Tuesday, February 8, 2022
10:15 am – 1:00 pm

Up the Creek Farms, 3590 Valkaria Road, Grant-Valkaria, FL 32950

This meeting is open to the public
*** Masks are encouraged ***

The order of items appearing on the agenda is subject to change during the meeting and is at the discretion of the presiding officer.

1. Call to Order and Pledge of Allegiance (Kathy LaMartina, Chair)

2. Introductions & Public Comments (Kathy LaMartina, Chair)

3. Agenda Revisions (Kathy LaMartina, Chair)

4. Approval of Minutes (Kathy LaMartina, Chair)
   Requested Action: Approval of Minutes from the meeting of November 16, 2021.

5. Finance Sub-Committee Report (Stu Glass, Chair Finance Subcommittee)
   Requested Action: Accept Committee Report.

6. Water Quality Reports
   a. Central and Northern Lagoon (Dr. Chuck Jacoby, SJRWMD)
   b. Southern Lagoon (Dianne Hughes, Martin County)

7. Presentations
      Mark Rains, Professor, University of South Florida and Kai Rains, Research Associate Professor, University of South Florida
   b. GeoCollaborate and Additional GIS Project Update
      Kirsten Jo Ayres, GIS Coordinator, IRLNEP

8. Old Business
   NONE
9. New Business

a. Election of Officers (Duane De Freese)
   **Requested Action:** Elect Chair and Vice Chair for Calendar Year 2022 for the Management Board.

b. Fiscal Year 2023 Tentative Budget (Daniel Kolodny)
   **Requested Action:** Recommend that the IRL Council Board of Directors approve the FY 2023 tentative budget by Resolution 2022-01, pursuant to Florida Statutes.

c. Fiscal Year 2023 RFPs (Daniel Kolodny)
   **Requested Action:** Motion to recommend that the IRL Council Board of Directors accept the IRLNEP Management Conference recommendations and approve the final ranked list of proposals; fund the top proposals contingent and consistent with available funds and budgetary authority; and authorize staff to negotiate and enter into contracts with those applicants.

d. Fiscal Year EPA Workplan and IRLNEP Business Plan (Daniel Kolodny)
   **Requested Action:** Recommend that the IRL Council Board of Directors authorize staff to finalize and submit the FY 2023 EPA Workplan and complete the IRLNEP Business Plan.

e. Planning for Congressional Infrastructure Investment and Jobs Law (Duane De Freese)
   **Requested Action:** Discussion of procedures for identifying and funding eligible projects; recommend that the IRL Council Board of Directors authorize staff to develop and release a Request for Proposal or Request for Qualifications as appropriate.

f. Committee Quorum Update (Duane De Freese)
   **Requested Action:** Review and discuss potential options and recommend that the IRL Council Board of Directors direct staff to make policy changes as directed.

10. IRLNEP Staff reports

   a. IRL Project Update (Daniel Kolodny)
   b. Communications Report (Kathy Hill)
   c. Executive Director Report (Duane De Freese)

11. General Public Comment

12. Adjourn
    Next Management Board Meeting: Tuesday, May 10, 2022
NOTE: If a person decides to appeal any decision made by the Board with respect to any matter considered at such meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he or she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. Section 286.0105, Florida Statutes (2014).

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting: Ashley Malcolm at (860) 416-3102. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800) 955-8771 (TDD) or 1(800) 955-8770 (Voice). For more information, contact: Ashley Malcolm, IRL Council, 1235 Main St, Sebastian, FL 32958, (860) 416-3102, or by email at malcolm@irlcouncil.org.
Meeting Minutes
November 16, 2021
10:15 am

Up the Creek Farms, 3590 Valkaria Road, Grant-Valkaria, FL 32950

Members in Attendance: Mel Bromberg, Tom Carrey, Paul Carlisle, Anthony Catanese, Dave Fuss, Stu Glass, James Gray, Layne Hamilton, Hannah Hart, Chris Hendricks, Dianne Hughes, Dr. Chuck Jacoby, George Jones, Kathy LaMartina, Vince Lamb, John Leslie, Mike McCabe, Matt Mitts, Bob Musser, Judy Orcutt, Kevin Shropshire, Laurilee Thompson, Charles Vogt III, Greg Wilson


Agenda Item 1. Call to Order and Pledge of Allegiance (Tom Carey, Co-Chair)

THE MEETING WAS CALLED TO ORDER AT 10:21AM.

Agenda Item 2. Introductions & Public Comments (Tom Carrey, Co-Chair)

Tom Carey led Introductions and Ms. Kathy Hill requested all Management Board members to please sign-in.

Agenda Item 3. Agenda Revisions (Kathy LaMartina, Chair)

There were no agenda revisions.

Agenda Item 4. Minutes Approval (Kathy LaMartina, Chair)

Requested Action: Approval of Minutes from Management Board meeting on August 10, 2021.
MOTION WAS MADE BY VINCE LAMB, SECONDED BY ANTHONY CATANESSE TO APPROVE THE AUGUST 10, 2021 MEETING MINUTES. MOTION IS PASSED UNANIMOUSLY.

Agenda Item 5. Finance Sub-Committee Report
Financial Subcommittee (Stu Glass, Chair Finance Subcommittee)

Mr. Glass reviewed the Finance Subcommittee meeting highlights including the approval of several items including the Financing the CCMP Plan, two Budget Amendments (2021-06 and 2021-07) and the proposed 2022 Meeting Calendar. Mr. Glass also expressed the Finance Subcommittee’s agreement on the IRLNEP Workforce Analysis expansion.

Requested Action: Accept Committee Report.

MOTION MADE BY GREG WILSON TO ACCEPT THE FINANCE SUBCOMMITTEE REPORT. MOTION WAS SECONDED BY ANTHONY CATANESSE. MOTION PASSED UNANIMOUSLY.

Agenda Item 6. Presentations

Dr. De Freese apologized for Dr. Rains absence and acknowledged he will present his information in February 2022.

a. NASA Kennedy Space Center Indian River Lagoon and Health Initiative Plan
   (Jeffrey Collins, NASA)

   Mr. Collins first acknowledged his team with him before discussing the NASA Kennedy Space Center Indian River Lagoon Health Initiative Program. Mr. Collins reminded the Management Board that the full report on this Health Initiative can be found by clicking here.

b. The Importance of High Confidence Data in Geospatial Analysis for Environmental Management for the Indian River Lagoon
   (Kirsten Jo “KJ” Ayres, IRLNEP)

   Ms. Ayres presented her findings by beginning with the background of the GeoCollaborate project and her responsibilities in QA/QC of data. She outlined the goal of the project was to create a virtual HAB information center for the IRL and find, more widely, the state of Florida.

Agenda Item 7. Old Business

a. NONE

Agenda Item 8. New Business

a. Fiscal Year 2021 Final Budget Amendment (Daniel Kolodny)
**Requested Actions:** Recommend that the IRL Council Board of Directors approves the amended budget for FY 2021 by Resolution 2021-06, pursuant to Florida Statutes.

Mr. Kolodny reviewed the 2021 Budget Amendment and its details.

MOTION WAS MADE BY ANTHONY CATANESE TO APPROVE RESOLUTION 2021-06, PURSUANT TO FLORIDA STATUTES. MOTION WAS SECONDED BY VINCE LAMB. MOTION PASSED UNANIMOUSLY.

b. Fiscal Year 2022 Budget Amendment (Daniel Kolodny)

**Requested Action:** Recommend that the IRL Council Board of Directors approves the amended budget by FY 2022 by Resolution 2021-07, pursuant to Florida Statutes.

Mr. Kolodny reviewed the 2022 budget amendment which includes bringing forward of the FDEP grant from Fiscal Year 2021. This is an end of year reconciliation.

MOTION MADE BY JAMES GRAY TO APPROVE RESOLUTION 2021-07, PUSUANT TO FLORIDA STATUTES. MOTION SECONDED BY ANTHONY CATANESE. MOTION CARRIED UNANIMOUSLY.

c. Approval of Communications Plan (Kathy Hill)

Ms. Hill reviewed the highlights of the Communications Plan, an EPA concurrence document. The plan summarizes a three-year communications strategy.

**Requested Action:** Recommend that the IRL Council Board of Directors reviews and adopts the Communications Plan contingent on EPA concurrence.

MOTION WAS MADE BY PAUL CARLISLE TO APPROVE THE COMMUNICATION PLAN CONTIGENT ON EPA CONCURRENCE. MOTION SECONDED BY LAURILEE THOMPSON. MOTION PASSED UNANIMOUSLY.

d. Approval of Financing the CCMP Plan (Duane De Freese)

Dr. De Freese summarized the highlights of the Financing the CCMP Plan. The first part of the document contains the narrative which outlines the cost and expectations. The appendix will be eventually pulled out as value document for our partners.

**Requested Action:** Recommend that the IRL Council Board of Directors reviews and adopts the Financing the CCMP Plan contingent on EPA concurrence.
MOTION WAS MADE BY MEL BROMBERG TO APPROVE THE FINANCING THE CCMP PLAN. MOTION WAS SECONDED BY GREG WILSON. MOTION PASSED UNANIMOUSLY.

e. Planning for FY 2023 IRLNEP Workforce Analysis (Duane De Freese)

Dr. De Freese summarized the proposed IRLNEP Workforce Analysis which would include adding a full-time position for a GIS Specialist and three Community Engagement Coordinators that would be positioned in the North, Central and South IRL regions. These Engagement Coordinators would be present at meetings and events, perform outreach, and coordinate projects.

**Requested Action:** No action required. Discussion and direction to guide development of the tentative FY 2023 Budget.

f. IRL Council Leadership Transition Policy (Duane De Freese)

Dr. De Freese reviewed the IRL Council Leadership Transition Policy which guides the first 30 - 90 days of a leadership transition outlines a series of steps with the Board of Directors on how to move forward with internal/external recruitment.

**Requested Action:** Recommend that the IRL Board of Directors reviews and adopts the IRL Council Leadership Transition Policy.

MOTION WAS MADE BY KEVIN SHROPSHIRE TO APPROVE THE IRL COUNCIL LEADERSHIP TRANSITION POLICY. MOTION WAS SECONDED BY GEORGE JONES. MOTION PASSED UNANIMOUSLY.

g. 2022 Legislative Priorities (Duane De Freese)

Dr. De Freese summarized and highlighted the 2022 Legislative Priorities.

**Requested Action:** Recommend that the IRL Board of Directors reviews and adopts the IRL Council Legislative Priorities for 2022 and authorize the Executive Director to represent the IRL Council in legislative policy discussions and appropriations.

