WORKPLAN
Indian River Lagoon National Estuary Program
Fiscal Year 2017 – 2018

Indian River Lagoon National Estuary Program
1235 Main Street
Sebastian, FL 32958
IRLCouncil.com
Partnerhsip Guides Program
The Indian River Lagoon National Estuary Program is a partnership whose members work to improve the water quality and ecological integrity of the 156-mile long estuary on Florida's east coast. The U.S. Environmental Protection Agency (EPA) designated the lagoon as an "Estuary of National Significance" in April 1990 and included the lagoon in the National Estuary Program in 1991.

The IRLNEP is sponsored by the IRL Council, which was established in February 2015 as an independent special district of Florida. The IRL Council includes representatives of five counties bordering the lagoon (Volusia, Brevard, the Indian River County Lagoon Coalition, St. Lucie and Martin Counties), the St. Johns River and South Florida Water Management Districts, and the Florida Department of Environmental Protection (DEP). The U.S. EPA provides guidance to the IRL Council as a non-voting member.
Section A. General Information Reporting Requirements


Atmospheric Deposition
AD-1 Determine the impacts of atmospheric deposition of pollutants on the water quality and resources of the Indian River Lagoon. *Priority – Medium.*

Biotoxins and Aquatic Animal Health
BAH-2 Continue support of the Biotoxin and Aquatic Animal Health Working Group and the goals of this working group. *Priority – High.*
BAH-3 Complete or continue the projects identified in the Preliminary Strategic Plan for Algal Toxins and Aquatic Animal Health in the Indian River Lagoon. *Priority – High.*

Climate Change
CC-1 Track state, national and international actions and research concerning climate change issues that affect the Indian River Lagoon. *Priority – Medium.*
CC-2 Support Indian River Lagoon-based research that considers and integrates global climate change issues and seeks practical scientific, technological and public policy solutions. *Priority – Medium.*
CC-3 Provide information to local governments and residents of the Indian River Lagoon region about impacts of climate change and actions they can take to reduce these impacts. *Priority – Medium.*

Data and Information Management Strategy
DIM-1 Continue projects and strategies related to data and information management. *Priority – High.*

Fisheries
F-1 Conserve, protect, restore and manage the finfish and shellfish resources in the Indian River Lagoon region. *Priority – High.*
FI-2 Continue measurement of progress of CCMP implementation activities. *Priority – High.*

Fresh and Storm Water Discharges
FSD-1 Complete or continue the diagnostic, management or pilot projects related to stormwater or freshwater discharges being planned or undertaken by federal, state, regional and local governments. *Priority – High.*
FSD-7 Amend local government comprehensive growth management plans and land development regulations to incorporate the goals, objectives and actions found in the IRLCCMP. *Priority – High.*
FSD-10 Encourage the proper use of fertilizers, herbicides, pesticides and reuse water. *Priority – High.*
FSD-11 Educate residents and property owners about the impacts of freshwater and stormwater discharges on the Indian River Lagoon and what they can do to reduce these impacts. *Priority – High.*
FSD-13 Upgrade existing urban and agricultural stormwater systems to reduce pollutant loadings to the Indian River Lagoon. *Priority – High.*

Monitoring
### On-Site Sewage Treatment and Disposal Systems

**OSDS-3** Undertake further studies of OSTDSs in the region to quantify the impacts of OSDSs on the Indian River Lagoon and to further quantify the extent of “problem” and “potential problem” areas. *Priority – High.*

**OSDS-4** Promote the connection of areas served by OSTDS to central sewer service or, where connection to central sewer is not feasible, promote the development and use of alternative or advanced OSTDS technologies offering improved treatment in areas identified in the IRL SWIM studies as “problem” or “potential problem” for OSTDS. Identify and publicize potential funding sources that could be used to connect areas served by OSTDS to central sewer or support the development and use of alternative or advanced OSTDS technologies. *Priority – High.*

### Public Involvement and Education

**PIE-1** Implement and expand public involvement and education projects or programs. *Priority- High.*

**PIE-2** Develop, implement and refine a communications plan to inform stakeholders and government officials about the resources of the Indian River Lagoon, the economic and ecological value of these resources and threats to the continued viability of these resources. *Priority- High.*

**PIE-4** Increase public and governmental involvement in activities designed to protect and restore the resources of the Indian River Lagoon. *Priority- High.*

### Point Source Discharges

**PS-4** Investigate and recommend funding alternatives for the upgrading of WWTPs. *Priority – High.*

### Seagrass Protection, Restoration and Management

**SG-1** Implement a program of protection, restoration and management activities needed to maintain, protect and restore the seagrass/SAV community of the Indian River Lagoon. – *Priority - High.*

### Indian River Lagoon Scientific Research

**SR-1** Create an Indian River Lagoon Science and Management Working Group charged with the development and implementation of a scientific research vision and implementation strategy for the Indian River Lagoon. This strategy should be consistent with and complimentary to statewide research strategies identified by the Florida Coastal and Ocean Resources Council and national coastal priorities. *Priority – High.*

**SR-3** Expand and diversify funding for scientific research in the Indian River Lagoon. *Priority – High.*

### Wetlands

**W-1** Implement programs that protect the ecological services of wetlands. *Priority – High.*

**W-4** Implement innovative programs and incentives supporting wetlands protection and management on privately owned lands. When necessary, acquire ownership or control of crucial wetlands. *Priority – High.*

**W-5** Continue restoration & rehabilitation of impacted coastal wetlands. *Priority – High.*

**W-6** Continue projects to restore shorelines. *Priority – High.*

**W-7** Promote the removal of trash and litter from wetlands, shorelines and islands. *Priority – High.*

*Total of 25 High Priority and 6 Medium Priority Action Plans within 13 CCMP categories.*
<table>
<thead>
<tr>
<th>Activity</th>
<th>CCMP Action</th>
<th>IRLNEP Core Elements</th>
<th>Program Title and Abstract</th>
<th>CWA320 Funding</th>
<th>IRLNEP Partner Match (Minimum)</th>
<th>Total Program Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FI-1 (High)</td>
<td>IRLNEP CCMP and Program Management</td>
<td><strong>IRL CCMP Revision and Implementation:</strong> Funding supports continuation of a technical support contract for revision of the 2008 IRLNEP Comprehensive Conservation and Management Plan (CCMP). The primary output is delivery of a draft revised CCMP in fiscal year 2017-2018. The primary outcome of this effort will be a CCMP that is visionary, actionable, adaptable, comprehensive and responds to the changes that have occurred in the IRL since the 2011 “superbloom”. Technical components include lagoon-wide data synthesis; reprioritization of action plans; addition/expansion of new action plans; and identification of remediation projects and projected costs.</td>
<td>$100,000.00</td>
<td>$ -</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>2</td>
<td>CC-1 (Medium) CC-2 (Medium) CC-3 (Medium)</td>
<td>Ecosystem Status &amp; Trends</td>
<td><strong>IRL Resilient Coastal Community Planning:</strong> These EPA Section 320 grant funds support: 1. Conducting a lagoon-wide, risk-based vulnerability assessment with full participation of the IRLNEP newly reorganized Management Conference; 2. Integrating findings from the vulnerability assessment into the IRLNEP CCMP revision process and integrate climate change considerations in all action plan revisions and additions; and 3. Developing a IRLNEP Summary Report of the findings and process to better inform IRLNEP Management Conference participants, stakeholders citizens and policy makers.</td>
<td>$25,000.00</td>
<td>$ -</td>
<td>$25,000.00</td>
</tr>
<tr>
<td>3</td>
<td>CC-1 (Medium) CC-2 (Medium) CC-3 (Medium)</td>
<td>Ecosystem Status &amp; Trends</td>
<td><strong>IRL Resilient Coastal Community Planning Phase II:</strong> This project will allow the IRLNEP to follow the remaining 5 steps of the 10 step climate change adaptation process as presented in the U.S. EPA’s “Being Prepared for Climate Change” workbook. The available climate change and sea level rise vulnerability data will be synthesized and integrated into the IRL CCMP revision process. A comprehensive final IRL climate change vulnerability and adaptation plan for how to address the top high risks will be developed, reviewed through the IRLNEP Management Conference and presented to the IRL Council for adoption as part of the CCMP.</td>
<td>$52,050.00</td>
<td>$ -</td>
<td>$52,050.00</td>
</tr>
<tr>
<td>4</td>
<td>PIE-1 (High) PIE-2 (High) Pie-4 (High)</td>
<td>Program Management Ecosystem Status &amp; Trends</td>
<td><strong>IRLNEP Program Communication:</strong> Funding supports implementation of the IRLNEP FY2017-2018 communications strategy. Outputs will include: New website content development, New brand strategic communications; IRL calendar, IRLNEP Annual Report; new print collaterals; social media campaign. Includes grant required allocation for travel - $10,000.</td>
<td>$100,000.00</td>
<td>$ -</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>5</td>
<td>SR-1 (High) SR-3 (High) MON-3 (Medium) AD-1 (Medium) BAH-1-2-3 (High)</td>
<td>Ecosystem Status &amp; Trends</td>
<td><strong>IRL Science and Technology (RFP Partner Projects):</strong> Funding supports a competitive grants program through issuance of a Request for Proposals (RFP) that will focus on FY 2016-2017 priority actions identified by the IRLNEP Management Conference: Science and/or technology that enhances our understanding of nutrient reduction actions, nutrient cycling; nutrient relationships to algal blooms, nutrient cycling in muck seagrasses and filter feeders, human and wildlife health harmful algal blooms</td>
<td>$300,000.00</td>
<td>$75,000.00</td>
<td>$375,000.00</td>
</tr>
<tr>
<td>Activity</td>
<td>CCMP Action</td>
<td>IRLNEP Core Elements</td>
<td>Program Title and Abstract</td>
<td>CWA320 Funding</td>
<td>IRLNEP Partner Match (Minimum)</td>
<td>Total Program Cost</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>----------------------</td>
<td>----------------------------</td>
<td>----------------</td>
<td>-------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>6</td>
<td>PIE-1 (High) PIE-2 (High) Pie-4 (High) FSD-10 (High) FSD-11 (High)</td>
<td>Technical Assistance and Capacity Building</td>
<td><strong>IRL Public Education and Engagement</strong> (RFP Partner Projects): Funding will be used to support a competitive grants program through issuance of a Request for Proposals (RFP). The IRLNEP Management Conference identified the following priorities for FY 2017-2018: Nutrient reduction implementation through knowledge and behavior change; efforts that coordinate lagoon-wide consistency in messaging; citizen engagement in habitat restoration; IRL ecosystem health assessment. Outputs will be strategic program implementation. Outcome desired is enhanced citizen knowledge, engagement and behavior change.</td>
<td>$100,000.00</td>
<td>$25,000.00</td>
<td>$125,000.00</td>
</tr>
<tr>
<td>7</td>
<td>PS-4 (High) OSDS-3 (High) OSDS-4 (High) FSD-1 (High) FSD-6 (HIGH) FSD-7 (High) FSD-13 (High) SG-1 (High) W-1-4-5-6-7 (High)</td>
<td>Ecosystem Restoration and Protection Projects</td>
<td><strong>Nutrient Reduction and Habitat Restoration Project Implementation</strong> (RFP Partner Projects): Funding will be used to support a competitive grants program and RFP. The IRLNEP identified several areas of priority for funding FY 2017-2018 projects: 1. Nutrient Reduction projects; 2. Habitat Restoration projects (filter feeders and seagrasses); 3. Living Shoreline restoration. Outputs will be quantified on amount of nutrients reduced or amount of habitat restored.</td>
<td>$577,050.00</td>
<td>$577,050.00</td>
<td>$577,050.00</td>
</tr>
</tbody>
</table>

**Subtotal** | $677,050.00 | $677,050.00 | $1,354,100.00 |
Executive Director, Duane E. De Freese, Ph.D.

Duties and Responsibilities:

- Responsible for ensuring the efficient and fiscally-responsible operation of the IRL Council and the Indian River Lagoon National Estuary Program
- Supervises and oversees the managers of technical projects, public education and outreach initiatives, and program administration functions
- Responsible for updating the program’s finance strategy and for developing sustainable funding sources from governmental and private sources
- Responsible for elevating and maintaining the position of the IRLNEP to further increase the commitment to, and investment in, Indian River Lagoon management and restoration activities
- Oversees implementation and updating of the CCMP by directing program office activities and management conference engagement
- Acts as the principal spokesperson for the IRL Council

Chief Operating Officer, Belhaim “Frank” Sakuma, Jr.

Principal Duties and Responsibilities:

- Oversees all aspects of the day-to-day operations of the IRL Council and IRLNEP
- IRLNEP project management and program operations
- HR manager, in coordination with Legal, keeping in compliance with our Personnel Policy
- Budget director, coordinating support for budget development and compliance, Grant Administration
- Coordinated Board support on matters outside the ED realm, works with Legal in keeping Board in the Sunshine
- Supports STEMAC/CAC/Finance/other committees, with coordination of other staff assignments
- Meets with and participates in various advisory boards and committees

Administrative Assistant & Communications Director, Kathleen Hill

Principal Duties and Responsibilities:

- Comprehensive administrative and program management support for the IRL Council/IRL NEP office
- Management, direction and message alignment for all internal and external communications
- IRL NEP Management Conference coordination and IRL Council/IRL NEP office liaison to committees, task forces and volunteers
- Supports STEMAC/CAC/Finance/other committees, with coordination of other staff assignments
- Meets with and participates in various advisory boards and committees
### Activity 1: Top Ranked RFP Respondent(s)
**Program Title and Abstract:** IRL CCMP Revision and Implementation: Funding supports continuation of a technical support contract for revision of the 2008 IRLNEP Comprehensive Conservation and Management Plan (CCMP). The primary outcome of this effort will be a CCMP that is visionary, adaptable, comprehensive and responds to the changes that have occurred in the IRL since the 2011 "superbloom". Technical components include lagoon-wide data synthesis; reprioritization of action plans; addition/expansion of new action plans; and identification of remediation projects and projected costs.

**CWA320 Funding FY 2017-2018:** 100,000

**Program Deliverables:** Facilitated stakeholder meetings throughout the IRL watershed; delivery of a draft revised CCMP.

**Program Start Date/Completion Date:** 10/01/2017- 9/30/2018

### Activity 2: Top Ranked RFP Respondent
**Program Title and Abstract:** IRL Resilient Coastal Community Planning: These EPA Section 320 grant funds support: 1. Conducting a lagoon-wide, risk-based vulnerability assessment with full participation of the IRLNEP newly reorganized Management Conference; 2. Integrating findings from the vulnerability assessment into the IRLNEP CCMP revision process and integrate climate change considerations in all action plan revisions and additions; and 3. Developing a IRLNEP Summary Report of the findings and process to better inform IRLNEP Management Conference participants, stakeholders, citizens and policy makers.

**CWA320 Funding FY 2017-2018:** 25,000

**Program Deliverables:** Risk-based vulnerability assessment; integration of findings into revised CCMP; final summary report.

**Program Start Date/Completion Date:** 10/01/2017- 9/30/2018

### Activity 3: Top Ranked RFP Respondent
**Program Title and Abstract:** IRL Resilient Coastal Community Planning Phase II: This project will allow the IRLNEP to follow the remaining 5 steps of the 10 step climate change adaptation process as presented in the U.S. EPA’s “Being Prepared for Climate Change” workbook. The available climate change and sea level rise vulnerability data will be synthesized and integrated into the IRL CCMP revision process. A comprehensive final IRL climate change vulnerability and adaptation plan for how to address the top high risks will be developed, reviewed through the IRLNEP Management Conference and presented to the IRL Council for adoption as part of the CCMP.

**CWA320 Funding FY 2017-2018:** 52,050

**Program Deliverables:** IRL climate change vulnerability and adaptation plan.

**Program Start Date/Completion Date:** 10/01/2017- 9/30/2018

### Activity 4: IRLNEP
**Program Title and Abstract:** IRLNEP Program Communication: Funding supports implementation of the IRLNEP FY2017-2018 communications strategy. Outputs will include: New website content development, New brand strategic communications; IRL calendar, IRLNEP Annual Report; new print collaterals; social media campaign. Includes grant required allocation for travel - $10,000.

**CWA320 Funding FY 2017-2018:** 100,000

**Program Deliverables:** Outputs will include: new website and associated content development, development of branded print and web documents for public distribution, development of branded meeting and event materials (table covers, pop-up tabletop displays, etc.), updated strategic communications plan, production of an annual report and annual calendar, implementation of new social media strategies and use of expanded social media platforms.

**Program Start Date/Completion Date:** 10/01/2017- 9/30/2018

### Activity 5: Top Ranked RFP Respondent(s)
**Program Title and Abstract:** IRL Science and Technology: (RFP Partner Projects) Funding supports a competitive grants program through issuance of a Request for Proposals (RFP) that will focus on FY 2016-2017 priority actions identified by the IRLNEP Management Conference: Science and/or technology that enhances our understanding of nutrient reduction actions, nutrient cycling; nutrient relationships to algal blooms, nutrient cycling in muck seagrasses and filter feeders, human and wildlife health, harmful algal blooms.

**CWA320 Funding FY 2017-2018:** 300,000

**Program Deliverables:** Outputs of funded projects will include science-driven and/or new technology projects that support management and/or monitoring actions for habitat restoration, nutrient cycling/reduction, increased seagrass coverage, increased population of filter feeders, muck removal/remediation, improved human and wildlife health, reduction of harmful algal blooms, or enhanced knowledge about nutrient driven algal blooms. Short term outcomes will be improved scientific knowledge that supports management tools for IRL restoration. Long term outcomes are improved water and habitat quality.

