Agenda Report

2725 Judge Fran Jamieson Way
Viera, FL 32940

New Business - Development and Environmental Services Group

J.1. 2/10/2026

Subject:

Adoption, Re: Save Our Indian River Lagoon Project Plan 2026 Update

Fiscal Impact:

The recommended plan update recognizes a $2,300,233 decrease in total revenues to be generated by the Save Our Indian River Lagoon Surtax over its 10-year life (decreased from $585.73 to $583.43 million) with $5.16 million re-allocated for new and revised projects as follows: 3 wastewater projects; 6 stormwater treatment projects; 3 restoration projects; 1 muck project; and 1 aquatic vegetation harvesting project.

Dept/Office:

Natural Resources Management

Requested Action:

Consider the following action items:

1) Adopt (or modify and adopt) the Save Our Indian River Lagoon Project Plan 2026 Update, as recommended unanimously by the Save Our Indian River Lagoon Citizen Oversight Committee on January 16, 2026;
2) approve continued signature authority to the Chair (or authorized representative, in accordance with the threshold limits provided for in Brevard County policies and administrative orders) to execute contracts, agreements, task orders, change orders, contract renewals, amendments, grant agreements, and other contract-related documents, subject to review and approval by the County Attorney, Risk Management and Purchasing, as appropriate, for projects and programs approved in the Save Our Indian River Lagoon Project Plan;
3) approve authority for the Director of Natural Resources Management to execute no-cost time extensions up to one year and approve the County Manager to execute no-cost time extensions up to two years;
4) grant permission to advertise and competitively procure goods and services needed to implement projects and programs approved in the Save Our Indian River Lagoon Project Plan, subject to available funding;
5) authorize staff to submit grant applications for leveraging cost share for projects and programs approved in the Save Our Indian River Lagoon Project Plan; and
6) authorize the County Manager to execute all necessary Project Plan Update and associated grant budget amendments (BCRs).

Summary Explanation and Background:

Each year, to account for new information and opportunities, the Save Our Indian River Lagoon Citizen Oversight Committee is tasked with recommending an Update to the Save Our Indian River Lagoon (SOIRL) Project Plan. The Committee has held monthly public meetings throughout the year to keep informed, gather

ideas from the community, review potential changes, and recommend an annual plan update to the County Commission. The Committee's annually recommended SOIRL Project Plan Update is posted on the Committee's webpage for public access at least 15 days prior to being brought to the County Commission for consideration. The County Commission may adopt or modify the Committee's recommended Plan Update.

An intergovernmental coordination meeting was held on July 9th, 2025, to review the process for submitting project requests to be considered for addition to the 2026 SOIRL Project Plan Update. Project requests for the 2026 Update were due September 26th. Project submissions are listed in the summary table and the detailed applications (attached) were reviewed by the Committee during a November 21st public meeting. The Committee recommended what new projects and project revisions to include in the draft 2026 SOIRL Project Plan Update.

The draft 2026 SOIRL Project Plan Update (attached) includes eleven (11) new projects and three (3) project revisions. The draft 2026 SOIRL Project Plan Update allocates funding for a total of 403 projects over the 10-year life of the Plan, plus 942 individual quick connections to sewer and 2,671 septic upgrades. The draft 2026 plan also includes performance updates and refinements on multiple project types. To help readers find all areas of the SOIRL Project Plan that contain proposed updates or modifications, the attached Draft 2026 Update uses yellow highlighted text, table, and figure captions to indicate additions and revisions.

Inflation is compounded from the year funds were approved for a project to the year the project is anticipated to be complete, up to a maximum of 5-years, based on the following inflation rates for each year: 2.6% for Plan Years 0-4, 7.8% for Year 5, 17.3% for Year 6, 6.5% for Year 7, and 3.5% for Years 8-10. (Construction inflation rates are based on local bids and national construction industry statistics for infrastructure construction costs.)

Significant changes in the draft 2026 Update include:

- Revising the revenue projection down $2,300,233 in response to state changes in sales tax holidays and exemptions;
- Adding 11 new projects and revising 3 projects (5 county, 4 city, 3 private and 2 non-profit) at $5.16M;
- Updating inflation reserves for each project in the plan that is not yet complete; and
- Reporting on the costs, benefits, successes, and lessons learned from completed projects.

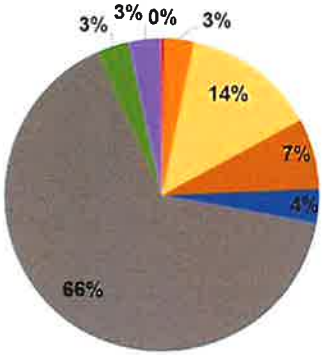
During fiscal year 24/25, actual tax collections were $70.7 million, which was $478,950 more than the $70.2 million estimated in the prior plan update. Using actual revenues collected in 2016 through September 2025, 1.47% for projecting revenue growth during the remainder of the 2025 calendar year, and 0.017% revenue growth in 2026, the estimated 10-year collections decreased by $2,300,233 from $585.73 million to $583.43 million.

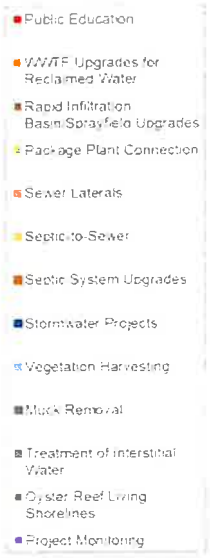
In the 2026 Update, $233 million (42% of the Trust Fund) is directed to projects that improve the treatment of human wastewater through upgraded treatment of reclaimed water, connection of package treatment plants to central sewer, nutrient removal from treatment plant spray-fields and rapid infiltration basins, smoke testing to identify leaky sewer infrastructure coupled with funding to incentivize repairs, conversion of septic neighborhoods to sewer service, connection of septic homes to adjacent sewer lines, and upgrade of high-risk conventional septic to advanced septic systems. The 2026 Update allocates $213 million (38%) for muck removal, including stripping nutrients from the dredge outflow water. The 2026 Update allocates $86.6 million

(16%) for stormwater treatment and vegetation harvesting, $11 million (2%) for restoration and $10 million (2%) for measuring project performance, and $4 million (<1%) for public outreach, as illustrated in the cost allocation pie charts (below). The recommended changes are consistent with the County Commission's 2019 shift in emphasis that reduced muck dredging down from 66% of the original allocation and increased human wastewater related projects up from 24% of the original allocation.

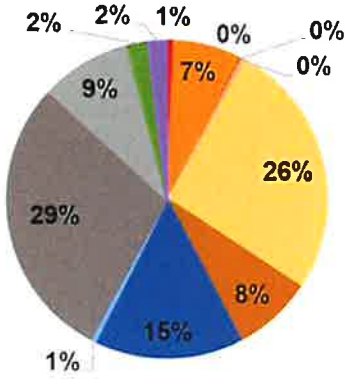
Comparison of Plan Costs

Original Plan - $302,881,000





2026 Plan Update - $558,966,024



Clerk to the Board Instructions:

Send Clerk's memo of Board action to Natural Resources.

BREVARD County
BOARD OF COUNTY COMMISSIONERS

FLORIDA'S SPACE COAST

Kimberly Powell, Clerk to the Board, 400 South Street • P.O. Box 999, Titusville, Florida 32781-0999

Telephone: (321) 637-2001
Fax: (321) 264-6972
Kimberly.Powell@brevardclerk.us

February 11, 2026

M E M O R A N D U M

TO: Virginia Barker, Natural Resources Management Director

RE: Item J.1., Adoption of the Save Our Indian River Lagoon Project Plan (SOIRLPP) 2026 Update

The Board of County Commissioners, in regular session on February 10, 2026, adopted the SOIRL Project Plan 2026 update as recommended unanimously by the SOIRL Citizen Oversight Committee on January 16, 2026; approved continued signature authority to the Chair, or authorized representative in accordance with the threshold limits provided for in Brevard County Policies and Administrative Orders, to execute contracts, agreements, task orders, change orders, contract renewals, amendments, grant agreements, and other contract related documents, subject to review and approval by the County Attorney, Risk Management, and Purchasing, as appropriate, for projects and programs approved in the SOIRLPP; approved authority for you to execute no-cost time extensions up to one year; approved the County Manager to execute no-cost time extensions up to two years; granted permission to advertise and competitively procure goods and services needed to implement projects and programs approved in the SOIRLPP, subject to available funding; authorized staff to submit grant applications for leveraging cost share for projects and programs approved in the SOIRLPP; and authorized the County Manager to execute all necessary Project Plan updates, associated grants, and budget amendments (BCR).

Your continued cooperation is always appreciated.

Sincerely,

BOARD OF COUNTY COMMISSIONERS
RACHEL M. SADOFF, CLERK

Kimberly Powell

Kimberly Powell, Clerk to the Board

cc: County Manager
Finance
Budget

CONTINUING PROFESSIONAL SERVICES AGREEMENT FOR:

Monitoring Groundwater Quality in 13 Communities to Measure the Performance of Multiple Projects Included in the Save Our Indian River Lagoon Project Plan

TASK ORDER NO. 26-10819-028-EC SOIRL

THIS TASK ORDER is made this 12th day of March, 2026, by and between Applied Ecology, Inc., hereinafter referred to as the ENGINEER, and Brevard County, Florida, a political subdivision of the State of Florida, hereinafter referred to as the COUNTY.

WHEREAS, on October 23, 2024, the ENGINEER and the COUNTY entered into a continuing professional services agreement for Environmental Consulting Services, hereinafter referred to as the AGREEMENT, which is incorporated herein by this reference; and

WHEREAS, under SECTION I of the AGREEMENT, the ENGINEER agrees to provide certain professional services which shall be implemented by task orders; and

WHEREAS, the ENGINEER agrees to provide certain ecological and environmental services which shall be implemented in accordance with this Task Order.

NOW, THEREFORE, the parties do mutually agree as follows:

Summary

The purpose of this task order is to provide environmental services to the Brevard County Natural Resources Management Department (County) to provide Performance Measurement and Monitoring Services called for in the Respond component (Section 4.4) of the Save Our Indian River Lagoon (SOIRL) Project Plan. This task provides for one year of monthly groundwater monitoring at 43 wells. The wells are located in thirteen communities and nearby control areas for the purpose of measuring the performance of multiple septic to sewer conversion projects and reclaimed water treatment upgrade projects funded by the SOIRL Trust Fund. Deliverables in this task order are quarterly and annual reporting to provide data trends as projects within the monitored areas are completed.

Section I, Scope of the Work

See Exhibit A – Applied Ecology, Inc. proposal

Section II, Contract Schedule

See Exhibit A – Applied Ecology, Inc. proposal

Section III, Deliverables

See Exhibit A – Applied Ecology, Inc. proposal

Section IV, Basis of Compensation

For the Scope of Work described in Section I of this Task Order, compensation from the COUNTY to the ENGINEER shall be on a percent complete basis as indicated in the attached Exhibit A, with task 1 being compensated based on the number of samples collected, for a total cost not to exceed **$343,721.47** unless authorized by a written Change Order executed by the COUNTY. Upon submittal of deliverables as described in Section III of this Task Order, the COUNTY will be invoiced only for actual work performed. The COUNTY shall pay such invoices in accordance with Florida's Prompt Payment Act. The COUNTY reserves the right to refuse payment for or deduct from any invoice, fees for incomplete or defective work. The following is a summary of the fee breakdown:

A. ECOLOGICAL CONSULTING SERVICES	
1. Groundwater Data Collection	$150,794.54
2. Data Analysis and Reporting	$54,670.78
Project Expenses	$58,554.00
Project Lab Fees (Nutrients)	$66,228.80
Lab Fees (Isotopes)	$13,473.35
Total Project Cost	**$343,721.47**

Section V, Other Terms and Conditions

All of the terms and conditions of the AGREEMENT, and any amendments thereto, shall apply to this Task Order as fully set out herein. In the case of a conflict between the terms of this Task Order and the AGREEMENT, the latter shall control. It is hereby acknowledged that this Task Order is prepared based upon the Master Agreement executed on October 23, 2024, for Environmental Consulting Services between the ENGINEER and the COUNTY. As such, this Task Order is subject to all conditions and stipulations contained in said AGREEMENT, as may be amended.

PURSUANT TO FLORIDA STATUTE SECTION 558.0035, AN INDIVIDUAL EMPLOYEE OR AGENT OF THE ENGINEER MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE.

Section VI, Effective Date and Authorized to Proceed

This Task Order shall be effective on the date specified in the Notice to Proceed from the COUNTY'S designated representative. This Task Order will expire sixteen (16) months from the date of issuance of the Notice to Proceed, unless otherwise extended through a subsequent change order.

Section VII. Authority

The Parties warrant that the person signing this Task Order has all the requisite authority necessary to bind the Party it represents.

IN WITNESS WHEREOF, the parties hereto set their hands and seals the date and year above written.

BREVARD COUNTY, FLORIDA

By: _____

Print: Thad Altman

Title: Chair

Date: APR 07 2026

As approved by the Board on February 10, 2026

Applied Ecology, Inc

By: _____

Print: Claudia M. Listopad, Ph.D., GISP

Title: Principal Scientist

Date: _____

Attest _____

Rachel M. Sadoff, Clerk

Date: APR 07 2026

EXHIBIT A

SCOPE OF WORK

Annual Monitoring of the Groundwater Quality of 13 communities under the Save Our Indian River Lagoon Project Plan, Brevard County.

See attached scope of work for breakdown of tasks, rates, and manhour estimates.

780 S. Apollo Blvd.
Suite 220
Melbourne, FL 32901

March 5, 2026

Virginia Barker, MS
Director
Brevard County Natural Resources Management Office
2725 Judge Fran Jamieson Way, Bldg. A
Viera, Florida 32940

SUBJECT: **Scope of Work and Fees for the 2025-2026 Annual Monitoring of the Groundwater Quality of 13 Communities under the Save Our Indian River Lagoon Project Plan (SOIRLPP)**

Dear Ms. Barker:

Applied Ecology, Inc. (AEI) is pleased to submit this scope of work to Brevard County on the above-referenced service. Included, and incorporated as part of this scope, is an outline of the project information provided to us, the proposed scope of services, our fee, and the proposed schedule.

INTRODUCTION

This scope of work includes groundwater monitoring, data analysis, and reporting for 13 distinct communities and three controls (natural areas) within Brevard County. The specific communities were selected in a previous study funded by the State Legislature and based on areas with high potential for retrofit under the SOIRLPP. The following study areas, which were selected to measure the benefits of retrofit projects included in the SOIRLPP, are included in this groundwater monitoring effort: Merritt Island (septic and sewer communities), Melbourne Beach/Satellite Beach (septic, reclaimed, and sewer communities), Turkey Creek (septic, reclaimed, and sewer communities), Suntree (septic, sewer, and reclaimed), and Titusville (sewer and reclaimed). In addition, three natural areas located in close proximity to various selected communities are included and will be used as controls: Coconut Point (Melbourne Beach), Turkey Creek Sanctuary (Turkey Creek), and Enchanted Forest (Titusville).

Monthly groundwater sampling was initiated in Turkey Creek in 2017 and in the remaining neighborhoods in 2018. Septic-to-sewer conversion is complete in the Suntree neighborhood, and all three properties where groundwater monitoring wells are located for this ongoing monitoring project have been converted. More frequent sampling was performed at these three properties in late 2024 and early 2025 to evaluate changes in concentration soon after conversion. Wastewater treatment facility upgrades have also occurred in Titusville and Turkey Creek, which affects groundwater concentrations in the reclaimed communities. As such, the data analysis for this groundwater monitoring project has transitioned from simply providing baseline data to evaluating

changes in groundwater concentrations post-conversion and post-upgrade. Additional areas are in the process of being, or are anticipated to be, converted or upgraded.

Ongoing groundwater monitoring will be performed in Task 1. Reporting will be performed in Task 2. Well abandonment is not anticipated under this task, unless there are unforeseen circumstances, such as a homeowner stopping participation in the study, a well being damaged, or a homeowner performing construction in the area of a well.

PROPOSED SCOPE OF SERVICES

TASK 1: DATA COLLECTION AND LABORATORY ANALYSIS

This task includes groundwater and reclaimed water sampling and analysis, and homeowner access agreements. The sampling is expected to occur monthly for 12 months, from approximately May 2026 through April 2027. Groundwater samples will be collected once per month. It is anticipated that sampling will occur for the entire 12 months at 43 monitoring wells.

During the previous sampling year, reclaimed water samples were collected from irrigation sprinklers at the Turkey Creek, Titusville, Melbourne Beach, and/or Suntree neighborhoods at an approximate rate of two samples per month. The 2025 Annual Report recommended discontinuing irrigation water sampling as adequate data have been collected to continue to confidently use wastewater treatment facility (WWTF) discharge monitoring reports (DMRs) as a proxy for irrigation nutrient concentrations, and the challenge of coordinating irrigation sampling overcomes the benefit of having irrigation data to confirm WWTF nutrient outputs. In accordance with the recommendation in the Annual Report, reclaimed water samples from irrigation sprinklers are not proposed for collection during the upcoming sampling year.

Groundwater sampling will be performed in general compliance with FDEP groundwater and general sampling protocols. Samples will be delivered within hold times to Pace Analytical Services, LLC, which is a certified National Environmental Laboratory Accreditation Conference (NELAC) laboratory. Orthophosphate has a short hold time of 48 hours. In order to meet the short hold times, AEI will drive the samples to the laboratory. Duplicate teams will be deployed to collect samples during each day of sampling, reducing travel time and the number of rush delivery trips to the laboratory.

Field parameters (pH, temperature, conductivity, dissolved oxygen, and turbidity) will be collected during sampling. The following laboratory parameters will be analyzed by the NELAC certified lab: ammonia (NH-3-N), nitrate-nitrite (NOx-N), total Kjeldahl nitrogen (TKN), calculated total nitrogen (TN), orthophosphate as P (OrthoP, or PO_4^{3-}), and total phosphorus (TP). A total of approximately 568 samples [516 groundwater samples and 52 blank/duplicates (approximately 10% of the collected samples)] will be collected and analyzed for the nutrients listed above. It is assumed that 10% of the samples will need to be filtered to meet the low turbidity requirements for the orthophosphate analysis.

A lump sum amount has been scoped for the isotopic analysis of samples, but the scope and schedule are subject to change. The UC Davis SIF laboratory is guaranteeing unit rates for only three months from the date of the quote. They have also indicated that unit rates are expected to increase in mid-2026. Therefore, though a sampling plan is proposed in the next paragraph, modifications may need to be made to the sampling plan so that actual costs do not exceed proposed costs. This may include a reduction in the number of samples collected and sent for isotopic analysis.

With the understanding that the scope for the isotopic analysis is subject to change, in order to meet the proposed budget, the following is tentatively proposed. It is tentatively proposed that a total of approximately 162 samples will be collected and shipped to the University of California (UC) Davis Stable Isotope Facility (SIF) Laboratory for isotopic analysis. It is estimated that the 162 samples will include approximately 154 groundwater samples and 8 duplicates. It is estimated that samples will be collected from approximately 14 monitoring wells each month. As in previous years, samples are anticipated to be sent to UC Davis after collection of 11 months of samples, in order to facilitate completion of the isotopic analysis in time for inclusion in the annual report. Due to the high cost of shipping, including using dry ice to keep the sample frozen, it is assumed that the samples can be sent in no more than two coolers. As discussed above, the number of samples is subject to change, in order to optimize usage of the funds available for this task.

Minor maintenance and repairs, such as replacing bolts and well caps, removing small tree roots, and performing minor reconditioning on up to one well, will be performed in conjunction with the monthly sampling. A formal report will not be prepared for the minor maintenance and repairs. Budget for equipment and miscellaneous replacement parts for wells has been included in the scope. AEI will notify the County if more extensive maintenance or repairs are needed and can provide a cost estimate upon request.

Field and laboratory data will be entered and quality assured monthly. AEI will coordinate with homeowners to renew homeowner agreements, set up agreements with new homeowners, and schedule monthly efforts. AEI will also check the Brevard County property appraiser website periodically to confirm if there have been any ownership changes. AEI will also coordinate with the local NELAC certified laboratory and the UC Davis SIF laboratory.

Expenses associated with Task 1 include laboratory analysis of nutrients, isotopic analysis, field supplies and equipment rental, and express laboratory delivery.

DELIVERABLE(S):

- None (field datasheets and laboratory results will be included in quarterly and annual reports in Task 2)

TASK 2: DATA ANALYSIS AND REPORTING

Summary statistics will be evaluated and reviewed as the study progresses and time series plots reviewed for quality control and a continued understanding on the nitrogen and phosphorus variations in this study. Data will be analyzed for trends over time for each of the parameters, with the emphasis on those parameters that are changing quickly or providing insight into treatment success. Changes to the project area (e.g., connection to central sewer for the septic sites, upgrades to WWTP for the reclaimed water) will be the focus on this evaluation.

Quarterly data updates will be provided in a presentation format (slides) in lieu of the quarterly reports that have been submitted under previous task orders. The quarterly data updates may include summary data tables, graphical representation of changes in nutrients in timeseries plots, and tabular and/or graphical comparison of concentrations before and after changes to the project areas. The focus on the analysis will be on reinforcing pre-post treatment comparison and any newly visible patterns that might emerge during the annual monitoring process. The following will not be included as part of the data updates: summaries of findings, interpretation of statistical analyses, advanced statistics/inferential data analyses, sampling logs, and laboratory reports. The data updates will be submitted as final versions, and AEI understands that the data updates are not required to be ADA-compliant.

The data from the fourth quarter of sampling will be presented, along with the entire time series dataset, in the Annual Report. The annual report will include laboratory and field data, summary data, graphical representations of trends, pre- versus post-retrofit comparisons (when and where available), and relevant statistical analysis. The Annual Report will be submitted as draft. The County's comments, if any, will be incorporated into the Annual Report prior to finalizing. The final Annual Report will be ADA-compliant in accordance with County requirements. This task also includes time for coordination, up to one formal presentation (if requested), and one meeting to discuss the monitoring results, as well as time to incorporate one set of comments in the final annual report.

DELIVERABLE(S):

- Quarterly data updates (3), including summary data tables, time series plots, and comparison of concentrations before and after upgrades (PowerPoint or PDF version with data plots/charts).
- Power Point or PDF version of a presentation, if requested.
- Draft Annual Report that summarizes the field and lab data, statistical analysis results, and data interpretation.
- Final Annual Report, which incorporates one set of comments received from County staff.

FEE AND METHOD OF COMPENSATION

We propose performing the above scope of services for a lump sum fee of **$343,721.47** Monthly invoices will be billed based on the percentage of tasks completed during each calendar month. Details on the level of effort and associated cost by task are provided in **Attachment A**.

If unforeseen conditions should require services beyond the scope of services described herein, Applied Ecology will notify you immediately of additional costs necessary to complete the project prior to proceeding. Services beyond those described herein would be invoiced in accordance with our standard schedule of fees at the applicable rates.

SCHEDULE

We anticipate initiating the project immediately after notice to proceed (NTP). The first monthly groundwater monitoring event in Task 1 (Data Collection) is scheduled for May 2026, and the final monthly event is scheduled for April 2027. Task 2 (Data Analysis and Reporting) is expected to be completed within four (4) months after the last sampling event, i.e. August 2027, assuming the isotopic analytical results are received by July 2027.

AUTHORIZATION

Please provide written authorization to proceed consistent with the terms and conditions of the Environmental Consulting Contract between Brevard County and Applied Ecology dated 10/23/2024.

We appreciate the opportunity to offer our professional services on this project. If you have any questions concerning this proposal, please contact us at 321-499-3336.

Sincerely,

Catherine A. Soistman, P.E. (AL, CA, FL, MS)
Principal Engineer

Claudia Listopad, Ph.D., GISP
President, Principal Scientist

ATTACHMENT:

Attachment A: Detailed Costs including expenses and laboratory costs.

Task 1: ***Data Collection***

Subtask	Description	Principal Scientist / Engineer ($191.01)	Sr. Staff Scientist / Engineer ($138.23)	Staff Scientist / Engineer ($106.81)	Assoc. Staff Scientist / Engineer ($82.94)	Clerical / Administrative Support ($65.7)	Field Technician ($81.74)	Total Hours	Total Cost
1	Homeowner Notifications and Sampling Preparation	2	24	72	0	0	0	98	$ 11,389.86
2	Sampling effort for 12 monthly events for 43 wells	8	20	34	908	0	260	1230	$ 104,486.14
3	Compilation and Reporting of Lab Results and Field Parameters, QA	8	24	60	120	0	0	212	$ 21,207.00
4	Project management (coordination with laboratory, homeowners, client)	12	28	12	0	12	0	64	$ 8,232.68
5	Contact Homeowners to Obtain Renewals/Abandon Wells	6	8	24	8	0	0	46	$ 5,478.86
ALL	***Total Data Collection***	***36***	***104***	***202***	***1036***	***12***	***260***	***1650***	***$ 150,794.54***

Task 2: ***Data Analysis and Reporting***

Subtask	Description	Principal Scientist / Engineer ($191.01)	Sr. Staff Scientist / Engineer ($138.23)	Staff Scientist / Engineer ($106.81)	Assoc. Staff Scientist / Engineer ($82.94)	Clerical / Administrative Support ($65.7)	Field Technician ($81.74)	Total Hours	Total Cost
1	Quarterly Data Updates (3 quarters)	6	24	60	12	0	0	102	$ 11,867.46
2	Data Analysis for Annual Report	16	24	80	30	0	0	150	$ 17,406.68
3	Draft and Final Annual Report	24	32	80	30	20	0	186	$ 21,354.60
4	Meetings, Presentations & PM (one meeting)	16	0	8	0	2	0	26	$ 4,042.04
ALL	***Total Data Analysis and Reporting***	***62***	***80***	***228***	***72***	***22***	***0***	***464***	***$ 54,670.78***

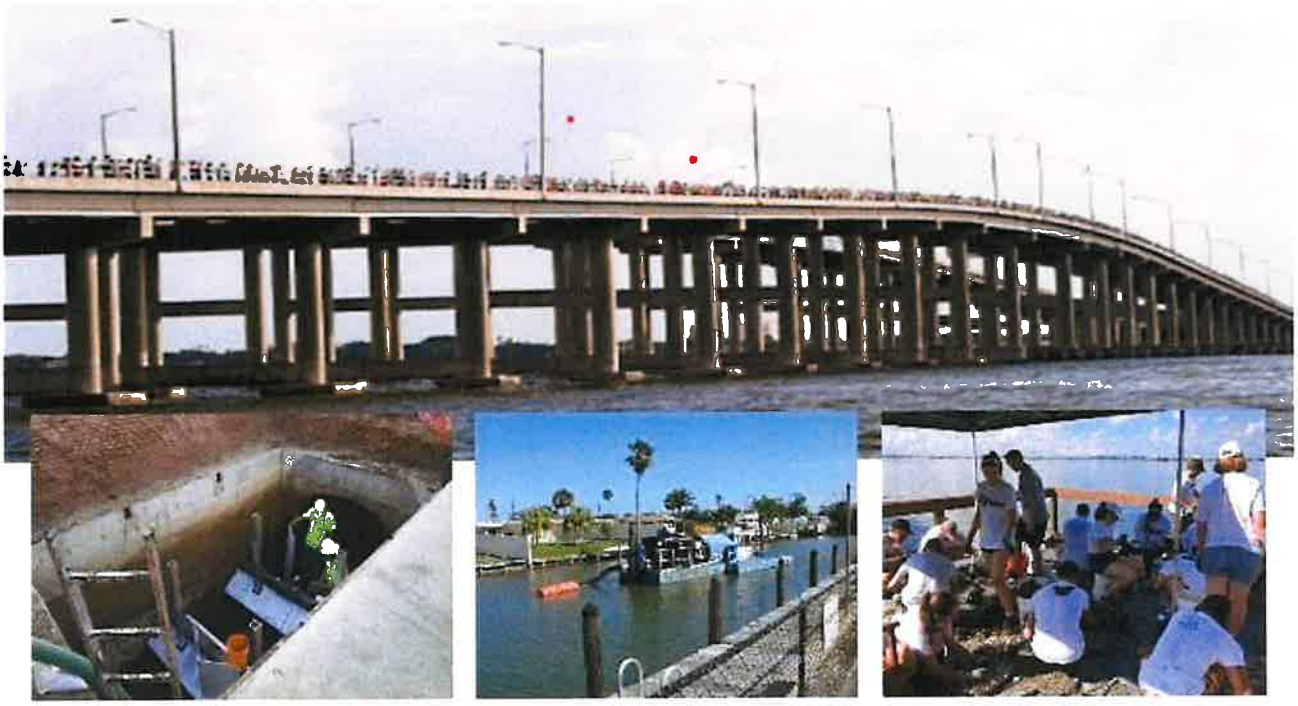
Major Task Summary

Task	Description	Principal Scientist / Engineer ($191.01)	Sr. Staff Scientist / Engineer ($138.23)	Staff Scientist / Engineer ($106.81)	Assoc. Staff Scientist / Engineer ($82.94)	Clerical / Administrative Support ($65.7)	Field Technician ($81.74)	Total Hours	Total Cost
1	Data Collection	36	104	202	1036	12	260	1650	$ 150,794.54
2	Data Analysis and Reporting	62	80	228	72	22	0	464	$ 54,670.78
Total Labor		***98***	***184***	***430***	***1108***	***34***	***260***	***2114***	***$205,465.32***
Project Expenses									***$ 58,554.00***
Project Lab Fees (Nutrients)									***$ 66,228.80***
Lab Fees (Isotopes)									**$ 13,473.35**
Total Project									***$343,721.47***

Table 1. Project Application Table

Project Number	Project Name	Entity	Project Type	Eligible Cost-Share Rate ($/pound TN)	Total Cost ($/pound TN)	TN Reduction (pounds/year)	Total Cost	Maximum Eligible SOIRL Cost Share	Eligible Cost Share Request	Cumulative SOIRL Funding Increase	Dollar Amount Secured Grants	Notes
285	Unincorporated Countywide Vegetation Harvesting 3	Brevard County	Vegetation Harvesting	$114	$127	4,524	$575,000	$515,736	$515,736	$515,736	$0	Removal of 3,000,000 pounds of aquatic vegetation over 2 years
286	Coconut Point Shoreline Stabilization and Living Shoreline Enhancement	Hubbs SeaWorld Research Institute	Planted Shoreline	$259	$3,593	34	$122,168	$8,806	$8,806	$524,542	$41,400 NEP	500 linear feet of shoreline
287	The Cove Package Plant Upgrade	Private HOA	WWTF Upgrade	$431	$21,739	23	$500,000	$9,913	$9,913	$534,455	$0	Upgrading package plant
288	The Zip Project: An Oyster Restoration Project	The Zip Project	Oyster Bar	$475	$275	20	$5,500	$9,500	$5,500	$539,955	$0	500 square feet of oyster bar
289	Brevard Zoo North IRL Oyster Project 5	Brevard Zoo	Oyster Bar	$475	$475	2,600	$1,235,000	$1,235,000	$1,235,000	$1,774,955	$0	65,000 square feet of oyster bar
290	South St & US1 Baffle Box	City of Titusville	Stormwater	$574	$695	698	$485,000	$400,652	$400,652	$2,175,607	$0	Baffle box with media treating 202 acres
291	535 Knox McRae Baffle Box	City of Titusville	Stormwater	$574	$760	572	$435,000	$328,328	$328,328	$2,503,935	$0	Baffle box with media treating 168 acres
292	Basin 212 East Main Street	Brevard County Natural Resources	Stormwater	$574	$875	656	$574,263	$376,544	$376,544	$2,880,479	$0	Denitrification treatment system treating 140 acres
207	Basin 1124 Elliot Drive	Brevard County Natural Resources	Stormwater	$574	$971	617	$598,930	$354,158	$354,158	$3,075,989	$158,648 SOIRL	Revising denitrification project with updated nutrient reduction treating 140 acres for an additional $195,510
258	Cocoa Beach Golf Course Floating Vegetative Islands	City of Cocoa Beach	Stormwater	$574	$7,645	152	$1,162,000	$87,248	$87,248	$3,125,139	$38,098 SOIRL	Revising project with updated nutrient reduction for an additional $49,150
293	Fillmore Avenue Streetscape Project	City of Cape Canaveral	Stormwater	$574	$56,372	60	$3,382,316	$34,440	$34,440	$3,159,579	$0	Rain garden project treating 11 acres
294	Tequesta Harbor Revitalization Project	Tequesta Harbor Yacht Club Association	Muck Removal	$607	$662	68	$45,000	$41,276	$41,276	$3,200,855	$0	Remove approximately 3,200 cubic yards of muck from Tequesta Harbor
203	South Central A	Brevard County	Septic to Sewer by Extension	$1,553	$2,187	5,318	$11,629,426	$8,258,854	$8,258,854	$4,910,531	$3,370,572 State $6,549,178 SOIRL	Revising project from 101 to 129 connections; eligible for an additional $1,709,676
295	South Tropical Trail / Kadlac Drive Sewer Extension	Brevard County	Septic to Sewer by Extension	$1,553	$2,273	162	$368,204	$251,586	$251,586	$5,162,117	$0	Septic to sewer conversion of 6 properties

Draft Save Our Indian River Lagoon Project Plan 2026 Update for Brevard County, Florida



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- Dr. Richard (Grant) Gilmore, expert in Indian River Lagoon fisheries and ecology
- Dr. Charles Jacoby, St. Johns River Water Management District Supervising Environmental Scientist
- Dr. Kevin Johnson, Florida Institute of Technology Associate Professor, Marine and Environmental Systems

- Dr. Mitchell A Roffer, Florida Institute of Technology Adjunct Professor, President Roffer's Ocean Fishing Forecasting Service, Inc.
- Dr. Jonathan Shenker, Florida Institute of Technology Associate Professor of Marine Biology
- Dr. John Trefry, Florida Institute of Technology Professor of Marine and Environmental Systems
- Martin S. Smithson, Sebastian Inlet District Administrator
- Joel Steward, St. Johns River Water Management District Supervising Environmental Scientist (Retired)
- Dr. John Windsor, Florida Institute of Technology Oceanography and Environmental Science Professor Emeritus and Program Chair

Economic Impacts Subject Matter Experts Consulted during Original Plan Development:

- Jim Brandenburg, Brevard County Property Appraiser Information Technology
- Eric Garvey, Brevard County Tourism Development Council Executive Director
- Herb Hiller, Brevard County Tourism Development Council Consultant on Ecotourism
- Vince Lamb, Indian River Lagoon Council Management Board, Florida Master Naturalist, Entrepreneur
- Dr. Michael H. Slotkin, Florida Institute of Technology Associate Professor, Nathan M. Bisk School of Business
- Laurilee Thompson, Brevard County Tourism Development Council, Commercial Fisheries Expert, Entrepreneur
- Dr. Alexander Vamosi, Florida Institute of Technology Associate Professor, Nathan M. Bisk School of Business

Agencies and Local Governments Consulted during Original Plan Development:

- Florida Department of Environmental Protection
- Florida Department of Health
- Space Coast Association of REALTORS®
- Space Coast Tourism Development Council
- St. Johns River Water Management District
- Brevard County Budget Office
- Brevard County Natural Resources Management Department
- Brevard County Property Appraiser Information Technology
- Brevard County Utility Services Department
- City of Melbourne
- City of Palm Bay
- City of Titusville
- City of West Melbourne

Photographs on cover:
Top from http://spacecoastdaily.com/2013/09/hands-across-lagoon-set-for-sept-28/
Bottom left from the Central Boulevard baffle box upgrade in the City of Cape Canaveral
Bottom middle from the muck dredging project in the City of Cocoa Beach
Bottom right from the Bomalaski oyster bar project in Merritt Island

Executive Summary

The Indian River Lagoon system (IRL or lagoon) includes Mosquito Lagoon, Banana River, Indian River, and Halifax River. This is a unique and diverse system that connects Volusia, Brevard, Indian River, St. Lucie, Martin, and Palm Beach counties. The IRL is part of the National Estuary Program, one of 28 estuaries of National Significance, and has one of the greatest diversity of plants and animals in the nation. A large portion of the IRL, 71% of its area and nearly half its length, is within Brevard County (County) and provides County residents and visitors with many opportunities and economic benefits.

However, the balance of this delicate ecosystem has been disturbed as development in the area has led to harmful impacts. Stormwater runoff from urban and agricultural areas, wastewater treatment facility discharges, septic systems, and excess fertilizer applications have led to harmful levels of nutrients and sediments entering the IRL. These pollutants create cloudy conditions in the lagoon and feed algal blooms, both of which negatively affect the seagrass community that provides habitat for much of the lagoon's marine life. In addition, these pollutants lead to muck accumulations, which release (flux) nutrients and hydrogen sulfide, deplete oxygen, and create a bottom that is not hospitable to seagrass, shellfish, or other marine life.

Efforts have been ongoing for decades to address these sources of pollution. Despite significant load reductions, in recent years signs of human impact to the IRL have been magnified. In 2011, the "superbloom" occurred, an intense algal bloom in the Mosquito Lagoon, Banana River Lagoon, and North IRL, as well as a secondary, less intense bloom in the Central IRL. There have also been recurring brown tides; unusual mortalities of dolphins, manatees, and shorebirds; and large fish kills due to low dissolved oxygen from decomposing algae.

Local governments and the St. Johns River Water Management District have been proactive in implementing projects over the last several decades. However, to restore the IRL to health and prosperity, additional funds were needed to eliminate current excess nutrient loading and remove the legacy of previous excess loading. Therefore, Brevard County placed a Save Our Indian River Lagoon 0.5 cent sales tax referendum on the ballot in November 2016, which passed and is providing a funding stream for the types of projects listed in this plan for the County and its municipalities.

The Save Our Indian River Lagoon Project Plan outlines local projects planned to meet water quality targets and improve the health, productivity, aesthetic appeal, and economic value of the IRL. Implementation of these projects is contingent upon funding raised through the 0.5 cent sales tax. This sales tax funding also allows the County to leverage additional dollars in match funding from state and federal grant programs because the IRL ecosystem is valued not only at the local level, but also at both the state and national levels. Funding implementation of this plan would help to restore this national treasure. Lagoon ecosystem response may lag several years behind completion of nutrient reductions; however, major steps must begin now to advance progress on the long road to recovery.

In the development of this plan, Subject Matter Experts were consulted to provide feedback on the plan elements. The experts all agreed that a "critical mass" of excess nutrient reductions must be achieved to see a beneficial result in the IRL. This critical level of reduction will be achieved through the implementation of the projects in this plan. During plan development in 2016, it was estimated that the benefit of restoring the IRL had a present value of $6 billion with an expense of $300 million from the tax. Therefore, implementing this plan to restore the IRL

was an excellent investment in the future of Brevard County's community and economy with a benefit to cost ratio of 20:1. An economic valuation completed in 2025 for the National Estuary Program found an annual benefit of $28.3 billion for the entire Indian River Lagoon and a Return on Investment for restoration projects of 24:1 (The Balmoral Group, 2025).

To restore the lagoon's balance, Brevard County seeks to accelerate implementation of a multi-pronged approach to **Reduce** pollutant and nutrient inputs to the IRL from fertilizer and grass clippings, reclaimed water from wastewater treatment facilities, sprayfields and rapid infiltration basins, package plants, sewer laterals, septic systems, and stormwater; **Remove** the accumulation of muck from the lagoon bottom; **Restore** water-filtering oysters and clams and related IRL ecosystem services; and monitor progress to **Respond** to changing conditions, technologies, and new information by amending the plan to include actions that will be most successful and cost-effective for significantly improving IRL health, productivity, and natural resilience.

The portfolio of projects in this plan was selected as the most cost-effective suite of options to achieve water quality and biological targets for the IRL. Investment has been distributed among a set of project types with complementary benefits to reduce future risk of failure. Approximately 60% (originally one-third) of the effort and expense is split among multiple projects to reduce incoming load to healthy levels. Approximately 36% (originally two-thirds) of the effort and expense is directed toward muck removal to address decades of past excess nutrient loading. Nitrogen and phosphorus released each year as muck decays are now larger than any current source of nutrient pollution to IRL waters. Less than 5% of tax revenues go towards restoring natural filtration systems; measuring the success of different project types; and responding to new information, technologies, and opportunities with annual plan updates.

The projects in the plan have been prioritized and ordered to deliver improvements to the lagoon in the most beneficial spatial and temporal sequence so that the implementation of this plan is expected to result in a healthier IRL. If a future project is ready to move forward earlier than scheduled in the plan, if such advancement is consistent with temporal sequencing goals in the plan and is recommended by the Citizen Oversight Committee, and if sufficient Trust Fund dollars are available, the County Manager (for budget changes less than $200,000) or Brevard County Commission have the authority to adjust the project schedule at any time to ensure that approved projects funded in the plan move forward as soon as feasible.

This 2026 Update to the Save Our Indian River Lagoon Project Plan contains the tenth set of project updates, new approved projects, and schedule modifications to the plan. Local stakeholders submitted projects annually to Brevard County for inclusion in the plan. The appointed Citizen Oversight Committee reviewed the submitted projects and made a recommendation to the Board of County Commissioners on which projects should be added, removed, and/or replaced to the Save Our Indian River Lagoon Project Plan. This update includes those changes recommended by the Citizen Oversight Committee and approved for inclusion by the Board of County Commissioners.

A summary of the types of projects included in the plan, as well as the associated costs and total nitrogen (TN) and total phosphorus (TP) reductions in pounds per year are shown in **Table ES-1**. Despite the considerable cost of restoration, analysis demonstrates that the economic cost of inaction is double the cost of action. Furthermore, although many tangible and intangible benefits exist for saving the IRL, the readily estimated return on investment for three benefits – tourism, waterfront property values, and commercial fisheries – is approximately 10% to 26%.

Table ES-1. Summary of Project Types, Costs, and Nutrient Reductions in the 2026 Update of the Save Our Indian River Lagoon Project Plan

Project Category	Project Type	Inflated/Final Save Our Lagoon Project Cost	Approved Save Our Indian River Lagoon Project Cost	TN Reductions (pounds per year)	Average Cost per Pound per Year of TN	TP Reductions (pounds per year)	Average Cost per Pound per Year of TP
Reduce	Public Education	$4,000,742	$3,530,000	33,709	$105	2,413	$1,463
Reduce	WWTF Upgrades for Reclaimed Water	$37,964,159	$32,589,561	82,174	$397	18,048	$1,806
Reduce	Rapid Infiltration Basin/Sprayfield Upgrades	$93,054	$82,207	317	$259	To be determined	To be determined
Reduce	Package Plant Connection	$1,484,731	$1,366,500	911	$1,500	To be determined	To be determined
Reduce	Sewer Lateral Rehabilitation	$1,558,648	$1,314,594	6,196	$212	188	$6,993
Reduce	Septic-to-Sewer	$146,772,832	$124,007,902	103,510	$1,198	997	$124,381
Reduce	Septic System Upgrades	$45,183,828	$40,057,872	43,310	$925	To be determined	To be determined
Reduce	Stormwater Projects	$83,775,372	$82,351,432	217,501	$379	29,883	$2,756
Reduce	Vegetation Harvesting	$2,890,339	$2,883,120	47,498	$61	5,015	$575
Remove	Muck Removal	$162,569,997	$133,749,381	235,202	$569	18,747	$7,134
Remove	Treatment of Muck Interstitial Water	$50,896,253	$38,761,200	500,032	$78	29,897	$1,296
Restore	Oyster Bars	$11,108,467	$9,536,765	22,261	$428	625	$15,259
Restore	Planted Shorelines	$110,132	$110,132	440	$250	151	$729
Restore	Clam Restoration	$557,470	$542,000	4,241	$128	858	$632
Respond	Projects Monitoring	$10,000,000	$10,000,000	-	-	-	-
Respond	Contingency	$24,468,512	$24,468,512	-	-	-	-
Total	***Total***	***$583,434,536***	***$505,351,178***	***1,297,302***	***$390 (average)***	***106,822***	***$4,731 (average)***

Section 1. Background

The Indian River Lagoon system (IRL or lagoon) includes Mosquito Lagoon, Banana River, Indian River, and Halifax River. A large portion of the IRL, 71% of its area and nearly half its length, is within Brevard County (County) and provides County residents and visitors many opportunities.

However, the balance of this delicate ecosystem has been disturbed as development in the area has led to harmful impacts. Stormwater runoff from urban and agricultural areas, wastewater treatment facility discharges, septic systems, and excess fertilizer applications have led to harmful levels of excess nutrients and sediments entering the IRL. In addition, these pollutants lead to muck accumulation on the lagoon bottom, which fluxes nutrients and creates a lagoon bottom that is not conducive to seagrass, shellfish, or benthic invertebrate growth.

Efforts have been ongoing to address these sources of pollution. The Indian River Lagoon System and Basin Act of 1990 (Chapter 90-262, Laws of Florida) was enacted to protect the IRL from wastewater treatment facility discharges and the improper use of septic systems. The act includes three objectives: elimination of surface water discharges, investigation of feasibility of reuse, and centralization of wastewater collection and treatment facilities (Florida Department of Environmental Protection, 2016). This act led to the removal of effluent discharges to the IRL from more than 40 wastewater treatment facilities (St. Johns River Water Management District, 2016a).

Stormwater regulations were adopted in unincorporated Brevard County in 1978 and adopted statewide in 1989. Due to stormwater regulations, stormwater treatment systems were constructed along with all new development exceeding size thresholds. Privately owned and operated stormwater treatment systems have prevented more than a million pounds of sediments from entering the IRL since 1989 (St. Johns River Water Management District, 2016a). Stormwater treatment projects also reduce excess nutrient inputs to the lagoon. In addition, dredging projects have been ongoing since 1998 to remove muck from the IRL and major tributaries, including Crane Creek, Turkey Creek, Eau Gallie River, and St. Sebastian River (St. Johns River Water Management District, 2016a). These stormwater treatment and muck removal projects contributed to significant improvements in IRL water quality and water clarity, which allowed for a great expansion of seagrass from 2000–2010.

However, recently, human impacts on the IRL have been magnified. In 2011, the "superbloom" occurred, an intense algal bloom in the Mosquito Lagoon, Banana River Lagoon, and North IRL, as well as a secondary, less intense bloom in Central IRL. The extent and longevity of the bloom had a detrimental impact on seagrass, with a 75% reduction in areal extent and 89% reduction in seagrass cover. There have also been recurring brown tides; unusual mortalities of dolphins, manatees, and shorebirds; and large fish kills due to low dissolved oxygen from decomposing algae.

In 2009, to improve water quality and restore seagrass, the Florida Department of Environmental Protection adopted total maximum daily loads for total nitrogen (TN) and total phosphorus (TP) allowed to discharge to the Banana River Lagoon, North IRL, and Central IRL. The purpose of these total maximum daily loads is to reduce excess nutrients that lead to algae growth, which block sunlight from seagrass and create low dissolved oxygen conditions that affect fish in the IRL. To implement these total maximum daily loads, the Florida Department of Environmental Protection adopted three basin management action plans that outline responsibilities for reductions by the local stakeholders, list projects, and stipulate a timeline for

implementation. The intent of the excess nutrient reductions is to provide water quality conditions that should result in seagrass growth in the lagoon at historical levels. Brevard County has a major responsibility in all three basin management action plans along with its 16 municipalities, Florida Department of Transportation District 5, Patrick Space Force Base, National Aeronautics and Space Administration – Kennedy Space Center, and agriculture. The Florida Department of Environmental Protection updated all three basin management action plans in 2020.

From 2012 to 2015, Brevard County led an effort with its municipalities, Florida Department of Transportation District 5, and Patrick Space Force Base to update the estimates of nutrient loadings to the IRL. The County and its partners teamed with several consultants to develop the Spatial Watershed Iterative Loading model that revised the estimates of loading by source to the lagoon (refer to **Section 2** for more details). The revised loading estimates for each year were compared to seagrass areas for each respective year to recommend refinement of state and federal approved total maximum daily loads. The loading estimates and total maximum daily load targets referenced in this plan are from these local efforts, as they are based on the most up-to-date data and analyses even though the state and federal total maximum daily loads have not been officially updated.

Damage to the IRL has been occurring for decades and will require time and money to reverse. An important example is the accumulation of muck on the bottom of 10% of the IRL. This muck kills marine life and releases stored pollutants into the IRL. To address the damage to the IRL, in 1990, Brevard County implemented a stormwater utility assessment, which established an annual assessment rate of $36 per year per equivalent residential unit that stayed at this level until 2014. The rate increased to $52 per equivalent residential unit for 2014 and 2015 and increased to $64 per equivalent residential unit in 2016. This raised collections from $3.4 million (in 2014) to $6.0 million (in 2016). Of the funding raised, a portion is available for capital improvement programs or other stormwater best management practices and is split between water quality improvement programs and flood control and mitigation programs. In addition, funding is spent on annual program operating expenses. Operation and maintenance includes National Pollutant Discharge Elimination System permit compliance activities (street sweeping, trap and box cleaning, and aquatic weed harvesting), outfall/ditch treatments, small-scale oyster restoration, as well as harvesting and replanting of floating vegetative islands.

While revenues from this unincorporated county stormwater assessment as well as stormwater assessments in the cities have funded many projects, a significant portion of projects have also been partially funded by grants. When applicable, federal water quality grants provide up to 60% matching funds, state total maximum daily load grants provide up to 50% match, and St. Johns River Water Management District cost-share grants have funded up to 33% of construction. All these grant programs are highly competitive and subject to variable state and federal appropriations, as well as changing priorities.

In addition to the stormwater utility fees, the County and city wastewater utilities charge set rates to maintain their wastewater collection systems and treatment facilities. In 2012, the Brevard County Utility Services Department engaged engineering firms to evaluate the condition of the sewage infrastructure assets. This investigation identified $134 million in capital improvement needs over a ten-year period to bring County-owned sewer system assets up to a fully functional, reliable, affordable, efficient, and maintainable condition (Brevard County Utility Services, 2013). The Brevard County Commission approved financing the identified projects and increased the County's sewer service rates to repay the debt. In 2022, the County conducted another assessment of the sewage infrastructure, which identified additional capital

improvement needs. The Brevard County Commission approved an increase in the sewer service rates and $460 million in bonding for the identified projects. It is important to note that the funding raised through the utility rates goes towards required operation and maintenance of the existing system and facilities but does not pay for extending sewer service or upgrading the treatment levels beyond permit requirements.

Due to funding limitations and the continuing degradation of key indicators of health in the IRL, such as seagrass and fish, Brevard County identified a need for additional funding to implement projects identified as critical to IRL restoration. Therefore, the County placed a Save Our Indian River Lagoon 0.5 cent sales tax referendum on the ballot in November 2016. This referendum passed by more than 60% of the votes, provides a funding mechanism for the projects listed in this plan and annual updates. Revenue collection from the sales tax began in January 2017.

This Save Our Indian River Lagoon Project Plan outlines projects planned to meet updated total maximum daily load targets and improve the health, productivity, aesthetic appeal, and economic value of the IRL. Almost all these projects require sales tax funding to be implemented. Furthermore, the local sales tax funding is being used to leverage more in match funding from state and federal grant programs. Finally, a significant amount of tax dollars collected are from out of county visitors. The IRL ecosystem is an asset both on the state and national levels; therefore, implementation of this plan will help to restore this national treasure. If additional funding is provided through matching funds from other sources, additional projects may be implemented, which would increase the overall plan cost, and/or project timelines may be moved up to allow the benefits of those projects to occur earlier than planned. Response of the IRL ecosystem may lag for several years behind completion of excess nutrient reduction implementation; however, action must be accelerated now to ensure restoration succeeds over time.

1.1. Return on Investment and Economic Value

The economic value of the Indian River Lagoon system (IRL or lagoon) was evaluated during development of this plan. It was estimated that at least a total present value of $6 billion is tied to restoration of the IRL. Approximately $2 billion in benefits occurs from restoration and an estimated $4 billion in damages if the IRL is not brought back to health during the next decade. If viewing this project plan purely as a financial investment that pays the $2 billion in benefits alone (i.e., not counting the avoidance of the $4 billion loss), the projected pretax internal rate of return is 10%, if the plan takes 10 years to implement (CloseWaters LLC, 2016).

Table 1-1 documents projections of three economic engines likely to have significant economic impacts on Brevard County residents with positive impacts if the IRL is restored versus negative impacts if the IRL is not restored. Additional detail on each of these impacts is provided in **Section 1.1.1**. The upper part of the table lists the economic benefits for restoring a healthy IRL while the lower part of the table lists the economic costs of declining IRL health in the absence of restoration through plan implementation.

Economic impacts in the table are expressed both as annual cash flows and as the discounted expected present value of those cash flows over a 30-year financial plan period. Expected present value is an economic indicator used in business to express the present monetary value of a future stream of cash flows. This expected monetary value discounts the future stream by an interest rate and discounts it further by a probability factor to account for the uncertainty of future events. Therefore, the expected present value of IRL economic benefits shown in **Table 1-1** is much less than the sum of those future cash flows.

Table 1-1. Economic Impact Scenarios Based Upon the Conditions of the IRL

Economic Benefits for Restoring a Healthy IRL and Costs of Declining IRL Health	Annual Cash Flow	Expected Present Value
Tourism and Recreation Growth Benefits	$95 million	$997 million
Property Value Growth Benefits	$81 million	$852 million
Rebirth of Commercial Fishing Benefits (excludes indirect benefits)	$15 million	$159 million
Healthy Residents and Tourists Benefits	Not quantified	Not quantified
Total Benefits	***$191 million***	***$2.01 billion***
Tourism and Recreation at Risk Damages	-$237 million	-$3 billion
Property Value at Risk Damages	-$92 million	-$1.2 billion
Decline of Commercial Fishing (excludes indirect impacts)	-$6 million	-$87 million
Potential Pathogen Impacts to Residents and Tourists	Not quantified	Not quantified
Total Damages	***-$335***	***-$4.29 billion***

Note: Developed by CloseWaters LLC for the original Save Our Indian River Lagoon Project Plan.

In 2016, Brevard County faced a $6 billion decision point for the IRL. Despite unprecedented algae blooms and fish kills, conditions could have become worse. If large-scale fish kills continued with increasing frequency, algae blooms continued or became toxic, or there was a pathogen outbreak, then real estate, tourism, and the quality of life and health for Brevard County residents would likely suffer more.

1.1.1. Areas of Economic Value at Risk

The information in this section was developed by CloseWaters LLC for the original Save Our Indian River Lagoon Project Plan in 2016.

Tourism and Recreation

In 2016, tourism revenue in Brevard County (County) came primarily from the beaches. To diversify the tourism base and increase revenue, Brevard County developed a plan to increase ecotourism, a globally growing and high value sector of tourism that depends on restoration and maintenance of a healthy Indian River Lagoon (IRL). High value ecotourism relies on exceptional natural experiences including fishing, bird watching, kayaking, paddle boarding, camping, hiking, and nature tours. In the short-term, opportunities exist for tourists to participate in restoration experiences, such as collecting mangrove seeds by kayak or canoe, planting mangrove seedlings, or establishing colonies of clams, oysters, or mussels. A successful example of Brevard County's ecotourism is the world famous annual Space Coast Birding and Wildlife Festival that brings $1.2 million annually to the County and attracts approximately 5,000 visitors.

Property Value

While the economic benefits of IRL restoration are likely to increase property value throughout the County, to be conservative this plan assessed the exposure only to properties with frontage on Mosquito Lagoon, IRL, Banana River Lagoon, Sykes Creek, and connected waterways. Approximately 11.2% of the County's $27 billion in taxable property value is directly on the IRL. Therefore, more than $3 billion in taxable property value is directly at risk with ongoing IRL issues, such as algal blooms and fish kills. Furthermore, a weighted-average millage rate of 18.58 results in an estimated annual tax revenue of $56 million that is also at risk in the absence of IRL restoration. The $852 million of incremental expected present value assumes a 20% improvement in IRL frontage property value, which would be 90% likely after 10 years with the IRL restored.

Consultants for the County surveyed the Space Coast Association of REALTORS® to assess the likely impacts of IRL health on the waterfront property value. Approximately 170 REALTORS® most familiar with the waterfront market replied to the survey. These professionals assessed that waterfront IRL property values would increase 22% on average over five years if the IRL were healthy and would decrease by 25% over five years if the IRL were not restored.

Commercial Fishing

IRL restoration is critical to the recovery of a once thriving, valuable, and world-class fishery, both commercial and recreational. In 1995, the commercial fish harvest in Brevard County was $22 million annually. While a 1995 ban on commercial net fishing marked economic decline, the degradation of the lagoon contributed considerably to a severe reduction in value of only $6.7 million annually in 2015, based on Florida Fish and Wildlife Conservation Commission data (see **Figure 1-1**). These numbers do not include the many indirect benefits of a robust commercial fishing industry including fresh local fish for restaurants, employment, commerce of supplies and services for the industry, and benefits of local fresh fish for residents and visitors.

Figure 1-1. Decline of Commercial Fishing in Brevard County

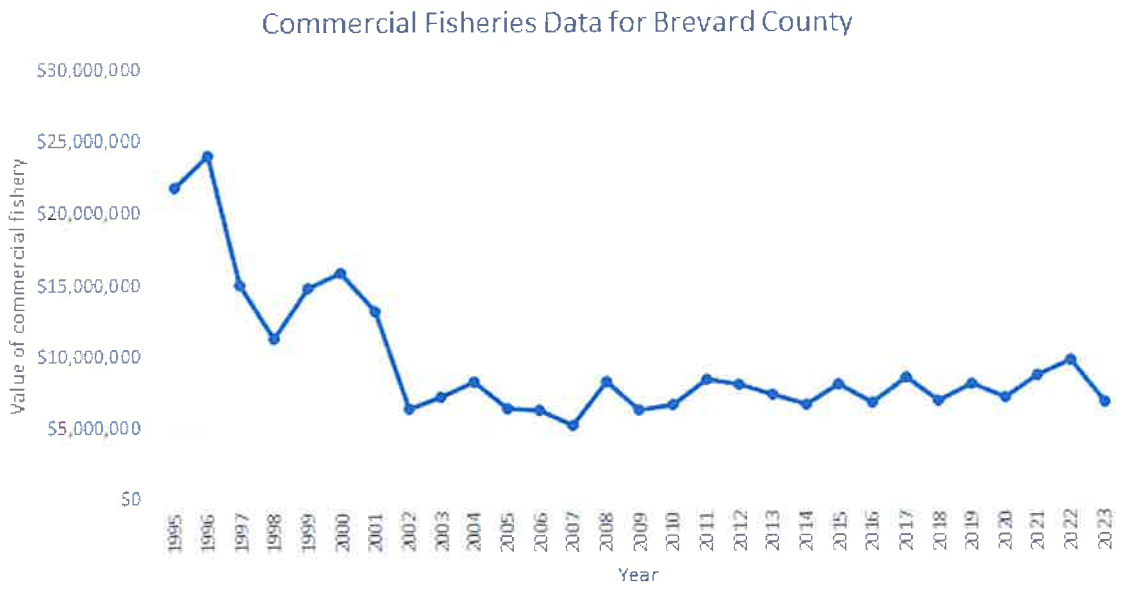


Figure 1-1 Long Description

In addition, a healthy fish population is critical to the brand of any coastal community. Historically Brevard County was once home to a world-class abundance and diversity of rare and widespread species of fish, crabs, shrimp, and clams that made the IRL a global brand. That brand can be restored along with IRL fish and shellfish.

Healthy Residents and Tourists

Septic systems within the County can pollute groundwater that migrates to the IRL. This groundwater moves slowly toward the IRL through soils that attenuate some but not all these pollutants. It would cost billions to convert all septic systems to central sewage treatment. While total conversion is cost prohibitive, this plan targets the septic systems with the highest potential impacts to the lagoon. Targeted action includes connection to the central sewer system or

upgrade to advanced treatment systems that remove significantly more nutrients and pathogens than traditional septic systems.

Although studies have identified pathogens migrating from septic systems into waterways, it is not possible to estimate the economic impact of potential disease from these waterborne pathogens. The conversion of septic systems is expensive relative to other types of nutrient reduction projects; however, the additional health benefits associated with septic system upgrades make this option a priority beyond only the abatement of nutrients.

1.2. Maximizing Benefits and Managing Risk

Much is at stake with regard to both economic outcomes and the incremental funding critical to restoration; therefore, Brevard County (County) chose to address the unavoidable risks inherent in a multi-year, large-scale restoration plan in a transparent and objective manner. To help ensure objectivity, the County retained outside consultants to assess risk and to estimate potential positive or negative outcomes.

The approach for this plan to evaluate the different project options included using expected monetary value models; a decision science tool used in business to improve decision-making and planning in a context of unavoidable uncertainty. Expected monetary value is a financial model of probability-weighted outcomes expressed in quantified financial terms that are comparable across multi-year planning periods. To compare outcomes, expected present value was used as a key metric. Expected present value has the benefit of valuing future financial costs and benefits in common present day terms to take into account the value of time and to facilitate comparisons of initiatives spanning long periods of time.

As part of this methodology, consultants engaged Subject Matter Experts to assess the uncertainties of project scenarios. Subject Matter Experts included scientists, property value experts, tourism experts, Indian River Lagoon (IRL) advocates, and agency staff. Subject Matter Experts brought expertise in IRL science, nutrient reduction technologies, waterborne pathogens, and relevant law or county financial and accounting parameters needed for the expected monetary value models. Information gathered during these assessments was used to document the key interdependence of initiatives, minimize risk, and maximize the likely return on investment (CloseWaters LLC, 2016).

1.2.1. Project Selection to Maximize Return on Investment

Assessment of risk by Subject Matter Experts determined that the amount and speed of nutrient reductions are the two most critical factors affecting the success of restoring Indian River Lagoon (IRL) health. Therefore, those projects with the greatest nutrient reduction benefit for the least cost are recommended for funding and, of those, the projects with the greatest benefits are planned for implementation first. Three other key criteria drove this plan:

1. Achieving sufficient nutrient abatement through a blend of options was a key success factor for restoration.
2. No one type of project alone could achieve an adequate nutrient abatement.
3. The target for nutrient reduction must be sufficient to minimize the need for recurring expensive muck removal, which is important for future cost avoidance.

The plan sequences a diversity of project types, implementing the highest nutrient reduction impact early and implementing other projects concurrently to achieve a multi-pronged blend of total nutrient abatement as quickly as possible with minimal risk. Another important

consideration for project sequencing was how quickly projects could produce significant nutrient pollution reduction. For decades, man-made nutrient pollution from fertilizers, septic systems, and stormwater runoff have been introduced at varying distances from the IRL. The soils are still saturated with those nutrients. Therefore, if all sources of nutrient pollution ended today, groundwater would continue to transport nutrients accumulated in the soil into the IRL with every rain event for decades in the future. However, soils next to the IRL will purge themselves quickly, in days or weeks. Septic system conversions near the lagoon or near drainage conduits into the lagoon are likely to produce water quality and reduced pathogen benefits in weeks or months whereas septic conversions more distant from waterways are not anticipated to generate IRL benefits for several decades. Therefore, whenever possible, project selection and sequencing scheduled nutrient abatements closest to the IRL first.

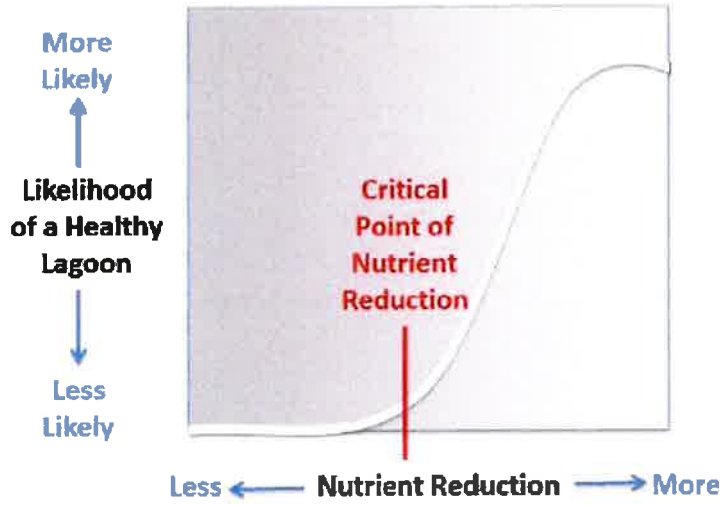
Undoing the damage to a unique and complex biological system as large as the IRL carries inherent risk. The County made the decision to be open and transparent about that risk. Assessing that risk diligently has allowed the County to mitigate and manage risk proactively in the development of this plan.

Two subjective risk assessments were conducted by an independent consultant working with top science Subject Matter Experts most knowledgeable about the IRL. The first assessment was conducted with individual Subject Matter Experts and occurred before plan projects were defined. These experts assessed that the likelihood of a healthy fish population in the IRL would begin to rise faster after reaching a critical point of nutrient reduction. Therefore, a "critical mass" of nutrient reduction is needed to achieve significant and sustainable IRL health benefits. The Subject Matter Experts also assessed that the likelihood of recovery would continue to improve as more nutrients are removed from the IRL and then begin to decline if too many nutrients were removed. The result of that first risk assessment reinforced the objective of reducing nutrients in the IRL as quickly as possible through the definition and sequencing of the projects in this plan (CloseWaters LLC, 2016).

A second uncertainty assessment was conducted in a meeting at the Florida Institute of Technology with a group of water quality, toxicity, muck, fish, algae, invertebrates, and seagrass Subject Matter Experts. First, the experts were briefed about the projects proposed in this plan. The experts were then asked their subjective assessment of the likelihood of a healthy IRL after this plan was implemented in each sub-lagoon. Sub-lagoons were assessed because the experts had commented previously that each sub-lagoon functioned differently. This group assessment indicated higher likelihoods of success than the first assessment. However, the scientists continued to voice concern about the restoration of the IRL in the absence of regulatory reform needed to prevent new development from adding more septic system and stormwater pollution to the IRL. Therefore, updated regulations are needed as a complement to this plan to ensure timely and sustained success in restoring health to the IRL (CloseWaters LLC, 2016).

Figure 1-2 represents the input from the Subject Matter Experts.

Figure 1-2. Likelihood of a Healthy IRL as Nutrients are Removed



Other large-scale aquatic system restoration efforts have been successful in achieving restoration. Some of these systems were damaged even more so than the IRL, but they have recovered through the implementation of extensive, multi-year, and multi-pronged restoration plans. These include the Chesapeake Bay, Cuyahoga River, Lake Erie, and Tampa Bay. These areas have reaped enormous economic and quality of life benefits as a result of dedicated investments in their restoration.

Section 2. Approach, Outputs, and Outcomes

The amount and distribution of nutrient loading from the sources described in **Section 3** were examined to determine the key locations where nutrient reduction projects are needed and the extent of reductions required from each source to achieve Brevard County's proposed total maximum daily loads for each sub-lagoon. For each source, a reduction goal is set, and projects are proposed to meet the goal. The estimated cost for each project is also included. Information on expected project efficiencies and project costs were gathered from data collected by Brevard County in implementation of similar projects, as well as literature results from studies in Florida, where available, and across the country. The most cost-effective projects are selected and prioritized to maximize the nutrient reductions that can be achieved.

2.1. Plan Focus Area

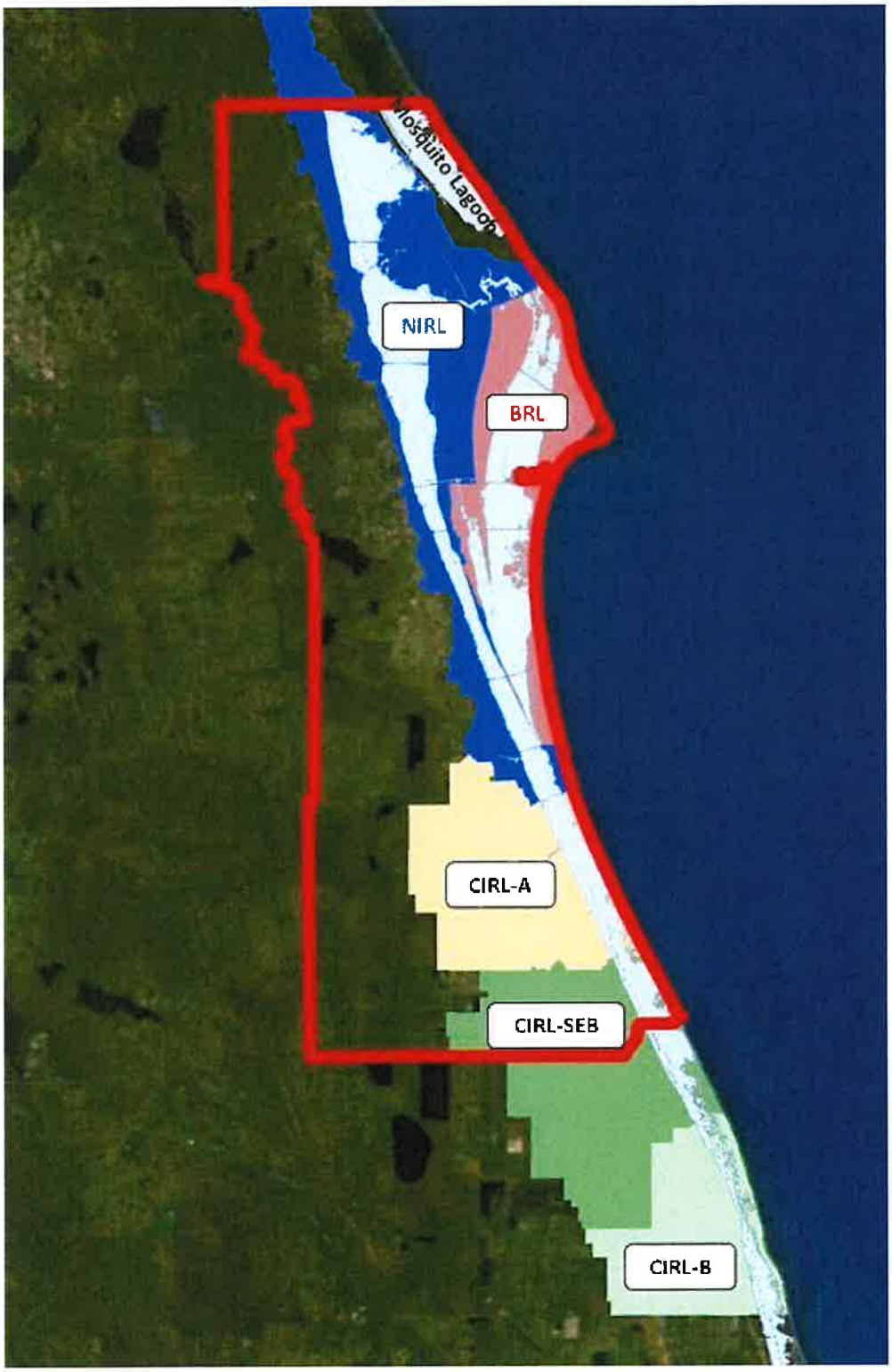
This plan focuses on projects implemented in three sub-lagoons in the Indian River Lagoon (IRL) system: Banana River Lagoon, North IRL, and Central IRL. **Figure 2-1** shows the locations of these sub-lagoons and associated watersheds. All the Banana River Lagoon watershed and the majority of the North IRL watershed are located within Brevard County (County). However, only a portion of the Central IRL watershed is located within the County. As shown in **Figure 2-1**, Central IRL Zone A is located entirely in Brevard County, whereas Zone SEB straddles Brevard and Indian River counties. For Zone SEB, the County has completed several projects in this area and the St. Johns River Water Management District is completing projects along the C-54 Canal and on the Wheeler property to treat the Sottile Canal. The reductions from these projects for total nitrogen and total phosphorus should be sufficient to meet the estimated need for reductions in the County portion of Zone SEB, as shown in **Table 2-1**. This plan includes some additional beneficial projects located in Zone SEB to help ensure that the necessary reductions are achieved throughout the County; however, most of the projects proposed in this plan for the Central IRL fall within Central IRL Zone A.