MOTION WAS MADE BY CHRIS HENDRICKS TO APROVE THE 2022 LEGISLATIVE PRIORITIES. MOTION WAS SECONDED BY GERoge JONES. MOTION PASSED UNANIMOUSLY.

h. 2022 Meeting Calendar (Ashley Malcolm)

Ms. Malcolm presented and reviewed the proposed 2022 meeting dates.

**Requested Action:** Recommend that the IRL Council Board of Directors approves the proposed 2022 Meeting dates.
MOTION TO APPROVE THE PROPOSAL 2022 MEETING DATES WAS MADE BY VINCE LAMB. MOTION WAS SECONDED BY ANTHONY CATENESE. MOTION PASSED UNANIMOUSLY.

**Agenda Item 9. IRLNEP Staff reports**

a. Project Update (Daniel Kolodny)

Mr. Kolodny reviewed the end of year (2021) project list including 28 CCMP projects and activities completed in 2021 and 17 projects and activities were completed in quarter four alone in 2021. Communication Report (Kathy Hill)

Ms. Hill reviewed the communications report and reported good numbers and engagement with the 10-second YouTube Ads, including high viewing numbers in each key demographic. Facebook is performing well; Instagram is performing moderately; Twitter is still proving to be a challenge.

b. Executive Director Report (Duane De Freese)

Dr. De Freese reviewed 2021 for the IRLNEP which included $2.64 million dollars in IRLNEP revenue, 28 completed projects, and $963,470.00 secured through a FDEP Innovation Grant. Additionally, the IRLNEP completed two EPA concurrence documents and one Climate Ready Estuary report completed. He further discussed the 5 Year EPA Program Evaluation and how the PE is used by EPA to assess how NEPs are making progress in achieving program and environmental results through implementation of the CCMP. Meetings for this purpose will be scheduled in May.

**Agenda Item 10. General Public Comments**

There were no public comments.

**Agenda Item 11. Adjourn**

MOTION MADE BY MIKE MCCABE TO ADJOURN THE MANAGEMENT BOARD MEETING. MOTION SECONDED BY GEORGE JONES. MOTION PASSED UNANIMOUSLY. MEETING ADJOURNED AT 1:04 PM.

NEXT MANAGEMENT BOARD MEETING: Tuesday, February 8th, 2022*

*Contingent on adoption of the 2022 Meeting Calendar.*
RESOLUTION NO. 2022-01

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE IRL COUNCIL ADOPTING THE TENTATIVE BUDGET FOR THE 2023 FISCAL YEAR

WHEREAS, the IRL Council was created via Interlocal Agreement to carry out the goals of the Indian River Lagoon National Estuary Program; and

WHEREAS, the IRL Council held a public hearing to consider the tentative Budget;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE IRL COUNCIL, THAT:

Section 1. The Fiscal Year 2023 Tentative Budget is attached as Exhibit “A”.

Section 2. The Fiscal Year 2023 Tentative Budget is hereby adopted.

Section 3. This Resolution shall become effective immediately upon passage.

DONE at____________________, Florida, this_____ day of____________________, 2022.

By: __________________________
IRL Council Chair

ATTEST:

____________________________
IRL Council Secretary

Approved as to legal form and sufficiency:

____________________________
Glen J. Torcivia
IRL Council, Legal Counsel
IRL Council
FY 2023 Tentative Budget
Exhibit A

REVENUES
Federal Section 320 $ 750,000
Federal Infrastructure Investment and Jobs Law $ 914,000
IRL License Plate $ 125,000
Member Contributions $1,500,000
TOTAL REVENUES $3,289,000

EXPENDITURES
Other Expenditures $2,806,243
IRL Council Strategic Program, IRLNEP 2023 EPA Work Plan,
IRLNEP 2023 Infrastructure Work Plan, Unplanned Contingency Reserve
Salaries & Benefits $ 567,759
Facilities Expenses $ 38,500
Rent, Utilities, Equipment Maintenance, Communications
Administrative Costs $ 66,500
Postage, Office Supplies, Insurance, Printing, Travel,
Licenses & Subscriptions, Dues, Professional Development
Administrative Services $ 118,025
Legal, Accounting, Auditing, IT Services, Legal Ads
TOTAL EXPENDITURES $3,597,027
Agency Balance Beginning of Year $ 0
Fund Balance - Beginning of Year $ 550,888
Fund Balance – End of Year $ 242,861
FY 2023 Tentative Budget Expenditure Detail (Narrative)

• OTHER EXPENDITURES ($2,806,243)
  1. IRL Council Strategic Program ($1,120,000) includes the following:
     a. Water Quality Restoration Projects - $600,000
     b. Habitat Restoration - $200,000
     c. Community-Based Restoration - $200,000
     d. Market Research RFP Project - $50,000
     e. Small grants program - $25,000
     f. IRLNEP Technical Support of Conferences and Workshops - $25,000
     g. Cost share match for IRL Council Economic Update Grant Opportunities - $20,000
  2. IRLNEP FY2023 EPA Workplan ($750,000) includes the following:
     a. Science and innovation RFP project(s) - $100,000
     b. State of the Lagoon Technical Report Y4 - $75,000
     c. Communication Support: Service contracts for web/graphics/design support, scientific and other publications, other contract support as needed, and expanded social media and support for communication intern. Includes service contracts with IDEAS, Brandt Ronat, Firefly, and O’Hara - $118,000
     d. Biodiversity Inventory Contract Y4 - $25,000
     e. Atmospheric Deposition Monitoring Y4 - $29,000
     f. 2 NEW Atmospheric Deposition Monitoring Stations Operation and Maintenance - $60,000
     g. 3 Community Engagement coordinators (Salary Only) - $165,000
     h. Harmful Algal Bloom Monitoring Contracts - $150,000
     i. EPA Travel (mandatory) - $10,000
     j. CCMP project inventory and prioritization service contract(s) - $18,000
  3. IRLNEP FEDERAL INFRASTRUCTURE INVESTMENT AND JOBS LAW Workplan ($914,000)
     a. Infrastructure Projects TBD - $914,000
  4. Unplanned Contingency Reserve - $22,243

• SALARIES AND BENEFITS ($567,759)
  1. Executive Director - $151,875 (includes benefit rate of 35%)
  2. Deputy Director - $112,019 (includes benefit rate of 35%)
  3. Chief Operating Officer - $100,531 (includes benefit rate of 35%)
  4. Administrative Coordinator - $57,834 (includes benefit rate of 35%)
  5. GIS Coordinator - $87,750 (includes benefit rate of 35%)
  6. Community engagement coordinators (benefits rate of 35% only) - $57,750

• FACILITIES EXPENSES ($38,500)
  1. Utilities - $2,000
  2. Rent and Leases - $8,500
  3. Equipment Maintenance - $3,000
  4. Equipment and Communications - $25,000

• ADMINISTRATIVE COSTS ($66,500)
  1. Travel General - $20,000
2. Postage and Mailing - $1,000  
3. Office Supplies - $5,000  
4. Dues, Licenses, and Subscriptions - $10,000  
5. Printing - $15,000  
6. Insurance - $7,500  
7. Staff Training and Professional Development - $8,000

- **ADMINISTRATIVE SERVICES ($130,200)**  
  1. Legal - $65,000  
  2. Accounting - $28,500  
  3. Auditing - $19,025  
  4. IT Services and Compliance - $5,000  
  5. Legal Ads - $500

**Fund Balance Beginning of Year**  
- This total includes:  
  - $308,027 of Unrestricted Funds passed through FY2021 and FY2022 from the FY2020 Financial Statements to FY 2023.  
  - $242,861 of Restricted License Plate Funds passed through FY2021 and FY2022 from the FY2020 Financial Statements to FY 2023.

**Fund Balance End of Year**  
- This total includes:  
  - $242,861 of Restricted License Plate Funds.
Category 1: Water Quality Restoration Proposals
<table>
<thead>
<tr>
<th>Rank</th>
<th>Applicant</th>
<th>Project Description</th>
<th>Requested Funding</th>
<th>Cost Share Match</th>
<th>Score Above 70%?</th>
<th>Eligible?</th>
<th>Total Project Cost</th>
<th>Match %</th>
<th>Remaining Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Martin County</td>
<td>The Martin County Connect to Protect Septic to Sewer Nutrient Removal Program Y3</td>
<td>$200,000.00</td>
<td>$640,400.00</td>
<td>76 87%</td>
<td>Y</td>
<td>$840,400.00</td>
<td>76 87%</td>
<td>$600,000.00</td>
</tr>
<tr>
<td>2</td>
<td>Florida Institute of Technology</td>
<td>Continued Application and Optimization of an Environmentally Friendly, Bioreactor Developed for Use in the Indian River Lagoon Using Repurposed Materials.</td>
<td>$74,865.00</td>
<td>$92,000.00</td>
<td>55 82%</td>
<td>Y</td>
<td>$166,865.00</td>
<td>55 82%</td>
<td>$74,865.00</td>
</tr>
<tr>
<td>3</td>
<td>City of Cocoa</td>
<td>Dixon Blvd at Indian River Drive WQ and Resiliency Project (D&amp;E)</td>
<td>$40,000.00</td>
<td>$40,000.00</td>
<td>50 80%</td>
<td>Y</td>
<td>$80,000.00</td>
<td>50 80%</td>
<td>$40,000.00</td>
</tr>
<tr>
<td>4</td>
<td>City of Fort Pierce</td>
<td>Moore’s Creek Distinctive Communities Project</td>
<td>$106,500.00</td>
<td>$106,500.00</td>
<td>50 70%</td>
<td>Y</td>
<td>$213,000.00</td>
<td>50 70%</td>
<td>$106,500.00</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Martin County is submitting the Rio East-Crossroads Hill Nitrogen & Phosphorus Removal Project grant application for the Indian River Lagoon Council (IRLC) and Indian River Lagoon National Estuary Program (IRLNEP) FY2023 IRLNEP Category-1: Water Quality Restoration grant opportunity. The following Table outlines the critical information for this application:

| Title of Project:                  | Rio East-Crossroads Hill Nitrogen & Phosphorus Removal Project |
| Lead Organization & Partners:     | Martin County Utilities                                      |
| Project Location:                 | Rio East-Crossroads Hill Community (27.226009, -80.218427)  |
| IRLNEP Contribution & Source:    | Category 1: Water Quality Restoration Project Grant $200,000 Grant Request (24% of Total Project) |
| Partner Match:                   | $ 640,400 76% Match from Martin County Utilities |
| Total Project Cost:              | $ 840,400 |

PROJECT DESCRIPTION

Martin County's Connect-to-Protect Program is a 10-year septic-to-sewer conversion initiative launched in the spring of 2019. The goal is to connect homes to the Martin County Utilities (MCU) wastewater collection and treatment system, abandon septic systems, and improve the health of local waterways, with a focus on the Indian River Lagoon (IRL) and the St. Lucie Estuary. The next prioritized project in the initial 5-year work plan is the Rio East-Crossroads Hill Sewer Project submitted for funding from the FY2023 IRLNEP Water Quality Grant Program. The request is to partially fund the construction of the force mains that will connect approximately 382 residences to the MCU sewer system. The work will be completed within the 12-month period as required by the Program.

