nutrients, suspended solids, organic material, trash, oils, and grease to prevent them from dissolving in stormwater. When regularly and properly maintained, they may substantially reduce TN, TP, and suspended solids. These boxes could be installed in areas with a lot of organic material or trash to capture those materials before they enter the stormwater system. They could also be installed on County, municipality, and FDOT outfalls to major tributaries, canals, and the Lagoon to reduce the amount of pollutants discharged to surface waters.

- Conservation Lands

- Oslo Riverfront Conservation Area

- Approximately 298 acres of undeveloped mature coastal hammock, scrubby flatwoods, and impounded estuarine wetlands located on the north side of Oslo Road adjacent to the Indian River Lagoon in Indian River County. A FDOT drainage ditch flows through the property from U.S. 1 to the Lagoon. There may be opportunities for wetland vegetative enhancement and improved hydrology that may be beneficial to the Lagoon.

- Round Island South Conservation Area

- This large wetland impoundment contains a mixture of herbaceous saltmarsh flats and mangroves and is one of the more diverse estuarine wetlands in the area. There are potential opportunities for establishment of a more diverse living shoreline along some sections of the impoundment.

- Round Island Riverside Park

- This park includes two county owned spoil islands with a boardwalk connected to the smaller of the two islands. This smaller island is dominated by exotic species and would be a potential site for habitat revitalization and water quality

improvements such as creation of wetlands along the shoreline, creation of sand flats for avian habitat, and creation of native uplands.

- Oyster Bar Marsh
 - The County has been working in partnership with Indian River Land Trust and with the Indian River Mosquito Control District to install culverts connecting the impoundment to the Lagoon that will improve flushing.
- Prange Island Conservation Area
 - This area consists of two undeveloped islands with encroachment of exotic species. In areas where there is heavy exotic invasion, there is potential to create a mixture of upland and wetland communities that may benefit the Lagoon from both a habitat and a water quality perspective.
- Captain Forster Hammock Preserve
 - The section of the preserve abutting the Lagoon was damaged from salt water inundation as a result of Hurricane Matthew, and may have the potential to be revitalized in a manner that will provide significant benefits to the Lagoon.
- Pelican Island National Wildlife Refuge
 - The County works closely with the United States Fish and Wildlife Service to ensure that management of the areas is targeted at maximizing the potential wildlife habitat. The County intends to continue this collaboration to identify opportunities for projects that can enhance conditions within the Lagoon.
- Archie Smith Fish House
 - This property consists of approximately 1.1 acres of developed and undeveloped lands and the County plans to revitalize these facilities as part of the management plan for the site. Part of this revitalization may include identifying opportunities to enhance seagrass or oyster habitat in proximity to the site or evaluating the shoreline to determine if there are opportunities for creating a living shoreline.
- Spoil Island Enhancement Opportunities
 - There are 43 identified islands within Indian River County with many of them designated as Critical Wildlife Areas. Spoil islands offer a unique opportunity to blend several objectives and gives the opportunity for the County to work with other governmental entities to enhance the habitat. In addition to the ecological aspects of the revitalization, there would be potential increase in recreational opportunities.
- South Oslo Riverfront Conservation Area
 - This site consists largely of mangroves abutting the Lagoon. A large FDOT ditch traverses the site and ultimately discharges into the Lagoon. There is potential to provide pretreatment of the stormwater associated with this ditch through modifications to the site, which may also serve as additional wildlife habitat.
- Harmony Oaks
 - The mangroves wetlands on the site are part of a large impoundment system, and may provide an opportunity to enhance water quality via filtration of nearby untreated stormwater. In addition, removal of several dikes that are not utilized may provide an opportunity to create a more diverse wetland community.

- Coastal Engineering
 - A1A Shoreline Enhancement
 - This site offers the opportunity for living shoreline projects to naturally protect this area, which was damaged during Hurricane Matthew.
 - Wabasso Causeway Living Shoreline
 - This site offers the opportunity for living shoreline projects to restore damaged shoreline, as well as the opportunity for the removal of invasive plants.
 - Living Docks
 - With help from the public, the County hopes to utilize volunteers that have docks on the Indian River Lagoon to create vertical oyster gardens, which will provide water filtration and habitat benefits.