**Program Start Date/Completion Date:** 10/01/2017- 9/30/2018

### Activity 6: Top Ranked RFP Respondent(s)
**Program Title and Abstract:** IRL Public Education and Engagement (RFP Partner Projects): Funding will be used to support a competitive grants program through issuance of a Request for Proposals (RFP). The IRLNEP Management Conference identified the following priorities for FY 2017-2018: Nutrient reduction implementation through knowledge and behavior change; efforts that coordinate lagoon-wide consistency in messaging; citizen engagement in habitat restoration; IRL ecosystem health assessment. Outputs will be strategic program implementation. Outcome desired is enhanced citizen knowledge, engagement and behavior change.

**CWA320 Funding FY 2017-2018:** 100,000

**Program Deliverables:** Outputs will include programs that support nutrient reduction via behavior change, and citizen engagement activities associated with habitat restoration. Outcomes include behavior change, restored habitat, expanded citizen engagement and understanding.

**Program Start Date/Completion Date:** 10/01/2017- 9/30/2018
### Nutrient Reduction and Habitat Restoration Project Implementation

Funding will be used to support a competitive grants program and RFP. The IRLNEP identified several areas of priority for funding FY 2017-2018 projects: 1. Nutrient Reduction projects; 2. Habitat Restoration projects (filter feeders and seagrasses); 3. Living Shoreline restoration. Outputs will be quantified on amount of nutrients reduced or amount of habitat restored.

Outputs will include project activities that reduce nutrients, restore habitat, and restore living shoreline and must provide specific documentation of amount of habitat restored and/or amount of nutrients or other pollutants reduced. Outcomes will be improved water quality, improved habitat, and restored shoreline.

<table>
<thead>
<tr>
<th>7</th>
<th>Top Ranked RFP Respondent(s)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PS-4 (High)</td>
<td>OSDS-3 (High)</td>
<td>OSDS-4 (High)</td>
<td>FSD-1 (High)</td>
</tr>
<tr>
<td></td>
<td>FSD-6 (HIGH)</td>
<td>FSD-7 (High)</td>
<td>FSD-13 (High)</td>
<td>SG-1 (High)</td>
</tr>
<tr>
<td></td>
<td>W-1-4-5-6-7 (High)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total** 677,050

**Dates:** 10/01/2017 - 9/30/2018
Outcomes:

- Clean Water Act implementation
- EPA Strategic Plan implementation
- Support of EPA Non-Point Source Program
- Improved water quality and shoreline habitats
- Restored oyster beds
- Increased use of native plants
- Increased Program visibility
• Increased wetland acreage restored and or protected
• Increased public awareness and stewardship
• Continued watershed-wide coordination and networking
• Increased knowledge of living resources
• Increased knowledge of IRL ecological health
Section B.2 Proposed New and Ongoing Project Reporting Requirements

Activity 1

CCMP/Work Plan Goal:
F-1 Conserve, protect, restore and manage the finfish and shellfish resources in the Indian River Lagoon region. Priority- High.
FI-2 Continue measurement of progress of CCMP implementation activities. Priority – High.
DIM-1 Continue projects and strategies related to data and information management. Priority – High.

Project/Activity Name:
IRL Comprehensive Conservation and Management Plan (CCMP) Revision and Implementation.
Lead Contractor: Top Ranked RFP Respondent(s).

Project/Activity Purpose and Description: (indicate as proposed or ongoing)
This project is Ongoing. The Contractor will:
1. Develop a database of Indian River Lagoon restoration projects underway and proposed projects (with no or partial funding) within 6 broad categories of IRL CCMP interest: 1. Stormwater projects; 2. Groundwater projects (including septic conversions and other groundwater remediation projects); 3. Muck removal projects; 4. Habitat restoration projects (including living shorelines, wetlands, seagrasses, filter feeders and filter marshes); 5. Education and outreach projects; and 6. Monitoring and research projects.
2. Provide data synthesis to focus on nutrient load quantification and reduction from all sources. Data synthesis and GIS map development to graphically present projects underway.
3. Facilitate Advisory Committees, Management Board, and Public workshop meetings for CCMP revisions, develop meeting notes and prepare post-meeting reports.
4. Develop a draft revised CCMP for full Management Conference review/edit/approval.

Budget: $100,000 NEP funding.

Outcomes: (report anticipated and/or completed accomplishments)
Short-term: Improved IRLNEP Management Conference Coordination and focus with a clear path forward for the next five program years.
Intermediate: Implementation of prioritized projects and programs in support of the IRLNEP goals.
Long-term: Restoration of IRL shoreline, enhanced public participation in restoration activities, and enhanced habitat and water quality.

CWA implementation information: This project addresses the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
Activity 2

CCMP/Work Plan Goal:
CC-1 Track state, national and international actions and research concerning climate change issues that affect the Indian River Lagoon. Priority – Medium.
CC-2 Support Indian River Lagoon-based research that considers and integrates global climate change issues and seeks practical scientific, technological and public policy solutions. Priority – Medium.
CC-3 Provide information to local governments and residents of the Indian River Lagoon region about impacts of climate change and actions they can take to reduce these impacts. Priority-Medium.

Project/Activity Name:
IRL Resilient Coastal Community Planning.
Lead Contractor: Top Ranked RFP Respondent(s).

Project/Activity Purpose and Description: (indicate as proposed or ongoing)
This project is Proposed. The Contractor(s) will:
1. Conduct a lagoon-wide, risk-based vulnerability assessment with full participation of the IRLNEP newly reorganized Management Conference;
2. Integrate findings from the vulnerability assessment into the IRLNEP CCMP revision process and integrate climate change considerations in all action plan revisions and additions; and
3. Develop a IRLNEP Summary Report of the findings and process to better inform IRLNEP Management Conference participants, stakeholders, citizens and policy makers.

Budget: $25,000 NEP Funding.

Outcomes: (report anticipated and/or completed accomplishments)

Short-term: Improved understanding of climate change and sea level rise impacts to successful implementation of the IRL CCMP.

Intermediate: Improvement in adaptive management of CCMP action plans.

Long-term: CCMP actions which evolve according to the best science at the time, for improved IRL health.

CWA implementation information:
This project addresses elements of the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
Activity 3

CCMP/Work Plan Goal:
CC-1 Track state, national and international actions and research concerning climate change issues that affect the Indian River Lagoon. Priority – Medium.
CC-2 Support Indian River Lagoon-based research that considers and integrates global climate change issues and seeks practical scientific, technological and public policy solutions. Priority – Medium.
CC-3 Provide information to local governments and residents of the Indian River Lagoon region about impacts of climate change and actions they can take to reduce these impacts. Priority-Medium.

Project/Activity Name:
IRL Resilient Coastal Community Planning Phase II.
Lead Contractor: Top Ranked RFP Respondent(s).

Project/Activity Purpose and Description: (indicate as proposed or ongoing)
This project is Proposed. The Contractor(s) will:
Follow the remaining 5 steps of the 10-step climate change adaptation process as presented in the U.S. EPA’s “Being Prepared for Climate Change” workbook. The available climate change and sea level rise vulnerability data will be synthesized and integrated into the IRL CCMP revision process. A comprehensive final IRL climate change vulnerability and adaptation plan for how to address the top high risks will be developed, reviewed through the IRLNEP Management Conference and presented to the IRL Council for adoption as part of the CCMP. Conduct a lagoon-wide, risk-based vulnerability assessment with full participation of the IRLNEP Management Conference.

Budget: $52,050 NEP Funding.

Outcomes: (report anticipated and/or completed accomplishments)

Short-term: Improved understanding of climate change and sea level rise impacts to successful implementation of the IRL CCMP.

Intermediate: Improvement in adaptive management of CCMP action plans.

Long-term: CCMP actions which evolve according to the best science at the time, for improved IRL health.

CWA implementation information:
This project addresses elements of the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
Activity 4

CCMP/Work Plan Goal:
PIE-1 Implement and expand public involvement and education projects or programs. Priority- High.
PIE-2 Develop, implement and refine a communications plan to inform stakeholders and government officials about the resources of the Indian River Lagoon, the economic and ecological value of these resources and threats to the continued viability of these resources. Priority- High.
PIE-4 Increase public and governmental involvement in activities designed to protect and restore the resources of the Indian River Lagoon. Priority- High.

Project/Activity Name:
IRLNEP Program Communication.
Lead Contractor: IRLNEP.

Project/Activity Purpose and Description: (indicate as proposed or ongoing)
This project is Proposed. IRLNEP will develop and implement the IRLNEP FY2017-2018 communications strategy. Outputs will include: New website content development, new brand strategic communications; IRL calendar; IRLNEP Annual Report; new print collaterals; full social media campaign. Includes grant required allocation for travel - $10,000.

Budget: $100,000 NEP Funding.

Outcomes: (report anticipated and/or completed accomplishments)

Short-term: Increased knowledge of the IRL NEP, the IRL system, the challenges to restoration, and actions citizens can take in restoring the IRL to health.

Intermediate: Behavior change by individuals with direct impact on pollutant loadings to the IRL, and increased habitat and water quality restoration.

Long-term: The potential to increase treatment efficiency and positively affect water quality, specifically nitrogen treatment, by retrofitting denitrification beds into existing infrastructure at a cost less than land acquisition and construction of new projects.

CWA implementation information:
This project addresses the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
**Activity 5**

**CCMP/Work Plan Goal:**
SR-1 Create an Indian River Lagoon Science and Management Working Group charged with the development and implementation of a scientific research vision and implementation strategy for the Indian River Lagoon. This strategy should be consistent with and complimentary to statewide research strategies identified by the Florida Coastal and Ocean Resources Council and national coastal priorities. Priority – High.
SR-3 Expand and diversify funding for scientific research in the Indian River Lagoon. Priority – High.
MON-3 Provide support for the development of a triennial report on the state of the Indian River Lagoon. Priority – Medium.
AD-1 Determine the impacts of atmospheric deposition of pollutants on the water quality and resources of the Indian River Lagoon. Priority – Medium.
BAH-1 Implement a lagoon-wide, multi-species, multi-disciplinary approach to determine the status of emerging infectious diseases in the Indian River Lagoon, assess trends and identify underlying causes. Priority – High.
BAH-2 Continue support of the Biotoxin and Aquatic Animal Health Working Group and the goals of this working group. Priority – High.
BAH-3 Complete or continue the projects identified in the Preliminary Strategic Plan for Algal Toxins and Aquatic Animal Health in the Indian River Lagoon. Priority – High.

**Project/Activity Name:**
Indian River Lagoon Science and Technology.

**Lead Contractor:** Top Ranked RFP Respondent(s).

**Project/Activity Purpose and Description:** (indicate as proposed or ongoing)
This project is proposed. Funding supports a competitive grants program through issuance of a Request for Proposals (RFP) that will focus on FY 2016-2017 priority actions identified by the IRLNEP Management Conference: 1. Science and/or technology that enhances our understanding of nutrient reduction actions, nutrient cycling; nutrient relationships to algal blooms, nutrient cycling in muck seagrasses and filter feeders, human and wildlife health, harmful algal blooms.

**Budget:** $300,000 NEP Funding, $75,000 match from grant recipient(s).

**Outcomes:** (report anticipated and/or completed accomplishments)

**Short-term:** Outputs of funded projects will include science-driven and/or new technology projects that support management and/or monitoring actions for habitat restoration, nutrient cycling/reduction, increased seagrass coverage, increased population of filter feeders, muck removal/remediation, improved human and wildlife health, reduction of harmful algal blooms, or enhanced knowledge about nutrient driven algal blooms.

**Intermediate:** Improved scientific knowledge that supports management tools for IRL restoration.

**Changes (+/-) in Pressure Targets:** Projected change is positive as the projects support efforts to attain and maintain water and sediment of sufficient quality to support a healthy estuarine lagoon system.

**Long-term:** Long term outcomes are improved water and habitat quality.

**CWA implementation information:**
This project addresses the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
Activity 6

**CCMP/Work Plan Goal:**
PIE-1 Implement and expand public involvement and education projects or programs. Priority- High.
PIE-2 Develop, implement and refine a communications plan to inform stakeholders and government officials about the resources of the Indian River Lagoon, the economic and ecological value of these resources and threats to the continued viability of these resources. Priority- High.
PIE-4 Increase public and governmental involvement in activities designed to protect and restore the resources of the Indian River Lagoon. Priority- High.
FSD-10 Encourage the proper use of fertilizers, herbicides, pesticides and reuse water. Priority- High.
FSD-11 Educate residents and property owners about the impacts of freshwater and stormwater discharges on the Indian River Lagoon and what they can do to reduce these impacts. Priority- High.

**Project/Activity Name:**
IRL Public Education and Engagement.
Lead Contractor: Top Ranked RFP Respondent(s).

**Project/Activity Purpose and Description:** (indicate as proposed or ongoing)
This project is proposed. Funding will be used to support a competitive grants program through issuance of a Request for Proposals (RFP). The IRLNEP Management Conference identified the following priorities for FY 2017-2018: Nutrient reduction implementation through knowledge and behavior change; efforts that coordinate lagoon-wide consistency in messaging; citizen engagement in habitat restoration; IRL ecosystem health assessment.

**Budget:** $100,000 NEP Funding, $25,000 match from grant recipients.

**Outcomes:** (report anticipated and/or completed accomplishments)

- **Short-term:** Strategic education and engagement program implementation.
- **Intermediate:** Enhanced citizen knowledge, engagement and behavior change.
- **Changes (+/-) in Pressure Targets:** Positive as the number of oyster reefs in the southern IRL become established and provides enhanced estuarine habitat and improvements to adjacent surface water quality.
- **Long-term:** Long term outcomes are improved water and habitat quality.

**CWA implementation information:**
This project addresses the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
Activity 7

CCMP/Work Plan Goal:

PS-4 Investigate and recommend funding alternatives for the upgrading of WWTPs. Priority – High.

OSDS-3 Undertake further studies of OSTDSs in the region to quantify the impacts of OSDSs on the Indian River Lagoon and to further quantify the extent of “problem” and “potential problem” areas. Priority – High.

OSDS-4 Promote the connection of areas served by OSTDS to central sewer service or, where connection to central sewer is not feasible, promote the development and use of alternative or advanced OSTDS technologies offering improved treatment in areas identified in the IRL SWIM studies as “problem” or “potential problem” for OSTDS. Identify and publicize potential funding sources that could be used to connect areas served by OSTDS to central sewer or support the development and use of alternative or advanced OSTDS technologies. Priority – High.

FSD-1 Complete or continue the diagnostic, management or pilot projects related to stormwater or freshwater discharges being planned or undertaken by federal, state, regional and local governments. Priority - High.

FSD-6 Reduce the impacts of muck on the Indian River Lagoon. Priority – Medium.

FSD-7 Amend local government comprehensive growth management plans and land development regulations to incorporate the goals, objectives and actions found in the IRLCCMP. Priority – High.

FSD-13 Upgrade existing urban and agricultural stormwater systems to reduce pollutant loadings to the Indian River Lagoon. Priority - High.

SG-1, Implement a program of protection, restoration and management activities needed to maintain, protect and restore the seagrass/SAV community of the Indian River Lagoon. – Priority - High.

W-1 Implement programs that protect the ecological services of wetlands. Priority – High.

W-4 Implement innovative programs and incentives supporting wetlands protection and management on privately owned lands. When necessary, acquire ownership or control of crucial wetlands. Priority – High.


W-6 Continue projects to restore shorelines. Priority – High.

W-7 Promote the removal of trash and litter from wetlands, shorelines and islands. Priority – High.

Project/Activity Name:
Nutrient Reduction and Habitat Restoration Project Implementation.

Lead Contractor: Top Ranked RFP Respondent(s).

Project/Activity Purpose and Description: (indicate as proposed or ongoing)
This project is proposed. This match funding to the EPA grant is from the IRL Council funded cost share grants program and RFP. The IRLNEP identified several areas of priority for funding FY 2017-2018 projects: 1. Nutrient Reduction projects; 2. Habitat Restoration projects (filter feeders and seagrasses); 3. Living Shoreline restoration. Outputs will be quantified on amount of nutrients reduced or amount of habitat restored.

Budget: $0 NEP Funding, $577,050 in match funding from the IRL Council.

Outcomes: (report anticipated and/or completed accomplishments)

Short-term: Nutrient reduction projects; habitat restoration projects; living shoreline projects.

Intermediate: Reduction of nutrients into the IRL; increased and restored IRL habitat; increased areas of living shoreline.
Changes (+/-) in Pressure Targets: Projected change is positive as the projects support efforts to attain and maintain water, sediment and habitat of sufficient quality to support a healthy estuarine lagoon system.

Long-term: Long term outcomes are improved water and habitat quality.

CWA implementation information: This project addresses the following core objectives of the Clean Water Act: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program, and (7) protecting Large Aquatic Ecosystems.
Section C. Completed Major Projects/ Activities

Previous Years Reporting

C.1 Summary of IRLNEP and Management Conference Accomplishments for 2016-2017

The IRLNEP had another successful year in FY 2016-2017 implementing its CCMP. Staff administered the Program, including 23 high priority CCMP implementation projects (please see Section C.2 of this Work Plan).

The IRLNEP Management Conference has transitioned successfully to the leadership of the IRL Council. Currently, 100 members of the Management Conference have been appointed to the Management Board, Citizens’ Advisory Committee and Science, Technology, Engineering and Modeling (STEM) Advisory Committee. These individuals, representing over 65 agencies, local governments, citizen’s organizations and individuals have been actively managing Program activities since Spring, 2016 and are now fully engaged in all IRLNEP activities.

The following are projects that have been initiated and/or completed by members of the IRL Council and Management Board in FY 2016-2017.