Table 2-1. Summary of Load Reductions and Projects in Central IRL Zone SEB

Category	Annual Total Nitrogen Load (pounds per year)	Five-Month Total Nitrogen Load (pounds per year)	Annual Total Phosphorus Load (pounds per year)	Five-Month Total Phosphorus Load (pound per year)
Stormwater and Baseflow Loading	248,233	79,956	34,901	11,242
Atmospheric Deposition Loading	22,371	7,206	404	130
Point Sources Loading	0	0	0	0
Total Loading	270,604	87,162	35,305	11,372
Target Percent Reductions	18.0%	38.0%	16.0%	35.0%
Targeted Reductions	***48,709***	***33,121***	***5,649***	***3,980***
Completed County Projects (2010-February 2016)	29,890	12,454	9,643	4,018
C-54 Project	65,974	27,489	10,558	4,399
Wheeler Property Project	27,223	11,343	16,753	6,980
Total Project Reductions	***123,087***	***51,286***	***36,954***	***15,397***
% of Targeted Reductions Achieved	***252.7%***	***154.8%***	***654.2%***	***386.9%***

In addition, a small portion of Brevard County is located within the Mosquito Lagoon. The County does not have stormwater outfalls, septic systems, or point sources in this sub-lagoon.

Figure 2-1. Locations of the Banana River Lagoon (BRL), North IRL (NIRL), and Central IRL (CIRL) Sub-lagoons



2.2. Plan Outputs and Outcomes

Vision Statement

An Indian River Lagoon teeming with fish, birds, and wildlife that provides recreation, economic vitality, and pride in our community.

Mission Statement

Restoring the Indian River Lagoon through collaborative, science-based projects which Reduce and Remove pollution to benefit our community, economy, and natural resources.

Several outcomes are expected from implementation of the plan. The plan outputs represent the project types included to **Reduce** external loads to the Indian River Lagoon (IRL), **Remove** internal sources from the IRL, **Restore** the natural filtration systems, and **Respond** to the changing conditions and opportunities. The outcomes from these outputs are the results, impacts, and accomplishments that will occur due to plan implementation (**Figure 2-2**). The timeframes for reaching various outcomes may be impacted by many factors outside Brevard County control, including federal and state legislation and weather; however, division of outcomes into short-term, mid-term, and long-term categories is meant to illustrate the sequence and approximate schedule of anticipated natural recovery.

2.3. Additional Project Benefits

The health of the Indian River Lagoon system (IRL or lagoon) is affected by a variety of pollutants, physical conditions, and climate factors. The focus of this Save Our Indian River Lagoon Project Plan is on addressing nutrients to be consistent with the Florida Department of Environmental Protection's total maximum daily load and basin management action plan requirements, which are based on scientific studies showing the relationship between nutrients and phytoplankton algae blooms, which limit light availability for seagrass. However, while the Plan is focused on nutrients and the eligible Save Our Indian River Lagoon Trust Fund contribution to new projects is determined based on the amount of total nitrogen removed, the benefits of implementing these projects include reductions in other pollutant sources, as well. These projects will reduce a multitude of different contaminates to meet water quality targets and improve the health, productivity, aesthetic appeal, and economic value of the IRL. These additional benefits vary according to project design and site-specific conditions but often include significant reduction of pathogenic bacteria, viruses, human and animal wastes, chemicals, metals, plastics, and sediments (see **Table 2-2**).

This Save Our Indian River Lagoon Project Plan is an adaptable document informed by science and under supervision of the community. As monitoring updates our understanding of Indian River Lagoon pollutants, the plan projects will target funds to the most successful and cost-effective projects.

Table 2-2. Pollutants Removed by Different Project Types

Wastewater Treatment Facility Upgrades	Septic-to-Sewer	Septic System Upgrade	Stormwater	Vegetation Harvesting	Muck Removal	Surface Water Remediation
Nitrogen Phosphorus Escherichia coli Viruses Fecal coliform Pharmaceuticals Chemicals of emerging concern Forever chemicals	Nitrogen Phosphorus Escherichia coli Viruses Fecal coliform Pharmaceuticals Biochemical oxygen demand Chemicals of emerging concern Forever chemicals	Nitrogen Phosphorus Escherichia coli Viruses Fecal coliform Biochemical oxygen demand Chemicals of emerging concern Forever chemicals	Nitrogen Phosphorus Sediments Escherichia coli Viruses Fecal coliform Herbicides Pesticides Metals Oil Litter Chemicals of emerging concern Forever chemicals Turbidity	Nitrogen Phosphorus Sediments Herbicides Pesticides Organic matter	Nitrogen Phosphorus Clay sediments Hydrogen sulfide Biochemical oxygen demand Chemicals of emerging concern Forever chemicals Turbidity	Nitrogen Phosphorus Organic matter Algal bloom toxins Turbidity

Figure 2-2. Summary of the Save Our Indian River Lagoon Outputs and Outcomes

Figure 2-2 Long Description

In response to concerns about the potential impacts of herbicide applications on Indian River Lagoon (IRL) seagrass, the Florida Institute of Technology conducted a study in 2023, which was funded by the IRL National Estuary Program, to evaluate the impacts of glyphosate on seagrass growth and nutrient cycling. Glyphosate is the most widely used herbicide globally, as well as within the IRL watershed. Mesocosm experiments were conducted using *Ruppia maritima* (widgeon grass) and *Halodule wrightii* (shoal grass) seagrass species, which were exposed to concentrations of 1, 100, and 1,000 parts per million of glyphosate. There was no significant decrease in leaf chlorophyll for either seagrass species at 1 part per million; however, significant decreases were observed at higher concentrations. In all except the 1,000 parts per million mesocosms, water column chlorophyll increased, with a seven-fold increase at 100 parts per million. These data demonstrate that at very high glyphosate concentrations, acute toxicity and light limitation from enhanced phytoplankton algal biomass may have adverse impacts to seagrasses. However, there were no statistically significant adverse impacts of acute toxicity at 1 part per million, which is more than 1,000 times higher than concentrations measured in the IRL (Fox et. al, 2023; Fox et. al, 2024). It is important to note the duration for this glyphosate study was short and the parameters measured were limited.

While the Florida Institute of Technology study did not find a statistically significant correlation between glyphosate and seagrass loss, Brevard County and its municipalities have been exploring options to reduce herbicide applications. A discussion on lessons learned from several municipalities was conducted during the July 2023 Citizen Oversight Committee meeting to help inform future management decisions.

As scientists study the impacts of other pollutants on the IRL, this plan can be adjusted to better focus the funds on necessary projects. The information gathered will also help the local governments, agencies, and other stakeholders improve their management of pollutants to assist in IRL restoration.

Section 3. Pollutant Sources in the IRL Watershed

Pollutant loads in the Indian River Lagoon (IRL) watershed are generated from multiple external sources that discharge to the lagoon. Excess loads also accumulate in nutrient sinks within the lagoon, which release nutrients to the water column during certain conditions.

External sources fall into four major categories: stormwater, baseflow, atmospheric deposition, and point sources.

Stormwater runoff occurs when rainfall hits the land and cannot soak into the ground. Urban stormwater runoff is generated by rainfall and excess irrigation on impervious areas associated with urban development. Urban runoff picks up and transports nutrient loading from fertilizers, grass clippings, and pet waste, as well as other pollutants including sediments, pesticides, oil, and grease. Stormwater ponds and baffle boxes reduce the nutrient loading in stormwater; however, consistent proper maintenance of these systems is necessary to maintain their performance. Agricultural stormwater runoff occurs on agricultural land and this runoff also carries nutrients from fertilizers, as well as livestock waste, pesticides, and herbicides. This source of stormwater runoff is not addressed in this plan as the County does not have jurisdiction over agricultural use. The Florida Department of Agriculture and Consumer Services has an agricultural best management practice program, and they work with agricultural producers to control the loading from this source. Natural stormwater runoff comes from the natural lands in the basin. This source is not addressed by this plan as natural loading does not need to be controlled, although it has the potential to convey pollutants to the IRL system.

Baseflow is the groundwater flow that contributes loading to the IRL. Due to the sandy soils in the basin and excess irrigation, nutrients can soak quickly into the groundwater with little removal. This groundwater can seep into surface water in ditches, canals, tributaries, or the IRL. Excess fertilizer soaks into the ground past the root zones. Septic systems, both functioning and failing, contribute nutrient loading to the groundwater. Leaking sewer pipes located above the water table can also contribute nutrient loading to the groundwater.

Atmospheric deposition falls on both the land and the IRL itself. Nutrients in the atmosphere fall into the basin largely during rainfall events. The sources of these nutrients are from power plants, cars, and other sources that burn fossil fuels. However, because of atmospheric conditions and weather patterns, not all the nutrients from atmospheric deposition are generated within the watershed. Atmospheric loading is not directly addressed by this plan as air quality and air emission standards are regulated by the United States Environmental Protection Agency through the Clean Air Act and are not within the County's control. However, the stormwater projects and in-lagoon projects will treat some of the nutrient loading from atmospheric deposition that falls on the land and lagoon surface.

For decades, point sources were permitted to discharge industrial wastewater or treated sewage to the IRL. Most of the wastewater treatment facilities in the basin have been modified to use the treated effluent for reclaimed water irrigation instead of discharging treated effluent to the lagoon. However, depending on the level of treatment at the wastewater treatment facility, the reclaimed water can have an excessive concentration of nutrients that may contribute loading to stormwater runoff and groundwater baseflow (see **Figure 4-36**). There have been issues with inflow and infiltration into the sanitary sewer collection system. Large rain events can result in large amounts of water entering the sewer collection system, and this additional water can cause sewer overflows that contribute nutrients and bacteria to local waterbodies.

In addition to these external sources of loading, nutrients released from muck (muck flux) are an internal source of loading within the IRL itself. Muck is made up of organic materials from soil erosion on the land and from decay of organic matter (leaves, grass clippings, algae, and aquatic vegetation) in the IRL. As these organic materials decay, they constantly flux nutrients into the water column above, where they add to the surplus of nutrients coming from external sources.

Table 3-1 summarizes the estimated total nitrogen (TN) and total phosphorus (TP) loading from these major sources in the Banana River Lagoon (including canals), North IRL, and Zone A of the Central IRL. The stormwater runoff and baseflow/septic systems loading estimates are from the Spatial Watershed Iterative Loading model version 5.0, the point source loading estimates were based on the facility monthly operating reports and discharge monitoring reports, and the atmospheric deposition loads are from measured data at two stations along the northern lagoon. The muck flux load estimates are calculated based on the muck area in each portion of the lagoon and flux estimates from recent IRL studies (refer to **Section 4.2.1** for more details). The loading from these sources is also shown graphically in **Figure 3-1**, **Figure 3-2**, and **Figure 3-3**.

Table 3-1. Loading from Different Sources in Each Sub-lagoon Within the County

Source	Banana River Lagoon Total Nitrogen (pounds per year)	Banana River Lagoon Total Phosphorus (pounds per year)	North IRL Total Nitrogen (pounds per year)	North IRL Total Phosphorus (pounds per year)	Central IRL Zone A Total Nitrogen (pounds per year)	Central IRL Zone A Total Phosphorus (pounds per year)
Stormwater Runoff	47,306	6,544	142,347	18,661	175,165	24,435
Baseflow/Septic, Leaking Sewer, Reclaimed Water	209,729	25,300	600,437	75,527	569,242	78,085
Atmospheric Deposition	175,388	3,222	301,977	5,505	49,456	892
Permitted Point Sources	17,484	3,370	14,711	1,029	0	0
Muck Flux	799,482	50,778	313,294	31,007	53,280	2,880

Figure 3-1. Banana River Lagoon TN (left) and TP (right) Annual Average Loads by Source

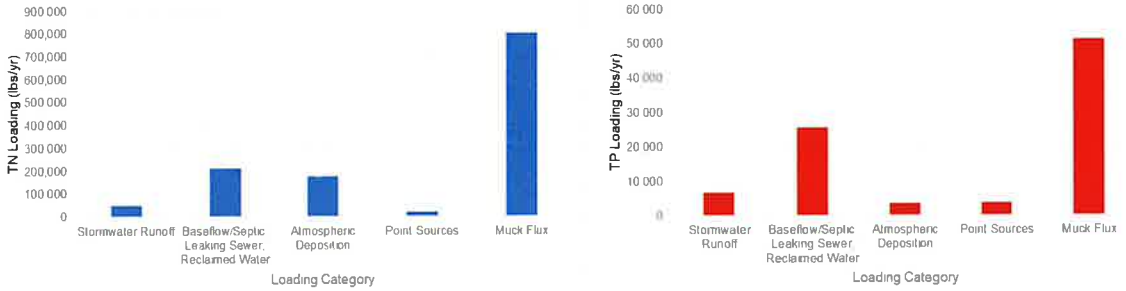


Figure 3-2. North IRL TN (left) and TP (right) Annual Average Loads by Source

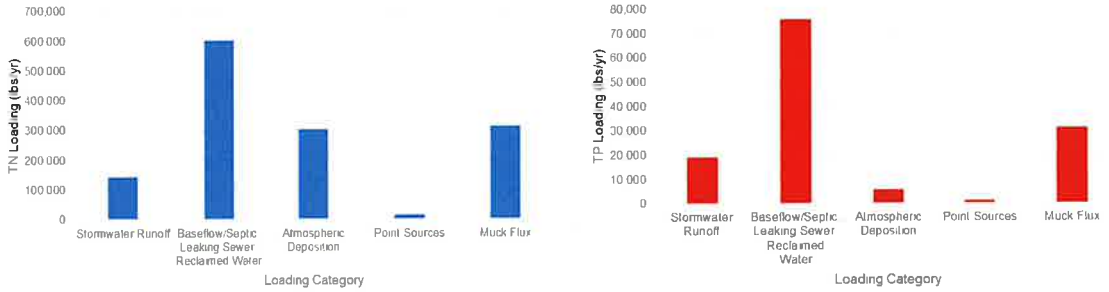
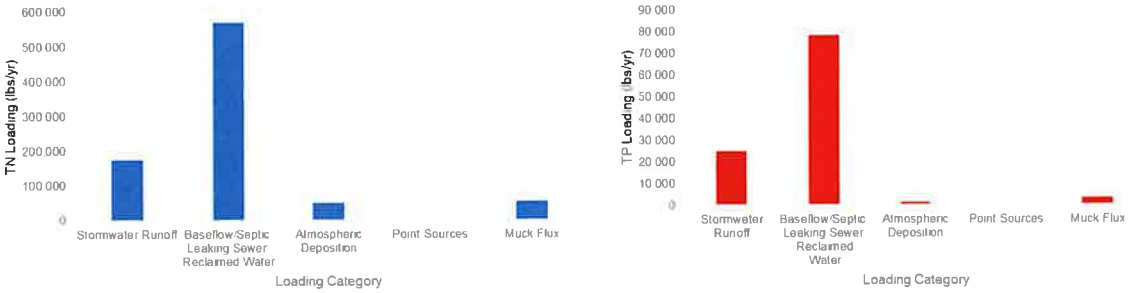


Figure 3-3. Central IRL Zone A TN (left) and TP (right) Annual Average Loads by Source



Section 4. Project Options

To restore the Indian River Lagoon's (IRL) balance, Brevard County has been implementing a multi-pronged approach to **Reduce** pollutant and nutrient inputs to the lagoon, **Remove** the accumulation of muck from the lagoon bottom, and **Restore** water-filtering oysters, clams, and related IRL ecosystem services. This plan also recommends funding for project monitoring, needed for accountability and to **Respond** to changing conditions and opportunities. **Respond** funds will be used to track progress, measure cost effectiveness, and report on performance. Each year, the Citizen Oversight Committee (additional details are included in **Section 4.4.1**) will review monitoring reports and make recommendations to the Brevard County Board of County Commissioners to redirect remaining plan funds to those efforts that will be most successful and cost-effective. Although research is important to better understand factors that significantly impact the health, productivity, and natural resilience of the Indian River Lagoon, funding for research is not included in this project plan.

Several goals were set to help select the projects for this plan. The goal for the **Reduce** projects is to achieve the locally proposed total maximum daily load for each sub-lagoon (refer to **Section 6** for additional details on the total maximum daily loads). The goal for the **Remove** projects is to achieve about a 25% reduction in estimated recycling of internal loads. The goals for the **Restore** projects are to filter the entire volume of the IRL annually and to reduce shoreline erosion. The most cost-effective projects in each category were selected to maximize nutrient reductions, minimize lag time in lagoon response, reduce risk, and optimize the return on investment.

Section 4.1 through **Section 4.5** provide information on the proposed projects, estimated nutrient reduction benefits, and costs, as well as the ongoing studies needed to measure and assess the project efficiencies and benefits to the lagoon.

4.1. Projects to Reduce Pollutants

An important step in restoring the Indian River Lagoon (IRL) system is reducing the pollutants that enter the IRL through stormwater runoff and groundwater. Reduction efforts include source control (such as fertilizer reductions, wastewater treatment facility upgrades, and septic-to-sewer conversions) to reduce the pollutants generated, as well as treatment to reduce pollutants that have already been discharged before they are washed into the lagoon by stormwater runoff or migrate to the lagoon through groundwater. Monitoring of these projects will be performed to verify the estimated effectiveness of each project type implemented (refer to **Section 4.4**).

The benefits from fertilizer management and public education, wastewater treatment facility upgrades for reclaimed water, and stormwater treatment are seen fairly quickly in the IRL. Public education about fertilizer and other sources of pollution addresses nutrients at their source and prevents these nutrients from entering the system. Wastewater treatment facility upgrades result in reduced nutrients in the treated effluent, which is then used throughout the basin for reclaimed water irrigation. The stormwater projects will capture and treat runoff, which is currently untreated or inadequately treated, before it reaches the lagoon.

While greatly beneficial, septic-to-sewer or upgrade projects may take longer to result in a nutrient reduction to the lagoon. The septic systems in key areas must be removed or upgraded to see the full benefits. In addition, septic systems contribute nutrient loading to the IRL through groundwater, and the travel time of the nutrient plumes through the groundwater to a waterbody vary throughout the basin depending on watershed conditions.

Florida's Clean Waterways Act of 2020, House Bill 1379 of 2023, and Senate Bill 7040 of 2024 have placed new requirements on local governments. Under the Clean Waterways Act enacted by Senate Bill 712, local governments are required to develop wastewater and septic system remediation plans to be incorporated into all nutrient basin management action plans. The Florida Department of Environmental Protection issued a final order in 2023 setting a timeline for plan submittal. House Bill 1379 created the IRL Protection Program, which included major implications for wastewater. As of January 2024, new construction within the IRL watershed is required to connect to sewer or use enhanced nutrient reducing septic systems. All existing conventional septic systems in the IRL watershed must connect to central sewer or upgrade to enhanced nutrient reducing septic systems by July 1, 2030. By 2033, all wastewater facilities discharging to the IRL will be required to meet advanced wastewater treatment standards. Senate Bill 7040, also referred to as the Statewide Stormwater Rule, was adopted in 2024. The bill ratified updates to the state's stormwater management criteria to protect waterways by emphasizing performance-based designs and increased nutrient removal. The law requires stricter operation, mandates routine inspections by qualified inspectors, and sets stronger performance criteria for nutrient reduction. The minimum performance standards, except for redevelopment, requires nutrient loads (total nitrogen and total phosphorus) for post-development to be less than that of pre-development. The Save Our Indian River Lagoon Project Plan identifies, prioritizes, and allocates funding to many projects needed to comply with the State's new rules.

The following subsections summarize (1) public education and outreach efforts; (2) infrastructure improvements for wastewater treatment facilities; (3) sprayfield and rapid infiltration basin upgrades; (4) package plant connections; (5) sewer laterals rehabilitation; (6) septic-to-sewer and septic system upgrades; (7) stormwater treatment projects; and (8) vegetation harvesting projects.

4.1.1. Public Outreach and Education

Approximately 81,600 pounds per year of TN and 3,250 pounds per year of TP enter the Indian River Lagoon watershed from excess fertilizer application.

The education and outreach campaigns are summarized in the sections below.

Fertilizer Management

It is a common practice to apply fertilizer on urban and agricultural land uses. However, excessive and inappropriately applied fertilizer pollutes surrounding waters and stormwater. To help address fertilizer as a source of nutrient loading, local governments located within the watershed of a waterbody or water segment that is listed as impaired by nutrients are required to adopt, at a minimum, the Florida Department of Environmental Protection's Model Ordinance for Florida-Friendly Fertilizer Use on Urban Landscapes (Section 403.067, Florida Statutes). Brevard County (County) and its municipalities adopted fertilizer ordinances that included the required items from the Model Ordinance in December 2012, as well as additional provisions in 2013 and 2014. Local fertilizer ordinances are posted online at the Brevard County Extension website. These ordinances require zero phosphorus year-round, nitrogen to be at least 50% slow release, no nitrogen use during the rainy season (June – September), and surface water protection buffers adjacent to shorelines.

Florida Department of Agriculture and Consumer Services compiled information on the fertilizer sales by county, as well as the estimated nutrients from those fertilizers. It is important to note that all fertilizer sold in a county may not be applied within that county because a portion of that

fertilizer may be transported to another county. However, details on the amount of fertilizer transported between counties is not tracked. Therefore, the information in the Florida Department of Agriculture and Consumer Services reports is simply the best estimate of the amount of fertilizer used, and the associated nutrient content, in a county.

Based on the Florida Department of Agriculture and Consumer Services information, the lawn fertilizer sold in Brevard County in fiscal year 2014–2015 contained 408,220 pounds of nitrogen and 32,520 pounds of phosphorus. The fertilizer applied is attenuated through several naturally occurring physical, chemical, and biological processes including uptake by grass. The environmental attenuation/uptake for urban fertilizer is 80% for nitrogen (Florida Department of Environmental Protection, 2017) and 90% for phosphorus. The estimated total nitrogen (TN) and total phosphorus (TP) that is applied but is not naturally attenuated is shown in **Table 4-1**. It is important to note that not all the un-attenuated nutrients will migrate to the Indian River Lagoon (IRL), either through runoff or baseflow (groundwater that enters ditches, canals, and tributaries), but these numbers provide an idea of the excess nutrients that could be reduced as a result of public education and changes in fertilizer use.

Table 4-1. Estimated TN and TP Not Attenuated in Fiscal Year 2014–2015

Parameter	Pounds Sold Fiscal Year 2014-15 (Lawn Only)	Environmental Attenuation (%)	Fiscal Year 2014-15 Pounds (Lawn Only) after Attenuation
Total Nitrogen	408,220	80%	81,644
Total Phosphorus	32,520	90%	3,252

When recent sales data are compared to the fertilizer sold in fiscal year 2013–2014, which is before adoption of the more protective amendments to the ordinance, significant reductions are observed. These reductions from the implementation of the ordinance are shown in **Table 4-2**.

Table 4-2. Reductions from Fertilizer Ordinance Compliance as of Fiscal Year 2014–2015

Parameter	Fiscal Year 2013-14 Pounds (Lawn Only) after Attenuation: Pre-Ordinance (pounds per year)	Fiscal Year 2014-15 Pounds (Lawn Only) after Attenuation: Post-Ordinance (pounds per year)	Reductions from Ordinance to Date (pounds per year)
Total Nitrogen	127,540	81,644	45,896
Total Phosphorus	12,640	3,252	9,388

Based on studies by the University of Florida, approximately 0.03% of applied nitrogen ends up in runoff during establishment of sodded Bermudagrass on a 10% slope. Nitrogen leaching into groundwater ranged from 8% to 12% of the amount applied (Trenholm and Sartain, 2010). Therefore, nitrogen leaching from fertilizer into the groundwater is 300 to 400 times as much as the nitrogen running off in stormwater. To help address the leaching issue, the Brevard County fertilizer ordinance encourages the use of slow release nitrogen fertilizer. Slow release fertilizer decreases nitrogen leaching by about 30% (University of Florida-Institute of Food and Agricultural Sciences, 2012). In addition, the ordinance requires that fertilizer with zero phosphorus is used.

The public education and outreach campaign was expanded to include focus on slow release and zero phosphorus fertilizers. An important component of this is to reach out to stores within Brevard County to ensure they are making slow release and zero phosphorus fertilizers more visible and to add signage to let buyers know which fertilizers are compliant with all local ordinances. This would cost approximately $125,000 per year for a period of five years. If an additional 25% of fertilizer users switch to 50% slow release nitrogen and zero phosphorus

formulations, compliant with the ordinance, this would result in a reduction of 6,123 pounds per year of TN and 813 pounds per year of TP.

In 2018, the Citizen Oversight Committee recommended extending the fertilizer education and outreach beyond the original plan recommendation of five years to all ten years of the plan. As part of the 2023 Update, the Citizen Oversight Committee recommended expanding the fertilizer outreach efforts with an additional $50,000 per year for the remaining five years of the plan, which adds $250,000 to the expanded fertilizer education outreach program. The $881,000 for this project was redistributed as follows: (1) $125,000 in Year 1 to create the education campaign and begin implementation, (2) $50,000 per year to continue implementation in Years 2–5, (3) $100,000 per year in Years 6–10, (4) an additional $50,000 in Year 6 (for a total of $150,000 in this year) to evaluate program success and update the outreach materials as needed, and (5) $1,200 in Years 6–10 for digital messaging with action items for further reach and evaluation of that reach after Year 6.

In 2019, the University of Florida Institute of Food and Agricultural Sciences and MTN Marketing conducted a survey that was concentrated on fertilizer awareness questions. The results from the 2019 survey were compared to similar questions from the 2015 Blue Life survey to evaluate changes in fertilizer use. Based on the survey results, 33.33% of respondents in 2019 stated that they use slow release nitrogen fertilizer compared to only 6.30% in 2015, which is a 27% increase in the usage of slow release fertilizer. Therefore, as part of the 2021 Update, the estimated nitrogen reductions from the expanded fertilizer education was updated to 27%, which results in an estimated reduction of 6,613 pounds per year of TN. The TP reductions were kept at 25% compliance because, the way the survey was setup, participants were only able to select one option for the type of fertilizer used. Therefore, an update on the use of zero phosphorus formulas could not be obtained.

The updated plan costs and estimated reductions from this outreach are shown in **Table 4-3**.

Table 4-3. Project for Additional Fertilizer Ordinance Compliance

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
Original	58a	Expanded Fertilizer Education*	Brevard County	All	6,613	$133	813	$1,084	$881,000

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan.

Grass Clippings

Grass clippings contain nutrients and those nutrients are released in stormwater or the IRL as they decompose (Brevard County Natural Resources Management Department, 2017). St. Augustine grass contains 2.5% nitrogen and 0.2–0.5% (average of 0.5%) phosphorus and Bahia grass contains 2% nitrogen (University of Florida-Institute of Food and Agricultural Sciences, 2015). According to Okaloosa County Extension (2017), a 7,500-square foot lawn produces about 3,000 pounds of clippings per year. Unfortunately, the percentage of those total clippings that end up in stormwater is not known.

To estimate the potential nutrient reduction impact of a grass clippings campaign, it was assumed that the average home lot size is 10,000 square feet with a 100-foot by 100-foot boundary, with 2,500 square feet of built space and 7,500 square feet of lawn (**Figure 4-1**). The University of Florida-Institute of Food and Agricultural Sciences estimated that 3,000 pounds of

grass clippings are produced annually from a healthy lawn of this size. It was assumed that most of the grass clippings in Brevard County are from St. Augustine grass, which means that 3,000 pounds of clippings contains approximately 75 pounds of TN and 10.5 pounds of TP.

It was also assumed that the standard mower size is two feet wide. From one roadside pass along 100 feet of the average lawn with a two-foot wide mower, 200 square feet or 2.6% of the total lawn clippings could be cast into the road. This equals 0.02 pounds of TN and 0.0027 pounds of TP per foot per year left in the road. With about 3,800 miles of roads in the IRL watershed within the County, of which approximately 1,250 miles are paved with curb and gutter and are most likely to allow the ready transport of grass clippings to the IRL in stormwater, the potential nutrient release from those grass clippings could be up to 260,000 pounds per year of TN and 35,640 pounds per year of TP from mowing along both sides of the road.

If Brevard County expects a similar rate of awareness of 24% as Alachua County (2012), then a potential 200,000 pounds per year of TN and 27,000 pounds per year of TP may be entering the stormwater. If a successful grass clippings campaign in the County can capture an increase of awareness similar to Alachua County (from 24% to 69%), then the potential reduction is 88,920 pounds per year of TN and 12,189 pounds per year of TP. In addition, assuming the environmental attenuation/uptake for grass clippings is similar to the urban fertilizer uptake of 80% for nitrogen and 90% for phosphorus, the estimated reductions would be 17,800 pounds per year of TN and 1,200 pounds per year of TP.

This estimate assumes a simplified worst-case scenario in which everyone leaves a portion of their clippings in the road; however, it does not take into account the number of driveways, sidewalks, medians, and other impervious surfaces that grass clippings could be falling or the grass clippings being directly cast into the IRL, canals, and other waterways. Using the available information, this provides an order of magnitude estimate of the potential benefits of a grass clippings campaign for the IRL.

Figure 4-1. Grass Clippings Example for a Typical Lot

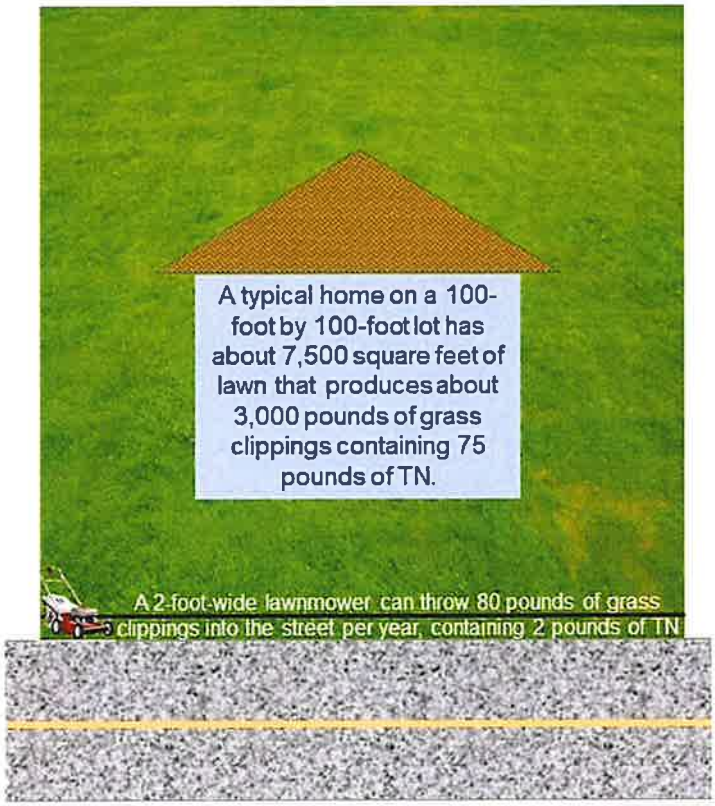


Figure 4-1 Long Description

The Marine Resources Council proposed a partnership between the IRL watershed counties to pursue a grass clippings campaign similar to the Alachua County campaign. The Citizen Oversight Committee recommended contributing $20,000 in Year 1 of the plan towards the research and marketing to develop the campaign. This was followed by an annual investment of $20,000 per year for Years 2 through 10 for media and promotional materials targeting Brevard County. As part of the 2023 Update, the Citizen Oversight Committee recommended expanding the grass clippings campaign with an additional $20,000 per year for the remaining five years of the plan, which adds $100,000 to the campaign. In addition, they recommended adding $1,200 per year in Years 6–10 for digital messaging with action items for further reach and evaluation of that reach after Year 6. Therefore, the total project cost is $306,000.

Table 4-4 summarizes the costs and benefits of implementing the grass clippings campaign.

Table 4-4. Project for Grass Clippings Campaign

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2018	58b	Grass Clippings Campaign+	Brevard County	All	17,800	$17	1,200	$255	$306,000

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Market research needed to guide development of a grass clipping campaign was contracted through the Marine Resources Council to a community-based social marketing firm, Uppercase Inc. Survey results from 2018 and 2022 are reported in **Section 4.4.3**.

Excess Irrigation

Fertilizer nutrients are more susceptible to leaching if turfgrass is overwatered, carrying nutrients beyond the reach of the turf roots. During excess watering, soluble nutrients, such as highly mobile nitrate, wash through the soil from the root zone too quickly. Excess irrigation is easy to accomplish in Florida's sandy soils as these soils typically hold no more than 0.75 inches of water per foot of soil depth (Hochmuth et al., 2016). This excess irrigation is part of the baseflow contributing nutrient loading to the IRL. Additionally, some residents use reclaimed water for irrigation, which already contains nitrogen and phosphorus, some at levels exceeding the nutrient needs of turf grass. Overirrigation with reclaimed water, especially if combined with fertilizer, can further compound the excess nutrients leaching into the groundwater baseflow.

From June 2015 to May 2016, 470,737 pounds of TN in fertilizer were sold within Brevard County. Florida Department of Agriculture and Consumer Services Urban Turf Fertilizer Rule (RE-1.003[2], Florida Administrative Code) does not specify a percentage of slow-released nitrogen in fertilizer or separately track slow-release nitrogen from all nitrogen sources. However, if it is assumed that 50% of fertilizer was soluble nitrogen (compliant with local fertilizer ordinances), then the total soluble nitrogen sold in the County could be as high as 235,368 pounds per year. If 13% of soluble nitrogen were leached, up to 30,597 pounds per year of TN could potentially enter the groundwater. If, like South Florida survey respondents, 50% of irrigation users in the County are not over-irrigating and if an outreach campaign can impact half of those who do over-irrigate, fertilizer leaching could be reduced by 7,649 pounds per year of TN. As noted above, the environmental attenuation/uptake for urban fertilizer is 80% for nitrogen (Florida Department of Environmental Protection, 2017). Therefore, the total amount of TN that could be reduced by reducing excess irrigation is 1,530 pounds per year.

Conducting an outreach campaign with an initial $50,000 social marketing research and development investment and $25,000 in annual implementation, the total 10-year budget would be $300,000. This results in an average of $196 per pound of TN reduced per year.

This education campaign was originally proposed in 2018 but was not funded at that time. However, as part of the 2023 Update, the Citizen Oversight Committee recommended funding the campaign with $50,000 per year for the remaining five years of the plan, with an additional $50,000 in the first year to create the education campaign and begin implementation (a total of $100,000 in the first year). In addition, they recommended adding $1,200 per year in Years 6–10 for digital messaging with action items for further reach and evaluation of that reach after Year 6. The five-year total budget would be $306,000. **Table 4-5** summarizes the costs and estimated reductions for this campaign.

Table 4-5. Project for Reducing Excess Irrigation Campaign

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reductions (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2023	245	Irrigation Education Campaign+	Brevard County	All	1,530	$200	Not applicable	Not applicable	$306,000

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Stormwater Pond Maintenance

Wet detention ponds, also known as stormwater ponds, are one method used to remove nutrients from stormwater as mandated by Florida Statutes 403.0891. Increase the residence time of water in the pond accommodates the removal of accumulated nutrients by allowing material to settle and be absorbed. By itself, an optimally sized and properly maintained stormwater pond typically provides a 35–40% removal of nitrogen and 65% removal of phosphorus through settling (Florida Department of Environmental Protection and Water Management Districts, 2010 and 2021). Additional behaviors and technologies can be combined with ponds to increase removal rates. On the other hand, poor pond maintenance practices can decrease nutrient removal rates or worse yet, release nutrients to downstream waterbodies.

A stormwater pond maintenance program would initially focus on vegetative buffers and their appropriate maintenance to reduce stormwater pollution. The Indian River Lagoon watershed in Brevard County contains 4,175 stormwater ponds covering 13,276 acres with 6,976,338 linear feet of shoreline. The average size of a pond is 3.2 acres with 1,671 linear feet of shoreline. These numbers include ponds affiliated with both residential and commercial areas. The average load to stormwater ponds is 11.4 pounds of TN per acre of land surrounding the pond annually according to the Florida Department of Environmental Protection's Spreadsheet Tool for Estimating Pollutant Loads. Assuming that a 50-foot perimeter directly impacts the pond, 8,008 acres contribute 91,288 pounds of TN annually to the ponds. Of this, up to 40% of the TN is removed through retention in the pond leaving a potential 54,773 pounds per year of TN to enter the lagoon. For TP, approximately 18,836 pounds per year is entering the stormwater pond. Of this, up to 65% of the TP is removed through retention in the pond leaving a potential of 6,593 pounds per year TP to enter the lagoon.

Creating a 10-foot-wide low-maintenance buffer zone of un-mowed ornamental grasses has the potential to remove about 25% of the TN and TP entering the pond (United States Environmental Protection Agency, 2005). This amount increases with the width of the buffer and the addition of woody vegetation. For the plan calculations, the assumption was made that convincing homeowners to not mow a 10-foot buffer is the easiest practice to achieve. The pond will remove up to 40% of the remaining TN. Assuming that the education campaign can reach at least half of the 48% of people unaware of what stormwater is, the reduction could be 3,286 pounds per year of TN and 396 pounds per year of TP.

Conducting an outreach campaign with an initial $50,000 social marketing research and development investment plus $25,000 in annual implementation, would require a 10-year total budget of $300,000. This would result in reductions at $91 per pound of TN and $750 per pound of TP. Additionally, during focus group research in the first year, it may be possible to identify other best management practices that homeowners' associations are willing to adopt that would further improve the performance of their stormwater pond. This would improve the cost effectiveness of this campaign.

This education campaign was originally proposed in 2018 but was not funded at that time. However, as part of the 2023 Update, the Citizen Oversight Committee recommended funding the campaign with $50,000 per year for the remaining five years of the plan, with an additional $50,000 in the first year to create the education campaign and begin implementation (a total of $100,000 in the first year). In addition, they recommended adding $1,200 per year in Years 6–10 for digital messaging with action items for further reach and evaluation of that reach after Year 6. The five-year total budget would be $306,000. **Table 4-6** summarizes the costs and estimated reductions for this campaign.

Table 4-6. Project for Stormwater Best Management Practice Maintenance Campaign

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reductions (pounds per year)	Total Nitrogen Cost per Pound Per Year	Total Phosphorus Reductions (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2023	246	Stormwater Best Management Practice Maintenance Education+	Brevard County	All	3,300	$93	400	$765	$306,000

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Implementation of a Citizen Science Stormwater Pond Monitoring and Maintenance Pilot Program began in October 2024 and will continue through March 2026. The goal of this pilot program is to educate and engage homeowners' associations in efforts to implement best management practices to improve stormwater pond maintenance and reduce stormwater pollution in the Indian River Lagoon. The four participating homeowners' associations are Country Walk, Longwood, South Lakes, and Tortoise Island. Volunteers were trained to collect pond water samples in December 2024, with monthly water sampling to continue through March 2026. Pond water samples are analyzed for total nitrogen, total phosphorus, and chlorophyll-a. These water quality data are used to educate homeowners' associations about the water quality in their pond and identify water quality trends and changes in nutrient levels. Educational meetings are ongoing and focus on stormwater pond maintenance best management practices, homeowner actions to reduce stormwater runoff, and increasing awareness about the impact of nutrient pollution from stormwater on the Indian River Lagoon.

Volunteers from each homeowners' association participated in a "pond assessment field day" during spring 2025 to assess the state of their stormwater pond. This included an evaluation of stormwater structures, shoreline erosion, and littoral and buffer zones. These assessments were used to identify and address pond issues and identify potential areas for improvement. Each homeowners' association was eligible for up to $12,500 to complete a pond improvement project. Potential projects included adding native aquatic plants to the shallow littoral zone and adding native plants to the shoreline buffer zone. The homeowners' associations completed their pond improvement projects in summer/fall 2025.

Pre-pilot surveys were completed by each of the four homeowners' associations in February 2025 and post-pilot surveys will be deployed in winter 2026. Survey results will be used to measure learning outcomes, assess the adoption of pollution prevention measures, and evaluate the effectiveness of the Pond Pilot Program. Lessons learned from the pilot program will be used to strategize the best way to expand this program to include additional homeowners' associations and stakeholder groups in the future. Grant funding from the Indian River Lagoon National Estuary Program was secured to help fund the Pond Pilot Program.

Septic Systems and Sewer Laterals Maintenance

Nationwide, 10–20% of septic systems are failing from overuse, improper maintenance, unsuitable drainfield conditions, and high-water tables. When septic systems are older and failing or are installed over poor soils close to the groundwater table or open water, they can be a major contributor of nutrients and bacterial and viral pathogens to ground and surface waters (De and Toor, 2017; United States Environmental Protection Agency, 2002).

A properly functioning septic tank and drainfield system reduces TN by 30–40%. However, the reduction has been measured at 0–20% in adverse conditions. The best available studies estimate a 10% reduction in nitrogen within a properly maintained tank versus an improperly maintained tank. The remaining 20–30% of nitrogen removal occurs in a properly functioning drainfield (Anderson 2006). If 15% of systems are failing and failing systems attenuate 30% less of the nitrogen load, these systems may pose far greater impacts to the groundwater, tributaries, and IRL than the average impact reported for properly functioning septic systems. Without the 30% reduction, the potential load to the IRL and its tributaries is estimated to be 27.2 pounds per year of TN for properties within 55 yards (instead of 19 pounds per year of TN for functioning septic systems), 5.2 pounds per year of TN for properties between 55 and 219 yards away (instead of 3.6 pounds per year of TN for functioning septic systems), and 1.1 pounds per year of TN for properties more than 219 yards away (instead of 0.8 pounds per year of TN for functioning septic systems).

An estimated 62,226 septic systems are in Brevard County within the IRL watershed. As noted in **Section 4.1.6**, the total loading of septic systems within 55 yards of the IRL and its tributaries is calculated at 299,590 pounds per year of TN, the total loading of septic systems between 55 and 219 yards is 86,575 pounds per year of TN, and the total loading of septic systems further than 219 yards is 10,805 pounds per year of TN. If the failure rate in the County is about 15%, and if failing septic systems receive 30% less attenuation, then failing septic systems within 55 yards of open water are contributing 13,481 pounds per year of TN, failing septic systems between 55 and 219 yards of open water are contributing 3,896 pounds per year of TN, and failing septic systems further than 219 yards are contributing 486 pounds per year of TN. By factoring in this failure rate, the total additional loading to the IRL from failing septic systems is approximately 17,863 pounds per year of TN.

A 10-year outreach campaign budget of $300,000, which includes $50,000 for research and campaign development and $25,000 per year for implementation to improve septic system maintenance, reduce excess use, and prevent harmful additives, would strive to reduce the number of failing systems countywide by 25%, thereby reducing the excess loading from failing systems by 4,466 pounds per year of TN. As part of the 2023 Update, the Citizen Oversight Committee recommended expanding the septic system maintenance campaign with an additional $25,000 per year for the remaining five years of the plan, which adds $125,000 to the campaign. In addition, they recommended adding $1,200 per year in Years 6–10 for digital messaging with action items for further reach and evaluation of that reach after Year 6. The updated total budget is $431,000. **Table 4-7** summarizes the costs and benefits of implementing this campaign.

Table 4-7. Project for Septic System Maintenance Program

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2018	58c	Septic System Maintenance Education+	Brevard County	All	4,466	$97	Not applicable	Not applicable	$431,000

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Market research needed to guide development of a septic maintenance campaign was contracted with state grant funding through the Marine Resources Council to the University of Central Florida. Survey results from 2018 are reported in **Section 4.4.3**. In reaching out to

citizens to participate in the survey, it was found that many people are unsure of whether they are on central sewer or a septic system. When developing the septic system maintenance education program, Brevard County will identify opportunities to educate people who are on central sewer about proper maintenance of their sewer laterals. Adding this education component to the septic system maintenance education campaign is not anticipated to require additional funding.

Lagoon Loyal Program

Using funding from the fertilizer education and septic system maintenance education programs, the marketing company MTN Advertising was contracted in 2019 to create an outreach campaign to engage Brevard County citizens in IRL restoration efforts. In 2024, the community-based social marketing company, SparkTide, was contracted to evaluate, update, and expand the outreach campaigns to include programs addressing grass clippings, excess irrigation, and stormwater pond maintenance education programs. The Lagoon Loyal campaign uses an incentive program to motivate positive actions that benefit the IRL (website). Citizens can create an online Lagoon Loyal profile that keeps track of participation in suggested activities that benefit the IRL and then provides rewards. Previously, each activity earned points, which would accumulate and be redeemed for discounts to local area businesses. While reporting actions occurred, the coupon incentive was underused. New incentives of lagoon-related giveaways were tested and successfully increased engagement. SparkTide is exploring how to expand those and other incentives as the program moves forward. A blog section was also added to the Lagoon Loyal website to highlight pollution reduction actions and create a more dynamic website that encourages site visitors to return to engage with new content.

Lagoon Loyal businesses providing discounts are given display materials that indicate support for the IRL and program participation. These display materials also advertise the program to their customers. Citizens who complete Lagoon Loyal actions receive coupons that encourage them to patronize Lagoon Loyal businesses, providing a positive feedback loop for local citizens and businesses. SparkTide is exploring how to expand business engagement and highlight actions that Lagoon Loyal businesses are taking to help the lagoon. The goal is to inspire a sense of community cooperation for residents to join businesses in helping the lagoon.

The Lagoon Loyal program has also developed and distributed outreach materials targeted for greatest impact with the public. Message selection is guided by focus groups and survey responses from citizens. Fertilizer ordinance signs, educating the public on proper use of fertilizer, were distributed to all fertilizer retail locations in Brevard County. These signs must remain posted anywhere fertilizer is sold. A pilot program was conducted with stickers marking ordinance compliant fertilizer bags to help direct the public in making the right choice when purchasing fertilizer. Three fertilizer best management practices videos (Fertilizer Timing, Fertilizer Buffer Zone, and Fertilizer Buying Guide) were developed and distributed through various media outlets. Two fertilizer ban radio ads were created to air on several local radio stations during the ban period. One ad is for homeowners who manage their own lawn, and one is for homeowners who hire professional lawn care services. Additionally, fertilizer best management practices bookmarks were created and handed out at libraries with each book checked out.

For the septic system outreach program, a best management practices magnet was created and provided to septic contractors to distribute to clients when making service calls. An educational flyer on septic system best management practices, which also encourages septic system inspections during home purchases, was created to be distributed by realtors, title agencies, and home inspectors to buyers of homes with septic systems. Four septic

maintenance videos (Think at the Sink, Don't Overload the Commode, Inspect It, and Protect It) were created and distributed through various media outlets. The Lagoon Loyal Program website also maintains landing pages to help interested homeowners find links to the applications for septic system upgrade and septic-to-sewer grants available to eligible locations.

Oyster Gardening Program and Restore Our Shores

Before oyster restoration began in the IRL, much of Brevard County no longer had sufficient oyster populations for natural recruitment processes to stock newly constructed suitable substrate (Futch, 1967). Today, oyster recruitment levels are improving but vary by sub-basin. To create sustainable oyster bars where recruitment is limited, the oysters must be grown and then carefully placed on appropriate substrate in the selected locations. To help increase the oyster population, in fiscal year 2013–2014, the Board of County Commissioners approved $150,000 of stormwater funds to launch the Oyster Gardening Program. This program is a citizen-based oyster propagation program where juvenile oysters are raised under lagoon-front homeowners' docks for about six months before being used to populate constructed oyster bar sites. Oyster Gardening participants receive spat-on-shell oysters plus all supplies needed to care for their oysters. The Oyster Gardening Program is executed in partnership with the Brevard Zoo. The project continued during fiscal year 2014–2015 with funding from the state and continued through 2019 with annual County Stormwater Utility funding.

In 2020, at the request of the County Commission, the Citizen Oversight Committee recommended a total of $300,000 from the Save Our Indian River Lagoon Trust Fund to fund two years of the Oyster Gardening Program through September 2021 (**Table 4-8**).

Table 4-8. Project for Oyster Gardening Program

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2020	193	Oyster Gardening Program+	Brevard County	All	Not applicable	Not applicable	Not applicable	Not applicable	$300,000
2022	227	Restore Our Shores: Community Collaborative+	Brevard County and Brevard Zoo	All	Not applicable	Not applicable	Not applicable	Not applicable	$1,000,000

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

As the IRL restoration needs continue to grow, the Brevard Zoo Restore Our Shores Program that leads Oyster Gardening is poised to diversify restoration efforts, as needed. Through independent grants and the County funded Community Collaborative Project, Brevard Zoo Restore Our Shores team maintains contact with community members and conducts workshops to educate and train volunteers in resource propagation and care, living shorelines, and issues facing the lagoon. Brevard Zoo Restore Our Shores now leads oyster, living shoreline, seagrass and clam restoration efforts. The Oyster Gardening Program has diversified to connect waterfront homeowners with other community members to tend oyster habitats and grow *Mercenaria mercenaria* clams to repopulate the IRL. Clams are important filter feeders that can live within seagrass meadows directly benefiting the habitat through local water quality improvements (Wall et al., 2008).

Seagrass restoration needs are increasing and, as IRL water quality conditions become suitable, it will be necessary to raise more seagrass to plant in the lagoon. The establishment of

seagrass nurseries can provide opportunities for the public to engage in seagrass grow-out. Brevard Zoo has built two seagrass nurseries: one in Rockledge and one in Melbourne Beach, which is part of a network of nurseries initially supported by the IRL National Estuary Program. Sea and Shoreline, LLC has completed a third seagrass nursery in Melbourne Beach that was also supported by the IRL National Estuary Program. The existing network of community participants in the Oyster Gardening Program will be invaluable to support these additional restoration efforts.

4.1.2. Wastewater Treatment Facility Upgrades

88% of reclaimed water in the County is used in public access areas and for landscape irrigation.

Direct wastewater treatment facility discharges to the Indian River Lagoon (IRL) were largely eliminated in the 1990s in response to the Indian River Lagoon System and Basin Act of 1990. Most facilities in the basin now use the treated effluent for reclaimed water irrigation. While the use of reclaimed water for irrigation is an excellent approach to conserving potable water, if the reclaimed water is high in nutrient concentrations, the application of the reclaimed water for irrigation can result in nutrients leaching into the groundwater. University of Florida-Institute of Food and Agricultural Sciences studies indicate that a nitrogen concentration of 5 to 9 milligrams per liter is optimal for turfgrass growth, with a maximum application rate of 1 pound of nitrogen per 1,000 square feet of turf per year (University of Florida-Institute of Food and Agricultural Sciences, 2013a and 2013b). Nitrogen leaching increases significantly when irrigation is greater than 2 centimeters per week (0.75 inches per week), even if the nitrogen concentrations are half of the maximum Institute of Food and Agricultural Sciences recommendation of 9 milligrams per liter.

In 2020, the Florida Legislature adopted the Clean Waterways Act requirements to reduce wastewater nutrient impacts on the health of the IRL. In 2024, House Bill 1557 established a requirement that all wastewater treatment facilities that provide reclaimed water for commercial or residential irrigation, or are otherwise land applied within the Indian River Lagoon basin management action plan areas, must meet advance wastewater treatment standards of 3 milligrams per liter of total nitrogen (TN) and 1 milligrams per liter of total phosphorus (TP) by July 1, 2034.

In Brevard County (County), 88% of the reclaimed water is used in public access areas and for landscape irrigation. The total reclaimed water used countywide is approximately 18.5 million gallons per day, which is applied over 7,340 acres. The unincorporated County and city wastewater treatment facilities with the reclaimed water flows and TN concentrations based on permit data and loads in pounds per year are shown in **Table 4-9**. This table also summarizes the excess TN in the reclaimed water after environmental attenuation/uptake (75% for TN [Florida Department of Environmental Protection, 2017]), for both the current TN effluent concentration and if the facility were upgraded to achieve a TN effluent concentration of 6 milligrams per liter (the City of Palm Bay Water Reclamation Facility update will achieve a TN effluent concentration of 7.5 milligrams per liter and the City of Melbourne Grant Street Wastewater Treatment Facility will achieve a TN effluent concentration of 5 milligrams per liter).

Table 4-9. TN Concentrations in Wastewater Treatment Facility Reclaimed Water

Facility	Permitted Capacity (million gallons per day)	Reclaimed Water Flow (million gallons per day)	Total Nitrogen Concentration (milligrams per liter)	Total Nitrogen After Attenuation (pounds per year)	Total Nitrogen After Attenuation and Upgrade (pounds per year)
City of West Melbourne Ray Bullard Water Reclamation Facility	3.00	2.10	14.80	24,054	9,752
Brevard County Barefoot Bay Water Reclamation Facility	0.90	1.04	14.10	11,349	4,829
Cape Canaveral Air Force Station	0.80	0.47	14.00	5,093	2,182
Brevard County South Central Regional	12.00	4.86	13.40	50,409	22,568
City of Palm Bay Water Reclamation Facility	2.30	1.02	13.30	10,499	5,921
City of Melbourne Grant Street	5.50	3.45	12.00	32,042	13,351
Brevard County North Regional	0.99	0.29	12.00	2,693	1,347
Brevard County Port St. John	0.49	0.39	9.50	2,867	1,811
Rockledge Wastewater Treatment Facility	4.50	2.31	8.00	14,303	10,727
City of Titusville Blue Heron	4.00	2.20	7.28	12,396	10,216
City of Cocoa Jerry Sellers Water Reclamation Facility	4.50	2.22	7.30	20,068	10,309
Brevard County South Beaches	8.00	6.46	3.30	16,499	Not applicable
Brevard County Sykes Creek	6.00	3.33	2.32	5,979	Not applicable
City of Titusville Osprey	2.75	1.96	2.00	3,034	Not applicable
City of Cocoa Beach Water Reclamation Facility	6.00	3.49	1.94	8,384	Not applicable
City of Cape Canaveral Water Reclamation Facility	1.80	1.03	1.44	1,837	Not applicable

Based on a 2007 study by United States Environmental Protection Agency, the cost to upgrade wastewater treatment facilities to meet advanced wastewater treatment standards is approximately $4,200,000 per plant. This cost is in 2006 dollars, which, when inflated to 2016 dollars and costs are included for design and permitting, is approximately $6,000,000 per facility. Where cost estimates were available for facility upgrades, these costs were used instead of the inflated estimated costs. Due to the high cost per pound of TN and TP removed to upgrade some of these facilities compared to other projects in this plan, only those facilities in **Table 4-10** are recommended for upgrades as part of this plan. This table also includes the wastewater treatment facility upgrade projects submitted as part of an annual update to the plan. As part of the public education and outreach efforts, customers who use reclaimed water for irrigation should be informed of the nutrient content in the reuse water because they can and should eliminate or reduce the amount of fertilizer added to their lawn and landscaping. This information can be provided to the customers through their utility bill.

Table 4-10. Projects for Wastewater Treatment Facility Upgrades to Improve Reclaimed Water

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed	Plan Funding
Original	2016-17	City of Palm Bay Water Reclamation Facility*	City of Palm Bay	Central IRL	20,240	$180	102	$35,636	$3,634,900
Original	2016-02a	City of Titusville Osprey Wastewater Treatment Facility*	City of Titusville	North IRL	8,660	$1,016	Not applicable	Not applicable	$8,800,000
2018	59	Grant Street Water Reclamation Facility Nutrient Removal Improvements+	City of Melbourne	Central IRL	18,052	$375	9,671	$700	$6,769,500
2019	99	Cocoa Beach Water Reclamation Facility Upgrade+	City of Cocoa Beach	Banana	2,520	$375	685	$1,380	$945,000
2020	2016-2b	City of Titusville Osprey Nutrient Removal Upgrade Phase 2+	City of Titusville	North IRL	3,626	$83	Not applicable	Not applicable	$300,000
2020	138	Ray Bullard Water Reclamation Facility Biological Nutrient Removal Upgrade+	City of West Melbourne	Central IRL	11,360	$375	3,302	$1,290	$4,260,000
2022	216	City of Rockledge Flow Equalization Basin Project+	City of Rockledge	North IRL	5,365	$383	Not applicable	Not applicable	$2,054,795
2023	234	South Brevard Water Reclamation Facility+	Brevard County Utilities	Central IRL	4,316	$383	863	$1,915	$1,653,028
2025	282	South Beaches Wastewater Treatment Plant Upgrade+^	Brevard County Utility Services Department	Central IRL	5,734	$431	1,147	$2,152	$2,471,354
2025	283	Port Saint John Wastewater Treatment Plant Replacement+^	Brevard County Utility Services Department	North IRL	2,278	$431	2,278	$431	$981,818
2026	286	The Cove Package Plant Upgrade+	Private Homeowner's Association	Central IRL	23	$431	To be determined	To be determined	$9,913
-	-	***Total***	-	-	***82,174***	***$388 (average)***	***18,048***	***$1,766 (average)***	***$31,880,308***

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan. The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.
^Approved with the stipulation to review and contract up to an amount exceeding regulatory requirements.

4.1.3. Sprayfield and Rapid Infiltration Basin Upgrades

Another opportunity to reduce the nutrient loading from the wastewater treatment facilities is to upgrade the disposal locations, either sprayfields or rapid infiltration basins, for the treated effluent. The sprayfields and rapid infiltration basins could be modified to include biosorption activated media to provide additional nutrient removal. Examples of biosorption activated media include mixes of soil, sawdust, zeolites, tire crumb, vegetation, sulfur, and spodosols (Wanielista et al., 2011). Based on a pilot project in the City of DeLand, the potential removal of adding biosorption activated media to a sprayfield or rapid infiltration basin is 83% for total nitrogen (TN) and 66% for total phosphorus (TP) (City of DeLand and University of Central Florida, 2018). The loads for the facilities in Brevard County that dispose of reclaimed water to a sprayfield or rapid infiltration basin were estimated based on permit and discharge monitoring report information (where available). Attenuation rates used were based on Florida Department of Environmental Protection (2017) estimates of 60% for sprayfields and 25% for rapid infiltration basins. Then the biosorption activated media efficiency rate was applied to determine the TN that could be removed. Costs were estimated for each upgrade and the upgrades that could be made for the least cost per pound of TN are recommended for pilot project funding as part of this plan (see **Table 4-11** and **Table 4-12**). Information on nutrient concentrations or the size of the sprayfield/rapid infiltration basin were missing from several facilities. As this information is gathered, additional upgrades may be found to be cost-effective.

Table 4-11. Projects for Sprayfield or Rapid Infiltration Basin Upgrades for Public Facilities

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2017	6	Long Point Park Upgrade+	Brevard County Parks Department	Central IRL	163	$625	Not applicable	Not applicable	$101,854
-	-	***Total***	-	-	***163***	***$625***	***Not applicable***	***Not applicable***	***$101,854***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Table 4-12. Projects for Sprayfield or Rapid Infiltration Basin Upgrades for Private Facilities

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2022	196	Sterling House Condominium Sprayfield+^	Property Owner	Central IRL	154	$390	To be determined	To be determined	$60,000
-	-	***Total***	-	-	***154***	***$390***	***To be determined***	***To be determined***	***$60,000***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.
^ This is the most cost-effective location that is not likely to become eligible to connect to sewer in the near future.

4.1.4. Package Plant Connections

Package plants are miniature wastewater treatment facilities that serve small communities producing more than 2,000 gallons of effluent per day. The most common package plant treatment methods are extended aeration, sequencing batch reactors, and oxidation ditches; the

same biological treatment methods used in larger wastewater treatment plants. The smallest package plants often use the same technology as advanced septic systems. Following this treatment, the effluent is disposed of in rapid infiltration basins (ponds), sprayfields, or drainfields (United States Environmental Protection Agency, 2000).

Most package plants were removed in the 1990s following the Indian River Lagoon System and Basin Act of 1990. However, opportunities still exist to address some of the worst remaining package plants by upgrading the existing plant, adding nutrient scrubbing technology, or preferably connecting them to central sewer where the wastewater will receive further treatment and disposal far from the Indian River Lagoon (IRL). A few of these package plants are located along the IRL and, therefore, pose a substantial nutrient risk due to their effluent concentration and disposal methods. **Table 4-13** lists the estimated total nitrogen (TN) reductions and costs to connect the package plants to the sewer system. The estimated TN load from each package plant accounts for attenuation rates that were based on Florida Department of Environmental Protection (2017) estimates of 60% for sprayfields and 25% for rapid infiltration basins.

Table 4-13. Projects for Package Plant Connection

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2021	192	Oak Point Wastewater Treatment Facility Improvements+	Oak Point Mobile Home Park	North IRL	186	$1,500	To be determined	To be determined	$279,000
2023	237	Willow Lakes Recreational Vehicle Park+	Willow Lakes Homeowners Association	North IRL	725	$1,500	To be determined	To be determined	$1,087,500
-	-	***Total***	-	-	***911***	***$1,500 (average)***	***To be determined***	***To be determined***	***$1,366,500***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

4.1.5. Sewer Laterals Rehabilitation

Sewage overflows following heavy rainfall events are an indicator of illegal connections or inadequate sewer asset conditions. Three major components of wastewater flow in a sanitary sewer system: (1) base sanitary (or wastewater) flow, (2) groundwater infiltration, and (3) rainfall inflow. Virtually every sewer system has some infiltration and/or inflow. Historically, small amounts of infiltration and/or inflow are expected and tolerated. However, infiltration and/or inflow becomes excessive when it causes overflows, health, and/or environmental risks. There were recurring overflows from the South Beaches Wastewater Treatment Facility sewer system, including significant overflows following Hurricane Matthew in 2016 and Hurricane Irma in 2017. Less frequent overflows and line breaks have occurred in other sewer service areas.

In 2012, in recognition of aging infrastructure and increasingly frequent issues, the Brevard County (County) Utility Services Department engaged seven professional engineering firms to perform independent field evaluations of the condition of the sewage infrastructure assets located in each of the County's seven independent sewer service areas. The output of this investigation was the identification of $134 million in specific capital improvement needs required over a ten-year period to bring County-owned sewer system assets up to a fully functional, reliable, affordable, efficient, and maintainable condition (Brevard County Utility Services, 2013). The field evaluation results and corresponding 10-year Capital Improvement

Program Plan were presented to the Brevard County Commission in 2013. In response, the Commission approved financing the entire Capital Improvement Program Plan and increased the County's sewer service rates to repay the debt. Plan implementation began in 2014 and projects progressed quickly. In 2022, the County conducted another assessment of the sewage infrastructure, which identified additional capital improvement needs. The County Commission approved an increase in the sewer service rates to fund $460 million in bonding for the identified projects. Many of those projects are underway.

Because a capital improvement plan and funding mechanism for updating the County's aging sewer system infrastructure already existed, the original Save Our Indian River Lagoon Project Plan did not include analysis or funding for sewer infrastructure repairs. Unfortunately, even in areas where capital improvements were made, infiltration and/or inflow continued to be a problem contributing to overflows that discharge untreated wastewater into the Indian River Lagoon (IRL). This indicated the probability of issues outside the County-owned assets, such as illegal connections and/or leaks in the privately owned lateral connections of homes and businesses to the County sewer system.

Identifying problems on the customer side of the connection required smoke testing each building or private residence to detect leaks or illegal connections. The extent of infiltration and/or inflow on the customer side of the connections was unknown and, therefore, the nutrient loading associated with these issues was also unknown. As a first step to determine the extent of infiltration and/or inflow problems with the sewer laterals, the County partnered with the City of Satellite Beach on a pilot project to perform smoke testing of more than 12,000 buildings and residences within an area of concern in March through July of 2018. Smoke testing results are included in **Section 4.4.3**.

Repair of privately owned portions of the sewer system is not funded in the County's adopted Capital Improvement Program Plan for the Wastewater Utility; therefore, use of the Save Our Indian River Lagoon Trust Fund was considered. The Brevard County Utility Services Department estimated that infiltration and/or inflow due to rainfall and flooding associated with Hurricane Irma in 2017, caused 1,835 pounds of total nitrogen (TN) and 350 pounds of total phosphorus (TP) to enter the lagoon from sewage overflows from the South Beaches Regional Wastewater Treatment Facility sewer system. Staff reviewed 13 years of storm-related release data (2004–2017) to estimate the average annual nutrient load to the IRL from emergency sewage overflows. If repairing private connections could prevent similar overflows in the future, then the average annual nitrogen reduction benefit of such repairs would be approximately 988 pounds per year of TN. The average cost-effectiveness of sewer expansion projects funded in the 2017 Plan Supplement was $852 per pound of nitrogen removed, thus the cost to reduce 988 pounds per year of TN loading by implementing septic-to-sewer projects would have been $841,842. Therefore, the 2018 Update allocated $840,000 for smoke testing and to assist property owners with the cost to repair detected leaks.

After smoke testing was complete in the pilot area, the cost to repair the leaks that were detected was estimated at $646,200. These results supported expansion of this program from the Satellite Beach pilot area to other city and county sewer service areas. A second pilot area for smoke testing was added in 2019 and three more areas were added in 2020, and the Citizen Oversight Committee and Brevard County Board of County Commissioners decided to make the $840,000 of funding available to offer grants county-wide for the repair of leaky laterals within the watershed of the IRL. Based on the costs reported so far for the replacement of missing caps and repair of broken pipes, current funding levels are expected to be sufficient to fund the repair of all leaks detected in the currently approved smoke testing areas. **Table 4-14**

summarizes the sewer laterals rehabilitation projects. It should be noted that smoke testing alone does not result in nutrient load reductions; identified issues must be repaired to achieve a nutrient load reduction benefit. Therefore, the funding for sewer laterals includes leak detection and repair costs to achieve pollutant load reductions.

The Save Our Indian River Lagoon Respond funds were used to measure the nutrient pollution in groundwater near leaks detected by smoke testing. These results supported the decision to require that privately owned leaky lateral connections be repaired. After the leaks are repaired, flow volumes in the sewer collection system will be compared following storms to document reductions of groundwater leaking into pipes and overwhelming the sewer infrastructure.

Table 4-14. Projects for Sewer Laterals Rehabilitation

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per year of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed	Plan Funding
2018	63a	Countywide Repair/Replacement+	Brevard County	All	6,196	$102	188	$3,371	$633,808
2021	63b	Satellite Beach Lateral Smoke Testing+	Brevard County	Banana	Not applicable	Not applicable	Not applicable	Not applicable	$206,192
2019	100	Osprey Basin Lateral Smoke Testing+	City of Titusville	North IRL	Not applicable	Not applicable	Not applicable	Not applicable	$200,000
2020	114	Barefoot Bay Lateral Smoke Testing+	Brevard County Utility Services Department	Central IRL	Not applicable	Not applicable	Not applicable	Not applicable	$90,000
2020	115	South Beaches Lateral Smoke Testing+	Brevard County Utility Services Department	Central IRL	Not applicable	Not applicable	Not applicable	Not applicable	$200,000
2020	116	Merritt Island Lateral Smoke Testing+	Brevard County Utility Services Department	North IRL	Not applicable	Not applicable	Not applicable	Not applicable	$250,000
-	-	***Total***	-	-	***6,196***	***$1,230 (average)***	***188***	***$8,404 (average)***	***$1,580,000***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

4.1.6. Septic-to-Sewer and Septic System Upgrades

Septic systems are commonly used where central sewer does not exist. When properly sited, designed, constructed, maintained, and operated, septic systems are a safe means of disposing domestic waste but even well-functioning systems release nutrients at higher levels than most wsatewater treatment facilities to ground and surface waters. When septic systems are older, failing, or installed over poor soils close to the groundwater table or open water, they can be a major contributor of nutrients and bacterial and viral pathogens to the Indian River Lagoon (IRL) system. To reduce this source of nutrients, options for both septic-to-sewer and septic system upgrades were evaluated.