MAP AND PHOTOS - Attachment A- Rio East & Crossroads Hill Maps; Attachment B Photo

KEY OUTPUTS (DELRIVERABLES)
Project deliverables will include 1) preliminary design, 2) final design plans and specifications, 3) engineer's opinion of probable construction cost, 4) contract documents delivered at the 30, 60, 90, and 100% project segments.

KEY OUTCOMES (BENEFITS TO THE IRL)
The Rio East-Crossroads Hill Sewer Project, part of Martin County's Connect-to-Protect Program, will connect 382 residences to the MCU central sewer system. Key benefits are 1) Improved water quality and ecosystem health; 2) Reduced nutrients, BOD, and fecal coliform concentrations to the IRL; 3) Elimination of 382 septic tanks will reduce the total nitrogen (TN) by about 4,900 lbs TN/yr and total phosphorus (TP) loads by about 725 lbs TP/yr to the IRL based on cited literature; 4) Aligns strongly with the CCMP IRL Vital Signs, and 5) Supports healthy waterways and ecosystem.
## Executive Summary

**CATEGORY 1: Water Quality Restoration Projects**

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Continued Application and Optimization of an Environmentally Friendly, Biological Denitrification Bioreactor Developed for Use in the Indian River Lagoon Using Repurposed Materials.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead Organization and Partners:</strong></td>
<td><strong>Lead Organization:</strong> Florida Institute of Technology (Florida Tech - Austin Fox Ph.D.). <strong>Project Partners:</strong> Oxsolve and Lapin Services (Dan Young).</td>
</tr>
<tr>
<td><strong>Project Location</strong></td>
<td>This project will be carried out in the Indian River lagoon associated with a canal located in Turkey Creek (WBID 3098A) at 28°01'52&quot;N and 80°34'47&quot;W on the Florida Tech Rivers Edge Property.</td>
</tr>
<tr>
<td><strong>Key CCMP Vital Signs:</strong></td>
<td>Impaired waters, legacy loads, stormwater, contaminants, harmful algal blooms, 21st century communities, monitoring and data, science &amp; technology innovation plus citizen engagement</td>
</tr>
<tr>
<td><strong>IRLNEP Contribution and Source:</strong></td>
<td>$74,865, IRL Council</td>
</tr>
<tr>
<td><strong>Partner Match:</strong></td>
<td>$92,000, Lapin Services (55% of total)</td>
</tr>
<tr>
<td><strong>Total Project Cost:</strong></td>
<td>$166,865</td>
</tr>
</tbody>
</table>

**Project Description:** We propose to continue the use and optimization of the currently funded (IRLNEP 2021-2022), simple and innovative biological denitrification bioreactor to remove nitrogen (N) and phosphorus (P) from stormwater in Turkey Creek located within the Central IRL BMAP. The system was developed at Florida Tech based on a thorough search of the literature plus examination of existing wastewater, aquaculture and aquarium systems, followed by extensive laboratory and field-testing in the IRL. Environmental conditions (e.g., dissolved oxygen) in a bioreactor containing denitrification media are managed to promote the growth and proliferation of denitrifying and/or anammox bacteria found naturally in IRL water and sediments. Following extensive testing of various media, the use of repurposed plastics (BPA-free bottle caps), similar in function to plastic Bioballs used in home and large commercial aquaria, have yielded up to or greater than 70% ammonium nitrogen (N) and 80% phosphate (P) decreases from IRL water and dredge material. To date, the system also significantly improves turbidity and decreases microplastic counts with treatment. Data from field and laboratory testing will be used to adapt the system for stormwater use and to improve treatment efficiencies. Continued use and advancement of this system will not only benefit the lagoon but could provide a relatively simple and inexpensive method for treatment of natural waters globally and in underrepresented communities while also promoting awareness and providing a way for the public to get involved in lagoon research and restoration.

**Map and Photo(s):** Attached JPEG image per proposal guidelines (Figures ES1 and ES2, Attachment A).

**Key Outputs (Deliverables):** The primary deliverable is the treatment of stormwater (5,000-7,000 gallons per day) in Turkey Creek by promoting natural, ecosystem services in a developed and already mobilized denitrification bioreactor with community support and engagement.

**Key Outcomes (Benefits to the IRL):** **Short term:** Removal of hundreds of pounds of N and associated P from the IRL using an innovative and environmentally friendly bioreactor, helping to reduce the occurrence and severity of HABs and subsequent hypoxia and improve overall water quality while promoting community outreach and engagement. **Medium term:** Incorporating enhanced biological denitrification systems into city and county level stormwater and muck management plans. **Long term:** Improved water, habitat and sediment quality with fewer and less severe algal blooms, establishing a healthier ecosystem while promoting the success of other restoration efforts.
Executive Summary

<table>
<thead>
<tr>
<th>Dixon Blvd at Indian River Drive Water Quality and Resiliency Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead Organization and Partners:</strong></td>
</tr>
<tr>
<td>City of Cocoa</td>
</tr>
<tr>
<td><strong>Project Location</strong></td>
</tr>
<tr>
<td>Eastern Terminus of Dixon Blvd at the intersection of</td>
</tr>
<tr>
<td>Indian River Drive, in Cocoa, Florida.</td>
</tr>
<tr>
<td>Lat: 28°22'52.21&quot;N Lon: 80°44'10.72&quot;W</td>
</tr>
<tr>
<td><strong>Key CCMP Vital Sign(s):</strong></td>
</tr>
<tr>
<td>Impaired Waters, Stormwater, Trash-Free Waters, Climate-</td>
</tr>
<tr>
<td>Ready Estuary</td>
</tr>
<tr>
<td>Citizen Engagement and Education</td>
</tr>
<tr>
<td><strong>IRLNEP Contribution and Source:</strong></td>
</tr>
<tr>
<td>$40,000</td>
</tr>
<tr>
<td><strong>Partner Match:</strong></td>
</tr>
<tr>
<td>$40,000</td>
</tr>
<tr>
<td><strong>Total Project Cost:</strong></td>
</tr>
<tr>
<td>$80,000</td>
</tr>
</tbody>
</table>

Project Description:
This project will provide stormwater treatment and resiliency at Dixon and Indian River Drive (IRD). The project will elevate the roadway providing resiliency and safety. Also, an existing 19"x30" drainage pipe will be transitioned from a direct untreated outfall to the Indian River to a NRFS Baffle Box. This project will also seek to tie in additional untreated outfalls on IRD to treat stormwater prior to entering the Indian River. This should provide treatment to two or more direct outfalls, out of the over 65 within the City of Cocoa, to the Indian River. This project helps to address four of the CCMP Vitals, which are listed in the table above. The NRFS will help treat stormwater and remove trash before entering into an impaired body of water. The City of Cocoa anticipates including a small pedestrian and bicycle lookout at the discharge location. This will provide a much-needed rest stop for both bicyclists and pedestrians using the Indian River Scenic Drive. An educational display will be included showing the benefits of this project and by providing resources to users on what they can do to help achieve our goal of a clean lagoon. The preliminary design of this project is currently underway. The requested funding within this proposal is for the final design and permitting needed prior to construction.

Area Treated: Approximately +/- 37 Acres
TN & TP removed: 98.36/15.538#/year, respectively
*Note: these are preliminary numbers that would be finalized at the conclusion of the preliminary design phase.

Key Outputs (Deliverables):
- Preliminary Design – In-progress. The anticipated completion is Spring 2022.
- Final Design and Permitting – Anticipated start/finish is Fall 2022/Spring 2023.
- Construction – Anticipated start/finish is Fall 2023/Spring 2024.

Key Outcomes (Benefits to the IRL):
The three key benefits of this project include water quality, education, and resiliency. This project has the potential to treat roughly 37 acres of vacant, multi-family, and single-family land-uses. This would result in approximately 98.36 lb/yr and 15.538 lb/yr of TN and TP removed, respectively.
Title of Project | Moore’s Creek Distinctive Communities Project: Striving Towards Trash-Free Connected Waters
---|---
Lead Organization and Partners: | Lead Organization: City of Fort Pierce Partners: SWORD Outreach, Treasure Coast Food Bank; Habitat for Humanity; Lincoln Park Main Street
Project Location: | 17th and 29th Street Sections of Moore’s Creek
Key CCMP Vital Sign (s): | Impaired Waters; Trash Free Waters; Harmful Algae Bloom, Seagrasses, Distinctive Lagoon Communities, Vibrant 21st Century Communities, Connected Waters & Watersheds, Contaminants of Concern, Storm Water, Monitoring and Data Sharing.
IRLNEP Contribution and Source: | $50K–95,000, IRL Council
Partner Match: | Total Project Cost:

Project Description:
The Moore’s Creek Distinctive Communities Project calls for the installation of a series of watershed trash traps to be installed at two sections of Moore’s Creek where large amounts of trash from stormwater runoff, trail users, and the surrounding residential communities, lands in the watershed and ultimately flows towards and into the Indian River Lagoon. The netting attached to each trash trap would continuously capture debris immediately as the debris flows through the culverts, preventing further travel through the watershed. Once the nets fill, they would be emptied by the City’s Public Works Department and the trash would be properly discarded. This project would immediately improve the aesthetics of the Creek’s waters and the surrounding community and would ward off hundreds of pounds of trash from ever reaching the IRL.