U.S. FISH AND WILDLIFE SERVICE, MERRITT ISLAND NATIONAL WILDLIFE REFUGE (MINWR)

Refuge Boating Safety and Resource Protection:
Two Federal Wildlife Officers spent over 250 hours patrolling the Indian River Lagoon (IRL) by boat and enforcing State, Federal and U.S. Coast Guard regulations. At least five hours each workday were spent checking bank anglers, totaling over 2,500 hours annually. The officers also worked details with the Florida Fish and Wildlife Conservation Commission (FWC) for marine sanitation, BUI, resource checks, and navigation/safety checks. Over 200 citations and warnings were issued for fishing violations, 50 citations and warnings were issued for boating violations and 30 citations and warnings were issued for manatee zone violations. These Federal Wildlife Officers typically work as many as five search and rescues each year on the IRL. Boating hours have dropped since last year while bank fishing compliance check hours have increased. Poll and Troll Zone (PTZ) complaints have increased markedly and as a result, PTZ citations doubled from the last year. ($100K)

Management of Impounded Marsh and Environmentally Sensitive Lands:
MINWR manages 26,000 acres of impounded wetlands (55 impoundments; 140 miles of levees; 430 water control structures) to enhance waterfowl and migratory bird food production, control mosquito breeding, and enhance healthy salt marsh habitat. Water levels and salinity are monitored and managed. Staff monitored the productions of submerged aquatic vegetation in the impoundments managed for wintering waterfowl. Management actions are conducted in coordination with conservation initiatives such as the North American Waterfowl Management Plan, U.S. Shorebird Plan, and North American Waterbird Conservation Plan. The Refuge continues to conduct an experiment in subsided marsh restoration in cooperation with the SJRWMD and Brevard County Mosquito Control. Phase II of the subsided marsh restoration
project in the T-10-D impoundment has begun to remove organic sediment from a 40-acre pond and use it to rebuild 16 acres of eroded marsh. (50K)

The refuge monitors and maps invasive non-native plant infestations to track effectiveness of herbicide treatments and ensure follow-up treatments. Staff, volunteers and contractors treated 1,350 acres of exotic plants ($350K).

Prescribed fire is the primary habitat management tool for coastal scrub habitat. Between October 2015 and September 2016, 16,800 acres were prescribed burned on MINWR ($350K).

Approximately 2,500 feral hogs were removed from the refuge by staff and permitted trappers ($35K).

Endangered and Threatened Species Management:
Population monitoring was conducted on several federal threatened and endangered species: Florida scrub jays, sea turtles, and Southeastern beach mice. Scrub jays were monitored to determine their response to the prescribed burn program. Beach mice were surveyed to determine the presence/absence of the species across the coastal landscape and correlate with desired habitat conditions (partners: NPS, NASA, Air Force). This past summer, 1,863 loggerhead, 73 green and 5 leatherback sea turtle nests were counted along the six miles of refuge beach. Post emergence analyses were conducted to determine hatching success. Predation of nests was monitored and predator control measures implemented to minimize nest predation. ($155K)

Public Involvement and Education:
MINWR hosts over 1 million visitors each year. The refuge conducts environmental education programs for local schools and on-site and off-site outreach programs. Many of the visitor activities/programs highlight the IRL. Interpretive signs at boat ramps, the Manatee Observation Deck, and Haulover area provide information to visitors about the IRL.

Cleanup Projects:
The Refuge has an “Adopt an Area” program with 20 groups conducting four cleanups per year at designated sites. Additionally, 5 scout groups conducted clean ups at Dummitt Cove and Haulover Canal. Volunteers empty trash cans at five refuge boat ramps, twice each week ($10K). The refuge conducted a shoreline clean-up at Haulover Canal in February which attracted about 80 volunteers. The refuge maintains monofilament containers at seven locations on the Refuge.

Interpretive Programs, Workshops and Festivals:
In partnership with Anglers for Conservation, the Refuge hosted a “Hook Kids on Fishing” program where approximately 40 children and their family members learned fishing techniques and ethics. Refuge staff and volunteers provide manatee programs at the Manatee Observation Deck and Bairs Cove boat ramp throughout the year. Other interpretive programs include presentations about shorebirds and recreational fishing in the IRL. ($5K).
Projects:
The Refuge replaced the Bio Lab boat ramp with a push-slab concrete ramp and adjacent dock. An ADA accessible kayak launch was also installed. The new facility was opened to the public on October 29, 2016 ($160k). Construction on replacement boat ramp at Beacon 42 will commence in May 2017, with completion expected by the end of summer 2017 ($255K). Merritt Island National Wildlife Refuge entrance fees and Florida Inland Navigation District’s Cooperative Assistance Program jointly funded the construction of these boat ramps.

Environmental Education:
Approximately 3,000 students participate in various environmental education programs each year. A total of 12 environmental educational programs pertaining to the IRL will be presented for the time frame of October 2016 through May 2017. Participating youth come from public and private schools as well as scouting organizations. Program topics include seining, water quality, mangroves, and manatees. In addition, Brevard Zoo conducted Lagoon Quest Programs at the Refuge’s Sendler Education Pavilion which is located along the shoreline of the lagoon. This program involves 4th grade students participating in seining and water quality activities. The Refuge has initiated planning for a new 8,100 square foot ($4.2 million) Community Conservation Education Center, which will serve as a coastal nature and conservation education center. Construction is expected to start in 2018.

Signs:
The Refuge maintains signage for the Poll/Troll Zone in Mosquito Lagoon, IRL informational signage at four boat ramps, Bird Island Interpretive signs, Banana River Manatee Zone signs and kiosks located at Haulover Canal and manatee and IRL signs at the Manatee Observation Deck. In addition, manatee, sea-grass and IRL brochures are given out at the refuge visitor center and at kiosks located at several locations on the Refuge ($10K).

CANAVERAL NATIONAL SEASHORE- MOSQUITO LAGOON

Boating safety and Resource Protection:
Three Federal Wildlife Officers spent over 300 hours patrolling the Indian River Lagoon (IRL) by boat and enforcing State, Federal and U.S. Coast Guard regulations. The officers also worked with the Florida Fish and Wildlife Conservation Commission (FWC), and local law enforcement for resource checks, navigation/safety checks. Officers assisted State agencies and researchers with rescues of injured and sick manatees and dolphins.

Wetland Restoration:
The University of Central Florida continued oyster restoration on reefs eroded by boat wakes, including known archeological sites. Approximately 1 acre of oyster habitat was restored and continues to conduct monitoring and research on the health of the oysters. In addition 250 meters of living shoreline was installed to prevent erosion and restore wetland habitat. Over 7,000 volunteer hours were documented for these activities.
Funding in the amount of $275,000 combined from Florida Fish and Wildlife Conservation Commission Invasive Plant Management and National Park Serve Exotic Plant Management was used to treat over 2,000 acres of exotic plants in effort to restore habitat in and along the lagoon.

National Park Service staff from the Inventory and Monitoring group continued wetland SET monitoring at fixed locations in the Park. There is also a sonde that collects continuous water quality data and is downloaded monthly. A five-year vegetation mapping of the 58,000 acres was also conducted.

**Endangered and Threatened Species:**
The Park continued monitoring and protection of state and federally listed species, including scrub jays, beach mice, and sea turtles. Over 5,400 sea turtle nests were deposited on the 24 mile stretch of beach. A region-wide environmental assessment is in process to address predator control for better protection of species.

**Public Education:**
Canaveral National Seashore conducts education programs on a regular basis, including guided canoe and boat tours to educate visitors about the lagoon, habitats, and species. Interpretation staff gives programs on seining and fishing in the lagoon. Guided hikes are offered along trails and at Turtle Mound which is a very important archaeological site. Brochures and information are provided to hundreds of guest on daily basis. The Park had an annual visitation of 1.5 million visitors. Plans are underway to revamp displays at the Visitor Center to focus on lagoon and mangrove habitat. The National Park System celebrated its Centennial and has been providing additional education at more festivals and events. New signs have been installed at the various boat ramps to notify boaters of an App developed by the University of Central Florida to map areas of oyster reefs and other sensitive areas to avoid. A new kayak trail and tour have been added to the south district.

**Clean Up Projects:**
The Park and partners continue to conduct regular clean ups in the lagoon and along the ocean. Many dumpsters of debris have been removed.

**Research Projects:**
NPS collaborates with many universities and partners for monitoring of habitats and wildlife. Research projects included dolphin health assessments and abundance by Hubbs SeaWorld, horseshoe crab behavior and morphology by the University of Florida and Marine Discovery Center, vegetation mapping by the University of Georgia, vegetation monitoring by NASA biologists, and sea turtles. The Park provides housing and logistical support for University of Central Florida and in return valuable data is conducted. Including research on climate change impact on ecosystems, brown tide effect on oyster populations, impounded restoration monitoring, and sediment elevation monitoring. Florida Institute of Technology is conducting an intensive data mining project in an effort to compile all the work being done within Park boundaries. The Park continues to work with state and other partners for water quality, seagrass, manatee, and invertebrate monitoring.
Hurricane Matthew:
The park incurred significant damage to boardwalks and docks. Buildings and other structures continue to be repaired. Several feet of lagoon shoreline was eroded. The park continues to work with UCF to help stabilize.

THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP)
FDEP has staff involved with research and restoration activities benefiting the Indian River Lagoon (IRL) and has contributed funding to local government and other projects designed to improve water quality in the IRL and its tributaries.

Indian River Lagoon Basin
In January 2013, DEP adopted basin management action plans (BMAPs) for the Indian River Lagoon (IRL) stakeholders to implement actions toward achieving the nutrient total maximum daily loads (TMDLs). An annual BMAP update meeting was held in May 2016 to review the BMAP Annual Progress Reports, to present results of the Step 2 Seagrass Compliance Analysis, and to provide several stakeholders an opportunity to discuss their ongoing projects. Based on the results of the seagrass compliance tests, future reductions will now be required of Central IRL BMAP stakeholders.

The next annual meeting will be held during May 2017. During this meeting, DEP will present to the stakeholder’s updates on water quality monitoring results, new and completed projects, a discussion regarding project verification, mapping efforts, and funding.

Research and Modeling:
The Department, in conjunction with the St John’s River Water Management District (SJRWMD), continues seagrass mapping efforts in the lagoon. The department received results for the 2015 Seagrass Mapping in March 2016. The lagoon-wide mapping effort provided an overall picture and trend for the seagrass resources in the IRL. These maps serve as important management tools for obtaining a current inventory of this resource, identifying healthy areas that may deserve special protection efforts, and identifying potential problem areas that require further investigation.

St. Lucie Basin
The department adopted the BMAP for the St. Lucie River and Estuary in May 2013. This plan is a collaborative effort of Martin, Okeechobee, and St. Lucie counties along with multiple cities, water control districts, and other stakeholders. DEP held an annual BMAP update meeting in October 2016 to inform stakeholders of BMAP progress and discuss various projects being implemented by local agencies.

The BMAP Annual Progress Report from December 2016 contained new projects in the BMAP area, assigned load reductions for each, and added the load reductions to the previous year’s total. Stakeholders have been actively engaged in the process and are implementing new and innovative projects around the basin to help improve water quality.

Research and Modeling:
The department, in conjunction with the South Florida Water Management District (SFWMD), has completed an effort to update the St. Lucie Estuary Watershed Model (WaSH Model) to
better meet the needs of the BMAP. This effort includes enhancements to the modeling code, updates to the water quality component, and further model calibration to observed water quality and quantity data. The spatial resolution is improved over the previous WaSH Model and will assist in providing more detailed analyses of how projects can impact water quality. This model will be used in future BMAP implementation efforts to produce allocations and assess projects.

**Lake Okeechobee Basin**

In December 2014, DEP adopted the Lake Okeechobee BMAP to implement restoration efforts, which is impaired for total phosphorus. The BMAP sets a multi-year plan in place for restoration of the lake, and includes over $700 million worth of projects aimed at reducing phosphorus pollution from the surrounding landscape. The BMAP estimates that throughout the first ten years, over 100 metric tons per year of phosphorus will be eliminated from entering the lake. This is a direct result of projects and actions taken by the coordinating agencies and various partners working towards the restoration goal.

The department conducted an annual BMAP update meeting in May 2016 to provide information on various BMAP related activities including significant efforts to revise the Watershed Assessment Model (WAM). The next annual meeting will be held in May 2017.

**Research and Modeling:**

The department, in conjunction with the coordinating agencies implementing the Lake Okeechobee BMAP, is finalizing the updates to the WAM. This update includes incorporation of more recent input data, expansion of the model domain to include the southern sub-watersheds, and refinements to the overall model outputs.

**Project Funding**

The Department has a relatively new Division of Water Restoration Assistance (DWRA) where staff that work with all the various types of potential project funding available through FDEP are housed together (such as the EPA 319 program, the TMDL Grants Program, Legislative Appropriations, and the State Revolving Fund), allowing for better coordination among the various programs. Additionally, the DWRA staff manage the Legislative Appropriations that are provided by the Legislature.

Below is a summary of projects that received funding assistance during the past year, or that are multi-year ongoing projects that received funds through the FDEP, or are managed by the FDEP such as the Legislative Appropriation Funds (in alphabetical order). All of these projects are currently underway or recently received funding through FDEP.

- **Bethune Cookman University** received $494,694.00 of 319 grant funds, with a match of $345,979.00, for a total project cost of $840,673.00 for the “Bethune Cookman University Project”. This project would reduce nonpoint source pollution along the Mosquito Lagoon, a northern sub-lagoon of the IRL system, by transforming turf-grass dominated shorelines and retention ponds into living shorelines of native Florida plants that are known to better filter nonpoint source nutrients. The project will also engage the public and enhance awareness of their role in contribution to best management practices for reducing nonpoint source pollution impacting the system.
• **Brevard County** received $275,000.00 of TMDL grant funds, with a match of $279,328.98, for a total project cost of $554,328.98 for the “**Baffle Box Upgrades Project**”. The project is to retrofit 17 existing first generation Baffle Boxes by installing trash screens that will convert these boxes to second generation Baffle Boxes, located in TMDL boundary areas where screens could effectively be installed above normal water levels inside the boxes (under construction and additional baffle boxes to be converted).

• **Brevard County** received a Legislative Appropriation of $1,000,000 for the “**Brevard County Groundwater Remediation Project**”. A groundwater remediation priority map will be created based on topography, drainage, infrastructure, soils, land use, and groundwater movement that identifies where contamination is likely to be impacting the Lagoon. Samples will be collected for ground-truthing and a report will identify hot spot areas where polluted groundwater is reaching the Lagoon. Funding will also create a volunteer pilot program, implemented to provide septic owners in critical areas with funding assistance to hook up to sewer or upgrade to advanced treatment, and participants would be reimbursed 50% of their cost to upgrade.

• **Brevard County** received a Legislative Appropriation of $41,500,000 for the “**Brevard County Muck Dredging Project**”. Phase One of the Brevard County Muck Dredging project will remove up to approximately 350,000 cubic yards of muck soils from sites within the IRL, the Banana River Lagoon (BRL) and associated tributaries. This dredging project will remove up to 672 tons of total nitrogen and 144 tons of total phosphorous that are contained within the muck deposits. Phase Two will remove approximately 400,000 additional cubic yards of muck soils.

• **Brevard County** received a Legislative Appropriation of $800,000 for the “**Source Reduction and Legacy Load Remediation of Muck in the Indian River Lagoon Project**”. This project is part of an annual multi-million-dollar effort to reduce pollution, remove muck and restore the natural filtration systems of the lagoon. This project strategically targets removing muck-building noxious aquatic weeds at their sources in the contributing watershed, from stormwater treatment and conveyance systems that drain to the IRL. Secondly, this project will characterize and prioritize legacy loads of muck already accumulated in critical areas of the IRL by sediment toxicity testing and producing contaminant level maps. Sub-basin nutrient and muck exchange assessments will be used to prioritize muck remediation in the IRL.

• **Brevard County** received $177,325.61 of 319 grant funds, with a match of $36,771.88, for a total project cost of $214,097.49 for the “**Brevard South Lake (Carpenter Road) Water Quality Retrofit, Carpenter Road Pond Denitrification Bioreactor Project**”. The project will replace the dry retention pond bottom with a bioreactor layer consisting of a 1:1 wood chip and soil mixture, with extensive pre-construction and post-construction monitoring to evaluate this best management practice in an urban setting (under construction).

• **Brevard County** received $273,910.00 of TMDL grant funds, with a match of $273,910.00, for a total project cost of $547,820.00 for the “**C-1 Rediversion Project**”. This project will add two additional pumps to an existing facility to clean and divert flow from the IRL to the
St. Johns River Basin. The pump upgrades, will divert and restore an additional 14 percent of freshwater flow back towards the St. Johns River, further reducing freshwater, nutrient and suspended solid impacts to Turkey Creek and the IRL.

- **Brevard County** received $398,015.00 of 319 and TMDL grant funds, with a match of $188,939.00, for a total project cost of $586,954.00 for the “**Countywide Floating Vegetative Islands Upgrades for Wet Detention Ponds Project**”. There are 28.14 acres of surface water in ten ponds selected for this project. Per the manufacturer’s recommendations, 5% of each pond’s water surface areas, 61,288 square feet total, will be planted with Floating Vegetative Islands (FVIs) to achieve a 20% removal efficiency above and beyond treatment obtained in the pond. FVIs will be planted with several plant species recommended by the manufacturer and secured in deep water areas until harvesting time, when the mats will be pulled to shore and water quality improvements measured.

- **Brevard County** received $591,082.51 of 319 and TMDL grant funds, with a match of $264,480.00, for a total project cost of $855,562.51 for the “**Fleming Grant Wet Detention Pond Project**”. Project involves construction of a 7.6-acre wet detention pond along Fleming Grant Road in southeastern Brevard County and installation of a layer of denitrification bioreactor media to the bottom of the wet detention pond to enhance the treatment of the wet detention pond. A public educational component of this project is included. This project is under construction.

- **Brevard County** received $309,865.00 of TMDL and 319 grant funds, with a match of $261,394.00, for a total project cost of $571,259.00 for the “**Fountainhead Advanced Denitrification System Project**”. The Fountainhead stormwater system is located in a residential area in the City of Melbourne and receives runoff from 234.65 acres of surrounding residential land use. The system discharges through a series of canals leading to the Eau Gallie River with final discharge to the North IRL and through Crane Creek to the Central IRL. Two offline denitrification bioreactor chambers will be installed adjacent to the Fountainhead pond to remove nitrogen and release the treated water back to the pond. Estimated load reduction for TN is 19%.