It is important to note that although Brevard County (County) is taking the lead on septic system upgrades, the state is responsible for the regulation and permitting of septic systems. In 2021, the responsibility of implementing the Florida Statutes applicable to septic systems moved from the Florida Department of Health to the Florida Department of Environmental Protection. The County coordinates with the Florida Department of Health and the Florida Department of Environmental Protection on the septic system projects recommended in this plan.

Regulations on the installation of septic systems have evolved since the start of the Project Plan. In 2018, Brevard County adopted a County-wide septic overlay ordinance, stopping development in sensitive areas of the lagoon watershed from installing conventional septic systems. In 2023, House Bill 1379 set additional requirements for septic systems installed anywhere within the Indian River Lagoon (IRL) watershed. As of January 2024, new construction within the IRL watershed is required to connect to sewer or use enhanced nutrient reducing septic systems. The legislation also requires all existing conventional septic systems in the IRL watershed to connect to central sewer or upgrade to enhanced nutrient reducing septic systems by July 1, 2030.

Brevard County currently has an estimated 62,226 septic systems within the IRL watershed. Estimates of the total number of systems have fluctuated as data sources and modeling approaches improved. In 2016, the number of septic systems was estimated at 59,438. By 2018, refinements to the data reduced the estimate to 53,178 residential systems. With continued updates and more comprehensive datasets, the current estimate has increased to 62,226 septic systems, including both residential and commercial properties on septic systems. Due to the large number of septic systems in the IRL watershed, prioritizing projects that address areas with the largest nutrient loading is critical to ensure the highest return on investment. Septic-to-sewer projects remove the septic impact entirely, whereas upgrading septic systems to advance treatment can substantially reduce, but not eliminate, nitrogen impacts.

In 2018, Brevard County conducted a detailed evaluation of septic system impacts to surface waters through both groundwater monitoring and modeling using the Florida Department of Environmental Protection-approved ArcGIS-Based Nitrate Load Estimation Toolkit (Rios et al., 2013). This evaluation found that groundwater conductance and soil types were stronger drivers of nitrogen transport from septic systems than was previously accounted for in the approach used for ranking in the original Save Our Indian River Lagoon Plan. Therefore, the 2019 Project Plan Update revised the approach to prioritize areas for connection to sewer. The updated approach and recommended projects are summarized below.

The updated approach to rank areas for septic system impacts used information on the potential nutrient contribution from the ArcGIS-Based Nitrate Load Estimation Toolkit (Rios et al., 2013).

Potential nutrient contributions were determined based on numerous factors, but after testing model sensitivity, a simplified approach was developed for Brevard County that was based primarily on the spatial location of the septic system (i.e., Barrier Island, Merritt Island, Mainland, or Melbourne Tillman Water Control District), soil type (soil hydraulic conductance), and the minimum distance to waterbodies (Applied Ecology, 2018).

A direct comparison between the previous model that adapted studies from Martin and St. Lucie counties (**Table 4-15**) and the new model tailored to Brevard County's soil and water (**Table 4-16**) is difficult. For loading in pounds per year, the 2016 study estimated total nitrogen (TN), which is the sum of nitrate, nitrite, ammonia, and organic nitrogen, whereas the 2018 approach using the ArcGIS-Based Nitrate Load Estimation Toolkit estimated only nitrate and ammonia.

In 2024, the ArcGIS-Based Nitrate Load Estimation Toolkit model was calibrated with groundwater well data, specifically groundwater elevation, ammonia, and nitrate-nitrate concentrations, collected from 2018 to 2021 across four priority septic communities (Melbourne Beach, Merritt Island, Suntree, and Turkey Creek) to improve estimations of nitrogen loads reaching the Indian River Lagoon (Applied Ecology, 2024). The ArcGIS-Based Nitrate Load Estimation Toolkit model only allows for the prediction of ammonia and nitrate. Other forms of nitrogen, such as urea or total Kjeldahl nitrogen, often included in septic system effluent, are not included in the ArcGIS-Based Nitrate Load Estimation Toolkit model estimates. This local calibration effort provides a more accurate estimate of TN loading from septic systems to the Indian River Lagoon (see **Table 4-17**).

Table 4-15. 2016 Estimate of TN Loading and Cost to Connect for Septic Systems

Septic System Distance from Surface Water (yards)	Number of Septic Systems	Total Nitrogen Load Per System (pounds per year)	Total Nitrogen Load (pounds per year)	Cost per System to Connect	Total Cost	Cost per Pound per Year of Total Nitrogen
0–55	15,090	27.095	408,863	$20,000	$301,800,000	$738
55–219	25,987	6.865	178,395	$20,000	$519,740,000	$2,913
Greater than 219	18,361	0.001	10	$20,000	$367,220,000	$37,624,010
Total	***59,438***	***9.880 (average)***	***587,268***	***$20,000***	***$1,188,760,000***	***$2,024 (average)***

Table 4-16. 2018 Estimate of TN Loading based on ArcGIS-Based Nitrate Load Estimation Toolkit and Updated Cost to Connect for Septic Systems

Septic System Distance from IRL (yards)	Number of Septic Systems	Total Nitrogen Load per System (pounds per year)	Total Nitrogen Load (pounds per year)	2022 Cost per System to Connect	Total Cost	Cost per Pound per Year of Total Nitrogen
0–55	15,737	19.037	299,590	$60,618	$953,945,466	$3,184
55–219	23,969	3.612	86,575	$60,618	$1,452,952,842	$16,782
Greater than 219	13,472	0.802	10,805	$60,618	$816,645,696	$75,584
Total	***53,178***	***Not applicable***	***396,970***	***$60,618***	***$3,223,544,004***	***$8,120 (average)***

Table 4-17. 2024 Estimate of TN Loading based on ArcGIS-Based Nitrate Load Estimation Toolkit and Updated Cost to Connect for Septic Systems

Septic System Distance from IRL (yards)	Number of Septic Systems	Total Nitrogen Load per System (pounds per year)	Total Nitrogen Load (pounds per year)	Cost per System to Connect	Total Cost	Cost per Pound per Year of Total Nitrogen
0–55	1,465	22.181	32,495	$75,656	$110,836,040	$3,411
55–219	3,670	16.713	61,337	$75,656	$277,657,520	$4,527
Greater than 219 (in Overlay)	15,058	7.665	115,418	$75,656	$1,139,228,048	$9,870

Septic System Distance from IRL (yards)	Number of Septic Systems	Total Nitrogen Load per System (pounds per year)	Total Nitrogen Load (pounds per year)	Cost per System to Connect	Total Cost	Cost per Pound per Year of Total Nitrogen
Greater than 219 (Outside Overlay)	42,033	4.180	175,702	$75,656	$3,180,048,648	$18,099
Total	***62,226***	***6.186***	***384,952***	***$75,656***	***$4,707,770,256***	***$12,229***

Those septic systems within 55 yards of surface waters were further analyzed by soil hydraulic conductivity since it was found to be a highly influential variable in nutrient loading from septic systems. Hydraulic conductance is the ability of water to move through pore space in the soil with sandy soils having a higher conductance compared to loamy and clay soils. As shown in **Table 4-18**, nitrogen loading is much higher in the very high and high conductivity soils compared to the average for all soils within 55 yards. Although only half of the septic systems are in very high and high conductance soils, these account for 76% of the nitrogen loading.

Table 4-18. Septic Systems by Soil Hydraulic Conductance Class within 55 Yards of IRL

Hydraulic Conductivity of Septic Systems Within 55 Yards of IRL	Number of Septic Systems	Total Nitrogen Load per System (pounds per year)	Total Nitrogen Load (pounds per year)	Cost per System to Connect	Total Cost	Cost per Pound per Year of Total Nitrogen
Very High	1,899	34.926	66,324	$60,618	$115,113,582	$1,736
High	6,304	26.021	164,039	$60,618	$382,135,872	$2,330
Medium	3,230	12.198	39,401	$60,618	$195,796,140	$4,970
Low	3,396	5.930	20,141	$60,618	$205,858,728	$10,222
Very Low	908	10.664	9,683	$60,618	$55,041,144	$5,684
Total	***15,737***	***Not applicable***	***299,588***	***$60,618***	***$953,945,466***	***$3,184 (average)***

Table 4-19 shows those properties with septic systems in very high and high hydraulic conductance soils distributed by distance to surface waterbodies. Waterfront properties served by septic systems, including those properties adjacent to the IRL, tributary rivers and creeks, or on canals or drainage ditches that discharge to the lagoon contribute 48% of all septic system loading in the IRL watershed in Brevard County. Changes in the 2019 Update shifted septic-to-sewer and septic upgrade projects as much as feasible to areas of high conductivity soils located adjacent to waterways that contribute the greatest loading to the IRL.

Table 4-19. Septic Systems in Very High and High Hydraulic Conductance Soils Distributed by Distance to Surface Waters

Septic System Distance from Surface Water (yards)	Number of Septic Systems	Total Nitrogen Load per System (pounds per year)	Total Nitrogen Load (pounds per year)	Cost per System to Connect	Total Cost	Cost per Pound per Year of Total Nitrogen
0–11	5,584	33.838	188,956	$60,618	$338,490,912	$1,791
11–22	1,207	16.404	19,799	$60,618	$73,165,926	$3,695
22–33	465	17.466	8,121	$60,618	$28,187,370	$3,471
33–44	384	12.458	4,784	$60,618	$23,277,312	$4,866
44–55	563	15.456	8,702	$60,618	$34,127,934	$3,922
Total	***8,203***	***28.083***	***230,362***	***$60,618***	***$497,249,454***	***$2,159 (average)***

Septic-to-Sewer

For the funded opportunities that were identified using the 2018 ranking method, the number of lots that could be connected, associated cost of the connection, and estimated TN reductions are shown in **Table 4-20**. **Figure 4-2** through **Figure 4-13** show the location of each of these

areas. These funded opportunities, including the quick connection projects described below, represent the connection of approximately 9% of the septic systems in Brevard County within the IRL watershed but reduce 29% of the nutrient load contribution attributed to existing septic systems in the County. Funding for sewer extension projects is used for the engineering, permitting, and construction of the underground infrastructure within the right-of-way, and the construction or reimbursement to property owners for private sewer lateral connections to the new sewer line. Connections within Septic-to-Sewer Extension Projects will be funded on a prorated basis of up to $1,600 of Save Our Indian River Lagoon Program funds per pound of nitrogen loading reduced. Loading for each non-residential property within a sewer project area is determined by multiplying the ArcGIS-Based Nitrate Load Estimation Toolkit nitrogen loading value for a single-family home by the property's equivalent residential unit water usage.

Several types of sewer systems are designed to transport wastewater from residential, commercial, and industrial properties. The choice of what type of sewer system to construct depends on factors such as population density, topography, and available space. Gravity sewer is the most commonly used system as it efficiently transports wastewater using the network of pipes with a consistent downward slope towards a lift station. Lift stations then pump the wastewater to the wastewater treatment facility. Vacuum sewer systems are another type of conveyance method that uses a vacuum to draw wastewater from the property to a pump station. This system acts like a gravity system to the user as wastewater flows from each property to a vacuum pit in the right-of-way. Wastewater collected in the vacuum pits are sucked out to the pump station. Lift stations then pump the wastewater from the pump station to the wastewater treatment facility. Low-pressure force main sewer systems use individual pumps on each property to push wastewater into the sewer system. Vacuum and low-pressure force main sewer systems are particularly useful in areas with challenging topography, where gravity-based wastewater flow is impractical. They can also be constructed in tighter areas that may not have the space for gravity lines between existing utilities and built-out properties.

Another opportunity for removing septic systems is to use a hybrid septic tank effluent pumping system. In this system, effluent from the septic tank is connected to sewer pressure lines. Small-diameter pipes, which can be installed relatively quickly, are used instead of the gravity sewer system. A high pressure ½ horsepower pump (115 volt) pumps the effluent from the septic system to a force main or gravity sewer system. The City of Vero Beach is installing these systems, maintaining the septic tank effluent pumping system, and pumping out the septic tanks when needed. The customer pays the electrical costs to operate the pump for this system.

For highly ranked properties located within the vicinity of a pressure line or gravity sewer system, the septic tank effluent pumping system may be a good option instead of the septic system upgrades described below. If septic tank effluent pumping systems are selected as a preferred option anywhere in Brevard County, specific locations for septic tank effluent pumping system installation can be submitted for funding consideration through the annual project funding request and plan update process.

The detailed septic analysis also identified 4,496 properties located within 30 feet of existing sewer infrastructure. The highest loading "Quick Connect" opportunities are included in **Table 4-20** based on their ability to connect to gravity or force main sewer and are shown in **Figure 4-14** through **Figure 4-16**.

Quick Connects to sewer will be funded on a prorated basis of $1,600 per pound of nitrogen loading to the IRL reduced, up to a maximum of $24,000 for residential connection to force main sewer or gravity connections that require pumps, and a maximum of $12,000 for residential

connection to gravity sewer without a private pump. Loading for each non-residential Quick Connect is determined by multiplying the ArcGIS-Based Nitrate Load Estimation Toolkit nitrogen loading value for a single-family home by the property's actual equivalent residential unit water usage. Funding allocation for this grant program is based on the number of highest priority connection opportunities within each sub-lagoon as reported in **Table 4-20**.

However, when cost-share grants are secured, the County can offer Quick Connect grants to all property owners within the IRL watershed on a first-come, first-served basis. This is cost-effective because the average nitrogen loading per septic system within the IRL watershed is 7.5 pounds. At the pro-rated basis of $1,600 per pound, the average cost-share for preventing 7.5 pounds of nitrogen loading would be $12,000 from program funds. While grant funds last, these program funds will be matched with up to $12,000 of state grant funding to cost-share up to $24,000 per connection.

Table 4-20. Projects for Septic-to-Sewer

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Number of Lots	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
Original	2016-16	Banana Quick Connects+	Brevard County	Banana	144	3,224	Average of $592 Maximum of $1,600	Not applicable	Not applicable	$1,908,000
Original	2016-47	Sykes Creek - Zone N*	Brevard County	Banana	91	2,784	$1,500	26	$160,615	$4,176,000
Original	2016-48	Sykes Creek - Zone M*	Brevard County	Banana	56	1,798	$1,500	16	$168,563	$2,697,000
Original	2016-49	Sykes Creek - Zone T*	Brevard County	Banana	148	3,360	$1,500	43	$117,209	$5,040,000
Original	2016-18	North IRL Quick Connects+	Brevard County	North IRL	463	11,339	Average of $531 Maximum of $1,600	Not applicable	Not applicable	$6,018,000
Original	2016-31/32	City of Cocoa – Zones J and K*	City of Cocoa	North IRL	92	3,748	$1,646	27	$228,421	$6,167,373
Original	2016-35	South Beaches - Zone A*	Brevard County	North IRL	37	1,306	$1,500	11	$178,091	$1,959,000
Original	2016-19	Central IRL Quick Connects+	Brevard County	Central IRL	335	7,378	Average of $510 Maximum of $1,600	Not applicable	Not applicable	$3,765,881
Original	2016-39	City of Palm Bay – Zone A*	City of Palm Bay	Central IRL	77	2,136	$1,319	22	$128,057	$2,817,256
Original	109	City of Titusville - Zones A-G*	City of Titusville	North IRL	18	1,563	$769	5	$223,212	$1,201,392
Original	203	South Central - Zone A*	Brevard County	North IRL	129	5,318	$1,553	37	$128,057	$8,258,854
2017	1	Breeze Swept Septic-to-Sewer Connection+	City of Rockledge	North IRL	143	2,002	$440	41	$21,476	$880,530
2017	2	Merritt Island Septic Phase Out Project+	Merritt Island Redevelopment Agency	North IRL	74	2,501	$128	21	$15,251	$320,268

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Number of Lots	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2017	4	Hoag Sewer Conversion+	City of Melbourne	Central IRL	5	101	$852	1	$86,031	$86,031
2017	5	Pennwood Sewer Conversion	City of Melbourne	Central IRL	5	103	$786	1	$81,000	$81,000
2018	60	Sylvan Estates Septic-to-Sewer Conversion+	City of West Melbourne	Central IRL	59	1,073	$1,455	17	$91,836	$1,561,215
2018	61	Riverside Drive Septic-to-Sewer Conversion+	City of Melbourne	North IRL	12	305	$872	3	$88,653	$265,960
2018	62	Roxy Avenue Septic-to-Sewer Conversion+	City of Melbourne	Central IRL	6	102	$872	2	$44,472	$88,944
2019	2019-27	Sharpes - Zone A+	Brevard County	North IRL	186	5,248	$1,500	54	$145,778	$7,872,000
2019	2019-29	South Banana - Zone B+	Brevard County	Banana	41	915	$1,500	12	$114,375	$1,372,500
2019	2020-34	Pineapple Avenue Sewer Conversion +	City of Melbourne	North IRL	61	1,688	$1,008	18	$94,554	$1,701,972
2019	2019-36	South Beaches - Zone O+	Brevard County	North IRL	2	54	$2,472	1	$133,488	$133,488
2019	2019-37	South Beaches - Zone P+	Brevard County	North IRL	11	242	$1,241	3	$100,116	$300,348
2020	145	Merritt Island - Zone F+	Brevard County Utility Services Department	Banana	71	1,292	$851	21	$160,976	$1,100,000
2020	50b	South Central - Zone C+	Brevard County Utility Services Department	North IRL	140	5,146	$1,283	41	$86,031	$6,600,000

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Number of Lots	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2020	136	Micco - Zone B+	Brevard County Utility Services Department	Central IRL	229	6,484	$1,553	66	$152,570	$10,069,652
2020	146	Merritt Island - Zone C+	Brevard County Utility Services Department	Banana	43	1,419	$1,113	13	$121,538	$1,580,000
2020	147	Sykes Creek - Zone R+	Brevard County Utility Services Department	Banana	221	5,040	$1,553	64	$122,299	$7,827,120
2020	150	South Central - Zone D+	Brevard County Utility Services Department	North IRL	94	3,387	$1,410	27	$176,833	$4,774,500
2020	148	North Merritt Island - Zone E+	Brevard County Utility Services Department	North IRL	223	3,287	$1,553	65	$78,534	$5,104,711
2020	151	Merritt Island - Zone G+	Brevard County Utility Services Department	Banana	785	7,588	$1,553	228	$51,685	$11,784,164
2020	152	Sharpes - Zone B+	Brevard County Utility Services Department	North IRL	136	2,692	$1,500	39	$103,538	$4,038,000
2020	153	Cocoa - Zone C+	Brevard County Utility Services Department	North IRL	61	2,550	$1,553	18	$220,008	$3,960,150
2021	3	Micco Sewer Line Extension (Phase I and II)+	Brevard County	Central IRL	29	1,493	$1,500	8	$279,938	$2,239,500
2021	189	Avendia del Rio Septic-to-Sewer+	City of Melbourne	Central IRL	3	71	$986	1	$70,000	$70,000
2021	190	Bowers Septic-to-Sewer+	City of Melbourne	North IRL	6	120	$1,225	2	$73,500	$147,000

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Number of Lots	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound per Year	Total Phosphorus Reduction (pounds per year)	Total Phosphorus Cost per Pound per Year	Plan Funding
2021	191	Kent and Villa Espana Septic-to-Sewer Conversion+	City of Melbourne	North IRL	33	542	$1,310	10	$71,000	$710,000
2022	222	Hedgecock/ Grabowsky and Desoto Fields+	City of Satellite Beach	Banana	2	81	$1,500	1	$121,500	$121,500
2022	224	Lake Ashley Circle+	City of West Melbourne	Central IRL	46	1,136	$1,500	13	$131,077	$1,704,000
2022	225	Dundee Circle and Manor Place+	City of West Melbourne	Central IRL	60	1,499	$1,500	17	$132,265	$2,248,500
2023	238	Kelly Park+	Brevard County Parks and Recreation	Banana	1	90	$1,500	0	Not applicable	$135,000
2023	240	Rotary Park+	Brevard County Parks and Recreation	Banana	1	104	$1,500	0	Not applicable	$156,000
2023	241	Manatee Cove+	Brevard County Parks and Recreation	North IRL	1	24	$1,500	0	Not applicable	$36,000
2023	242	Riverwalk+	Brevard County Parks and Recreation	North IRL	1	4	$1,500	0	Not applicable	$6,000
2025	284	Sewer Available Not Connected Phase 2+	City of Palm Bay	Central IRL	551	1,011	$1,600	Not applicable	Not applicable	$1,616,992
2026	295	South Tropical Trail/Kadlac Drive Sewer Extension+	Brevard County	North IRL	6	162	$1,553	2	$125,793	$251,586
-	-	***Total***	-	-	***4,942***	***103,510***	***$1,207 (average)***	***997***	***$125,329 (average)***	***$124,953,387***

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan. The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Figure 4-2. Septic-to-Sewer Projects in Banana River Lagoon

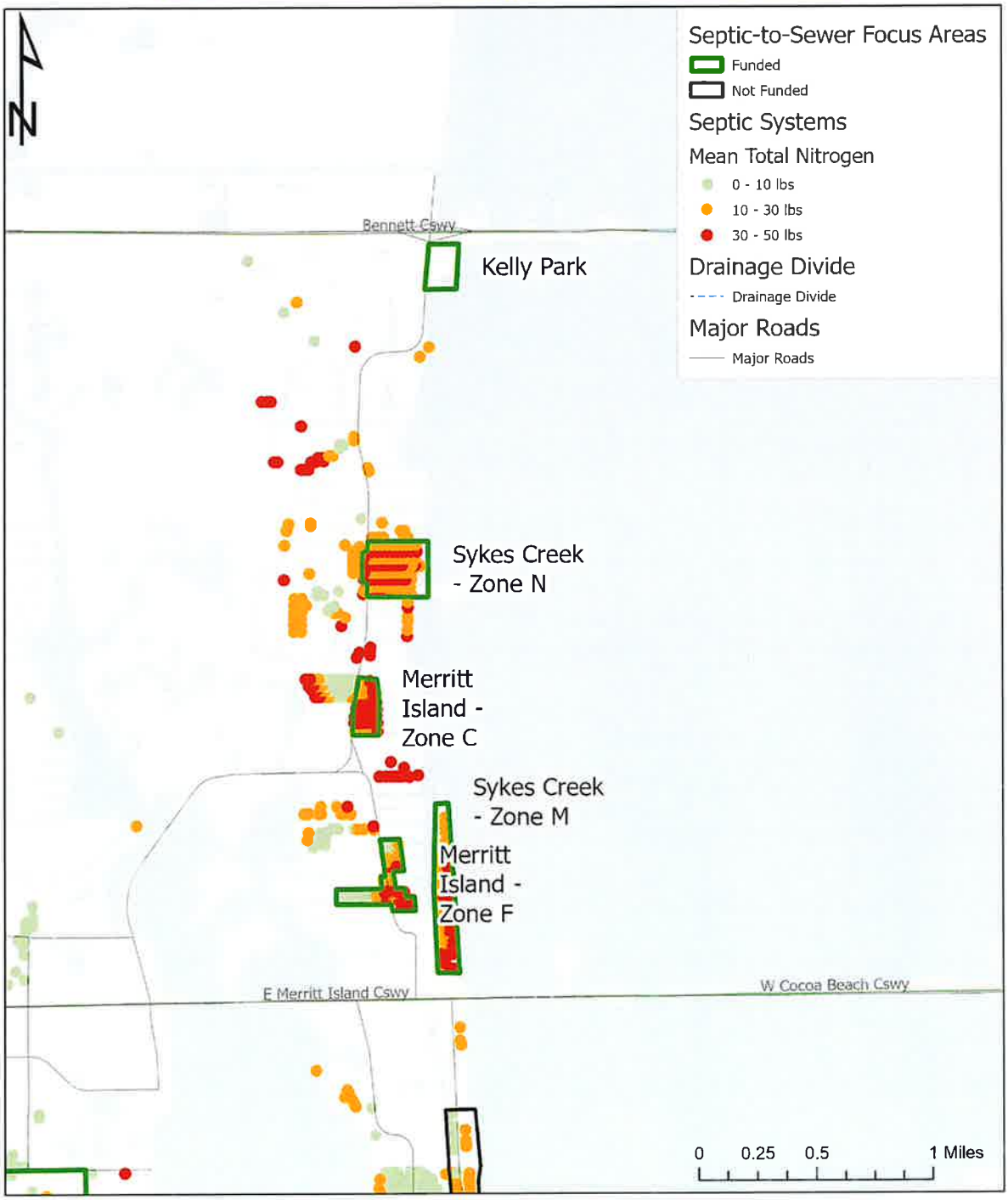


Figure 4-2 Long Description

Figure 4-3. Septic-to-Sewer Projects in Banana River Lagoon, continued

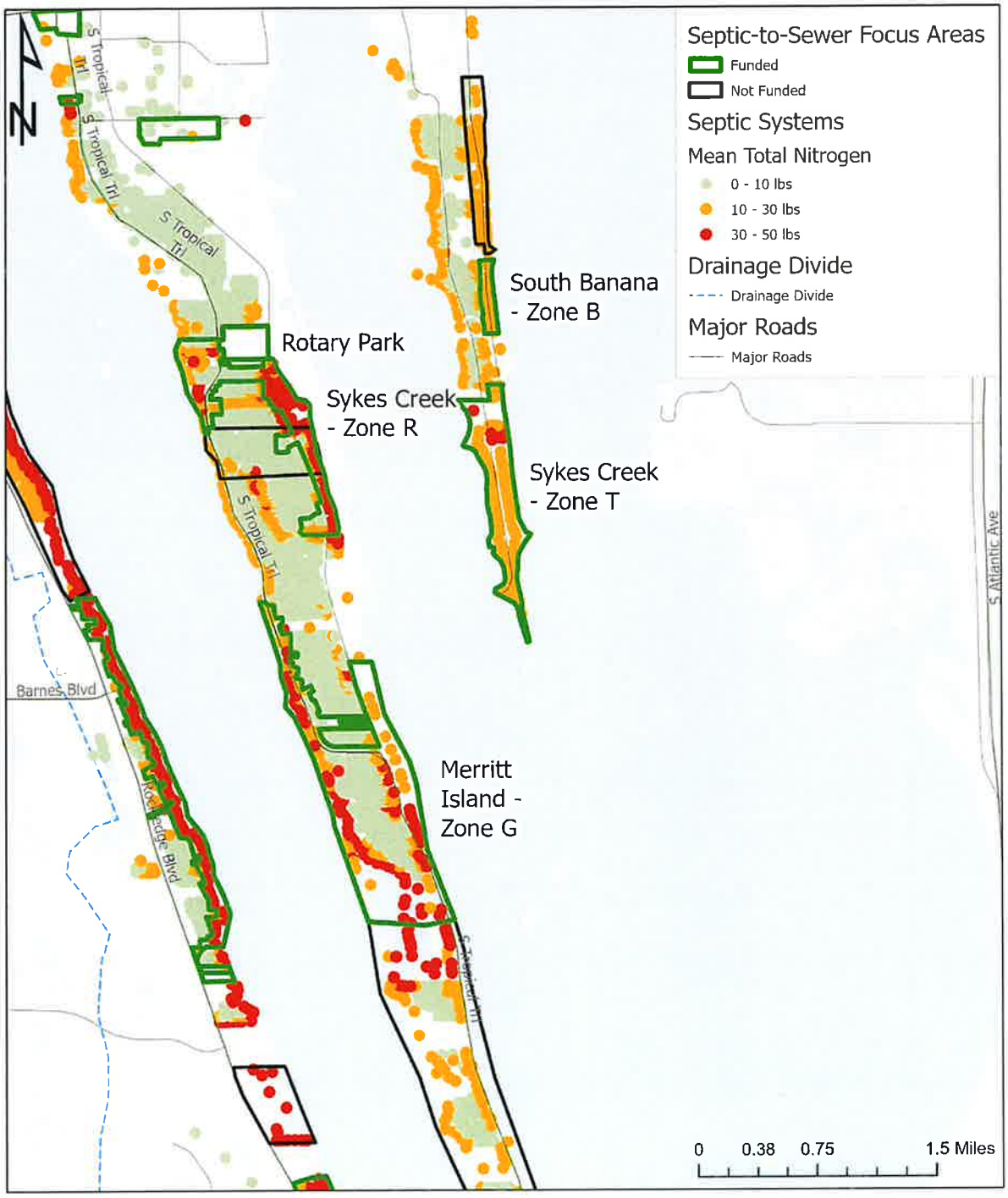


Figure 4-3 Long Description

Figure 4-4. Septic-to-Sewer Projects in Banana River Lagoon, continued

Figure 4-4 Long Description

Figure 4-5. Septic-to-Sewer Projects in North IRL

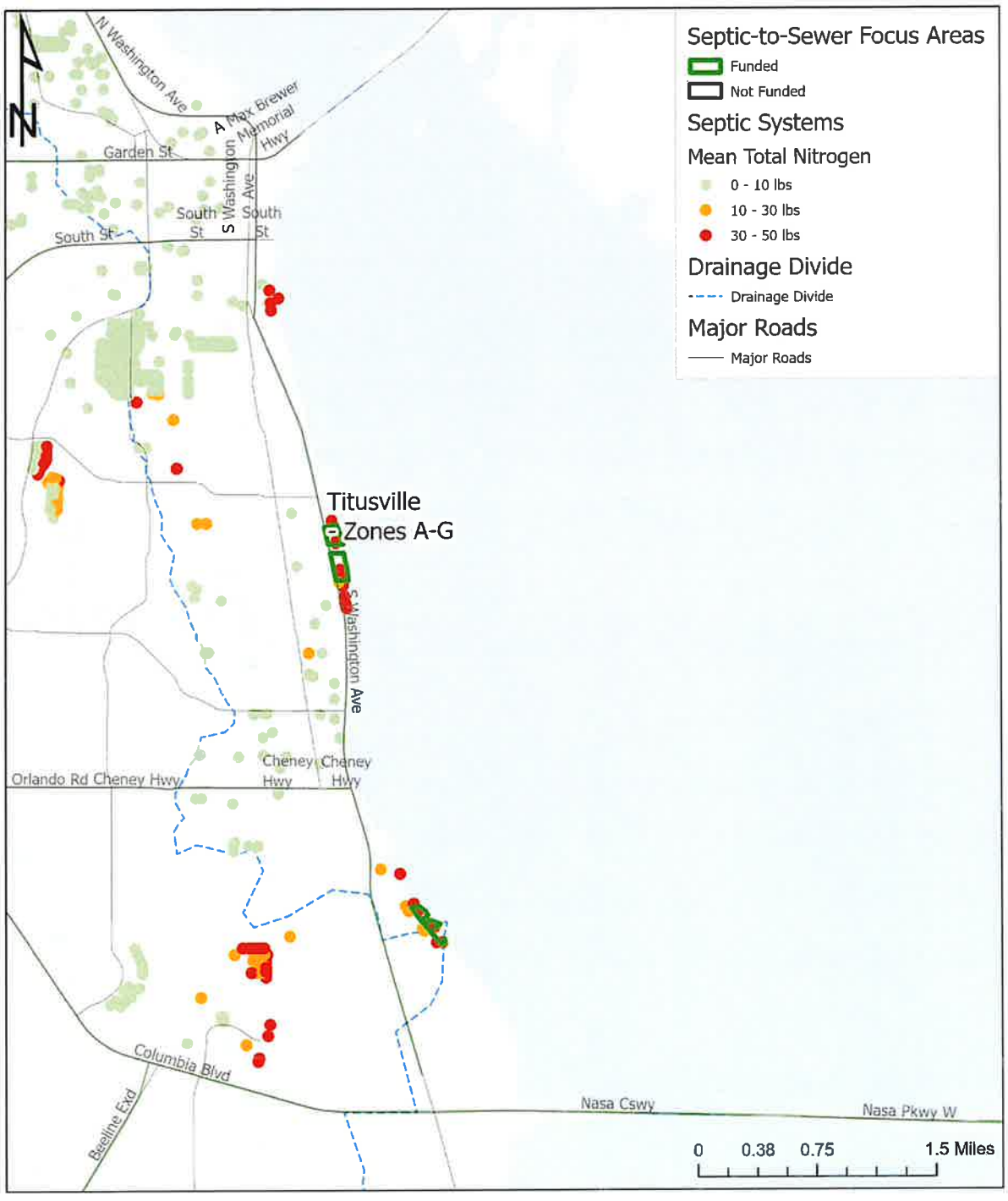


Figure 4-5 Long Description

Figure 4-6. Septic-to-Sewer Projects in North IRL, continued

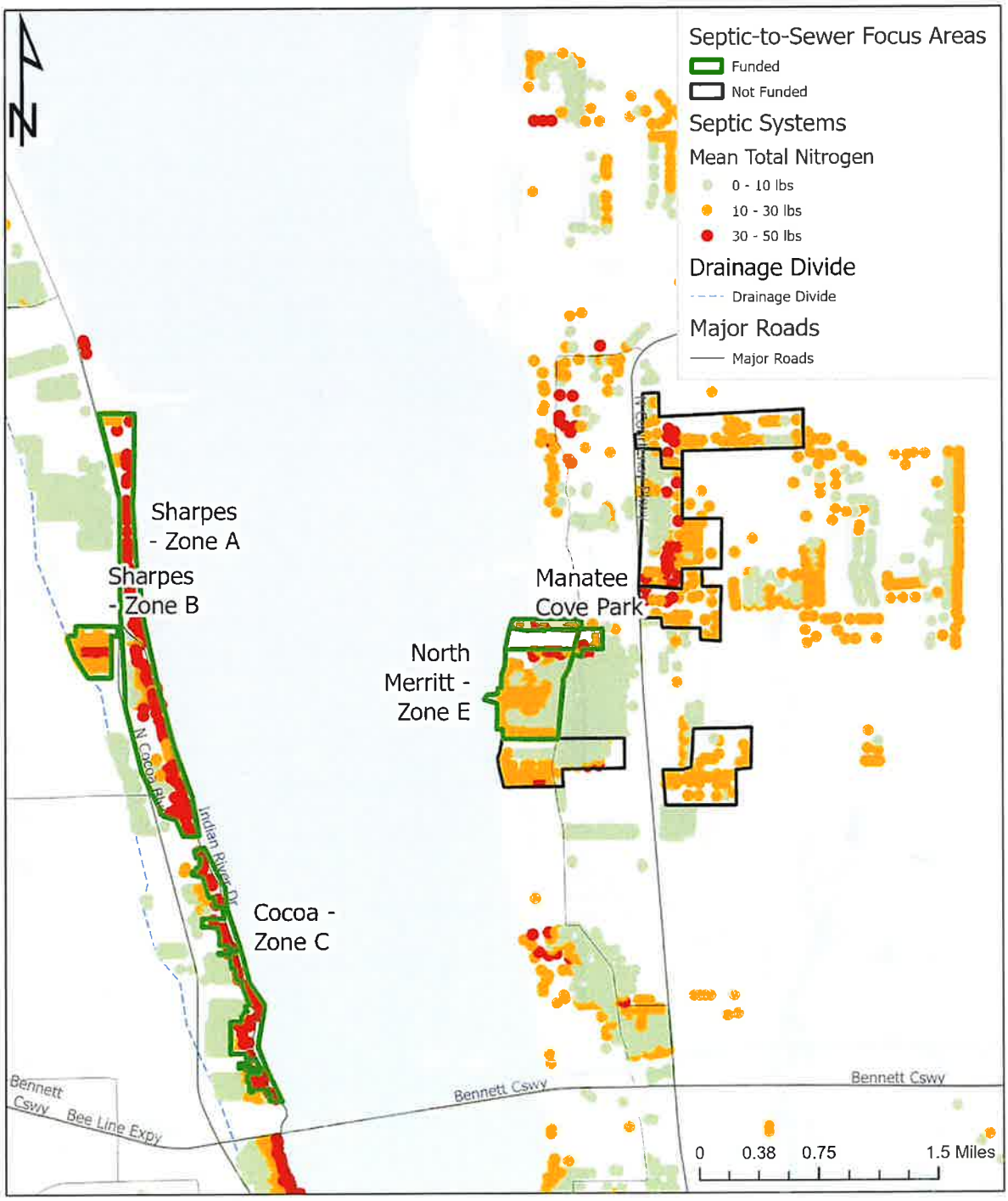


Figure 4-6 Long Description

Figure 4-7. Septic-to-Sewer Projects in North IRL, continued

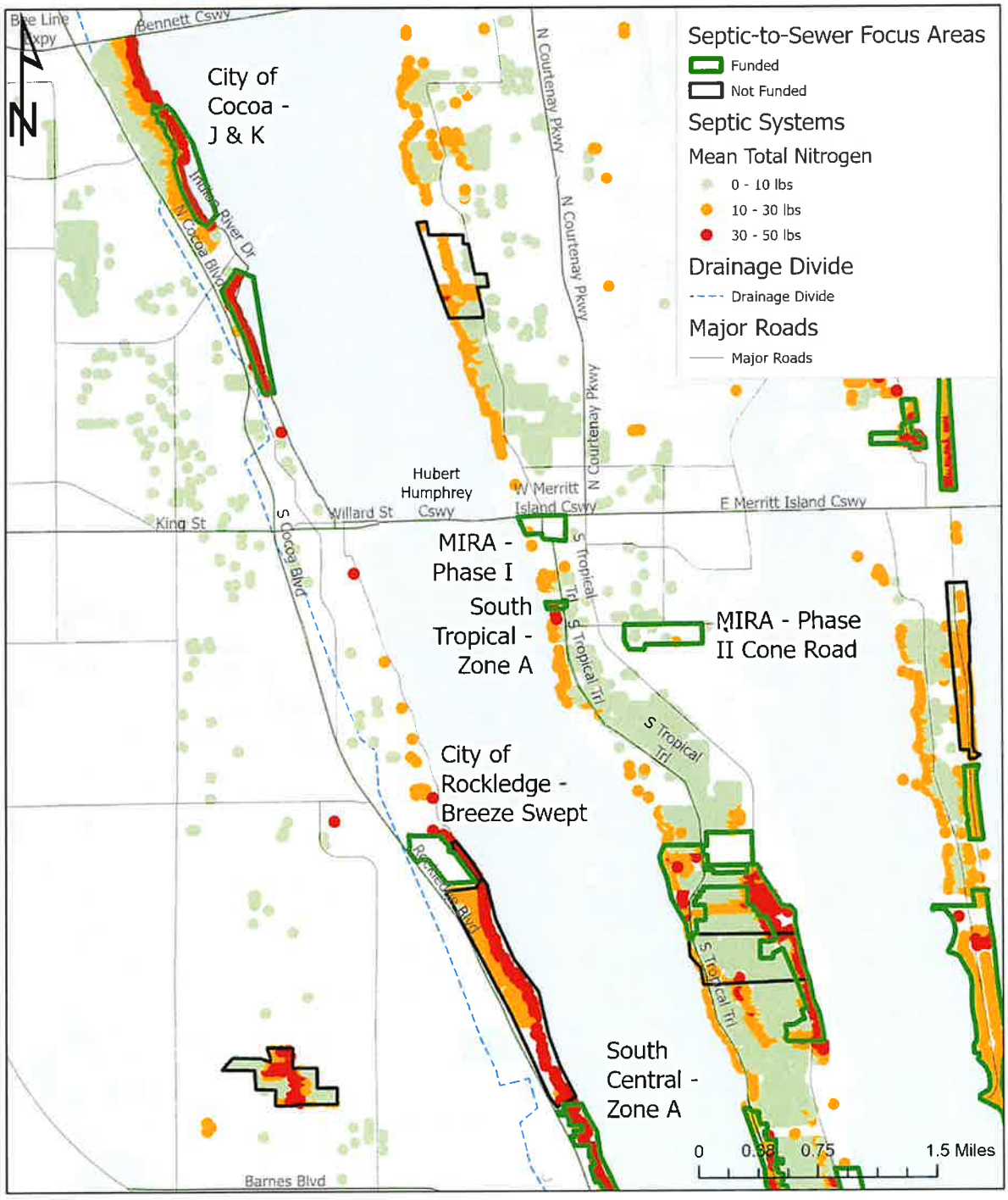


Figure 4-7 Long Description

Figure 4-8. Septic-to-Sewer Projects in North IRL, continued

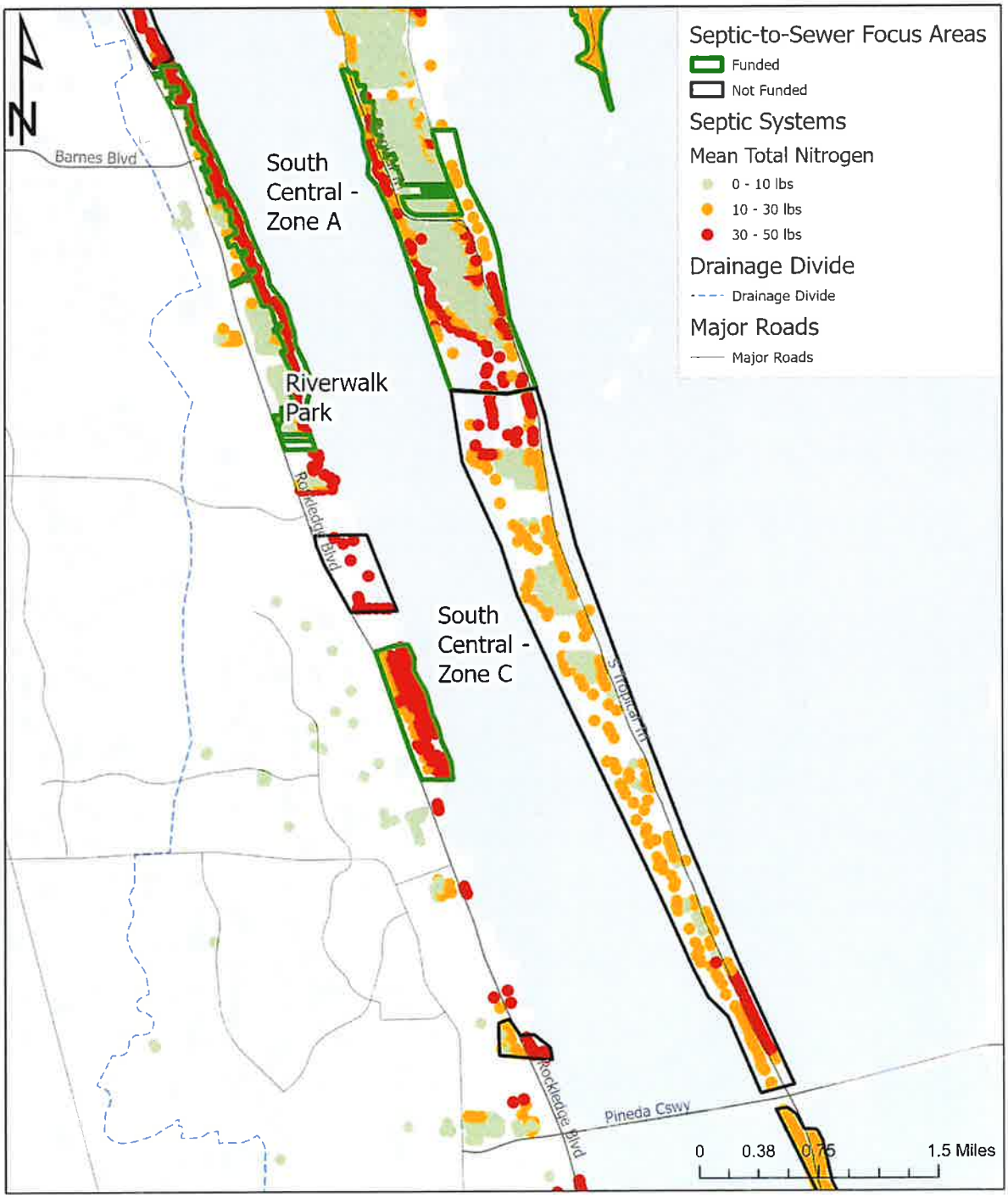


Figure 4-8 Long Description

Figure 4-9. Septic-to-Sewer Projects in North IRL, continued

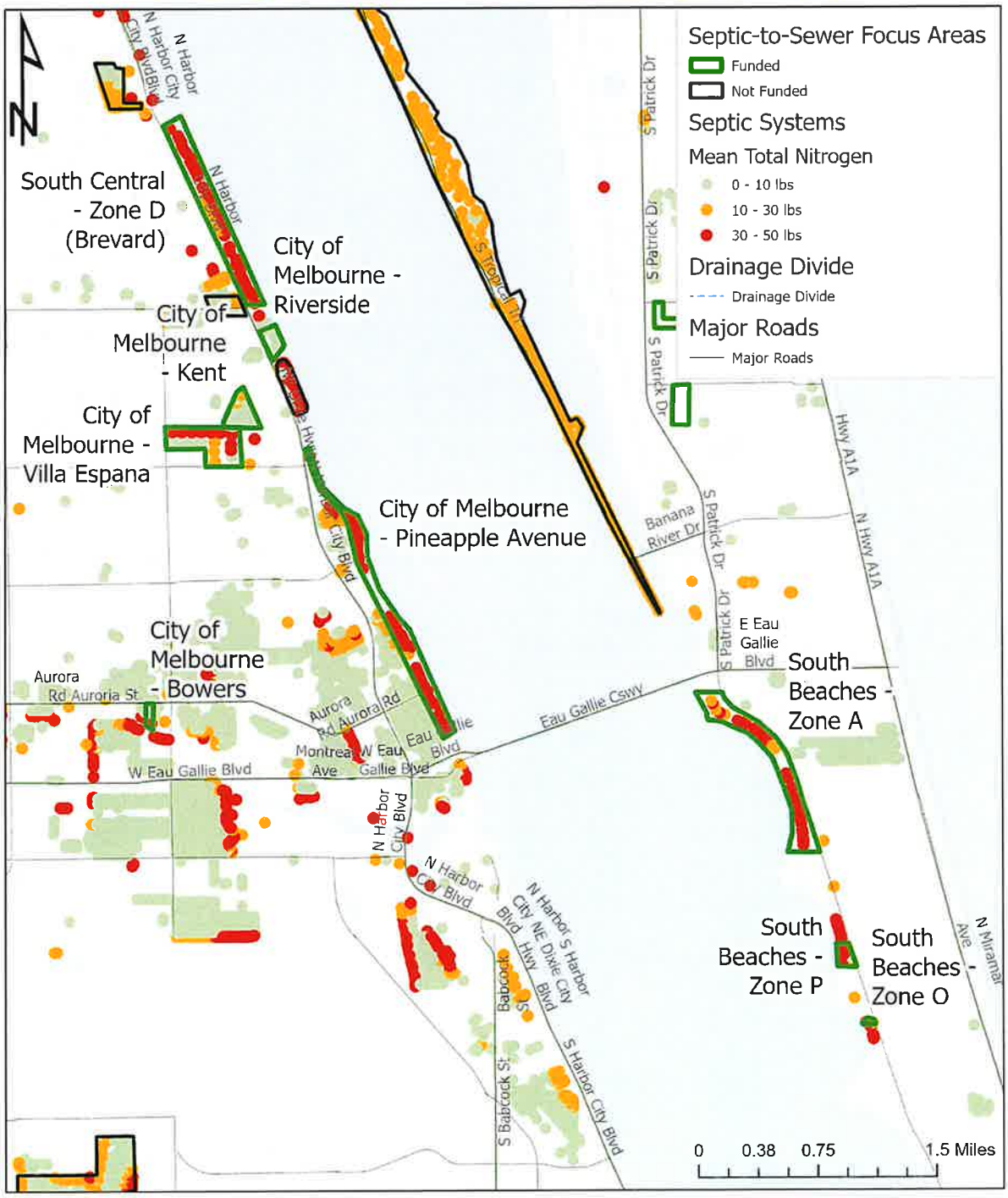


Figure 4-9 Long Description

Figure 4-10. Septic-to-Sewer Projects in Central IRL

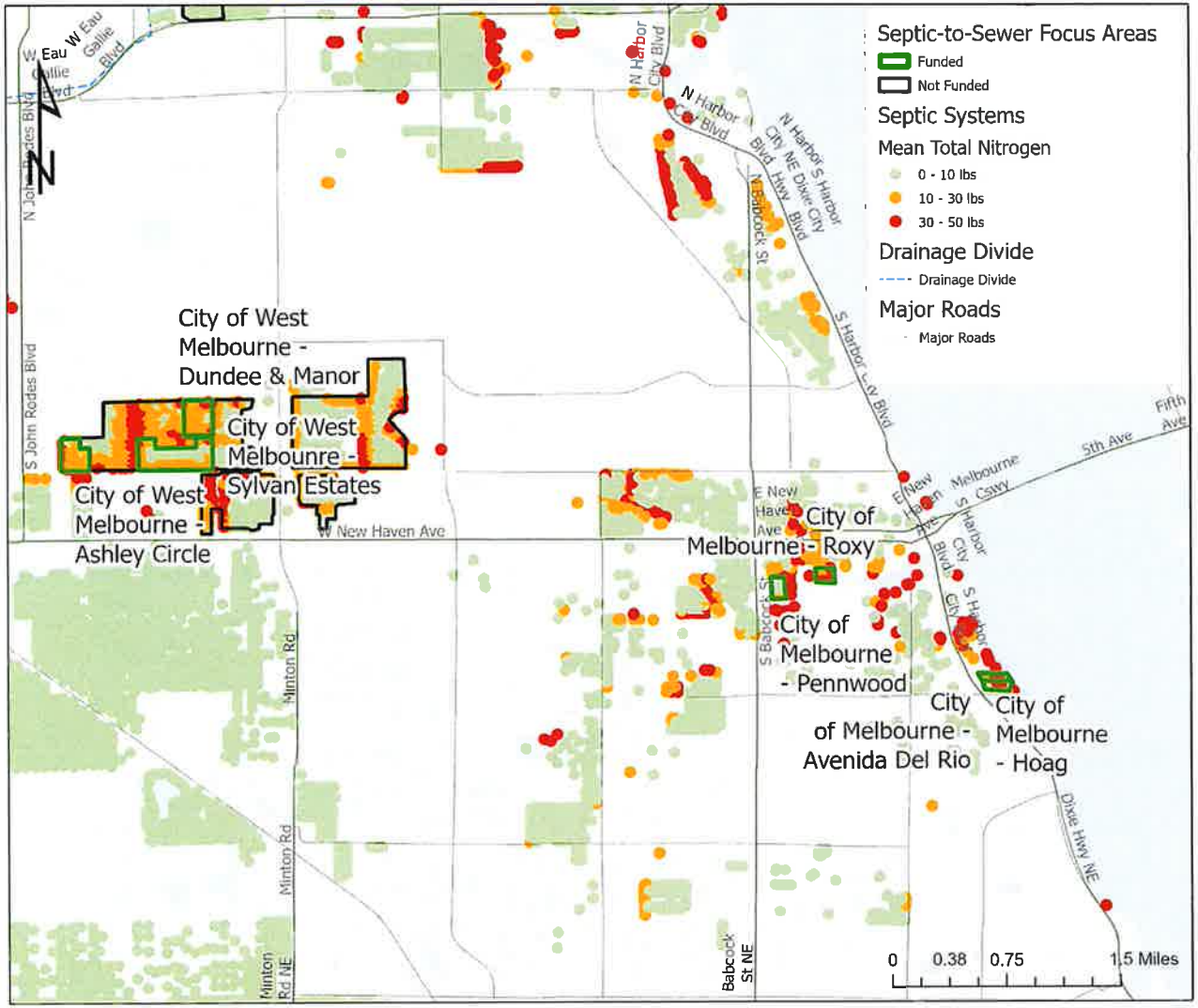


Figure 4-10 Long Description

Figure 4-11. Septic-to-Sewer Projects in Central IRL, continued

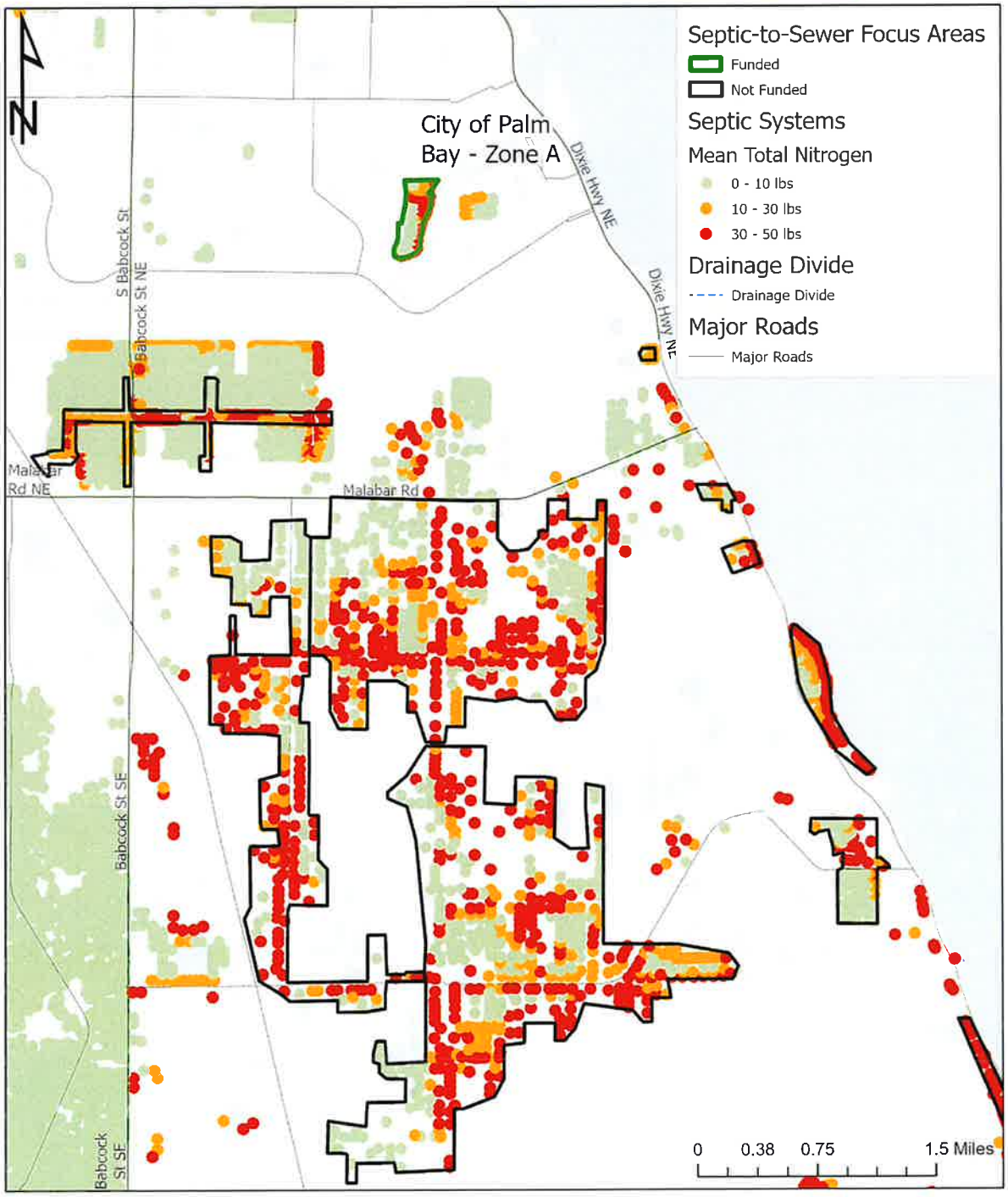


Figure 4-11 Long Description

Figure 4-12. Septic-to-Sewer Projects in Central IRL, continued

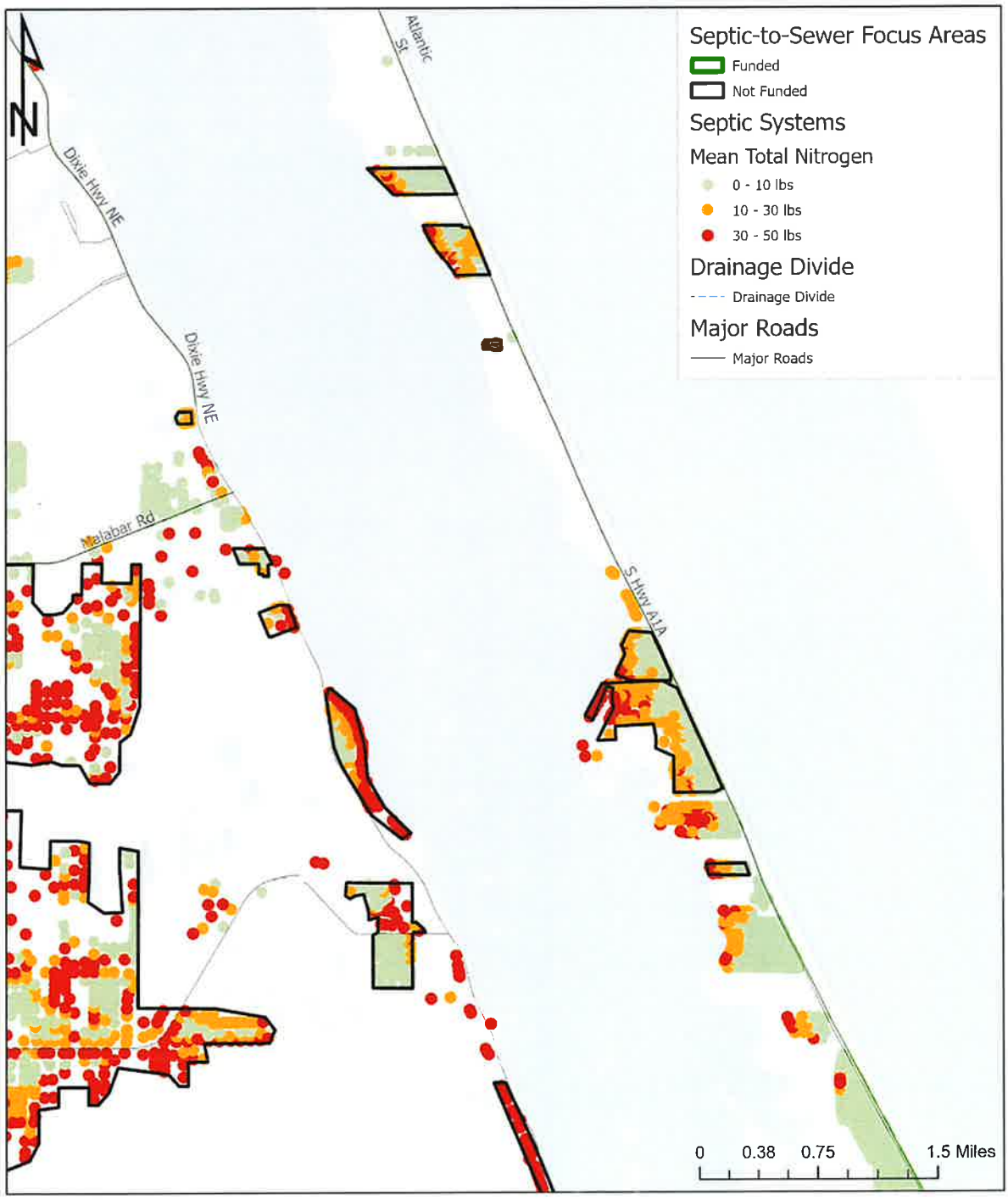


Figure 4-12 Long Description

Figure 4-13. Septic-to-Sewer Projects in Central IRL, continued

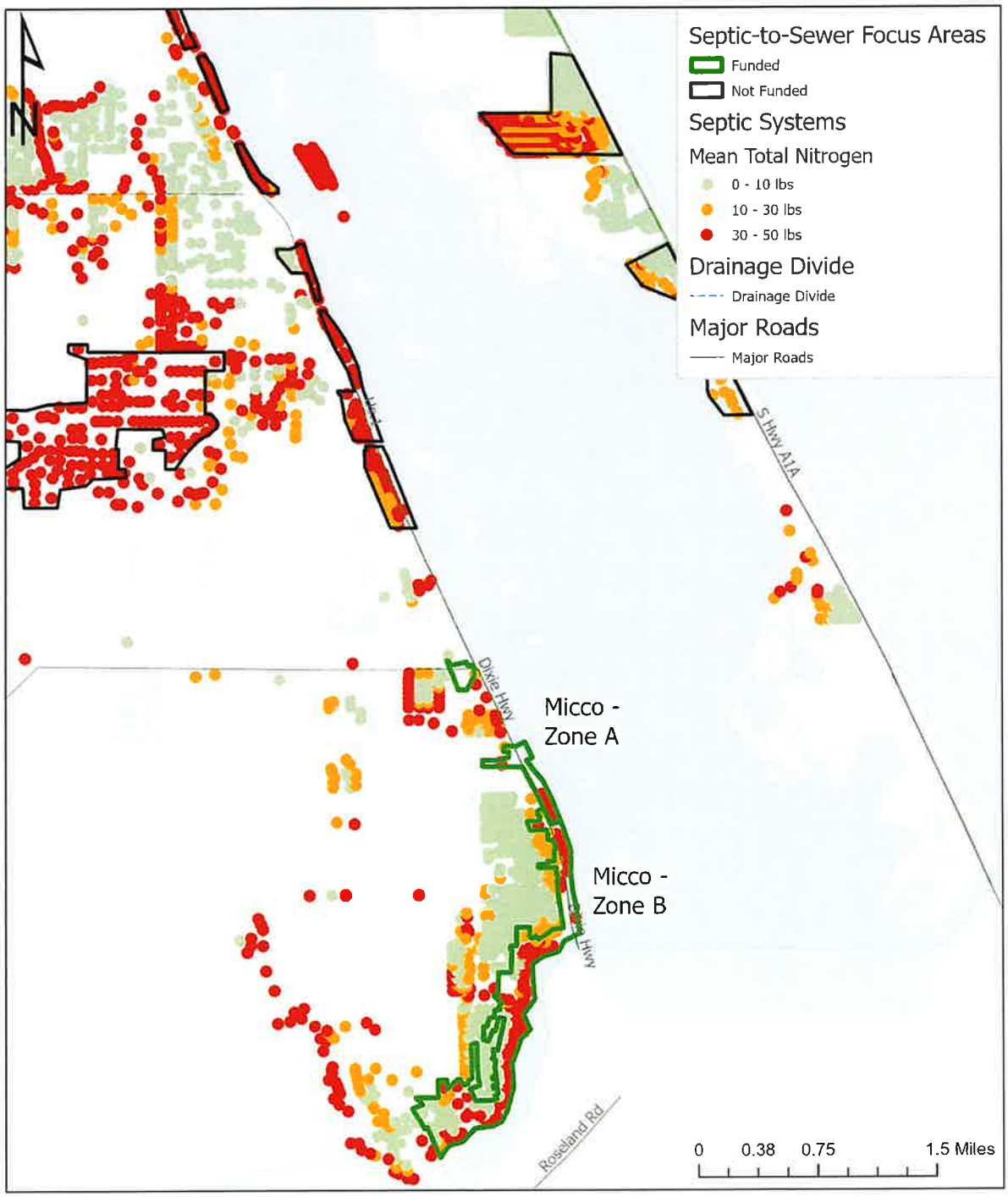


Figure 4-13 Long Description

Figure 4-14. Quick Connection Septic-to-Sewer Locations in North Brevard County

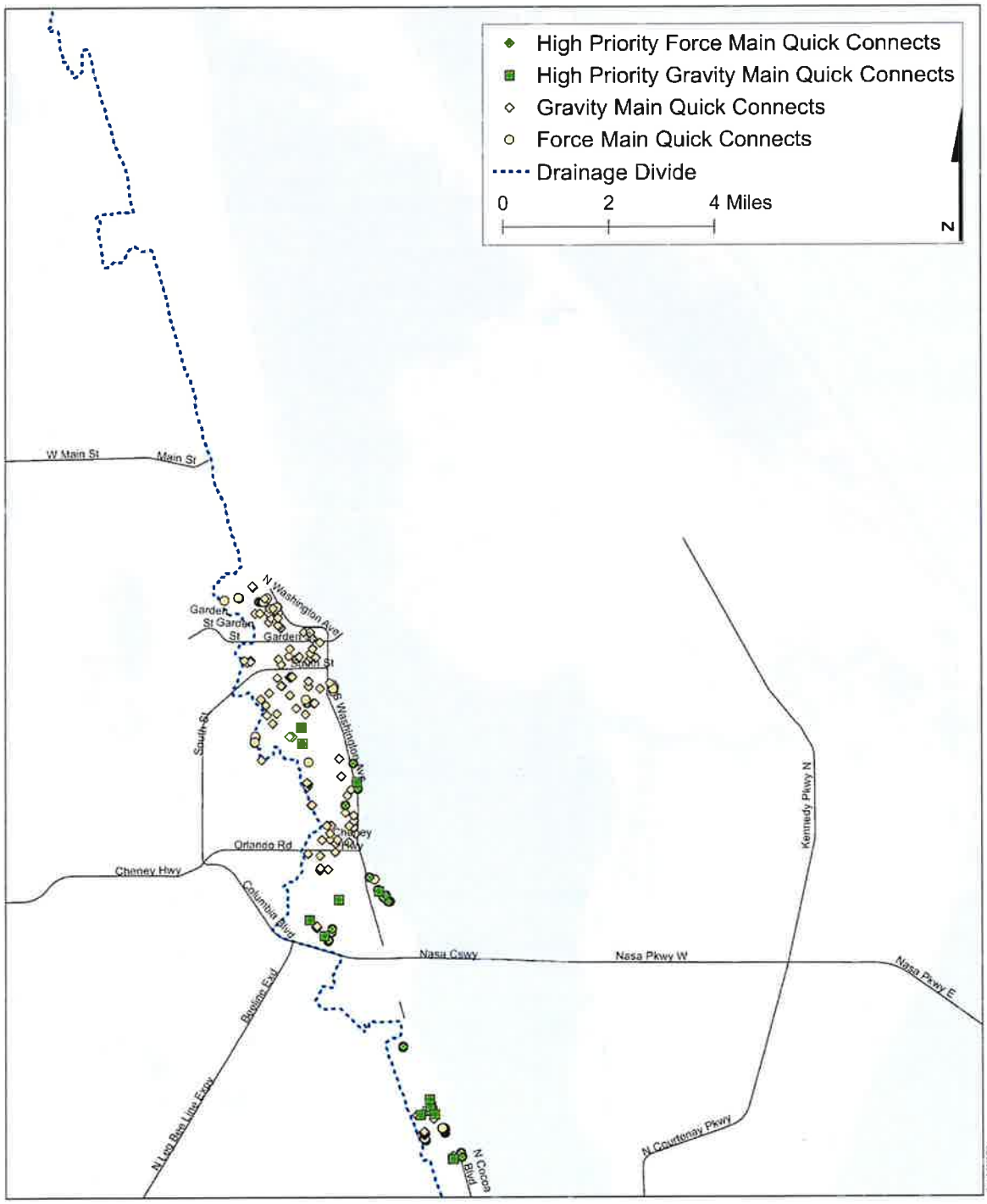


Figure 4-14 Long Description

Figure 4-15. Quick Connection Septic-to-Sewer Locations in Central Brevard County

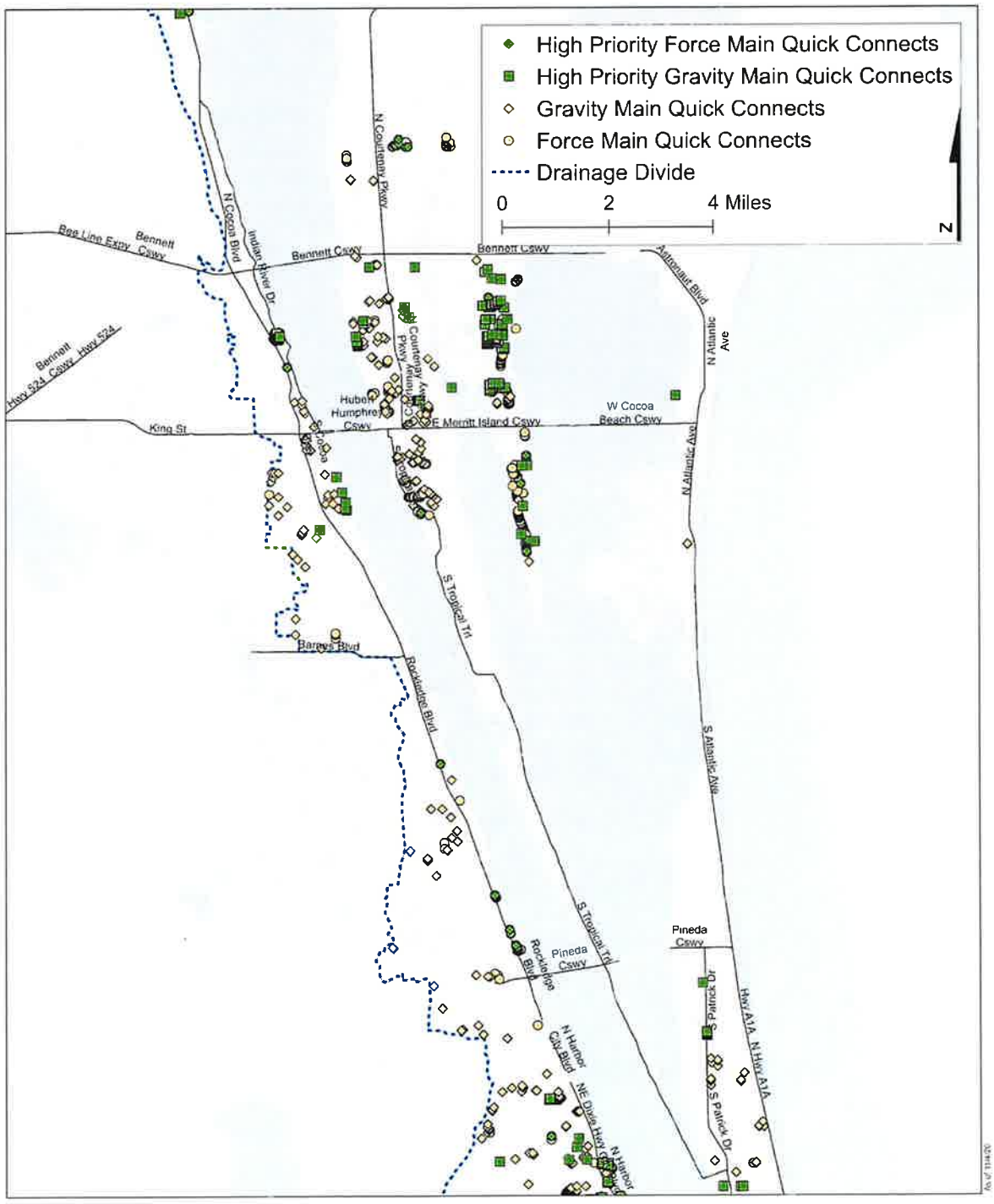


Figure 4-15 Long Description

Figure 4-16. Quick Connection Septic-to-Sewer Locations in South Brevard County

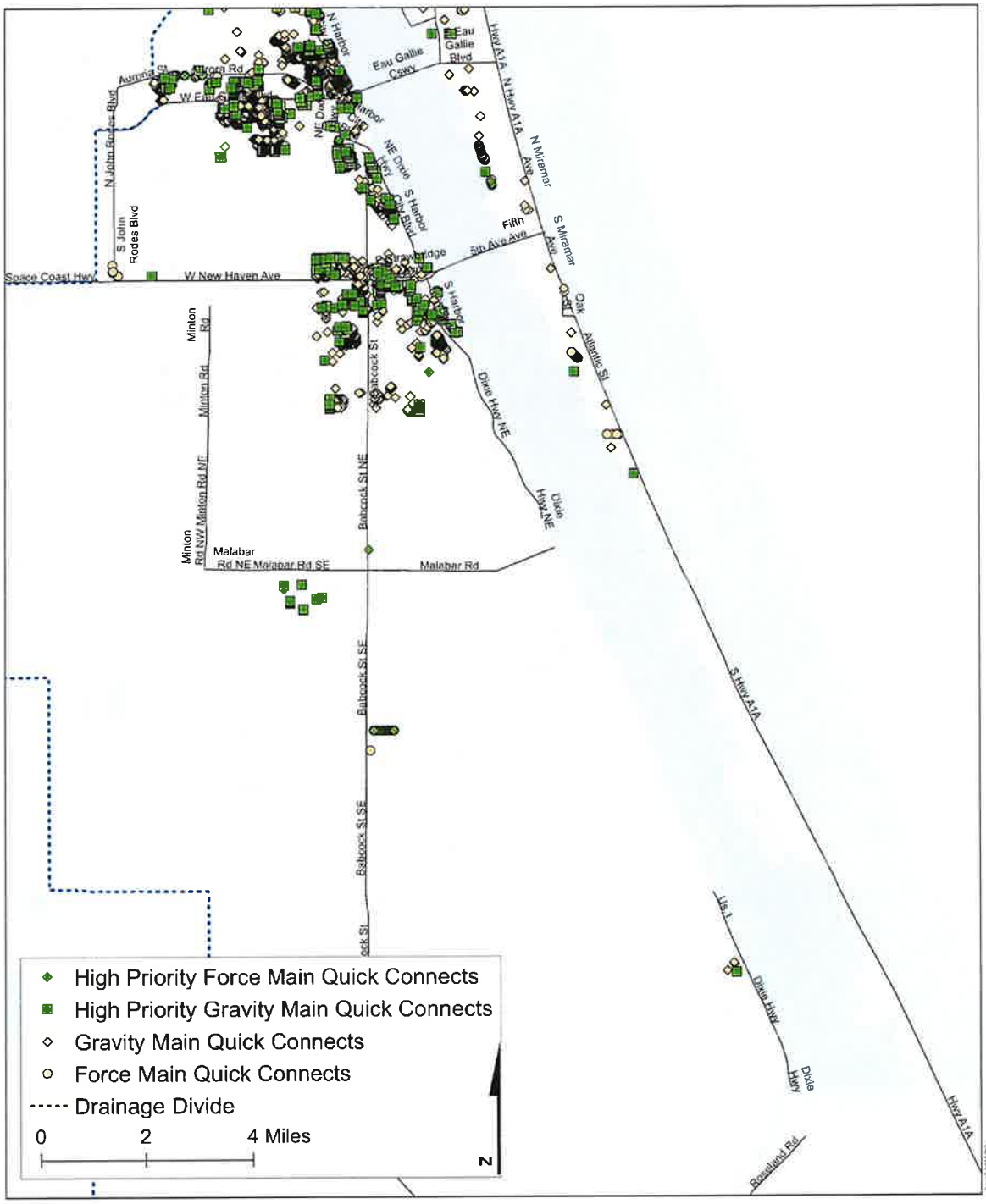


Figure 4-16 Long Description

Septic System Upgrades

In locations where providing sewer service is not feasible due to distance from sewer infrastructure, facility capacity, or insufficient density of high-risk systems, options exist to upgrade the highest risk septic systems to increase nutrient and pathogen removal efficiency. In addition to nutrient reducing aerobic septic systems, research has been conducted on passive treatment systems, which provide significant treatment efficiencies without monthly sewer fees or highly complex maintenance needs for mechanical features.