Map and Photos: (attached to email)
Key Outputs ( Deliverables):

| Project initiated; RFP issued; contractors selected (if applicable) | Copy of RFP, signed contract, and statement of reasoning for contractor selection |
| Site locations and boundaries identified | Location maps of problem areas |
| Design considerations and permit needs; water quality improvement needs/objectives | Site Design Report, permits, water quality improvement objective and goals; project summaries & water quality improvement. |
| 100% Design Complete | Finalized Design Report |
| Determination of Operation and Maintenance | O & M Report |
| Assessment Complete | Final Assessment Report |
| Monthly watershed trash reduction | 3–4 hundred pounds of trash removed monthly |
| Ongoing maintenance and upkeep of traps | Official designation of personnel or dept. responsible for ongoing upkeep and maintenance of traps. |

Key Outcomes (Benefits to the IRL):

| Installation of Trash Traps | Short | Blocks trash as small as 5mm without interrupting the Creek’s waterflow |
| Traps are Emptied at frequent Intervals | Short-Medium | Removal of products containing oil and other contaminants that contribute to toxic waters; flood mitigation |
| Informational Kiosks / Community Outreach | Short/long | Engages community; offers informative water protection information; encourages proper trash disposal |
| Cleaning the waters; improving water quality | Short/medium long | Minimize dangers posed to marine and human life |
Category 2: Habitat Restoration Proposals
### CATEGORY 2: HABITAT RESTORATION

<table>
<thead>
<tr>
<th>Rank</th>
<th>Applicant</th>
<th>Project Description</th>
<th>Requested Funding</th>
<th>Cost Share Match</th>
<th>Match %</th>
<th>Total Project Cost</th>
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<th>Above 70%?</th>
<th>Eligible?</th>
<th>Funding Amount</th>
<th>Category Total Remaining</th>
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<tbody>
<tr>
<td>1</td>
<td>University of Florida</td>
<td>Restoration of Clam Populations in the Indian River Lagoon for Water Quality Improvement Y4</td>
<td>$197,892.00</td>
<td>$441,716.00</td>
<td>50.5</td>
<td>$639,608.00</td>
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<td>83%</td>
<td>Y</td>
<td>$197,892.00</td>
<td>$2,108.00</td>
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<tr>
<td>2</td>
<td>City of Stuart</td>
<td>SE Illinois Avenue Living Shoreline Project</td>
<td>$85,000.00</td>
<td>$85,000.00</td>
<td>50</td>
<td>$170,000.00</td>
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<td>77%</td>
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<tr>
<td>3</td>
<td>Indian River County</td>
<td>Phase 4 Restoration for the Lost Tree Island Conservation Area</td>
<td>$50,000.00</td>
<td>$165,804.08</td>
<td>76.8</td>
<td>$215,804.08</td>
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<td>$50,000.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bethune-Cookman University</td>
<td>IRL Seagrass Restoration using Mosquito Control Impoundment</td>
<td>$32,500.00</td>
<td>$37,630.00</td>
<td>53.7</td>
<td>$70,130.00</td>
<td>158</td>
<td>72%</td>
<td>Y</td>
<td>$0.00</td>
<td>$2,108.00</td>
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</tbody>
</table>

- Staff recommends applying surplus funds from Category 1 to fund all Eligible projects in Category 2.

- $165,392 is needed to fund the 3 remaining projects.
**Executive Summary**

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Category 2 Habitat Restoration Proposal: Restoration of clam populations in the Indian River Lagoon for water quality improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Organization and Partners</td>
<td>University of Florida (lead), St. Johns River Water Management District, Florida Fish and Wildlife Conservation Commission, Coastal Conservation Association, Riverside Conservancy, Blair Wiggins Outdoors, Florida Oceanographic Society</td>
</tr>
<tr>
<td>Project Location</td>
<td>Titusville-Sebastian-Ft. Pierce, and Banana River (80° 48’ W, 28° 43’ N, to 80° 11’ 53” 27° 12’ 02” W)</td>
</tr>
<tr>
<td>Key CCMP Vital Signs</td>
<td>Habitats, Filter Feeders &amp; Seagrasses Living Resources, Fisheries &amp; Harmful Algal Blooms, Water Quality, Impaired Waters, Legacy Loads, and Contaminants</td>
</tr>
<tr>
<td>IRLNEP Contribution and Source</td>
<td>$197,892 IRL Council</td>
</tr>
<tr>
<td>Partner Match</td>
<td>$441,716 – UF (3.5%) SJRWMD (3.1%) CCA (7.7%) FWC (79.2%) RC (6.3%) (total match rate 69%)</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td>$639,608</td>
</tr>
</tbody>
</table>

**Project Description:** Hard clams have historically been significant contributors to healthy water quality in the Indian River Lagoon (IRL) via filter-feeding that both reduces turbidity from algae and detritus and removes organic nutrients from the water column and deposits them in sediments. Unfortunately, overfishing and environmental degradation have led to the collapse of native clam populations in the IRL. We propose to leverage recent environmental stressors (algal blooms, hypoxia) that have naturally selected for the hardiest, most stress resistant filter-feeding bivalves in the IRL, by collecting surviving individuals of historically abundant species (e.g., hard clam, *Mercenaria mercenaria / campechiensis*) in these environmentally stressed areas for use in ecosystem restoration.

**Key Outputs:** We propose to continue our ongoing efforts (yr 1&2 funded by IRLNEP) to restore filter feeding clam populations in the IRL by: (1) spawning broodstock collected previously from areas identified as highly stressed by deleterious environmental conditions in recent years, making them exceptional genetic stock from which to produce IRL specific stress resistant clams; (2) growing clams to out-plant size in nursery facilities; and (3) repatriating nursery raised native clam populations to selected locations at densities necessary to support successful reproduction, (5) co-planting seagrasses with clams (4) reporting.

**Key Outcomes:** Restoration of clam populations will result in: (1) reduced turbidity and improved water quality, (2) nutrient reduction, (3) improved condition for seagrass recruitment (4) improved performance of co-planted seagrass.
### Executive Summary

<table>
<thead>
<tr>
<th><strong>Title of Project</strong></th>
<th>SE Illinois Avenue Living Shoreline Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead Organization and Partners:</strong></td>
<td>City of Stuart, Tim Voelker, P.E.</td>
</tr>
<tr>
<td><strong>Project Location:</strong></td>
<td>The project is located at the north end of SE Illinois Avenue in Stuart, FL. Latitude 27°11'57.81&quot;N, Longitude 80°14'42.70&quot;W</td>
</tr>
<tr>
<td><strong>Key CCMP Vital Signs(s):</strong></td>
<td>Living Shorelines, Impaired Waters, and Stormwater</td>
</tr>
<tr>
<td><strong>IRLNEP Contribution and Source:</strong></td>
<td>$85,000.00, IRL Council</td>
</tr>
<tr>
<td><strong>Partner Match:</strong></td>
<td>$85,000.00 (50%) Match</td>
</tr>
<tr>
<td><strong>Total Project Cost:</strong></td>
<td>$170,000.00</td>
</tr>
</tbody>
</table>

#### Project Description:

The project is in the City of Stuart, Florida, in the St. Lucie River drainage basin. With this project, a Living Shoreline will be installed to protect against erosion and to provide habitat for marine species and wading birds. The Living Shoreline plantings will also provide nutrient removal from the existing stormwater discharge entering the river at this location. A Buffered Shoreline will be constructed at the north end of SE Illinois Avenue to provide filtration for stormwater runoff from the northern portion of the SE Illinois Avenue right-of-way and adjacent properties. The project is important for the City of Stuart to continue progress towards resiliency and meeting BMAP requirements for the St. Lucie River. The conceptual design of this project is complete.

#### Map and Photo(s):

As instructed, a Project Location Map and Photo are attached to this application.

#### Key Outputs (Deliverables):

- **Living Shorelines-1:** RESEARCH and REPORT science-based siting, planning, design, and construction criteria.
- **Living Shorelines-3:** RESEARCH and REPORT on living shoreline information.
- **Impaired Waters-2:** Work with BMAP Partners and DEP to support implementation of BMAPs and track progress, compliance, and implementation challenges.
- **Stormwater-5:** Upgrade existing urban and agricultural stormwater infrastructure networks to reduce freshwater discharges, nutrient loads, and other pollutants to the IRL.

#### Key Outputs Benefits:

**Short term (1-2 years):** This project will also serve as a model project for future Living Shoreline projects within the City of Stuart and is part of the City of Stuart’s continuing effort to implement strategies to improve the quality of runoff entering the St. Lucie River and to advance toward BMAP goals.

**Medium-term (3-4 years):** Continuing to provide erosion protection, and restoring natural shoreline habitat, and to serve as a model project for future City of Stuart Living Shoreline projects.

**Long-term (5-10+ years):** Continuing to provide erosion control benefits and provide shoreline habitat, in addition to serving as a model project for other City of Stuart Living Shoreline projects.
## PHASE 4 RESTORATION FOR THE LOST TREE ISLAND CONSERVATION AREA (EARMAN ISLAND)

<table>
<thead>
<tr>
<th><strong>Lead Organization</strong></th>
<th>Indian River County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Location</strong></td>
<td>508-acre site is located in Indian River County at 27°40’21.86”N &amp; 80°22’42.60”W in the Central IRL.</td>
</tr>
<tr>
<td><strong>Key CCMA Vital Sign(s)</strong></td>
<td>Wetlands 4; Spoil Island 2; Land 1; Biodiversity 1,3; Species of Concern 4; Invasive Species 1,2; Climate-ready Estuary 2; Trash-Free waters 1; Communicate 1.</td>
</tr>
<tr>
<td><strong>IRLNEP Contribution and Source</strong></td>
<td>$50,000, IRL Council</td>
</tr>
<tr>
<td><strong>Partner Match</strong></td>
<td>$165,804.08</td>
</tr>
<tr>
<td><strong>Total Project Cost</strong></td>
<td>$215,804.08</td>
</tr>
</tbody>
</table>

### Project Description
In 2019 the IRLC provided funding for the development of design and engineering plans and construction specifications for the ecological enhancement of the three large islands within the LTICA. These islands include: Duck Head Island ~ 60.4 Acres; Joe Earman Island ~ 68.6 Acres; and Hog’s Head Island ~ 48.4 Acres. This completed design is planned to be submitted to obtain required permits for construction in early 2022. To accelerate the restoration process, the County is moving forward with enhancement work that does not require State or federal permits.

Restoration phases 1 through 3 on Duck Head Island are underway. This IRLNEP 2022/23 application includes Phase 4, which is planned to occur on Earman Island. The 13.7 acres of restoration work on Earman Island will follow a similar approach as planned for Phases 1 and 2 on Duck Head Island. Portions of the western side of Earman Island will be mechanically treated and re-vegetated with native species. The mechanically treated areas will be managed to minimize establishment of opportunistic undesirable species within the mulched areas for a period of at least six months prior to planting. A diverse array of native plants will be installed in mulched areas within transitional wetland and hammock areas. Re-vegetation is planned to coincide with the wet season (June to September) to maximize survivorship of planted materials. Phase 4 also will include the treatment of exotics within the existing mangroves fringing Earman Island.