- **Brevard County** received a Legislative Appropriation of $700,000 for the “**Fresh Water Discharges to the Indian River Lagoon Project**”. This project reduces nitrogen and phosphorus pollution entering the IRL by using innovative, low cost, biological systems to treat groundwater and stormwater. Twenty priority ditches will be retrofitted with denitrification media, and a successful stream-bed treatment design will be adapted to suit the site-specific flow volume, pollutant concentration, confined space and other conditions of each ditch.

- **Brevard County** received $239,500.00 of TMDL grant funds, a Legislative Appropriation of $122,350.00, with a match $127,350.00 for the “**Johnson Jr. High School Pond Retrofit Project**”. The existing 2.8-acre retention pond will be retrofitted with a flow regulator at a fixed depth to drain the pond at a nearly constant flow through a chamber of denitrification and phosphorus sorption media.
Brevard County received a Legislative Appropriation of $272,500.00 for the “Merritt Island Inflow and Infiltration Project”. The on-going project will rehabilitate older portions of the collection system to reduce local neighborhood sewer system overflows surcharging; eliminate infiltration of groundwater via leaking joints or cracked pipes; minimize rainfall runoff entering sewer collection system; minimize treatment plant emergency discharges to IRL caused by plant overloading during storm events; help reduce the hydraulic loading to the treatment plant from the extraneous flows; and improve the overall structural integrity of the pipe. It is anticipated that by implementing this program, the occurrence of sanitary sewer discharges, which adversely affect public health and safety will be reduced.

Brevard County received $484,900.00 in 319 grant funds, a Legislative Appropriation of $71,200.00, with a match of $265,900.00, for a total project cost of $822,000.00 for the “Pines Industrial Pond with Denitrification and Phosphorus Baffle Filters Project”. A 4-acre retention pond will be excavated to intercept two east-west running feeder ditches before they reach the ditch that runs parallel to the railroad tracks. Prior to discharge into the pond, the stormwater will be filtered through an area of natural wetland vegetation. The wetland will act as a natural filter upstream of the retention pond. Near the entrance to the pond, a stainless-steel frame will be constructed with multiple phosphorus removing baffle filters to quickly bind phosphorus entering from the wetland. The enhanced pond system is estimated to reduce TP loads by 101 lbs/yr (80.2%), TN by 801 lbs/yr (98.2%), and Total Suspended Solids (TSS) 46,720 lbs/year (98.9%).

Brevard County received a Legislative Appropriation of $437,000.00 for the “Scottsmoor Denitrification Project”. This project will provide water quality treatment for a 577-acre basin. Untreated stormwater runoff and groundwater from the basin is currently discharged to the North IRL Project Zone A. To reduce nutrient loads, a diversion weir will be constructed to force flows into an offline underground treatment train consisting of a second-generation baffle box with a phosphorus filter, followed by a denitrification bioreactor system.

Brevard County received a Legislative Appropriation of $300,000.00 for the “South Beaches Inflow and Infiltration Project”. The County will make improvements to reduce the inflow and infiltration to the sewer system. The County’s Inflow and Infiltration Program has the objective of reducing the amount of groundwater and rainfall runoff that enters the County's sanitary sewer system. The project will rehabilitate older portions of the sewage collection system, typically consisting of Vitrified Clay Pipe (VCP), by using the Cured-In-Place-Pipe (CIPP) pipe lining method.

Brevard County received $136,000 of 319 grant funds, with a match of $95,324.00, for a total project cost of $231,324.00 for the “South Patrick Drive Baffle Box Denitrification Bioreactor Project”. On each side of South Patrick Drive, just south of Pineda Causeway, large open ditches carry stormwater runoff northward to Patrick Air Force Base and out to the Banana River Lagoon. The ditches convey runoff from 73.9 acres of a mostly untreated drainage basin in unincorporated Brevard County. The denitrifying baffle box will be placed in the ditch, within the road right-of-way, for inline treatment prior to entering the Air Force Base property. This enhanced baffle box system is estimated to reduce TP loads by 48.31 lbs/yr, TN by 243.90 lbs/yr, and TSS by 10,518.03 lbs/year.
Brevard County received a Legislative Appropriation of $800,000.00 for the “Brevard County Inflow and Infiltration Sewer Program”. The County's Inflow and Infiltration Program reduces the amount of groundwater and rainfall runoff that enters the County's sanitary sewer system. The on-going project will rehabilitate older portions of the collection system. Once installed the upgraded pipes will: eliminate infiltration of groundwater via leaking joints or cracked pipes; reduce local neighborhood sewer system overflows caused by inflow and infiltration surcharging; minimize rainfall runoff entering sewer collection system; minimize treatment plant emergency discharges to Indian River Lagoon caused by plant overloading during storm events; help reduce the hydraulic loading of the treatment plant from extraneous flows; and improve the overall structural integrity of the pipe.

Brevard County received a Legislative Appropriation of $300,000.00 for the “Barge Canal Forcemain Project”. The County's objective is to directionally drill approximately 860 linear feet of 24-inch diameter forcemain across the Barge Canal. This forcemain will run parallel to the existing 30-year old 24-inch forcemain crossing the Barge Canal. Having only one forcemain crossing the canal to service 90 percent of the Sykes Creek Regional Wastewater Treatment Facility customers is a possible single point of failure for the sanitary sewer's collection and transmission system south of the Barge Canal. A parallel main will protect customers from a loss of service should the main fail and protect the Barge Canal, which flows to the IRL, from potentially catastrophic environmental impacts.

Brevard County received a Legislative Appropriation of $425,000.00 for the “North Courtenay Parkway Sewer Main Extension Project”. The project will provide sewer infrastructure to North Merritt Island. This sewer main and essential collection structures will preclude the additional growth of hundreds of new septic tanks that pollute ground water to allow the nutrients to migrate to the IRL. This project will eliminate the potential pollution from hundreds of existing and new septic tanks and route the flows to the Sykes Creek Wastewater Treatment Facility. The results will improve the water quality of the IRL.

Brevard County received a CWSRF loan of $40,972,625.00 for the “Brevard County's Wastewater Treatment Facility Expansion Project”. The proposed project consists of the expansion and upgrade of the existing wastewater treatment facilities at the County's South Central Regional Wastewater Treatment Facility. These improvements include the following elements: A new pretreatment/headworks structure and new aerators that will increase the capacity of the existing plant from 5.5 to 6 mgd, a new 3.0 mgd integrated fixed film activated sludge biological treatment unit, two new secondary clarifiers; three Disc filters and retrofit of four Dynasand filters with new Disc filters, a new chlorine contact chamber and transfer structure; a new 1.0 million gallon reuse storage tank with a high service pump station, expansion of the existing sludge handling building and a new belt filter press, and a new 12,000 square foot maintenance facility.

City of Cape Canaveral received a Clean Water State Revolving Fund (CWSRF) Loan of $5,164,812.00 for the “Cape Canaveral Wastewater and Stormwater Upgrades Project”. The project will construct a reclaimed water storage tank and rehabilitate the existing sludge
belt press. It also includes stormwater improvements such as pipe rehabilitation, streetscaping, ditch dredging, as well as the installation of new reinforced concrete pipe.

- **City of Cape Canaveral** received a CWSRF loan of $2,769,700.00 for the “**Cape Canaveral WWTF Upgrades Project**”. The project includes installing a blower and diffusers at the equalization tank, yard piping improvements, replacing the existing aerator at the oxidation ditch, installing mist eliminating panels, dissolved oxygen probes and replacing stairs. It also includes all temporary bypass and internal recycle pumping operations, temporary erosion and sediment control for all areas as detailed on the plans and required by governing authorities. Other restoration activities include asphalt pavement, concrete, sidewalks, curbing and signage.

- **City of Cape Canaveral** received $98,400 of 319 grant funds, with a match of $65,600.00, for a total project cost of $164,000.00 for the “**Banana River Park and Manatee Sanctuary Park Shoreline Restoration Project**”. The Grantee intends to provide park shoreline protection from high wind/wave erosion by providing a combination of coquina rock placement, selective bank planting with use of suitable existing vegetation (mangroves, wire grass, etc.) and enhancement of a top of bank infiltration swale.

- **City of Cape Canaveral** received $598,262.00 of 319 grant funds, and a Legislative Appropriation of $589,000.00 for a total project cost of $1,187,262.00 for the “**Canaveral City Park Exfiltration Project**”. Best Management Practices will be implemented to improve water quality by reducing stormwater pollutant loads to the Banana River Lagoon. The project will include the installation of 4,015 cubic-foot stormwater chambers beneath two outfield areas and one infield area of Canaveral City Park. The contributing area to be treated is 30.3 acres. Upon completion of the stormwater chamber installation activities, the Park will be returned to its original land use.

- **City of Cocoa Beach** received $994,540.00 of 319 and TMDL grant funds, with a match of $1,721,735.00, and a Legislative Appropriation of $800,000.00, for a total project cost of $3,516,275.00 for the “**Stormwater Contaminants on Minuteman Causeway Project**”. Most of the drainage area surrounding the Minuteman Causeway shares a single stormwater outfall. A small portion of Minuteman West discharges to the Banana River Lagoon, through small separate outfalls but close to the major Minuteman outfall. This project will provide treatment for all stormwater flowing from the watershed that is comprised 20.28 acres of urban, densely developed mixed land use. The project will use five major Low Impact Design (LID) best management practices including urban planters/rain gardens, tree wells, exfiltration vaults, pervious pavers and biosorption media. The project is estimated to reduce total phosphorus by 33.4 lb/yr, and total nitrogen by 160.7 lb/yr. The project will include water-quality monitoring and provide public education.

- **City of Cocoa Beach** received a CWSRF loan of $2,845,199.00 for the “**Cocoa Beach Sewer Rehabilitation and Stormwater Improvements Project**”. The sewer rehabilitation portion of this project includes cleaning and televising the laterals and sewer mains, repairing manholes, and repairing or replacing the sewer mains to eliminate excessive infiltration and inflow. The stormwater improvements portion of this project consist of the installation of
state-of-the-art treatment trains. The project watershed sub-basins are along the Minuteman Causeway, which is the main street corridor for the City of Cocoa Beach. All project basins currently discharge untreated stormwater into the Banana River Lagoon. With these improvements, and installing a treatment train, more nitrogen and phosphorus will be removed. Construction almost complete.

- **City of Edgewater** received $159,300.00 of TMDL grant funds, with a match of $166,040.00, for a total project cost of $325,340.00 for the “**Lamont Street-Hubbell Street Stormwater Treatment Improvements Project**”. The project will retrofit Lamont Street and Hubbell Street with storm inlets, exfiltration trenches and a baffle box. The estimated total phosphorus and total nitrogen load reductions are 61 percent and 59 percent, respectively.

- **City of Edgewater** received a CWSRF loan of $336,500.00 for the “**Edgewater Reuse Transmission Expansion Project**”. This project will expand the reclaimed water distribution system. Additionally, a reclaimed storage pond and wetland outfall is proposed to be constructed at the Public Works Facility which will provide wet weather discharge during low irrigation periods. These improvements align with the goals of the City and the St. Johns River Water Management District to protect water quality in the IRL basin.

- **City of Melbourne** received $518,740.00 of 319 grant funds, with a match of $360,480.00, for a total project cost of $879,220.00 for the “**City of Melbourne Autumn Woods Detention Pond Improvements Project**”. This project reduces the City’s nitrogen and phosphorus discharge into the Eau Gallie River and IRL by constructing a wet detention pond at the intersection of an untreated stormwater conveyance system and the Eau Gallie River. The detention pond will restore treatment to areas currently being served by a dysfunctional treatment system and provide detention for additional stormwater in the currently untreated conveyance system.

- **City of Melbourne** received $191,100.00 of TMDL grant funds, with a match of $198,900.00, for a total project cost of $390,000.00 for the “**City of Melbourne South Croton Project**”. This project reduces stormwater pollutant loadings into the North IRL by creating four dry retention basins in a series with a final outfall through a nutrient removal baffle box. The project will also relieve roadway flooding during large storm events and repair erosion in several places along the roadway.

- **City of Melbourne** received $517,050.00 of TMDL grant funds, with a match of $537,950.00, for a total project cost of $1,055,000.00 for the “**Bell and Garfield Stormwater Retrofit Project**”. This project will reduce stormwater pollutant loadings into the North IRL in Brevard County and consists of four nutrient-removal baffle boxes, three of which will contain biologically active media to treat a 206-acre basin. This project serves several neighborhoods that have little stormwater treatment. Estimated load reductions for total phosphorus and total nitrogen are 15.5 percent and 19 percent, respectively.

- **City of Melbourne** received $400,000.00 of TMDL grant funds, with a match of $1,768,800.00, for a total project cost of $2,168,800.00 for the “**Sherwood Park Stormwater Quality Project**”. This project will construct a wet detention pond adjacent to
the Sherwood Park subdivision to provide treatment to a 246-acre basin comprised of three residential subdivisions that currently has no stormwater treatment.

- City of Palm Bay received a Legislative Appropriation of $250,000.00 for the “Palm Bay Basin 1 Stormwater Treatment Project”. This project expands a treatment train that drains a 172-acre watershed servicing the cities of Palm Bay and Melbourne. The drainage system flows through commercial and industrial areas adjacent to an auto salvage yard before directly discharging into the IRL. Treatment components will be installed at existing drainage facilities along NE Victoria Drive and University Blvd E. This project will reduce detrimental effects of untreated stormwater on the IRL.

- City of Palm Bay received a Legislative Appropriation of $400,000.00 for the “Palm Bay Stormwater Treatment at City Marina in High-Tech Corridor Project”. The project will install a stormwater treatment train using multiple technologies to cleanse untreated stormwater flowing from the marina's Bayfront watershed to the IRL. These technologies include nutrient reducing baffle box at the outfall and stormwater conveyance system within roadside swales. The treatment train is estimated to eliminate 89% of total Nitrogen and 78% total Phosphorus entering the IRL from the Bayfront watershed.

- City of Sebastian received $90,000.00 of TMDL grant funds, with a match of $90,000.00, for a total project cost of $180,000.00 for the “Sebastian Presidential Street Load Reduction Project”. The project includes the construction of stormwater drainage systems for two watershed areas. Both systems will include: drainage pipes, shallow grass swale treatment, and a second-generation nutrient-separating baffle box with Bold and Gold filtration media to treat and reduce pollutants before discharging into the Indian River.

- City of Sebastian received $67,000.00 of TMDL grant funds, with a match of $89,000.00, for a total project cost of $156,000.00 for the “Working Waterfront Drainage BMP Project”. The treatment train will include the installation of shallow grassy swales, conveyance drainage pipe, Floc Logs and nutrient baffle boxes with nutrient-removing filters at the outfall. Estimated pollutant load reductions for total phosphorus and total nitrogen are 79.3 percent and 53.7 percent, respectively.

- City of South Daytona received a Legislative Appropriation of $200,000.00 for the “South Daytona Jones Street Stormwater Project”. The City of South Daytona purchased a ½-acre lot adjacent to the City Hall Complex for stormwater treatment and the construction of a stormwater management system. This project includes the construction of a wet detention system for water quality improvements during minor storm events and also includes a simplex stormwater pumping station to aid in the recovery of stormwater on Jones Street during major storm events.

- City of Stuart received $90,000.00 of TMDL grant funds, with a match of $110,000.00, for a total project cost of $200,000.00 for the “East Heart of Haney Creek Wetlands Restoration Project”. The project will regrade 6 acres of exotic-cleared area, create berms and weirs, and restore the eastern third of heart of Haney Creek to native wetlands. Waters
from the 395-acre Eastern Haney Creek watershed will be directed through the restored wetlands before discharge to tidal Haney Creek.

- **City of Stuart** received $150,000.00 of 319 grant funds, with a match of $176,216.61, for a total project cost of $326,216.61 for the “**Poppleton Creek Tidal Wetlands Creation and Restoration Project**”. The project will construct 1.4 acres of created wetlands to connect with Poppleton Creek and restore 2.8 acres of red mangrove wetlands.

- **City of Titusville** received $60,000.00 of 319 grant funds, with a match of $41,720.00 for a total project cost of $101,720.00 for the “**Littoral Zone Vegetation Planting Project**”. The project establishes littoral zone vegetation within three existing stormwater wet detention ponds. The littoral fringe will have two zones consisting of low marsh and high marsh mixes of species. The low marsh littoral species will tolerate saturated and temporarily inundated conditions while the high marsh mix will be planted at higher elevations along the edge of the sites. Shoreline plantings provide an important buffer between upland landscapes and waterbodies by taking up excess phosphorus and nitrogen originating from fertilizers, pet waste and vegetative debris, as well as other pollutants carried by stormwater runoff.

- **City of Titusville** received $388,825.00 of 319 grant funds, with a match of $413,488.00, and a Legislative Appropriation of $800,000.00, for a total project cost of $1,602,313.00 for the “**Titusville Draa Field Stormwater Improvements Project**”. The Draa Field Stormwater Park will implement numerous best management practices to improve water quality and reduce flooding in the drainage basin. The treatment system consists of a 4-acre enhanced wet detention pond, permeable reactive barrier, constructed wetland, pond aeration and pervious paving. The pond will have vegetated littoral zones and will discharge through a forested wetland to provide additional biological water treatment. In addition, the park will offer recreation with a multi-use trail and environmental education opportunities.

- **City of Titusville** received a Legislative Appropriation of $105,000.00 for the “**Titusville Eliminating Nutrients from Knox McRae Watershed for a Healthier Indian River Lagoon Project**”. The Knox McRae area is an older neighborhood in the City of Titusville with untreated stormwater discharging to the Indian River Lagoon. This project will treat stormwater flowing from a 100-acre watershed by installing a treatment train with four stormwater technologies to eliminate nutrients. The train is estimated to eliminate 284 lbs of nitrogen and 55 lbs of phosphorus.