In July 2018, the Florida Department of Health adopted new rules that allow for In-Ground Nitrogen-Reducing Biofilters under the drainfield of septic systems (**Figure 4-17**). This passive nitrogen-reducing technology is a result of the Florida Onsite Sewage Nitrogen Reduction Strategies project and the Springs and Aquifer Protection Act. Pilot projects to measure the performance of this new system are currently in progress throughout the state and Brevard County is a participating partner in these initial installations. This passive In-Ground Nitrogen-Reducing Biofilter system is expected to remove 65% of nitrogen from the effluent and cost an extra $4,000 above the typical costs of a conventional septic system. This system requires 51" of soil above the groundwater and, therefore, may not be appropriate in areas with shallow depth to groundwater.

Figure 4-17. Example In-Ground Nitrogen-Reducing Biofilter Septic System

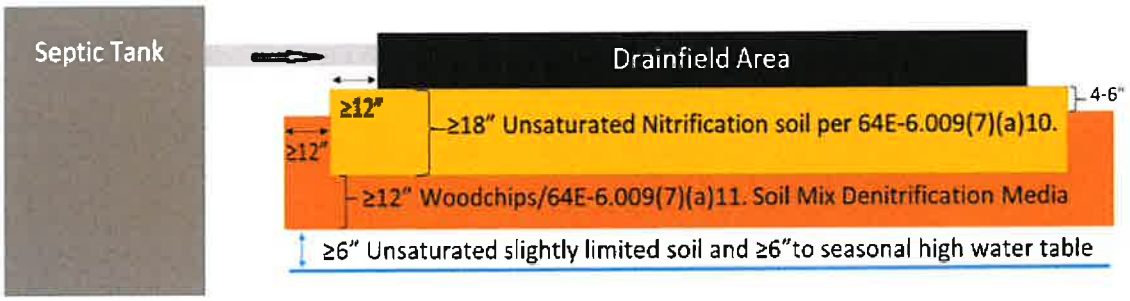


Figure 4-17 Long Description

The current ruling by the Florida Department of Environmental Protection only allows woodchips within the denitrification layer of this system; however, other biosorption activated media can also enhance nutrient and bacterial removal before the effluent reaches the drainfield or groundwater, potentially removing more than 65% of nitrogen from effluent, and lasting longer than woodchips. A test of the biosorption activated media removal capacity was conducted at Florida's Showcase Green Envirohome in Indialantic, Florida. This test location is a residential site built with stormwater, graywater, and wastewater treatment in a compact footprint onsite (Wanielista et al., 2011). The media used was Bold & Gold®, which is a patented blend of mineral materials, sand, and clay. For the residential site study, the effluent from the septic tank was evenly divided between an innovative biosorption filter media bed and a conventional drainfield. the study found that the TN and TP removal efficiencies were 76.9% and 73.6%, respectively, for the Bold & Gold® media drainfield system, which was significantly higher than the 45.5% TN removal and 32.1% TP removal from the conventional drainfield.

In 2019, Brevard County entered into an agreement with the Florida Department of Health to test In-Ground Nitrogen Reducing Biofilter septic systems with known nitrogen-reducing media. The first six septic systems under this agreement were installed in the summer of 2020 using Bold & Gold® wastewater filtration media. The agreement was accepted by the Florida

Department of Environmental Protection when the septic system program transferred to them from the Florida Department of Health. To measure effectiveness of the alternative media, nutrient concentration of septic tank effluent was measured before and after passage through a layer of filtration media. Five of the study sites were monitored quarterly from June 2021 to April 2022. A final report showing the nitrogen removal efficiency of the system was completed by Environmental Consulting and Technology, Inc. and submitted to the Florida Department of Environmental Protection in 2023. The report shows that each of the five properties monitored met the 65% TN removal efficiency target before using chloride concentrations to attempt to account for dilution. Environmental Consulting and Technology, Inc. recommended against using chloride concentration in calculations due to the high variability in the chloride concentrations and the significant percentage of samples missing chloride concentration values. Meetings with the Florida Department of Environmental Protection to review data and discuss results are ongoing, through 2025. Following a comprehensive review, the Florida Department of Environmental Protection will make a final decision on approving the use of Bold & Gold® as a denitrification layer in In-Ground Nitrogen-Reducing Biofilter Septic Systems.

In areas where septic systems are in close proximity to a surface waterbody but are not in a location where connection to the sewer system is feasible, adding biosorption activated media to the drainfield or upgrading to the passive nitrogen removing systems could be used to retrofit the existing septic systems. To be conservative and to match the Florida Department of Environmental Protection rule, the estimates of the TN reductions that could be achieved are based on an efficiency of 65% removal, which is the average efficiency from the two state studies described above that tested biosorption activated media in the drainfield.

In areas where the In-Ground Nitrogen-Reducing Biofilters system or biosorption activated media retrofits are not appropriate, National Sanitation Foundation 245 certified aerobic treatment units are another alternative. National Sanitation Foundation 245 certification verifies that these advanced septic systems remove at least 50% of nitrogen within the septic tank, although some systems have been shown to remove up to 80% of nitrogen. The drainfield is credited with removing another 15% of nitrogen, which brings the total nitrogen removed by the advanced septic system to 65%. Due to the electrical plumbing requirements of aerobic treatment units, the owner is required to have a maintenance agreement with a septic company and an operating permit from the Florida Department of Environmental Protection. Individually engineered performance-based septic systems, some of which use the septic system effluent for drip irrigation, provide another septic system option for meeting 65% nitrogen load reduction onsite.

The estimated cost for septic system upgrade retrofits was increased from $16,000 per septic system in the original plan to $18,000 each in the 2019 Update and then to $20,000 each in the 2025 Update. Using the best available ArcGIS-Based Nitrate Load Estimation Toolkit model, septic system upgrades are funded on a prorated basis of $1,600 per pound of reduced TN loading to the Indian River Lagoon, (increased from $1,200 per pound in 2025) up to a maximum of $20,000 per septic parcel.

For the 2026 Update, septic system upgrades will offer a minimum cost-share of $6,000 to all properties, regardless of their nitrogen loading. This minimum eligibility is based on the average septic system nitrogen loading of 7.5 pounds per year into the Indian River Lagoon. The minimum cost-share must use state grant funds, if available.

Options for distributed onsite sewage treatment systems are approved by the Florida Department of Environmental Protection as miniature sewage treatment plants sized for

residential and commercial use. These systems provide additional opportunities to improve nutrient removal from sites where connection to central sewer is not feasible and are eligible options for septic system upgrades as part of this plan. Both the Save Our Indian River Lagoon Project Plan and Springs and Aquifer Protection Act have highlighted the need for other wastewater options that have less impact on surface water and groundwater. Brevard County will continue to vet these options as they become available in Florida.

To prioritize the septic systems for upgrade, the scoring matrix used in the original Save Our Indian River Lagoon Project Plan was replaced in the 2019 Update using ArcGIS-Based Nitrate Load Estimation Toolkit modeling performed during determination of the Nitrogen Reduction Overlay area adopted in the Countywide Septic Ordinance, as noted above.

The septic systems with the highest loading in each sub-lagoon are recommended for retrofit upgrades to reduce the impacts of these septic systems on the waterbodies. For the septic systems with the highest loading, Brevard County mailed letters and postcards and provided information to contractors to market to them. The costs and nutrient reductions by sub-lagoon are shown in **Table 4-21**. The locations of the highest priority sites for septic system upgrades are shown in **Figure 4-18**, **Figure 4-19**, and **Figure 4-20**. This upgrade opportunity alone addresses at least 3% of the septic systems in the IRL drainage basin and nearly 10% of the nitrogen load contributed by existing septic systems.

Septic system retrofit upgrades will be funded on a prorated basis of $1,600 per pound of reduced nitrogen loading to the IRL, up to a maximum of $20,000 per septic system parcel. Funding allocation for this grant program is based on the number of highest priority upgrade opportunities within each sub-lagoon as reported in **Table 4-21**. However, recently secured funding from state cost-share grants allows the County to offer these grants to more locations than the priority lots identified for Save Our Indian River Lagoon Trust funds listed in **Table 4-21**. Combined state and local funding is currently offered to all property owners within the IRL watershed (excluding those within a funded septic-to-sewer project area) on a first-come, first-served basis, prorated based on a property's estimated nitrogen loading. Prior to applying for septic system upgrade grant funding, a property owner must contact their local utility to determine if sewer connection is "allowable." Sewer connection is considered allowable if: (1) there is an existing sewer line (gravity main or force main) that the property can connect to, and (2) the local utility has capacity to accept additional wastewater from the property. If sewer connection is deemed allowable, the property owner is eligible to apply for Quick Connect grant funds. Because sewer connection results in a greater reduction in nitrogen, phosphorus, pathogen, and pharmaceutical loading to the lagoon compared to upgrading the septic system, septic system upgrade grant funding will not be approved for properties where sewer connection is deemed allowable.

Table 4-21. Projects for Septic System Upgrades

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus	Plan Funding
Original	51	Banana River Lagoon – at least 262 lots*	Brevard County	Banana	3,149	Average of $958 Maximum of $1,600	Not applicable	Not applicable	$3,015,872

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus	Plan Funding
Original	52	North IRL – at least 1,061 lots*	Brevard County	North IRL	17,420	Average of $933 Maximum of $1,600	Not applicable	Not applicable	$16,248,000
Original	53	Central IRL – at least 1,348	Brevard County	Central IRL	22,741	Average of $914 Maximum of $1,600	Not applicable	Not applicable	$20,794,000
-	-	***Total***	-	-	***43,310***	***$925 (average)***	***Not applicable***	***Not applicable***	***$40,057,872***

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan.

Figure 4-18. Septic System Upgrades in North Brevard County

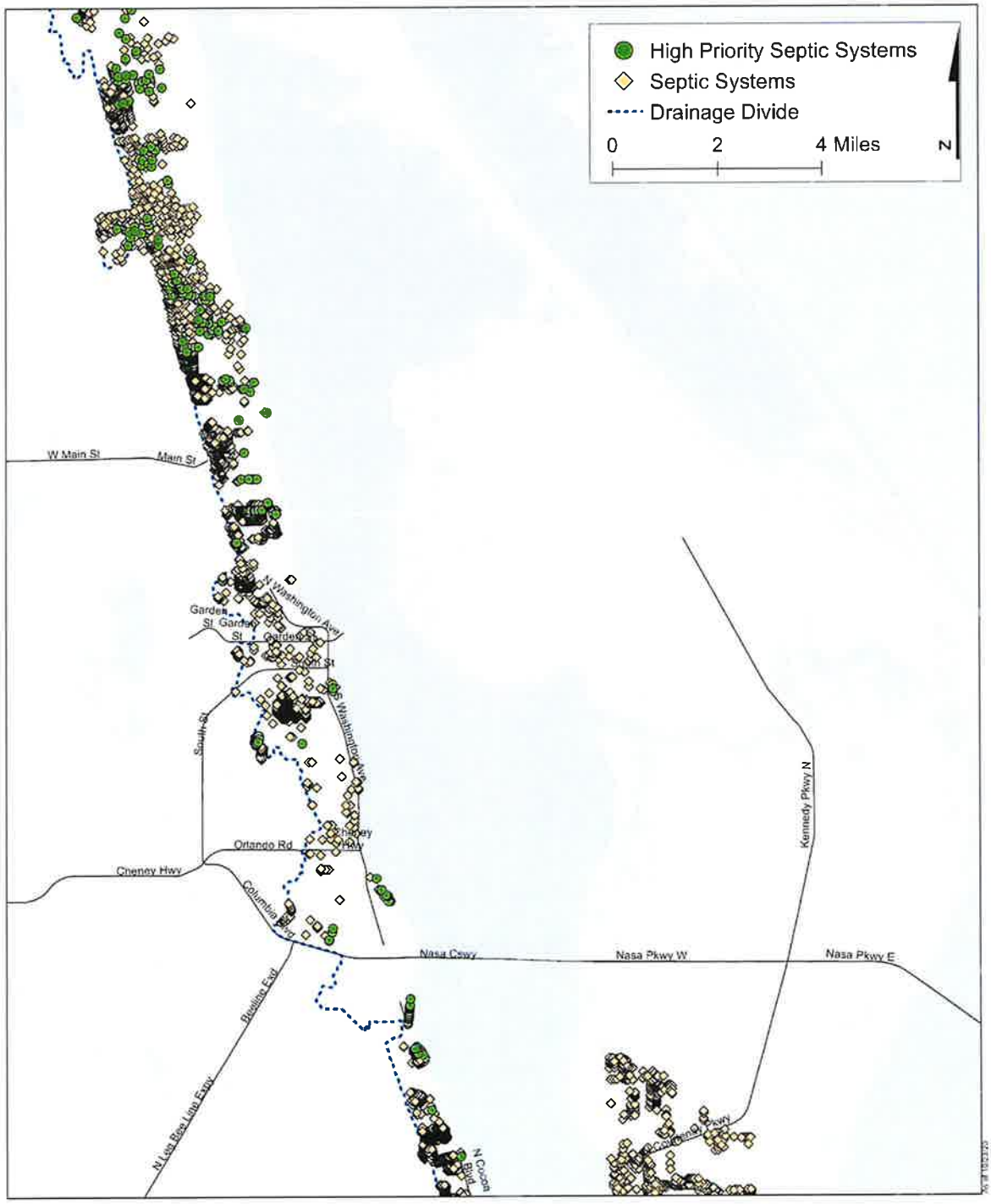


Figure 4-18 Long Description

Figure 4-19. Septic System Upgrades in Central Brevard County

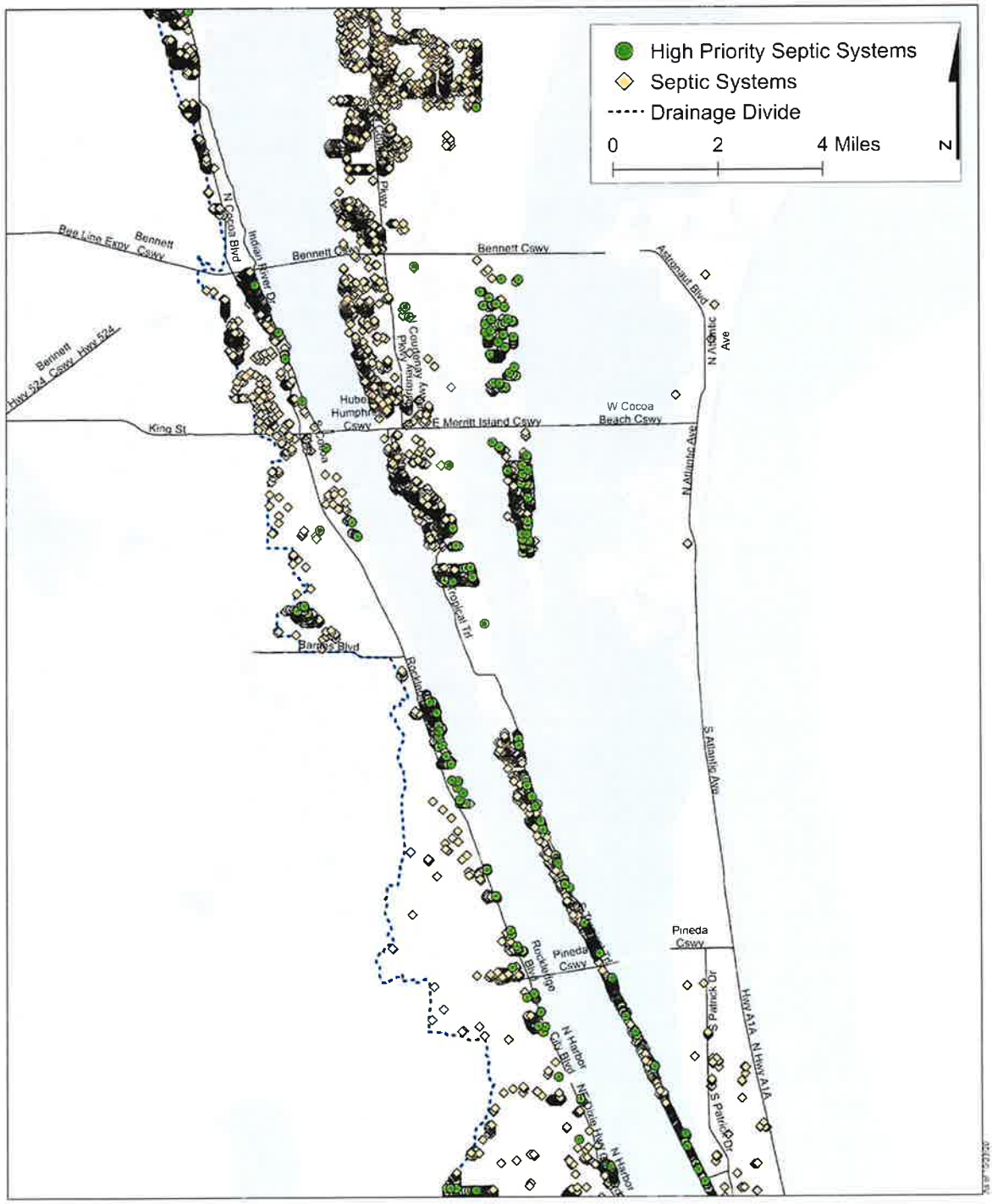


Figure 4-19 Long Description

Figure 4-20. Septic System Upgrades in South Brevard County

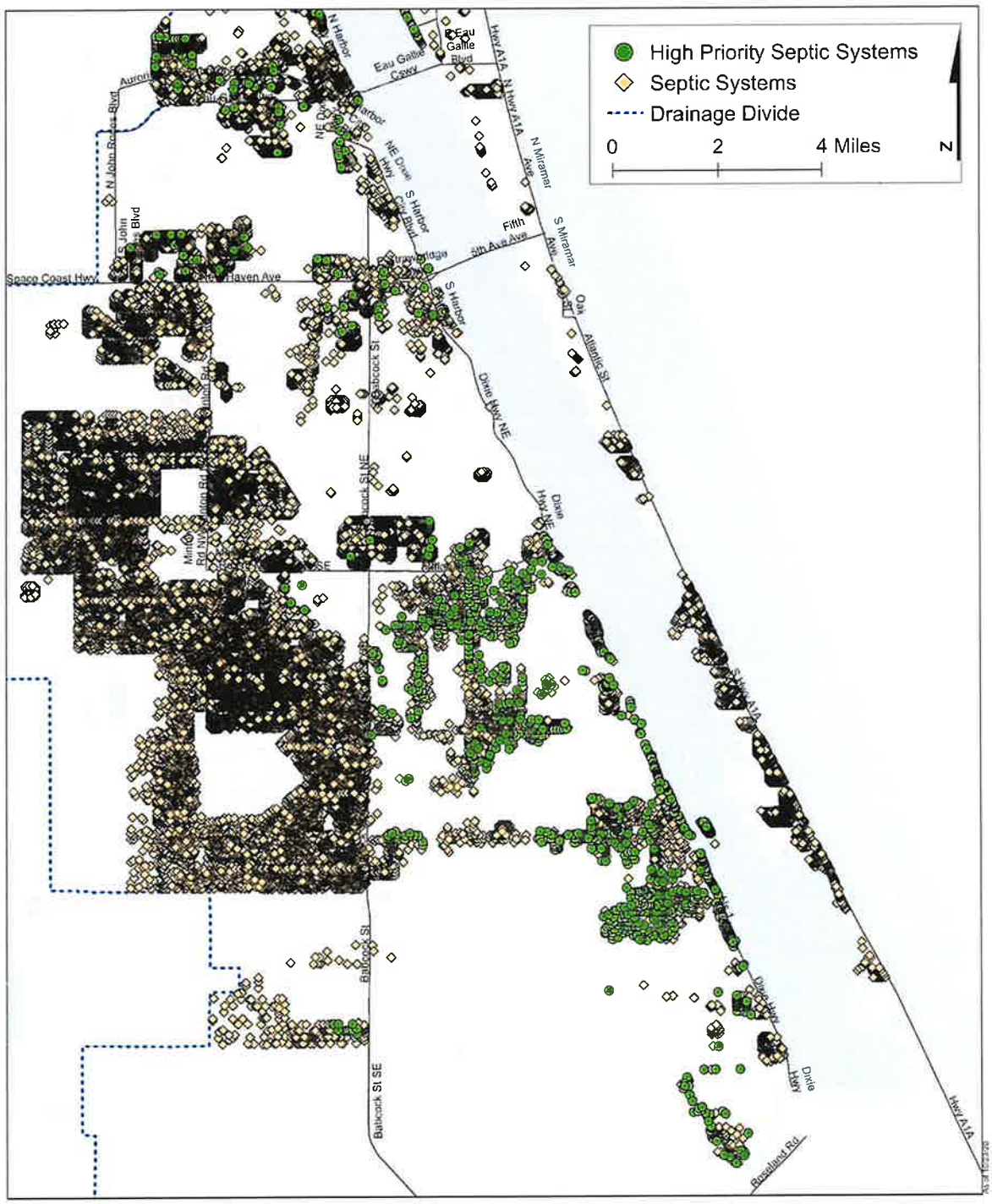


Figure 4-20 Long Description

Reimbursement Incentives for Best Available Nitrogen-Reducing Systems

Starting in 2023, as an incentive for homeowners to consider best available technology, reimbursements are scaled according to the percentage of total nitrogen (TN) reduction reported for the installed technology rather than the minimum standard of 65% achieved by all National Sanitation Foundation 245 certified systems. The National Sanitation Foundation 245 minimum standard is based on a requirement of at least 50% TN reduction in the tank combined with an assumption of 15% more TN removal (30% of the remaining 50%) in the drainfield. Currently, TN removal rates for National Sanitation Foundation 245 certified systems range from a low of 53% to a high of 85% in the tank and 67% to 90% TN reduction when including the drainfield (**Table 4-22**). Furthermore, new technologies with higher removal rates may be added to the list of National Sanitation Foundation 245 systems approved for use in Florida. The list of Florida National Sanitation Foundation 245 Certified Aerobic Treatment Units and their average TN removal efficiencies is available at the following website.

Table 4-22. Total Nitrogen Removal for Different Types of Septic Systems

System Type	Total Nitrogen Removal in Tank*	Total Nitrogen Removal in Drainfield	Total Nitrogen Removal of Total System
Conventional	10%	20%	30%
Basic National Sanitation Foundation 245, 50% Reduction	50%	15%	65%
National Sanitation Foundation 245, 60% Reduction	60%	12%	72%
National Sanitation Foundation 245, 70% Reduction	70%	9%	79%
National Sanitation Foundation 245, 75% Reduction	75%	7.5%	83%
National Sanitation Foundation 245, 80% Reduction	80%	6%	86%

* Total nitrogen removal in the tank is from the average TN reduction published in the National Sanitation Foundation 245 Completion Report for use in Florida.

Table 4-23 is a sample table of scaled eligible reimbursement amounts for systems with different TN reduction capabilities. Each row assumes the home currently has a conventional system that is loading 15 pounds of TN per year to the IRL. This table illustrates how the eligible reimbursement increases for higher performing systems and provides an incentive for homeowners to consider best available technology instead of the least expensive, lowest performing National Sanitation Foundation 245 certified system.

Table 4-23. Example Eligible Reimbursement for Different Septic System Upgrades

System Type	Load to the IRL for a 30-Pounds Per Year Home	Increased Reduction Over Conventional (pounds)	Cost-share Rate per Pound of Reduction	Eligible Reimbursement
Conventional	10.50	0.00	$1,600	$0
Basic National Sanitation Foundation 245, 50% Reduction	5.25	5.25	$1,600	$8,400
National Sanitation Foundation 245, 60% Reduction	4.20	6.30	$1,600	$10,080
National Sanitation Foundation 245, 70% Reduction	3.15	7.35	$1,600	$11,760
National Sanitation Foundation 245, 75% Reduction	2.62	7.88	$1,600	$11,760
National Sanitation Foundation 245, 80% Reduction	2.10	8.40	$1,600	$13,440

Due to basic National Sanitation Foundation 245 systems achieving 50% load reduction in the tank, scaling the load reduction and eligible reimbursement amount up from the basic eligible reimbursement is a simple calculation. The Scaled Reimbursement Eligibility is calculated by doubling the percent TN removal in the tank for the chosen system multiplied by the Eligible Reimbursement Amount of the Basic National Sanitation Foundation 245 system. The Eligible Reimbursement Amount of a Basic National Sanitation Foundation 245 system is posted online for each home in the Septic Upgrade Story Map. For example, to calculate the Scaled Reimbursement Eligibility of a system that reduces TN by 70% in the tank, the eligible amount for a basic National Sanitation Foundation 245 system is multiplied by 140%.

In 2022, retroactive reimbursement payments were approved for Brevard County property owners who upgraded existing conventional septic systems to advanced treatment septic systems before applying for grant funds. These retroactive reimbursements are capped at $6,000 and the upgrade must meet the following conditions:

1. Upgrade must have been voluntary, not required by local or state code.
2. Upgrade must have followed all Save Our Indian River Lagoon Program guidelines other than grant approval prior to construction.
3. Upgrade must have been properly permitted and certified by the Florida Department of Health/Florida Department of Environmental Protection.
4. Operation and maintenance permits must be current, with no gaps in the owner's compliance.
5. Retroactive payment amount shall not exceed the sum of costs documented with proof of payment.
6. Work must have been completed after program inception.
7. Work had to be completed before June 1, 2022 (when the last notifications were mailed to owners of priority sites).
8. Eligible funding is pro-rated at $1200 per pound of TN based on septic loading estimated in the 2018 county-wide septic system loading model for conventional septic systems at the site.
9. Retroactive payment amount shall be up to $6,000, representing the typical difference in cost between conventional ($12,000) and advanced systems ($18,000) and equal to the typical cost-share of $1,200 per pound times 5 pounds of TN load reduction.
10. The sum of retroactive payments to be processed by staff shall not exceed $100,000 without specific authorization by the County Commission.

In December 2025, the Brevard County Board of County Commissioners approved retroactive reimbursements to property owners who installed a 65% nitrogen reducing septic system up to $6,000 each, (the average pro-rated eligibility for septic upgrades in Brevard County), if they also meet the following conditions:

1. Upgrade must have followed all Save Our Indian River Lagoon program guidelines other than grant approval prior to construction.
2. Upgrade must have been properly permitted and certified by the Florida Department of Health/Florida Department of Environmental Protection.
3. Operation and maintenance permits for the advanced system must be current.
4. Retro-pay amount shall not exceed the sum of costs documented with proof of payment.
5. Work must have been completed after inception of the septic upgrade homeowner grant program.

4.1.7. Stormwater Treatment

Stormwater runoff contributes 15.8% of the external TN loading and 20.5% of the external TP loading to the Indian River Lagoon annually.

Stormwater runoff from urban areas carries pollutants that affect surface waters and groundwater. These pollutants include nutrients, pesticides, pet waste, oil and grease, debris and litter, and sediments. In Brevard County (County), more than 1,500 stormwater outfalls go to the Indian River Lagoon (IRL).

A variety of best management practices can be used to capture and treat stormwater to remove or reduce these pollutants before the stormwater runoff reaches a waterbody or infiltrates to the groundwater. Potential stormwater best management practices that could help restore the IRL include:

Traditional best management practices. These are the typical practices used to treat stormwater runoff and include wet detention ponds, retention, swales, dry detention, baffle boxes, stormwater reuse, alum injection, street sweeping, catch basin inserts/inlet filters, and floating islands/managed aquatic plant systems. Descriptions of these traditional best management practices and expected total nitrogen (TN) and total phosphorus (TP) efficiencies are shown in **Table 4-24**.

Low impact development/green infrastructure. These practices use natural stormwater management techniques to minimize runoff and help prevent pollutants from getting into stormwater runoff. These best management practices address the pollutants at the source so implementing them can help decrease the size of traditional retention and detention basins and can be less costly than traditional best management practices (University of Florida Institute of Food and Agricultural Sciences, 2016). Descriptions of low impact development and green infrastructure best management practices and estimated efficiencies are shown in **Table 4-25**.

Denitrification best management practices. These practices use a soil media, known as biosorption activated media, to increase the amount of denitrification and absorb more phosphorus, which increases the amount of TN and TP removed. Biosorption activated media includes mixes of soil, sawdust, zeolites, tire crumb, vegetation, sulfur, and spodosols. Biosorption activated media comes in different material blends with varying lifecycles depending on the materials used and the conditions where the media is applied. The media may need to be replaced periodically according to the manufacturer's specifications or monitoring that shows reductions in nutrient removal capacity. Additional details about denitrification best management practices are included below.

Best management practices to reduce baseflow intrusion. These practices are modifications to existing best management practices that help reduce intrusion of captured groundwater baseflow into stormwater drainage systems. These best management practices include backfilling canals so that they do not cut through the baseflow, modifying canal cross-sections to maintain the same storage capacity while limiting the depth, installing weirs to control the water levels in the best management practice or adding a cutoff wall to prevent movement into the baseflow.

Re-diversion to the St. Johns River. Portions of the current IRL watershed historically flowed towards the St. Johns River. By re-diverting these flows back to the St. Johns River, the excess

stormwater runoff, as well as the additional freshwater inputs, to the IRL would be removed. The re-diversion projects would include a treatment component so that the runoff is treated before being discharged to the St. Johns River. The County has re-diverted more than 400 acres in the Crane Creek basin and partnered with the St. Johns River Water Management District to increase re-diversion from the Melbourne-Tillman Water Control District canal system and Crane Creek/M-1 Canal.

Table 4-24. Traditional Stormwater Best Management Practices with TN and TP Removal Efficiencies

Best Management Practice	Definition	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency	Source
Wet detention ponds	Permanent wet ponds are designed to slowly release a portion of the collected stormwater runoff through an outfall structure. Recommended for sites with moderate to high water table conditions. Provides removal of both dissolved and suspended pollutants through physical, chemical, and biological processes.	8%-44%	45%-75%	Florida Department of Environmental Protection et al., 2010
Off-line retention	Recessed area that is designed to store and retain a defined quantity of runoff, allowing it to percolate through permeable soils into the groundwater aquifer. Runoff in excess of the specified volume of stormwater does not flow into the retention system storing the initial volume of stormwater.	40%-84%	40%-84%	Harper et al., 2007
On-line retention and swales	Recessed area that is designed to store and retain a defined quantity of runoff, allowing it to percolate through permeable soils into the groundwater aquifer. Runoff in excess of the specified volume of stormwater does flow through the retention system that stores the initial volume of stormwater.	30%-74%	30%-74%	Harper et al., 2007
Dry detention	Designed to store a defined quantity of runoff and slowly release it through an outlet structure to adjacent surface waters. After drawdown of the stored runoff is completed, the storage basin does not hold any water. Used in areas where the soil infiltration properties or seasonal high-water table elevation will not allow the use of a retention basin.	10%	10%	Harper et al., 2007
2nd generation baffle box	Box chambers with partitions connected to a storm drain. Water flows into the first section of the box where most pollutants settle out. Water overflows into the next section to allow further settling. The water ultimately overflows to the stormwater pipe. Floating trays capture leaves, grass clippings, and litter to prevent them from dissolving in the stormwater.	19.05%	15.5%	GPI, 2010

Best Management Practice	Definition	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency	Source
2nd generation baffle box plus media filter (3rd generation baffle box)	Box chambers with partitions connected to a storm drain. Water flows into the first section of the box where most pollutants settle out. Water overflows into the next section to allow further settling. The water ultimately overflows to the stormwater pipe. Floating trays capture leaves, grass clippings, and litter to prevent them from dissolving in the stormwater. Inclusion of the media filter enhances the nutrient removal of the stormwater.	BMP Trains model	BMP Trains model	City of Casselberry, 2014
Stormwater reuse	Reuse of stormwater from wet ponds for irrigation. Compare volume going to reuse to total volume of annual runoff to pond.	Amount of water not discharged annually	Amount of water not discharged annually	Florida Department of Environmental Protection et al., 2018
Alum injection	Chemical treatment systems that inject aluminum sulfate into stormwater systems to cause coagulation of pollutants.	50%	90%	Harper et al., 2007
Street sweeping	Cleaning of pavement surfaces to remove sediments, debris, and trash deposited by vehicle traffic. Prevents these materials from being introduced into the stormwater system.	Total nitrogen content in dry weight of material collected annually	Total phosphorus content in dry weight of material collected annually	University of Florida, 2011
Catch basin inserts/inlet filters	Devices installed in storm drain inlets to provide water quality treatment through filtration of organic debris and litter, settling of sediment, and adsorption of hydrocarbon by replaceable filters.	Total nitrogen content in dry weight of material collected annually	Total phosphorus content in dry weight of material collected annually	University of Florida, 2011
Managed Aquatic Plant System	Aquatic plant-based best management practices that remove nutrients through a variety of processes related to nutrient uptake, transformation, and microbial activities.	10% with 5% pond coverage	10% with 5% pond coverage	Florida Department of Environmental Protection, 2018

Best Management Practice	Definition	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency	Source
Managed Aquatic Plant System Plus Pond Circulation	Circulation in stormwater ponds enhances mixing of the water column, which increases the nutrient uptake of Managed Aquatic Plant System by bringing nutrients up from the bottom layer of the pond to the root zone of the floating plants. Two pilot studies conducted in Brevard County, using the SolarBee Circulator (IXOM Watercare SB10000), showed an increase of total nitrogen and total phosphorus removals compared to standalone Managed Aquatic Plant System. The cost-share eligibility is based on the average removal efficiencies between the two pilot studies. The nutrient removal efficiency is for the combined benefit of Managed Aquatic Plant System plus enhanced Pond Circulation	11%	11%	Brevard County SolarBee Pilot Study presentation, March 2024 Citizen Oversight Committee Meeting
Pond Circulation (added to a pond that separately received Save Our Indian River Lagoon cost-share for Managed Aquatic Plant System)	Circulation in stormwater ponds enhances mixing of the water column, which increases the nutrient uptake of Managed Aquatic Plant System by bringing nutrients up from the bottom layer of the pond to the root zone of the floating plants. Two pilot studies conducted in Brevard County, using the SolarBee Circulator (IXOM Watercare SB10000), showed an increase of Total Nitrogen and Total Phosphorus removals compared to standalone Managed Aquatic Plant System. The cost-share eligibility is based on the average removal efficiencies between the two pilot studies. The nutrient removal efficiency is for the benefit of adding circulation to a pond with existing Managed Aquatic Plant System.	1%	1%	Brevard County SolarBee Pilot Study presentation, March 2024 Citizen Oversight Committee Meeting

Best Management Practice	Definition	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency	Source
Aquatic Vegetation Harvesting	The harvest of aquatic vegetation removes nutrients from the waterbody rather than recycling them through decomposition and settlement of the plant material into the sediment. The removal of aquatic vegetation may be accomplished in several ways. For canals or waterbodies with small surface area, booms laid across the water surface can divert flow to screening and sorting facilities for removal of floating vegetation. Also, in canals, drag lines or back hoes can be used for removal of submerged vegetation or modified front end loaders with baskets can collect floating plant material. Harvesters and shredders are also specifically designed to move through the water and cut and remove vegetation.	Wet weight of plant material times the percent dry weight from a laboratory analysis times the total nitrogen concentration per dry weight from a laboratory analysis - material must be disposed away from waterbody; if multiple locations, provide the total wet weight removed from all ponds	Wet weight of plant material times the percent dry weight from a laboratory analysis times the total phosphorus concentration per dry weight from a laboratory analysis - material must be disposed away from waterbody; if multiple locations, provide the total wet weight removed from all ponds	Florida Department of Environmental Removal of Aquatic Vegetation for Nutrient Credits (developed for Indian River Lagoon Basin Management Action Plans)

Table 4-25. Low Impact Development and Green Infrastructure Best Management Practices and TN and TP Removal Efficiencies

Best Management Practice	Definition	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency	Source
Permeable pavement	Hard, yet penetrable, surfaces reduce runoff by allowing water to move through them into groundwater below (University of Florida Institute of Food and Agricultural Sciences, 2016).	30%-74%	30%-74%	Harper et al., 2007
Bioswales	An alternative to curb and gutter systems, bioswales convey water, slow runoff, and promote infiltration. Swales may be installed along residential streets, highways, or parking lot medians (University of Florida Institute of Food and Agricultural Sciences, 2016). Must be designed for conveyance, greater in length than width, have shallow slopes, and include proper landscaping.	38%-89%	9%-80%	Florida Department of Environmental Protection, 2014

Best Management Practice	Definition	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency	Source
Green roofs	These systems can significantly reduce the rate and quantity of runoff from a roof and provide buildings with thermal insulation and improved aesthetics (University of Florida Institute of Food and Agricultural Sciences, 2016). Retention best management practice covered with growing media and vegetation that enables rainfall infiltration and evapotranspiration of stored water. Including a cistern capture, retain, and reuse water adds to effectiveness.	45% (without cistern) 60%-85% (with cistern)	Not applicable	Florida Department of Environmental Protection, 2014
Bioretention basins/rain gardens	Small, vegetated depressions in the landscape collect and filter stormwater into the soil (University of Florida Institute of Food and Agricultural Sciences, 2016). Constructed adjacent to roof runoff and impervious areas.	30%-50%	30%-90%	Florida Department of Environmental Protection, 2014
Tree boxes	Bioretention systems with vertical concrete walls designed to collect/retain specified volume of stormwater runoff from sidewalks, parking lots and/or streets. Consists of a container filled with a soil mixture, a mulch layer, under-drain system, and shrub or tree (Florida Department of Environmental Protection, 2014).	38%-65%	50%-80%	Florida Department of Environmental Protection, 2014

Multiple studies found that treating dry season baseflow to the IRL is particularly important for controlling blooms and protecting seagrass; therefore, ditch denitrification is a preferred best management practice. Biosorption activated media can be added in existing or new best management practices to improve nutrient removal efficiency. The removal efficiencies of using biosorption activated media in various stormwater treatment projects (Wanielista, 2015) are summarized in **Table 4-26**. While the efficiencies in **Table 4-26** are only for Bold & Gold®, other types of biosorption activated media may be used in a project, if Florida-specific information is available on the removal efficiencies for that media.

Table 4-26. TN and TP Removal Efficiencies for Biosorption Activated Media

Location in Best Management Practice Treatment Train	Material	Total Nitrogen Removal Efficiency	Total Phosphorus Removal Efficiency
Bold & Gold® as a first practice, example up-flow filter in baffle box and a constructed wetland	Expanded clay, tire chips	55%	65%
Bold & Gold® in up-flow filter at wet pond and dry basin outflow	Organics, tire chips, expanded clay	45%	45%
Bold & Gold® in inter-event flow using up-flow filter at wet pond and down-flow filter at dry basin	expanded clay, tire chips	25%	25%
Bold & Gold® down-flow filters 12-inch depth at wet pond or dry basin pervious pavement, tree well, rain garden, swale, and strips	Clay, tire crumb, sand and topsoil	60%	90%

Note: From Wanielista, 2015

The County's proposed total maximum daily loads include two components: (1) a total maximum daily load for the five-month period (January–May) that is critical for seagrass growth, and (2) a total maximum daily load for the remaining seven months of the year to avoid algal blooms and protect healthy dissolved oxygen levels. In 2019, Brevard County updated the estimates for nutrient loading entering the lagoon through each stormwater ditch and outfall. The update incorporated more recent land use data, more recent rainfall and evapotranspiration data, and improved stormwater infrastructure mapping and topography. More than 2,000 hydrologically distinct catchment basin areas are within the IRL watershed countywide. These connect to the IRL through more than 1,500 stormwater ditches and outfall structures. To maximize seagrass response to stormwater treatment, these new loading estimates for catchment basins were prioritized based on the amount of nutrients migrating into the stormwater system as groundwater baseflow during a five-month season found to be most critical to annual seagrass expansion or loss.

The stormwater project benefits were estimated, as follows, to ensure both components of the total maximum daily load are adequately addressed. The five-month total maximum daily load covers the local dry season when minimal rainfall and stormwater runoff occur; therefore, the benefits of stormwater biosorption activated media projects during this period were based only on January–May baseflow loading estimates from the Spatial Watershed Iterative Loading model. The estimated project treatment efficiencies used for January to May baseflow only are 55% for TN and 65% for TP. To estimate annual load reduction benefits, the annual baseflow and stormwater loading estimates from the Spatial Watershed Iterative Loading model were used with a project efficiency of 45% for TN and 45% for TP. The estimated TN and TP reductions in pounds per year accomplished by using biosorption activated media upstream of these priority outfalls are summarized in **Table 4-27**. The locations of the basins to be treated are shown in **Figure 4-22**, **Figure 4-23**, and **Figure 4-24**. Projects approved as part of an annual update to the plan are also included in **Table 4-27**.

Table 4-27. Projects for Stormwater Treatment

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
Original	-	1002*	Brevard County	Banana	904	$469	127	$3,336	$423,636
Original	-	979A*	Brevard County	Banana	1,162	$482	174	$3,220	$560,328
Original	-	1037*	Brevard County	Banana	709	$490	98	$3,548	$347,694
Original	-	CCB-B*	Brevard County	Banana	761	$528	111	$3,619	$401,713
Original	-	1222*	Brevard County	Banana	931	$548	136	$3,748	$509,754
Original	-	1024*	Brevard County	Banana	669	$554	105	$3,528	$370,402
Original	-	1172*	Brevard County	Banana	920	$578	133	$4,000	$531,972
Original	-	1067*	Brevard County	Banana	811	$585	115	$4,125	$474,328
Original	-	CCB-D*	Brevard County	Banana	629	$585	103	$3,575	$368,256
Original	-	CCB-C*	Brevard County	Banana	526	$600	83	$3,805	$315,846
Original	-	CCB-H*	Brevard County	Banana	629	$613	103	$3,746	$385,828
Original	-	1309*	Brevard County	Banana	593	$619	90	$4,078	$367,045
Original	-	997*	Brevard County	Banana	546	$632	83	$4,160	$345,313
Original	-	1037A*	Brevard County	Banana	540	$642	80	$4,333	$346,661
Original	-	1187*	Brevard County	Banana	645	$646	85	$4,905	$416,886
Original	-	940B*	Brevard County	Banana	523	$690	76	$4,750	$360,979
Original	-	CC-B2C*	Brevard County	Banana	430	$727	64	$4,886	$312,675
Original	-	SB-SH-2*	Brevard County	Banana	561	$744	77	$5,421	$417,440
Original	-	CC-B4B*	Brevard County	Banana	412	$748	67	$4,597	$308,022
Original	-	CC-B10A*	Brevard County	Banana	364	$792	58	$4,970	$288,232
Original	-	SB-SH-1*	Brevard County	Banana	385	$808	67	$4,645	$311,218
Original	-	1071*	Brevard County	Banana	439	$814	61	$5,856	$357,206
Original	-	1071A*	Brevard County	Banana	354	$821	39	$7,454	$290,687
Original	-	961*	Brevard County	Banana	405	$823	53	$6,286	$333,155
Original	-	1039A*	Brevard County	Banana	355	$829	47	$6,261	$294,287
Original	-	1308*	Brevard County	Banana	366	$837	56	$5,469	$306,271
Original	-	SB-SD-2*	Brevard County	Banana	359	$853	54	$5,668	$306,057
Original	-	CCB-A*	Brevard County	Banana	358	$860	52	$5,923	$307,987
Original	-	CC-B1*	Brevard County	Banana	337	$885	56	$5,327	$298,323
Original	-	1039*	Brevard County	Banana	366	$911	48	$6,944	$333,293
Original	-	1327*	Brevard County	Banana	317	$913	48	$6,030	$289,417
Original	-	1317*	Brevard County	Banana	302	$940	46	$6,172	$283,922
Original	-	934*	Brevard County	Banana	264	$947	29	$8,622	$250,050
Original	-	1120*	Brevard County	Banana	301	$953	47	$6,105	$286,944
Original	-	1062*	Brevard County	Banana	291	$969	33	$8,545	$281,990
Original	-	979C*	Brevard County	Banana	292	$977	43	$6,638	$285,424
Original	-	1175*	Brevard County	Banana	275	$982	28	$9,646	$270,075

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
Original	-	1125*	Brevard County	Banana	280	$989	43	$6,441	$276,976
Original	-	1183*	Brevard County	Banana	269	$1,027	38	$7,270	$276,251
Original	-	970E*	Brevard County	Banana	264	$1,046	39	$7,083	$276,245
Original	-	1310*	Brevard County	Banana	259	$1,060	41	$6,699	$274,644
Original	-	944A*	Brevard County	Banana	287	$1,070	40	$7,676	$307,021
Original	-	SB-D-1*	Brevard County	Banana	248	$1,106	37	$7,413	$274,287
Original	-	CC-B11*	Brevard County	Banana	243	$1,112	30	$9,008	$270,235
Original	-	975*	Brevard County	Banana	240	$1,129	36	$7,530	$271,065
Original	-	1010*	Brevard County	Banana	220	$1,161	30	$8,512	$255,371
Original	-	1223*	Brevard County	Banana	225	$1,184	34	$7,833	$266,306
Original	-	SB-D-6*	Brevard County	Banana	211	$1,252	31	$8,520	$264,121
Original	-	1223A*	Brevard County	Banana	202	$1,258	33	$7,699	$254,083
Original	-	IHB-FDOT*	Brevard County	Banana	204	$1,261	30	$8,572	$257,151
Original	-	970C*	Brevard County	Banana	203	$1,268	29	$8,876	$257,391
Original	-	997A*	Brevard County	Banana	188	$1,289	31	$7,815	$242,256
Original	-	IHB-79*	Brevard County	Banana	189	$1,301	35	$7,025	$245,860
Original	-	SB-D-4*	Brevard County	Banana	191	$1,350	28	$9,212	$257,929
Original	-	1302*	Brevard County	Banana	210	$1,359	30	$9,513	$285,393
Original	-	969*	Brevard County	Banana	195	$1,369	29	$9,204	$266,929
Original	-	1000*	Brevard County	Banana	195	$1,376	28	$9,580	$268,248
Original	-	CC-B13A*	Brevard County	Banana	183	$1,382	30	$8,427	$252,818
Original	-	SB-N-1*	Brevard County	Banana	205	$1,393	28	$10,201	$285,640
Original	-	IHB-33*	Brevard County	Banana	198	$1,408	29	$9,616	$278,862
Original	-	CC-B5A*	Brevard County	Banana	180	$1,427	27	$9,516	$256,922
Original	-	1250*	Brevard County	Banana	185	$1,429	26	$10,166	$264,325
Original	-	770A*	Brevard County	Banana	172	$1,459	26	$9,652	$250,952
Original	-	SB-D-2*	Brevard County	Banana	178	$1,501	26	$10,277	$267,190
Original	-	1314*	Brevard County	Banana	162	$1,536	24	$10,368	$248,831
Original	-	IHB-7A*	Brevard County	Banana	157	$1,540	29	$8,335	$241,728
Original	-	SB-D-3*	Brevard County	Banana	162	$1,541	24	$10,399	$249,577
Original	-	1308A*	Brevard County	Banana	159	$1,552	24	$10,284	$246,805
Original	-	IHB-6*	Brevard County	Banana	159	$1,564	24	$10,362	$248,690
Original	-	955*	Brevard County	Banana	167	$1,568	25	$10,471	$261,783
Original	-	1270*	Brevard County	Banana	156	$1,595	22	$11,311	$248,840
Original	-	1303*	Brevard County	Banana	154	$1,598	22	$11,187	$246,123
Original	-	969A*	Brevard County	Banana	152	$1,623	23	$10,728	$246,741
Original	-	1152*	Brevard County	Banana	159	$1,630	20	$12,962	$259,247
Original	-	1315A*	Brevard County	Banana	149	$1,647	22	$11,156	$245,433

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
Original	-	SB-SI-1*	Brevard County	Banana	159	$1,687	22	$12,194	$268,263
Original	-	1372*	Brevard County	Banana	136	$1,747	20	$11,880	$237,603
Original	-	TV-Addison Canal Basin*	Brevard County	North IRL	7,070	$385	914	$2,979	$2,722,750
Original	-	973*	Brevard County	North IRL	2,134	$397	307	$2,762	$847,923
Original	-	16*	Brevard County	North IRL	1,095	$401	177	$2,478	$438,557
Original	-	1399*	Brevard County	North IRL	1,499	$411	232	$2,657	$616,389
Original	-	RL-2A*	Brevard County	North IRL	1,715	$420	246	$2,927	$719,944
Original	-	RL-3B*	Brevard County	North IRL	2,158	$427	307	$3,003	$921,817
Original	-	RL-3I*	Brevard County	North IRL	3,009	$429	423	$3,053	$1,291,630
Original	-	TV-Main Street Basin*	Brevard County	North IRL	1,298	$442	189	$3,038	$574,240
Original	-	94*	Brevard County	North IRL	1,141	$448	178	$2,869	$510,638
Original	-	19*	Brevard County	North IRL	818	$451	129	$2,862	$369,147
Original	-	992*	Brevard County	North IRL	1,241	$453	187	$3,009	$562,614
Original	-	865*	Brevard County	North IRL	879	$454	109	$3,660	$398,919
Original	-	TV-Parrish Basin*	Brevard County	North IRL	1,070	$459	164	$2,996	$491,331
Original	-	116*	Brevard County	North IRL	936	$459	143	$3,007	$430,037
Original	-	1392*	Brevard County	North IRL	1,051	$462	159	$3,052	$485,195
Original	-	901*	Brevard County	North IRL	1,895	$465	233	$3,785	$881,808
Original	-	TV-Sycamore Basin*	Brevard County	North IRL	1,247	$466	184	$3,157	$580,867
Original	-	1256*	Brevard County	North IRL	1,580	$467	237	$3,112	$737,589
Original	-	1409*	Brevard County	North IRL	1,375	$478	209	$3,143	$656,944
Original	-	833*	Brevard County	North IRL	1,084	$480	184	$2,825	$519,838
Original	-	CO-2I*	Brevard County	North IRL	980	$482	146	$3,233	$471,995
Original	-	824*	Brevard County	North IRL	722	$482	104	$3,346	$347,962
Original	-	1368*	Brevard County	North IRL	1,125	$487	163	$3,359	$547,591
Original	-	829*	Brevard County	North IRL	813	$498	162	$2,498	$404,623
Original	-	6*	Brevard County	North IRL	717	$500	84	$4,271	$358,748
Original	-	1263*	Brevard County	North IRL	914	$503	132	$3,481	$459,427
Original	-	1324*	Brevard County	North IRL	1,373	$505	179	$3,874	$693,435
Original	-	835*	Brevard County	North IRL	1,134	$510	160	$3,613	$578,045
Original	-	831*	Brevard County	North IRL	733	$513	106	$3,544	$375,702
Original	-	1078*	Brevard County	North IRL	1,017	$513	151	$3,458	$522,182
Original	-	TV-Royal Palm Basin*	Brevard County	North IRL	879	$517	128	$3,551	$454,536
Original	-	1342*	Brevard County	North IRL	1,034	$519	158	$3,398	$536,962
Original	-	RL-3A*	Brevard County	North IRL	796	$526	114	$3,669	$418,304
Original	-	1016*	Brevard County	North IRL	687	$527	98	$3,692	$361,865
Original	-	1331*	Brevard County	North IRL	840	$529	132	$3,366	$444,357

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
Original	-	112*	Brevard County	North IRL	735	$529	108	$3,601	$388,895
Original	-	838*	Brevard County	North IRL	803	$531	117	$3,648	$426,770
Original	-	105*	Brevard County	North IRL	750	$532	108	$3,694	$398,900
Original	-	827*	Brevard County	North IRL	792	$535	107	$3,963	$424,069
Original	-	894*	Brevard County	North IRL	845	$540	126	$3,620	$456,092
Original	-	159*	Brevard County	North IRL	648	$541	119	$2,946	$350,620
Original	-	1389*	Brevard County	North IRL	737	$549	112	$3,615	$404,887
Original	-	RL-3E*	Brevard County	North IRL	961	$551	139	$3,809	$529,439
Original	-	980*	Brevard County	North IRL	817	$551	120	$3,753	$450,399
Original	-	46*	Brevard County	North IRL	635	$566	101	$3,557	$359,241
Original	-	CO-2M*	Brevard County	North IRL	867	$567	120	$4,095	$491,417
Original	-	95*	Brevard County	North IRL	683	$568	100	$3,877	$387,716
Original	-	796*	Brevard County	North IRL	726	$569	106	$3,898	$413,208
Original	-	TV-Ponce De Leon Basin-B*	Brevard County	North IRL	604	$569	87	$3,951	$343,778
Original	-	1318*	Brevard County	North IRL	903	$569	125	$4,114	$514,235
Original	-	1032*	Brevard County	North IRL	658	$582	96	$3,990	$383,063
Original	-	RL-1Q*	Brevard County	North IRL	759	$584	113	$3,922	$443,240
Original	-	TV-SR 50 Basin*	Brevard County	North IRL	576	$584	86	$3,912	$336,456
Original	-	1395*	Brevard County	North IRL	675	$584	97	$4,067	$394,505
Original	-	840*	Brevard County	North IRL	828	$588	131	$3,718	$487,058
Original	-	1295*	Brevard County	North IRL	744	$588	112	$3,908	$437,658
Original	-	896*	Brevard County	North IRL	644	$591	91	$4,183	$380,614
Original	-	RL-4B*	Brevard County	North IRL	837	$591	106	$4,668	$494,782
Original	-	805*	Brevard County	North IRL	675	$594	98	$4,089	$400,704
Original	-	1232*	Brevard County	North IRL	673	$613	99	$4,167	$412,522
Original	-	1301*	Brevard County	North IRL	954	$615	139	$4,223	$586,974
Original	-	CO-6H*	Brevard County	North IRL	564	$616	83	$4,185	$347,319
Original	-	1418*	Brevard County	North IRL	824	$616	107	$4,743	$507,448
Original	-	212*	Brevard County	North IRL	668	$619	91	$4,542	$413,299
Original	-	1221*	Brevard County	North IRL	593	$633	83	$4,523	$375,433
Original	-	1352*	Brevard County	North IRL	684	$635	99	$4,384	$434,044
Original	-	1380*	Brevard County	North IRL	680	$638	96	$4,520	$433,905
Original	-	TV-Garden Street Basin*	Brevard County	North IRL	473	$643	66	$4,607	$304,070
2017	13	Central Boulevard Baffle Box+	City of Cape Canaveral	Banana	481	$72	14	$2,479	$34,700

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2017	14	Church Street Type II Baffle Box+	City of Cocoa	North IRL	937	$94	135	$652	$88,045
2017	15	Bayfront Stormwater Project+	City of Palm Bay	Central IRL	348	$88	83	$369	$30,624
2017	16	Gleason Park Reuse+	City of Indian Harbour Beach	Banana	48	$88	9	$469	$4,224
2017	18	Denitrification Retrofit of Johns Road Pond+	Brevard County	North IRL	1,199	$88	Not applicable	Not applicable	$105,512
2017	19	St. Teresa Basin Treatment+	City of Titusville	North IRL	3,100	$88	459	$594	$272,800
2017	20	South Street Basin Treatment+	City of Titusville	North IRL	987	$88	156	$557	$86,856
2017	21	La Paloma Basin Treatment+	City of Titusville	North IRL	2,367	$88	346	$602	$208,296
2017	22	Kingsmill-Aurora Phase Two+	Brevard County	North IRL	4,176	$88	814	$451	$367,488
2017	23	Denitrification Retrofit of Huntington Pond+	Brevard County	North IRL	1,190	$88	Not applicable	Not applicable	$104,720
2017	24	Denitrification Retrofit of Flounder Creek Pond+	Brevard County	North IRL	856	$88	Not applicable	Not applicable	$75,328
2017	34	Cliff Creek Baffle Box+	City of Melbourne	North IRL	3,952	$88	797	$436	$347,781
2017	35	Thrush Drive Baffle Box+	City of Melbourne	North IRL	3,661	$88	773	$417	$322,200
2018	64	Stormwater Low Impact Development Convair Cove 1 – Blakey Boulevard+	City of Cocoa Beach	Banana	30	$155	3	$1,550	$4,650
2018	65	Stormwater Low Impact Development Convair Cove 2 – Dempsey Drive+	City of Cocoa Beach	Banana	29	$155	3	$1,498	$4,495
2018	66	Big Muddy at Cynthia Baffle Box+	City of Indian Harbour Beach	Banana	269	$155	48	$869	$41,695
2018	67	Grant Place Baffle Box+	City of Melbourne	Central IRL	937	$88	193	$427	$82,481

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2018	68	Crane Creek/M-1 Canal Flow Restoration+	St. Johns River Water Management District	Central IRL	24,000	$85	3,100	$656	$2,033,944
2018	69	Apollo/GA Baffle Box+	City of Melbourne	North IRL	3,381	$88	479	$621	$297,522
2019	66b	Big Muddy at Cynthia Baffle Box Expansion+	City of Indian Harbour Beach	Banana	167	$155	10	$2,584	$25,837
2019	85	Basin 1304 Bioreactor+	Brevard County	Banana	958	$94	127	$709	$90,000
2019	87	Fleming Grant Biosorption Activated Media+	Brevard County	Central IRL	602	$94	91	$622	$56,588
2019	88	Espanola Baffle Box+	City of Melbourne	Central IRL	1,119	$94	148	$711	$105,186
2019	89	Basin 1298 Bioreactor+	Brevard County	North IRL	917	$94	116	$743	$86,198
2019	90	Johns Road Pond Biosorption Activated Media+	Brevard County	North IRL	245	$94	37	$622	$23,030
2019	91	Burkholm Road Biosorption Activated Media+	Brevard County	North IRL	685	$94	104	$619	$64,390
2019	92	Basin 115 Carter Road Biosorption Activated Media+	Brevard County	North IRL	665	$94	101	$619	$62,510
2019	93	Basin 193 Wiley Avenue Biosorption Activated Media+	Brevard County	North IRL	954	$87	144	$575	$82,735
2019	94	Basin 832 Broadway Pond Biosorption Activated Media+	Brevard County	North IRL	456	$94	69	$621	$42,864
2019	96	Spring Creek Baffle Box+	City of Melbourne	North IRL	1,057	$313	232	$1,426	$330,841
2019	97	Titusville High School Baffle Box+	City of Titusville	North IRL	1,190	$94	166	$674	$111,813
2019	98	Coleman Pond Managed Aquatic Plant System+	City of Titusville	North IRL	1,240	$28	198	$177	$35,000

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2020	110	Osprey Plant Pond Managed Aquatic Plant Systems+	City of Titusville	North IRL	606	$99	88	$682	$60,000
2020	117	Basin 10 County Line Road Woodchip Bioreactor+	Brevard County Stormwater	North IRL	597	$122	90	$809	$72,773
2020	118	Basin 26 Sunset Avenue Serenity Park Woodchip Bioreactor+	Brevard County Stormwater	North IRL	605	$122	92	$802	$73,810
2020	119	Basin 141 Irwin Avenue Woodchip Bioreactor+	Brevard County Stormwater	North IRL	567	$122	86	$804	$69,174
2020	120	Draa Field Pond Managed Aquatic Plant Systems+	City of Titusville	North IRL	256	$122	38	$823	$31,281
2020	121	Basin 2258 Babcock Road Woodchip Bioreactor+	Brevard County Stormwater	Central IRL	412	$122	62	$810	$50,203
2020	122	Basin 22 Huntington Road Serenity Park Woodchip Bioreactor+	Brevard County Stormwater	North IRL	329	$122	50	$802	$40,077
2020	124	Floating Wetlands to Existing Stormwater Ponds+	City of Cocoa	North IRL	12	$125	3	$499	$1,497
2020	127	Basin 5 Dry Retention+	Town of Indialantic	North IRL	113	$148	18	$927	$16,680
2020	128	Jackson Court Stormwater Treatment Facility+	City of Satellite Beach	Banana	56	$148	8	$1,033	$8,266
2021	169	Basin 1335 Sherwood Park Stormwater Quality+	City of Melbourne	North IRL	3,214	$122	879	$446	$392,108
2021	174	St. Johns 2 Baffle Box+	City of Titusville	North IRL	1,992	$122	611	$398	$243,070
2021	123	Ray Bullard Water Reclamation Facility Stormwater Management Area+	City of West Melbourne	Central IRL	1,317	$122	400	$402	$160,674

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2021	175	High School Baffle Box+	City of Melbourne	North IRL	1,183	$122	319	$452	$144,326
2021	176	Funeral Home Baffle Box+	City of Melbourne	North IRL	481	$122	129	$455	$58,682
2021	177	North and South Lakemont Ponds Floating Wetlands+	City of Cocoa	North IRL	107	$122	25	$522	$13,054
2021	178	Marina B Managed Aquatic Plant Systems+	City of Titusville	North IRL	55	$122	7	$953	$6,670
2021	179	Lori Laine Basin Pipe Improvement Project+	City of Satellite Beach	Banana	117	$150	21	$835	$17,525
2022	213	Johnson Junior High Denitrification Media Chamber Modification+	Brevard County Natural Resources	North IRL	206	$313	Not applicable	Not applicable	$64,478
2022	214	Sand Point Park Baffle Box+	City of Titusville	North IRL	438	$313	71	$1,931	$137,135
2022	215	Basin 960 Pioneer Road Denitrification+	Brevard County Natural Resources	Banana	105	$370	3	$12,950	$38,850
2022	219	McNabb Outfall Bioretention+	City of Cocoa Beach	Banana	44	$441	7	$2,775	$19,423
2022	220	Basin 1398 Sand Dollar Canal Bioreactor+	Brevard County Natural Resources	North IRL	444	$446	70	$2,829	$198,024
2023	205	Basin 998 Hampton Homes+	Brevard County Natural Resources	Banana	312	$204	47	$1,354	$63,618
2023	206	Basin 1066 Angel Avenue+	Brevard County Natural Resources	Banana	1,150	$202	173	$1,342	$232,200
2023	207	Basin 1124 Elliot Drive+	Brevard County Natural Resources	Banana	617	$574	97	$3,651	$354,158
2023	235	Woodland Business Center Stormwater Retention+	Woodland Business Center	Banana	11	$446	2	$2,453	$4,906

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2023	247	Basin 998 Richland Avenue Canal+	Brevard County Natural Resources	Banana	641	$204	97	$1,348	$130,782
2023	250	Basin 1280B Flamingo Road+	Brevard County Natural Resources	Banana	161	$445	31	$2,311	$71,645
2023	251	Basin 1304 West Arlington Road+	Brevard County Natural Resources	Banana	216	$446	To be determined	To be determined	$96,425
2023	231	North Fiske Stormwater Pond Floating Wetlands+	City of Cocoa	North IRL	200	$250	32	$1,563	$50,000
2023	232	Riverfront Center Nutrient Removing Filtrations Boxes+	City of Titusville	North IRL	679	$313	160	$1,327	$212,257
2023	233	Commons and City Hall Tree Boxes+	City of Titusville	North IRL	80	$313	15	$1,669	$25,040
2023	252	Basin 89 Scottsmoor I Aurantia+	Brevard County Natural Resources	North IRL	1,706	$144	292	$839	$245,100
2024	254	Maritime Hammock Preserve Floating Vegetative Islands+	City of Cocoa Beach	Banana	174	$49	36	$236	$8,500
2024	256	C-10 Water Management Area+	St. Johns River Water Management District	Central IRL	29,300	$357	1,300	$8,046	$10,460,100
2024	257	Riverview Park Baffle Box+	City of Melbourne	Central IRL	863	$357	168	$1,834	$308,091
2024	258	Cocoa Beach Golf Course Floating Vegetative Islands+	City of Cocoa Beach	Banana	152	$574	21	$4,155	$87,248
2024	259	Ramp Road Park - Stormwater Improvements+	City of Cocoa Beach	Banana	41	$410	8	$2,100	$16,796
2025	269	Coleman Pond Circulator+	City of Titusville	North IRL	353	$357	55	$2,291	$126,021
2025	270	Tennessee Street Baffle Box+	City of Titusville	North IRL	1,442	$357	191	$2,695	$514,794