### Key Outputs
The deliverable for the project will be completion of the 13.7 acres of upland enhancement, which will be summarized in the interim and final reports provided to the IRLC. The enhanced uplands will be monitored and maintained by County staff and contractors. The initial report will provide a detailed description and photographs documenting the pre-restoration conditions; representative photos of mechanical treatment completed; photographs of the restoration areas prior to planting; and photographs of the re-vegetated areas. Interim and final reports will be provided to provide updates on the progress of the restoration.

### Key Outcomes
The project will provide resource benefits to the IRL via the creation and enhancement of transitional wetlands, coastal hammock, and estuarine wetlands. These communities will provide many ecological and public benefits to the IRL including the short-term and medium-term outcomes such as: increased biodiversity; creation of potential spoil island habitat not common to the area; the removal of exotic species; providing potential refuge for protected wildlife species; sustainable communities; re-vegetating with native upland species; and debris removal. Added long-term benefits of the project include: wetland restoration and enhancement, and expanded public educational opportunities.
**INDIAN RIVER LAGOON NATIONAL ESTUARY PROGRAM**  
**FY 2023 PROPOSAL APPLICATION (Cat-2 Habitat Restoration)**  
**EXECUTIVE SUMMARY**

<table>
<thead>
<tr>
<th><strong>Title of Project (Montserrat Font)</strong></th>
<th><strong>IRL Seagrass Restoration using Mosquito Control Impoundment</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Lead Organization and Partners:</strong></td>
<td>Bethune-Cookman Univ., Brevard County Mosquito Control, Florida Fish &amp; Wildlife Conservation Commission</td>
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<tr>
<td><strong>Project Location</strong></td>
<td>North Siphon Impoundment in Indian River Lagoon Preserve State Park (27.94352229, -80.50403877)</td>
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<tr>
<td><strong>Key CCMP Vital Sign(s):</strong></td>
<td>Seagrasses, Connected Waters, Species of Concern, Biodiversity, Science &amp; Technology Innovation, State of The Lagoon, Monitoring and Data</td>
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<tr>
<td><strong>IRLNEP Contribution and Source:</strong></td>
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<tr>
<td><strong>Partner Match:</strong></td>
<td>Total $37,630.15 (53.66%); $9,399 (BCU in-kind); $3,271.14 (BCMC in-kind) $24,960 (FWC-cash-pending)</td>
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<td><strong>Total Project Cost:</strong></td>
<td>$70,130.15</td>
</tr>
</tbody>
</table>

**Project Description:** This proposed project will (1) establish a population of a native seagrass species *Ruppia maritima* in a mosquito impoundment; (2) monitor the restored impoundment to assess its character as a natural seagrass nursery and a source for IRL seagrass re-colonization and succession; and (3) develop and share protocol of guide and strategy toward IRL seagrass restoration using impoundment hydrology and *Ruppia* phenology. Success measures will be made through estimating production of reproductive shoots, flowers, seeds from the transplants as well as expansion of the transplanted area along the seasonal hydrologic regime.

**Map and Photo(s):** Attached. North Siphon Impoundment is located in Indian River Lagoon Preserve Park in Brevard County. The total surface impounded area is 17 acres with a 1.11 acres reservoir in the south; of which, the southwestern portion has shallower water and sandy substrates (~0.55 acres). *Ruppia maritima* will be transplanted in the shallow sandy substrates during a low water period (Jan-Mar 2013) and will be monitored.

**Key Outputs (Deliverables):**

1. **Restoration of seagrass in the mosquito control impoundment**
   A total of 4,000 mechanical planting units (MPU; see attached photo) will be installed on 0.5-meter (~20 in.) centers in the impoundment. The total restoration area will be around 11,000 sq. ft. Once rooted and mature, the transplants will establish a seagrass source population for IRL.

2. **Protocol and Technical transfer:**
   This proposed restoration method employs unique natures of seasonal impoundment hydrology and biology of *Ruppia maritima*. A protocol of the technique using *Ruppia* and impoundments will be developed and published both electronically and in prints, which will be also shared through a workshop, invited lectures, conference presentations, and a journal publication.

**Key Outcomes (Benefits to the IRL):**

1. Natural dispersal of *Ruppia* seeds and reproductive shoots from backwaters into main estuarine areas has been documented in other locations (short-term benefits); and both natural and controlled dispersal from the proposed restored area into IRL is expected as a result of this project (medium- to long-term benefits). This fast-growing seagrass promotes ecological succession by reducing turbidity/erosion for growth of other seagrass-dependent organisms that require stable habitat conditions (medium- and long-term benefits).

2. The protocol and technique developed will be applicable in other locations within IRL for broader adoption and implementation in other impoundments (short-, medium- and long-term benefits).
Category 3: Community-Based Restoration Projects
<table>
<thead>
<tr>
<th>Project</th>
<th>Requested Funding</th>
<th>Cost Share Match</th>
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<th>Category Total Remaining</th>
<th>Funding Amount</th>
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</thead>
<tbody>
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<td>63.3</td>
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<td>$269,722</td>
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<tr>
<td>Restore Our Shores: Community-Based Seagrass Restoration in the Indian River Lagoon</td>
<td>$60,000</td>
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<td>67.5</td>
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<th>Match %</th>
<th>Cost Share Match</th>
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<td>93</td>
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<td>Brevard Zoo</td>
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<td>$124,496</td>
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</tbody>
</table>
## Category 3 - Community-Based Restoration Proposal: Enhancement of Habitat Health and Biodiversity with Non-Plastic Restoration Materials in Mosquito Lagoon

| Lead Organization & Partners: | Jessy Wayles, Marine Discovery Center (Lead Organization)  
|                             | Dr. Linda Walters, University of Central Florida  
|                             | Dr. Melinda Donnelly, University of Central Florida |
| Project Location:           | Mosquito Lagoon for 800' living shoreline stabilization and 4 restored oyster reefs (29°04’18.97”N, 80°54’58.15”W; 28°44’16.1”N, 80°45’08.21”W), Shuck & Share based at Marine Discovery Center, New Smyrna Beach, FL (29°03’61.29”N, 80°91’80.38”W). |
| Key CCMP Vital Signs:       | Filter Feeder, Living Shorelines, Biodiversity, Climate-Ready Estuaries, Trash Free Waters, Citizen Engagement and Education, Monitoring and Data Sharing |
| IRLNEP Contribution & Source: | $99,000 |
| Partner Match:              | $170,772 |
| Total Project Cost:         | $269,772 |

**Project Description:** This project will improve water quality (reduce nutrients, increase clarity) and increase resiliency of IRL to sea level rise and storm surge by restoring 4 (~0.25 acre) oyster reefs and stabilizing 800 feet of eroded shoreline in Mosquito Lagoon. We will continue our highly successful, community-based, and partner-driven restoration and monitoring efforts; oyster restoration has run continuously since 2007 and living shoreline stabilization since 2010. Marine Discovery Center has worked with 4,300+ volunteers on the Shuck and Share program, collecting 700,000 lbs of shell and producing 11,000+ restoration units, all of which have been deployed around the state of Florida. UCF has involved 63,000+ volunteers, including elementary school students from underserved communities, in restoring 91 reefs (3.75-acre footprint) and stabilizing over 13,800 ft of shoreline in Mosquito Lagoon (5.5 acres). This will be our fourth year deploying non-plastic materials as we continue to expand and improve biodegradable designs to identify best methods for IRL conditions. Since its establishment in 2014, the Shuck & Share Oyster Recycling Program has been a critical component of successful estuarine restoration efforts in the IRL by diverting oyster shells discarded by seafood restaurants from landfills for use in aquatic habitat restoration. Volunteers are the heart of our efforts and will be involved in all aspects of the project. All permits from SJRWMD, USACE, and National Park Service are in hand, so we are shovel-ready for both living shoreline stabilization of culturally important midden sites and intertidal oyster reef restoration in the IRL.

**Map and Photos:** Map of restoration/stabilization locations and photos of materials provided as attachments.

**Key Deliverables:**

- **Deliverable 1:** 4 restored oyster reefs (~0.25-acre footprint) in Mosquito Lagoon using BESE™ biodegradable mesh with oyster shell attached with stainless wire or pH-balanced cement/jute patties.
- **Deliverable 2:** 800 linear feet of living shoreline in Mosquito Lagoon with cement/jute-based volcano shaped breakwaters or steel mesh bags filled with oyster shell designed specifically for IRL waters.
- **Deliverable 3:** Recycle 90,000 pounds of oyster shell through the Shuck & Share Program.
- **Deliverable 4:** A minimum of 20 community restoration preparation events and 10 deployment events
- **Deliverable 5:** Quarterly and final reports to IRLNEP with project progress and pre- and post-monitoring results.

**Key Outcomes (Benefits to the IRL):**

- **Restored oyster reefs in Mosquito Lagoon.** *Short-term:* 10,000 live oysters; *Mid-term:* 20,000 live oysters; *Long-term:* 40,000 live oysters
- **Living shoreline in Mosquito Lagoon.** *Short-term:* 1000 plants and 0.5 cm accretion of sediment; *Mid-term:* Plant retention and 1-2 cm accretion; *Long-term:* Retention of reproductive plants and 4 cm accretion
- **Recycle and distribute oyster shell through the Shuck & Share Program.** *Short-term:* Reduction of waste in landfills; *Mid-term:* Increased capacity for oyster-based restoration projects in IRL; *Long-term:* Stable source of shell for regional IRL restoration.
- **Community events.** *Short-term:* Community stakeholder engagement of 500+ individuals (2000 hours) in entire restoration process from shell recycling to deployment and monitoring; *Mid-term:* Enhanced protection of IRL through volunteer education; *Long-term:* Increased water quality and shoreline and oyster reef habitats.
- **Quarterly and final reports.** *Short-term:* Evaluation of oyster reef and living shoreline success and biodegradable materials effectiveness in IRL; *Mid-term:* Increased awareness of the effectiveness of biodegradable restoration materials and methods; *Long-term:* More efficient restoration and less plastic deployed in the IRL.
Executive Summary