- **Grove Land Utilities** received a Legislative Appropriation of $6,000,000.00 for the “**Groveland Reservoir and Stormwater Treatment Area Project**”. The project will produce an average of 136 million gallons per day, as an alternative water supply, to supplement the flow of the St. Johns River, while reducing damaging stormwater discharge impacts on IRL and St. Lucie by up to 37 percent.

- **Indian River County** received a Legislative Appropriation of $50,000.00 for “**The Oyster Bed Project**”. Indian River County will construct a three-dimensional “patch” reef approximately 100 feet east of the 45th Street ditch using clean concrete rubble. The “patch” reef would be capable of providing a habitat for attached and encrusting invertebrates such as...
oysters, other invertebrates such as stone crabs, juvenile fish species, and game fish species. In turn, the “patch” reef will act as a water treatment system to facilitate the removal of nitrogen and phosphorus from stormwater discharged through the 45th Street ditch into the IRL. The “patch” reef is self-perpetuating in that the attached and encrusting invertebrates and turf algae will continue to overgrow any bare areas created at future times. Therefore, there is no short or long term maintenance costs associated with this project.

- **Town of Indiatlantic** received $65,500.00 of TMDL grant funds, with a match of $107,500.00, for a total project cost of $173,000.00 for the “**Lily Park Stormwater Retrofit Project**”. The project will upgrade existing infrastructure to provide an offline retention basin within a 1960's era storm sewer system that drains directly into the IRL. The proposed stormwater improvements will consist of diversion piping, a weir and a stormwater treatment area that will provide enhanced water quality of stormwater discharge.

- **Martin County** received $1,125,000.00 of 319 grant funds, with a match of $822,500.00, and a Legislative Appropriation of $700,000.00 for a total project cost of $2,647,500.00 for the “**All American Ditch Retrofit Project**”. The project involves construction of a deep, wet detention lake and shallow stormwater treatment area. The primary objective of this project is to treat runoff and provide water quality benefits by reducing the nutrient loads of Total Phosphorus (TP) by an estimated 69.2%, Total Nitrogen (TN) by 48.0% and Total Suspended Solids (TSS) by 91% to the South St Lucie Estuary, a nutrient impaired water body with an adopted TMDL and BMAP.

- **Martin County** received a Legislative Appropriation of $1,500,000.00 for the “**Martin County North River Shores Phase II Vacuum Sewer System Project**”. This project is for the construction of a vacuum assisted gravity sewer system and associated pumping facility to provide sanitary sewer service to approximately 301 single family and multi-family parcels of land in the North River Shores area of Martin County, Florida. The project will enhance water quality in the North Fork of the St. Lucie River by eliminating nutrient loading from septic systems.

- **Merritt Island** received a Legislative Appropriation of $1,240,000.00 for the “**Merritt Island High School Sykes Creek Project**”. Design and construction of a project that will eliminate the direct discharge points and route stormwater to a wet detention pond away from Sykes Creek. The project also includes replacing the field with artificial turf to reduce pollutant loads. Currently, stormwater discharges directly to Sykes Creek (a tributary of the Banana River - an Outstanding Florida Water) from the Merritt Island High School stadium field.

- **Town of Ocean Breeze** received $315,000.00 of TMDL grant funds, with a match of $350,000.00, and a Legislative Appropriation of $150,000.00, for a total project cost of $815,000.00 for the “**Ocean Breeze Indian River Lagoon Stormwater Quality Retrofit Project**”. This project will construct a stormwater treatment train with bio-swale excavation, bio-swale plantings and two baffle boxes to treat stormwater from a 46-acre watershed that currently drains to the IRL.
City of Rockledge received $162,500.00 of TMDL grant funds, with a match of $487,000.00 (SJRWMD contributed $162,500), and a Legislative Appropriation of $775,000.00 for a total project cost of $1,424,500.00 for the “Rockledge Septic Tanks Elimination Project”. Phase I calls for the elimination of 143 septic tanks and construction of a central sewer line to service homes and lots in the Rockwood and Knollwood Gardens subdivisions, located only 2-3 blocks in from the Indian River Lagoon's eastern shoreline. The total anticipated load reduction from both phases includes 367 septic tanks and will remove approximately 11,377 pounds of total nitrogen and 1,835 pounds of total phosphorus annually.

SJRWMD – received a Legislative Appropriation of $20,000,000.00 for the “Eau Gallie River and Elbow Creek Dredging Project”. As a remedy to the Eau Gallie River and Elbow Creek sedimentation problems, which affect water quality in both the Eau Gallie River and Elbow Creek, and likewise contribute to shoaling in the Indian River Lagoon and Intracoastal Waterway, the District has proposed dredging nearly 625,000 cubic yards of muck sediment as a phased environmental restoration project. Under this Phase 1 agreement, dredging will remove 150,000 cubic yards of muck, which will remove approximately 288 tons of total nitrogen and 62 tons of total phosphorus.

St. Lucie County received $500,000.00 of 319 grant funds, with a match of $535,000.00, for a total project cost of $1,035,000.00 for the “Citrus Saegar Stormwater Treatment Train Project”. The project will add a 4.01-acre detention lake, upgrade the storm water conveyance system, and install a mechanism to pump water through the Polyacrylamide ‘Floc Logs’ that will be utilized to reduce erosion and nutrient loads.

St. Lucie County received a Legislative Appropriation of $225,000.00 for the “St. Lucie County Paradise Park Stormwater Improvements Phase 5A Project”. Paradise Park is an older Fort Pierce neighborhood close to the IRL with poor stormwater conveyance leading to the discharge of silt, pollutants and excess nutrients through Taylor Creek into the IRL. Since 2005, St. Lucie County has completed three of five planned phases of stormwater improvements. This project will construct 10 interconnected dry retention ponds and 2 drainage outfalls.

St. Lucie West Services District received $159,658.00 of TMDL grant funds, with a match of $201,046.50, for a total project cost of $360,704.50 for the “St. Lucie West Services District Water Management Improvement Project”. This project includes modifying isolated wetland into an enhanced stormwater pollution runoff zone and natural preserve that will assist in detaining and treating stormwater runoff. This stormwater best management practice relies upon natural processes, such as microbial activity, filtration, infiltration, and de-nitrification, nutrient reduction and evapotranspiration to enhance water quality.

City of Satellite Beach received $560,500.00 of 319 grant funds, with a match of $389,500.00, for a total project cost of $950,000.00 for the “Desoto Stormwater Retrofit Project”. This retrofit project will construct a three-stage treatment train immediately upstream from discharge into receiving waters of an existing multi-stage treatment train treating surface runoff from a 293-acre urban watershed comprised almost exclusively of low-density, single-family, detached homes built in the 1960s and 1970s.
- Fl Dept. of Health, Indian River County received $111,568.00 of 319 grant funds, with a match of $56,900.00, for a total project cost of $168,468.00 for the “OSTDS Scanning and Inventory FL DOH Indian River County Project”. The Grantee will hire a subcontractor to create a database of OSTDS permit files, and county property tax or appraiser records for Indian River County. The finished databases will then be imported to a web-based management and tracking program and to a web-based, publicly-available search program. The new tools resulting from this project will be helpful in tracking ongoing maintenance of operating permitted OSTDS within these areas of critical concern.

- Ocean Research and Conservation Association received a Legislative Appropriation of $2,000,000.00 for the “Monitoring Discharges to the Indian River Lagoon Project”. Twenty-five discharge sites will be selected along the IRL from Volusia County to Martin County. Monitoring instruments will be placed at these locations to monitor water parameters and nutrient content from these discharge sites into the IRL. The Grantee will analyze data obtained and create analysis plots for distribution from Grantee's website.

- FAU/Harbor Branch received three Legislative Appropriations totaling $2,700,000.00 for the “Land/Ocean Biogeochemical Observatories Project”. The objective of this project is to launch a Land/Ocean Biogeochemical Observatories (LOBO) estuarine observation network in the St. Lucie Estuary (SLE) and nearby IRL that will provide real-time, high-accuracy, and high-resolution water quality data through a dedicated interactive website. This network will provide a time series of critical environmental data that can be used by all parties, for new/alternative methods for nitrate, orthophosphorus and chlorophyll a, to understand and address both short- and long-terms issues in the SLE and the nearby IRL.

- Florida Oceanographic Society received a Legislative Appropriation of $500,000.00 for the “Northern Estuaries Resource Recovery Program”. The Northern Estuaries Resource Recovery is a pilot recovery program to reestablish vital estuarine habitats of oyster reefs and seagrass beds within the Northern Estuaries; St. Lucie Estuary/Indian River Lagoon and the Caloosahatchee Estuary. Restoration of shellfish and submerged vegetative resources in the southern IRL will be accomplished by designing restoration activities that address recovery or replacement of these resources lost during freshwater discharges, and building resiliency in these resources to reduce the impacts of future discharge events.

**FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION (FWC), FISH AND WILDLIFE RESEARCH INSTITUTE**

FWC is continuing a phytoplankton sampling partnership between the Saint John’s River Water Management District (SJRWMD) and the Florida Fish and Wildlife Conservation Commission (FWC), with the goal of incorporating rapid flow-cytometric screening into monitoring in the Indian River Lagoon (IRL). This partnership was formalized to improve monitoring for small phytoplankton size classes in the IRL through a joint grant awarded from the National Estuary Program in 2015 to FWC, the SJRWMD, and the University of Florida (UF) that focused on developing and validating new monitoring tools.
Joint sampling efforts began again after a short hiatus (when this grant ended), largely in response to a sustained bloom of the brown tide alga, *Aureoumbra lagunensis*, and have continued since then. The rigorous and integrated sampling conducted by the SJRWMD and partners, and their provision of additional preserved samples to FWC for flow cytometric analysis, has already demonstrated the efficacy of this method for discriminating and quantifying photosynthetic picoplankton (eukaryotes and prokaryotes) of similar size (0.2-2 μm), and different populations of nanoplankton (i.e., 2-20 μm).

**Completed projects:**

**Lagoon-wide oyster health monitoring** of restored and natural reefs with partners (FDEP, FAU HBOI), studying oyster gut condition and disease prevalence ($45K of state funding through FWC)

**Estuarine Impacts on St. Lucie Reef: Determining the Effects of Changing Resource Management on Florida’s Northernmost Coral Reef**

co-PI (Beal) on the study monitoring of Everglades restoration in terms of coral health as related to estuarine discharges ($145K federal, $75K state match). This informs water management decision-making on discharges in terms of coral and zooxanthellae gene expression and other indicators. Voss Lab at FAU HBOI is collaborator so they might submit this as well.

FWC is continuing to assist FDACS with HAB monitoring/shellfish testing in the harvest areas in the northern IRL.

FWC (IRL and Tequesta Field Labs) is continuing its **Fisheries Independent Monitoring (FIM)** sampling in the northern IRL. FWC has also continued its expanded sampling efforts in the St. Lucie, Loxahatchee, and St. Sebastian Rivers to improve abundance estimates of juvenile Common Snook (w/ focus on age-1 fish) for stock assessments. Although designed to assess juvenile Common Snook, this new sampling effort included habitats and geographic areas (i.e., backwater and tidal creek habitats; southern Indian River Lagoon) that had been under-sampled by the traditional FIM program. In addition to Common Snook, this new sampling has provided data on a wide variety of other species. These data may prove useful in the preservation of habitat critical for their conservation, as some of these non-targeted are considered threatened species (e.g., Opossum Pipefish) or of important fisheries value (e.g., Sheepshead, Lane and Gray Snapper).

**New projects**

FWC’s Habitat and Species Conservation group is continuing the **coral health studies** with a NOAA Coral Reef Program grant ($63K fed, $63K state match).

In collaboration with UCF (Geoff Cook and Brittany Troast), FWC is looking at the dynamics of fish community diversity within the Indian River Lagoon. FWC will be quantifying alpha, beta, and gamma diversity dynamics to improve understanding of IRL fish communities. Changes and trends in diversity will be quantified across multiple spatial and temporal scales, in an effort to provide insight into how temperate and tropical species assemblages have changed over time.
FWC has recently provided data to two students at FAU who are looking into how the distribution of dolphins in the lagoon match with their fish prey distribution.

FWC is assisting FIT with a project titled “Compilation and Summary of Data to Assess Potential Impacts of Commercial and Recreational Fisheries on Marine Resources at Canaveral National Seashore” lead by Gary Zarillo. FWRI’s role was to evaluate whether existing data were sufficient to make inferences regarding targeted fishery species within CANA boundaries. Project dates: Aug1, 2016 - July 31, 2017.

ST JOHNS RIVER WATER MANAGEMENT DISTRICT (SJRWMD)

SJRWMD has continued coordination of the Indian River Lagoon Algal Blooms Investigation. Most of the contracts collecting data to underpin the Indian River Lagoon Algal Blooms Investigation were closed during 2016, and the results were assembled in a form that the modelers require. Sampling of nutrients to quantify atmospheric inputs, characterize loads generated by storm events, document inputs in submarine groundwater, and measure flux from muck has ended. The data were formatted as necessary and supplied to the modelers.

Similarly, initial efforts to document the storage and cycling of nutrients by seagrasses, epiphytes and drift algae have been supplied to the modelers. Efforts to draw together information on the physiology of the key phytoplankters responsible for the superbloom, tolerances of drift algae, and grazing rates for zooplankton, infauna, and epifauna continue. The results of these efforts will be incorporated into a model over the next year. At a meeting, the models were introduced, and input on potential scenarios to be examined was gathered.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD)

SFWMD continues to lead localized IRL restoration efforts and CCMP implementation throughout the southern IRL watershed.

SFWMD, in collaboration with FDEP, FDACS and local stakeholders, submitted the 2015 St. Lucie River Watershed Protection Plan to the legislature. This update focuses on the progress since 2012 toward meeting the plan’s integrated, multi-phased goals. It also defines current and proposed nutrient reduction and storage projects and programs that will require funding for implementation and identifies the lead agencies responsible for implementation.

Since 2005, the South Florida Water Management District has been working with a coalition of agencies, environmental organizations, ranchers and researchers to enhance opportunities for storing excess surface water on private, public and tribal lands. In addition to utilizing regional public projects, the Dispersed Water Management Program encourages property owners to retain water on their land rather than drain it, accept and detain regional runoff, or do both. The ultimate goal for the Dispersed Water Management Program is to provide 450,000 acre-feet of retention/storage throughout the Northern Everglades watershed. 131,500 acre-feet of water retention/storage has been made available to date with an additional 230,000 acre-feet planned, pending funding.
SFWMD through the **CERP RECOVER** program is monitoring IRL and St. Lucie River benthos, submerged aquatic vegetation, oyster reefs and water quality parameters in partnership with the U.S. Army Corps of Engineers. Data is reported in the System Status Report on Evergladesrestoration.gov

The SFWMD **Coastal Ecosystems Section (CES)** is currently doing research on the effects of low level dry season freshwater releases into the estuary on the productivity in the oligohaline zone of the estuary.

Waters of the St. Lucie estuary sometimes exhibit low concentrations of dissolved oxygen and some WBIDs are impaired for this water quality parameter. To better understand the causes and extent of this impairment, the CES is conducting a study of dissolved oxygen in the North Fork of the St. Lucie.

The Coastal Ecosystems Science Section is developing and calibrating a water quality model and a nutrient budget for the St. Lucie Estuary.

**The St. Lucie River Issues Team** was formed by the South Florida Ecosystem Restoration Working Group in May 1998 and is managed by SFWMD. The Issues Team mission is to develop federal, state and stakeholder consensus on an action plan that would accelerate progress toward improving water and habitat quality in the St. Lucie River Estuary and IRL. This action plan assessed current problems in the estuary and lagoon and set direction for achieving improvements in both water quality and estuarine ecosystem functions (e.g., fish and wildlife habitat).

The Issues Team has continued to solicit, rank and submit projects to the Florida Legislature. And to date, has received $65.7 million from the Florida Legislature, and an additional $2 million in federal funding for over 131 individual projects in Martin and St. Lucie counties.

The Florida Department of Environmental Protection took over the administration of the Issues Team contracts in 2015.

Current Issues Team projects administered by the District are as follows:

**Land/Ocean Biogeochemical Observatories (LOBOs) for Intensive, Real-time Water Quality Sampling in the St. Lucie Estuary:** Harbor Branch Oceanographic Institute proposes to install a LOBO that will provide real-time comprehensive suite of critical environmental data that are directly relevant to understanding ecosystem change which is necessary for management of the St. Lucie Estuary and Indian River Lagoon.

Issues Team projects completed since April 2016 include:

**White City Drainage Project** – Citrus and Saeger Avenues: St. Lucie County constructed roadside swales and a 4-acre detention pond to treat and attenuate stormwater runoff from a low-lying 42-acre residential neighborhood.
Veteran’s Memorial Park: The Treasure Coast Resource Conservation and Development Council installed a treatment train to provide water quality for runoff from a 44.1-acre drainage basin. Veteran’s Memorial Park in on the Indian River Lagoon and is part of the drainage basin that discharges untreated stormwater through two outfalls located in the park directly into the Indian River Lagoon.

St. Lucie Estuary Oyster Reef Habitat Restoration: Martin County restored oyster reefs in the St. Luci estuary by constructing 4-acres of habitat and a living shoreline. This restoration will improve water quality, provide habitat for hundreds of species, and increase resiliency to climate change induced sea level rise.

The Indian River Lagoon License Plate Program was established to support habitat restoration, water quality improvement, and associated education projects. The South Florida Water Management District is responsible for administering Indian River Lagoon License Plate funds for projects in St. Lucie, Martin and Palm Beach counties.

Indian River Lagoon License Plate projects currently under contract are as follows:

**Phillips C. Gates Structure:** This project will retrofit a Fort Pierce Farms Water Control Structure to prevent sediment from entering the Indian River Lagoon.