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2025	271	Osprey Pond Circulator+	City of Titusville	North IRL	242	$357	35	$2,468	$86,394
2025	274	Basin 1263 Waelti Drive Pond Retrofit+	Brevard County Natural Resources	North IRL	274	$357	40	$2,445	$97,818
2025	275	Basin 1349 Lake Washington & Croton Road Pond Retrofit+	Brevard County Natural Resources	North IRL	158	$357	24	$2,350	$56,406
2025	276	Basin 1335 North Wickham & Conservation Place Wet Pond Retrofit+	Brevard County Natural Resources	North IRL	261	$357	38	$2,452	$93,177
2025	277	Darrow Baffle Box+	City of Melbourne	Central IRL	536	$357	87	$2,199	$191,352
2025	278	Line Street Cemetery Baffle Box+	City of Melbourne	Central IRL	770	$357	122	$2,253	$274,890
2025	279	Melbourne Cemetery Baffle Box+	City of Melbourne	North IRL	606	$357	105	$2,060	$216,342
2025	280	Westside Basin Water Quality Improvements+	City of Satellite Beach	Banana	137	$409	24	$2,335	$56,033
2025	281	Cocoa Isles Boulevard Dry Pond+	City of Cocoa Beach	Banana	14	$409	2	$2,863	$5,726
2026	290	South Street and US 1 Baffle Box+	City of Titusville	North IRL	698	$574	92	$4,355	$400,652
2026	291	535 Knox McRae Baffle Box+	City of Titusville	North IRL	572	$574	75	$4,378	$328,328
2026	292	Basin 212 East Main Street+	Brevard County Natural Resources	North IRL	656	$574	115	$3,274	$376,544
2026	293	Fillmore Avenue Streetscape Project+	City of Cape Canaveral	Banana	60	$574	11	$3,131	$34,440
-	-	***Total***	-	-	***217,501***	***$376 (average)***	***29,883***	***$2,737 (average)***	***$81,814,038***

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan. The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

Figure 4-21. Stormwater Projects in North Brevard County

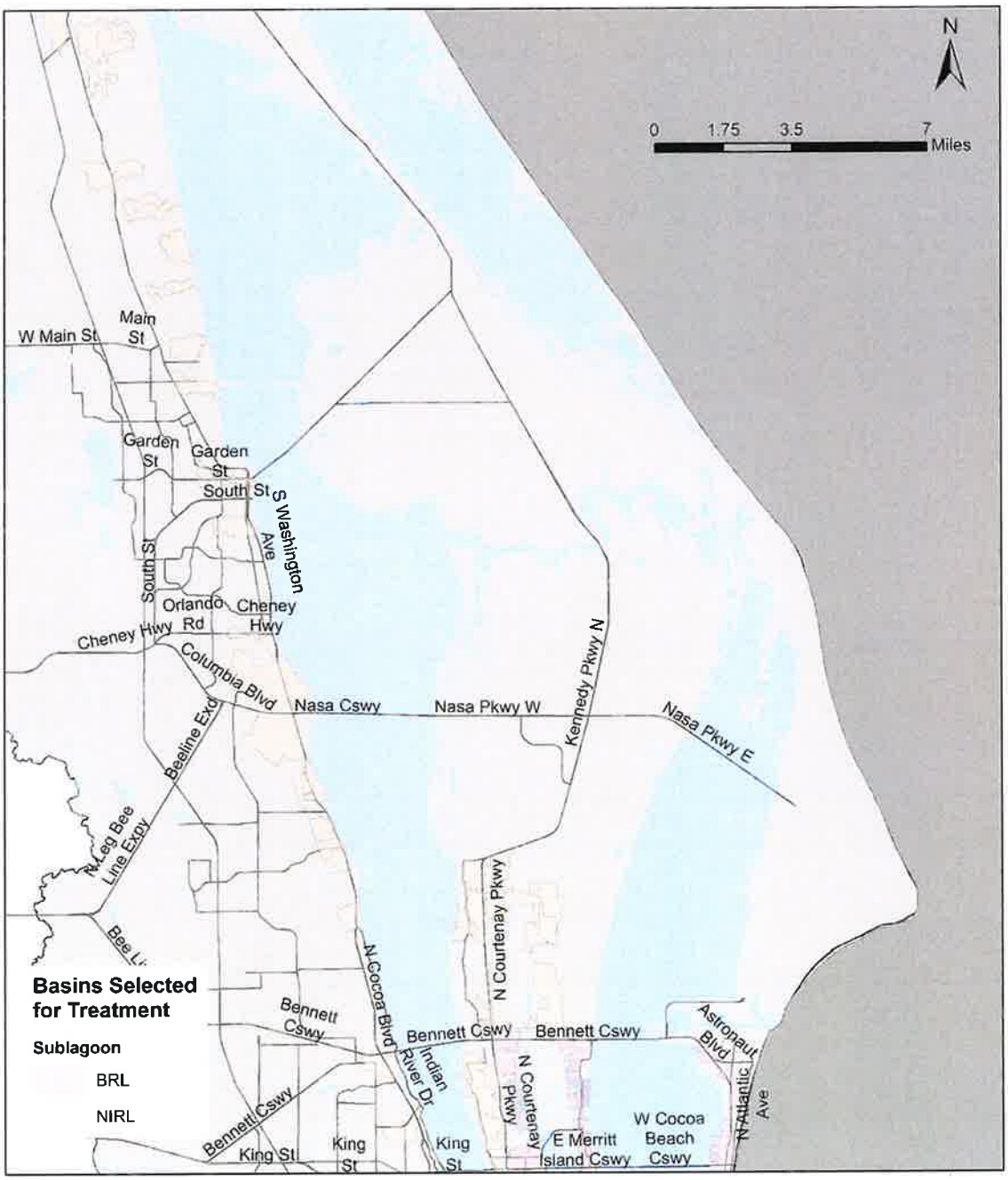


Figure 4-21 Long Description

Figure 4-22. Stormwater Projects in Central Brevard County

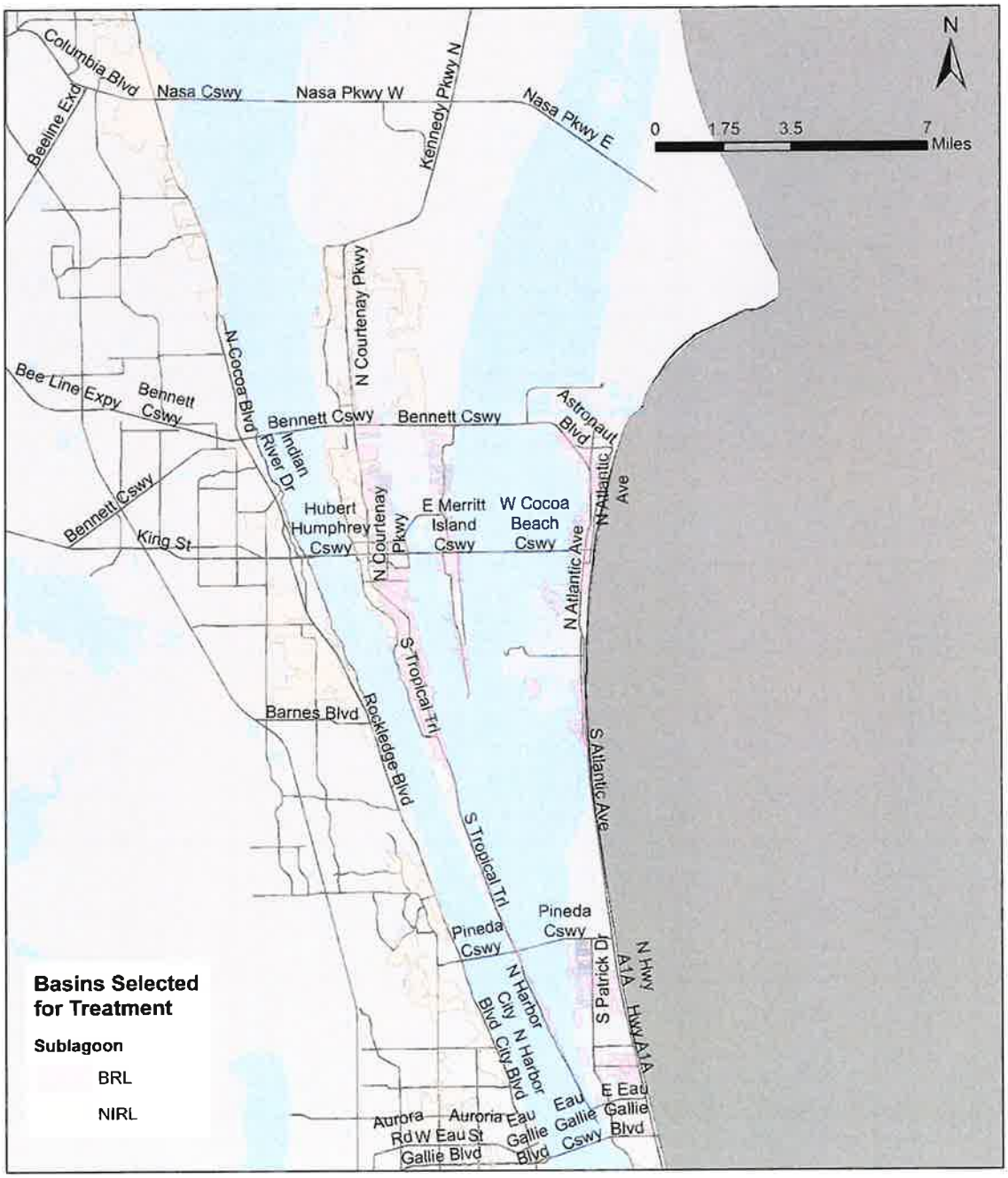


Figure 4-22 Long Description

Figure 4-23. Stormwater Projects in South Brevard County

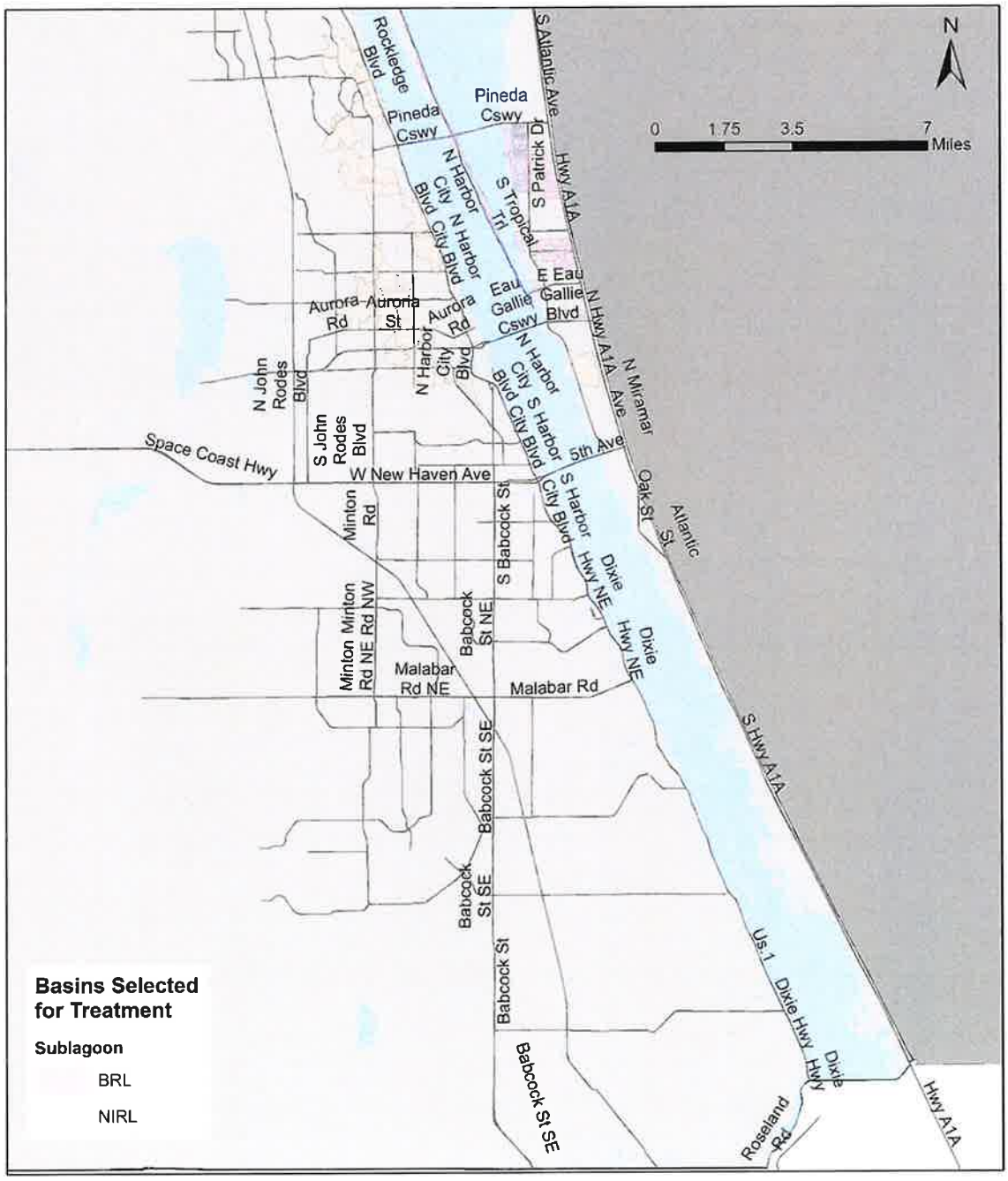


Figure 4-23 Long Description

4.1.8. Vegetation Harvesting

Mechanical removal or harvest of aquatic vegetation rather than treatment with herbicides or other control mechanisms can also reduce nutrient loads to the Indian River Lagoon (IRL) and its tributaries. The use of aquatic plants for nutrient management has been considered since at least the 1960s (Boyd, 1969). The harvest of aquatic vegetation removes nutrients from the waterbody rather than recycling them through decomposition and settlement of the plant material into the sediment. Most freshwater plants do not tolerate the salinity of the IRL and, upon release (such as floating plants washed out of canals) to the IRL, will die and decompose adding a nutrient load directly to the IRL.

Aquatic vegetation can occur either in mixed stands or as large monocultures. It is not uncommon for invasive plants to form largely monotypic stands. The plant material can form dense floating mats that prevent light diffusion into the water column, thus shading the bottom and limiting benthic habitat. The dense layer of vegetation also limits exchange of gases across the water surface and can cause depletion of dissolved oxygen under the mat. At greater densities, vegetation may also form floating islands or tussocks and incorporate woody plants.

Common invasive plants present in waterways that connect to the IRL are hydrilla, water lettuce, duck weed, and water hyacinth, and these plants present the greatest opportunity for harvest and removal of nutrients through plant biomass. However, native vegetation can be intermixed with exotics. Examples of common native aquatic vegetation that may also be removed includes cattails, fanwort, contrail, bladderwort, and water lilies.

The removal of aquatic vegetation may be accomplished in several ways. For canals or waterbodies with small surface area, booms laid across the water surface can divert flow to screening and sorting facilities for removal of floating vegetation. Also, in canals, drag lines or back hoes can be used for removal of submerged vegetation or modified front end loaders with baskets can collect floating plant material. Harvesters and shredders are also specifically designed to move through the water and cut and remove vegetation (Florida Department of Environmental Protection, 2012).

The cost-share for vegetation harvesting was initially based on actual annualized costs and laboratory analyses of the total nitrogen (TN) and total phosphorus (TP) content of plant material removed from floating vegetative islands in eight Brevard County stormwater ponds (see **Table 4-28**). Cost-share reimbursement of approved projects will be based on laboratory analysis of plant material to determine true nutrient removal. Eligible cost-share is adjusted annually as additional cost and nutrient removal benefit data are collected.

Table 4-28. Estimated Costs and Nutrient Reductions for Vegetation Harvesting

Project	Annualized Cost	Annualized Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen Reduction	Annualized Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Reduction
Vegetation Harvesting	$198,868	1,812	$110	191	$1,041

Table 4-29 summarizes the approved projects for vegetation harvesting.

Table 4-29. Projects for Vegetation Harvesting

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Reduction	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Reduction	Plan Funding
2020	111	Draa Field Vegetation Harvesting+	City of Titusville	North IRL	786	$110	99	$873	$86,413
2020	112	County Wide Stormwater Pond Harvesting+^	Brevard County Stormwater	North IRL	931	$15	327	$43	$14,000
2021	171	Mechanical Aquatic Vegetation Harvesting+	Melbourne-Tillman Water Control District	Central IRL	20,538	$49	1,664	$608	$1,011,976
2021	172	Horseshoe Pond Vegetative Harvesting+^	Brevard County Stormwater	North IRL	4,536	$2	242	$34	$8,140
2022	208	Maritime Hammock Preserve Stormwater Pond Aquatic Vegetation Harvesting+^	City of Cocoa Beach	Banana	143	$101	5	$2,896	$14,480
2022	209	Basin 1398 Sand Dollar Canal Harvesting+	Brevard County Natural Resources	North IRL	222	$110	21	$1,163	$24,420
2022	210	Basin 958 Pioneer Road Vegetation Harvesting+	Brevard County Natural Resources	Banana	363	$110	47	$850	$39,930
2022	211	Cocoa Beach Golf Course Stormwater Ponds Aquatic Vegetation Harvesting+	City of Cocoa Beach	Banana	1,984	$110	377	$579	$592,350
2023	228	Unincorporated Countywide Vegetation Harvesting+	Brevard County Natural Resources	All	9,263	$51	993	$453	$450,000
2025	264	Unincorporated Countywide Vegetation Harvesting 2+	Brevard County Stormwater Management	Banana	4,208	$114	593	$797	$472,758
2026	285	Unincorporated Countywide Vegetation Harvesting 3+	Brevard County	All	4,524	$114	647	$797	$515,736
-	-	***Total***	-	-	***47,498***	***$68 (average)***	***5,015***	***$644 (average)***	***$3,230,203***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.
^ Total nitrogen and total phosphorus reductions adjusted after project completion and certified laboratory analysis.

4.2. Projects to Remove Pollutants

The purpose of the projects in this section is to remove pollutants that have accumulated in the Indian River Lagoon (IRL). Eligible project types include dredging to remove accumulations of muck from the lagoon bottom, muck capping to reduce or prevent nutrient flux to the water column, as well as treatment of the interstitial water when feasible. These muck projects have more immediate benefits on the IRL water quality than external reduction projects because the nutrient flux is reduced as soon as muck is removed from the system whereas it takes time for the external load reduction benefits to reach the lagoon. The County is using state innovative technology grants to evaluate new treatment technologies to provide surface water remediation. In addition, the St. Johns River Water Management District, Indian River Lagoon National Estuary Program, Florida Institute of Technology, and the University of Central Florida are evaluating opportunities for enhanced circulation projects, which will allow additional ocean water to flow into the IRL to improve dissolved oxygen levels and reduce the flux of nutrients from IRL sediments and muck. The following sections describe the proposed muck removal and capping projects, scrubbing of muck interstitial water, and spoil management areas as well as potential surface water remediation and potential circulation enhancement projects.

4.2.1. Muck Removal

Muck flux contributes 63% of the TN and 53% of TP load to the Banana River Lagoon each year.

The muck in the Indian River Lagoon (IRL) increases turbidity, inhibits seagrass growth, promotes oxygen depletion in sediments and the water above, produces hydrogen sulfide, stores and releases nutrients, covers the natural bottom, and destroys healthy communities of benthic organisms (Trefry, 2013). When muck is suspended within the water column due to wind or human activities such as boating, these suspended solids limit light availability and suppress seagrass growth. Even for deeper water areas without seagrass growth, muck remains a nutrient source that potentially affects a broader area of the lagoon through nutrient flux and resuspension of fine sediments and their subsequent transport. As shown in **Table 3-1**, in the Banana River Lagoon, the annual release of nutrients from decaying muck is greater than the annual external loading delivered by stormwater and groundwater baseflow combined. The muck deposits cover an estimated 5,916 acres of the IRL bottom in Brevard County (County) (Fox and Trefry, 2023).

The muck deposits in the IRL flux nutrients that enter the water column and contribute to algal blooms and growth of macroalgae. Removal of the muck solids removes over 70 years of accumulated nitrogen and phosphorus sequestered in the IRL that has the potential to release nutrients. Muck flux rates for nitrogen and phosphorus have been estimated through studies in the IRL and continue to be updated as new data are collected. In 2016, muck sediments were assumed to have an average organic matter content of 10%. This equated to 150 pounds per acre per year nitrogen flux and the phosphorus flux was estimated to be 20 pounds per acre per year, except where specific measurements indicated otherwise. These original estimates were more conservative and based on a relatively limited data set.

Researchers at the Florida Institute of Technology have continued to track nutrient fluxes from the muck and analyzed approximately 100 samples from the open lagoon and about 140 samples from the canals over the span of four years and provided updated nutrient fluxes (Fox and Trefry, 2023). Sample sites were generally categorized as discrete, continuous, or in canals. Discrete and canal muck deposits had high organic matter content, high flux rates, and

were relatively contained. The median nitrogen and phosphorus flux for the canal samples are approximately 480 pounds of total nitrogen (TN) per acre per year and 30 pounds of total phosphorus (TP) per acre per year. The median nitrogen and phosphorus flux for the discrete samples are approximately 329 pounds of TN per acre per year and 18 pounds of TP per acre per year. Continuous muck deposits had lower organic matter content, lower flux rates, and were a mixture of muck and sand. The median nitrogen and phosphorus flux for the continuous samples are 89 pounds of TN per acre per year and 6 pounds of TP per acre per year. For estimating project benefits and cost effectiveness, the appropriate median fluxes are used unless site-specific measurements indicate otherwise. Due to the relatively low organic content and flux rates from the continuous areas, these sites were not included in the plan tables.

The focus of the muck removal projects for this plan is on large discrete deposits of muck in big, open-water sites within the lagoon itself. Several of the canal systems that directly connect to the IRL are also included for muck removal. The goal of the muck removal is to reduce TN and TP muck flux loads by 25%, which should result in a significant improvement in water quality and seagrass extent, as well as a reduced risk of massive algal blooms and fish kills. A 70% efficiency for muck removal projects was applied. This efficiency accounts for two factors: (1) each target dredge area may have less than 100% muck cover, and (2) some muck will be left behind despite using the best dredge technology available. Funded primarily by legislative appropriations, the Florida Institute of Technology conducted extensive evaluations of the muck deposits throughout the lagoon for Brevard County (Fox and Trefry, 2018; Fox and Trefry, 2019; Shenker, 2018; Souto, 2018; Trefry et al., 2019a and 2019b; Zarillo and Listopad, 2019; Fox, 2022; Fox and Trefry, 2023). The updated muck acreage and flux estimates are shown in **Table 4-30**. **Table 4-30** reflects data collected through 2023 by researchers at the Florida Institute of Technology.

Table 4-30. Muck Acreages and Flux Estimates in the IRL

Muck Reduction Targets	Open Banana	Banana Canals	North IRL	North IRL Canals	Central IRL	Central IRL Canals	Mosquito Lagoon
Muck area (acres)	1,067	752	1,260	51	59	52	398
Muck flux (pounds of total nitrogen per year)	438,522	360,960	288,814	24,480	28,320	24,960	113,032
Funded dredging sites (acres)	251	405	316	2.85	25	15	0
Flux from funded dredging sites (pounds of total nitrogen per year)	145,948	196,679	131,944	1,137	15,350	10,800	0
Flux reduction from funded sites (pounds of total nitrogen per year)	102,164	137,675	92,361	796	10,745	7,560	0
Percent of total flux reduced by dredging the funded sites	23%	38%	32%	3%	38%	30%	0%

Using the information from the Florida Institute of Technology, Brevard County reevaluated the priority muck locations for dredging. The estimated area and nutrient flux using average flux rates for the County or site-specific data collected by the Florida Institute of Technology are shown in **Table 4-31** for the recommended projects. **Table 4-32** provides a summary of the recommended projects and the projects submitted as part of an annual plan update. Load reductions and cost efficiencies are updated annually to reflect the best available data to date. The locations of these projects are shown in **Figure 4-25** through **Figure 4-28**.

In addition to muck removal, upland input of muck components must be reduced to prevent new muck accumulation. Therefore, land-based source control measures for nutrients, organic waste, and erosion are needed. Without source controls, muck removal will need to be frequently repeated, which is neither cost-effective nor beneficial to the lagoon's health. Public awareness and commitment are needed to control future muck accumulation. Activities that contribute organic debris and sediment to stormwater and open water must be curtailed.

Table 4-31. Estimated Volume, Area, and Nutrient Flux for Muck Removal Project Areas

Location	Sub-Lagoon	Volume of Muck Identified in the Project Area (cubic yards)	Volume of Funded Muck to be Managed (cubic yards)	Acres (funded)	Total Nitrogen Flux*^ (pounds per acre per year)	Total Phosphorus Flux (pounds per acre per year)
Canaveral South (Capping)	Banana	738,000+	476,570+	66+	917*	50*
Pineda Banana River Lagoon (Capping)	Banana	467,000+	467,000	18+	765*	35*
Patrick Space Force Base (Capping)	Banana	342,000+	342,000	24+	650*	21*
Cocoa Beach Golf (Capping)	Banana	975,000	975,000	140	392*	21*
Titusville Railroad East and West (Capping)	North IRL	1,100,000+	225,000+	78+	291*	11*
National Aeronautics and Space Administration Causeway East (Capping)	North IRL	491,500+	491,500	75+	917*	44*
Rockledge A (Capping)	North IRL	115,000+	115,000	46+	142*	31*
Eau Gallie Northeast (Dredging)	North IRL	376,600+	138,800+	80+	128^	15^
Grand Canal Muck Dredging+	Banana	647,000+	544,000+	99+	390*	25*
Sykes Creek Muck Dredging+	Banana	506,000+	300,100+	62+	470^	26^
Cocoa Beach Muck Dredging – Phase III+	Banana	44,040	44,040	39	480^	30^
Merritt Island Muck Removal – Phase 1+ (Dredging)	Banana	312,540	312,540	78	480^	30^
Muck Removal of Indian Harbour Beach Canals+ (Dredging)	Banana	325,209+	325,209	33	480^	30^
Muck Re-dredging in Turkey Creek+>	Central IRL	143,875	143,875	25	614*	30*
Cocoa Beach Muck Dredging Phase II-B+	Banana	110,999	110,999	60	480^	30^
Satellite Beach Muck Dredging+	Banana	299,144+	299,144	34	480^	30^
Spring Creek Dredging+	North IRL	10,876	10,876	1.5	480^	30^
Sunnyland Canals Muck Removal+ (Dredging)	Central IRL	104,000	104,000	15	480^	30^
Shore View Lane (Dredging)	North IRL	18,645+	18,645	0.7+	480^	30^
Mims Rim Ditch (Dredging)	North IRL	167,000+	167,000	37+	641*	20*
Tequesta Harbor (Dredging)	North IRL	3,200	3,200	0.65	480^	30^

*Flux rates from Fox, 2022.
^Flux rates from Fox and Trefry, 2023.
+Based on updated field survey measurements.

Table 4-32. Projects for Muck Removal

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed	Plan Funding
Original	2016-10a	Canaveral South*	Brevard County	Banana	35,382	$415	1,925	$7,636	$14,700,000
Original	2016-5a	Pineda Banana River Lagoon*	Brevard County	Banana	15,033	$454	686	$9,949	$6,825,000
Original	2016-11a	Patrick Space Force Base*	Brevard County	Banana	6,497	$1,104	382	$18,783	$7,175,000
Original	168a	Cocoa Beach Golf*	Brevard County	Banana	29,694	$719	2,058	$10,374	$21,350,000
Original	2016-06a, 2016-08a	Titusville Railroad West and East*	Brevard County	North IRL	19,799	$362	815	$8,804	$7,175,000
Original	2016-07a	National Aeronautics and Space Administration Causeway East*	Brevard County	North IRL	21,872	$456	1,047	$9,527	$9,975,000
Original	2016-04a	Rockledge A*	Brevard County	North IRL	7,581	$577	825	$5,303	$4,375,000
Original	54a	Eau Gallie Northeast*	Brevard County	North IRL	10,476	$835	1,482	$5,904	$8,750,000
2017	41a	Grand Canal Muck Dredging+#	Brevard County	Banana	10,469	$260	1,396	$1,948	$2,719,178
2017	42a	Sykes Creek Muck Dredging+	Brevard County	Banana	19,635	$744	2,618	$5,582	$14,612,850
2018	70a	Cocoa Beach Muck Dredging – Phase III+	City of Cocoa Beach	Banana	4,095	$336	780	$1,764	$1,376,305
2018	71	Merritt Island Muck Removal – Phase 1+	Brevard County	Banana	8,085	$957	1,540	$5,022	$7,733,517
2018	72a	Muck Removal of Indian Harbour Beach Canals+	City of Indian Harbour Beach	Banana	3,780	$961	720	$5,044	$3,631,815
2018	2016-3a	Muck Re-dredging in Turkey Creek+	Brevard County	Central IRL	5,691	$38	221	$973	$215,000
2019	101	Cocoa Beach Muck Dredging Phase II-B+	City of Cocoa Beach	Banana	6,300	$939	840	$7,045	$5,917,650
2020	144	Satellite Beach Muck Dredging+	City of Satellite Beach	Banana	3,885	$485	518	$3,638	$1,884,225
2022	223	Spring Creek Dredging+	City of Melbourne	North IRL	154	$520	21	$3,813	$80,080
2023	236	Sunnyland Canals Muck Removal+	Sunnyland Beach Property Owners Association	Central IRL	10,030	$520	336	$15,523	$5,215,600
2024	260	Mims Rim Ditch Muck Removal Project+	Brevard County	North IRL	16,602	$607	518	$19,454	$10,077,414
2024	262	Shore View Lane Dredging+	Resident	Central IRL	74	$607	10	$4,492	$44,918

Year Added	Project Number	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed	Plan Funding
2026	294	Tequesta Harbor Revitalization Project+	Tequesta Harbor Yacht Club Association	North IRL	68	$607	9	$4,586	$41,276
-	-	***Total***	-	-	***235,202***	***$569 (average)***	***18,747***	***$7,1421 (average)***	***$133,874,828***

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan. The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

[#] In 2021, contingency funding was approved to add Berkeley Canal to the Grand Canal project.

Figure 4-24. Location of Muck Removal Projects in the Northern Banana River Lagoon

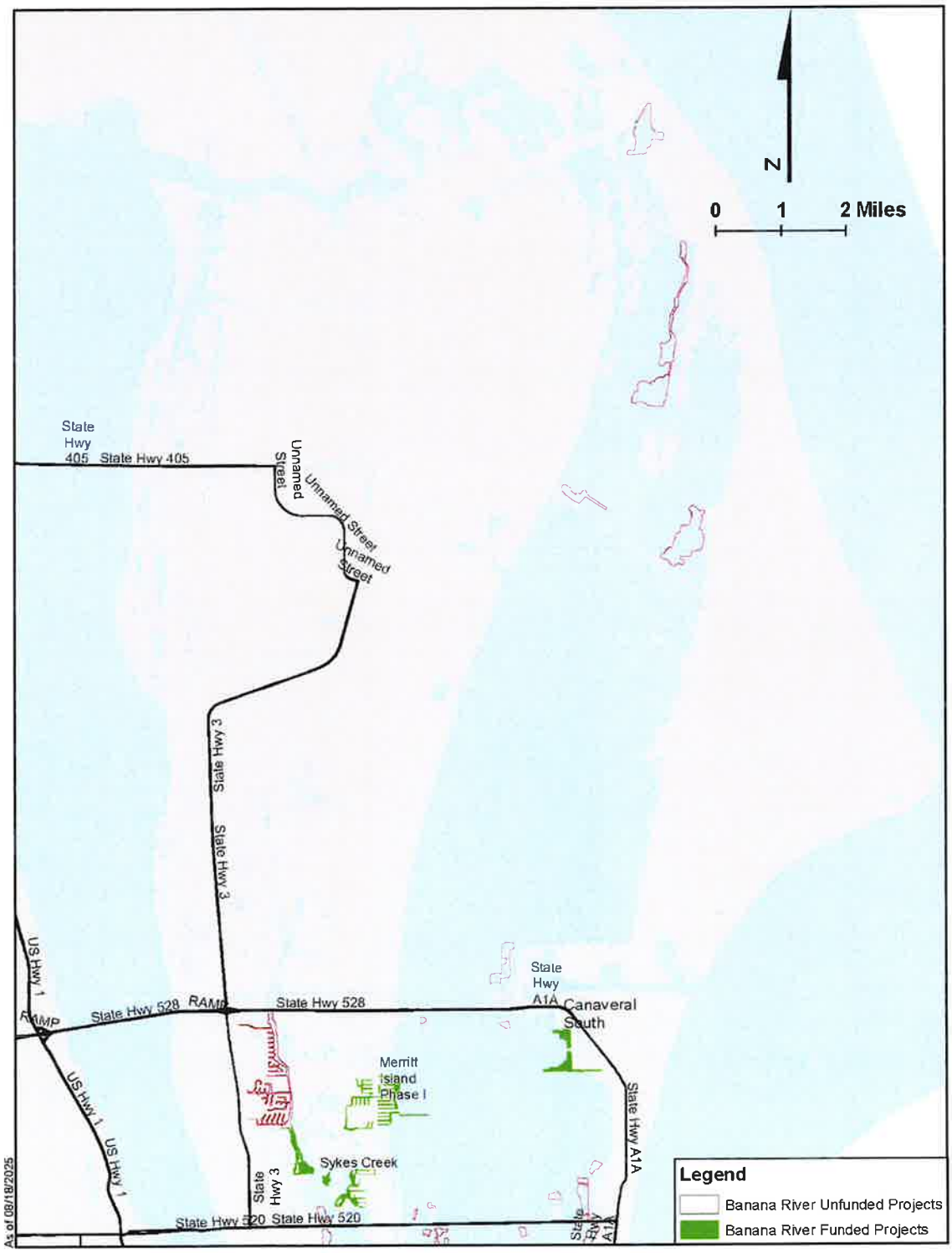


Figure 4-24 Long Description

Figure 4-25. Location of Muck Removal Projects in the Southern Banana River Lagoon

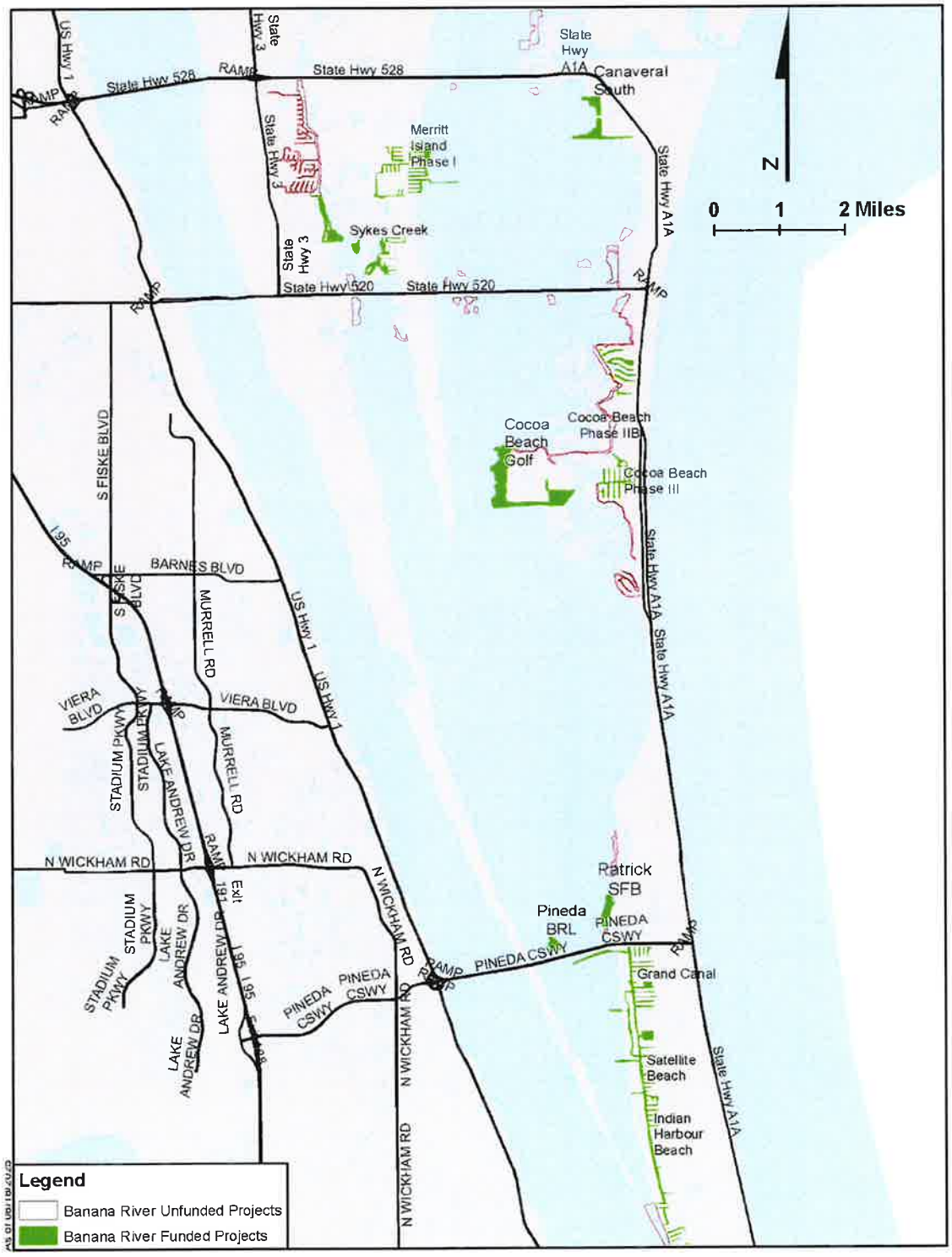


Figure 4-25 Long Description

Figure 4-26. Location of Muck Removal Projects in North IRL

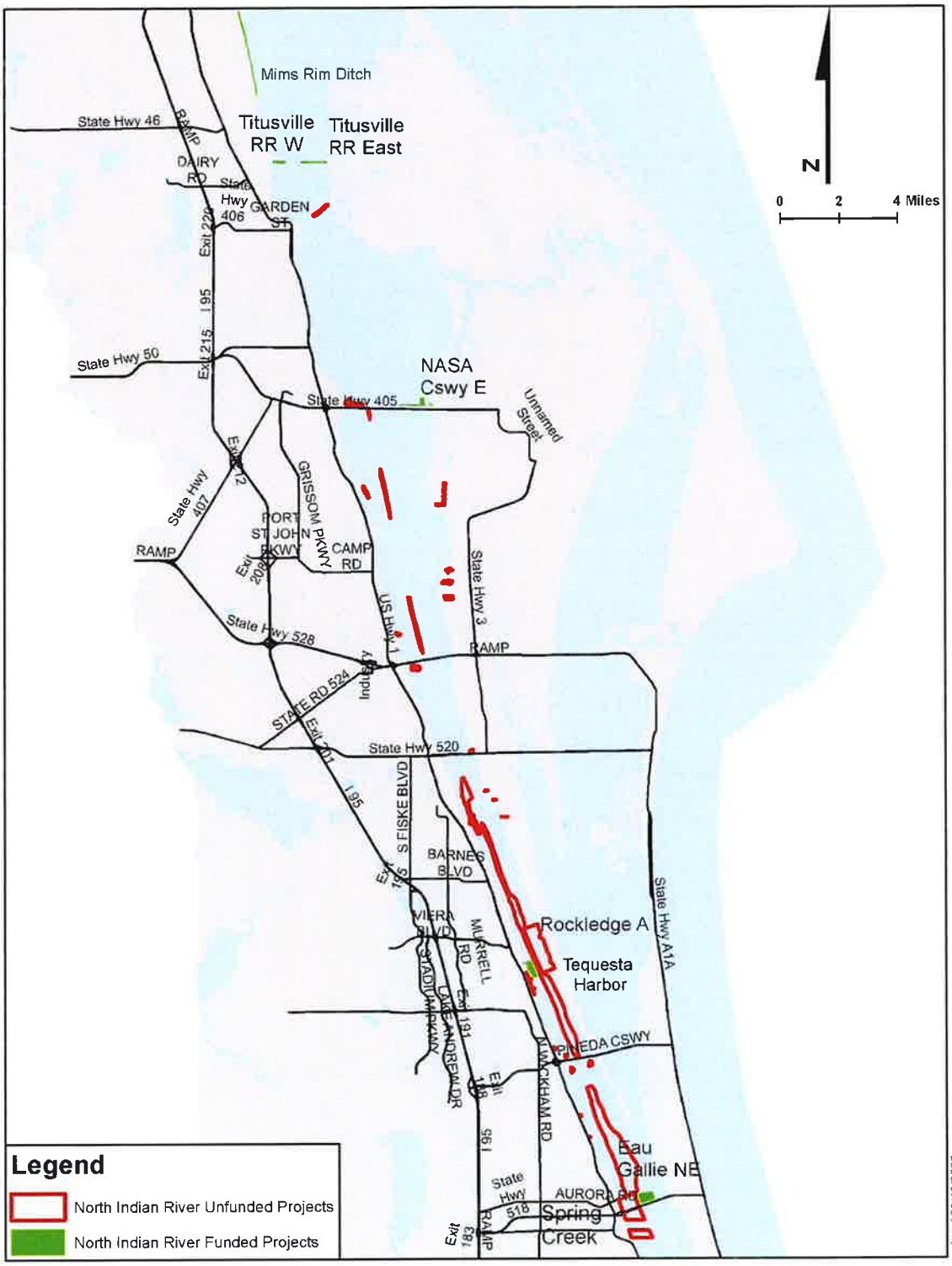


Figure 4-26 Long Description

Figure 4-27. Location of Muck Removal Projects in Central IRL

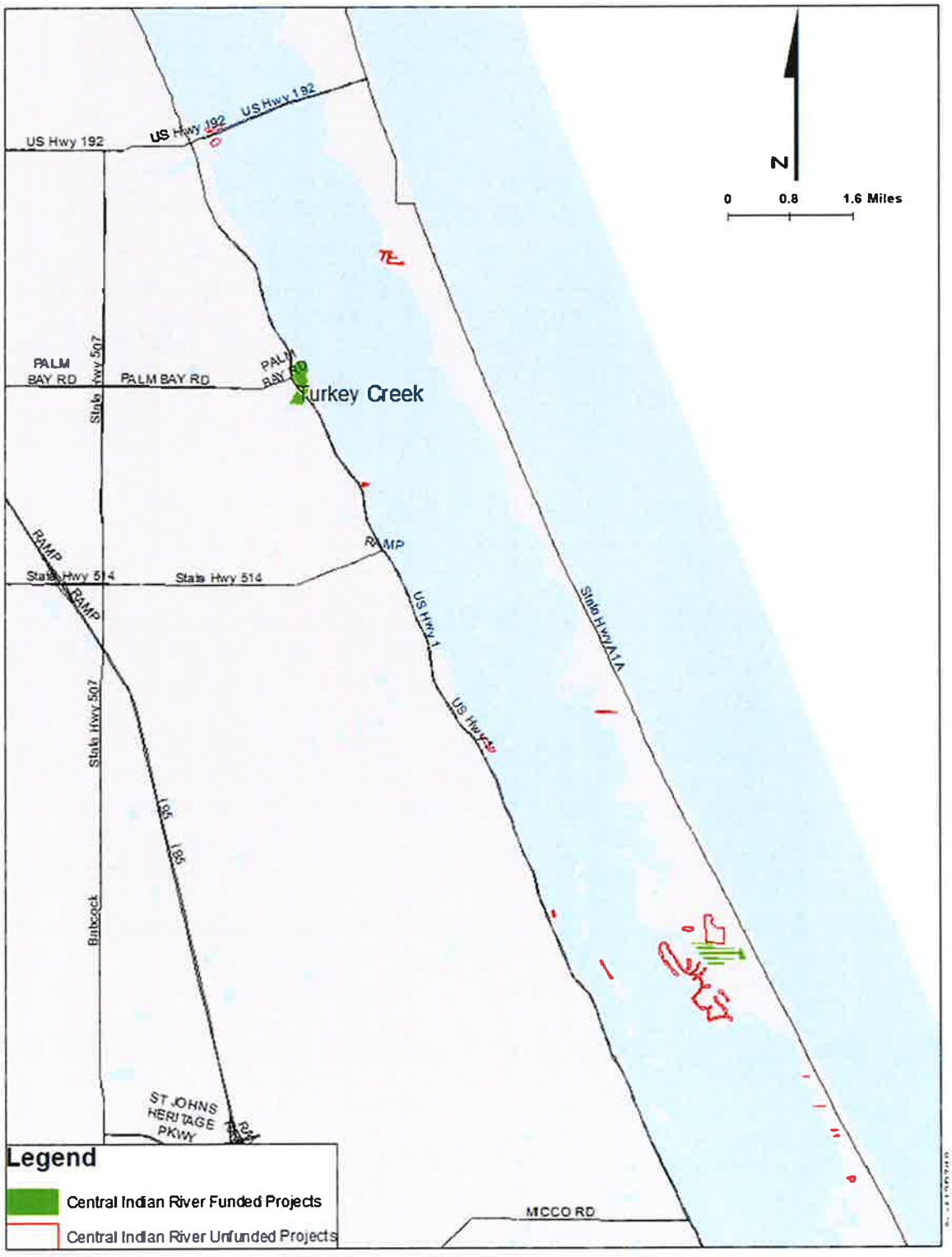


Figure 4-27 Long Description

4.2.2. Treatment of Muck Interstitial Water

Interstitial water refers to the water content that is present within the muck material. Sampling and testing conducted by Florida Institute of Technology researchers has shown that the majority of nutrients are bound to solid particles in the muck; however, the interstitial water also contains a significant amount of dissolved nutrients. When the muck material is dredged, interstitial water nutrients are pumped with the muck and Indian River Lagoon (IRL) water in a slurry to the dredged material management area. At the dredged material management area, the muck slurry is processed in a settling pond where sediments settle out and overflow water is returned to the IRL. Treatment of this overflow water represents a significant opportunity to prevent return of these nutrients to the IRL.

Working with the dredging industry, sewage treatment industry, stormwater treatment entrepreneurs, and industrial waste treatment engineers, feasible and reasonably cost-effective concentration targets for return water to the IRL were initially identified as 2,000–3,000 parts per billion for total nitrogen (TN) and 75–100 parts per billion for total phosphorus (TP). Treatment options for TP were demonstrated during the state-funded initial dredging of Turkey Creek, with Florida Institute of Technology researchers providing independent third-party verification of performance levels. These targets can be achieved through a variety of technologies including, but not limited to, coagulants, polymers, biosorption activated media, or a combination of these technologies. Costs vary by technology, target nutrient reduction levels, and interstitial nutrient concentrations. Open market costs were initially collected through three bid solicitations: (1) Mims Boat Ramp muck removal project, (2) Sykes Creek muck removal project, and (3) Grand Canal muck removal project. More recent dredging experience indicates that concentration targets for TN may need to be adjustable and procured as bid options or alternates to allow market conditions to identify what targets are most cost-effective.

To encourage partnering entities and applicants for Save Our Indian River Lagoon Trust Fund dollars to enhance the performance of muck removal projects by removing interstitial water nutrients from the dredge slurry during muck dredging operations whenever project configuration allows, a separate cost-share was developed to account for this added cost and associated nutrient reduction benefit. Using available cost information from Turkey Creek, Mims, and Sykes Creek, Brevard County (County) staff considered how to incentivize the addition of this processing step as soon as possible into permitted muck removal projects, as well as future projects. When the substitute project request form was distributed to the public in 2018, staff estimated that a cost-share of $200 per pound of TN removed would be sufficient to entice most partners to agree to stipulate a specific condition in their bids and dredging contracts that return water not exceed 3,000 parts per billion of TN nor 100 parts per billion of TP. However, based on bids for nutrient mitigation alternatives for sediment dewatering for Sykes Creek (Tetra Tech, 2015), Grand Canal, and Mims, the cost-share used for the County's projects has been adjusted to reflect average costs and inflation.

The recommended locations for interstitial water treatment and load reductions are shown in **Table 4-33**. Load reductions and cost effectiveness are updated annually to reflect the best available data to date. As part of the 2024 Plan Update, funding for interstitial water treatment at Grand Canal was reevaluated based on recent Pay Applications. The funds not utilized for interstitial water treatment were re-allocated to the dredging funds. As part of the 2025 Plan Update, the Citizen Oversight Committee and the Board of County Commissioners approved a scope amendment for the Eau Gallie Northeast Muck Removal Project, prioritizing muck removal from those portions of the project areas with the highest nutrient flux. Board direction also allows Save Our Indian River Lagoon Trust Funds to be used to bid dredging operations

without including interstitial water treatment initially. If negotiated costs are reasonable and sufficient funds are available or become available, staff may negotiate costs and the County Manager may execute change orders to increase muck removal or incorporate interstitial treatment into the contract. This flexible approach will be extended to all Save Our Indian River Lagoon-approved muck removal projects, ensuring continued progress within allocated budgets while focusing on zones with the highest nutrient flux.

Table 4-33. Projects for Treatment of Interstitial Water

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduced (pounds)	Cost per Pound of Total Phosphorus Removed	Plan Funding
2017	40	Mims Muck Removal: Outflow Water Nutrient Removal+*	Brevard County	North IRL	2,803	$143	244	$1,639	$400,000
2018	2016-10b	Canaveral South+	Brevard County	Banana	42,688	$50	3,887	$549	$2,134,419
2018	2016-5b	Pineda Banana River Lagoon+	Brevard County	Banana	19,820	$50	1,804	$549	$990,980
2018	2016-11b	Patrick Space Force Base+	Brevard County	Banana	20,836	$50	1,897	$549	$1,041,800
2018	168b	Cocoa Beach Golf+	Brevard County	Banana	99,098	$30	9,022	$334	$3,013,100
2018	41b	Grand Canal+#	Brevard County	Banana	89,495	$63	To be determined	To be determined	$5,610,821
2018	42b	Sykes Creek+	Brevard County	Banana	64,278	$175	To be determined	To be determined	$11,248,704
2018	2016-06b, 2016-08b	Titusville Railroad West and East+	Brevard County	North IRL	20,836	$50	1,897	$549	$1,041,749
2018	2016-07b	National Aeronautics and Space Administration Causeway East+	Brevard County	North IRL	28,967	$50	2,637	$549	$1,448,355
2018	2016-04b	Rockledge A+	Brevard County	North IRL	12,705	$50	1,157	$549	$635,244
2018	54b	Eau Gallie Northeast+	Brevard County	North IRL	25,410	$50	2,313	$549	$1,270,487
2018	2016-3b	Muck Interstitial Water Treatment for Turkey Creek+	Brevard County	Central IRL	Not applicable	Not applicable	688	Not applicable	Part of dredging cost
2018	72b	Muck Interstitial Water Treatment for Indian Harbour Beach Canals+	City of Indian Harbour Beach	Banana	27,418	$200	To be determined	To be determined	$5,483,600
2020	113	Satellite Beach Interstitial Water Treatment+	City of Satellite Beach	Banana	29,978	$102	3,059	$1,000	$3,057,756
2024	261	Mims Rim Ditch Interstitial Treatment+	Brevard County	North IRL	15,700	$114	1,292	$1,381	$1,784,135
-	-	***Total***	-	-	***500,032***	***$78 (average)***	***29,897***	***$1,310 (average)***	***$39,161,200***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

* Outflow Water Nutrient Removal for the Mims Muck Removal project was funded, bid, and awarded to the lowest successful bidder; however, the contractor was unsuccessful at reducing outflow water nutrient concentrations as much as required by the contract. Therefore, only partial reductions were achieved and the Save Our Indian River Lagoon Trust Fund was not used.

In 2021, contingency funding was approved to add Berkeley Canal to the Grand Canal project.

4.2.3. Spoil Management Areas

As Brevard County (County) seeks to execute muck dredging projects, the availability of upland processing areas for the treatment of dredge spoils is a limiting factor. These working sites, referred to as temporary spoil management areas or in the industry as dredged material management areas, are upland parcels of land that can be used as needed for the temporary processing of dredge spoils until the materials can be moved offsite to a permanent beneficial use or disposal location.

To move muck dredging projects forward in a timely manner, initial project locations were selected to make use of existing dredged material management areas through the County's long-standing partnership with the Florida Inland Navigation District. The Florida Inland Navigation District manages Florida's Intracoastal Waterway for which it has acquired eight dredged material management area sites distributed from north to south along the 72 miles of the Indian River Lagoon (IRL), not the Banana River, in Brevard County. Only three of these Florida Inland Navigation District dredged material management areas are presently developed.

The eight Florida Inland Navigation District sites are insufficient to meet the volume and timing of muck dredging projects included in this plan. As the distance between dredging sites and dredged material management areas increases, more booster pumps are required. Booster pumps can complicate project operations and increase cost, particularly as multiple boosters become necessary. Booster pumps are required as project pump distances approach one-mile and are required at one-mile intervals thereafter. Each booster pump adds approximately $1 per cubic yard of material dredged. Pump distances for the Eau Gallie and Sykes Creek projects have five- to seven-mile pump distances to the Florida Inland Navigation District sites and project amounts in excess of 400,000 cubic yards each.

As a supplement to the Florida Inland Navigation District sites, County staff investigated lease and purchase options for the development of additional multi-use spoil management areas. Lease options for parcels of interest resulted in unfavorable cost-benefit ratios on these short-term investments due to the up-front costs of site development including design, permitting, mitigation, and construction. Similar cost effectiveness issues arise from depending on private sector contractors to provide a temporary dredged material management area as part of construction costs. The contractor passes along most or all the costs of providing a dredged material management area, but the County does not have the benefit of using the site multiple times.

Fee simple purchase and development of spoil management areas, designed with multi-use options for the implementation of regional surface water or stormwater treatment projects, emerges as the most cost-effective long-term option. Through fee simple site acquisition and a prescribed site use and management plan, investments in acquisition and development costs, including required mitigation, can be recovered. For example, the acquisition of a spoil management site four miles closer than the nearest Florida Inland Navigation District site could reduce booster pump costs by $1.6 million on a single 400,000 cubic yard muck removal project. This savings can offset site acquisition and development costs associated with the parcel.

Publicly owned dredged material management area sites could be used for stormwater or surface water treatment, when not being used for dredging. These additional uses can be factored into site selection and design to provide supplementary lagoon benefits. Therefore, land acquisition shall be considered an eligible muck management project cost, particularly

when the site can be designed to provide multi-use regional surface water or stormwater treatment alongside or intermittently between usages for muck management. A preliminary project design and construction layout with cost evaluation (comparison to an existing, more distant dredged material management area) shall be part of the site selection and land acquisition decision process.

Another factor to consider when evaluating long-term operations and the feasibility of muck dredging projects is the strategy for final disposal and the development of permanent beneficial use or disposal locations. Often left to the contractor as part of their construction and implementation plan, a final disposition strategy is, in many cases, not part of the dredging project plan. The dependency on private sector contractors to provide a final disposition strategy and permanent material disposal site can have consequences that a managed permanent disposal site can avoid. These consequences can increase the contractor's risk and drive up project costs.

A managed disposal site would consider the fiscal, environmental, and social implications of the site. A final disposition strategy evaluates the appropriateness of the disposal site in terms of the local community and future development, the environmental proximity to surface waters and runoff potential, groundwater protection, hauling costs, and minimizing risk by providing a defined disposal site. A defined material disposal site, laid-out in the project design, provides a level of security at the time of project bidding that reduces risk to the contractor and potentially lowers the project cost. Staff investigation into the purchase, use and reclamation of existing borrow pits are an example of final disposal areas that are being considered. Similar to what is seen with the development of temporary spoil management areas, the most cost-effective long-term option for the disposal of muck material should include the evaluation of fee simple purchase options and the development of spoil disposal areas.

A further approach for final muck disposal is an advertised, competitive process to identify suitable long-term locations for the final placement of muck. A Request for Proposals will invite property owners to submit parcels for consideration as permanent disposal or beneficial reuse sites. Qualified properties will be evaluated and shortlisted for potential use based on project-specific needs; however, shortlisting does not guarantee selection. If selected, Brevard County or its dredging contractor will negotiate terms with the property owner, including fees, long-term site management, and permitting. This process aims to increase disposal site options, reduce haul distances, minimize booster pump requirements, increase competition, and reduce project costs while ensuring that the selected sites meet fiscal, environmental, and community standards.

4.2.4. Surface Water Remediation System

In 2016, surface water remediation technologies had not yet been tested in estuarine systems; therefore, these remediation systems were not recommended at the time. However, these types of treatment technologies were being demonstrated in freshwater and shown to offer additional benefits that should be more thoroughly explored to better assess their total value to restoring and maintaining Indian River Lagoon (IRL) health. Estimated costs and benefits for a large-scale project are provided for information on the potential for surface water remediation.

Aqua Fiber Technologies Corporation had a technology that was proposed to treat up to 25 cubic feet per second (16 million gallons per day) of water from Turkey Creek, which is a major tributary to the Central IRL. This project proposed at Turkey Creek had the potential to reduce total suspended solids by more than 90%, remove algal blooms and cyanobacteria to improve

the lagoon's color and clarity, improve the dissolved oxygen concentration by returning water with near 100% oxygen saturation, and produce a biomass that could be processed into fertilizer pellets or used as a feedstock for waste-to-energy utilities to produce electricity.

This project proposed to remove an estimated 35,633 pounds per year of total nitrogen (TN) and 2,132 pounds per year of total phosphorus (TP) from the watershed. The facility would have cost $19,720,760 for design, permitting, construction, and use of a technology to destroy the biomass onsite. The cost to operate and maintain the remediation facility was estimated to be $6,271,200 per year. **Table 4-34** summarizes the benefits and costs of nutrient removal for this project for a 10-year period. On an annual basis, the yearly costs would be $8,243,276, which would result in an annual cost per pound per year of TN removed of $231 and cost per pound per year of TP removed of $3,867.

Brevard County (County) also received information from Phosphorus Free Water Solutions, which has a pay for performance treatment technology to reduce phosphorus, nitrogen, color, and turbidity in surface waters. Phosphorus Free evaluated a project to treat 50 cubic feet per second of water from Turkey Creek. The measured phosphorus concentration in Turkey Creek is very low and it would not be cost-effective to remove additional phosphorus from the system through this technology. Based on the measured concentrations in Turkey Creek, Phosphorus Free Water Solutions provided two options for treating nitrogen. The first option would use the basic nitrogen removal process, which would remove a portion of the dissolved organic nitrogen. This option would reduce TN by 53% or 50,353 pounds per year at a cost of $6,797,000 or $135 per pound of TN removed. The second option would include an additional treatment step to increase the removal of dissolved organic nitrogen. This option would reduce TN by 86% or 81,469 pounds per year at a cost of $13,035,000 or $160 per pound of TN removed (**Table 4-34**). The costs for each scenario do not include the capital costs to construct the treatment facility, only the annual pay for performance cost estimates for a ten-year contract for treatment.

Table 4-34. Summary of Annual Benefits and Ten-Year Costs of a Surface Water Remediation System

Project	Ten-Year Project Cost	Total Nitrogen Reduction (pounds per year)	Cost per pound per Year of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
Aqua Fiber	$82,432,760	35,633	$2,313	2,132	$38,665
Phosphorus Free Option 1	$67,970,000	50,353	$1,350	To be determined	To be determined
Phosphorus Free Option 2	$130,350,000	81,469	$1,600	To be determined	To be determined

In 2020, Brevard County received a grant to collaborate with Aqua Fiber Technologies Corporation to pilot test their surface water remediation technologies. Unfortunately, Aqua Fiber had to cancel the project due to COVID-19 related economic hardships. In 2022, the County received a grant to collaborate with AECOM to pilot test their system in the IRL. Testing was performed in Titusville, Melbourne, Palm Bay, and the South Beaches. Although successful at harvesting turbidity and algae, the cost effectiveness was relatively low (see Section 4.4.3 for more details).

In 2023, the County received an Innovative Technology Grant to collaborate with HydroBioscience to test their ultrasonic transducer's effectiveness in mitigating harmful algal

blooms in the canals of Sykes Creek. All equipment was installed by the end of December 2024, and the project will run for one year collecting data pre- and post-activation. The County continues to investigate potential surface water remediation technologies and a portion of the Respond funding may be used to incentivize pilot testing. As feasible technologies are proven, projects may be added to future plan updates.

In 2025, Brevard County partnered with Resource Environmental Solutions, LLC., and EutroPHIX for the grant funded Turkey Creek Sediment Inactivation Pilot Study. This study uses lanthanum-modified bentonite to reduce internal phosphorus loading from organic-rich sediments within Turkey Creek and adjacent canals. Lanthanum-modified bentonite is a benign and nontoxic clay that preferentially bonds to free phosphate compounds in water and rapidly forms into a highly stable insoluble mineral. The resulting mineral settles into the sediment and is no longer bioavailable. Lanthanum-modified bentonite is used successfully to manage algae blooms in freshwater systems and marine aquaria. The study will proceed once the Florida Department of Environmental Protection approves the quality assurance project plan.

4.2.5. Enhanced Circulation

The 2011 superbloom occurred in the Banana River Lagoon, North Indian River Lagoon (IRL), and southern Mosquito Lagoon. These areas have long residence times, which means that water in these areas stagnates and nutrients can build up leading to additional algal blooms. Options to address this condition are to increase circulation by replacing causeways with bridges, installing culverts under causeways, or increasing ocean exchange by adding culverts, pump stations, or inlets to provide new connections to the ocean. Addressing man-made causeways that interfere with natural circulation should be beneficial without unintended consequences and modeling can help prioritize actions, but implementation is costly and requires participation by the Florida Department of Transportation. The United States Army Corps of Engineers is a potential funding partner for feasible causeway retrofits.

New artificial ocean exchange projects introduce a lot of unknowns. While the residence time of water in the IRL would decrease, the input ocean water with its complement of marine life has the potential to alter the IRL ecosystem. Whether the amount of ocean exchange needed to have a beneficial impact on the system can be achieved without causing unintended harm to the IRL is unknown. Artificial ocean exchange projects are costly with significant social implications and permitting hurdles to overcome. For these reasons, causeway replacements are encouraged while ocean exchange projects are not a recommended component of this plan. Other entities have been evaluating options. The results of evaluations by the St. Johns River Water Management District and the IRL National Estuary Program are summarized below.

The St. Johns River Water Management District contracted with CDM Smith and Taylor Engineering to identify potential locations where enhanced circulation projects would be beneficial. The first phase of the project (CDM Smith et al., 2014) involved a literature review and geographic information system desktop analysis. All the locations considered in Phase I, including the top ranked locations, are shown in **Figure 4-29**. From this first phase, ten locations were identified for future evaluation as shown in **Table 4-35**. The external projects are those that could potentially connect the IRL with the Atlantic Ocean whereas internal projects would improve circulation within the IRL (CDM Smith et al., 2015).

Table 4-35. Phase I Top Ranked Potential Enhanced Circulation Project Locations

Project Site	Project Description	Zone	Project Type	Rank
D	Canaveral Lock*	Banana River Lagoon	External	1

Project Site	Project Description	Zone	Project Type	Rank
C	Port Canaveral*	Banana River Lagoon	External	2
15	Sykes Creek/Merritt Island Causeway*	Banana River Lagoon	Internal	3
B	Pad 39-A*	Banana River Lagoon	External	4
16	Cocoa Beach Causeway	Banana River Lagoon	Internal	5
23	South Banana River	Banana River Lagoon	Internal	6
E	Patrick Air (Space) Force Base *	Banana River Lagoon	External	7
20	Minuteman Causeway	Banana River Lagoon	Internal	8
1	Port Canaveral (East)	Banana River Lagoon	External	9
8	Coconut Point Park*	Central and Southern Portion of IRL Study Area	External	10

Source: CDM Smith et al., 2015.
* Sites evaluated in Phase 2 of the CDM Smith and Taylor Engineering project for the St. Johns River Water Management District.

As part of the second phase of the project, six of the top ranked sites were further evaluated to assess the water volumes. These sites are noted in **Table 4-35**. Based on the initial evaluation of the sites, CDM Smith and Taylor Engineering determined that a project at the Sykes Creek/Merritt Island Causeway was not feasible. This location had a relatively new bridge crossing with built-up abutment protection that precludes construction of culverts and the increase of bridge openings. In addition, this connection would only provide an internal connection in the IRL and would not increase the tidal exchange. The five remaining sites were evaluated for the following types of connections (additional information in **Table 4-36**):

- Port Canaveral (Project Site C) – Culvert connection
- Pad 39-A (Project Site B) – Culvert connection
- Patrick Air (Space) Force Base (Project Site E) – Culvert connection
- Canaveral Lock (Project Site D) – Open channel flow by keeping the Canaveral Lock open over extended periods, which may require additional maintenance dredging to remove sediment deposition near the gates.
- Coconut Point Park (Project Site 8) – Culvert connection
- Coconut Point Park (Project Site 8) – Inlet connection with an inlet that is at least 1,350-feet long, with an average depth of about 25 feet below mean sea level.

Figure 4-28. Phase I Potential Enhanced Circulation Project Locations

Source: CDM Smith et al., 2015.

Figure 4-28 Long Description

Table 4-36. Computed Hydraulics for Connections at Select Locations

Site/Potential Project	Flood Prism (million cubic feet)	Ebb Prism (million cubic feet)	Maximum Flow (cubic feet per second)	Estimated Impacted Area for 0.27 Foot Tide Range (acres)
Port Canaveral Culvert (Project Site C)	1.51	-1.08	89	92 to 128
Pad 39-A Culvert (Project Site B) (estimated)	1.38 to 1.51	-1.08 to -1.59	Not applicable	92 to 135
Patrick Air (Space) Force Base Culvert (Project Site E) (estimated)	1.38 to 1.51	-1.08 to -1.59	Not applicable	92 to 135
Canaveral Lock Open Channel Flow (Project Site D)	68.67	-83.03	-4,670	5,839 to 7,060
Coconut Point Park Culvert (Project Site 8)	1.38	-1.59	-94	117 to 135
Coconut Point Park Inlet (Project Site 8)	1,890	Not applicable	111,000	160,698

Source: CDM Smith et al., 2015.
Note: Positive flow is towards the IRL.

A screening matrix was used to evaluate the costs and benefits of the project based on the criteria for the tidal prism, area affected, land acquisition, relative costs, ease of construction, seagrass loss, and benefit to cost ratio. The top ranked project from this evaluation is the Port Canaveral culvert (CDM et al., 2015). It is important to note that a culvert will likely not provide the amount of exchange needed to provide a significant benefit to the lagoon. The size of the IRL in Brevard County (County) is more than 150,000 acres. The second ranked project is the Canaveral Lock open channel. This option may have challenges moving forward based on past experience with sediment blocking submarines from using the port after the lock was held open for an extended period of time. In addition, limited data are available for estimating the water quality benefits and unintended ecological consequences that could result from keeping the lock open.

In 2019, the Florida Institute of Technology received $800,000 in funding from the Florida Legislature, which was administered by the Florida Department of Education, to plan and perform studies at sites within the IRL and along the coast to restore lagoon inflow. The first phase of the study gathered baseline data and performed modeling on existing water quality, biological parameters, and hydrologic conditions at potential locations for future temporary permitted inflow test structures. The Phase 1 modeling and engineering project research was conducted in parallel with the biological and water quality monitoring to gather data for an enhanced circulation pilot project. The first phase of the project was completed in September 2020. Phase 1 provided baseline biological and geochemical data near the three proposed inflow locations: Port Canaveral and south Cocoa Beach in Brevard County and Bethel Creek in Indian River County. Modeling results were provided for different flow rates in each location based on preliminary engineering concepts for three structure options: pipe with no pump, pump and pipe, and weir (Florida Institute of Technology, 2020).

In 2020, the Florida Institute of Technology received another $752,000 in funding from the Florida Legislature, which was also administered by the Florida Department of Education, for Phase 2 of the study. Phase 2 identified the most feasible and cost-effective location for a temporary inflow pilot system in the Banana River Lagoon within a cove that would receive inflow from the ocean side of the Port Canaveral lock system. Engineering design for a 0.5 cubic meter per second pumping system was completed, and pre-application meetings were held with the permitting agencies. This phase also included additional water quality, geochemical, and biological monitoring to build a baseline conditions database, and updated models to predict changes due to the pilot inflow. Phase 2 was completed in September 2021 (Florida Institute of Technology, 2021).

In 2022, the Florida Institute of Technology received another $921,500 in funding from the Florida Legislature, also administered by the Florida Department of Education, for Phase 3 of the study. Phase 3 focused on the design and permitting of a temporary inflow pilot system and additional research and modeling. The United States Army Corps of Engineers Section 404 and Section 408 permits and Florida Department of Environmental Protection Environmental Resources Permit were obtained and additional design of the pilot system was completed. Biogeochemical research and modeling efforts proceeded in parallel with permitting and design. Phase 3 was completed in September 2023 (Florida Institute of Technology, 2023). In 2024, the University of Central Florida received $4.9 million to construct the pilot project designed by Florida Institute of Technology. A construction timeline has not yet been announced.

Temporary Inlet: Another potential option for ocean exchange is when a large storm creates an opening. Instead of immediately filling in the new opening, an evaluation should be completed using available models to determine the potential benefits of temporarily stabilizing the opening

long enough to provide significant ocean exchange for short-term water quality benefits, but not long enough to excessively alter beach erosion and sand transport into the IRL.