<table>
<thead>
<tr>
<th>Title of Project:</th>
<th>Restore Our Shores: Community-Based Seagrass Restoration in the Indian River Lagoon</th>
</tr>
</thead>
</table>
| Lead Organization and Partners: | **Lead:** East Coast Zoological Society of Florida d/b/a Brevard Zoo (ECZS)  
Contact: Luke Dumas, 8225 N Wickham Rd, Melbourne, FL 32940, 321-354-9453 ext. 508, LDumas@brevardzoo.org  
**Partners:** Seagrass Ecosystems Analysts; Don Deis, Independent Contractor; Hubbs-SeaWorld Research Institute (HSWRI) |
| Project Location:       | Seagrass nursery will be constructed on HSWRI property at 4020 S. Hwy A1A, Melbourne Beach, FL 32951. Seagrass planting will take place throughout the Brevard County portion of the Indian River Lagoon, at or around 28°23'09.6"N 80°41'31.1"W. |
| Key CCMP Vital Sign(s): | "Seagrasses” (Level 1: Critical); “Citizen Engagement and Education” (Level 2: Serious) |
| IRLNEP Contribution and Source: | $60,000, IRL Council |
| Partner Match:          | ECZS - $82,896 (45%)  
Seagrass Ecosystems Analysts - $20,800 (11%)  
Don Deis, Independent Contractor - $20,800 (11%)  
Hubbs-SeaWorld Research Institute - $0 (0%) |
| Total Project Cost:     | $184,496 |

Project Description:
East Coast Zoological Society of Florida (ECZS) will stabilize seagrass populations in the Indian River Lagoon (IRL) through a two-pronged approach to seagrass restoration: (1) ECZS will construct a seagrass nursery at the Hubbs-SeaWorld Research Institute using starter stock from a third-party restoration group. This nursery will include multiple tanks and a pump setup that utilizes lagoon water, and will be capable of producing 4,800 square feet of seagrass annually. (2) Using seagrass from the nursery, ECZS will plant 24 seagrass beds, totaling 4,800 square feet, throughout the IRL.

Map and Photo(s):
Please see attached.

Key Outputs (Deliverables):
- Construction of a sustainable seagrass nursery capable of producing 4,800 square feet of seagrass per year.
- Planting of 24 seagrass beds throughout IRL totaling 4,800 square feet.
- Report of findings/replicable model that highlights best practices for site selection and planting seagrass.
- 50 volunteers engaged in 300 hours of seagrass planting, monitoring, and water quality data collection.

Key Outcomes (Benefits to the IRL):
- **Short-Term (1-2 years):**
  - 4,800 square feet of habitat restored.
  - Report of findings/replicable model including science-based site identification and planting techniques.
  - Creation of seagrass nursery to provide seagrass for restoration project for years to come.
  - Removal of 4.656 pounds of nitrogen from Indian River Lagoon annually.
- **Medium-Term (3-4 years):** Continued provision of 4,800 square feet of seagrass for restoration in the IRL.
- **Long-Term (5-10+ years):**
  - Reestablishment of lost seagrass beds.
  - Decrease in Florida manatee deaths reported by FWC.
Category 4: Science and Innovation Projects
<table>
<thead>
<tr>
<th>Rank</th>
<th>Applicant</th>
<th>Project Description</th>
<th>Requested Funding</th>
<th>Cost Share Match</th>
<th>Match %</th>
<th>Cost Share Match Total Project Cost Score Above 70%? Eligible?</th>
<th>Funding Amount</th>
<th>Cost Share Match Total Project Cost</th>
<th>Score</th>
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<tbody>
<tr>
<td>1</td>
<td>Florida Institute of Technology</td>
<td>A Preliminary Characterization of Microcystin in Coastal-Dwelling Mammals in the Indian River Lagoon, Florida</td>
<td>$30,039.00</td>
<td>$30,039.00</td>
<td>50</td>
<td>$60,078.00</td>
<td>$100,000.00</td>
<td>$69,961.00</td>
<td>173.2</td>
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<tr>
<td>2</td>
<td>Florida Institute of Technology</td>
<td>Suffocating Sand; Mapping Hypoxia and its Impacts on Benthic Nutrient Fluxes in the IRL</td>
<td>$73,898.00</td>
<td>$36,900.00</td>
<td>33.3</td>
<td>$110,798.00</td>
<td>$134,219.00</td>
<td>$69,961.00</td>
<td>173.1</td>
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<tr>
<td>3</td>
<td>University of Florida</td>
<td>Enhancing Living Shorelines: How can we manipulate Spartina alterniflora plantings to improve impaired waters by stabilizing sediment and reducing nutrients?</td>
<td>$99,618.00</td>
<td>$34,601.00</td>
<td>25.8</td>
<td>$134,219.00</td>
<td>$134,219.00</td>
<td>$80,643.00</td>
<td>156.0</td>
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<td>4</td>
<td>University of Central Florida</td>
<td>Unintended Consequences: Are Non-Plastic Materials Now Used in Coastal Restoration Always Better for the Indian River Lagoon?</td>
<td>$60,435.00</td>
<td>$20,208.00</td>
<td>25</td>
<td>$80,643.00</td>
<td>$80,643.00</td>
<td>$64,590.00</td>
<td>140</td>
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<td>5</td>
<td>The Manatee Observation and Education Center</td>
<td>Seagrass Restoration Project</td>
<td>$39,875.00</td>
<td>$79,184.00</td>
<td>25</td>
<td>$119,059.00</td>
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<td>6</td>
<td>Ocean Research &amp; Conservation Association, Inc.</td>
<td>A Novel Approach to Distinguish Among Human Waste Sources Using a Pollutant Source Tree Model</td>
<td>$45,000.00</td>
<td>$9,000.00</td>
<td>60</td>
<td>$54,000.00</td>
<td>$9,000.00</td>
<td>$45,000.00</td>
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<td>7</td>
<td>Nature Folk Inc.</td>
<td>Inclusion of St. Lucie Watershed into Go Hydrology</td>
<td>$6,000.00</td>
<td>$9,000.00</td>
<td>60</td>
<td>$15,000.00</td>
<td>$6,000.00</td>
<td>$15,000.00</td>
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</table>

Staff recommends fully funding project 2 with the surplus from category 1 funding and recommends projects 3-5 be funded as IRL Council funding becomes available from BIL funding being allocated to projects already in progress with Council Funds.
Executive Summary

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>A Preliminary Characterization of Microcystin in Coastal-Dwelling Mammals in the Indian River Lagoon, Florida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Organization and Partners:</td>
<td>Lead: Florida Institute of Technology; Partners: Hubbs SeaWorld Research Institute, Harbor Branch Oceanographic Institute</td>
</tr>
<tr>
<td>Project Location</td>
<td>IRLNEP watershed and the IRL-Halifax Buffer Planning Boundary</td>
</tr>
<tr>
<td>Key CCMP Vital Sign(s):</td>
<td>Harmful Algal Blooms, Monitoring and Data, Science and Technology Innovation</td>
</tr>
<tr>
<td>IRLNEP Contribution and Source:</td>
<td>$30,039, IRL Council</td>
</tr>
<tr>
<td>Partner Match:</td>
<td>50% match by Florida Institute of Technology</td>
</tr>
<tr>
<td>Total Project Cost:</td>
<td>$60,078</td>
</tr>
</tbody>
</table>

Project Description: Aquatic mammals inhabiting the Indian River Lagoon (IRL) can serve as indicators of human and environmental health by exposing the presence and deleterious effects of harmful algal bloom (HAB) toxins. Microcystin (MC), a potent hepatotoxin produced by the cyanobacteria *Microcystis*, is a toxin of emerging concern in the IRL. However, susceptible aquatic mammals are not routinely evaluated for MC toxicity, severely limiting our understanding of the occurrence and health consequences of chronic exposure. The study will measure MC levels in tissues and bodily fluid and correlate findings to health biomarkers in stranded bottlenose dolphins and river otters in the IRL. Findings of this study will serve as a critical preliminary step to describe exposure risks and inform future research and monitoring for the safety of humans and wildlife that utilize IRL waters. Expected outcomes for publication include 1) MC quantification in IRL aquatic mammal liver tissue, the primary target organ for toxicity and screening, 2) MC quantification in subcutaneous tissue and respiratory secretions, potential novel sample sites for future, minimally-invasive screening in free-ranging wildlife populations, 3) correlation of MC exposure with the incidence and degree of systemic injury and stress for use as health biomarkers, and 4) establishment of a preliminary chronic MC toxicity profile considering sample type and seasonal variations as a barometer for current interventions and future research within the IRL.

Maps and Photo(s): See attached

Key Outputs (Deliverables):
1) Peer-reviewed manuscript submissions, 2) locally disseminated data reports, and 3) professional presentations describing the following findings in IRL aquatic mammals: a) MC detectability, load, and trends, establishing preliminary reference ranges based on sample type, b) systemic health status correlated to MC load, c) "proof of concept" evaluation of utilizing novel, minimally-invasive sample sites for future MC screening in free-ranging populations.

Key Outcomes (Benefits to the IRL):
1) An improved understanding of the health challenges faced by coastal-dwelling mammals inhabiting the IRL can inform management decisions of veterinarians, biologists, public health officials, and policymakers to help reduce MC exposure risks (short-term)
2) Data regarding MC bodily load and concurrent health state can serve as a foundation for future biomonitoring (short- to long-term)
3) Support for future implementation of novel MC screening in free-ranging aquatic mammals using subcutaneous biopsy and respiratory secretions (short- to long-term)
4) Training of citizen scientists and students in laboratory methods and wildlife health (short-term)
Executive Summary

CATEGORY 4: Science and Innovation Projects

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Suffocating Sand; Mapping Hypoxia and its Impacts on Benthic Nutrient Fluxes in the IRL.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Organization and Partners:</td>
<td><strong>Lead Organization:</strong> Florida Tech (Austin Fox Ph.D). <strong>Partners:</strong> Brevard County Department of Natural Resources (Virginia Barker). Brevard Zoo (Tyler Provoncha). Cocoa Beach (Kelsey Mack).</td>
</tr>
<tr>
<td>Project Location</td>
<td>This project will be carried out in the IRL/BRL between the Eau Gallie and the Cocoa Beach causeways (Figure ES1, Attachment A). Project centered at 28°17'50&quot;N, -80°38'25&quot;W.</td>
</tr>
<tr>
<td>Key CCMP Vital Signs:</td>
<td>Legacy Loads and Healthy Sediments, Filter Feeders, Harmful Algal Blooms, 21st Century Communities, Monitoring, Science &amp; Technology Innovation</td>
</tr>
<tr>
<td>IRLNEP Contribution and Source:</td>
<td>$73,898, IRL Council</td>
</tr>
<tr>
<td>Partner Match:</td>
<td>$12,000 (FIT) + 24,900 (Brevard County) = (33% of total)</td>
</tr>
<tr>
<td>Total Project Cost:</td>
<td>$110,798</td>
</tr>
</tbody>
</table>

**Project Description:**
One of the most far-reaching and ubiquitous perturbations in the lagoon has been largely understudied and is not yet well understood; the expanding extent and duration of hypoxia with associated impacts to nutrient cycling, eutrophication and loss of ecosystem services. This study will use a relatively low-cost network of continuous monitoring stations to track the extent, duration and movement of bottom water dissolved oxygen (DO) and hypoxia in the IRL. Resulting data coupled with nutrient fluxes determined using benthic chambers at sites co-located with DO monitors will help link nutrient cycling to changes in DO. Previous efforts have shown that during hypoxic events, healthy sediments switch from a sink to a source of nitrogen and can release large pulses of phosphorus. This study will focus on degraded areas between the Eau Gallie and Cocoa Beach Causeways supporting listed water quality monitoring efforts (nutrient and DO) within the Central IRL and Banana River BMAPs (WBID 2963C). This study will leverage and build upon limited monitoring carried out as part of partner and cost-share projects and will use the collective dataset to evaluate trends for DO against variations in lagoon morphology, muck distribution and circulation patterns. These synergistic efforts plus high resolution data and interpretations will help project partners and others to better select restoration sites with higher probabilities of success (e.g., Oyster Habitat Suitability Index) thereby promoting greater coastal resilience and improved water quality while addressing the IRLNEP 2023 priorities, action items and the 2030 CCMP priority areas.