**Indian River Drive Stormwater Quality Retrofit:** The project includes stormwater improvements including the installation of approximately 230 linear feet of exfiltration trench, baffle boxes and bio-swale treatment for an existing development adjacent to the Indian River Lagoon in Jensen Beach.

**Dubois Park Shoreline Stabilization and Environmental Enhancement Project:** The project includes construction of a maintenance ramp that will allow frequent removal of sand from the snorkeling lagoon, thereby reducing sediment flow in to the Indian River Lagoon. Installation of native landscaping and stabilization of the eastern shoreline of the tidal creek will provide habitat and prevent further erosion and sediment flow into the tidal creek and Indian River Lagoon.

**Continuation of the Northern Estuaries Resource Recovery Program:** The objectives of the program are to continue oyster and seagrass and living shoreline restoration at 5 sites within the southern Indian River Lagoon; and engage members of the community in these efforts both as volunteers in on-ground restoration and waterfront property owners as living shoreline site partners.

**Indian River Lagoon Science Enrichment Program in Martin County:** This project will develop education programs focused on the Indian River Lagoon, for Martin County’s underserved students and future leaders.

**Loxahatchee River District Sewering of 171st Street:** This project will result in the acquisition of right-of-way and conversion of seven homes from septic to sewer on 171st Street, a private road, adjacent to the southern Indian River Lagoon.
**Mandalay-Marguerita Stormwater Quality Retrofit:** This project includes construction of exfiltration within the existing road ROW in South Sewall’s Point prior to discharges into the IRL. The location this exfiltration pipe serves presently discharges without control into the IRL.

**Mangrove on the Move and Water Awareness** School based Educational Community Outreach Programs: This project includes two separate contracts for Martin County and St. Lucie County and will result in the implementation of fully interactive, hands-on structured programs whose main focus is to provide education and resources to students in regards to preservation and protection of the Indian River Lagoon.

**Indian River Lagoon License Plate projects** that were completed in FY2016 include:

**River Cove Living Shoreline Project:** The project involved creating a shoreline by restoring sub tidal, shoreline, and upland habitats along the Indian River Lagoon on Hutchinson Island.

**Riverwalk Habitat Restoration and Education Project:** The project involved creating 4,000 square feet of reef to the Riverwalk Oyster Project Site in the Indian River Lagoon in downtown Fort Pierce. Students helped build and deployed reef bags as part of the County’s Lagoon and You Program.

**UNIVERSITY OF CENTRAL FLORIDA**

**Restoration of oyster reefs impacted by recreational boat wakes.** Between April 2016 and March 2017, 4 additional reefs were restored (0.2 acres), bringing our decade total to 77 reefs (2.8 acres). Within 10 years, this would equate to restoration of 11.9 million oysters in Mosquito Lagoon. We have documented positive impacts beyond our restoration footprint as well – with additional oysters growing nearby the stabilized area and seagrass recruitment at 30% now adjacent to restored reefs. Unfortunately, boring sponge and brown tide have had negative impacts on our restored and natural reefs within Mosquito Lagoon. We are currently examining both of these impacts as well as invasive species, crown conch predation, and microplastics. Lifetime volunteer numbers exceed 48,000.

**Living Shoreline Stabilization** of culturally important shorelines (historic structures, shell middens). Over the past 6 years we have stabilized 2000 meters of shoreline, including numerous sites within CANA. Through monitoring we have documented that highly eroded areas are now accreting sediment and that storms as powerful as Hurricane Matthew did not hinder our progress. Lifetime volunteer numbers exceed 9000.

**Living shoreline suitability modeling.** In collaboration with Brevard County natural resources, we are developing an easy-to-view map of where living shoreline stabilization will be most effective in Brevard County.

**Impact vs Success of Mosquito Lagoon living shorelines and oyster reef restoration.** With funding from the National Science Foundation, in addition to standard success metrics of restoration/stabilization (# new oysters, # volunteers, etc.), we are collectively looking at impacts
on biodiversity (wading birds, fisheries, crabs, worms, etc.), nutrients, ecohydrology, and volunteer perceptions (social science).

**VOLUSIA COUNTY ENVIRONMENTAL MANAGEMENT DIVISION (EMD)**

EMD continues to monitor numerous sites in Mosquito Lagoon for water quality (since 1988). Monthly and quarterly collections have been continuous for the northern stretches of the lagoon from Ponce Inlet south to Oak Hill, with sites along the Intracoastal Waterway as well as at points eastward near Bethune Beach and south of George’s Bar. Several points near the Intracoastal Waterway lie near marinas, and some are near shellfish harvesting areas. Sites currently sampled are widely dispersed in the Volusia segment of Mosquito Lagoon to provide a good data set for modeling purposes for water quality requirements.

In April 2016, hundreds of the “Be Floridian Now” fertilizer fliers were distributed at the Wildflower Festival in DeLand, the Spring Home Show at the Ocean Center in Daytona Beach, and Lagoonacy at the Marine Discovery Cnter in New Smyrna Beach.

In April 2016, EMD staff met with a home improvement store in Port Orange to discuss fertilizer education. This paved the way for Be Floridian Now fliers to be placed on fertilizer racks in these stores.

In April 2016, County staff met with the Cities of New Smyrna Beach, Edgewater, and Oak Hill along with the Florida Department of Transportation at New Smyrna Beach City Hall to develop the Reasonable Assurance Plan (RAP) for the Mosquito Lagoon.

In September 2016, EMD hosted the International Coastal & Halifax/Indian River Cleanup. 1733 adults and 398 children (under 12) volunteered to clean up trash along the shores of the beach, Halifax River and Indian River Lagoon. Volunteers were located at 38 sites and they removed over 7,400 pounds of trash on foot, kayak, paddle board, canoe, motorboat and by scuba.

EMD continues its commitment to “Project H2O” – a consortium of NGO’s, Universities, Colleges, and other institutions established in 2014. Project H2O helps to coordinate projects and match needs with resources to better address issues of water quality, quantity, and habitat. Partners collaborate on research, education, restoration, and funding to ensure the most effective use of limited resources.

The Volusia County Council approved the 2017 State and Federal Legislative agenda on November 3, 2016 which supports funding for water quality improvements that provide dedicated funding to improve surface water quality including in the Indian River/Mosquito Lagoon estuary.

On December 15, 2016, Volusia County Council adopted the Volusia Governments Water Resource Compact and pledged to work with municipalities to support projects that improve water quality.
The Indian River Lagoon Surface Water Improvements and Management Overlay Zone (AKA Class II overlay) is an Environmental Ordinance within the Land Development Code. This regulation was designed to reduce the negative impacts of development adjacent to the Indian River Lagoon and to protect this vital natural resource and the shellfish harvesting industry in that area. Environmental Permitting issued 38 permits within the Class II overlay between April 1, 2016 and March 31, 2017.

EMD operates the Marine Science Center (MSC) in Ponce Inlet to educate residents and visitors about marine environments. From April 2016 – March 2017, 101,356 visitors toured the exhibits and aquariums at the MSC that interpret the marine environments of Volusia County. This includes public programs on marine life, reptiles and birds held 5 times daily. Over 15,000 school children participated in formal, grade-oriented marine science educational programs. In addition, the MSC presented “Kids Can Fish Too” injunction with FWC and the Halifax Sportfishing Club. The MSC also operated 9 week-long of summer camp programs on the local marine environments. The MSC also provided marine science field experiences for several area colleges and universities and additional lectures throughout Volusia County, St. Augustine, Gainesville, Orlando, Rockledge and Tampa. The Marine Science Center provides critical wildlife care to sick and injured wildlife at its sea turtle rehabilitation center and its bird rehabilitation center. During this year, the sea turtle hospital treated over 100 larger sea turtles and 1,800 hatchlings and washbacks. The bird hospital treated over 1,100 birds.

EMD staff assisted with the Project H2O Protect Our Lagoon Academy, which was held from February 6 to March 13, 2017.

EMD continues to participate in the Be Floridian Now campaign, a multi-county promotional partnership that focuses on limiting fertilizer use.

EMD staff, assisted by Project H2O and Master Gardeners with UF/IFAS Extension Office, attended events that promoted the fertilizer ordinance countywide including: a three day home show at the Ocean Center where staff gave presentations on the Fertilizer Ordinance and 5 Steps to Floridify Your Yard; the Lyonia Environmental Center Wildlife Festival; Water Festival in Deland; and a month long display in the rotunda of the county’s administration building.

EMD printed 12,500 fertilizer fliers and the Marine Discovery Center printed 500 magnets for distribution at stores and outreach events.

EMD and volunteers worked with local fertilizer retail stores to promote the fertilizer ordinance. To date, The Home Depot, Ace Hardware, and one independent nursery are displaying fertilizer ordinance fliers (pads) in stores. Staff continues to work to increase the number of stores.

In March 2017, staff contacted fertilizer applicators to remind and/or advise them of the county’s fertilizer ordinance. In February 2017, staff assisted UF/IFAs staff to promote the Florida Green Industries Best Management Practices training by contacting local fertilizer applicators.

In 2017, EMD began contacting HOAs, Rotary, Elks, and Eagles clubs to offer and schedule presentations on BFN and the County’s fertilizer ordinance.
Curriculum-based educational and summer camp programs for school age students were held in the IRL watershed that focused on the coastal environment and the connection to inland areas.

Explore Volusia provided 45 programs within the IRL watershed reaching 1,060 people, which includes High School students in the IBIS (Investigating Biomes in Science) program. Explore Volusia programs provide outdoor education opportunities teaching residents and visitors about the diverse habitats of Volusia County. Programs range from hiking, biking, kayaking, and EcoBuggy tours. Experienced educators lead all programs with a focus on biodiversity and conservation. These programs are designed to engage participants, teach them about the county’s diverse habitats and how they are interconnected. Topics for discussion during the programs vary depending on the location but often include water quality, quantity, and conservation.

The Volusia County Marine Mammal Stranding Team assisted with 53 marine mammals in distress within the Indian River Lagoon watershed. This included 22 dolphins, 27 manatees, and 4 whales. This was done in partnership with the Florida Fish and Wildlife Conservation Commission, Hubbs SeaWorld Research Institute, Volusia County Beach Safety and Sheriff’s Marine Unit.

EMD staff conducted 7 underwater cleanups, retrieving a total of 593 pounds of monofilament line and marine debris from within the lagoon watershed.

Working with Volusia County school students and the IBIS program, Manatee Protection Program staff initiated a marine debris clean-up and education program by partnering with the NOAA Marine Debris Monitoring and Assessment Project to document marine debris in Rose Bay. Staff provide Volusia County High School students with hands-on scientific experience detecting microplastics in our waterways. To date, this is the only project site in Florida for this NOAA program.

Of the 140 recycling bins in the Monofilament Line Recycling Program 50 are located within the Indian River Lagoon watershed. Citizens volunteer to empty the bins, document and send in the data, and then take the line to a recycling center.

Three Manatee Watch program trainings were conducted that train volunteers to document manatee sightings and report animals in distress. These sightings serve to indicate manatee usage of our waterways and inform our citizens about manatee habitat, biology, and physiology.

A bi-lingual English/Spanish sign was designed by staff to assist fishers in what to do if they accidentally hook a bird while fishing. The signs were created with specific areas along the IRL in mind. The sign, approved by the Florida Fish and Wildlife Conservation Commission, will be available for use throughout the state in their “Don’t Cut the Line” campaign. Bird monofilament line entanglement presents a great hazard for birds, especially shore and wading birds that feed and nest close to waterways.
MTWCD completed mechanical harvesting of *Hydrilla* in Canals C-1, C-2R, C-10, and C-9R during 2016. Canals like C-10 and others in the Melbourne-Tillman system are widespread throughout the lagoon basin, acting to drain freshwater lakes and rivers to coastal waters. The 8-mile, 100-foot-wide C-1 canal was cut in the 1920s, draining more than 100 square miles of historic St. Johns River floodplain directly to the Indian River Lagoon.

The district is turning to mechanical harvesting as a more effective and less expensive alternative to killing hydrilla and other invasive plants with herbicides. The District spends approximately $1,000 per acre to treat *Hydrilla* with herbicide. However, mechanically harvesting *Hydrilla* cost $40,500 to treat approximately 80 acres, reducing total nitrogen and phosphorus by approximately 14,300 pounds and 1,400 pounds respectively. Use of the harvester has also allowed the District to pile *Hydrilla* along canal banks where it drains, dries, and is later tilled in as a soil amendment to improve vegetation growing on canal banks, and prevent erosion.

FAU HARBOR BRANCH OCEANOGRAPHIC INSTITUTE (FAU HBOI)

FAU HBOI has undertaken a wide variety of programs and projects in several different areas as summarized below:

**Indian River Lagoon Research and Education:**
FAU HBOI, with its scientific and technology expertise, ideal geographical location, and over 40 years of history of research on the Indian River Lagoon (IRL), continues to be a strong contributor to finding answers to research questions regarding the many facets of the Lagoon. HBOI researchers collaborate with other research institutions, federal and state agencies, not-for-profits, governmental bodies, and other interested parties to advance this research and education.

**Research:**
**The Indian River Lagoon Observatory (IRLO):** Biodiversity and Ecosystem Function of an Estuary in Transition (PI: D. Hanisak) – IRLO is a long-term, multi-disciplinary, ecosystem-based program, that addresses emerging issues of environmental health in the IRL ecosystem ([http://www.fau.edu/hboi/irlo/index.php](http://www.fau.edu/hboi/irlo/index.php)). Key components are: (1) long-term ecosystem-based research, including high-frequency water quality and seagrass/macroalgal monitoring along a water quality gradient in the south central IRL that demonstrates both human impacts and climate-related interannual variability in IRL water quality; (2) collaboration among various organizations working in the IRL, best exemplified by the Indian River Lagoon Symposium (see below); and (3) use of advance technology for observing long-term changes in the IRL, including IRLO’s Network of Environmental Sensors (IRLON), a network of Land/Ocean Biogeochemical Observatories (LOBOs) and weather stations that provides continuous real-time, high-accuracy, high-resolution water-quality and weather data through a dedicated interactive website ([http://fau.loboviz.com/](http://fau.loboviz.com/)). (Save Our Seas Florida specialty license plate sales granted by the HBOI Foundation: $300,429 – July 1, 2015 to June 30, 2016; $420,079 – July 1, 2016 to June 30, 2017)
Land/Ocean Biogeochemical Observatories (LOBOs) for Water Quality Sampling in the St. Lucie Estuary and Indian River Lagoon (PI: D. Hanisak) – This project supports five IRLON real-time water quality and weather stations in the St. Lucie Estuary (SLE) and nearby IRL. These data provide scientists of various disciplines from many organizations reliable, continuous observatory data to better quantify and model relationships between environmental factors and biological processes in the SLE and IRL. The data can also be used to follow the outcome of changes related to recovery measures and assist resource and policy managers with decision making. (Florida Department of Environmental Protection: $2,350,000 – July 1, 2014 to June 30, 2016; $350,000 – July 1, 2016 to June 30, 2017)

Land/Ocean Biogeochemical Observatories (LOBOs) for Intensive, Real-time Water Quality Sampling in the St. Lucie Estuary (PI: D. Hanisak) – This project provides support for one IRLON site, strategically located in the South Fork of the SLE (South Florida Water Management District: $138,007 and $138,007 match from HBOI – June 11, 2015 to June 10, 2017)

Algal Blooms Investigation: Analysis of Submersed Aquatic Vegetation Tissue Nutrient Content and the Response of Drift Macroalgae to Extreme Levels of Salinity, Temperature and Light (PI: D. Hanisak) – This project, part of the SJRWMD Indian River Lagoon Algal Bloom Investigation (IRLABI), will provide a better understanding of macrophyte nutrient cycling in the IRL and how the disruption of this role may have contributed to the development and persistence of the severe phytoplankton blooms in 2011. (St. Johns River Water Management District: $447,998 – March 1, 2014 to September 30, 2016)

Development of a Seagrass Nursery for Restoration of Seagrass in the Indian River Lagoon (PI: D. Hanisak) – Traditional seagrass restoration efforts depend on transplantation from established beds to other locations, which damages donor beds and contradicts the management practice of no loss of habitat. This project is developing an experimental seagrass nursery at the HBOI Aquaculture Development Park. It is estimated that the nursery will yield enough material for a 1-acre test planting effort. (HBOI Foundation: $111,840 – April 20, 2015 to June 30, 2107)

Ecology, Nutrition & Biochemistry of Macroalgal Blooms in the IRL (PI: B. Lapointe) – Persistent macroalgal blooms can reduce the prevalence and distribution of seagrass. This project is studying the composition and seasonal variability of macroalgal blooms and the nutrients fueling them at more than 20 sites throughout the IRL from Jupiter Inlet to the Mosquito Lagoon. (Save Our Seas Florida specialty license plate sales granted by the HBOI Foundation: $210,000 – July 1, 2015 to June 30, 2016; $195,766 – July 1, 2016 to June 30, 2017)

Analysis of Sediments in the IRL for Herbicides (PI: A. Wright) – Investigation of IRL seagrass die-offs in recent years has included analyses of sediments from 13 affected sites, most near drainage canals, that have suggested the presence of herbicides. This project worked on determining a more definitive conclusion and analysis of new sediments from the 13 sites as well as from healthy and degraded seagrass beds. (Save Our Seas Florida specialty license plate sales granted by the HBOI Foundation: $25,000 – July 1, 2015 to June 30, 2016)
Developing Source Tracking for Indicators of Fecal Contamination (PI: P. McCarthy) – Measures of Fecal Indicator Bacteria are used routinely to assess IRL water quality but do not identify contamination sources, which can include humans, agriculture, and wildlife. This work analyzed water samples from the central IRL using real-time polymerase chain reaction and markers for human, ruminant, and bird waste to help identify nutrient sources over the course of a year. (River Branch Foundation: $39,877 – July 1, 2015 to June 30, 2016)