Causeway Modification: In 2018, the IRL National Estuary Program, in partnership with the Canaveral Port Authority, worked with the Florida Institute of Technology to assess the potential for modifications of the State Road 528 and State Road 520 causeways and bridge structures to enhance circulation in the northern portion of the Banana River Lagoon and adjacent North IRL. The Florida Institute of Technology used the United States Army Corps of Engineers Coastal Modeling System for this evaluation (Zarillo, 2018).

The model was set up to reproduce the physical conditions of 2015 to ensure the model was well calibrated. Measured data, including water levels, freshwater inflows, wind velocity, and topography, were used to drive the model. Nine model tests were performed to represent current conditions and scenarios with hypothetical bridge spans over the Banana River Lagoon and North IRL. Three of the model tests included flow relief structures embedded in the State Road 528 and State Road 520 causeways. The tests were run using numerical tracer dye concentration throughout the model domain to track the dye concentration reduction throughout the model simulation. Circulation in the model occurred through ocean exchanges through the Sebastian Inlet, freshwater inflows, and wind (Zarillo, 2018).

The model results indicated that modifying the bridge and causeway structures would have a detectible influence on exchange rates within the Banana River Lagoon and North IRL. Longer bridge spans over the Banana River Lagoon along State Road 528 combined with longer bridge spans over State Road 520 resulted in a 10% net reduction in the dye concentration in the Banana River Lagoon between State Road 528 and State Road 520 at the end of the 340-day model run. The net improvement in exchange in the Banana River Lagoon immediately to the north of State Road 528 was predicted to be 5% if bridge spans are present on both state roads. The study concluded that a significant improvement in exchange in the Banana River Lagoon study area and adjacent North IRL would require bridge spans on both State Road 520 and State Road 528 (Zarillo, 2018).

In 2019, Dr. Zarillo expanded his circulation model to include Mosquito Lagoon and the ocean inlet at New Smyrna instead of a closed boundary at Haulover Canal. This expanded model was run again to estimate the impact of causeways on residence time in various compartments of the IRL. From the modeling, longer bridge spans over the Banana River Lagoon along State Road 528 and State Road 520 resulted in a 17% net reduction in the dye concentration in the Banana River Lagoon between State Road 528 and State Road 520 at the end of the 340-day model run. The net improvement in exchange in the Banana River Lagoon immediately to the north of State Road 528 was predicted to be 8% and exchange within Sykes Creek improved by 20% (Zarillo, 2019).

In response to the 2019 model results, the St. Johns River Water Management District offered to use their state-of-the-art ecological modeling tools to quantify water quality improvements and algal bloom reductions anticipated from the proposed causeway modifications. At the request of Brevard County, Port Canaveral, and IRL National Estuary Program, the Florida Department of Transportation agreed to pause their causeway widening project for six months until the ecological impacts could be estimated and evaluated. The modeling results confirmed the improvement in residence time identified in Dr. Zarillo's modeling but predicted little corresponding change in chlorophyll-a concentrations (St. Johns River Water Management District, 2020).

As part of the State Road 528 widening project from Industry Road to State Road 401/Port Canaveral, the Florida Department of Transportation will be replacing all bridges except the newest bridge over the IRL. Due to input from various stakeholders and environmental agencies, the Florida Department of Transportation committed to bridging and elevating the causeway over the Banana River Lagoon to improve transportation resiliency. This design option will allow other stakeholders to analyze future causeway removal for better water flow in the Banana River Lagoon in an effort to improve water quality. The Florida Department of Transportation will be pursuing a design/build option to update the current design and move directly into construction. It is unknown when funding will become available.

The United States Army Corps of Engineers is authorized by Congress to initiate investigations and implement projects for aquatic ecosystem restoration that improve the quality of the environment, are in the public interest, and are cost effective. After the Florida Department of Transportation agreed to replace the roadway with bridges, the Brevard County Commission sent a letter asking the United States Army Corps of Engineers to consider an ecosystem restoration project that would reduce or remove the earthen causeway crossing the Banana River Lagoon. A Federal Interest Determination completed in 2023 indicates that compartmentalization of IRL waters by earthen causeways impedes natural hydrology and the associated movement of flora and fauna and contributes to habitat degradation in the Banana River Lagoon.

The next step is to conduct a Feasibility Study to develop a range of structural change alternatives and determine the best one. The estimated cost of the Feasibility Study is $700,000 and requires 50% non-federal funding. The best, cost-effective alternative will be eligible for federal implementation at 65% federal cost-share up to $10 million. Construction costs are not yet known but are expected to be within the $10 million federal cost-share limit. Modeling to compare the benefits of structural alternatives to the earthen causeway could also be useful for evaluating the performance of other IRL projects.

State cost-share for the Feasibility Study was requested through a grant from the $100 million Indian River Lagoon Protection Program and the 2024 Legislative Appropriations process. To get the Feasibility Study started, the Citizen Oversight Committee unanimously recommended using Save Our Indian River Lagoon Respond funds to front the local cost-share, but this has not yet been approved by the Brevard County Commission. State grants could partially or fully reimburse the fronted local cost-share. A 2026 legislative funding request for $176,000 was submitted and, if approved, the County Commission will consider providing Save Our Indian River Lagoon funding as a match.

4.3. Projects to Restore the Lagoon

Another component of this plan is to implement projects that will restore important, filtering ecosystem services within and adjacent to the Indian River Lagoon (IRL) to improve water quality and resilience. Oyster reefs provide ecosystem services, including improved water quality, shoreline stabilization, carbon burial, and habitat provision for more than 300 different species (Grabowski et al., 2012). Clams filter water, sequester nutrients, and bury carbon. Planting shorelines with natural vegetation helps to filter excess nutrients and suspended solids from the IRL (Grizzle et al., 2008; Reidenbach et al., 2013). Restoring natural filtration processes will improve water quality, allowing for seagrass growth (Newell and Koch, 2004) and may reduce the number and severity of algal blooms in the IRL. These types of projects take years before the full benefits are seen in the IRL as it takes some time for oyster and clam

populations to recover to self-sustaining levels and for vegetation to grow and become established.

The sections below summarize the oyster restoration, planted shoreline, and clam restoration and aquaculture projects that are proposed, as well as considerations for seagrass planting.

4.3.1. Oyster Restoration

Oysters remove nitrogen from the water via assimilation into the shell and tissue, burial into the sediments, and microbe-related denitrification.

In addition to the fisheries value, oysters provide a variety of nonmarket ecosystem services, with a combined estimated economic value between $13,500 and $245,000 per acre per year (Grabowski et al., 2012). Oyster bars can function as natural breakwaters, provide habitat, and increase shoreline resiliency. The rate of vertical oyster bar growth on unharvested bars (2–6.7 centimeters per year) is greater than predicted sea level rise rate (2–6 millimeters per year); therefore, bars could serve as natural protection against shoreline erosion, shoreline habitat loss, and property damage and loss along many estuarine shorelines (Ridge et al., 2017). Oyster bars reduce erosion of other estuarine habitats such as salt marshes and submerged aquatic vegetation by serving as a living breakwater that attenuates wave energy and stabilizes sediments (Grabowski et al., 2012). In addition to these ecosystem services, oyster bars provide nutrient removal benefits through denitrification.

Restored oyster bars have been shown to result in a positive net effect on the removal and sequestration of nitrogen compared to unrestored sites. As nitrogen is a major contributor to algal blooms and resulting increased turbidity, removal of nitrogen from the system often yields water quality benefits. The nitrogen is removed through three pathways: (1) assimilation of the nitrogen in the shell and tissues of the oysters, (2) enhanced burial of nitrogen into the sediments surrounding oyster bars, and (3) conversion of nitrogen to a gaseous form that returns to the atmosphere through microbe-related denitrification (zu Ermgassen, 2016).

Some studies indicate that the primary mechanism by which oysters remove nitrogen from the system is by increasing local denitrification rates (Grabowski et al., 2012). While the impacts of oyster bars may be localized, they also influence the larger ecosystem. For example, a study by Sharma et al. (2016) found that even with limited bio-filtration and nonsignificant reef effects on water velocity, there was a "shadow" effect on seagrass beds between the reef and shoreline, which resulted in higher localized seagrass area five years after deployment relative to other nearby areas. Further, in a study by Kroeger (2012), it was noted that the eastern section of Mobile Bay had experienced harmful algal blooms that caused fish kills. These conditions occur in the summer months when denitrification by restored oysters would be highest. Therefore, the nitrogen removal associated with the oyster bar project in the bay may make a noticeable contribution to the local water quality by avoiding peak nitrogen concentrations that may trigger algal blooms.

Water quality improvement by target-driven nutrient reduction is required in many coastal areas of the United States as well as Asia, Australia, and Europe (Boesch, 2019; Ayvazian et al., 2021). To help meet nutrient reduction targets, there has been interest by governmental bodies to restore oyster populations, promoting oyster-mediated denitrification (Ayvazian et al., 2021). Recent studies have investigated the best methods for quantifying denitrification of oyster systems, and the current consensus points toward the dissolved nitrogen to argon gas ratio or

nitrogen-15 isotope tracer methods (Caretti et al., 2023; Ray and Fulweiler, 2020; Ray et al., 2021) rather than the acetylene block technique, which can disrupt microbial community function (Ray and Fulweiler, 2020; Ray et al., 2021). Additional recommendations include incorporating areal estimates of oyster biomass, extrapolating denitrification values only from systems with similar characteristics, and considering light levels and whether the reef is intertidal or subtidal (Ray et al., 2021).

Oysters also promote denitrification by directly recycling and removing nitrogen through the microbiome on their shells and in their digestive tracts, by increasing deposition of organic matter to the sediments, and as habitat for other filter-feeding organisms (Ayvazian et al., 2021). Recently, the Chesapeake Bay Program Partnership began evaluating best management practices and has given interim nutrient reduction credits for oyster-mediated denitrification through restoration practices (Cornwell et al., 2019; Reichert-Nguyen and Slacum, 2019). Current recommendations in the 2023 Expert Panel Second Report include oyster restoration through substrate addition and/or using hatchery-produced oysters (Caretti et al., 2023). Only the increase in biomass over the baseline plus any previous maximum biomass for a site receives credit (Caretti et al., 2023; Rose et al., 2021). Nitrogen assimilated into oyster reefs is constantly stored through cycles of new growth and mortality and subsequent assimilation and burial; therefore, the increase in biomass above baseline reflects measurable reduction in nitrogen and phosphorus (Reichert-Nguyen and Slacum, 2019). Since these data are from Chesapeake Bay, they estimated no net denitrification in the winter. Seasonal patterns were related to oyster biomass and a table of annual enhanced nitrogen removal was generated (Caretti et al., 2023).

For the Chesapeake Bay area, oyster tissue and shell dry weight can be calculated based on the shell length via the equations $W_t=0.00037 * L^{1.83359}$ and $W_s=0.00147 * L^{2.3964}$ where *W* is the dry weight in grams of tissues (*t*) or shells (*s*) and *L* is the shell height in millimeters (Reichert-Nguyen and Slacum, 2019). Nutrient storage can be estimated based on these values with mean nitrogen content in tissue dry weight and shell dry weight at 8.2% and 0.2%, respectively, and mean phosphorus content in oyster tissue dry weight and shell dry weight at 0.9% and 0.04%, respectively (Caretti et al., 2023). These values are appropriate for the mid-Atlantic and northeast coastal regions of the United States (Kellogg et al., 2013a). Local tissue dry weight equations from the Mosquito Lagoon yield approximately 25% lower biomass estimates (summarized in zu Ermgassen et al., 2016).

In a study by Kellogg et al. (2014), the annual denitrification enhancement rates associated with oyster bars in North Carolina were documented, ranging from 0.00055 to 0.011 pounds per square foot per year (2.7–55.6 grams per square meter per year). In Maryland, subtidal oyster reefs were found to assimilate 0.013 and 0.002 pounds per square foot (61.759 and 10.1241 grams per square meter) of nitrogen and phosphorus, respectively, into the tissue and shell standing stock biomass. Additionally, the oysters enhance annual denitrification by 0.011 pounds per square foot per year (55.6 grams per meter squared per year) (Kellogg et al., 2013b). Similar values were reported by Sisson et al. (2011) for intertidal and subtidal reefs in Virginia. A 2017 study was also conducted for Brevard County in Mosquito Lagoon to determine the local benefits from oyster bed restoration. This local study found that the net denitrification rate of 7 year-old reefs was 0.009 pounds per square foot per year (450 kilograms per hectare per year) and scaled nitrogen sequestration in oyster tissues and shells is 0.109 pounds per square foot (531 grams per square meter) (Schmidt and Gallagher, 2017).

Scaling denitrification values requires accurate seasonal data and extrapolation as denitrification values can vary with season (Kellogg et al., 2014). It is also important to note that

denitrification has been found to increase with oyster density; however, when ambient nitrate concentrations are elevated denitrification decreases with increasing oyster density above approximately 2,400 individuals per square meter (Smyth et al., 2015).

Based on the Mosquito Lagoon study, 14.5 acres of oyster reef could sequester an estimated 69,695 pounds of nitrogen and remove 5,821 pounds of nitrogen per year through denitrification (based on Schmidt and Gallagher, 2017). However, these denitrification values were obtained with the acetylene block method. Scaling nutrient sequestration and removal from values provided in Kellogg et al. (2013) using the dissolved nitrogen to argon method, 14.5 acres could assimilate an estimated 8,507 pounds of nitrogen, 1,310 pounds of phosphorus, and remove 7,193 pounds of nitrogen per year through enhanced denitrification. Considering the recent recommendations and advances in methods for quantifying oyster reef denitrification and crediting nutrient removal, additional studies in the Indian River Lagoon (IRL) are needed.

The focus for oyster restoration in the IRL system is to provide filtration, sequestration, denitrification, and scour protection along the shoreline (see **Section 4.3.2** for details on scour protection). The goal is not to restore historical oysters in the system because limited information is available on where oysters were historically located. In addition, seagrasses are a more critical component of the system, so restoration efforts aim to use the beneficial aspects of oysters in protecting seagrass from waves and increasing light availability (Newell and Koch, 2004) while minimizing the competition for space. Therefore, sites are evaluated for relative seagrass and oyster habitat requirements such as salinity, depth, and bottom type. In October 2021, Brevard County (County) adopted an Oyster Habitat Suitability and Rehabilitation Success Plan, which details environmental and biological targets to guide site selection for oyster bar projects, outlines adaptive management strategies, and defines related success criteria. Oyster bars may be constructed in submerged areas deeper than seagrass, in areas without an historic persistence of seagrass presence, or as narrow bars along the shoreline to act as a living wave break to reduce erosion.

The oysters from the Oyster Gardening Program were used to develop several pilot bars and demonstration sites in the IRL. In fiscal year 2014–2015, Brevard County received a $410,000 appropriation from the Florida Legislature for the Indian River Lagoon Oyster Restoration Project. This pilot study was completed in fall 2016. Initial design of oyster wave breaks funded by the Save Our Indian River Lagoon Trust Fund was based on monitoring results from the pilot bars and wave tank studies at Florida Institute of Technology that tested the oyster bar stability and wave attenuation of different designs. From these studies the importance of reef location and seasonal water depth (Anderson, 2016) as well as the ability of the reef to act as a wave break (Weaver et al., 2017) were highlighted. Monitoring of oyster bar projects continues to inform their design and placement. Design tests include increasing the project width, utilizing galvanized after welding stainless steel gabions, constructing oyster corrals, coquina corral walls, larger project footprints, and different seeding methods and densities.

Oyster filtration rates depend, at least in part, on the oyster size (Riisgard, 1988). Assuming oysters of 2.24 inches in length, which have an hourly filtration rate of approximately 1 gallon per hour per individual, and a population density of 51 oysters per square foot, approximately 14.5 acres would be needed to filter an equivalent volume of water as that contained in the North IRL, Central IRL, and Banana River Lagoon each year. This is roughly equivalent to 20 miles (105,600 feet) of oyster bars at a width of six feet. These bars will be placed throughout the IRL, at sites that meet Habitat Suitability selection criteria, along mosquito impoundments, parks, submerged spoil islands, and private properties where owners want to participate. Based on the pilot project costs and knowing that larger bars will be constructed more efficiently, in

2016, it was estimated that the 20 miles of oyster bars could be constructed at a cost of $10 million.

The projects for oyster bar restoration are summarized in **Table 4-37**.

Table 4-37. Projects for Oyster Restoration

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Reduction	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Reduction	Plan Funding
Original	2016-55	Banana River Lagoon Oyster Bars*	Brevard County	Banana	2,713	$395	68	$15,743	$1,070,540
Original	2016-56	North IRL Oyster Bars*	Brevard County	North IRL	4,416	$395	110	$15,842	$1,742,580
2018	75	Marina Isles Oyster Bar+	Brevard Zoo	Banana	60	$445	20	$1,335	$26,700
2018	76	Bettinger Oyster Bar+	Brevard Zoo	Banana	24	$445	8	$1,335	$10,680
2018	78a	McNabb Park Oyster Bar+	City of Cocoa Beach	Banana	47	$200	1	$9,422	$9,422
2018	79	Gitlin Oyster Bar+	Brevard Zoo	Banana	36	$445	12	$1,335	$16,020
2018	80	Coconut Point/Environmentally Endangered Lands Oyster Bar+	Brevard Zoo	Central IRL	96	$470	2	$22,560	$45,120
2018	81	Wexford Oyster Bar+	Brevard Zoo	Central IRL	70	$445	24	$1,298	$31,150
2018	83	Bomalaski Oyster Bar+	Brevard Zoo	North IRL	20	$445	7	$1,271	$8,900
2018	73	Riverview Senior Resort Oyster Bar+	Brevard County	Central IRL	77	$394	2	$15,152	$30,304
2019	104	Brevard Zoo Banana River Oyster Project+	Brevard Zoo	Banana	1,476	$395	37	$15,757	$583,020
2019	105	Brevard Zoo Central IRL Oyster Project+	Brevard Zoo	Central IRL	408	$395	10	$16,116	$161,160
2019	106	Brevard Zoo North IRL Oyster Project+	Brevard Zoo	North IRL	864	$395	22	$15,513	$341,280
2020	139	Brevard Zoo North IRL Oyster Project 2+	Brevard Zoo	North IRL	841	$400	21	$16,019	$336,400
2020	140	Brevard Zoo Central IRL Oyster Project 2+	Brevard Zoo	Central IRL	677	$400	17	$15,929	$270,800
2020	141	Brevard Zoo Banana River Oyster Project 2+	Brevard Zoo	Banana	662	$400	17	$15,576	$264,800
2020	142	Brevard Zoo Oyster Reef Adjustments North IRL+	Brevard Zoo	North IRL	68	$400	2	$13,600	$27,200
2020	143	Brevard Zoo Oyster Reef Adjustments Banana River+	Brevard Zoo	Banana	32	$400	1	$12,800	$12,800
2021	184	Brevard Zoo North Indian River Lagoon Oyster Project 3+	Brevard Zoo	North IRL	1,056	$397	26	$16,124	$419,232

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Reduction	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Reduction	Plan Funding
2021	185	Brevard Zoo Central Indian River Lagoon Tributary Pilot Oyster Project+	Brevard Zoo	Central IRL	581	$397	15	$15,377	$230,657
2021	186	Brevard Zoo North Indian River Lagoon Individual Oyster Project+	Brevard Zoo	North IRL	436	$397	11	$15,736	$173,092
2021	187	Brevard Zoo Central Indian River Lagoon Oyster Project 3+	Brevard Zoo	Central IRL	218	$397	5	$17,309	$86,546
2021	188	Brevard Zoo Banana River Oyster Project 3+	Brevard Zoo	Banana	143	$397	4	$14,193	$56,771
2022	217	Central IRL Oyster Project 4+	Brevard Zoo	Central IRL	348	$397	9	$15,351	$138,156
2022	218	Central Oyster Project Offshore Reefs+	Brevard Zoo	Central IRL	900	$397	23	$15,535	$357,300
2022	226	Hog Point Offshore Oyster Bar+	Brevard County	Central IRL	126	$397	3	$16,674	$50,022
2025	272	Brevard Zoo North Indian River Lagoon Oyster Project 4+	Brevard Zoo	North IRL	1,742	$475	44	$18,806	$827,450
2025	273	Brevard Zoo Central Indian River Lagoon Oyster Project 5+	Brevard Zoo	Central IRL	1,504	$475	38	$18,800	$714,400
2026	288	The Zip Project: An Oyster Restoration Project+	The Zip Project	Central IRL	20	$475	1	$5,500	$5,500
2026	289	Brevard Zoo North Indian River Lagoon Oyster Project 5+	Brevard Zoo	North IRL	2,600	$275	65	$19,000	$1,235,000
-	-	***Total***	-	-	***22,261***	***$417 (average)***	***625***	***$14,853 (average)***	***$9,283,002***

Note: The projects highlighted in green and marked with an asterisk were identified in the original plan. The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update. As specific project locations are added each year, the amount of funding for the original projects is reduced accordingly to keep the total funding allocation constant for projects that restore natural filtration processes (including oyster, clam, and planted shoreline projects).

4.3.2. Planted Shorelines

Typically, efforts to protect shorelines have involved hardened structures, such as seawalls, rock revetments, or bulkheads, to dampen or reflect wave energy. Although these types of structures may mitigate shoreline retreat, they accelerate scour and the ecological damages that result can be great (Scyphers et al., 2011). The planted shoreline approach incorporates natural habitats into a shoreline stabilization design; maintains the connectivity between aquatic, intertidal, and terrestrial habitats; and minimizes the adverse impacts of shoreline stabilization on the estuarine system. These efforts range from maintaining or transplanting natural shoreline vegetation without additional structural components to incorporating shoreline vegetation with hardened features, such as rock sills or oyster bars, in settings with higher wave energy (Currin et al., 2010). Selection of the most appropriate management system begins with a site analysis to evaluate the type of shoreline, amount of energy that a shoreline experiences, sediment transport forces, type and location of ecological resources, and adjacent land uses (Restore America's Estuaries, 2015).

As part of a study for the Chesapeake Bay, Forand et al. (2014) evaluated the pollutant load reductions from planted shoreline projects in the area. The results of this evaluation are shown in **Table 4-38**, and were used to update the United States Environmental Protection Agency Chesapeake Bay Program Office estimate of the total nitrogen (TN) and total phosphorus (TP) reductions per foot of planted shoreline. The estimated nutrient reductions from planted shorelines can be calculated using Chesapeake Bay Program Office recommended rates of 0.2 pounds of TN per linear foot and 0.068 pounds of TP per linear foot (Forand et al., 2014.), which is for an average planting width of 24 feet. These values were adjusted for the proposed average planting width of eight feet in Brevard County, which results in a reduction of 0.067 pounds of TN per linear foot and 0.023 pounds of TP per linear foot.

Table 4-38. Pollutant Load Reductions for Shoreline Management Practices

Source	Total Nitrogen (pounds per foot per year)	Total Phosphorus (pounds per foot per year)	Study Location
Ibison, 1990	1.65	1.27	Virginia
Ibison, 1992	0.81	0.66	Virginia
Proctor, 2012	Not applicable	0.38 or 0.29	Virginia
Maryland Department of the Environment, 2011	0.16	0.11	Maryland
Baltimore County mean (Forand, 2013)	0.27	0.18	Maryland
Chesapeake Bay Program Office Scenario Builder, 2012	0.02	0.0025	Chesapeake Bay Program policy threshold from one restoration site
New Interim Chesapeake Bay Program Office Rate (Expert Panel, 2013)	***0.20***	***0.068***	***Chesapeake Bay Program Office policy thresholds that come from six stream restoration sites***

Note: Table is from Forand et al., 2014.

To promote success, mangroves incorporated into planted shorelines will be at least three years old with fully woody trunks, which have been found to increase successful establishment by 1,087% compared to seedlings based on studies conducted in Mosquito Lagoon (Fillya, 2021).

A capstone project with students at the United States Naval Academy aimed to further investigate methods to increase the successful establishment of planted shorelines. The students chose the Fisherman's Landing shoreline to collect initial data on water level and waves and tested potential natural solutions in a wave tank at the United States Naval

Academy. The final design considered mangroves planted shoreward of cordgrass within 10 feet of mean high water level. The mangroves would be planted at a density of 1 per 5.4 square feet for a total of 30 mangroves within a 50 by 3.25 foot area. Cordgrass would be planted at 48 stems per square foot with 5,400 plugs per 50 by 3 foot area. Most waves on site had a period of about 2 seconds. In the wave tank, an incoming 2-inch wave with wave periods of 0.75, 1.57, and 2.38 seconds were tested. Wave energy attenuation for cordgrass or mangroves alone was about 30% to 40%. However, the configuration with both mangroves and cordgrass together yielded a 46% wave height attenuation and a 60% wave energy attenuation (Freitas et al., 2022).

At this time, the plan does not recommend a total length of planted shoreline. Planted shoreline projects will be considered for funding annually as partners submit projects for the plan. A cost-share of $16 per linear foot of shoreline, planted in eight-foot wide swaths, was established by using typical nursery installation costs and standard canopy dimensions for native shoreline species found in Brevard County. This equates to $240 per pound of nitrogen reduced by shoreline plantings. The inflation rates approved by the Citizen Oversight Committee adjust this to $259 per pound.

Brevard County conducted a survey of the shorelines, in conjunction with the University of Central Florida, to determine if the shoreline included a bulkhead/seawall, hardened slope/riprap, or no structure to help identify potential locations for future oyster bars and planted shorelines (Donnelly et al., 2018) (**Figure 4-30**). In 2024, a Living Shoreline Site Selection and Design Decision Support Tool was published for the Indian River Lagoon that incorporates future conditions induced by sea level rise (Parkinson et al, 2024). This tool helps to locate shorelines with slopes that will allow the living shoreline to perform as intended and migrate upslope as sea levels rise.

Table 4-39 summarizes the approved projects for planted shorelines and the estimated load reductions.

Figure 4-29. Shoreline Survey to Identify Locations Appropriate for Oyster Bars and Planted Shorelines

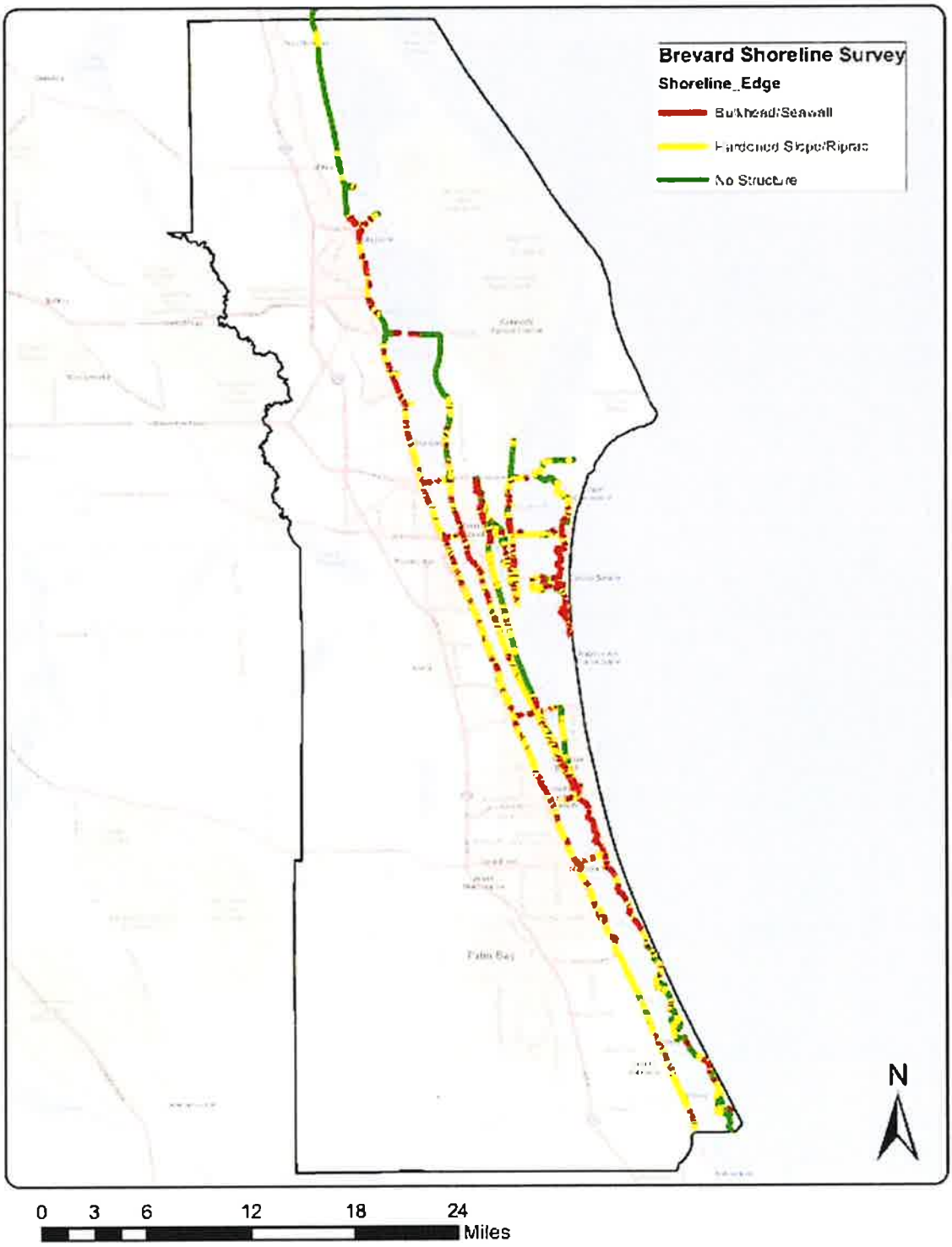


Figure 4-29 Long Description

Table 4-39. Projects for Planted Shorelines

Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Reduction	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Reduction	Plan Funding
2018	77a	Cocoa Beach Country Club Planted Shoreline+	Marine Resources Council	Banana	67	$240	23	$699	$16,080
2018	77b	Lagoon House Shoreline Restoration Planting+	Marine Resources Council	Central IRL	100	$240	34	$706	$24,000
2018	78b	McNabb Park Planted Shoreline+	City of Cocoa Beach	Banana	7	$240	2	$840	$1,680
2019	103	Brevard Zoo North IRL Plant Project+	Brevard Zoo	North IRL	3	$240	1	$720	$720
2020	130	Brevard Zoo North IRL Plant Project 2+	Brevard Zoo	North IRL	41	$240	14	$703	$9,840
2020	133	Fisherman's Landing+	Marine Resources Council	Central IRL	20	$240	7	$686	$4,800
2020	135	Rotary Park+	Marine Resources Council	Central IRL	20	$240	7	$686	$4,800
2021	181	Riveredge+	Marine Resources Council	North IRL	17	$240	6	$680	$4,080
2022	212	Titusville Causeway Multi-Trophic Restoration and Living Shoreline Resiliency Action Project+	Brevard County Natural Resources	North IRL	131	$240	45	$699	$31,440
2026	286	Coconut Point Shoreline Stabilization and Living Shoreline Enhancement+	Hubbs SeaWorld Research Institute	Central IRL	34	$259	12	$734	$8,806
-	-	***Total***	-	-	***440***	***$241 (average)***	***151***	***$704 (average)***	***$106,246***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

4.3.3. Clam Restoration and Aquaculture

Another potential tool for nutrient extraction, scour prevention, and water filtration in the Indian River Lagoon (IRL) is through clam aquaculture and restoration. Like oysters, clams can remove nitrogen from a system by burying it in sediments and enhancing the denitrification process through increased microbial activity in biodeposits (Clements and Comeau, 2019). The harvesting of clam shells and tissues can also extract nitrogen, as bivalves directly incorporate nitrogen (i.e., from consumption of phytoplankton and detritus; not dissolved nitrogen in the water) into their tissues and shells (Clements and Comeau, 2019). Those nutrients are removed from the system once the clams are harvested.

Studies suggest that bivalve aquaculture has the potential to stimulate rates of denitrification equal to that of wild oyster beds and that the impacts of biodeposition from aquaculture are minimal (Clements and Comeau, 2019). This is especially significant since shellfish aquaculture leases can only be located in areas of the IRL that undergo a resource survey to ensure the site is devoid of seagrasses and other marine life.

The exploration of clam aquaculture in Brevard County as a mitigation tool to extract excess nutrients from the IRL is warranted. According to the University of Florida Clam Farm Benefits Calculator, a single littleneck clam can filter 4.5 gallons of seawater per day and remove 0.09 grams of nitrogen when harvested. A study conducted in Virginia found that clam aquaculture beds can contribute to both denitrification and nitrate reduction to ammonium. The denitrification rates for a square meter area of clam beds ranged from 1.33 pounds per year (4.9 micromoles per hour) to 1.76 pounds per year (6.5 micromoles per hour). In comparison, the nitrate reduction to ammonium rates for a square meter area of clam beds ranged from 0.087 pounds per year (0.32 micromoles per hour) to 2.36 pounds per year (2.36 micromoles per hour; Smyth et al. 2018).

In 2020, the Citizen Oversight Committee approved allocating $60,000 in funds to stimulate bivalve aquaculture in Brevard County. This funding would be used to sponsor 10 farms with up to $6,000 per farmer to plant up to 500,000 clams each. The funding would help to offset licensure, lease, and/or material costs. It is estimated that the clams from this stimulus project would remove 1,000 pounds of total nitrogen (TN) at a cost of $60 per pound of TN (**Table 4-40**). In 2025, the Citizen Oversight Committee approved allocating an additional $40,000 from the Central Indian River Lagoon Septic Upgrades Program to the Clam Aquaculture Program. This program will also help promote education directed toward awareness of local aquaculture industries and their dependence on water quality to create mindfulness of the effects of eutrophication in a visceral, practical way. Clam aquaculture sponsorship grants create opportunities for successful partnerships with local clam farmers. Public sentiment toward clam restoration has been positive and the nutrient-removal aspects of shellfish aquaculture align with the Plan's goals.

In addition, a statewide partnership aims to restore clams in the IRL using genetic stock able to withstand the unfavorable conditions of an algae bloom-ridden lagoon. The IRL Clam Restoration Project is a cooperative venture between the Coastal Conservation Association, Florida Fish and Wildlife Conservation Commission, University of Florida Whitney Lab, Brevard Zoo, and Florida Oceanographic Society. They collected broodstock living in the IRL, spawned them, and have begun outplanting these "super clams" in bags or under cover-netting at strategic locations in the IRL (based upon historical sites and current water quality trends) including existing partner habitat restoration and commercial lease areas. Survivorship and growth data are collected to inform next steps for the program. Another goal is to establish

brood stock that will serve as the optimized variety (phenotype) lines for further stock enhancement.

In 2020, the Brevard Zoo received grant funding from the St. Johns River Water Management District to outplant super clam progeny at 100 sites throughout the lagoon. Funding was secured and a combination of private properties and public locations were chosen so that volunteers could assist with restoration. These locations were spread throughout the IRL to help obtain information on survival rates in different areas to improve restoration efforts. All clams were deployed and monitoring for one-year post-deployed has been completed. The Brevard Zoo Clam Restoration Final Report (2023) concludes that clam survival was significantly, positively related to salinity. Survival was also higher at locations where predation protection nets remained secured for the length of the project, highlighting the importance of predation protection when planting restoration sites at high density. Finally, the highest average growth rates occurred in the Central IRL, followed by the Mosquito Lagoon, North IRL, and Banana River Lagoon.

In 2023, the IRL Clam Restoration Project began repatriating clams to the IRL using drones. Clam seed was dispersed at a density of 10, 20, and 30 clams per square foot at authorized permitted locations. This method had a mean survival of 33.6% over the eight months of monitoring from October 2023 to May 2024, and negated the time and costs associated with maintaining nets and other protective gear (Hale and Osborne, 2024).

In 2025, the Citizen Oversight Committee approved the addition of two super clam restoration projects that will use the drone distribution methodology to seed clams in the IRL at a density of 3 million seed clams per acre, to achieve a survival of 1 million clams per acre. These two projects located in Titusville and Grant Island are estimated to remove over 2,500 pounds of nitrogen per year.

Table 4-40. Projects for Clam Restoration

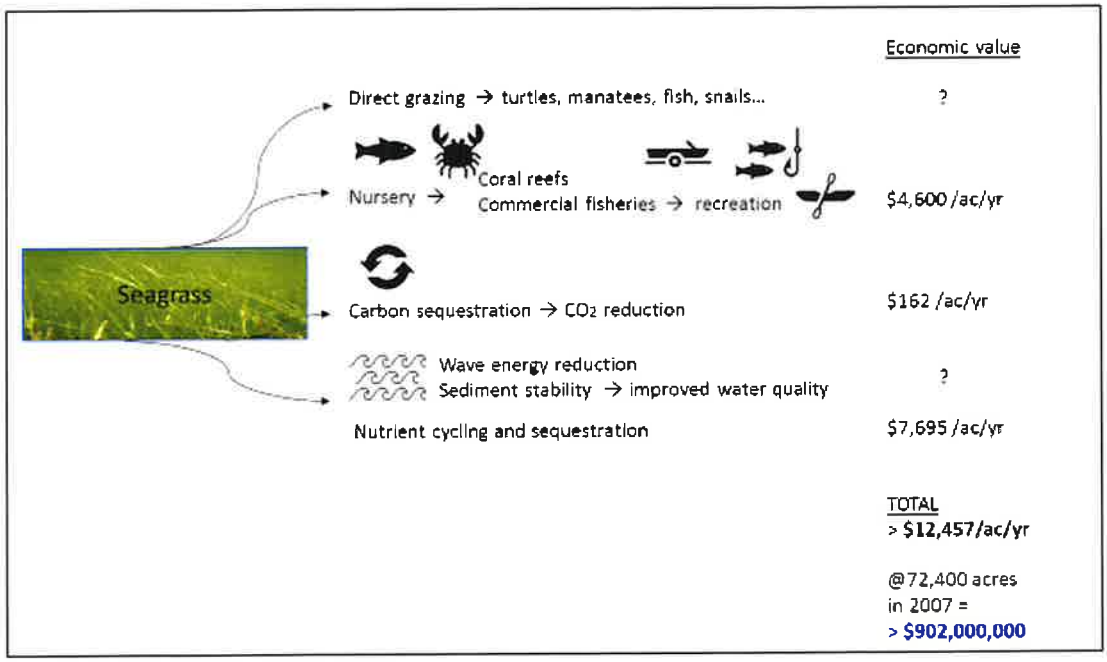
Year Added	Project Number	Project Name	Responsible Entity	Sub-lagoon	Total Nitrogen Reduction (pounds per year)	Cost per Pound per Year of Total Nitrogen Reduction	Total Phosphorus Reduction (pounds per year)	Cost per Pound per Year of Total Phosphorus Reduction	Plan Funding
2021	194	Aquaculture Stimulus Project+	Brevard County	All	1,667	$60	Not applicable	Not applicable	$100,000
2025	265	Restoration of Native Clams in the IRL – Titusville+	Indian River Lagoon Clam Restoration Project	North IRL	1,584	$172	528	$515	$272,000
2025	267	Restoration of Native Clams in the IRL - Grant Island+	Indian River Lagoon Clam Restoration Project	Central IRL	990	$172	330	$515	$170,000
-	-	***Total***	-	-	***4,241***	***$128 (average)***	***858***	***$632 (average)***	***$542,000***

Note: The projects highlighted in tan and marked with a plus sign were added to the plan as part of an annual update.

4.3.4. Seagrass Planting

The original Indian River Lagoon (IRL) Surface Water Improvement and Management Plan of 1989, as well as subsequent management plans up to and including the current basin management action plans, target a healthy, estuarine ecosystem populated by seagrasses. Seagrasses provide crucial benefits to Florida's estuaries by providing food and habitat for a variety of animals, improving water quality, sequestering carbon, cycling nutrients, and preventing erosion of sediment (Orth et al., 2006; Dewsbury et al., 2016). In total, the lagoon's previous 72,000 acres of seagrass could provide an economic benefit of more than $900 million per year (**Figure 4-31**; Dewsbury et al., 2016).

Figure 4-30. Estimated Economic Value of Some Seagrass Services



Note: Adapted from Dewsbury et al., 2016

Figure 4-30 Long Description

One key ecological role for seagrasses is to absorb and cycle nitrogen and phosphorus (Romero et al., 2006). Seagrasses do not remove these nutrients permanently, but they compete for them against phytoplankton and macroalgae and hold them longer (Banta et al., 2004). By stabilizing the cycling of nutrients, seagrasses can increase a system's ability to absorb nutrient loads without the initiation of detrimental blooms of phytoplankton or macroalgae (Schmidt et al., 2012). Seagrasses can filter nitrogen inputs via photosynthesis and nutrient uptake, acting as a seasonal sink (McGlathery, 2008). However, when systems become eutrophic, this function can be lost (McGlathery, 2008). The contribution of seagrasses can be evaluated by examining the quantity of nutrients bound in its aboveground and belowground structures (its mass of biological material or biomass), with this approach treating uptake and release of nutrients as offsetting components of the nutrient cycle (**Table 4-41**).

Table 4-41. Average Nutrients in Seagrass from 2005–2009

Sub-lagoon	Acres	Pounds of Seagrass*	Pounds of Nitrogen	Pounds of Phosphorus
Southern Mosquito Lagoon	13,695	3,302,996	77,951	7,597
Banana River Lagoon	22,994	4,358,114	102,852	10,024
North IRL	19,264	2,277,103	53,740	5,237
Central IRL	6,661	574,913	13,568	1,322

* Changes in seagrass cover yield changes in biomass of seagrass within the same number of acres.

Seagrass restoration may be necessary because more than 30,000 acres of seagrasses were lost due to shading during the superbloom in 2011, recovery has been limited, and the brown tide in 2016 exacerbated the situation (**Table 4-42**). In fact, the Banana River Lagoon in Brevard County (County) experienced the largest initial losses of seagrass (**Table 4-43**, **Appendix C**). Throughout the IRL, decreases in the extent and cover of seagrass between 2005 and 2023 meant that approximately 169,172 pounds (77 metric tons) of nitrogen and 16,484 pounds (7.5 metric tons) of phosphorus were no longer stored in seagrass (**Table 4-43**). After the loss of seagrass, nitrogen and phosphorus became available to phytoplankton, drift algae, and other primary producers (**Table 4-43**). Furthermore, the absence of seagrasses has made the sediments less stable, which hampers the colonization and spread of new seagrass.

Table 4-42. Average Nutrients in Seagrass 2023

Sub-lagoon	Acres	Pounds of Seagrass*	Pounds of Nitrogen	Pounds of Phosphorus
Southern Mosquito Lagoon	12,466	3,327,552	78,530	7,653
Banana River Lagoon	167	1,420	34	3
North IRL	580	4,575	108	11
Central IRL	1,196	12,539	296	29

* Changes in seagrass cover yield changes in biomass of seagrass within the same number of acres.

Overall, seagrasses may need some help to recover in the short-term, with more rapid recovery helping to sequester nutrients and reduce the amounts available to phytoplankton. Measures that could help seagrasses recover include protecting existing seagrass to promote expansion or protecting areas from waves to reduce the movement of sediment and allow seagrasses to colonize. Planting pilot studies have begun with *Halodule wrightii* as the initial focus because it has been the most common and abundant species in the IRL (Dawes et al., 1995; Morris et al., 2022) and can act as a pioneer due to its rapid growth and wide tolerance thresholds.

Table 4-43. Average Seagrass Lost and Nutrients Made Available to Other Primary Producers from 2005–2009 to 2023

Sub-lagoon	Reduction in Acres	Changes in Seagrass Biomass* (pounds)	Pounds of Nitrogen Available	Pounds of Phosphorus Available
Southern Mosquito Lagoon	1,230	24,556	-580	-57
Banana River Lagoon	22,827	-4,356,694	102,818	10,020
North IRL	18,684	-2,272,528	53,632	5,227
Central IRL	5,465	-562,374	13,272	1,294

* Changes in seagrass cover yield changes in biomass of seagrass within the same number of acres.

Planting seagrass is not a trivial undertaking; it requires considerable planning, resources, and time. For example, having suitable conditions is critical, as shown in Tampa Bay where stakeholders invested more than $500 million in projects to reduce nutrient pollution before they saw any return from planting seagrass (Lewis et al., 1999). Costs documented during a

workshop on seagrass restoration started at $1.4 million per acre for larger scale projects (Treat and Lewis, 2006). Seagrass meadows influence nutrient dynamics through storage, cycling, and promoting denitrification.

Scaled nitrogen storage and removal rates vary from 6 to 78 pounds per acre per year based on studies of various seagrass species conducted in Australia, Virginia, North Carolina, and IRL (Piehler and Smyth, 2011; Russel and Greening, 2015; Smyth et al., 2015; Aoki et al., 2019; Morris et al., 2022). With project costs ranging from approximately $2 to $7 per square foot of seagrass, this equates to $1,085 to $48,306 per pound of nitrogen sequestration. With the cost of seagrass restoration at approximately $400,000 per hectare (Bayraktarov et al. 2016), it would cost more than $7.8 billion to restore the 19,517 hectares lost in the IRL since 2005–2009.

Some of the lessons learned from past projects include selecting sites that will support seagrass growth, employing optimal methods for planting (e.g., type of planting units, use of chemicals to enhance growth, and density of initial planting), and protecting newly planted seagrass from disturbance (e.g., grazing, waves, exposure, and low salinity) until it is established. It may be best to tailor approaches to a specific location; therefore, one or more pilot studies prior to attempting full-scale restoration should prove valuable.

The Brevard Zoo has established two seagrass nurseries in the County through the IRL National Estuary Program with support of the Community Collaborative Save Our Indian River Lagoon project. In 2024, the Brevard Zoo planted seagrass at three restoration sites across the County, two of which had 1% coverage of *H. wrightii* after one-year of monitoring, and the third had 18% seagrass coverage. The location with the greatest seagrass cover was in the North IRL, where some natural recovery has also been observed. In these plantings, a larger-footprint fence excluder design was used. Due to high fetch and hurricane impacts, this design proved to be significantly more challenging. The Brevard Zoo has three new seagrass sites for 2025 to investigate the relationship between the macroalgae *Caulerpa prolifera* and the seagrass species *Halodule wrightii*.

The Brevard County Natural Resources Management Department was awarded funding from the state's resiliency grants program and from the Tourism and Development Council Lagoon Tourism + Lagoon Grant Program to support a seagrass planting pilot project in the IRL. The project planted 1.66 acres of seagrass over two separate locations in June 2024. The project was designed to test different planting methods (e.g., type of unit to be planted and density of units) to better understand how to approach, most effectively and economically, future, larger-scale restoration. The area will be monitored for two years post-restoration to document growth and survival, with measures being density, percent cover, and canopy height, as well as water depth, dissolved oxygen concentration, light availability, and other environmental conditions. The bids for installing this seagrass ranged from approximately $120,000 to $194,000. Based on the cost of this pilot project and literature values for sequestration rates, a planting cost of approximately $72,000 per acre ($1.65 per square foot), would equate to a cost-effectiveness of roughly $900 per pound of nitrogen sequestered.

Similar or more complex pilot studies could be designed to investigate other key components of restoration. Overall, successfully incorporating planting into the restoration of tens of thousands of acres of seagrass will benefit from strategic investment in optimizing techniques. For example, site selection and project scale may be critical to surviving chronic natural disturbance and increasing the potential for natural recolonization (Fonseca presentation to the Citizen's Oversight Committee on August 20, 2021). Brevard County supported the development of a

decision tree that will help all interested groups with these issues. This tool is based on decades of research by St. Johns River Water Management District regarding abiotic factors and thresholds found to limit seagrasses in the IRL. Variables known to influence seagrass growth and persistence were weighed using an ArcGIS-based suitability model to help identify the relative risk of planting in the County's portion of the IRL. In this way, it does not predict outcomes; rather aims to identify current conditions that pose differing risk levels to seagrass survival. It also aims to provide a framework for a methodical approach to planting design, execution, and monitoring so that important questions can be addressed and lessons learned can inform future restoration efforts. By its design, as results from future pilot projects are gathered, the model can be updated to reflect changes in IRL conditions and incorporate new data and lessons learned. The St. Johns River Water Management District is currently in the process of obtaining updated bathymetry for the IRL and initial plans for the next phase of this project are to perform and incorporate wave modeling once updated bathymetry is available. The ArcGIS tool can be found at this link. **Appendix C** includes additional details about seagrass.

4.4. Projects to Respond to New Information

The majority of funding raised from the Save Our Indian River Lagoon sales tax goes toward the projects listed in the sections above that will reduce or remove pollutants and restore the Indian River Lagoon (IRL). In addition, $10 million of the funding, over a period of 10 years, will go towards monitoring efforts to measure the success, nutrient removal efficiency, and cost effectiveness of projects included in this plan and those potentially added in future updates of this plan. Measuring effectiveness is important for reporting progress toward total load reduction targets and for refining project designs to be more effective with each iteration. The monitoring data are used to determine which projects are providing the most benefit in the most cost-effective manner so that the plan can be updated, as needed. Respond funds can also be used to measure if the IRL is responding as anticipated to the reductions made so that changes to the plan can be implemented if the lagoon is not responding as expected.

4.4.1. Adaptive Management to Report, Reassess, and Respond

The Indian River Lagoon (IRL) is located along the Space Coast, which is also known as a global center for exploration, innovation, and development of cutting edge technology. With a dedicated funding source and a brilliant community dedicated to meeting the challenges of today and tomorrow, it is wise to have a process that allows this plan to be updated and revised as new opportunities and better solutions are developed. The intent of the proposed adaptive management strategy is to provide a process that not only allows but also fosters the development and implementation of better tools and techniques for IRL restoration.

Although this plan was initially developed with the best information available in 2016, identifying the sources of water quality pollution and pairing those problems with the most timely and cost-effective solutions is a rapidly changing field of knowledge. To respond to change and take advantage of future opportunities, monitoring is necessary. Even without change in the industry, monitoring will provide data to support and refine the application of existing technology. An adaptive management approach is used to provide a mechanism to make adjustments to the plan based on new information. As projects from this plan are implemented, the actual costs and nutrient reduction benefits will be tracked, and the plan will be modified, as needed, as project performance in the IRL watershed is better understood.

This plan will be updated approximately annually with information from implemented projects and adjustments to the remaining projects. A volunteer committee of diversely skilled citizens

has been assembled to assist Brevard County (County) with the annual plan updates. From inception to 2024, the Citizen Oversight Committee consisted of seven representatives and seven alternates that represent the following fields of expertise: science, technology, economics/finance, real estate, education/outreach, tourism, and IRL advocacy. The League of Cities nominated representatives for three fields of expertise and nominated alternates for the remaining four fields of expertise. The Brevard County Board of County Commissioners nominated representatives for the other four fields of expertise and alternates for the remaining three fields of expertise. All Citizen Oversight Committee representatives and alternates were appointed by the Brevard County Board of County Commissioners. Appointees serve for two-year terms, after which time they may be considered for reappointment or replacement. The first term ended in February 2019, the second term ended in February 2021, the third term ended in February 2023, and the fourth term ended in February 2025.

In 2024, the County Commission approved ordinance changes that were recommended by the Citizen Oversight Committee to combine IRL advocacy with education/outreach to make room for a "Lagoon Commerce" field of expertise. Lagoon Commerce appointees should be citizens who work on the lagoon and experience changing conditions. Ordinance changes also added two emeritus positions to address six of seven voting members being term-limited in 2025. The emeritus members will be non-voting but subject to Florida Sunshine Law. They will provide historical context for new committee members, especially regarding previous public comment and direction from the County Commission.

The Citizen Oversight Committee's recommendations for annual plan updates are posted at least 15 days before being presented to the Board of County Commissioners, who can adopt changes to the plan after public comments in a public meeting.

Brevard County staff provides project monitoring reports to the Citizen Oversight Committee and works with them to recommend adjusting the planned projects, as needed. The adaptive management process allows for alternative projects to be submitted by the county, municipalities, and other community partners to be reviewed by the Citizen Oversight Committee for inclusion in the next annual update to this plan. Projects that deliver comparable nutrient removal benefits may be approved for inclusion in the plan. If a new approved project costs more than the average cost per pound of total nitrogen for that project type listed in this plan at the time of project submittal, the requesting partner must provide the balance of the costs. Eligible project costs include reasonable overhead cost to manage the project from design and permitting through construction completion.

As projects are implemented, progress toward meeting the County's proposed revisions to the total maximum daily loads are being tracked. Adjustments to the types and locations of projects implemented will be made to ensure that the locally proposed total maximum daily loads can be achieved in all the County portions of the IRL.

4.4.2. Cost-share for Substitute Projects

For the 2026 Update, local municipalities and partners were once again invited to submit new projects for inclusion in the Save Our Indian River Lagoon Project Plan. The projects submitted were required to deliver comparable nutrient removal benefits as those projects listed in the most recently approved plan update for each sub-lagoon.

The requesting partners each submitted a "Save Our Indian River Lagoon Project Plan Project Submittal Request" to Brevard County for review of the proposed projects. The project requests

were provided to the Citizen Oversight Committee to evaluate the potential for inclusion in the plan. The projects recommended by the Citizen Oversight Committee were included in the draft plan update presented to the Brevard County Board of County Commissioners for approval.

To determine the amount of funding that a project would be eligible to receive from the Save Our Indian River Lagoon Trust Fund, the estimated total nitrogen (TN) reductions from the project were multiplied by the allowable cost per pound per year of TN shown below in **Table 4-44** for that project type. The costs shown in **Table 4-44** were included in the application instructions provided to the partners in July 2024 and were an average of the actual or engineer's estimate of cost per pound of TN removed from the projects previously listed in the Save Our Indian River Lagoon Project Plan, as amended, or comparable projects recently planned or completed elsewhere in the Indian River Lagoon (IRL) watershed. A few extreme outliers were excluded when calculating average cost per pound per year of TN reduction. In addition, costs for the Plan projects were updated to reflect inflation between the year the project was added to the Plan and the year project construction is anticipated, capped at a maximum of five years of inflation when calculating these costs per pound of TN.

Table 4-44. Cost-share Offered for Project Requests Submitted for the 2026 Update

Project Type	Cost-share Offered per Pound per Year of Total Nitrogen
Wastewater Treatment Facility Upgrades for Reclaimed Water	$431
Package Plant Connections	$1,500
Sewer Lateral Rehabilitation	$289
Septic-to-Sewer by Extension	$1,553
Septic System Upgrades	$1,600
Stormwater Projects (Priority Basins)	$574
Vegetation Harvesting	$114
Muck Removal	$607
Treatment of Muck Interstitial Water	$124
Oyster Bar	$475
Planted Shorelines	$259

4.4.3. Responding to Implemented Projects

As of the drafting of this plan update, 97 projects have been completed throughout the Indian River Lagoon (IRL) system as shown in **Figure 4-32** through **Figure 4-35**. The implementation of these projects provided new cost information and actual pollution reduction measurements used to update the project cost-effectiveness for the 2026 Update. The project costs and Save Our Indian River Lagoon Trust Fund money expended on completed projects are shown in **Table 4-45**. **Table 4-46** summarizes the Save Our Indian River Lagoon Trust Fund money that has been contracted and/or expended on projects that are currently underway.

Table 4-45. Save Our Indian River Lagoon Trust Funds Expended on Completed Construction Projects (as of October 31, 2025)

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
193	Oyster Gardening	Public Education	$300,000	$300,000	$0	$300,000	$300,000	$0
2016-2, 2016-2b	City of Titusville Osprey WWTF	Wastewater Treatment Facility Upgrades	$13,500,000	$11,926,910	-$1,573,090	$8,300,000 (plus $800,000 of contingency)	$8,219,826	-$880,174
99	Cocoa Beach Water Reclamation Facility Upgrades	Wastewater Treatment Facility Upgrades	$5,920,320	$6,554,233	$633,913	$945,000	$945,000	$0
2016-17	City of Palm Bay Water Reclamation Facility Upgrades	Wastewater Treatment Facility Upgrades	$3,634,900	$3,634,900	$0	$3,634,900	$3,634,900	$0
216	City of Rockledge Flow Equalization Basin Project	Wastewater Treatment Facility Upgrades	$9,976,198	$15,731,670	$5,755,472	$2,344,222	$2,344,222	$0
6	Long Point Park Denitrification	Package Plant Rapid Infiltration Basin Upgrade	$101,854	$22,207	-$79,647	$101,854	$22,207	-$79,647
192	Oak Point Wastewater Treatment Facility Improvements	Package Plant Connection	$629,000	$647,941	$18,941	$279,000	$279,000	$0
63b	Satellite Beach Lateral Smoke Testing	Sewer Laterals	$206,192	$206,192	$0	$206,192	$202,210	-$3,982
100	Osprey Lateral Repair Project	Sewer Laterals	$200,000	$114,769	-$85,231	$200,000	$114,769	-$85,231
114	Barefoot Bay Lateral Smoke Testing	Sewer Laterals	$100,000	$83,564	-$16,436	$90,000	$32,873	-$57,127
115	South Beaches Lateral Smoke Testing	Sewer Laterals	$200,000	$192,297	-$7,703	$200,000	$84,304	-$115,696

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
116	Merritt Island Lateral Smoke Testing	Sewer Laterals	$250,000	$246,630	-$3,370	$250,000	$246,630	-$3,370
1	Breeze Swept Septic-to-Sewer	Septic-to-Sewer	$3,400,000	$3,400,000	$0	$880,530	$880,530	$0
2	Merritt Island Redevelopment Agency Phase 1 and 2 Septic-to-Sewer	Septic-to-Sewer	$3,138,098	$3,138,098	$0	$320,000 (plus $268 of contingency)	$320,268	$0
50b	South Central - Zone C	Septic-to-Sewer	$10,450,194	$9,138,040	-$1,312,154	$7,620,332	$5,532,246	-$2,088,086
222	Hedgecock/ Grabowsky & Desoto Fields Connections	Septic-to-Sewer	$271,668	$287,098	$15,430	$121,500	$121,500	$0
60	Sylvan Estates Septic-to-Sewer	Septic-to-Sewer	$1,720,430	$2,431,490	$711,060	$1,561,215	$1,561,215	$0
51	Banana River Lagoon 75 of 262 Septic System Upgrades	Septic System Upgrades	$1,474,919	$1,629,953	$155,034	$1,065,979	$996,013	-$69,966
52	North IRL 204 of 1,061 Septic System Upgrades	Septic System Upgrades	$3,379,853	$4,125,822	$745,968	$2,886,020	$2,649,159	-$236,861
53	Central IRL 302 of 1,348 Septic System Upgrades	Septic System Upgrades	$4,748,041	$5,728,559	$980,518	$4,367,869	$4,382,263	$14,394
2016-16	Banana Septic System 13 of 144 Quick Connections	Quick Connections	$163,960	$239,360	$75,400	$163,960	$93,094	-$70,866
2016-18	North IRL Septic System 81 of 463 Quick Connections	Quick Connections	$1,152,300	$2,630,881	$1,478,581	$1,152,300	$1,348,648	$196,348
2016-19	Central IRL Septic System 428 of 335 Quick Connections	Quick Connections	$5,011,368	$5,090,402	$79,034	$5,011,368	$2,626,883	-$2,384,485
13	Central Boulevard Baffle Box	Stormwater	$41,700	$43,700	$2,000	$34,700	$34,700	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
14	Church Street Baffle Box	Stormwater	$233,455	$233,455	$0	$88,045	$88,045	$0
15	Bayfront Stormwater Ponds	Stormwater	$630,956	$635,702	$4,746	$30,624	$30,624	$0
16	Gleason Park Reuse Expansion	Stormwater	$11,000	$7,193	-$3,807	$4,224	$4,224	$0
18	Basin 62 Denitrification Retrofit of Johns Road Pond	Stormwater	$116,905	$274,564	$157,659	$105,512	$105,512	$0
19	St. Teresa Basin Treatment	Stormwater	$375,250	$474,292	$99,042	$272,800	$272,800	$0
20	South Street Basin Treatment	Stormwater	$475,125	$683,969	$208,844	$86,856	$86,856	$0
21	La Paloma Basin Treatment	Stormwater	$375,250	$462,347	$87,097	$208,296	$208,296	$0
24	Basin 71 Denitrification Retrofit of Flounder Creek Pond	Stormwater	$444,930	$459,904	$14,974	$102,876	$102,876	$0
34	Cliff Creek Baffle Box	Stormwater	$350,000	$737,612	$387,612	$347,781	$347,781	$0
35	Thrush Drive Baffle Box	Stormwater	$350,000	$609,394	$259,394	$322,200	$322,200	$0
64	Stormwater Low Impact Development Convair Cove 1 – Blakey Boulevard	Stormwater	$218,263	$216,995	-$1,268	$4,650	$4,650	$0
65	Stormwater Low Impact Development Convair Cove 2 – Dempsey Drive	Stormwater	$218,263	$216,995	-$1,268	$4,495	$4,495	$0
66	Big Muddy at Cynthia Baffle Box	Stormwater	$288,640	$288,640	$0	$67,532	$59,631	-$7,901
67	Grant Place Baffle Box	Stormwater	$498,831	$498,831	$0	$82,841	$82,841	$0
68	Crane Creek/M-1 Canal Flow Restoration	Stormwater	$21,493,086	$21,493,086	$0	$2,883,368	$2,883,368	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
85	Basin 1304 Bioreactor	Stormwater	$125,000	$141,988	$16,988	$90,000	$83,029	-$6,971
87	Basin 2134 Fleming Grant Biosorption Activated Media	Stormwater	$172,300	$169,300	-$3,000	$56,588	$56,588	$0
89	Basin 1298 Bioreactor	Stormwater	$125,000	$136,100	$11,100	$86,198	$85,829	-$369
90	Basin 51 Johns Road Biosorption Activated Media	Stormwater	$116,905	$154,000	$37,095	$23,030	$23,030	$0
91	Basin 100 Burkholm Road Biosorption Activated Media	Stormwater	$117,735	$141,457	$23,722	$64,390	$64,390	$0
92	Basin 115 Carter Road Biosorption Activated Media	Stormwater	$156,079	$146,950	-$9,129	$62,510	$62,510	$0
93	Basin 193 Wiley Ave Biosorption Activated Media	Stormwater	$117,735	$162,216	$44,481	$82,735	$82,735	$0
94	Basin 832 Broadway Pond Biosorption Activated Media	Stormwater	$269,751	$269,750	-$1	$42,864	$42,864	$0
97	Titusville High School Baffle Box	Stormwater	$485,250	$332,800	-$152,450	$111,813	$111,813	$0
98	Coleman Pond Managed Aquatic Plant System	Stormwater	$35,000	$11,438	-$23,562	$35,000	$11,438	-$23,562
110	Osprey Pond Managed Aquatic Plant System	Stormwater	$60,000	$37,500	-$22,500	$60,000	$37,500	-$22,500
117	Basin 10 County Line Road Woodchip Bioreactor	Stormwater	$180,116	$166,174	-$13,942	$72,773	$72,773	$0
118	Basin 26 Sunset Road Serenity Park Woodchip Bioreactor	Stormwater	$130,062	$242,532	$112,470	$73,810	$73,810	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
119	Basin 141 Irwin Avenue Woodchip Bioreactor*	Stormwater	$124,626	$146,926	$22,300	$69,174	$69,174	$0
120	Draa Field Pond Managed Aquatic Plant Systems	Stormwater	$60,000	$48,750	-$11,250	$31,281	$31,281	$0
122	Basin 22 Huntington Road Serenity Park Woodchip Bioreactor**	Stormwater	$103,852	$99,334	-$4,518	$40,077	$0	-$40,077
123	Ray Bullard Water Reclamation Facility Stormwater Management Area	Stormwater	$1,604,860	$1,604,860	$0	$160,674	$111,847	-$48,827
124	Floating Wetlands to Existing Stormwater Ponds	Stormwater	$50,000	$14,336	-$35,664	$1,497	$1,497	$0
127	Indialantic Basin 5 Dry Retention Pond	Stormwater	$74,700	$62,718	-$11,982	$16,680	$16,680	$0
128	Jackson Court Stormwater Treatment Facility	Stormwater	$391,633	$391,633	$0	$8,266	$8,266	$0
169	Sherwood Park Stormwater Quality Project	Stormwater	$1,696,489	$1,696,489	$0	$292,400 (plus $99,708 of contingency)	$392,108	$0
174	St. Johns 2 Baffle Box	Stormwater	$465,000	$370,224	-$94,776	$243,070	$243,070	$0
175, 176	High School Baffle Box & Funeral Home Baffle Box	Stormwater	$1,129,535	$1,161,997	$32,462	$203,008	$203,008	$0
177	North and South Lakemont Ponds Floating Wetlands	Stormwater	$43,250	$38,250	-$5,000	$13,054	$13,054	$0
178	Marina B Managed Aquatic Plant System	Stormwater	$14,531	$17,424	$2,893	$6,670	$6,670	$0
179	Lori Laine Basin Pipe Improvement Project	Stormwater	$3,294,803	$3,294,803	$0	$17,525	$17,525	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
213	Johnson Junior High Denitrification Media Chamber Modification	Stormwater	$140,000	$51,675	-$88,325	$64,478	$40,815	-$23,663
214	Sand Point Park Baffle Box	Stormwater	$420,000	$281,155	-$138,845	$154,085	$52,155	-$101,930
219	McNabb Outfall Bioretention	Stormwater	$420,840	$438,544	$17,704	$21,824	$21,824	$0
231	North Fiske Stormwater Pond Floating Wetlands	Stormwater	$50,000	$50,000	$0	$50,000	$50,000	$0
232	Riverfront Center Nutrient Removing Filtration Boxes	Stormwater	$888,145	$899,895	$11,750	$224,992 (plus $17,411 of contingency)	$242,403	$0
233	Commons and City Hall Tree Boxes	Stormwater	$176,500	$495,419	$318,919	$26,823	$26,823	$0
235	Woodland Business Center Stormwater Retention	Stormwater	$100,981	$100,322	-$660	$5,200	$5,200	$0
251	Basin 1304B West Arlington Road Denitrification	Stormwater	$221,425	$307,293	$85,868	$83,029	$73,600	-$9,429
252	Basin 89 Scottsmoor I Aurantia Road Denitrification	Stormwater	$1,354,102	$1,675,262	$321,160	$245,100	$152,573	-$92,527
274	Waelti Drive Pond Retrofit	Stormwater	$235,000	$220,648	-$14,352	$97,818	$97,818	$0
275	Lake Washington & Croton Road Pond Retrofit	Stormwater	$198,000	$197,796	-$204	$56,406	$56,406	$0
276	North Wickham & Conservation Place Wet Pond Retrofit	Stormwater	$392,925	$409,247	$16,322	$93,177	$93,177	$0
111	Draa Field Vegetation Harvesting	Vegetation Harvesting	$60,000	$115,261	$55,261	$57,360 (plus $29,053 of contingency)	$86,413	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
112	County Stormwater Pond Harvesting	Vegetation Harvesting	$14,000	$14,777	$777	$14,000	$14,000	$0
171	Mechanical Aquatic Vegetation Harvesting	Vegetation Harvesting	$1,016,976	$1,016,976	$0	$1,011,976	$1,011,976	$0
172	Horseshoe Pond Vegetative Harvesting	Vegetation Harvesting	$14,000	$13,090	-$910	$8,140	$8,140	$0
208	Maritime Hammock Preserve Stormwater Pond Vegetation Harvesting	Vegetation Harvesting	$14,500	$14,480	-$20	$7,700 (plus $6,780 of contingency)	$14,480	$0
209	Basin 1398 Sand Dollar Canal Harvesting	Vegetation Harvesting	To be determined	To be determined	To be determined	$24,420	To be determined	To be determined
211	Cocoa Beach Golf Course Stormwater Pond Harvesting	Vegetation Harvesting	$592,350	$449,890	-$142,460	$592,350	$218,267	-$374,083
228	Unincorporated Countywide Vegetation Harvesting	Vegetation Harvesting	$477,000	$477,000	$0	$477,000	$477,000	$0
264	Unincorporated Countywide Vegetation Harvesting 2	Vegetation Harvesting	$472,758	$472,758	$0	$472,758	$472,758	$0
2016-03a, 2016-3b	Turkey Creek Hurricane Dredge and Interstitial Treatment	Muck Removal & Interstitial Treatment	$1,545,522	$1,098,631	-$446,891	$215,000	$137,329	-$77,671
40	Mims Muck Dredging Interstitial Treatment*	Interstitial Treatment	$2,162,286	$1,546,187	-$616,099	$400,000	$0	-$400,000
70	Cocoa Beach Muck Dredging Phase III	Muck Removal	$3,109,818	$2,903,356	-$206,462	$1,376,305	$1,376,305	$0
101	Cocoa Beach Muck Dredging Phase II-B	Muck Removal	$7,417,650	$7,417,650	$0	$5,917,650	$5,911,150	-$6,500
73	Riverview Senior Oyster Bar	Oyster	$30,304	$30,304	$0	$30,304	$30,304	$0
75	Marina Isles Oyster Restoration	Oyster	$26,700	$26,700	$0	$26,700	$26,700	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
76	Bettinger Oyster Bar	Oyster	$10,680	$10,680	$0	$10,680	$10,680	$0
78a	McNabb Park Oyster Bar	Oyster	$37,192	$37,192	$0	$9,422	$9,134	-$288
79	Gitlin Oyster Bar	Oyster	$16,020	$16,020	$0	$16,020	$16,020	$0
80	Brevard Zoo Coconut Point/Environmentally Endangered Lands Oyster Restoration	Oyster	$45,120	$45,120	$0	$45,120	$45,120	$0
81	Wexford Oyster Bar	Oyster	$31,150	$31,150	$0	$31,150	$31,150	$0
83	Bomalaksi Oyster Bar	Oyster	$8,900	$8,900	$0	$8,900	$8,900	$0
105	Brevard Zoo Central IRL Oyster Project	Oyster	$161,160	$161,160	$0	$161,160	$161,160	$0
106	Brevard Zoo North IRL Oyster Project	Oyster Bars	$475,438	$475,438	$0	$475,438	$475,438	$0
139	Brevard Zoo North IRL Oyster Project 2	Oyster Bars	$485,292	$485,292	$0	$485,292	$485,292	$0
226	Hog Point Offshore Oyster Bar	Oyster Bars	$50,022	$73,560	$23,538	$64,755	$21,023	-$43,732
77a	Cocoa Beach Country Club Living Shoreline	Living Shoreline	$16,080	$16,080	$0	$16,080	$16,080	$0
77b	Lagoon House Living Shoreline	Living Shoreline	$24,000	$24,000	$0	$24,000	$24,000	$0
78b	McNabb Park Planted Shoreline	Living Shoreline	$8,177	$10,660	$2,483	$1,680	$1,680	$0
103	Brevard Zoo North Plant Project	Living Shoreline	$720	$720	$0	$720	$720	$0
130	Brevard Zoo Plant Project 2	Living Shoreline	$9,840	$9,840	$0	$9,840	$9,840	$0
133	Fisherman's Landing Living Shoreline	Living Shoreline	$4,800	$4,800	$0	$4,800	$4,800	$0
135	Rotary Park Living Shoreline	Living Shoreline	$4,800	$4,800	$0	$4,800	$4,800	$0
181	Riveredge	Living Shoreline	$4,080	$4,080	$0	$4,080	$4,080	$0

Project Number	Project	Project Type	Estimated Total Cost	Final Total Cost	Change in Total Cost	Eligible Save Our Indian River Lagoon Cost	Final Save Our Indian River Lagoon Cost	Change in Save Our Indian River Lagoon Cost
212	Titusville Causeway Multi-Trophic Restoration & Living Shoreline	Living Shoreline	$155,000	$155,000	$0	$35,326	$35,326	$0
194	Clam Restoration (10 of 18)	Clam Restoration	To be determined	To be determined	To be determined	$60,000	$60,000	$0
-	***Total***	-	***$130,295,414***	***$138,196,452***	***$7,901,036***	***$62,791,206***	***$55,622,007***	***-$7,144,779***

* Not paid due to the contractor not meeting nutrient scrubbing contract requirements.
** Other grant sources used to complete the project.