**Map and Photo(s):** Attached JPEG image per proposal guidelines (Figure ES1, Attachment A).

**Key Outputs (Deliverables):**
Publicly available datasets for DO and reports showing the extent and duration of hypoxia plus N and P fluxes in relation to lagoon morphology, bottom composition and circulation patterns.

**Key Outcomes (Benefits to the IRL):**
**Short term:** quantifying the extent and duration of hypoxia in sub-basins of the IRL. **Medium term:** enhanced site selection for restoration (e.g., determination of HSI) by project partners plus others and developing a mechanisms to track the success of restoration projects. **Long term:** improved water, sediment and habitat quality resulting from informed placement and enhanced success of restoration projects.
EXECUTIVE SUMMARY: IRLNEP FY 2023 PROPOSAL APPLICATION

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Enhancing living shorelines: How can we manipulate <em>Spartina alterniflora</em> (smooth cordgrass) plantings to improve impaired waters by stabilizing sediment and reducing nutrients?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Organization and Partners:</td>
<td>University of Florida, FL SeaGrant, with logistic support from FL Fish and Wildlife Commission</td>
</tr>
<tr>
<td>Project Location:</td>
<td>Living Shorelines and natural marshes within the Indian River Lagoon Estuary Program, including New Smyrna Beach (29.0367333333, -80.9180638889), and North Peninsula State Park (29.406142, -81.098354).</td>
</tr>
<tr>
<td>Key CCMP Vital Sign(s):</td>
<td>Project addresses several priority vital signs, including <em>Impaired Waters, Seagrass, and Harmful Algal Blooms</em>), and addresses other vital signs; <em>Living Shorelines, Climate Ready Estuaries, and Biodiversity</em>.</td>
</tr>
<tr>
<td>IRLNEP Contribution:</td>
<td>$99,618.00</td>
</tr>
<tr>
<td>Partner Match:</td>
<td>UF: $34,601.00 (35%)</td>
</tr>
<tr>
<td>Total Project Cost:</td>
<td>$134,219.00</td>
</tr>
</tbody>
</table>

**Project Description:** This project will help optimize living shoreline (LSL) functions by identifying planting design specifications that promote sediment trapping and habitat. We will model how vegetation traits and planting design affect those goals, and assess how plant source, spacing, and density impact goals. Project locations include LSLs and natural marshes within the boundaries of the Indian River Lagoon National Estuary Program Watershed Boundary and the IRL-Halifax Buffer Planning Boundary, and include the New Smyrna Beach Saltmarsh Restoration and the North Peninsula State Park (additional sites selected using the Florida DEP Living Shoreline database¹ and the Shoreline Restoration Suitability Model²). Resulting guidance specifying optimal planting density, spatial arrangement, and plant material, will be co-developed and disseminated with managers.

**Map and Photo(s):** Two key sites will support the plant survey work for this proposal: New Smyrna Beach, planted with Spartina in 2014 and currently serving as a Spartina nursery for other projects and North Peninsula State Park, planted in 2010, 2012, 2013 and 2015. (map and photos attached to email submission).

**Key Outputs (Deliverables):** Increased nutrient reduction and sediment trapping for future LSL projects in the IRL (quantification will be a component of this project).

**Key Outcomes (Benefits to the IRL):** Short term: needed tools to optimally implement LSLs. Medium term: increased sediment trapping, nutrient retention and habitat. Long term: improved water quality (less *Impaired Waters*, fewer *Harmful Algal Blooms*, increased *Seagrass*), improved habitat (for *Biodiversity*), and enhanced function for *Living Shorelines*. 
EXECUTIVE SUMMARY

Title of Project: Category 4 Science and Innovation Proposal: Unintended Consequences: Are Non-Plastic Materials Now Used in Coastal Restoration Always Better for the Indian River Lagoon?

Lead Organization & Partners: University of Central Florida

Project Location: Mosquito Lagoon (28°54’24”N, 80°49’16”W)

Key CCMP Vital Sign(s): ONE LAGOON; Water Quality: Contaminants of Concern; Habitat Quality: Filter Feeders, Living Shorelines; ONE COMMUNITY: Trash-Free Waters; ONE VOICE: Monitoring and Data Sharing

IRLNEP Contribution & Source: $60,435, IRL Council

Partner Match: $20,208 from UCF (25.06%)

Total Project Cost: $80,643

Project Description: Many estuarine restoration projects have utilized aquaculture grade plastics. Use of plastic materials has recently come into question due to research documenting the prevalence and negative effects of plastics in estuaries, with the IRL being a hotspot for microplastics in waters and filter-feeding animals. To address this concern, Florida’s restoration practitioners have embraced non-plastic alternatives and this shift in materials is supported by FL DEP and State Aquatic Preserves. Funding agencies, including IRLNEP and FL FWCC, likewise discourage new projects using plastics, further expanding deployment of alternative materials. However, we are currently missing the critical step of assessing the ecological impacts of these alternative materials before these new innovations are widely utilized. Many non-plastic materials are designed from organic substances to be biodegradable; thus, these materials release compounds into estuarine waters and sediments as the materials decompose. Our team was the first to quantify releases of substantial carbon, nitrogen, and phosphorous from BESE™ elements (Sustainability, July 2021). However, nothing is known about the contribution of BESE™ and other new materials to estuarine nutrient and heavy metal loads over longer time periods. Our study addresses this knowledge gap by conducting chemical analyses of compounds released by non-plastic materials used in restoration throughout the IRL. With continued expansion of restoration utilizing non-plastic materials, there is an urgent need to investigate potential nutrients and chemical compounds being introduced into our estuaries by these materials. This knowledge will prevent unintentional consequences to IRL’s physical and biological communities.

Map and Photos: A) Map: The project location spans multiple oyster reefs and living shoreline stabilization sites within Mosquito Lagoon (ML). B) Photos: Non-plastic materials deployed in ML.

Key Outputs (Deliverables): 1: Chemical analyses of components released during breakdown of non-plastic materials used in estuarine restoration. 2: Dissemination of research findings through peer-reviewed publications. 3: Quarterly/final reports.

Key Outcomes (Benefits to the IRL): Deliverable 1: Short, identification of biodegradable materials with limited vs substantial nutrient and heavy metal impacts on IRL; Mid, data to compare to other novel materials; Long, large-scale adoption of the optimal biodegradable materials in the IRL. 2: Short, dissemination of results to scientific community; Mid, data-informed restoration projects in the IRL; Long, improved quality of water, sediments, and restored habitats. 3: Short, communication of results and progress to IRLNEP; Mid, new knowledge base for IRLNEP management decisions and prioritization; Long, fuel for additional research by others about the ecological effects of non-plastic restoration materials.
Executive Summary

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Manatee Observation and Education Center Seagrass Restoration Project</th>
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</thead>
<tbody>
<tr>
<td>Lead Organization and Partners:</td>
<td>The Manatee Observation and Education Center (MOEC) and Sea &amp; Shoreline, LLC</td>
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<tr>
<td>Project Location:</td>
<td>The project takes place in the tidal portion of Moores Creek and along the adjacent shoreline - 27°27’5.25”N 80°19’24.14”W</td>
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<td>Key CCMP Vital Sign(s):</td>
<td>Seagrasses, Biodiversity, Species of Concern, Science &amp; Technology Innovation</td>
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<td>IRLNRP Contribution and Source:</td>
<td>$39,875, IRL Council</td>
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<tr>
<td>Partner Match:</td>
<td>$58,750, TCMF $20,434 (in-kind), MOEC</td>
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<tr>
<td>Total Project Cost:</td>
<td>$119,059</td>
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</table>

**Project Description:** This project aims to restore approximately one acre of seagrass to Moores Creek, a tributary to the IRL, and enhance an additional 0.5 acres of adjacent seagrass community. The project also aims to examine the effectiveness of several cost-effective seagrass restoration methods to assist in the design and scalability of large-scale seagrass restoration projects in the IRL. These methods include supplemental planting, bioturbation control, and a sediment amending growth enhancement (SAGE) treatment.

**Key Outputs (Deliverables):**

1. The restoration of one acre of seagrass habitat in Moores Creek, a tributary to the IRL.
2. An increase in biomass of seagrass communities found adjacent to the project site.
3. Data demonstrating the effectiveness of three cost-effective seagrass restoration/biomass enhancement techniques that can be replicable in large-scale restoration efforts.
4. Data analyzing changes in manatee visitation frequency and behavior before, during, and after seagrass restoration in Moore’s Creek.