Water Quality Impacts of St. Lucie River Plume on Northern End of the Florida Reef Tract (PI: M. Jiang) – This work aimed at characterizing St. Lucie River freshwater plumes in terms of water quality (e.g., nutrients, dissolved oxygen, turbidity) and its contributors (i.e., Lake Okeechobee, St. Lucie watershed) to create a numerical model of the physical and biogeochemical processes governing this system. (NOAA: $59,556, plus $59,930 in match from the HBOI Foundation – July 1, 2015 to December 31, 2016)

Ventilation Rates of the IRL Through its Inlets (PI: L. Cherubin) – The exchange of water between the ocean and IRL is an important factor influencing the quality of water in the estuary, which in turn helps determine the favorability of conditions for the growth of seagrass, the development of harmful algal blooms, and the health of resident animals. This project employed a selection of underwater, surface, and aerial technologies to shed light on water exchange as well as the influence of precipitation fluctuations due to events and/or seasonal patterns on lagoon water quality. (Save Our Seas Florida specialty license plate sales granted by the HBOI Foundation: $100,527 – July 1, 2015 to June 30, 2016)

Wild Dolphin Stranding Response, Care & Research (PI: S. Burton) – As a member of the NOAA National Marine Fisheries Service Marine Mammal Health and Stranding Response Network, FAU HBOI is responsible for responding to marine mammal stranding incidents in the IRL and near-shore ocean waters between the Sebastian and St. Lucie Inlets. The team also serves as a resource to assist with strandings, transport, disentanglements and rehabilitation of dolphins throughout the IRL and state. (Protect Wild Dolphins Florida specialty license plate sales granted by the HBOI Foundation: $150,000 – January 1, 2016 to December 31, 2016; $92,500 – January 1, 2017 to December 31, 2017)

Photo-identification - Dolphin Census and Spatiotemporal Trends (PI: M. Mazzoil) – FAU HBOI has been conducting photo identification studies of IRL bottlenose dolphins since 1996, and has identified more than 1,700 individual dolphins. Among the findings enabled by this data is identification of a distinct IRL stock now breeding its third generation since the study began, and insights into breeding and social behavior. The program is expanding to include remote biopsy sampling to support ongoing research collaborations in the study of contaminant burdens and develop innovative projects to assess health, stress and brevotoxin effects. (Protect Wild Dolphins Florida specialty license plate sales granted by the HBOI Foundation: $572,000 – January 1, 2016 to December 31, 2016; $500,000 – January 1, 2017 to December 31, 2017)

Factors Affecting IRL Dolphin Locational Preferences: Water Quality and Prey Aggregation (PI: M. Mazzoil) – This work is intended to shed light on the influences of water quality and the spawning of their preferred prey species of IRL bottlenose dolphins. Water quality data will be provided primarily by HBOI’s Land-Ocean Biogeochemical Observatory
units. The fish assessments will include acoustic studies to determine if the dolphins are using passive listening or echolocation to find prey. (Protect Wild Dolphins Florida specialty license plate sales granted by the HBOI Foundation: $69,872 – December 10, 2014 to June 30, 2017)

**Utilizing Photo-identification Mark-Recapture Surveys to Estimate the Abundance and Better Understand the Current Distribution in the Indian River Lagoon** (PI: M. Mazzoil) – This project is addressing bycatch reduction of marine mammals using mark-recapture methodology and dorsal fin matching with the archived IRL catalogue to estimate the abundance and distribution of bottlenose dolphins inhabiting the IRL estuarine stock. (Subcontract from Hubbs-Sea World Research Institution for project funded by North Carolina Sea Grant: $43,328 – August 1, 2016 to June 30, 2017)

**Epidemiology, Pathology & Population Health Science** (PI: A. Schaefer) – FAU HBOI epidemiology research focuses on the health of IRL bottlenose dolphins as an indicator of the health of the ecosystem and potential implications for human health. Studies include a new approach to identification and characterization of a fungal infection that occurs in dolphins and humans, the use of MRI to investigate the effects of environmental chemicals on dolphin central nervous systems, molecular identification of dolphin viruses, and the study and archiving of tissues from stranded dolphins. (Protect Wild Dolphins Florida specialty license plate sales granted by the HBOI Foundation: $246,000 – January 1, 2016 to December 31, 2016); $160,500 – January 1, 2017 to December 31, 2017)

**CetOMICS: A State-Wide Cetacean OMICS Initiative to Investigate the Health, Fitness, Behavior and Ecology of Whales and Dolphins - Phase III** (PI: G. O’Corry-Crowe) – In 2015, HBOI launched the state-wide CetOMICs Initiative that combined genomics, transcriptomics and proteomics to determine how dolphins are impacted by and respond to threats at a molecular level and to inform management policy. Phase III will: complete many of the lab aspects of the initiative, emphasize the bioinformatic analyses needed to accurately interpret Next Generation Sequencing (NGS) data and overlay them with population data, expand epigenetic and gene expression studies particularly as they relate to the IRL dolphins and their immunogenetic responses to pathogens including HABs, and will complete the development of the “FastGen” kit. (Protect Wild Dolphins Florida specialty license plate sales granted by the HBOI Foundation: $137,500 – January 1, 2017 to December 31, 2017)

**The Microbiome of the Indian River Lagoon: A Baseline Study** (PI: P. McCarthy) – The microbial community of the IRL remains largely unexplored. This study aims to fill this knowledge gap by investigating the sediment and water bacterial and archaeal populations present in the IRL and their functions, as well as the effects of natural and anthropogenic stressors on their diversity. (Save Our Seas Florida specialty license plate sales granted by the HBOI Foundation: $95,654 – July 1, 2016 to June 30, 2017)

**Indian River Lagoon Shark and Ray Assessment** (PI: M. Ajemian) – A substantial data gap surrounds the status of the elasmobranchs inhabiting the IRL. This project is implementing a pilot-scale fishery-independent survey targeting IRL sharks and rays. This survey, which will be standardized to protocols established by fisheries monitoring agencies (i.e., NOAA) for abundance comparisons, will provide access to individuals for blood sampling to develop
important physiological and epidemiological baselines. (Save Our Seas Florida specialty license plate sales granted by the HBOI Foundation: $34,554 – July 1, 2016 to June 30, 2017)

**Modeling Ecosystem Dynamics in the Indian River Lagoon and Assessing the Potential Impacts of Climate Change** (PI: M. Jiang) – This project is improving an existing hydrodynamic and developing an IRL ecosystem model to address climate projection of the IRL residence time, connectivity, and potential occurrences of hypersaline conditions under IPCC climate change scenarios (warming temperature, changing precipitation, and sea level rise). (Indian River Lagoon National Estuary Program: $34,758 and $15,977 HBOI cost share – November 1, 2016 to October 31, 2017)

**Microcystis HAB Toxins in East Florida Waters** (PI: J. Sullivan) – The goal of this project is to determine the presence and/or concentration of known cyanobacteria HAB toxins (e.g. microcystins, BMAA) in water samples taken from the source waters of Lake Okeechobee, Lake Okeechobee discharge canals, and downstream end points within the St. Lucie Estuary, Indian River Lagoon, and associated inlets. (Everglades Foundation: $14,663 – January 1, 2017 to December 31, 2017)

**Determination of IRL Pathogenic Bacterial Impacts on the East Coast Florida Aquaculture Industry** (PI: S. Laramore) – This pilot-scale project will inform and assist the Florida East Coast Aquaculture industry that has been plagued by production problems in recent years related to pathogenic bacteria. The approach is to characterize the bacteria in the areas of the IRL in which aquaculture operations are sited, identifying both endemic and exotic pathogens and determining virulence to characterize bacterial pathogens of concern to determine appropriate mitigation strategies. (Florida Aquaculture Florida specialty license plate sales granted by the HBOI Foundation: $35,000 – July 1, 2016 to June 30, 2017)

**Dolphins as Sentinels for Harmful Algal Bloom Toxins in the Indian River Lagoon: An Interdisciplinary Study** (PI: J. Sullivan) – This project is assessing the distribution and concentration of Harmful Algal Bloom toxins (microcystin, nodularin, BMAA, saxitoxin) in IRL waters, the food chain (prey fish) and ultimately in resident dolphin populations. Assessing the concentration of these toxins within an IRL food chain potentially shared by both dolphins and humans (i.e., fish) could have significant public health impacts, where dolphins serve as the sentinel species for understanding future health threats to humans. (Protect Wild Dolphins Florida specialty license plate sales granted by the HBOI Foundation: $90,000 – January 1, 2017 to December 31, 2017)

**IRL Graduate Research Fellowships** (PI: P. McCarthy) – Proceeds from the Harbor Branch Oceanographic Institute Foundation’s 2016 Love Your Lagoon fundraising gala are supporting competitively awarded graduate student fellowships supporting IRL research projects being conducted by 5 Ph.D. and 9 M.S. students at FAU. The fellowships are being used for research assistantships, tuition, travel related to experimental work and presentation of research at scientific conferences, and purchase of necessary equipment and supplies related to these student research projects. (HBOI Foundation: $115,125 – May 16, 2016 to May 5, 2017)
Outreach and Education:
FAU HBOI works to foster IRL research via the annual Indian River Lagoon Symposium, which it hosts and organizes as part of a multi-institution steering committee. The event attracts over 300 scientists, resource managers, and students, and provides a forum for all researchers and agencies working in the IRL to share research findings and discuss challenges and opportunities. The program and abstracts for all of these symposia (2012-2017) are available at: http://indianriverlagoon.org/symposium.html.

The breadth of HBOI IRL research is reflected in its Mission: Ocean Discovery public outreach program, which includes the Ocean Science Lecture Series, a forum for HBOI researchers and guest speakers to inform the public about their work; the Immersion Tour program, which offers visitors an up-close look at the HBOI site and its laboratories; the Ocean Explorers Children’s Camp, a day camp providing introductions to marine ecosystems; and the Ocean Discovery Visitor’s Center, a museum-style visitor center that features interpretations of HBOI research and nearby marine environments including the IRL via a continually evolving array of interactive exhibits, small live animal tanks, video, and other displays. The HBOI IRL video (www.youtube.com/watch?v=1v6KlaUA18Q&list=UU6YvxeMtnn-a5NhMKnKv-Jg) is another outreach tool that provides an overview of the estuary and some of the ways the institute is investigating its challenges.

The IRL also is an integral part of the curricula for HBOI educational programming, which includes FAU College of Science and HBOI Semester By The Sea, a semester-long undergraduate immersion in marine science located at HBOI; graduate student training for FAU students pursuing advanced degrees in biological and environmental sciences; the Harbor Branch Summer Intern Program, competitive program that attracts top undergraduate and graduate students worldwide for a 10-week immersion in marine science and engineering projects; the Marine and Oceanographic Academy, a magnet high school program located at HBOI and created in partnership with the St. Lucie County School District; FAU Pine Jog’s and HBOI’s H20 to Go Summer Research Institute, a week-long, residential research institute for high school students focused on the interconnectedness and complexity of South Florida water systems and the environmental issues facing them; and the Indian River County Junior Scientists Fellows Program, a HBOI partnership with the Indian River Land Trust to engage high school students in the research and care of an environmentally sensitive, 185-acre preserve located along the IRL.

THE NATURE CONSERVANCY’S BLOWING ROCKS PRESERVE

Blowing Rocks Preserve has continued with planting the boat-wake impacted IRL shoreline with two alternative techniques: 1. Planting 3-gallon potted red mangroves in the intertidal zone and; 2. Planting potted sea oats on the lagoon’s sandy berm.

The preserve has also started a bi-monthly volunteer lagoon clean-up event that occurs along the IRL shoreline. The collected debris is sorted and then entered into The Ocean Conservancy’s global marine debris database.
**MARTIN COUNTY**

**Water Ambassador Program:**
Martin County and UF/IFAS Sea Grant Extension have partnered on a Water Ambassador training program. The Martin County Water Ambassadors is a one-day education in action program that unites and empowers residents and volunteers who have an interest in protecting local waterways and giving back to their communities. This is the second fiscal year that this program has been offered. Modules include an overview of the St. Lucie River and Indian River Lagoon, history of drainage in south Florida, fertilizer ordinance, Florida Friendly Landscaping, stormwater, TMDLs and BMAPs, living shorelines and estuary friendly living practices. The program provides an opportunity for motivated individuals to connect personal decisions with information about lagoon friendly practices. One-hundred and eighteen (118) individuals have now completed the program. Cost = $30,000.

**Be Floridian Now Program:**
The Be Floridian Now program is a multi-media education campaign to educate residents about Florida lawn care practices and products. It is based on the summer-time fertilizer free ban (June 1- Sept 30). Martin County has partnered with the Marine Resources Council to implement the program since 2015 in the St. Lucie River and Estuary and Indian River Lagoon watersheds.

Fiscal year 2016 accomplishments include utilizing the expertise and services of the TC Palm newspaper to advertise the Be Floridian Now website and promote sound landscaping practices, particularly during the summer fertilizer restricted season. The on-line ads were viewed over 1.7 million times and clicked on nearly 3,000 times. Print ads were viewed 1,499,787 times, representing about 15,000 homes every time the ads ran. This past year a Be Floridian Now Facebook page was launched and the web-based survey continued through the year. Nearly half of the respondents (43%) were aware of the fertilizer ordinances. Of the 123 Martin County respondents who answered the question, 36% answered that they were aware of Martin County fertilizer ordinances. A coloring book, brochure, give-away promotional items and 3-5 new billboard designs were developed. Additionally, a Be Floridian Now education booth tool-kit was produced and purchased to include a 10’ canopy, banner, custom made table cloth, flamingos, and coolie give-aways.

The focus for fiscal year 2017 is to survey the local retail stores to determine the availability of compliant products. Cost = $30,000.

**Savannas Regional Restoration Project:**
The Savannas Regional Restoration Project is a phased project focused on 1) improving natural habitats, 2) improving water quality, 3) alleviating community flooding and 4) optimizing water management operations in the Savannas and associated Indian River Lagoon watershed. Phase I of the project is the Water Management and Natural Systems Evaluation. Phase II of the project will be Prioritization and Implementation of Structural and Non-Structural Alternatives.