Table 4-46. Save Our Indian River Lagoon Trust Funds Contracted or Expended on Projects Underway (as of October 31, 2025)

Project Number	Project	Project Type	Save Our Indian River Lagoon Plan Inflated Funding	Save Our Indian River Lagoon Funds Contracted	Save Our Indian River Lagoon Expenditures for Projects Underway
58a	Expanded Fertilizer Education	Public Education	$968,194	$443,320	$432,846
58b	Grass Clippings Campaign	Public Education	$416,100	$100,000	$42,368
58c	Septic System Maintenance Education	Public Education	$517,203	$266,660	$224,587
245	Irrigation Education Campaign	Public Education	$338,166	To be determined	$10,131
246	Stormwater Best Management Practices	Public Education	$336,558	To be determined	$24,932
227	Restore Our Shores: Community Collaborative	Public Education	$1,036,876	$1,000,000	$738,203
234	South Brevard Water Reclamation Facility	Wastewater Treatment Facility Upgrade	$1,832,742	$1,752,210	$0
59	City of Melbourne Grant Street Water Reclamation Facility	Wastewater Treatment Facility Upgrade	$9,596,607	$9,128,125	$0
138	Ray Bullard Water Reclamation Facility	Wastewater Treatment Facility Upgrade	$6,506,916	$4,260,000	$459,050
237	Willow Lakes Recreational Vehicle Park	Package Plant Connection	$1,205,731	$1,152,750	$63,692
63a	County-wide Repair/Replacement	Sewer Laterals	$877,862	$540,678	$286,620
2019-27	Sharpes – Zone A	Septic-to-Sewer	$11,257,428	$534,082	$370,210
2019-29	South Banana - Zone B	Septic-to-Sewer	$1,962,756	$132,960	$126,446
2020-34	Pineapple Avenue Sewer Conversion	Septic-to-Sewer	$2,433,921	$1,701,972	$278,162
2016-35	South Beaches - Zone A	Septic-to-Sewer	$2,340,144	$259,160	$79,747
2019-36	South Beaches - Zone O	Septic-to-Sewer	$190,896	$18,800	$18,243
2019-37	South Beaches - Zone P	Septic-to-Sewer	$429,515	$101,440	$98,463
2016-47	Sykes Creek - Zone N	Septic-to-Sewer	$5,237,910	$348,392	$386,160
2016-48	Sykes Creek - Zone M	Septic-to-Sewer	$3,382,817	$978,306	$902,068
2016-49	Sykes Creek - Zone T	Septic-to-Sewer	$6,321,616	$638,749	$777,505
3	Micco Sewer Line Extension	Septic-to-Sewer	$6,321,616	$2,239,500	$35,605
4	Hoag Sewer Conversion	Septic-to-Sewer	$117,493	$112,285	$29,958
5	Pennwood Sewer Conversion	Septic-to-Sewer	$95,860	$40,632 (plus $40,368 of contingency)	$61,549
61	Riverside Drive Septic-to-Sewer Conversion	Septic-to-Sewer	$371,480	$353,345	$777,505
62	Roxy Avenue Septic-to-Sewer Conversion	Septic-to-Sewer	$126,089	$119,934	$50,391

Project Number	Project	Project Type	Save Our Indian River Lagoon Plan Inflated Funding	Save Our Indian River Lagoon Funds Contracted	Save Our Indian River Lagoon Expenditures for Projects Underway
109	City of Titusville - Zones A-G	Septic-to-Sewer	$1,435,136	$943,110	$190,960
136	Micco - Zone B	Septic-to-Sewer	$10,786,863	$2,282,220	$1,834,282
145	Merritt Island - Zone F	Septic-to-Sewer	$1,586,864	$177,532	$205,401
146	Merritt Island - Zone C	Septic-to-Sewer	$2,279,314	$231,151	$268,362
147	Sykes Creek - Zone R	Septic-to-Sewer	$8,384,607	$750,365	$694,009
148	North Merritt Island - Zone E	Septic-to-Sewer	$5,468,294	$704,072	$684,311
150	South Central - Zone D (Brevard County)	Septic-to-Sewer	$6,887,712	$651,403	$618,869
151	Merritt Island - Zone G	Septic-to-Sewer	$12,623,491	$2,762,275	$2,167,767
152	Sharpes - Zone B	Septic-to-Sewer	$5,825,234	$399,796	$398,241
153	Cocoa - Zone C	Septic-to-Sewer	$4,242,212	$781,661	$652,728
191	Kent & Villa Espana	Septic-to-Sewer	$983,393	$710,000	$131,805
2016-39	City of Palm Bay – Zone A	Septic-to-Sewer	$3,317,208	$0	$0
203	South Central - Zone A	Septic-to-Sewer	$6,549,178	$707,437	$616,969
224	Lake Ashley Circle	Septic-to-Sewer	$2,012,057	$1,704,000	$130,220
225	Dundee Circle & Manor Place	Septic-to-Sewer	$2,654,994	$2,248,500	$59,172
238	Kelly Park	Septic-to-Sewer	$149,677	$143,100	$0
240	Rotary Park	Septic-to-Sewer	$172,960	$165,360	$0
241	Manatee Cove	Septic-to-Sewer	$39,914	$38,160	$0
242	Riverwalk	Septic-to-Sewer	$6,652	$6,360	$0
22	Basin 1387 Kingsmill-Aurora Phase Two	Stormwater	$501,882	$479,634	$0
23	Basin 41 Denitrification Retrofit of Huntington Pond	Stormwater	$143,017	$136,677	$9,074
68	Crane Creek/M-1 Canal Flow Restoration	Stormwater	$473,122	$460,896	$0
96	Spring Creek Baffle Box	Stormwater	$72,423	$68,166	$0
121	Basin 2258 Babcock Street Woodchip Bioreactor	Stormwater	$70,534	$67,435	$0
205	Basin 998 Hampton Homes	Stormwater	$164,201	$156,986	$0
206	Basin 1066 Angel Avenue	Stormwater	$45,873	$43,652	$0
207	Basin 1124 Elliot Drive	Stormwater	$21,824	$21,824	$21,824
215	Basin 960 Pioneer Road Denitrification	Stormwater	$233,824	$222,500	$33,035
219	McNabb Outfall Bioretention	Stormwater	$26,823	$26,542	$26,823
220	Basin 1398 Sand Dollar Canal Bioreactor	Stormwater	$5,200	$5,200	$5,200
233	Commons and City Hall Tree Boxes	Stormwater	$145,000	$138,629	$0
235	Woodland Business Center	Stormwater	$79,434	$75,944	$14,960
247	Basin 998 Richland Avenue Canal	Stormwater	$501,882	$479,634	$0

Project Number	Project	Project Type	Save Our Indian River Lagoon Plan Inflated Funding	Save Our Indian River Lagoon Funds Contracted	Save Our Indian River Lagoon Expenditures for Projects Underway
250	Basin 1280B Flamingo Road Denitrification	Stormwater	$143,017	$136,677	$9,074
259	Ramp Road Park - Stormwater Improvements	Stormwater	$17,992	$16,796	$0
69	Apollo/GA Baffle Box	Stormwater	$421,774	$401,184	$0
88	Espanola Baffle Box	Stormwater	$150,422	$150,422	$0
256	C-10 Water Management Area	Stormwater	$11,205,121	$0	$0
270	Tennessee Street Baffle Box	Stormwater	$532,812	$514,794	$0
271	Osprey Pond Circulator	Stormwater	$89,418	$86,394	$0
210	Basin 958 Pioneer Road Vegetation Harvesting	Vegetation Harvesting	$47,149	$44,865	$8,725
2016-04a & b	Rockledge A Muck & Interstitial Treatment	Muck and Interstitial	$5,985,040	$175,340	$143,331
2016-05a & b	Pineda Banana River Lagoon & Interstitial Treatment	Muck and Interstitial	$9,336,662	$81,214	$73,891
2016-06a & b	Titusville Railroad West & Interstitial Treatment	Muck and Interstitial	$4,309,228	$146,361	$205,372
2016-07a & b	National Aeronautics and Space Administration Causeway East & Interstitial Treatment	Muck and Interstitial	$13,645,890	$209,255	$182,062
2016-08a & b	Titusville Railroad East & Interstitial Treatment	Muck and Interstitial	$5,506,238	$318,457	$330,764
2016-10a & b	Canaveral South & Interstitial Treatment	Muck and Interstitial	$20,109,734	$317,158	$339,565
2016-11a & b	Patrick Space Force Base & Interstitial Treatment	Muck and Interstitial	$9,815,466	$126,719	$104,462
41a & b	Grand Canal Muck & Interstitial Treatment	Muck and Interstitial	$24,827,671	$23,736,663	$10,454,000
42a & b	Sykes Creek Muck & Interstitial Treatment	Muck and Interstitial	$21,788,736	$13,517,914	$4,787,612
54a & b	Eau Gallie Northeast Muck & Interstitial Treatment	Muck and Interstitial	$11,970,079	$330,709	$322,204
71	Merritt Island Muck Removal – Phase 1	Muck and Interstitial	$10,963,220	To be determined	$0
72	Muck Removal of Indian Harbour Beach Canals & Interstitial Treatment	Muck and Interstitial	$12,922,232	$9,115,415	$0
144 & 113	Satellite Beach Muck Dredging & Interstitial Treatment	Muck and Interstitial	$7,129,321	$4,941,981	$0

Project Number	Project	Project Type	Save Our Indian River Lagoon Plan Inflated Funding	Save Our Indian River Lagoon Funds Contracted	Save Our Indian River Lagoon Expenditures for Projects Underway
168	Cocoa Beach Golf Muck & Interstitial Treatment	Muck and Interstitial	$29,103,198	$29,103,198	$1,444,373
223	Spring Creek Muck Dredging	Muck Dredging	$94,557	$80,080	$0
104	Brevard Zoo Banana River Oyster Project	Oyster Bars	$833,753	$812,207	$154,320
140	Brevard Zoo Central IRL Oyster Project 2	Oyster Bars	$390,657	$367,692	$89,364
184	Brevard Zoo North Indian River Lagoon Oyster Project 3	Oyster Bars	$580,662	$528,046	$336,616
185	Brevard Zoo Central Indian River Lagoon Tributary Pilot Oyster Project	Oyster Bars	$319,474	$290,525	$241,136
186	Brevard Zoo North Indian River Lagoon Individual Oyster Project	Oyster Bars	$239,743	$231,636	$0
187	Brevard Zoo Central Indian River Lagoon Oyster Project 3	Oyster Bars	$119,871	$109,009	$0
217	Brevard Zoo Central Indian River Lagoon Oyster Project 4	Oyster Bars	$163,132	$155,232	$0
218	Central Oyster Project Offshore Reefs	Oyster Bars	$421,894	$401,462	$0
272	Brevard Zoo North Indian River Lagoon Oyster Project 4	Oyster Bars	$856,411	$0	$0
273	Brevard Zoo Central Indian River Lagoon Oyster Project 5	Oyster Bars	$739,404	$0	$0
194	Aquaculture Stimulus Program	Clam Restoration	$75,573	$42,000	$60,000
265	Restoration of Native Clams in the IRL - Titusville	Clam Restoration	$281,520	$272,000	$0
267	Restoration of Native Clams in the IRL - Grant Island	Clam Restoration	$175,950	$170,000	$0
-	Respond and Monitoring	Respond	$10,000,000	$5,172,293	$5,471,239
-	***Total***	-	***$360,562,171***	***$137,821,352***	***$43,305,808***

Figure 4-31. Completed Projects in North Brevard County

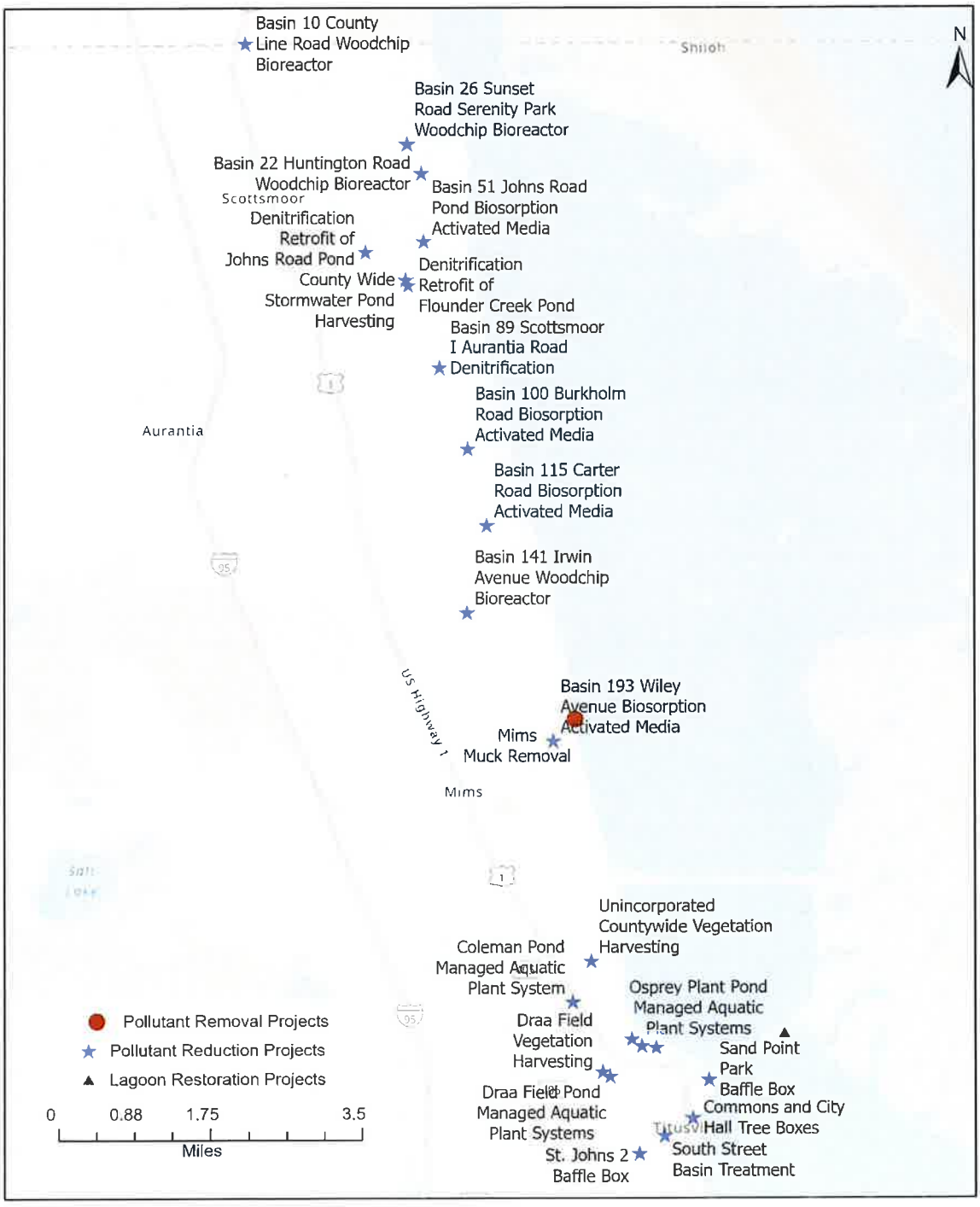


Figure 4-31 Long Description

Figure 4-32. Completed Projects in North Central Brevard County

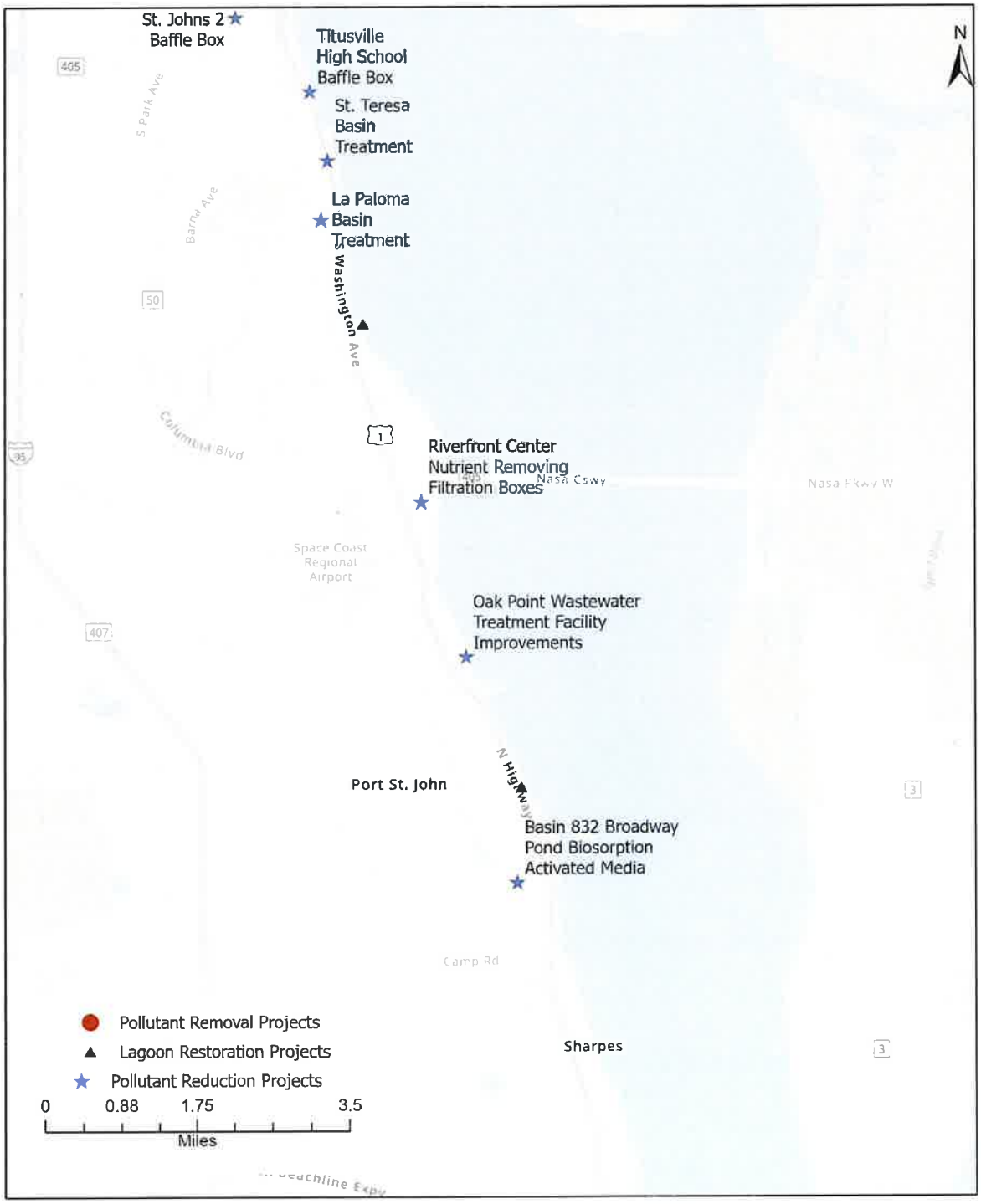


Figure 4-32 Long Description

Figure 4-33. Completed Projects in Central Brevard County

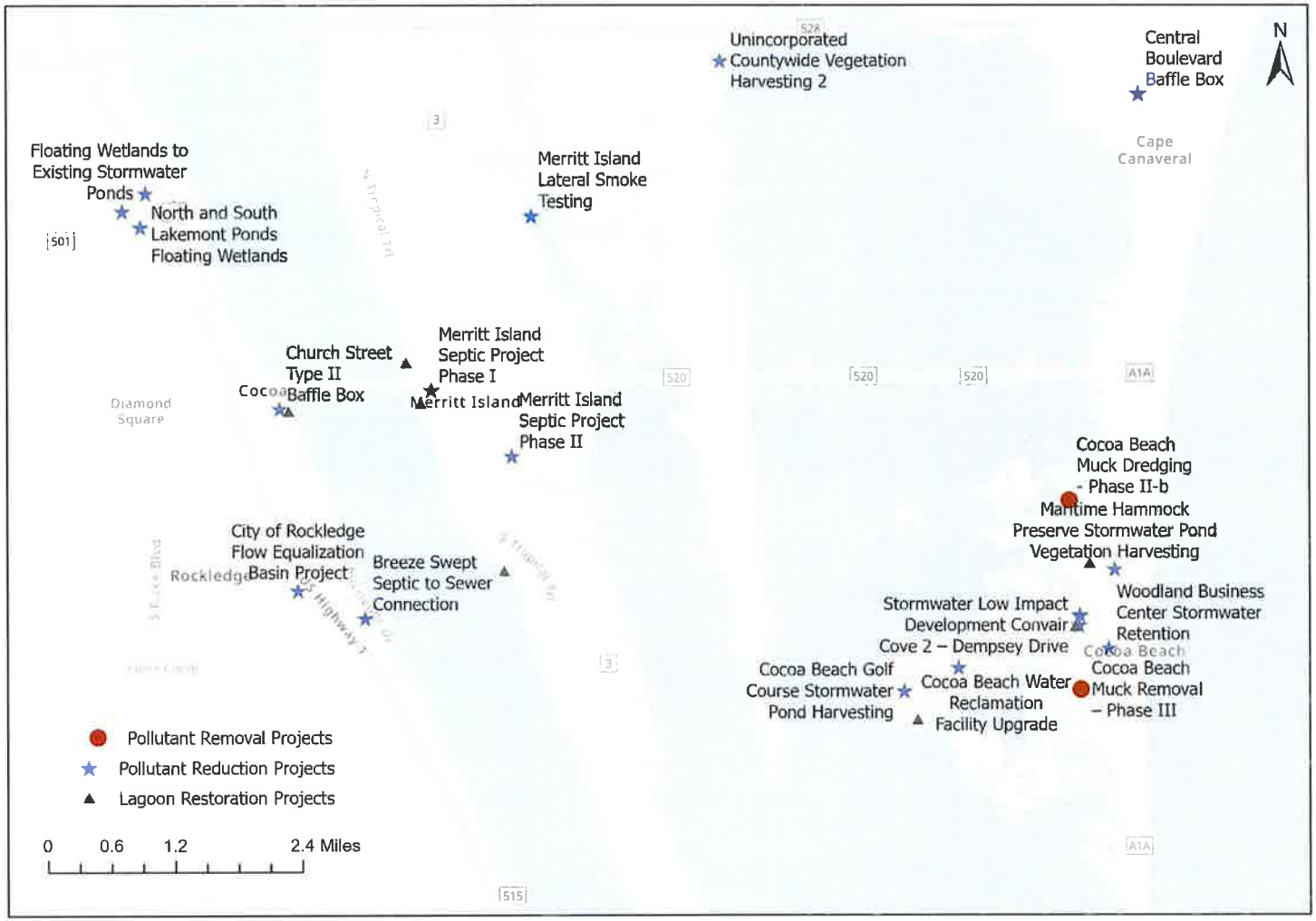


Figure 4-33 Long Description

Figure 4-34. Completed Projects in South Central Brevard County

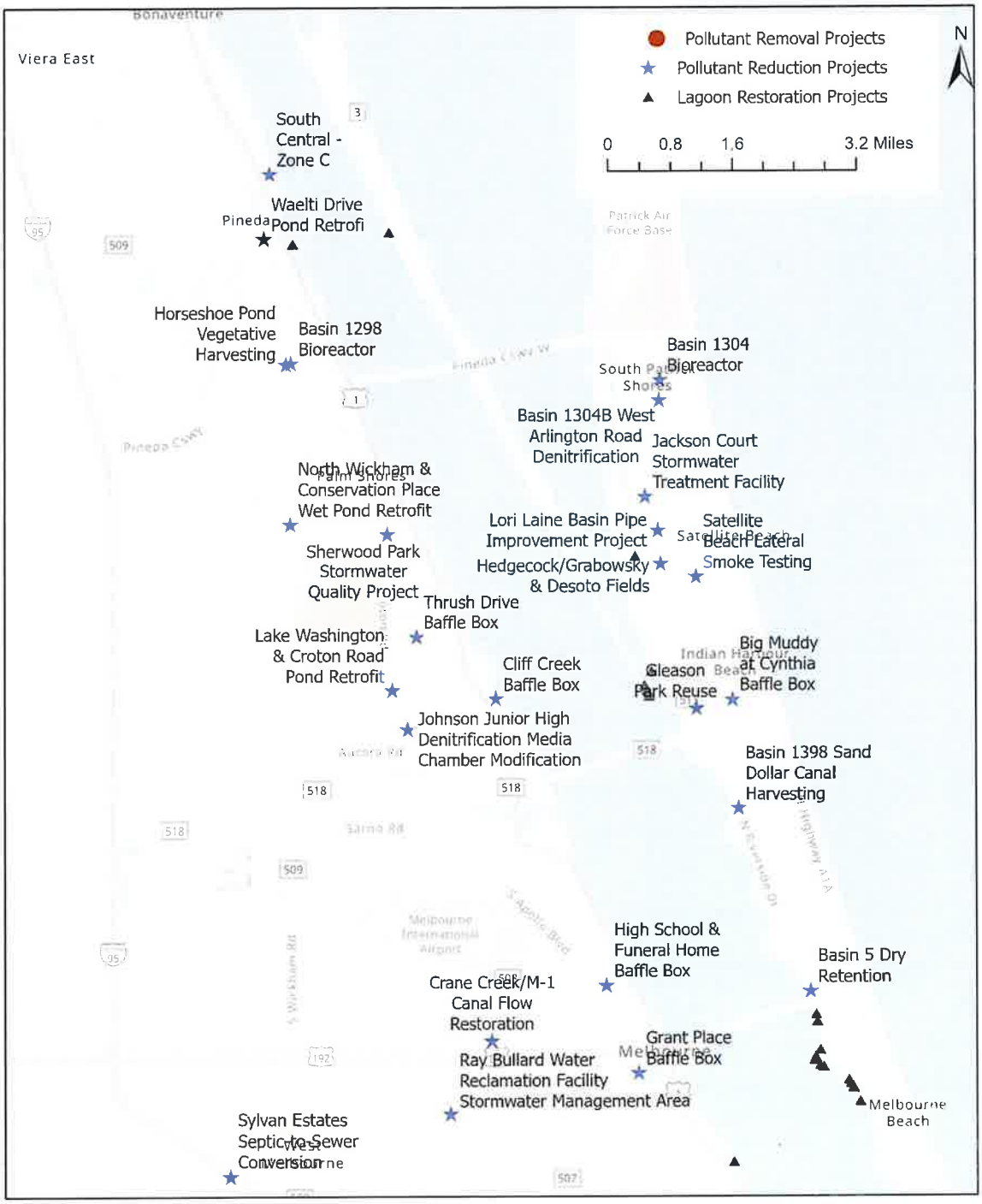


Figure 4-34 Long Description

Figure 4-35. Completed Projects in South Brevard County

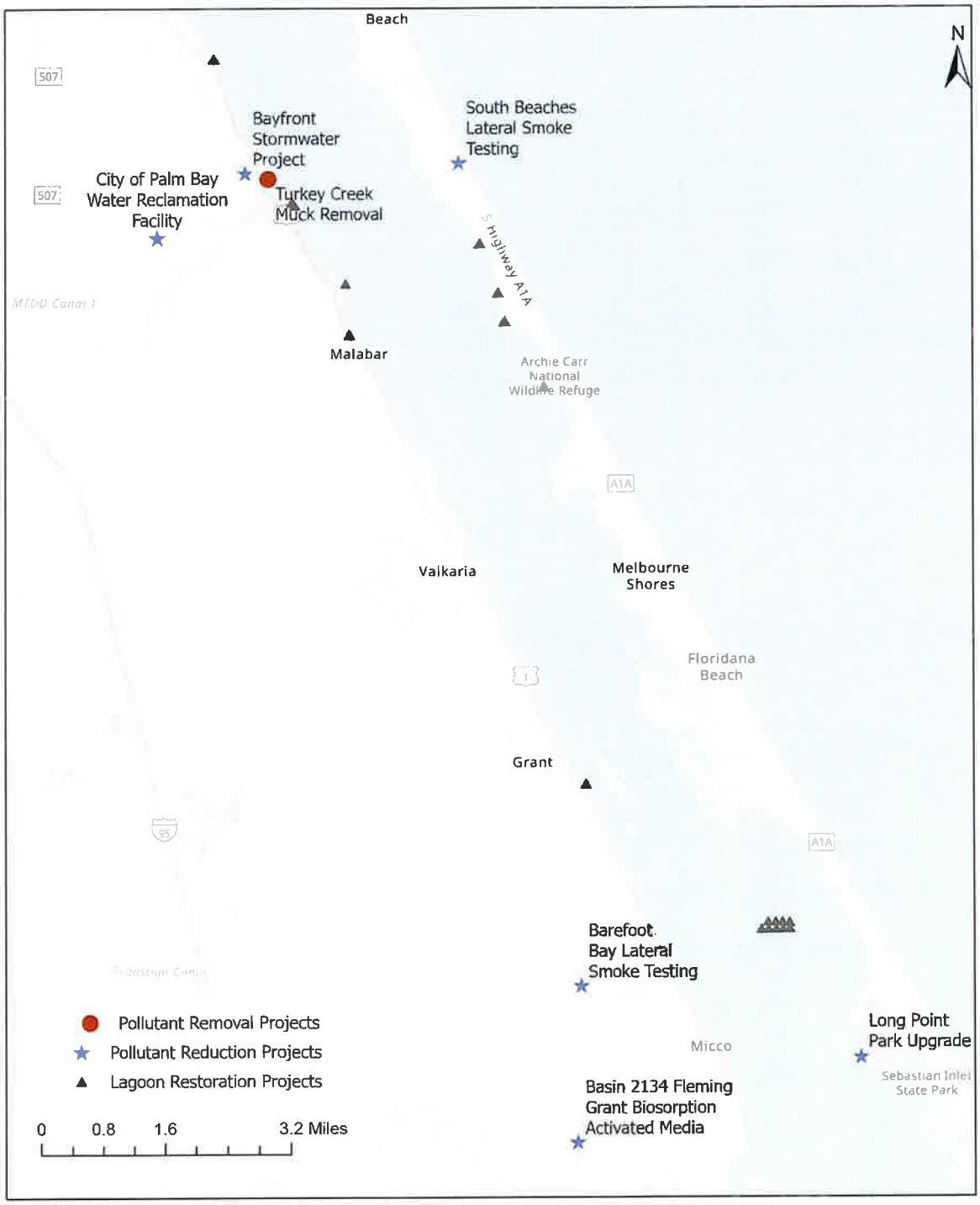


Figure 4-35 Long Description

Fertilizer Management Outreach

As noted in **Section 4.1.1**, in 2019, the University of Florida Institute of Food and Agricultural Sciences and MTN Marketing conducted a survey that was concentrated on fertilizer awareness questions. The results from the 2019 survey were compared to similar questions from the 2015 Blue Life survey to evaluate changes in fertilizer use. Based on the survey results, 33.33% of respondents in 2019 stated that they use slow release nitrogen fertilizer compared to only 6.30% in 2015, which is a 27% increase in the usage of slow release fertilizer. This resulted in better than anticipated cost effectiveness. The cost per pound of total nitrogen (TN) removed improved from an initial estimate of $102 to a revised estimate of $95. The total phosphorus (TP) reductions were kept at the original plan estimate of an additional 25% compliance because, the way the survey was setup, participants were only able to select one option for the type of fertilizer used. Therefore, an update on the use of zero phosphorus formulas could not be obtained.

Also in 2019, Brevard County (County) amended the fertilizer ordinance to require all fertilizer retail stores to display signage at the point of sale informing the public on the ordinance and best practices for fertilizer management. Focus groups were conducted to enhance the design of the sign. A total of 132 signs were distributed to 53 retails stores across the County. In summer 2020, the stores were surveyed for compliance with the ordinance. Only eight stores were out of compliance with no signage posted. Request for compliance letters were issued to the eight stores and additional signs were delivered to stores that could not locate the original signs. The stores were receptive of the letters and willing to come into compliance. In 2021, the stores were surveyed again and nearly half of the stores were out of compliance with missing signs. The signs were redesigned to add a sticker on the back noting that signs are legally required to be posted and provided contact information to request new signs if they were damaged. This information was already included with the letters provided to the managers when the signs were first delivered but the stickers on the signs will ensure this information is not lost with turnover in staff.

In 2021, five stores allowed stickers to be applied to fertilizer bags to indicate they met the fertilizer ordinance restrictions to test if marked bags would influence consumer choices when buying fertilizer. Issues with relabeling new stock and two of the stores not providing their post study sales data made for inconclusive results.

Grass Clipping Outreach

Uppercase, Inc. conducted a survey between September 9, 2018, and November 11, 2018, reaching out to citizens of Brevard, Martin, and Volusia counties through advertisements on social media sites, in popular mobile apps, on Google advertisements, in instant messenger, and other online and app platforms, as well as on the counties' social media pages. The survey received 733 responses from the three counties. When asked which items in the list provided are pollutants, 61% of respondents said grass clippings were a pollutant and 50% said leaves were a pollutant. Landscape professionals were more likely to say grass clippings were a pollutant (65%). About 48% of respondents maintained their own yards and 36% used a lawn care company. When asking those respondents who maintain their own yards what they do with grass clippings, 68% say they "seldom" or "never" leave the clippings where they land. 70% of respondents say they "always" or "usually" blow clippings back into their yard, 94% said they "never" or "seldom" blow clippings into the middle of the road, 97% said they "seldom" or "never" blow clippings toward a storm drain, and 97% say they "never" or "seldom" blow grass clippings toward a waterbody. The survey also tested taglines and images to encourage keeping grass clippings out of the street and waterbodies, and the best communication channels to provide

this information (Uppercase, 2018). The results from this survey will be used to guide the grass clipping campaign.

In 2021 and 2022, the Marine Resources Council conducted focus groups to test messaging campaigns and find the best method of delivering the message to both homeowner and lawncare professionals. Recommendations on messaging were to focus on the barriers to correct management of grass clippings, as well as promote the existing University of Florida-Institute of Food and Agricultural Sciences Green Industries certification program. Messaging was found to have the best reach to both groups through social media and billboards. Social media ranked highest with homeowners and billboards ranked highest with lawncare professionals. The next highest-ranking methods for both groups was through television and radio advertisements with homeowners ranking both media relatively equal and lawn care professionals showing a slightly higher preference to television advertisement.

Septic System and Sewer Lateral Maintenance Outreach

The University of Central Florida conducted a survey of Brevard County residents to gather information on septic system-related topics. The survey was conducted between May 2018 and September 2018 through phone calls and door-to-door visits, resulting in a total of 404 completed surveys. Most respondents (70%) said that they have had their septic system pumped out, of which most (39.1%) had their system pumped out in the last 2–4 years or within the last 12 months (38%). Most respondents (51%) answered that they have had their current septic system inspected although many (42%) answered that they have not had their septic system inspected. Of those who responded that their septic systems had been inspected, most were inspected within the past 12 months (41.8%) followed by within the past 2–4 years (37.2%). Most residents (53%) did not receive any information regarding the home's septic system when they moved into the home. Of the total respondents, 55.8% strongly agreed with the statement "I restrict what I flush in toilets to prevent damage." The participants strongly agree (44.8%) and agree (42.8%) with the statement "I avoid pouring chemicals and solvents down the sink" (Olive et al., 2018). The results from this survey will be used to help guide the septic system maintenance education program.

Information based on the United States Environmental Protection Agency's best management practices to maintain a healthy septic system was dispersed through social media and online advertisements. Additionally, a refrigerator magnet with this information was developed and distributed to septic system companies to provide to homeowners during septic system service. A flyer and letter were developed and distributed to realtors, title companies, and home inspectors to give to potential home buyers considering homes with septic systems. The letter encourages homebuyers to have a septic system inspected during the purchase process and the flyer informs them how to maintain a septic system.

Lagoon Loyal Program

The full launch of the Lagoon Loyal website and incentive program was on July 1, 2020. To date, 4,440 citizens and 99 businesses participate in the Lagoon Loyal Program. They have reported a total of 15,486 actions taken to help the IRL. There have also been 165,612 educational sessions and 119,856 users on the Lagoon Loyal websites.

Measuring Performance

Groundwater monitoring wells have been installed to measure pre- and post-project pollution levels in multiple project areas. This includes two areas funded for wastewater treatment plant upgrades to reduce nutrients in the reclaimed water, five septic areas where homes are being converted from septic-to-sewer service, one sewer area to estimate pollution from leaky

infrastructure, five septic system upgrade pilot projects, and three natural conservation areas for comparison.

This countywide groundwater monitoring effort has been ongoing since 2018. Differences have been observed in the forms and concentrations of nitrogen and phosphorus present in communities with different types of wastewater treatment. The monitoring demonstrates that septic systems and reclaimed water communities have significantly higher TN concentrations in comparison to sewer service areas and natural areas across all regions of the county. The areas with septic systems and reclaimed water had the highest median TN concentrations at 2.71 milligrams per liter and 4.11 milligrams per liter, respectively. Communities on septic systems had significantly higher TP concentrations compared to the other communities across all regions of the county. The median septic system TP concentration was 0.65 milligrams per liter compared to 0.10, 0.14, and 0.12 milligrams per liter for natural communities, sewer communities, and reclaimed water communities, respectively. Further, most of the TP in septic system communities (0.48 milligrams per liter) was in the highly bioavailable form of phosphate. Groundwater with only elevated nitrate plus nitrite concentrations is likely a good indicator of the use of reclaimed water for irrigation. Groundwater with elevated ammonia and phosphorus is likely a good indicator of the presence of septic systems (**Figure 4-36**) (Souto et al, 2025).

Figure 4-36. Countywide Groundwater Nutrient Concentrations for TN (top) and TP (bottom)

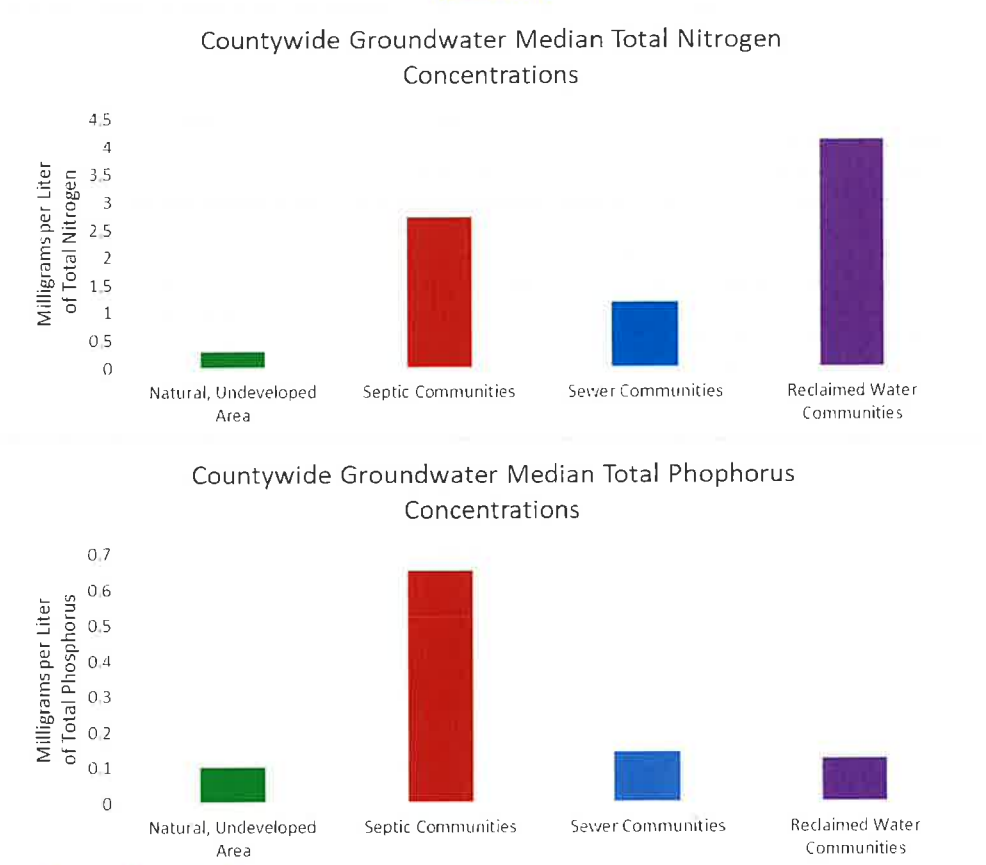


Figure 4-36 Long Description

Package Plant Rapid Infiltration Basin Upgrade

A denitrification wall was built surrounding a rapid infiltration basin approximately 120 feet from the IRL at Long Point Park in Melbourne Beach. Six monthly measurements of nitrogen and phosphorus from within the rapid infiltration basin were compared to nutrient measurements in the IRL versus in the groundwater at three locations between the basin and IRL. Average percent removals have been high when comparing concentrations in the rapid infiltration basin to the groundwater location closest to the IRL. Ammonia decreased by 62%, nitrite by 99%, nitrate by 82%, TN by 60%, total Kjeldahl nitrogen by 59%, orthophosphate by 72%, and TP by 66%. When comparing the basin concentrations to the groundwater inside the denitrification wall, the ammonia was reduced by 59%, nitrite by 98%, TN by 53%, total Kjeldahl nitrogen by 57%, orthophosphate by 78%, and TP by 61%; however, nitrate increased by 834%. Once the water passes through the denitrification wall, nitrate levels drop substantially (97% immediately). Overall, this project has been successful and no further monitoring is planned. Based on actual costs and current data on nitrogen removal, the cost effectiveness is $136 instead of $802 per pound of TN reduced.

Sewer Lateral Rehabilitation

In 2018, Brevard County Utilities conducted a sanitary sewer system smoke testing pilot study within the South Beaches Service Area between Pineda Causeway and Eau Gallie Boulevard. The study used smoke testing to identify major contributors of stormwater into the sanitary sewer system and identify the necessary repairs. A smoke-blowing machine that produces a non-toxic artificial "smoke" is used to pump smoke into the sewer system through an open manhole. As the smoke travels through the sanitary sewer system, it rises to the surface through any deficiencies in the lateral lines, such as cracks, leaks, and breaks. The South Beaches service area was selected because it had been experiencing elevated sanitary flow rates during storm events due to stormwater flow into the sanitary sewer through broken or missing infrastructure.

Smoke testing was performed for the Phase 1 area in April and May 2018 for 5,165 properties. The testing identified 99 deficiencies of which there were 87 broken/missing cleanout caps, 9 broken lateral pipes, 2 damaged gravity sewer pipes, and 1 damaged manhole. Smoke testing was performed for the Phase 2 area in May and July 2018 for 7,592 properties. The testing identified 190 deficiencies of which there were 163 broken or missing cleanout caps, 21 broken lateral pipes, 1 storm connection, and 5 damaged manholes/gravity mains. The County purchased cleanout caps and replaced the damaged or missing caps that were identified, accessible, and had no damage to the cleanout port (Kimley Horn, 2018a and 2018b). Based on the data collected during the pilot study, the Save Our Indian River Lagoon Trust Fund allocated funds to cover costs to replace missing caps, repair up to 250 broken cleanout ports, and replace up to 30 broken private lateral lines. The estimated cost for these repairs was $646,200, which was below the $840,000 budgeted for this project.

In 2022, Brevard County conducted additional smoke testing at over 30,000 homes in the Sykes Creek (Merritt Island), South Beaches, and Barefoot Bay Service Areas. The 2022 smoke tests resulted in 229 cleanout caps being replaced during the testing phase and 649 code enforcement letters being mailed out for sewer lateral deficiencies. Additional smoke testing is funded for Titusville.

This pilot study showed that smoke testing is an imperfect, but quick and affordable way to identify many sewer deficiencies over a large area. Brevard County also learned that the unknown costs of fixing private sewer laterals have disincentivized cash-limited homeowners from making repairs promptly. In response, the County has seven qualified plumbers that can

be paid directly by the County to fix these repairs and the County is using code enforcement to require property owners fix known deficiencies to comply with County Code. The preliminary results from performance data for the pilot area noted that the groundwater sampled at seven of the eight leaky lateral sites had evidence of sewage leaking out of the lateral when the groundwater table was low. Multiple sites had high nitrogen concentration values at or near the break locations, likely directly caused by a sewer leak. Most of the elevated phosphorus was in the readily bioavailable form of ortho-phosphorus (Applied Ecology, 2019).

Septic-to-Sewer

The Breeze Swept septic-to-sewer project in the City of Rockledge removed 143 septic systems installed between 1958 and 1967. This was the first septic-to-sewer conversion project to be undertaken as a strategic measure to reduce the nutrient loading to the IRL. During construction, the contractor noticed that many septic systems were already failing, which posed an increased health and environmental risk. The City of Rockledge authorized Applied Ecology to install five shallow groundwater monitoring wells in June 2017, three within the Breeze Swept community and two additional reference (i.e., control) wells in an adjacent septic community. Post-construction monitoring continued through summer 2019. There were 18 sampling events with a total of 90 samples collected. All samples were sent to a certified lab and analyzed for ammonia, nitrate-nitrite, total Kjeldahl nitrogen, and fecal coliform. The median ammonia, nitrate-nitrite, total Kjeldahl nitrogen, and mean TN concentrations from the post-construction samples taken from wells within the Breeze Swept community decreased with a statistically significant difference while the control wells showed no significant differences in median concentrations of nitrate-nitrite, total Kjeldahl nitrogen, and TN concentrations during the sampling period. These data provide a better understanding of the impact of septic systems on local water quality and help inform future septic-to-sewer conversion projects.

Construction costs for septic-to-sewer projects have increased significantly since the original plan was developed in 2016. At that time, the estimated cost per lot for connection to gravity sewer was $20,000. This estimate included construction of the public and private side of the sewer, abandonment of the septic tank, connection fee, and restoration of the site. Based on 2018 actual and budgeted costs from within Brevard County and surrounding counties, the estimated cost per lot was increased to $33,372. Costs have continued to increase due to construction inflation and supply-chain issues. Challenges associated with constructing sewer within old, narrow rights-of-way filled with existing utilities also drive up costs. The average sewer cost calculated for this 2026 Update is $75,656 per lot.

The project in the Breeze Swept community in the City of Rockledge, completed in 2017, cost $23,800 per lot. The West Melbourne Sylvan Estates project increased from an engineer's estimate of $28,800 to an actual project cost of $41,212 per lot. Indian River County experienced a similar increase in costs for a sewer project in West Wabasso. Phase 1 of West Wabasso was approved in 2011 with an estimated cost of $20,348 per lot. Actual costs for construction in 2014 were $22,942 per lot. Cost estimates for phase 2 of West Wabasso are $46,269 per lot. The South Central C sewer project was contracted in 2021 at $73,748 per lot. The Micco Sewer Extension Project was contracted in 2022 at $143,484 per lot. In 2024, the first vacuum sewer construction bid was received for three projects: Sykes Creek Zone M, Sykes Creek Zone N, and Sykes Creek Zone T. These three projects were bid together for a total cost per lot of $136,167. In 2025, two sewer projects were bid out for construction, South Beaches Zone O (two lots) at a cost per lot of $134,512 and South Beaches Zone P (11 lots) at a cost per lot of $87,715. State and federal cost-share grants have been secured by Brevard County and municipalities to bridge the gap between local funding and rising costs.

Many opportunities exist to remove septic systems in areas with existing sewer lines. The plan originally allocated $12,000 to these connection opportunities. Costs to connect to gravity lines were found to be consistent with this estimate; however, costs to connect to force main lines were higher. In the 2019 Update, connection costs to force main sewer were increased to $18,000. For the 2024 Update, the funding allocation was increased to $24,000 for each connection to force main sewer or gravity sewer when a pump is required to cover the cost of a grinder pump, the pump's electrical connection, directional drilling of the lateral line, abandonment of the septic tank, connection fee, and restoration of the site.

Septic System Upgrades

The eligible cost of an upgraded septic system was increased from $16,000 to $18,000 in 2019 and from $18,000 to $20,000 in the 2025 Plan Update to reflect the increasing cost to safely decommission the old tank and install the new tank and drainfield, electrical costs, and restoration of the site. Many of the oldest septic systems that are contributing the most loading to the lagoon do not comply with modern setbacks established by the Florida Department of Health. Bringing these septic systems to current standards in small lots is contributing to the higher average upgrade costs. The estimate of $16,000 is more accurate for new construction. **Table 4-47** shows the mean and median project cost for septic system upgrades. Any operations and maintenance costs associated with these upgrades, once installed, become the responsibility of the owner.

The regulatory environment for septic systems has changed considerably in recent years. House Bill 1379, passed in 2023, requires all commercial and residential properties on septic systems within the Indian River Lagoon watershed to either connect to central sewer or upgrade to an enhanced nitrogen reducing system by July 1, 2030. The Florida Department of Environmental Protection directs property owners to their local government bodies to ask about programs to help with the financial cost of upgrading. Because of this, Brevard County staff received a significantly higher volume of calls from property owners who have small nitrogen load contributions to the lagoon but are required by the state to upgrade. Many of these properties were eligible for little to no cost-share. In response, the Citizen Oversight Committee recommended that the County Commission approve a minimum cost-share of $6,000 for septic upgrades that meet all the program requirements.

Table 4-47. Mean and Median Project Costs for Septic System Upgrades 2020–2025

Year	Mean Project Cost	Median Project Cost
2020	$18,022.20	$18,000.00
2021	$18,548.38	$18,000.00
2022	$20,551.34	$19,150.00
2023	$20,732.75	$19,912.10
2024	$21,467.82	$20,740.72
2025	$22,263.44	$20,600.00

Stormwater Treatment

Brevard County was awarded a grant to help upgrade multiple baffle boxes to second generation technology. Eight baffle boxes in Cocoa, Cape Canaveral, Melbourne, and Titusville were retrofitted with screens to collect larger items such as litter, leaves, and twigs from the stormwater entering the baffle box. Three of the baffle box projects were sampled twice each to estimate the pollutant removal effectiveness of the added screens. The baffle box projects chosen for sampling were Central Boulevard (City of Cape Canaveral), Church Street (City of Cocoa), and South Street (City of Titusville). By applying state-approved dry bulk density ratios

to the volumes of material captured in the screens, nutrient removal was estimated to be 7.12 pounds of TN per year and 0.57 pounds of TP per year.

The Basin 26 (Sunset Avenue) denitrification project has been sampled 35 times since September 2022 with plans to continue monitoring for another 10 months. This project was designed to address nutrient loading by using groundwater and stormwater treatment technologies in a channel to intercept nutrient-laden waters before discharge into the Indian River Lagoon. Overall percent removal is 9% for TP and 85% for nitrate, which equates to 130 pounds of nitrate reduction per year. This yields a cost effectiveness of $1,865 for total costs and $568 for Save Our Lagoon Trust Fund costs for nitrate, which is a bioavailable form of nitrogen.

The Scottsmoor I Aurantia Road denitrification treatment train project was expected to begin monitoring in spring 2024. Due to groundwater conditions, modifications are being planned so the stormwater can flow without groundwater interference. Monitoring will begin once the modifications have been completed.

Although the monitoring was not funded by Save Our Indian River Lagoon Trust Fund dollars, the Johnson Junior High Denitrification Media Chamber Modification project has been monitored since 2019. In 2022, a Save Our Indian River Lagoon funded stormwater modification to the treatment system was made to add pea gravel for nitrogen reducing bacterial growth to act as a pre-treatment. The Johnson Junior High Stormwater project uses three different biosorption activated media to treat the stormwater in separate, parallel flow paths to evaluate the nutrient removal efficiency of each media. The three medias were Bold & Gold®, NutriGone™, and a woodchip mix. After the installation of the pea gravel, all three media showed a high reduction in inorganic nitrogen, with the woodchip mix the highest at 83%. The woodchip mix was also effective at treating the organic nitrogen with a removal rate of 25%. The Bold & Gold® and NutriGone™ mixes were not effective in treating the organic nitrogen. Brevard County is looking into methods to improve removal of organic nitrogen in future projects.

AECOM Algae Harvesting Pilot Project

In 2022, the Brevard County Department of Natural Resources secured an innovative technology grant from the Florida Department of Environmental Protection for $999,000 to pilot test emerging Hydronucleation Flotation Technology as a potential innovative solution for mitigating algae blooms and reducing nutrient concentrations in the IRL. Hydronucleation Flotation Technology is an advanced dissolved air flotation, liquid-solid separation process that efficiently removes algae cells and other suspended particles along with associated nutrients and algal metabolites from water. The technology has been tested extensively in freshwater systems in Florida and New York. The pilot project in the County tested the feasibility of using Hydronucleation Flotation Technology in brackish waters of the IRL.

Brevard County partnered with AECOM Technical Services, Inc. to implement this project. AECOM has a compact, mobile, and modular Hydronucleation Flotation Technology design that can be operated from land or on water, providing versatility and scalability to tackle nutrient enrichment and algal blooms in a variety of aquatic settings. If successful, Hydronucleation Flotation Technology could be used in brackish waters throughout Florida to treat algal blooms in-situ and help reduce nutrient loads to inhibit future occurrences of harmful algal blooms.

In September 2023, AECOM deployed a barge mounted Hydronucleation Flotation algal harvester in the IRL to respond to algal bloom "hot spots" as they occurred. The harvester was repositioned at four different locations in the IRL, one in the North IRL and three in the Central

IRL, over a two-month period, operating for a total of five weeks. The system treated 4,026,970 gallons of water from the IRL, removing 255 gallons of algae slurry, to evaluate system performance and cost-effectiveness tracked by a comprehensive monitoring program. Final reporting for the project was delivered in May 2024. Fluctuations in water conditions, such as low dissolved oxygen, impacted overall performance. Algae harvesting had percent removal efficiencies of 21% for chlorophyll-a, 26% for TP, 0% for TN, and 75% for turbidity. Another benefit from the treatment was a 26% increase in mean dissolved oxygen. Unlike past algae harvesting projects, there were higher levels of total suspended solids in the effluent compared to the influent. This may have been due to waves and boat wakes rocking the vessel and causing floc to enter into the effluent stream (AECOM, 2024). Although successful at reducing turbidity and harvesting algae, TN removal was minimal and the overall cost effectiveness was relatively low.

Ultrasonic Algae Treatment

In 2023, the Brevard County Department of Natural Resources was awarded an innovative technology grant from the Florida Department of Environmental Protection for $199,500 to test the use of ultrasonic transducer technology in estuarine waters. Conventional ways to treat harmful algal blooms can cause unintended consequences, including sudden toxin release. The use of ultrasonic sound to prevent harmful algal blooms and mitigate existing cyanobacteria blooms avoids cell lysis, thereby avoiding toxin release. This grant offers a unique opportunity to test this innovative technology in brackish/marine waters in the Sykes Creek canals.

Hydro BioScience, LLC assisted with the initial set up of six ultrasonic transducers in the Sykes Creek residential canals. There are 15 homeowners participating in the study, who allowed Brevard County to hang equipment from their docks. All equipment was installed by the end of December 2024, and the project will run for one year collecting data pre- and post-activation to look at parameters such as chlorophyll-a, nutrients, and algae identification and enumeration.

Muck Removal

As each project progresses, the lessons learned and new data are being used to improve designs and strengthen bid specifications and contract terms for upcoming projects. Pre-project muck flux data have been collected by researchers at Florida Institute of Technology for more than 20 potential muck dredging sites. These data were considered with other available data to reprioritize muck dredging areas in the 2019 Update. As researchers at the Florida Institute of Technology continue to move forward with muck-related research, data used in the plan will continue to be updated.

The goal of the muck removal program is to improve water quality and ecosystem health within the IRL. Muck removal benefits include reducing nitrogen, phosphorus, hydrogen sulfide, turbidity, pathogens, and contaminants; improving dissolved oxygen and pH; as well as uncovering clean, sandy sediments for recolonization by seagrass, shellfish, and a diversity of benthic marine life to support an abundant and productive food web. The St. Johns River Water Management District maintains several long-term water quality monitoring stations in the IRL, including one northeast of Brevard County's Turkey Creek muck removal project and one east of the St. Johns River Water Management District's Eau Gallie River and Elbow Creek restoration dredging project. Median turbidity values, measured monthly for 19.5 years at the St. Johns River Water Management District monitoring station near Turkey Creek, were 3.59 nephelometric turbidity units before dredging, 3.52 nephelometric turbidity units during dredging, and 2.40 nephelometric turbidity units for the six years of monthly data available after dredging. Median turbidity values, measured monthly for over 26 years at the St. Johns River Water Management District monitoring station near Eau Gallie River and Elbow Creek, were 5.69

nephelometric turbidity units before dredging, 6.88 nephelometric turbidity units during dredging, and 3.65 nephelometric turbidity units for the five years of monthly data available after dredging. Although the median turbidity values are lower after dredging compared to before dredging, too much monthly variability exists in the data to determine if the water quality improvements are statistically significant. However, the data indicate no significant increase in turbidity during dredging and a low turbidity value of 1.99 nephelometric turbidity units was recorded in May 2021 after dredging and marked the lowest reading in over 17 years at the Eau Gallie River station.

In 2020, Tetra Tech prepared a document with lessons learned for the muck dredging projects implemented between 2014 and 2019. One lesson learned is that the thickness and extent of muck deposits is generally difficult to determine. Therefore, a combination of sediment probes to plan an optimum density and pattern of sediment cores can improve the accuracy of muck sediment isopach mapping. Another lesson learned was related to the use of polymers and flocculants. The contractor methods used at the Mims Boat Ramp did not work for performance-based specifications for nutrient removal. For future projects, more than just bench testing of the chemicals is needed and enhanced contract standards, developed by Brevard County, should be included in future project specifications. Muck sediments with high clay contents can be difficult to dewater. Design efforts should include bench testing of polymer additives to improve flocculation of the suspended sediments and the geotechnical testing of the dredged material slurry to help optimize the dewatering of the dredged material. Significant benefits to TP removal can be realized through the appropriate use of polymers (Tetra Tech, 2020).

Predicting IRL response to muck removal could be useful for scaling the level of effort and investment that should be directed to dredging. Of the 21 funded muck removal project locations, four have been completed and two are in progress. The first capping project is currently out to bid. An additional project is going out to bid in 2026. While the results from completed projects are encouraging, they can also inform modeling that can predict the overall IRL response to the current level of proposed dredging. Dr. Gary Zarillo of the Florida Institute of Technology has simulated the impacts of muck dredging on the IRL by conducting three-dimensional modeling using observed and predicted hydrodynamic and water quality data. Results are presented in his July 2022 report entitled Impacts of Environmental Muck Dredging. Model results indicate that muck dredging benefits IRL water quality and has the potential to substantially reduce nitrogen and phosphorus concentrations in the water well beyond the immediate site of dredging operations.

Model inputs included observed data from the completed Turkey Creek muck removal project and sampling stations located throughout the IRL operated by several agencies and institutions. The model was calibrated using observed data and used to predict water quality response if another 14 muck sites in Brevard County were dredged as planned. Model results found that the relative level of improvement in water quality constituents, such as reductions in TN and TP and increases in dissolved oxygen, ranged from about 15% to 50% near areas of muck removal projects. Furthermore, when looking at water quality constituents throughout the entire County portion of the IRL, even areas most distant from dredging indicated measurable improvements of 2% to 4%.

The estimated costs per cubic yard for muck removal have more than doubled compared to initial projections, while the allocated funding for each project has remained unchanged. To ensure continued progress within the existing budget, project areas are being refined to focus on sections with the highest nutrient flux. This approach aims to maximize nutrient removal

effectiveness while staying within financial constraints, prioritizing areas that will yield the greatest improvements to water quality.

Air Quality Monitoring at the Grand Canal Dredge Material Management Area

To ensure the successful completion of the Grand Canal project, Brevard County sought approval from the Board of County Commissioners for a new Temporary Use Agreement to extend the use of the Dredge Material Management Area beyond the expiration date of July 2024. In April 2024, the County hosted a community open house to provide project updates and address questions or concerns for property owners within 1,000 feet of the Dredge Material Management Area. In response to concerns voiced during the meeting, the County engaged a third-party consultant to conduct air quality monitoring, specifically measuring hydrogen sulfide levels during active construction. Hydrogen sulfide is naturally produced in muck under low-oxygen conditions. Additionally, the County's Fire Rescue Hazard Mitigation team visited the construction site and neighborhood in question and did not detect any air quality concerns.

At the May 2024 Board of County Commissioners meeting, the Temporary Use Agreement extension for the Grand Canal Dredge Material Management Area was approved with a directive to continue hydrogen sulfide air quality monitoring throughout the month of May. **Figure 4-37** illustrates the locations of the air quality sensors positioned around the Dredge Material Management Area. Initially, one sensor was placed adjacent to the muck slurry inflow point on day one of monitoring. Following that, the sensor was repositioned daily within the construction site, ensuring it was consistently located downwind of active odor-producing areas to capture emissions data. A second sensor was installed in the construction area closest to residential homes.

Hydrogen sulfide concentrations were presented in graph form weekly, comparing the results against various regulatory and guideline thresholds. The Occupational Safety and Health Administration's Permissible Exposure Limit for construction workers is 10 parts per million averaged over eight hours. The Occupational Safety and Health Administration's Exposure Limits for construction sites were never exceeded.

To address concerns raised by the community about potential air quality impacts on nearby homes, the monitoring results onsite were compared to the more protective residential guidelines. The United States Environmental Protection Agency's most protective Acute Exposure Guideline for the public is 0.75 parts per million averaged over ten minutes. While one monitoring location on the construction site did exceed a residential guideline for a six-minute period during May, a vegetated buffer and canal in the area that provide natural diffusion and separation between the site and the nearest residences, further mitigating any potential impact.

Figure 4-37. Monitoring Sensor Locations at the Grand Canal Dredge Material Management Area from May 1 – 31, 2024

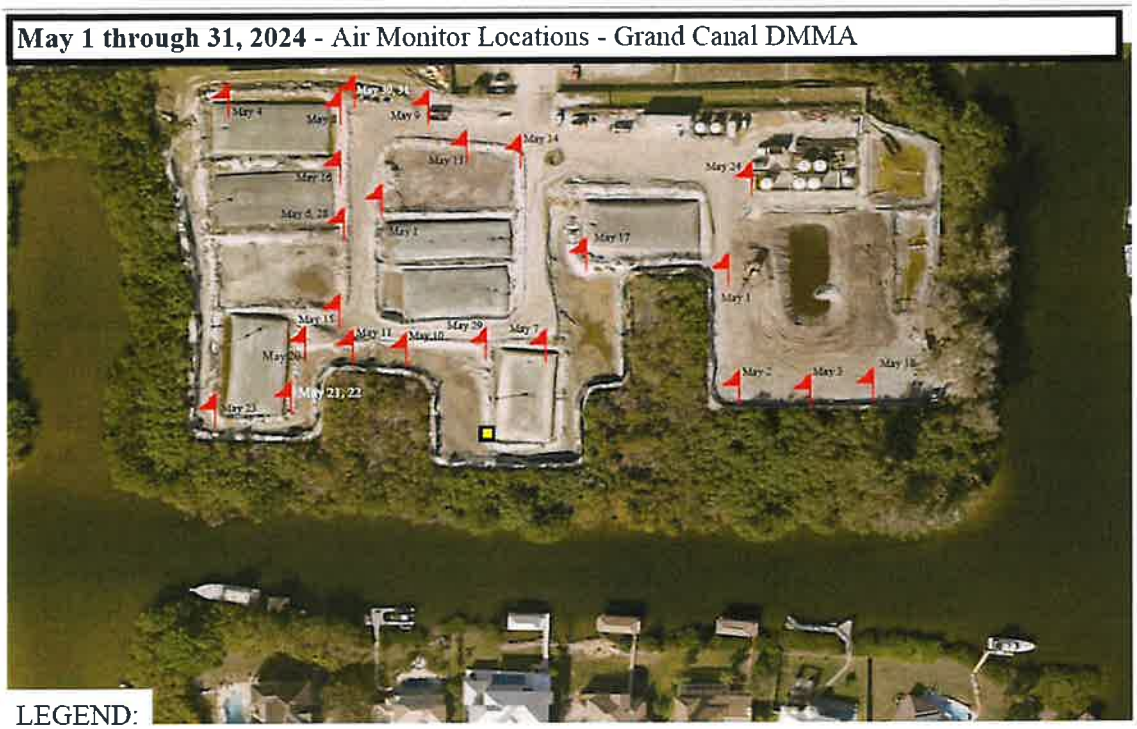


Figure 4-37 Long Description

Evaluating Sand Capping for Sediment Nutrient Reduction

Sand capping has been identified as a potential method to contain muck in place while reducing water depths, sediment oxygen demand, and the release/flux of dissolved nitrogen and phosphorus from the sediment into the water column. During or shortly after capping, the added weight of the capping material can drive a short-term release of porewater and associated nutrients. However, after short-term equilibration to the weight of the sand cap, nutrient releases are much slower. These slow releases can be reduced further or fully overcome by natural processes like coupled nitrification-denitrification and sorption of phosphate to inorganic particles in the sand cap over the muck.

Brevard County had interest in evaluating alternative cost-effective means for muck management in the IRL and sand capping has been successfully implemented in other locations. In 2018, Florida Power and Light carried out a sand filling remediation project to reduce the water depth and promote seagrass growth in the IRL just north of the National Aeronautics and Space Administration Causeway. The County and researchers at the Florida Institute of Technology used the project as an opportunity to evaluate the effectiveness of sand capping to mitigate muck nutrient fluxes in the IRL. Five years later, researchers at the Florida Institute of Technology returned to assess the long-term effectiveness of the sand cap. Surface sediment characteristics remain improved over time as shown in **Table 4-48**.

Table 4-48. Composition of Surface Sediments from the Florida Power and Light Project Area Before the Sand Cap, Two Months After, and Five Years After (Fox, 2020 and 2024)

Time	Percent Water by Volume	Percent Organic Matter by Mass	Percent Calcium Carbonate by Mass	Solids Characterization
Before the Sand Cap	91	20.4	9.7	93% silt + clay
2 Months After the Sand Cap	47	0.80	4.8	1.3% silt + clay, 94.2% sand, 4.5% gravel
5 Years After the Sand Cap	50	0.95	1.9	Less than 2% silt + clay

Five years after capping, fluxes of dissolved nutrients remain reduced by more than 80% for nitrogen and 90% for phosphorus. This coincides with decreased porosity of surface sediments and the presence of oxygen in the surface sediments. The lower sediment oxygen demand after capping promotes sorption of phosphorus and coupled nitrification-denitrification, reducing the concentration gradients for nitrogen and phosphorus in porewater after capping (Fox, 2024). Overall, the sand cap continues to perform after five years, limiting the release of phosphorus and nitrogen by creating a less permeable barrier between muck and overlying water. The long-term reduction in sediment oxygen demand and nutrient fluxes has shown benefits for the lagoon's oxygen levels and overall ecosystem resilience.