**Key Outcomes (Benefits):**

1. The short-term benefit is the restoration of approximately 1.5 acres of seagrass communities within the IRL. Restored seagrass meadows will provide many ecosystem benefits including habitat and foraging for a diverse group of marine organisms.
2. The medium-term benefit is the creation of self-sustaining seagrass meadows in the IRL as a result of many restoration projects that build off the data collected through pilot efforts such as this project.
3. The long-term benefit is an improvement to the health of the IRL as seagrass meadows from restoration projects continue to have positive feedback on existing seagrass habitat until critical thresholds for seagrass occurrence in the IRL are met. Restored seagrass meadows contribute towards biodiversity, water clarity, and nutrient sequestration.
Executive Summary

A novel approach to distinguish among human waste sources using a pollutant source decision tree model

Lead Organization and Partners
Ocean Research & Conservation Association, Inc. (ORCA)

Project Location
Entire Lagoon (156 miles)

Key CCMP Vital Sign(s)
One Lagoon: Water Quality - Wastewater, Impaired Waters, & Contaminants
Habitats - Connected Waters
Living Resources - Harmful Algal Blooms
One Voice: Communicate - Collaborate - Coordinate
Science & Technology Innovation

IRLNRP Contribution and Sources
$45,000

Partner Match
$19,590

Total Project Cost
$64,590

Project Description
Our goal is to create a standardized protocol for distinguishing between septic tank output and wastewater sources, including raw sewage, reclaimed water, and biosolids. The established method will help pinpoint sources of anthropogenic waste entering the lagoon. These products are known to contain contaminants and nutrients which can lead to harmful algal blooms.

Key Outputs

Identification of Pollution Sources: ORCA will identify numerous compounds that are not being removed through current treatment by septic systems and at wastewater facilities. ORCA plans to categorize these compounds based on their use: pharmaceuticals and personal care products (PPCBs), endocrine disruptor chemicals (EDCs), artificial sweeteners, heavy metals, etc. Simultaneously, compounds will be grouped by the product they were identified in: raw sewage, on-site sewage systems (i.e. septic systems), reclaimed water, and biosolids.

Analyzing Ratios: ORCA will examine ratios of nutrients and contaminants to aid in identifying sources in environmental water samples.

Decision Tree Model: Based on the previously identified sources and ratios of pollutants leaving septic tanks and WWTPs, ORCA will produce a decision tree model to distinguish among most likely sources of contaminants.

Analysis of Treatment Types: Due to the nature of this study, ORCA will be able to compare wastewater treatment types. ORCA can then provide information regarding the best strategies for the health of the IRL and its inhabitants.

Key Outcomes

Short-Term Benefits: This project will assist in identifying sources of pollution entering the IRL. The information provided will permit decision-makers to better prioritize the funding needed to stop pollution at its source.

Long-Term Benefits: The decision tree produced by this project can easily be adjusted to fit localized needs. It can also evolve as new technologies develop thereby ensuring the longevity of this significant tool for reducing pollution loads entering the IRL.
Executive Summary
Inclusion of St. Lucie Watershed into Go Hydrology
Nature Folk Inc, a 501(c)(3) non-profit organization
Submitted in December 2020

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Inclusion of St. Lucie Watershed into Go Hydrology</th>
</tr>
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<tbody>
<tr>
<td>Lead Organization</td>
<td>Nature Folk Inc, a 501(c)(3) non-profit organization</td>
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<tr>
<td>Project Location</td>
<td>St. Lucie River and Watershed</td>
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<tr>
<td>Key CCMP Vital Signs</td>
<td>Hydrology and Hydrodynamics, Connected Waters and Watersheds, Monitoring and Data Sharing</td>
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<tr>
<td>IRLNNEP Contribution and Source</td>
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<td>Partner and Match</td>
<td>Nature Folk Inc</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td>$15,000</td>
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</tbody>
</table>

Project Description
The proposed project will bring the St. Lucie water cycle to life using Go Hydrology’s (https://gohydrology.org) “water cycle” approach, brought to your by the overarching 501(c)(3) non-profit organization called Nature Folk Inc (https://naturefolk.net). The great advantage to the “water cycle” approach is in addition to creating a common framework for technical experts and lay enthusiasts to tap into, it uses the water cycle as a proxy for the seasons. This is a vital yet underutilized gateway for connecting people to the water in Florida. Unlike continental north where the four seasons are distinct, Florida’s seasons are more subtle. The proposed project will result in a series of user-friendly and easy-to-read charts, diagrams and data-based content featured within the Go Hydrology online journal. Go Hydrology serves up “fresh” water data in a way that helps people get in tune with the water cycle while simultaneously also giving them a deeper historical view; or in other words providing them with a portal for “feeling at home” and on the “inside looking out” at the water cycle and the watersheds that surround them.

Map and Photos
Please see attachment – showing a map, a representational artisinal hydrograph and a key photo for the area of interest.

Key Outputs (Deliverables)
The project will result in a special section within the Go Hydrology website that will (1) feature artisanal hydrographs, rain charts, histograms and other multi-media information sets (2) for the purpose of telling the story of the Indian River Lagoon and St. Lucie water cycle (3) in a way that engages and creates a dialog among a diverse audience of lay public and technical experts. Key parameters include surface-water discharge, water stage, water depth, rainfall and air temperature. All information will be available for the IRLNNEP to use on its websites and other programs.

Key Outcomes (Benefits to IRL)
Key outcomes include: (1) Establishing the St. Lucie watershed as a primary waterbody of interest for readers of Go Hydrology, (2) Application of the “water cycle” approach to the St. Lucie Watershed, (3) Creation and maintenance of regularly-updated artisanal charts and graphs for the St. Lucie watershed with the sum effect of (4) increasing social awareness and engagement in the St. Lucie River among technical experts and the lay public.
Category 5: Market Research Proposals
<table>
<thead>
<tr>
<th>Rank</th>
<th>Applicant</th>
<th>Project</th>
<th>Requested Funding</th>
<th>Cost Share Match</th>
<th>Match %</th>
<th>Total Project Cost</th>
<th>Score</th>
<th>Above 70%?</th>
<th>Eligible?</th>
<th>Funding Amount</th>
<th>Category Total Remaining</th>
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<tbody>
<tr>
<td></td>
<td>Brevard County</td>
<td>Quantitative and Qualitative Research to Increase Adoption of Lagoon-Friendly Fertilizer Practices Among IRL Watershed Residents Utilizing Reclaimed Water for Irrigation.</td>
<td>$20,000</td>
<td>$10,000</td>
<td>33</td>
<td>$30,000</td>
<td>74</td>
<td>67</td>
<td>N</td>
<td>$0.00</td>
<td>$50,000.00</td>
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</table>
## Quantitative and Qualitative Research to Increase Adoption of Lagoon-Friendly Fertilizer Practices Among IRL Watershed Residents Utilizing Reclaimed Water for Irrigation

<table>
<thead>
<tr>
<th>Lead Organization and Partners:</th>
<th>Brevard County Natural Resources Management Dept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location</td>
<td>Volusia, Brevard, Indian River, St. Lucie, and Martin counties</td>
</tr>
<tr>
<td>IRLNEP Contribution and Source:</td>
<td>$20,000, IRL Council</td>
</tr>
<tr>
<td>Partner Match:</td>
<td>$10,000</td>
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<tr>
<td>Total Project Cost:</td>
<td>$30,000 Total</td>
</tr>
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</table>

### Project Description:
This project proposes gathering data about the current irrigation and fertilizer behavior of residents who use reclaimed water for irrigation in the Indian River Lagoon (IRL) watershed, creating messaging based on quantitative data analysis, testing messaging through qualitative research and analysis, and providing final recommendations. Many wastewater treatment plants in the IRL watershed use their treated effluent for irrigation. According to both the IRLNEP 2030 CCMP and Brevard County’s Save Our Indian River Lagoon Project Plan 2021 Update, customers who use reclaimed water for irrigation should be informed of the nutrient content in the reuse water as part of public education and outreach efforts because they can and should eliminate or reduce the amount of fertilizer added to their lawn and landscaping. However, quantitative and qualitative research about current behavioral benchmarks related to fertilizer use among residents utilizing reclaimed water for irrigation has not been recently conducted. This project proposes to address this underserved target audience and target behavior and recommend data-based solutions to increase lagoon-friendly behavior change to improve water quality and advance IRLNEP’s mission of “One Lagoon. One Community. One Voice.”

### Key Outputs (Deliverables):
Proposed deliverables include: Quantitative Online Survey, Survey Analysis, Messaging and Creative Development, Message Testing and Qualitative Research, Qualitative Research Analysis, and Implementation and Final Recommendations. A quantitative survey will be implemented in the IRL watershed region to collect information about current behavior, beliefs, and barriers to reducing or eliminating the amount of fertilizer being added to lawn and landscaping for properties utilizing reclaimed irrigation water. Survey data will be presented in a report and segmented by county. Messaging will be developed from the results of the quantitative survey and tested through qualitative research with residents of Brevard County. Recommendations for testing and implementation of messaging and creative to increase the “Lagoon-Friendly” behavior of reduced fertilizer application among target audiences will be provided with the final deliverables.

### Key Outcomes (Benefits to the IRL):
This project will provide IRLNEP, counties, cities, and advocacy and community groups with quantitative and qualitative research about fertilizer and reclaimed water irrigation behavior within the IRL watershed and data-based recommendations for increasing adoption of lagoon-friendly fertilizer and reclaimed water irrigation practices. The project deliverables will address multiple strategies in the IRLNEP 2030 CCMP and advance the Action Plan Outputs for Wastewater-2 and Stormwater-2. The behavioral benchmarks collected in the quantitative survey can be used to help achieve short-term behavior change goals, as well as measure behavioral changes over time, or changes as a result of information exposure in subsequent surveys.
Infrastructure Investment and Jobs Act

EPA Appropriation at page 968 of 1039-page document.

- $132 million to NEP. $26,400 annually FY 2022 – 2026.
- IRLNEP expecting $914,000 annually for 5 years to begin FY 2022.
- EPA Administrator may waive or reduce the required non-Federal share.
- Up to three percent of the amounts made available under this paragraph in this Act shall be for salaries, expenses, and administration (EPA).
- EPA considers these as “no year” grants (“available until expended”).
- EPA would like to see timely allocations of 2022 funds.
- Funds accounted for in separate EPA work plan and with separate project reporting.
Infrastructure Investment and Jobs Act

EPA Appropriation at page 968 of 1039-page document.

• $132 million to NEP. $26,400 annually FY 2022 – 2026.
• IRLNEP expecting $914,000 annually for 5 years to begin FY 2022.
• EPA Administrator may waive or reduce the required non-Federal share.
• Up to three percent of the amounts made available under this paragraph in this Act shall be for salaries, expenses, and administration (EPA).
• EPA considers these as “no year” grants (“available until expended”).
• EPA would like to see timely allocations of 2022 funds.
• Funds accounted for in separate EPA work plan and with separate project reporting.
Quorum Options

• No change. Keep working to get attendance. Wait to see if attendance rebounds after COVID subsides.

• Reduce quorum attendance requirement in each committee.

• Change advisory committees to fact finding only. Committee reports to Executive Director.

• Seek legislative exemption for the IRL Council advisory committees