Phase I of this restoration project will help define habitat restoration and hydrologic needs, water quality and flooding problems through the development of a hydrological model for the 22,000 acre watershed spanning both St. Lucie and Martin County. Work on the model began in January
2017 and is expected to be complete by February 2018. Costs for Phase I are approximately $291,500.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Project Partners</th>
<th>CCMP Priority &amp; Action Plan</th>
<th>Project Title and Abstract</th>
<th>CWA320 Funding FY 2016-2017</th>
<th>Project Deliverables</th>
<th>Project Start Date/Completion Date</th>
<th>Project Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brevard Zoo (lead contractor), Brevard County; St Johns River Water Management District; Citizen Volunteers</td>
<td>High (PIE-1, 4, 5; F-1, 3, 4; SG-1); Medium (CC-3)</td>
<td>Restore Our Shores: This project, with the assistance of volunteers, will produce restoration materials of 500 oyster mats and a minimum of 5,000 native shoreline vegetation plants, as needed for deployment in coordination with Oyster Gardening and reef-building efforts funded by the St. Johns River Water Management District. 1,200 linear feet of shoreline will be restored to provide shoreline stabilization, water filtration, biodiversity protection, and carbon capture for the IRL ecosystem.</td>
<td>49,500</td>
<td>Minimum of 2,710 volunteer hours at a minimum of 20 project events; 500 oyster mats, and a minimum of 5,000 plants; 1,200 linear feet of restored shoreline; quarterly and project final reports</td>
<td>12/20/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>2</td>
<td>Cape Canaveral Scientific, Inc. (lead contractor); CAPTEC Engineering, Inc.; Scientific Environmental Applications, Inc.</td>
<td>High (BD-2; FSD-4, 13, 14; LA-1; F-3; PIE-4)</td>
<td>2016-17 Grant Writing &amp; Capacity Building to Support the IRL-CCMP. This project will provide grant-writing acquisition services to local governments and non-profit organizations tasked with implementing the CCMP.</td>
<td>60,000</td>
<td>Minimum of one municipal grant in each county, and one grant for the IRL Council</td>
<td>11/29/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>3</td>
<td>Martin County</td>
<td>High (FSD-1, 4, 11, 13; TMDL-3; MON-1); Medium (FSD-9)</td>
<td>Manatee Creek Technology Assessment Project: Project is a 1-year alternative technology assessment of the different stormwater treatment facilities within the Retrofit project, and in particular, a performance efficiency evaluation of the denitrification bed to determine if such a Best Management Practices (BMPs) can be beneficial both economically and spatially in the future. All monitoring will be conducted in compliance with EPA/FDEP Standard Operating Procedures associated with water quality monitoring.</td>
<td>100,000</td>
<td>Quality Assurance (QA) plan; installation and calibration of field monitoring equipment; routine efficiency monitoring and a project final report</td>
<td>09/24/2016 - 09/30/2018</td>
<td>On Schedule</td>
</tr>
<tr>
<td>4</td>
<td>Ocean Research &amp; Conservation Association</td>
<td>High (MON-1)</td>
<td>Indian River Lagoon Comprehensive Canal Study. The goal of this scientific project is to identify three canals that are contributing the most pollution to the Indian River Lagoon (IRL) and map the sediment toxicity and nutrient levels in approximate one square mile in the area where each of three canals enter the IRL. The results of this project will provide resource managers information they need to prioritize and focus mitigation and remediation efforts.</td>
<td>105,000</td>
<td>Identity of three (of 25 monitored) canals contributing the most pollution to the Indian River Lagoon; maps of sediment toxicity and nutrient levels in approximate one square mile in the area where each of three canals enter the IRL; project final report</td>
<td>10/18/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>5</td>
<td>Smithsonian Marine Station</td>
<td>High (F-1, F-3, PIE-1)</td>
<td>Rivals at Work: Determining effects of oyster reef restoration on water quality in the Southern Indian River Lagoon. The focus of this scientific study is to determine the efficacy of using filter feeders to improve water quality within the southern reaches of the Indian River Lagoon. The study will be conducted in the field using filter feeding devices that allow a number of physiological parameters to be determined including filtration rate and absorption efficiency of the feeding process.</td>
<td>29,400</td>
<td>Monthly experiments at three sites to assess seasonal variation affects of filter feeding performance; efficacy of using filter feeders to improve water quality within the southern reaches of the Indian River Lagoon; project final report</td>
<td>10/31/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>6</td>
<td>Harbor Branch Oceanographic Institute - Florida Atlantic University</td>
<td>High (OSDS-3; SG-1); Medium (CC-2, CC-3)</td>
<td>Modeling ecosystem dynamics in the Indian River Lagoon and assessing the potential impacts of climate change. Project is an integrative modeling approach to systematically examine the IRL ecosystem dynamics and to assess the impacts of climate change. First year objectives are: 1) Improvement of an existing hydrodynamic model, and understanding the residence time, and connectivity of the IRL; 2) Initial development of the IRL ecosystem model; and 3) Climate projection of the IRL residence time and connectivity, and potential occurrences of hypoxic condition under IPCC projected climate change scenarios (warming temperature, changing precipitation, and sea level rise).</td>
<td>34,758</td>
<td>Calibration of hydrodynamic model; simulation and validation of hydrodynamic model for 2006-2015; climate projections of the hydrodynamics for 2020 and 2050; initial development of the ecosystem; analysis, presentations and reporting; coupling of the ecosystem with the hydrodynamic model; project final report</td>
<td>11/17/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>7</td>
<td>City of Titusville</td>
<td>High (FSD-10; FSD-11; W-6; W-7; F-1; IFF-4; PIE-1; PIE-4); Medium (CC-3)</td>
<td>Educating Titusville: Developing a Living Shorelines Outreach Program Targeted to Specific Properties along the Indian River Lagoon. Goals of the Shoreline Educational Outreach Program are to: 1) Educate residents on what a living shoreline is, 2) Educate residents on how restoring living shorelines will benefit the Indian River Lagoon, 3) Educate residents on how to maintain their property along the living shorelines once they established, 4) Protect water quality.</td>
<td>12,000</td>
<td>Notification to property owner’s about the existence of the shoreline management plan; creation and printing of materials; launch of webpage; mailing of materials; homeowner workshop; evaluation survey; project final report</td>
<td>11/29/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>8</td>
<td>Environmental Learning Center</td>
<td>High (PIE-1; PIE-4; FSD-10; FSD-11)</td>
<td>Livin’ for the Lagoon Homeowner’s Association Education Program Expansion. This project will serve as Phase II of the educational behavior change program, Livin’ for the Lagoon, to teach Homeowner Association (HOA) residents specific practices to help the lagoon so that the quality of life in Indian River County as well as the economy will remain viable, with the overall goal of improving HOA landscape management to decrease nutrient and sediment pollution that enters the Indian River Lagoon and to improve the viability of seagrass beds.</td>
<td>30,635</td>
<td>12 six-hour comprehensive workshops with 180 participants; pre- and post-testing; follow up to encourage and determine HOA and homeowner behavior changes; program evaluation to determine outcomes; project final report</td>
<td>04/15/2016 - 09/30/2017</td>
<td>Contract pending execution</td>
</tr>
<tr>
<td>Activity</td>
<td>Project Partners</td>
<td>CCMP Priority &amp; Action Plan</td>
<td>Project Title and Abstract</td>
<td>CWA320 Funding FY 2016-2017</td>
<td>Project Deliverables</td>
<td>Project Start Date/Completion Date</td>
<td>Project Status</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>9</td>
<td>Pelican Island Audubon Society</td>
<td>High (PIE-1, 2, 4, 5; FSD-1; DIM-3; CC-3) Medium (MON-3)</td>
<td>Creating a new, more diverse generation of advocates for the Indian River Lagoon through education programs that raise public awareness of the lagoon’s decline. Project goals are to expand existing education programs to reach and engage a more diverse audience; promote an education program that explores the impacts on Lagoon bird species of climate change and sea level rise; develop and promoting the value and use of lagoon indicators as an educational tool, specifically to prepare socio-economic and institutional indicators that can be incorporated in a complete sustainability report card for the lagoon.</td>
<td>62,500</td>
<td>Cycle 192 elementary students through Audubon House classes, including field visits; develop and carry out an outdoor training curriculum for women; AFLOC - 15 one-week programs run June through August; collect and consolidate data for socio-economic and institutional indicator topics, refine the list, develop database and graphics; project final report</td>
<td>01/25/2017 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>10</td>
<td>Marine Discovery Center</td>
<td>High (FSD-10, 11; W7; IFF-4; PIE-1, 2, 4, 5; MON-1) Medium (CC-3; EIAR-2)</td>
<td>Project H2O Phase Two: Integrating Technology and the Project H2O Academy. Project will enhance the current efforts of Project H2O by strengthening partnerships, creating an action plan for future projects, integrating enhanced technology and expanding the current outreach efforts by implementing a Project H2O Academy that will educate and train citizens to become Ambassadors. These Ambassadors will give presentations, speak at public forums and educate others on the IRL and Volusia watershed.</td>
<td>41,207</td>
<td>Defined partner roles and strengthened partnerships; adaptive management plan for the future of Project H2O; facilitated integration of technology into Project H2O; creation of Project H2O Academy; project final report</td>
<td>09/30/2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
<tr>
<td>11</td>
<td>IRL Council</td>
<td>High (FI-1, 2)</td>
<td>Comprehensive Conservation &amp; Management Plan Revision. During the CCMP revision process, funds will be used to contract an experienced firm to provide professional meeting facilitation services and structured meeting planning to ensure connected leadership discussions among the public, private and independent sectors of the IRL community.</td>
<td>45,000</td>
<td>Management plan for CCMP revision; review and assessment of all actions; new actions and/or action plans; goals, objectives, recommendations for any additional priority action plans; facilitated public and committee workshops; revised CCMP</td>
<td>04/15/2016 - 03/31/2018</td>
<td>RFP Issued</td>
</tr>
<tr>
<td>12</td>
<td>University of Maryland Center for Environmental Science (UMCES)</td>
<td>High (PIE-1, 4)</td>
<td>IRL Health/Report Card. Funding will support elements of Phases II &amp; III of the Ecological Health Assessment project: UMCES Integration and Application Network team to Assess indicators &amp; establish benchmarks; report card production, printing &amp; website; and Public Relations and Promotional Campaign.</td>
<td>45,000</td>
<td>Assessed indicators &amp; established benchmarks; report card production, printing &amp; website; public relations and promotional campaign</td>
<td>02/14/2017 - 02/28/2018</td>
<td>On Schedule</td>
</tr>
<tr>
<td>13</td>
<td>IRL Council</td>
<td>High (FI-1, 2)</td>
<td>EPA Travel (Grant Administrative Condition Requirement) and Support of IRL NEP Program Office. CCMP implementation, work plan development and implementation, project management, contracts management, program coordination and Management Conference administration.</td>
<td>10,000</td>
<td>Continued program administration providing Management Conference support, CCMP implementation oversight and budgeting/project/contract activities and reports.</td>
<td>10-01-2016 - 09/30/2017</td>
<td>On Schedule</td>
</tr>
</tbody>
</table>

**Total** 625,000
Section C.3. IRLNEP Clean Water Act Implementation

The IRLNEP CCMP established under Section 320 of the Clean Water Act (CWA) and in compliance with the CWA has developed partnerships with federal, state and local governments, non-profit organizations, academia and the IRL region citizens. These partnerships form the framework for consensus, ecosystem based management strategies designed to restore and maintain IRL water quality and habitat. The FY 2016-2017 IRLNEP Work Plan directly or indirectly supports all of the CWA core programs. Highlighted in this section is a specific example of a project implemented in the IRL basin that directly relates to CWA.

Activity 9:

Creating a New, More Diverse Generation of Advocates for the IRL – The goals of this project are to inspire a younger, more diverse generation of advocates for the Indian River Lagoon, raise public awareness of the declining condition of the lagoon, reach minority communities previously uninvolved with lagoon issues, improve broad public understanding of the lagoon’s needs and promote sustainable behaviors that improve stormwater quality and respect natural habitat areas.

Clean Water Act Implementation Information

IRLNEP has a primary role in this project. This project directly supports the objectives of the CWA to restore and maintain the chemical, physical and biological integrity of the Nation’s waters and to control point and non-point sources of pollution.

In partnership with Florida Outdoor Center (AFLOC), the Pelican Island Audubon Society (PIAS) is conducting Lagoon-focused, after-school and summer science programs. The program targets traditionally underserved communities with high percentages of economically disadvantaged and minority students.

The program is designed to instill an understanding of lagoon ecology in elementary school students and their families (particularly their mothers), with the goal of engaging the community about lagoon issues. Field trips and outdoor programs help instill knowledge about and respect for natural habitats. Personal behaviors with respect to stormwater quality are stressed in showing connections between lagoon health, human health and institutional responses. To reinforce these connections, PIAS connects science with advocacy as a means of effecting solutions to declining water quality, loss of healthy fisheries, and negative socio-economic impacts.

One of the strategic goals for the EPA Office of Environmental Education is to promote the use of environmental education in schools and communities to improve academic achievement and stewardship. This program works to accomplish that goal, and, in the long term, addresses water quality and habitat issues as young children learn to appreciate and care for natural ecosystems, become community volunteers, reduce their impacts on stormwater runoff, and learn how to advocate for the lagoon environment.
C.4. Discussion of External Factors Impacting the IRLNEP FY 2017-2018

WORK PLAN IMPLEMENTATION

At the present time, all IRL NEP FY 2015-2016 and 2016-2017 Work Plan projects are being implemented on schedule and within budget. IRLNEP staff is in continuous communications with the project leads to insure outputs and outcomes are achieved. FY 2017-2018 represents the first operational year that the IRLNEP will be directed by a detailed IRLNEP Annual Business Plan that is fully aligned with the IRLNEP budget. The U.S. EPA work plan constitutes a portion of the overall IRLNEP Annual Business Plan. Also new to the FY 2017-2018 IRLNEP Business Plan is program performance language that specifically addresses U.S. EPA program evaluation metrics and the NEP program evaluation logic model (i.e. outputs, outcomes, and program performance measures for core elements).

IRLNEP Program Priorities for FY 2017-2018 include implementation of:

1. Nutrient reduction and habitat restoration projects with high return-on-investment value.
2. 2008 CCMP revision process.
3. Program responses to EPA Performance Evaluation recommendations and findings.
4. Strategic regional and statewide communication plan.
5. Strategic actions to expand and diversify revenues for program funding.
6. Development of the following IRLNEP guidance documents: IRL Science for the Next Decade; Communication Plan; and IRL Monitoring Plan.

In FY 2017-2018, the IRLNEP anticipates that the following external factors may influence program implementation and success during the upcoming fiscal year:

IRLNEP MANAGEMENT CONFERENCE:
The new IRLNEP Management Conference was structured as a network governance model. Success of the IRLNEP will require strong leadership and guidance from each component of the Management Conference (i.e. IRL Council Board of Directors, Management Board, Science, Technology, Engineering and Modeling Advisory Committee and Citizens Advisory Committee). A challenge during FY 2017-2018 will be to engage each committee at the appropriate level to optimize program productivity and ensure volunteer engagement satisfaction. Meaningful, productive and efficient volunteer engagement is essential.

FUNDING:
Recent challenges to IRLNEP funding at both state and federal levels suggest that expanded staff efforts will be required to ensure that annual funding levels are sustained. The commitment of recurring funding from IRL Council partners to the Interlocal Agreement represents a strong foundation for support. However, a strong return on investment value proposition must be documented annually to ensure continued partner funding support. In FY 2017-2018, the IRLNEP will focus its Annual Report on documentation of return on investment value to our partners and stakeholders. One example of the IRLNEP strong positive influence was program assistance to Brevard County and the passage of the voter-approved “Save Our Lagoon” sales tax referendum that will generate $30 million annually for the next 10 years dedicated to IRL restoration. The IRLNEP will expand the Indian River Lagoon Investors and Innovators (IRLI2) Network as a priority activity in FY 2017-2018.

FRAGILE HEALTH STATUS OF THE IRLNEP
The greatest external factor remains the uncertain health status of the IRL. The IRLNEP must remain ready to respond to changing IRL conditions and events. The reorganization of the IRLNEP has placed the program in a position of high visibility and growing regional authority. The IRLNEP must strive to be the trusted source of IRL science information and a unifying organizational hub for IRL stakeholders, communities and citizens.
<table>
<thead>
<tr>
<th>Personnel</th>
<th>Travel Dates</th>
<th>Purpose</th>
<th>Location</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duane De Freese, Frank Sakuma, Kathy Hill, Charles Jacoby</td>
<td>7/18-7/22</td>
<td>4th International Mangrove &amp; Macrobenthos Meeting (MM4)</td>
<td>St. Augustine, Florida</td>
<td>$1,440.00</td>
</tr>
<tr>
<td>Frank Sakuma</td>
<td>October, 2016</td>
<td>PGIT Education Conference- Travel &amp; Return/FIT - Introductory Speaker -Travel &amp; Return/Ronald Reagan Club Speaker - Travel &amp; Return</td>
<td>Deland, Melbourne</td>
<td>$145.26</td>
</tr>
<tr>
<td>Kathy Hill</td>
<td>October, 2016</td>
<td>Brevard Schools meeting/IRL Day Planning meeting/Boat/Field support - Volusia County</td>
<td>Melbourne, Viera, Volusia County</td>
<td>$193.13</td>
</tr>
<tr>
<td>Duane De Freese</td>
<td>October, 2016</td>
<td>FL Tech IRL Tech Con RegistrationTravel: IRLNEP office to 22 S. Orange St. Fellsmere and Return for meeting with City ManagerTravel: From IRLNEP office to Space Coast TDC 430 Brevard Ave, Cocoa Village and return. Meeting with Eric Garvey TDC Director. Travel from IRLNEP office to New Smyrna Beach City Commission and returnTravel from office to US Sailing Center, Jensen Beach FL, and returnTravel: From office to St. Lucie County Commission 2300 Virginia Ave, Ft. PierceListen to Water SpeechTravel from 2300 Virginia Ave, Ft. Pierce to Doubletree Hotel 101 S. Adams Street Tallahassee Hotel: 1 night at Doubletree 101 S. Adams, Tallahassee FLTravel: From 101 S. Adams, Tallahassee to House (200 Deland Avenue, Indialantic, FL)Travel from 200 Deland Avenue (home) to KSC Debus Center for MINWR speechTravel from KSC Debus Center to Sirata Beach Resort, St Petersburg Brach- Audubon Assembly SpeechHotel @ St Petersburg. Sirata Beach ResortTravel from Sirata Beach Resort St. Petersburg to 200 Deland Avenue</td>
<td>Fellsmere, Cocoa, New Smyrna Beach, Jensen Beach, Ft. Pierce, Tallahassee, KSC, St. Petersburg</td>
<td>$1,235.10</td>
</tr>
<tr>
<td>Frank Sakuma</td>
<td>November, 2016</td>
<td>Mileage - Brevard HR Director mtg. Viera &amp; Return to office; Mileage - IDEAS StoryJam - Port Canaveral &amp; Return; Mileage - Marine Discovery Center - Project H2O &amp; Return; ANEP/RAE Conference - New Orleans</td>
<td>Viera, Port Canaveral, New Smyrna, New Orleans</td>
<td>$2,051.22</td>
</tr>
<tr>
<td>Duane De Freese</td>
<td>November, 2016</td>
<td>American Water Resources Association - Duane DeFreese - Speaker, Travel from 200 Deland Avenue (home) to Port Canaveral for Study Jam and return; Travel from 200 Deland Avenue (home) to Port Canaveral for flushing meeting and return; Travel from 200 Deland Avenue (home) to MINWR Visitor Center for SOMM meeting and return, Travel from 200 Deland Avenue (home) to FL Hotel &amp; Conference Center, Sand Lake Rd, Orlando for AWRA speech and return</td>
<td>Orlando, Port Canaveral, MINWR Visitor Center</td>
<td>$523.88</td>
</tr>
<tr>
<td>Kathy Hill</td>
<td>November, 2016</td>
<td>11/7/16 Story Jam: 84.3 mi., 11/12/16 IRL Day Event: 33.5 mi., 11/21/2016 Meeting: Vince Lamb/Sierra Club: 38.2 mi.</td>
<td>Port Canaveral, Melbourne</td>
<td>$84.24</td>
</tr>
<tr>
<td>Duane De Freese, Frank Sakuma, Kathy Hill, Charles Jacoby</td>
<td>December, 2016</td>
<td>ANEP Tech Transfer Meeting Registration</td>
<td>New Orleans</td>
<td>$600.00</td>
</tr>
<tr>
<td>Charles Jacoby</td>
<td>December, 2016</td>
<td>ANEP/RAE Meeting</td>
<td>New Orleans</td>
<td>$1,797.85</td>
</tr>
<tr>
<td>Duane De Freese</td>
<td>December, 2016</td>
<td>Travel from 200 Deland Indialantic (home) to Norwoods 400 E 2nd Ave, New Smyrna Beach for meeting with Kelli McGee and Return, Travel from IRLNEP office to River Rocks in Rockledge for meeting with Ken Stackpoole from office and return, Travel from IRLNEP office to Treasure Coast Research Park, Ft. Pierce and return. Meeting with Patrick Sheehan, Travel from IRLNEP office to 2539 Palm Bay Road, Palm Bay for meeting with Rep. Shine staff (Joe Howard) and return</td>
<td>New Smyrna Beach, Rockledge, Ft. Pierce, Palm Bay</td>
<td>$181.44</td>
</tr>
<tr>
<td>Duane De Freese</td>
<td>December, 2016</td>
<td>ANEP/RAE Meeting</td>
<td>New Orleans</td>
<td>$1,970.99</td>
</tr>
</tbody>
</table>

Total: $10,223.11