The City of Cocoa Beach is planning a sand capping project to contain muck sediments in the Banana River Lagoon adjacent to the municipal golf course with funding from the Save Our Indian River Lagoon program and Florida Department of Environmental Protection. Given the project's scale and site-specific conditions, sand capping was identified as the most feasible and cost-effective option for nutrient management and habitat restoration for this specific project area. The proposed sand cap will cover about 140 acres of muck deposits, which currently contribute over 55,000 pounds of nitrogen and 3,000 pounds of phosphorus annually to the lagoon. Reducing nutrient fluxes of nitrogen and phosphorus, the sand cap will create beneficial benthic habitat and help to enhance ecosystem resilience.

For projects with large muck volumes and limited disposal or dewatering options, alternative analyses have been and will continue to be conducted to identify the most effective and feasible management approach. These evaluations compare sand capping with other dredging and treatment methods to assess cost-effectiveness, technical feasibility, and anticipated environmental benefits, providing guidance on the most suitable path forward for managing substantial muck deposits. Recent analyses for the Canaveral South project and the Titusville Railroad East and West project, completed by third-party engineers, led to the selection of a subaqueous fill, capping, and habitat restoration approach for Canaveral South, and a confined aquatic disposal cell creation with an ecological cap for Titusville as alternative solutions to traditional environmental dredging. These customized solutions can enhance environmental benefits while effectively addressing the unique challenges of each site.

General Performance of Interstitial Water Treatment

Data collected by researchers at the Florida Institute of Technology indicated the interstitial water, or the water that is "squeezed" out of the dredged muck material, contains relatively high concentrations of dissolved nitrogen and phosphorus. Treatment of this interstitial water can help to prevent a significant amount of nutrients from being returned to the lagoon; although numerous challenges must be overcome and adapted to when treating brackish water with variable characteristics. The various ions present in brackish IRL water (a mix of saltwater and

freshwater) interact with other ions used in more traditional methods for treatment of stormwater and wastewater (freshwater). When collaborating with the dredging industry, stormwater treatment engineers, and wastewater treatment engineers to treat the interstitial water, different approaches were tested first in jars, then on a larger laboratory scale, followed by a pilot scale, and finally improved upon at full scale where the challenges of variable field conditions were experienced.

Treatment of the interstitial water first began with the Turkey Creek dredging project where contractors began removing phosphorus through sorption methods and found that large amounts of nitrogen could be removed as well. Therefore, to further reduce the amount of nutrients entering the IRL, when bid requests were advertised for the Mims dredging project, interstitial treatment was included as pay-for-performance bid options in addition to muck removal. For Mims, bid options were requested for several effluent concentration targets ranging from 1,000–3,000 parts per billion (1–3 milligrams per liter) for nitrogen and 75–100 parts per billion (0.075–0.1 milligrams per liter) for phosphorus. The target for nitrogen is equivalent to advanced wastewater treatment targets for sewage, and the phosphorus target is more than ten times cleaner than the advanced wastewater treatment target. Both dredging and interstitial treatment were contracted, and the contractor was able to reduce interstitial nutrient concentrations but was unable to meet the contracted targets measured by seven-calendar day rolling averages; therefore, they were only paid for dredging and not paid for interstitial treatment.

Learning how complex it was to treat brackish water of highly variable quality and character but still wanting to incentivize meeting the effluent concentration targets, Brevard County strengthened the contract terms in the bid for the Grand Canal dredging and interstitial water treatment project. A start-up grace period of 21 days was granted to the contractor to ramp up to meeting the established effluent discharge targets of 3,000 parts per billion (3 milligrams per liter) for nitrogen and 75 parts per billion (0.075 milligrams per liter) for phosphorus. If the contractor was not able to meet the targets after the grace period, the new contract language allowed the County to stop work and require a new treatment proposal from the contractor.

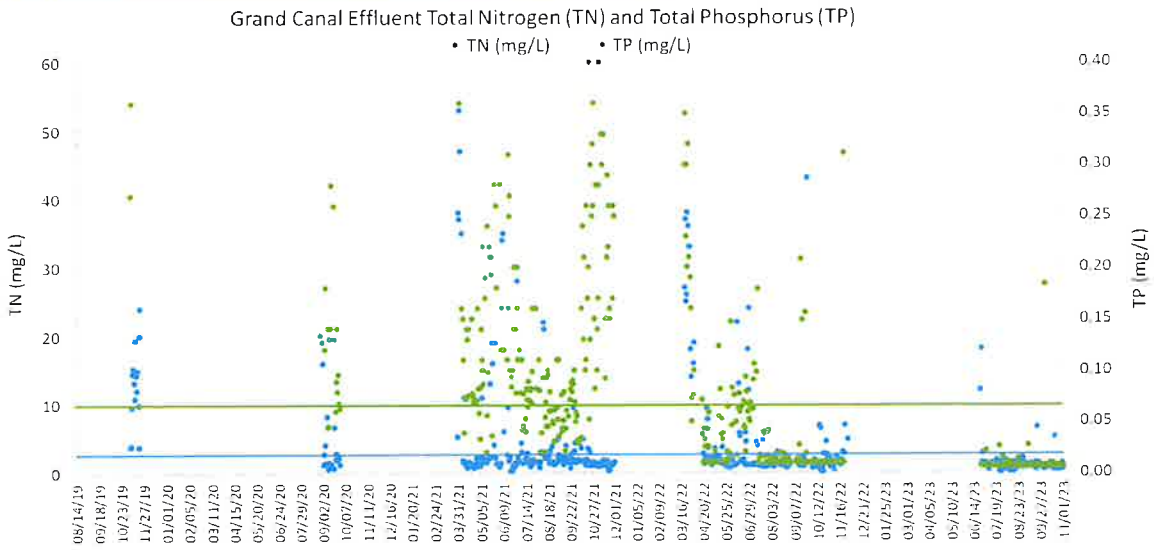
Interstitial treatment includes such challenges as variable organic decomposition rates as the sun heats the de-watering tubes used to separate muck solids from the interstitial water, differences in sediment characteristics as the dredge moves, and rainfall occurring during dewatering. These can result in fluctuating influent nutrient concentrations that may lead to instances where the discharge targets are not met. One bad day could devastate the seven-day rolling average; therefore, the Grand Canal dredging contract was revised to use daily data for performance pay calculations. Two interstitial treatment subcontractors were only able to meet the targets some of the time, as a result, the prime contractor brought in replacements. The current subcontractor is meeting nitrogen and phosphorus targets greater than 89% of the time, excluding the initial 21-day grace period for starting up the treatment process (**Figure 4-38**). Using the best available data to date, environmental dredging at Grand Canal will decrease the annual nitrogen flux by approximately 27,000 pounds per year and the phosphorus flux by approximately 1,730 pounds per year. The removal of the muck solids removes 2,450,000 pounds of nitrogen and 540,000 pounds of phosphorus from the IRL. Additionally, treatment of the interstitial water removes an extra 50,200 pounds of nitrogen and 4,400 pounds of phosphorus.

With the contractor consistently meeting nutrient effluent discharge targets at Grand Canal, the same treatment process was applied to Phase 1 of the Sykes Creek dredging and interstitial water treatment project. Perfection is not expected due to confounding factors that influence

treatment although, the efficacy of the treatment methods continues to improve with practice. At Sykes Creek Phase 1, treatment of interstitial water was successful with targets met greater than 80% of the time for nitrogen and 97% of the time for phosphorus (**Figure 4-39**). Removal of the organic-rich, decaying muck in Phase 1 will reduce annual nitrogen fluxes by approximately 6,970 pounds per year of nitrogen and approximately 617 pounds per year of phosphorus. Dredging of Phase 1 removed approximately 341,100 pounds of total nitrogen and about 75,000 pounds of total phosphorus in the solids, plus about 7,000 pounds of total nitrogen and 620 pounds of total phosphorus from the interstitial water treatment.

Decreasing nutrient concentrations through treatment of the interstitial water prevents relatively high concentrations of dissolved nutrients from re-entering the IRL in the return water. Contract payment terms are used to incentivize private industry to meet targeted nutrient reductions. As both the treatment process and payment terms evolve, the timing and method for collecting performance metric data also change. Based on actual costs and performance data available for assessing the current process at the Grand Canal and Sykes Creek, the cost-effectiveness of interstitial treatment is on the order of $50 per pound of total nitrogen. For future bids, those costs can be compared to nutrient concentration data collected upstream and downstream of interstitial treatment to further update the cost-effectiveness of interstitial treatment.

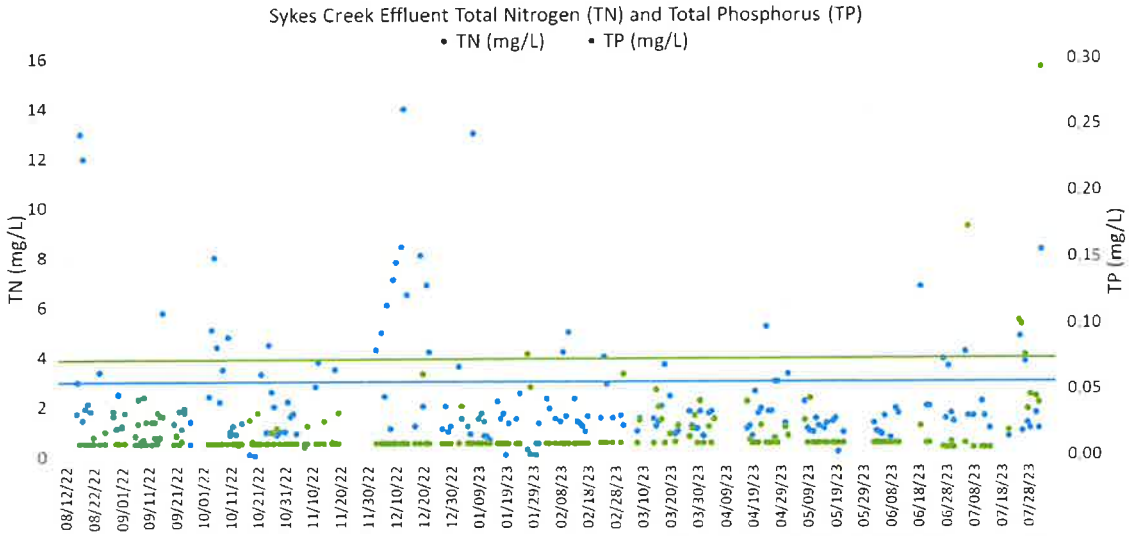
Figure 4-38. Effluent Concentrations from Interstitial Water Treatment at Grand Canal



Note: The blue horizontal line indicates the nitrogen effluent target (3 milligrams per liter) while the green line indicates the phosphorus effluent target (0.075 milligrams per liter). Gaps in the graph are representative of the mandatory manatee closure periods from December to March and other downtime.

Figure 4-38 Long Description

Figure 4-39. Effluent Concentrations from Interstitial Water Treatment at Sykes Creek



Note: The blue horizontal line indicates the nitrogen effluent target (3 milligrams per liter) while the green line indicates the phosphorus effluent target (0.075 milligrams per liter).

Figure 4-39 Long Description

In-lagoon Aeration Study

Dr. Austin Fox and Dr. John Trefry from the Florida Institute of Technology conducted two separate aeration studies in the IRL. The first studied microbubble aeration in two canals that were similar in bottom type and hydrology before aeration: (1) Anderson Canal (south of Anderson Court, Satellite Beach, Florida) was used as the control canal, and (2) Redwood Canal (south of Redwood Court, Satellite Beach, Florida) was used as the aeration canal. In the first study, from July 2017 to July 2018, microporous diffusers were installed at 50-meter intervals along the bottom of the aerated canal. An additional three diffusers were placed at the mouth the aerated canal, forming a bubble curtain to prevent any suspended material from being blown out of the canal. Water quality sampling was collected monthly for one year at the aeration and control sites. Microbubble aeration creates overturning vertical circulation of the water column, facilitating gas exchange at the water's surface and from the bubbles themselves. In a separate second study using a similar experiment setup, aeration using nanobubbles of highly concentrated dissolved oxygen was studied from February 2019 to March 2020 in the canal off Turkey Creek along the Florida Institute of Technology Rivers Edge property. During the second study, highly concentrated dissolved oxygen was injected directly into bottom water using six injection nozzles located at the bottom of the Rivers Edge Canal, with a control area adjacent to the aerated canal.

Results from the first study showed that aeration using microporous diffusers created a uniform concentration of dissolved oxygen vertically throughout the water column, whereas sites in the control (non-aerated) canal had high dissolved oxygen saturation at the surface and low to no dissolved oxygen saturation near the bottom. Nanobubble aeration used in the second study resulted in oversaturation of oxygen in bottom water without causing vertical mixing. Benthic fluxes of nitrogen and phosphorous showed similar seasonal variations between the aerated and control canals, except when the average nitrogen flux between February to April 2018 was 35% lower in the microbubble-aerated canal than in its control. It was also noted that the microbubble-aerated canal experienced recruitment of benthic infauna during winter months

when oxygen was able to enter the sediment, but in the summer months when bacterial metabolism and oxygen demand was high, mortality of the recruits occurred. Muck thickness, volume, and dissolved nutrients did not significantly decrease, and water clarity did not significantly improve using either the microbubble or nanobubble aeration techniques. Despite this, these two studies illustrated how aeration using microporous diffusers or highly concentrated dissolved oxygen can decrease benthic fluxes during cool months and how both types of aeration can increase bottom water dissolved oxygen in localized areas surrounding the aerators.

Brevard County conducted a separate aeration experiment in Sykes Creek (2576 Sykes Creek Drive, Merritt Island, Florida) from December 4–7, 2018. A commercial, floating, surface-pond aerator with no fountain was deployed in a fixed location. Dissolved oxygen levels were measured in 10-foot increments at a depth of two feet extending out from the aerator in both a northeast and southeast direction for 200 feet, before the aerator was turned on and after it was run continuously for three days (but before it was turned off and removed). The results showed dissolved oxygen concentrations near 100% saturation at 7.9–9.0 milligrams per liter before aeration began, and significantly higher ($p<0.001$), above 100% saturation, at 10.3–11.1 milligrams per liter at the end of the three-day experiment. Aeration using atmospheric air is only capable of bringing dissolved oxygen to 100% saturation. Therefore, although dissolved oxygen increased during aeration, the rise above 100% dissolved oxygen saturation suggests that aeration was not directly responsible for the significant increase in dissolved oxygen — it was likely due to increased photosynthetic activity in the area on the sunny December 7, relative to the overcast December 4. Wind direction in the area from December 4–7 (Time and Date, 2021) was consistently from the north, north-northwest, or northwest with similar low speeds (about 10 miles per hour), indicating similar physical parameters across the study days and that differences in weather conditions were mainly influenced by cloud cover before and during aeration.

Thus, both the Florida Institute of Technology studies and Brevard County experiment illustrated how aeration — whether from microbubbles, nanobubbles, or surface aeration — can help create small areas of refugia for benthic organisms against hypoxic events, although benefits are limited to localized areas surrounding the aerators.

Bottom-water Dissolved Oxygen Monitoring Network

Muck is organic-rich with high decomposition rates that consume dissolved oxygen from the water column, potentially resulting in overall lower oxygen concentrations. To further understand the relationship between bottom-water dissolved oxygen and nutrient cycling in the sediments, Dr. Austin Fox of the Florida Institute of Technology established a network of continuous monitoring stations in the IRL. Data from these sensors will be used to evaluate bottom water dissolved oxygen patterns and hypoxia in the IRL and its impacts to nutrient cycling, eutrophication, and loss of ecosystem services (Fox, 2023). These data will also be used as one of the tools to quantify success with measurable outcomes resulting from lower sediment oxygen demand and fewer hypoxic events following muck removal projects. Vertical profiles using the data retrieved by the network of sensors showed that bottom-water dissolved oxygen generally decreases in areas with either soft sediments (i.e., muck), restricted circulation, or both. The trends reflect the higher sediment oxygen demand of soft versus sandy sediments and less vertical mixing in areas with restricted circulation (Fox, 2023).

In January 2022, Dr. Austin Fox deployed bottom-water dissolved oxygen sensors in four canals in the Sykes Creek Phase 1 dredge template area to evaluate the impacts of muck removal via environmental dredging on bottom-water dissolved oxygen concentrations. To date, data from

these sensors indicate higher dissolved oxygen in the recently dredged canals and generally less-stratified water columns, meaning dissolved oxygen remained relatively uniform throughout the water column down to the sediments (Fox, 2023). Many factors and differences can impact dissolved oxygen levels; nevertheless, the data being collected provide insights into benefits associated with these muck removal projects.

In early 2024, Dr. Austin Fox deployed five additional sensors throughout the Sykes Creek Phase 2 dredge template area to track water quality before, during and after dredging. Long-term monitoring, to date, shows that sites with restricted circulation or near muck deposits consistently have lower dissolved oxygen, averaging 4.3 milligrams per liter in 2024, compared to open areas with higher dissolved oxygen levels, averaging 6.9 milligrams per liter in 2024 (Fox, 2024). These high-resolution data are valuable in detecting hypoxic areas that impact nutrient cycling and other ecosystem functions. These data can help guide restoration efforts by identifying areas that would benefit from nutrient management efforts versus those that are naturally more resilient.

Building upon the initial bottom water dissolved oxygen network and research, Florida Institute of Technology partnered with the Smithsonian Marine Station and Hubbs SeaWorld Research Institute in a collaborative effort to better understand nutrient cycling, seagrass health, and biodiversity in the IRL. With funding support from the Florida Department of Environmental Protection, an additional 60 bottom water dissolved oxygen sensors were deployed throughout the Banana River Lagoon in 2024.

Throughout the year, long-term monitoring continued to quantify the effects of muck sediments and restricted circulation on bottom-water dissolved oxygen. Sites in restricted areas or near muck deposits consistently had lower dissolved oxygen than open-lagoon sites. Seasonal variations were also evident; from January to March 2025, restricted sites had 1.27–4.54 milligrams per liter lower dissolved oxygen compared to open sites, with some canals dropping below the 2 milligrams per liter hypoxic threshold more than 20% of the time. From April to June 2025, 13 sites were hypoxic over 20% of the time, primarily canals or areas with limited circulation, while most sandy, open-lagoon sites experienced no hypoxia (Fox, 2025). Sykes Creek remained hypoxic over 20% of the time, more than double the open-lagoon average, reflecting the high sediment oxygen demand of remaining muck deposits. These high-resolution data continue to identify hypoxia "hotspots" and inform where targeted muck removal or nutrient management may provide the greatest benefit.

Oyster Restoration and Planted Shorelines

Brevard County oyster bars were initially built using mesh bags filled with oyster shell, known as cultch. They were typically two layers tall and, in some areas, seeded with approximately 100 young adult oysters per square yard of the top layer. Projects now include alternative materials and designs to minimize man-made materials and maximize project area while continuing to promote successful oyster recruitment. A University of Central Florida research team conducts independent monitoring of a subset of oyster bar projects, visually inspecting for oysters growing through the bags or gabions and cementing or "bridging" of adjacent oysters, and documenting the presence of predators, algal cover, and sedimentation. Additionally, a subsample of building units is emptied to quantify oyster survival, growth, recruitment, and the abundance as well as the diversity of fish and invertebrates living within the modules.

Monitoring results inform future decisions about oyster bar site selection, design, material type, and the need for seeding. Recruitment is necessary for oyster bars to sustain themselves without additional seeding. Adopted success metrics for the oyster bar projects are the

presence of two distinct size classes and at least 46 oysters and 0.1014 pounds total dry weight per square yard (50 oysters and 50 grams total dry weight per square meter) (Brevard County Oyster Habitat Suitability and Rehabilitation Success Plan, 2021).

The first two years of monitoring at 12 of the 23 areas are reported in the University of Central Florida monitoring reports for permit reporting. Brevard Zoo also monitors the remaining oyster bar sites and continues monitoring the sites after the University of Central Florida concludes the first two years of monitoring. University of Central Florida monitors the Cocoa Beach McNabb Oysters reef, which is not a comparable design to the other sites. The latest available censused data for all monitoring areas are included in **Figure 4-40**, **Figure 4-41**, and **Figure 4-42**.

Figure 4-40 shows the average number of measured oysters in each size class per monitored unit at locations funded by the Save Our Indian River Lagoon Program. Project names represent the location of projects within the IRL and are presented in order by deployment date. Each name includes the date (in parentheses) and age of the project at the most recent full census monitoring event. These numbers reflect the average of the first 50 randomly encountered oysters per sample. The oyster density at each location is shown in **Figure 4-41** and the total dry weight is shown in **Figure 4-42**.

Eleven projects were fully censused between 2021 and 2022, with ages at that time ranging from 1 to 3.5 years. Of these reefs, 72% were meeting all sustaining success criteria. An additional 11 projects were fully censused in 2023 ranging in age from 6 months to 4.5 years. For these reefs, 72% were meeting all sustaining success criteria with an additional 18% meeting at least the minimum success criteria. Eight reefs were fully censused between late-2024 and 2025, with ages at that time ranging from 0.25 to 3 years. Of these reefs, seven (88%) were meeting all sustaining success criteria with the other one (12%) meeting minimum success criteria. As reefs age and begin to accrete or degrade, the monitoring method may adapt to limit disturbance and expedite monitoring. In 2025, visual point-intercept transects were conducted at 11 oyster reef projects, yielding a percent cover of live oyster, shell substrate, and fouling.

Figure 4-40. Distribution of Oyster Sizes, Age, and Average Number of Measured Oysters Per Sample Unit

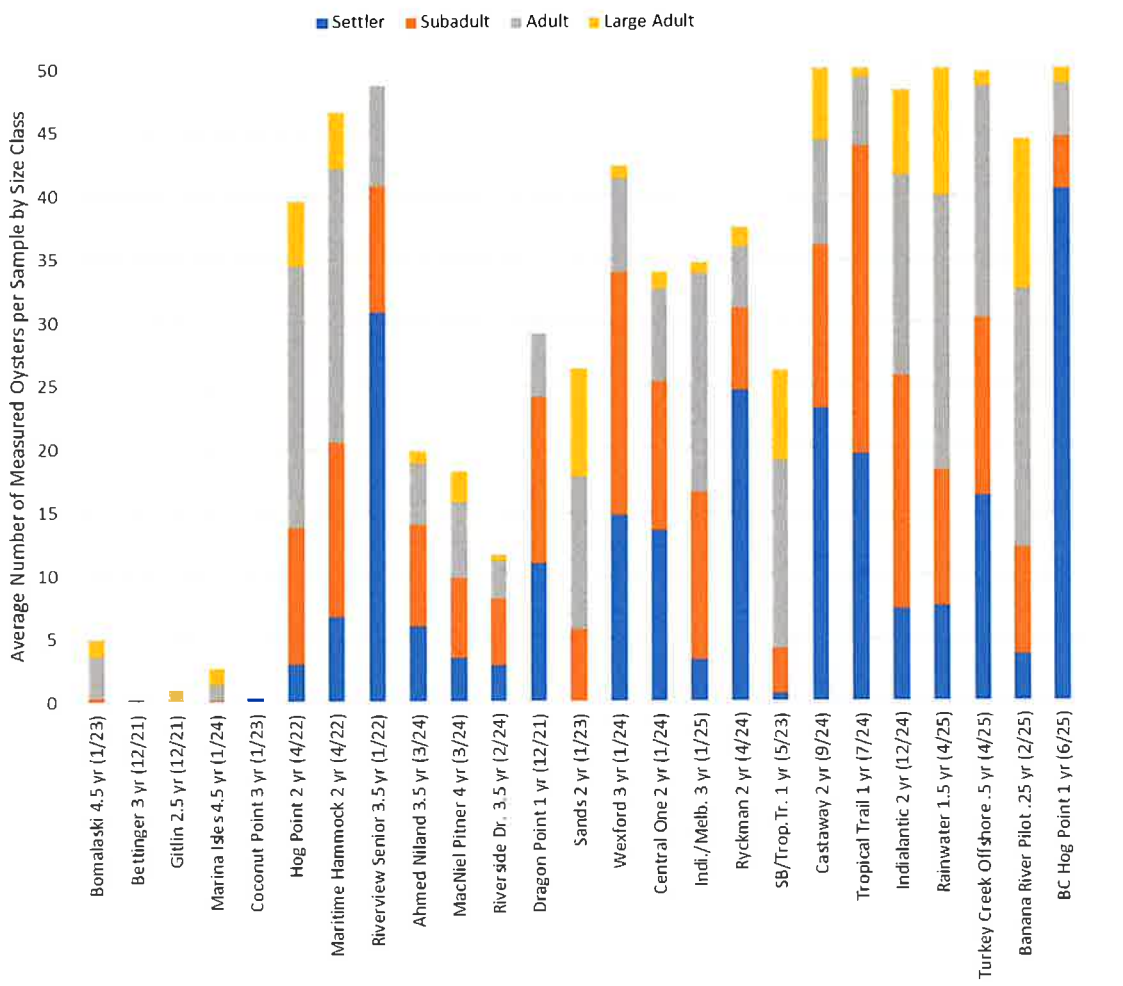


Figure 4-40 Long Description

Figure 4-41. Average Oyster Density Per Square Foot

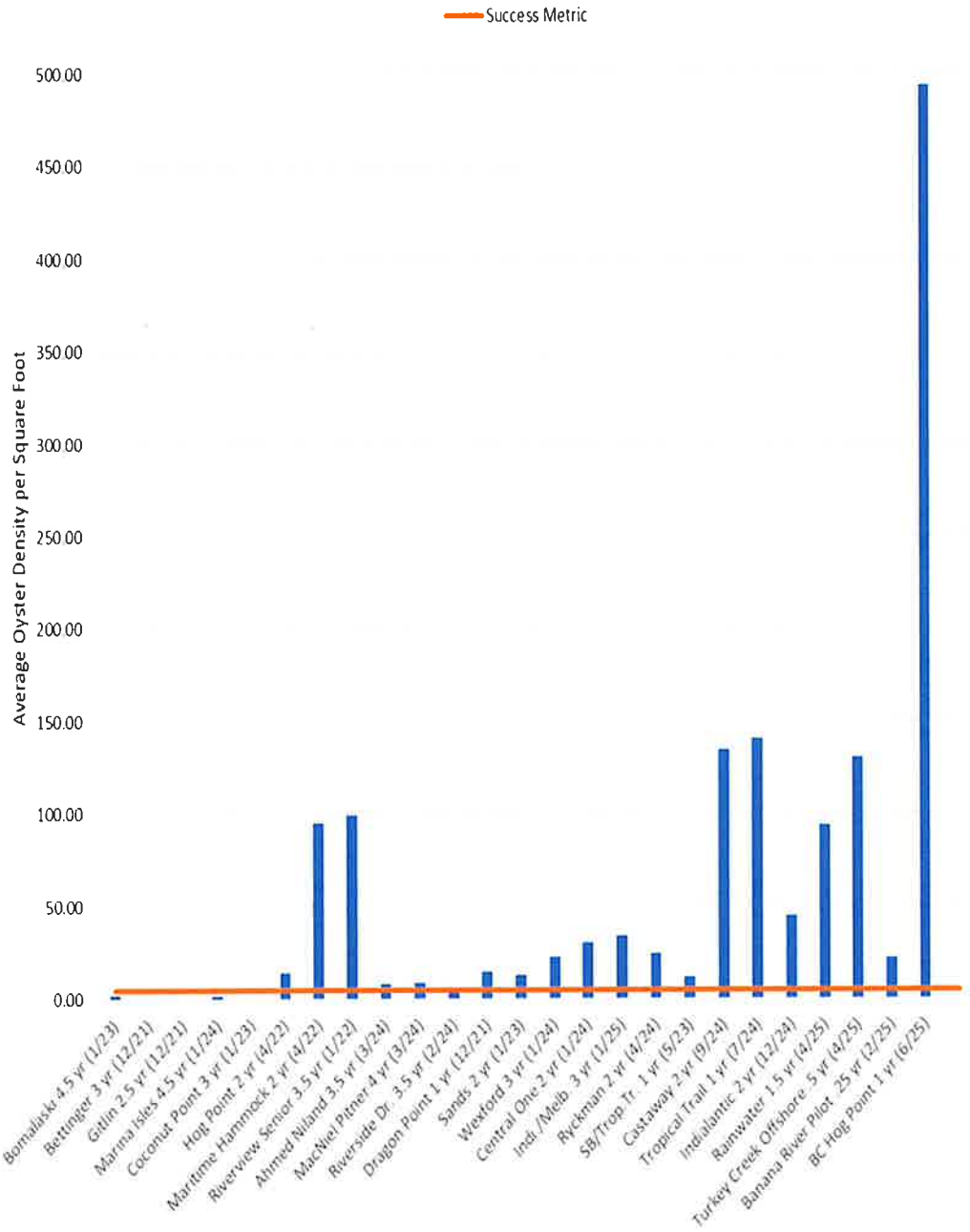


Figure 4-41 Long Description

Figure 4-42. Average Dry Total Weight Per Square Foot

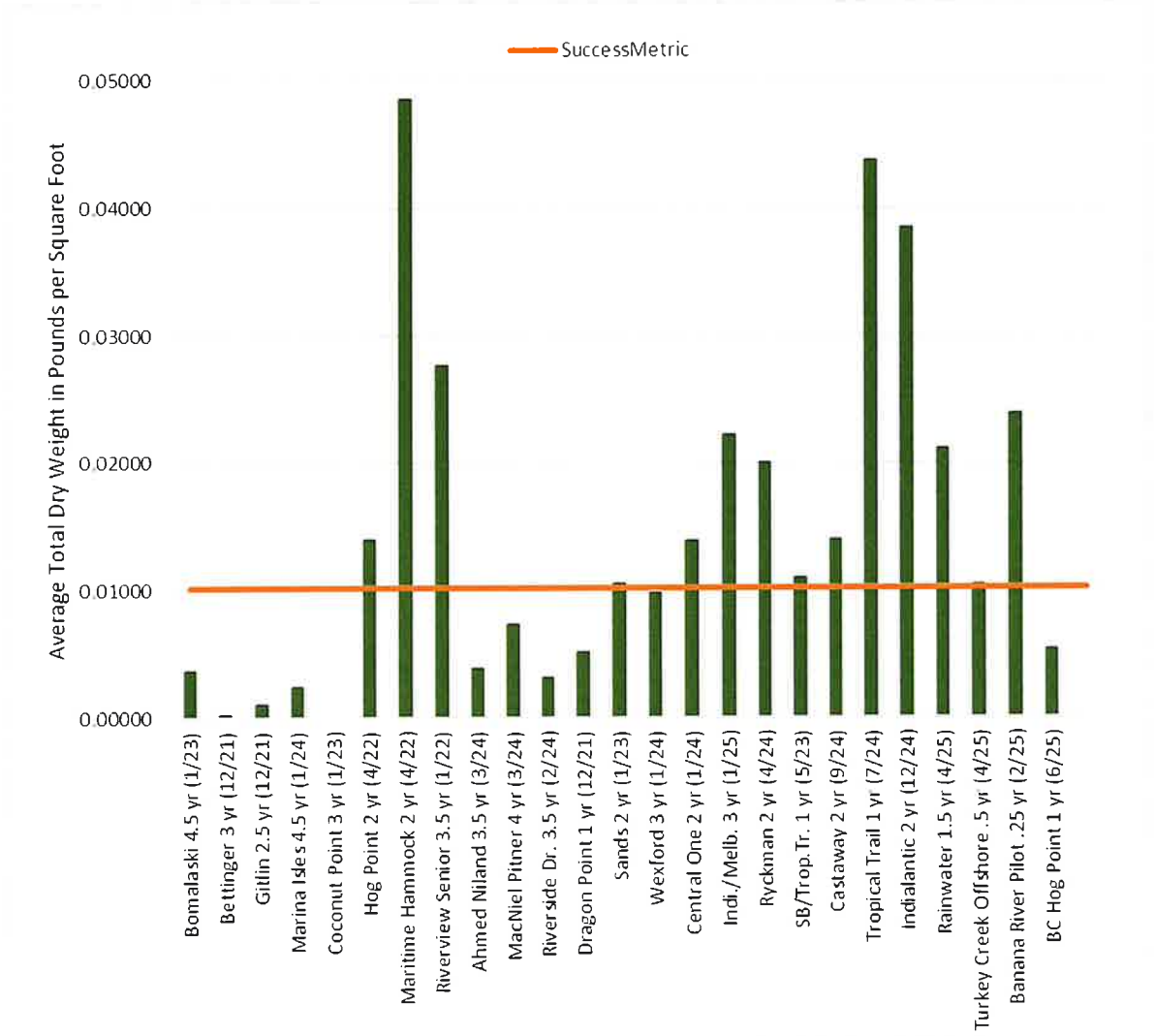


Figure 4-42 Long Description

The formation of bridges between bags has been noted at Bomalaski, Marina Isles, Maritime Hammock, and MacNiell-Pitner. Comparison of data from multiple sites indicates that oyster bars located in narrow canals are exposed to more variable salinity and less recruitment and, although surviving oysters do grow, the numbers of live oysters decline over time (University of Central Florida, 2020a). In contrast, bars constructed in open waters of the IRL experience fluctuations in density but many have sufficient recruitment to maintain populations over time (University of Central Florida, 2022b).

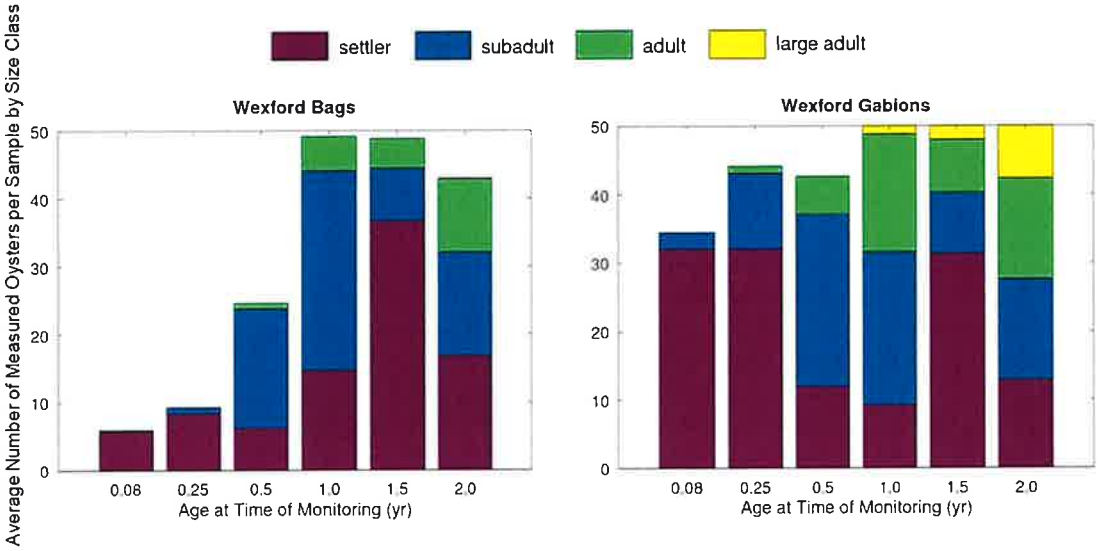
Beginning in July 2020, two projects located within 500 feet of one another were deployed in the Central IRL and monitored to compare the influence of initial seeding. At one year of age, recruitment and oyster density were similar at both sites, 10 and 12 settlers and 28 and 26 oysters per bag at the two sites, respectively. After two years the populations remained similar,

with an average 45 ± 5 oysters and 14 settlers per bag at the unseeded location and 63 ± 12 oysters and 26 settlers per bag at the seeded location. Therefore, in regions where recruitment is sufficient, oyster reefs do not need to be seeded.

In response to concerns related to the breakdown of plastics in the environment, six alternatives to using ultraviolet stabilized plastic mesh bags for securing loose oyster shell were tested at three locations in the IRL. With funding from the IRL National Estuary Program and collaborators from the University of Florida, Brevard County and the Brevard Zoo Restore Our Shores team built test structures that were monitored throughout an 18-month study. Modules were hung from docks and consisted of controls (ultraviolet stabilized plastic Naltex™ mesh bags); two gauges of galvanized steel gabions; and multiple configurations of cement, oyster shell, and several natural materials including Community Oyster Reef Enhancement modules, jute-reinforced calcium sulfoaluminate Plastic-free Restoration of Oyster Shorelines units, and oyster balls. Monitoring of degradation, fouling, and oyster recruitment and growth occurred quarterly. Results suggest that oyster gabions tended to maintain higher oyster densities and species richness without compromised structural integrity compared to the other materials' performance (Brevard County Natural Resources Management Department, 2022). Changes in trends over time and by location indicate that different materials may be best suited to different environments.

In 2020, alternative materials also began being tested on select oyster bar projects. Community Oyster Reef Enhancement modules were tested along-side ultraviolet stabilized plastic mesh bags at the Hog Point oyster bar. At two-years post-deployment, the average oyster density on Community Oyster Reef Enhancement modules was approximately 7.5% of that in the mesh bags when normalized by reef area (extrapolated from University of Central Florida, 2022a). In the alternative material test, these modules also tended to support much lower densities than mesh bags or gabions. Oyster gabions have also been tested along-side plastic mesh bags at the Wexford oyster bar. In the alternative material test, gabions tended to persist longer, support an equal or greater number of oysters, and oysters formed bridges earlier and more frequently (Brevard County Natural Resources Management Department, 2022). At Wexford, oyster densities remained consistently higher and oysters tended to grow more quickly and to larger size classes in the gabions than plastic mesh bags (**Figure 4-43**). This trend has also been observed on oyster reefs in Indialantic with 3.75 times greater oyster density in gabions versus plastic mesh bags and a greater proportion of the population growing to larger sizes.

Figure 4-43. Average Number of Measured Oysters in Each Size Class for Ultraviolet Stabilized Plastic Mesh Bags (left) and Galvanized After Welding Steel Gabions (right)



Note: Each bar represents the age of the project for each monitoring event.

Figure 4-43 Long Description

To continue minimizing the use of man-made materials and construct larger restoration projects, new designs are also being constructed by Brevard Zoo and monitored by the University of Central Florida. Recent projects have begun building wider footprints, contain larger areas of shell cultch rather than individual building units, and are using different materials. Castaway Cove, located north of the mouth of Turkey Creek, tested different widths (6 feet and 10 feet) modules of both gabion corrals and stacked gabions tested side-by-side to compare their success in recruiting and supporting oyster growth. After the first two years, modules at both 6- and 10-foot widths and with corral walls or stacked gabions have performed similarly (**Figure 4-44**). At Rainwater, located south of the mouth of the Eau Gallie River, 10-foot-wide gabion corrals are being compared to 10-foot-wide coquina rock corrals with a 10-foot-wide gabion module control. At the 18-month monitoring event, all modules were meeting success criteria. In addition, starting at the 18-month monitoring, oysters were not collected from the gabion control module for a detailed census because the oysters had grown through the gabion mesh in such high densities that pulling oysters would have destroyed the gabions and oysters. Instead, the number of live oysters within a quadrat were counted, which likely results in an underestimation of the true density per square meter (**Figure 4-45**). The Turkey Creek Offshore Project constructed eight, 20-foot-wide gabion and coquina corral modules on a submerged spoil island. This project is using wider modules, testing different module orientations (north to south and east to west), and was built further from shore than any of the other previously constructed reefs. The University of Central Florida is monitoring this reef and, after six months of monitoring, the different module types are performing similarly (**Figure 4-46**).

Figure 4-44. Comparison of Corral Wall and Stacked Gabion Oyster Module Performance

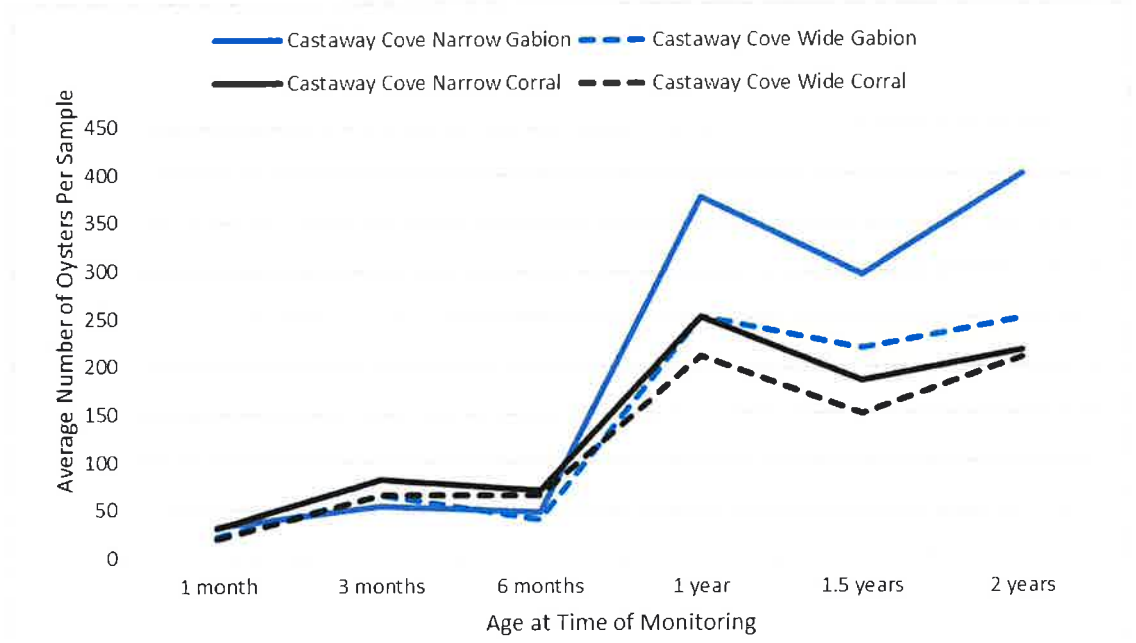


Figure 4-44 Long Description

Figure 4-45. Comparison of Gabion Corral Wall and Coquina Corral Wall Performance

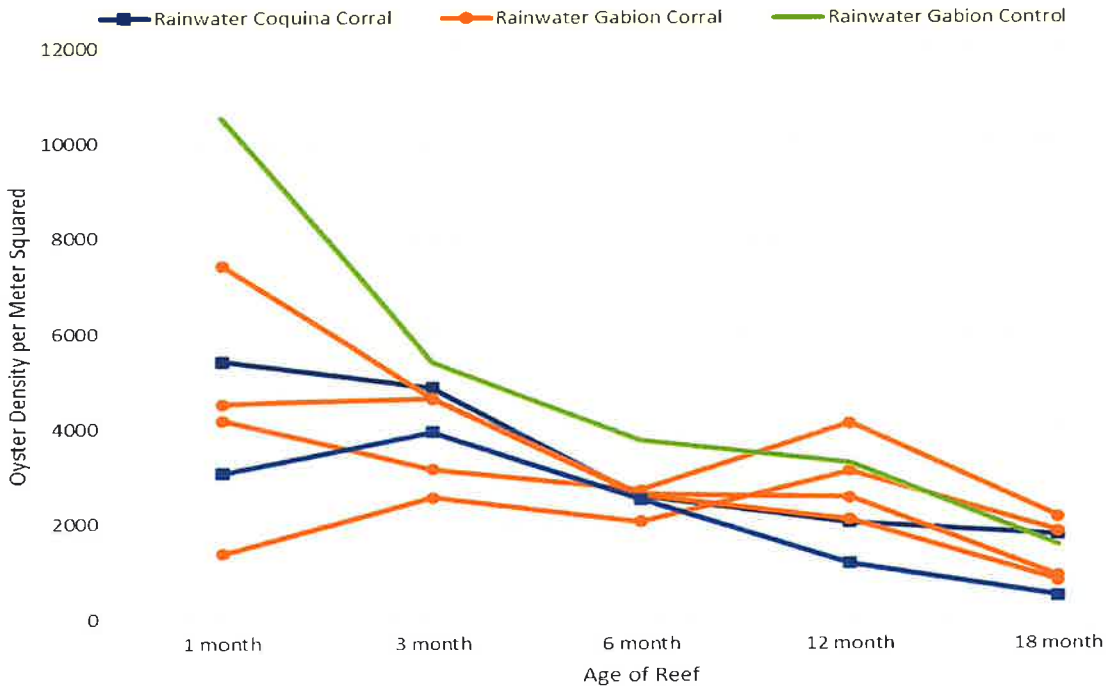


Figure 4-45 Long Description

Figure 4-46. Comparison of North to South and East to West Gabion Corral Wall and Coquina Corral Wall Modules at Turkey Creek Offshore

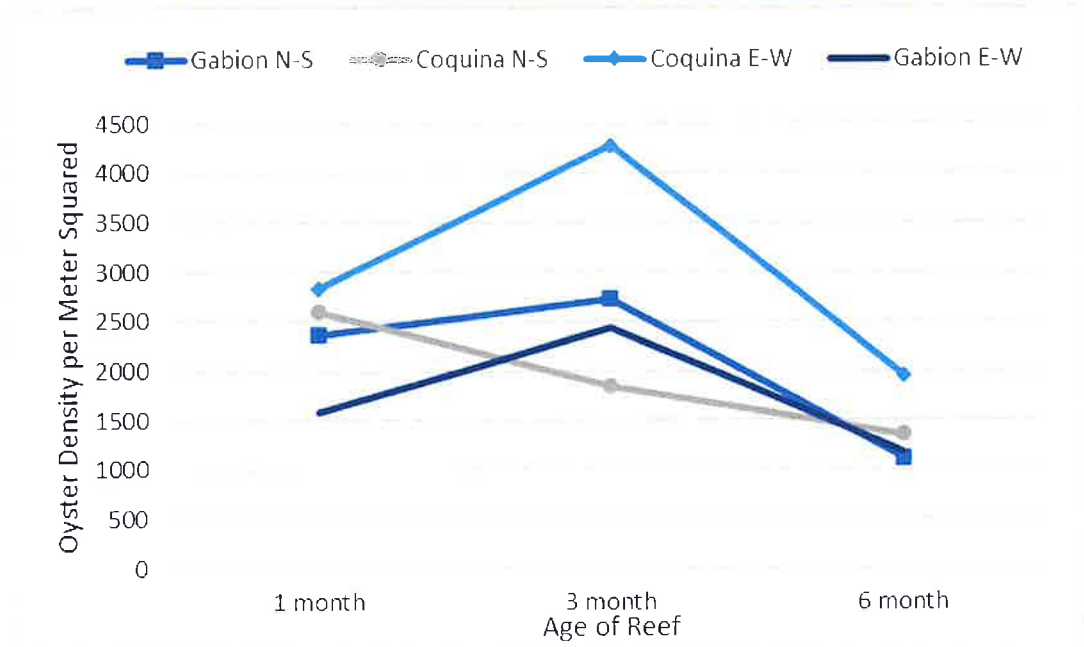


Figure 4-46 Long Description

The University of Central Florida has also monitored planted shorelines projects. Earlier projects (2018–2019) had higher success rates; 46–64% for red mangroves and 36–38% for sand cordgrass. In more recent projects, survival was initially similar to previous projects at equivalent ages. However, significant erosion was noted at two locations after fall 2020. Competition with terrestrial vegetation and erosion via waves and boat wakes are common causes of loss. In an effort to improve success and incorporate vegetation in hardened shorelines, variations of concrete-coated jute fiber mangrove planters are being tested. A pilot led by the Marine Resources Council had a mangrove survival rate of 57% after three months. At this location, *Spartina* spp. and muhly grasses were also planted in an upland area above a rip-rap shoreline, which had approximately 75% survival after three-months. Unfortunately, Hurricanes Ian and Nicole both significantly impacted this planted shoreline and significant mortality was observed. A new planter box is now being piloted by Cocoa Beach at the McNabb Park Oyster and Living Shoreline project. After 2 years, mangroves and smooth cordgrass survived and grew. However, degradation of the cement-infused jute planters has allowed soil to erode away from the plants, which may impact future growth and survival. The oyster bar at this location tested multiple materials and seeding methods. Populations on all three designs (gardened and spat deployed into gabions and gardened prisms) at this location declined in the first two years post-deployment, and there is no evidence of new oyster recruitment.

Data on oyster reef denitrification rates are very limited in Florida; therefore, a scientist with the University of Florida's Institute of Food and Agricultural Sciences was contracted to sample sediment from three oyster bar projects, one each from the North IRL, Central IRL, and Banana River Lagoon. This work builds on a previous study conducted for Brevard County on intertidal oyster reefs of different ages within the Mosquito Lagoon (Schmidt and Gallagher, 2017). Improved analysis techniques were employed on the subtidal oyster bars present in the County

to obtain sediment denitrification, percent organic matter, oxygen demand, and nitrate, ammonium, and phosphate flux rates across the sediment-water interface. Oysters were also included in some incubations for each site, which tended to alter most of the response variables tested, highlighting the importance of live organisms for filtration, biodeposition, and contributions to the microbiome. The net denitrification varied across seasons and locations and were within range of those in the northeast and mid-Atlantic regions of the United States. Although oyster reef sediments were not significantly different than reference sediments, denitrification rates increased when oysters were present in the samples. It is likely that the young age of the oyster bars and high energy of these sites may have limited the accumulation of biodeposits, affecting net denitrification rates. However, denitrification efficiencies were greater than 50% for most sites and seasons suggesting efficient nitrogen removal (Smyth, 2022).

The Brevard County Titusville Living Shoreline Project was completed in September 2025. This project installed 662 wave attenuation devices 400 feet from the shoreline. The wave attenuation devices protect the shoreline from wave energy and provide reef habitat structure for different organisms. Between the wave attenuation devices and shoreline, 3.6 acres of seagrass were planted, and the area was seeded with two million juvenile clams. The seagrass will be monitored quarterly. Two thousand linear feet of armored shoreline (i.e., riprap) was removed and replaced with over 14,000 native planting units to naturally stabilize the shoreline and provide nutrient reduction benefits. The planted shoreline will be monitored for a year to ensure that at least 80% of plants survive.

Clam Restoration

In the 2025 Plan Update, the Citizen Oversight Committee approved two clam restoration projects in the Indian River Lagoon. A task order for third-party monitoring of the two projects has been executed with the University of Central Florida.

Seagrass Restoration

Brevard County Natural Resources planted seagrass at two, 0.75-acre sites in the Indian River Lagoon adjacent to Hog Point, in Melbourne Beach, and William Manzo Park, in Titusville. The seagrass restoration used a variety of planting methods to test differences in planting density/heterogeneity, stabilization of planting, planting mosaics, and herbivory exclusion devices. The purpose of this study was to evaluate different restoration methods and determine which worked best in the lagoon. Planting was completed in early July 2024.

Seagrass at the Hog Point planting site showed a quick decline, and after multiple monitoring events with little to no seagrass present, it was decided that monitoring would be concluded after one year. The gabion oyster bar breakwater at the Hog Point site remains in place and had an oyster density of 5,313 oysters per square meter at the one-year monitoring event in June 2025. The seagrass project at William Manzo is continuing to be monitored for a second year.

Remote Sensing of Harmful Algal Blooms in IRL and Connected Waterways in Brevard County

The identification of algae bloom triggers and behaviors is vital to local efforts to manage the watershed. In 2021, Brevard County was awarded $290,972 from a Florida Department of Environmental Protection Water Protection Grant for development of innovative technologies to address harmful algal blooms. So far, remote sensing technologies are providing a cost-effective and encompassing approach to provide rapid identification of harmful algal bloom formation. With more data collection and analysis, it is anticipated that satellite imagery may be used to determine the harmful algal bloom lifecycle and identify hotspots of harmful algal bloom occurrences.

The scope of work began with the development, implementation, and analysis of satellite and unmanned aerial vehicle remote sensing of harmful algal blooms in the IRL. The European Space Agency Sentinel-2 and Sentinel-3 satellites were the primary sources of remote sensing data that provided Brevard County with weekly harmful algal bloom updates. Applied Ecology, Inc. performed spatiotemporal statistical analysis of these harmful algal blooms and corresponding water quality parameters. Applied Ecology, Inc. also flew an unmanned aerial vehicle equipped with a hyperspectral camera, which provided high resolution imagery of calibration areas, as well as on-the-ground data to improve the analysis of the satellite imagery. An additional $65,000 from the Florida Department of Environmental Protection extended the weekly monitoring in 2023 for approximately one year to coincide with the AECOM Algae Harvesting Project. The weekly mapping, data collection, and analysis for this project continues to be made available to interested agencies and researchers through an ArcGIS Online webapp.

The scope of work for this grant also included the development of a rapid harmful algal bloom identification and characterization process. This effort included a brief literature review of the recent research on IRL algae, a summary of recent chlorophyll-a monitoring in the lagoon, an assessment of satellite remote sensing for its suitability in estimating chlorophyll-a concentrations, and statistical analysis of how harmful algal blooms have varied within the IRL over space and time (2015–2021) as determined by satellite remote sensing.

As requested by Brevard County, a rapid assessment of the 2020 Titusville Sand Point Park sewage spill was performed. On December 19, 2020, the City of Titusville reported to the Florida Department of Environmental Protection that there was a release of over 7.2 million gallons of raw sewage into a stormwater pond at Sand Point Park along the IRL. The 2020 bloom event had reached its highest concentrations in the North IRL by September 2020, with concentrations of more than 150 micrograms per liter estimated chlorophyll-a throughout the North IRL. From September to December 2020, the estimated chlorophyll-a concentrations steadily decreased from a range of 90–154 micrograms per liter to 19–40 micrograms per liter. From January to February 2021, the variation in estimated chlorophyll-a peaked on February 3, 2021, at 56.1 micrograms per liter. The 2020 bloom in the North IRL was in decline prior to the sewage leak. There does not appear to be a corresponding increase in chlorophyll-a concentrations after the leak and the bloom concentrations in the Sand Point Park area of the IRL were not significantly different from other areas further from the leak.

One research objective was to evaluate the Sentinel derived data to determine the spatiotemporal variability of algal blooms harmful to the IRL. The first hypothesis of this objective was to determine if IRL harmful algal blooms were increasing in intensity, duration, and severity. A trio of novel harmful algal bloom metrics was created for use with Sentinel estimated chlorophyll-a: (1) Bloom Duration Index, which is a standard measure of the length of time a bloom lasts; (2) Bloom Intensity Index, which is a standard measure of bloom concentration; and (3) Bloom Severity Index, which is a combination of the first two indices and estimates the potential harm caused by long lasting, high concentration blooms at a given location. Using these indices, between 2017–2019 and 2020–2022, there appeared to be a decreasing trend in severity for the Northern-North IRL and Banana River Lagoon. However, there also appeared to be an increasing trend in the Bloom Severity Index for the Central-North IRL, Southern-North IRL, and North-Central IRL (Applied Ecology, 2023).

Additional analysis was performed using the indices to identify the relationship between blooms and their potential drivers. The influence of rainfall and septic system density was examined for segments of the North IRL between the cities of Cocoa and Melbourne. These segments were

identified to have significantly higher Bloom Severity Index during months with very low rainfall, while there was no significant difference in Bloom Severity Index during wet months. A significantly higher Bloom Severity Index was identified in the northernmost North IRL both overall and during low rainfall periods. As the southern North IRL had a higher density of septic systems and modeled nutrient inputs from its drainage area, this may suggest that the elevated Bloom Severity Index in the north segment may be due to other factors than septic systems (Applied Ecology, 2023).

To assess the impact of muck sediments and their removal on bloom activity, the Bloom Severity Index for the area near the mouth of the Eau Gallie River was compared to the overall Bloom Severity Index of the nearby North IRL segment. Both prior to and during the dredging project, the Bloom Severity Index around the mouth of the Eau Gallie River was significantly higher than the overall segment. This suggests that for the Eau Gallie River, the presence of muck may have been leading to elevated Bloom Severity Index. Following the muck dredging completion in March 2019, the portion of the segment next to the mouth of the river had significantly lower Bloom Severity Index than the entire segment suggesting that the removal of the muck in the Eau Gallie River helped reduce bloom activity (Applied Ecology, 2023).

Applied Ecology continues to analyze satellite imagery for the County's weekly harmful algal bloom reports. Along with the weekly reports, additional research questions are being addressed. An evaluation of wind in relation to algal activity was conducted in 2025, which found that Bloom Duration Index values were greater under calm wind conditions compared to breezy wind conditions in all segments of the Indian River Lagoon. This may suggest that during periods of elevated wind energy, the mixing of the water column and wind-driven currents disperse phytoplankton in the water column, which then results in a lower phytoplankton concentration observed at a point location. Then, as wind energy decreases, the rate of phytoplankton growth overtakes its dispersion, resulting in a negative relationship. Deeper areas of the lagoon maintained cold spots regardless of wind conditions, likely due to deeper water reducing wave stress on bottom sediments. During breezy wind conditions, Bloom Duration Index hotspot locations reflected the influence of long wind lines that increase wave fetch, move and stimulate algal activity, and concentrate alga in lees, eddies, and against barriers such as causeways. Under calm wind conditions, hot spots increased with proximity to developed shorelines in the watershed. This study demonstrated wind as more of a mediator of harmful algal bloom activity rather than a driver and shows that many confounding relationships underpin the complexity of harmful algal activity in a changing ecosystem (Applied Ecology, 2025b).

Indian River Lagoon Circulation and Water Quality Forecast Model

In 2025, Brevard County and Florida Institute of Technology partnered to secure an innovative technology grant from the state to use artificial intelligence to pull data in near real time from satellites and in-situ continuous monitoring sensors and use numerical modeling to generate seven to ten-day forecasts of water quality and algal bloom conditions. Dr. Gary Zarillo will build a continuously running, real-time hydrodynamic water quality forecast model for the Indian River Lagoon system, including high spatial resolution in the pilot inflow project area. Numerical model predictions will use Delft3D model capability to couple hydrodynamics with ecosystem dynamics. By integrating data on water level flows, circulation, and freshwater inputs, along with pump forced inflows, detailed information on nutrient cycling, algal growth, and submerged aquatic vegetation, the model can generate high-resolution predictions of water quality and habitat conditions under time-varying environmental conditions.

The modeling effort will provide continuous predictions of Indian River Lagoon water quality at high spatial resolution. Large seasonal and interannual shifts in the coastal ocean sea level of Florida and along the southeast coast of the United States are caused by changes in Gulf Stream flow. The timing of higher and lower sea levels propagating into the Indian River Lagoon system has primary control over estuarine residence time. Thus, the modeling will dynamically include the impacts of the Gulf Stream through data assimilation at seaward model boundaries. The model will predict and track water quality and potential harmful algal bloom through the lagoon system. Model forecasts will be disseminated to the public and stakeholders by an interactive web-based data portal.

4.4.4. Research Needs

Although the Save Our Indian River Lagoon Project Plan does not fund research, it should be recognized that many important research questions need attention. Universities, state agencies, and non-profit organizations are currently leading Indian River Lagoon (IRL) research efforts. This plan acknowledges the research needs identified in the Florida Department of Environmental Protection basin management action plans, St. Johns River Water Management District 2011 Superbloom Report, and IRL National Estuary Program Comprehensive Conservation and Management Plan, which are summarized below.

- Research needs identified in the basin management action plans (Florida Department of Environmental Protection 2021a, 2021b, and 2021c):
    - Collect data to update the bathymetry for the IRL watershed, which would be used in evaluations of seagrass depth limits.
    - Continue coordinated monitoring of phytoplankton, periphyton, drift algae, and macroalgae in the basin to gain insights into the cycling of nutrients as well as toxin production and release.
    - Analyze storm event monitoring data at the major outfalls.
    - Refine load estimates delivered by baseflows and modeling the contributions of baseflows.
    - Synthesize data on nutrient flux/internal recycling of legacy nutrient loads held within IRL sediments and exchanged with the water column.
    - Complete the development, calibration, and validation of a water quality model that can be used to design, site, and prioritize projects that reduce nutrient loads (e.g., Hydrologic Simulation Program FORTRAN or Spatial Watershed Iterative Loading model coupled with the Environmental Fluid Dynamics Code model, or another model that generates predictions of conditions that may be favorable for seagrass growth).

- Research needs identified in the Comprehensive Conservation and Management Plan revision (IRL National Estuary Program 2019):
    - Undertake further studies to quantify the impacts of septic systems on the IRL with a focus on identifying high priority "problem" and "potential problem" areas.
    - Develop, improve, and implement best management practices and education programs for stormwater management and freshwater discharges.
    - Determine the impacts of atmospheric deposition of nutrients and other pollutants on the nutrient budget, water quality, and resources of the IRL.
    - Support implementation, review, and update of IRL total maximum daily loads as needed and as best available science evolves.
    - Work to continue, expand, update, and improve the IRL species inventory.

- Research and develop new and improved wetland best management practices with a focus on understanding wetland responses to sea level rise and climate change.
- Continue to support and expand research initiatives and coordinated finfish and shellfish management strategies specific to the IRL.
- Prepare a Risk-Based Vulnerability Assessment and Adaptation Plan for the IRL.
- Develop a comprehensive IRL monitoring plan.
- Advance the ten research priorities in the 2018 Looking Ahead – Science 2030 Report.
- Update the IRL economic analysis produced by the Treasure Coast and East Central Florida Regional Planning Councils every five years.
- Support advancements in hydrological model development, verification, and application.
- Continue evaluation of options to enhance water flow through engineering solutions that have well defined water quality and ecological outcomes.
- Complete muck mapping of the entire IRL, prioritize muck dredging projects and site selection for seagrass and filter feeder restoration projects, and reduce source contributions of sediment and biomass that result in muck formation.
- Track emerging technologies, innovative approaches or alternatives to dredging, muck capping, upstream controls of muck transport, more efficient approaches to dewatering, enhanced pollutant removal in post-dredge water, and enhanced muck management to improve process efficiency and identify beneficial uses of muck.
- Monitor and research to better understand contaminants of emerging concern within the IRL.
- Research spatially explicit data on the extent and condition of existing filter feeder habitat.
- Research and report on science-based siting, planning, design, and construction criteria for living shorelines.
- Support research and assessment to identify and map suitable habitats and spawning habitats for forage fishes and track population size and health.

- Research needs identified in 2011 Superbloom Report (St. Johns River Water Management District 2016b):
  - Garner an improved understanding of the ideal biological and physiological conditions and tolerances of picocyanobacteria (small cyanobacteria) and Pedinophyceae (green microflagellate), including their ability to use organic forms of nutrients, their ability to fix nitrogen, their nutrient uptake rates, their reproductive rates, and their defenses against grazers.
  - Maintain or expand water quality sampling to ensure spatiotemporal variations are captured adequately, which could include continuous monitoring of various parameters to fill gaps between monthly samples.
  - Develop an improved understanding of the physiological tolerances of drift algae and seagrasses, especially man-made conditions that could be mitigated to improve health or natural resilience.
  - Maintain or expand surveys of drift algae and seagrasses to improve the capacity to evaluate their role in nutrient cycles.
  - Improve the ability to model bottom-up influences from external and internal nutrient loads, including atmospheric deposition, surface water runoff, groundwater inputs, diffusive flux from muck, decomposition of drift algae, and cycling and transformation of nitrogen and phosphorus.
  - Enhance surveys of bacterioplankton to improve the understanding of nutrient cycling.

- Improve surveys of potential zooplanktonic, infaunal, epifaunal, and fish grazers to enhance the understanding of spatiotemporal variation in top-down control of phytoplankton blooms.
- Evaluate grazing pressure exerted by common species to enhance the understanding of top-down control of phytoplankton blooms.

Section 5. Project Funding

5.1. Project Funding, Schedule, and Scope Adjustments

5.1.1. Contingency Fund Reserve

The 2018 Update established a Contingency Fund Reserve (Reserve) that will be included with the development and adoption of the County's budget each fiscal year. The Reserve will amount to 5% of the total Trust Fund dollars that are budgeted for all approved projects scheduled to occur or move ahead in that fiscal year. This includes projects in the Save Our Indian River Lagoon Project Plan (Plan), including additions captured in annual updates or supplements. The purpose of the Reserve is to fund emergency response to harmful algal blooms and major fish kills; cover reasonable funding shortfalls that may occur during project implementation and would delay implementation or completion of that project unless a ready source of funds is on hand; provide funding for projects (whether during the term of the project or upon project completion) that remove additional nutrients beyond the amount originally planned or anticipated in the project cost-share agreement; or move projects forward ahead of schedule if ready to proceed.

If a cost increase for an individual project is less than 10% of the amount identified in the project's cost-share agreement or the estimated cost or eligible amount of Trust Fund cost-share stated in the Save Our Indian River Lagoon Project Plan, as updated, then additional funding from the Reserve may be allocated to the project, as needed, in accordance with Brevard County approvals, policies, and administrative orders. For projects that are contracted with government entities and other partners that encounter cost overruns, the cost-share agreement may be increased up to 10% over the eligible cost-share amount stated in Attachment E of the respective cost-share agreement. Such an amendment will be executed by the authorized County representative and the appropriate representative or authorized agent of the government entity or partnering organization.

For project cost increases that exceed inflation rates and are more than 10% above the amount identified in the project's cost-share agreement or the estimated cost or eligible amount of Trust Fund cost-share stated in the Save Our Indian River Lagoon Project Plan, as updated, County staff will evaluate the project circumstances and present findings to the Citizen Oversight Committee for review. The Citizen Oversight Committee will recommend rejection, modification, or approval of the funding request and provide such recommendation to the County representative authorized to sign the amendment. Staff will provide the Citizen Oversight Committee's recommendation to the County representative authorized to sign the request based on the authority granted by the County Commission.

The Reserve may also be used to increase funding for approved projects (whether during the term of the project or upon project completion) that provide greater nutrient reduction benefits than planned or anticipated if funding could be made available before the next Plan update. If a project can be or was expanded or altered to provide greater nutrient reduction benefits than planned, contingency funds can be allocated at the rate for that project type established in the most recently adopted Plan update in the table titled "Cost-share Offered for Project Requests Submitted for the 2026 Update" (**Table 4-44**), as adjusted for inflation. In no case shall the governmental entity or partnering organization request Reserve funds that result in the total cost-share award exceeding the actual project costs incurred by the recipient, minus other grants or donations for that project.

5.1.2. Schedule Acceleration

If a project has already been approved by the County Commission and is: (1) ready to move forward earlier than scheduled in the Plan; (2) consistent with temporal sequencing goals in the Plan; and (3) recommended by the Citizen Oversight Committee, and if sufficient Trust Fund dollars are available for the project, then the County Manager (for budget changes less than $200,000) or County Commission (in any circumstance) are authorized to adjust the project schedule to ensure that approved projects funded in the Plan move forward as soon as feasible. This authority allows projects to move forward as soon as they are ready and funding is available.

5.1.3. Scope Reduction

If a project is not able to be fully completed as initially approved in the Plan due to extenuating circumstances including, but not limited to, permitting restrictions, loss of additional funding, or other situations beyond the entity's control, then the project may be downsized, within the framework of the already-approved project, and upon recommendation by the Citizen Oversight Committee. This recommendation will then be brought to the authorized County representative for review and, if acceptable, approval of an amendment to the costs and scope of the project's cost-share agreement. The revised funding amount will be based on the pounds of nitrogen removal estimated for the reduced project multiplied by the eligible cost-share per pound of total nitrogen removed that is adopted for that project type in the most recent Save Our Indian River Lagoon Project Plan plus inflation. If a project is downsized between Plan updates, the revised Plan costs and nutrient load reductions will be reflected in the next annual Plan update.

5.1.4. Inflation

The Reserve includes an additional amount of funding to account for the impact of inflation on project delivery costs. Inflation is estimated by applying the Consumer Price Index to project costs, compounded for the number of years between the year the project cost was estimated and the year that the project is expected to be constructed. For both the 2024 Plan Update and the 2025 Plan Update, inflation is applied and compounded annually for the years between when a project was added to the plan and when its construction is now anticipated. Construction costs have increased more than the Consumer Price Index. For projects that are not yet completed, an inflation factor of 2.6% is applied for Years 0–4, 7.8% for Year 5, 17.3% for Year 6, 6.5% for Year 7, and 3.5% for Years 8–10.

5.1.5. Contract Amendments

Amendments to the project cost-share agreements shall follow one of the three approval processes identified below:

1. If a cost increase for an individual project is less than 10% of the cost identified in the project's cost-share agreement, then the authorized County representative is eligible to review and, if acceptable, approve an amendment to the project cost-share agreement.
2. If a cost increase for an individual project is equal to or less than the inflation allocated for that project, then the authorized County representative is eligible to review and, if acceptable, approve an amendment to the project cost-share agreement.
3. If a cost increase above inflation for an individual project is more than 10% of the cost identified in the project's cost-share agreement, then County staff will bring the item before the Citizen Oversight Committee for a recommendation to reject, modify, or approve the funding request, and this recommendation will then be brought to the

authorized County representative for review and, if acceptable, approval of an amendment to the project cost-share agreement.

5.2. Revenue Projection Update

Brevard County calculates a new estimate for total Save Our Indian River Lagoon Trust Fund revenues annually. The estimate for the 2026 Plan Update is based on the actual revenues for 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, and the first nine months of 2025. The October, November, and December 2024 revenues were used to estimate the revenue for the remaining three months of 2025 by using a 0.4% decline due to the state's adoption of new and expanded sales tax exemptions. The 2026 revenues assume 0.017% annual growth. The new estimate for the total tax revenue is $583,434,536, or an average of $58.3 million per year. This current estimate is $24.3 million per year more than the $34 million per year estimate in the original Save Our Indian River Lagoon Plan, which was based on 2016 dollars, and $2,300,233 less than the projection in the 2025 Plan Update.

5.3. Project Funding Allocations

Figure 5-1 summarizes the funding allocated by category (Reduce, Remove, Restore, and Respond) in this 2026 Plan Update. **Figure 5-2** shows the funding allocations by project type from the original plan through the 2026 Plan Update.

Figure 5-1. Funding for Reduce, Remove, Restore, and Respond Projects

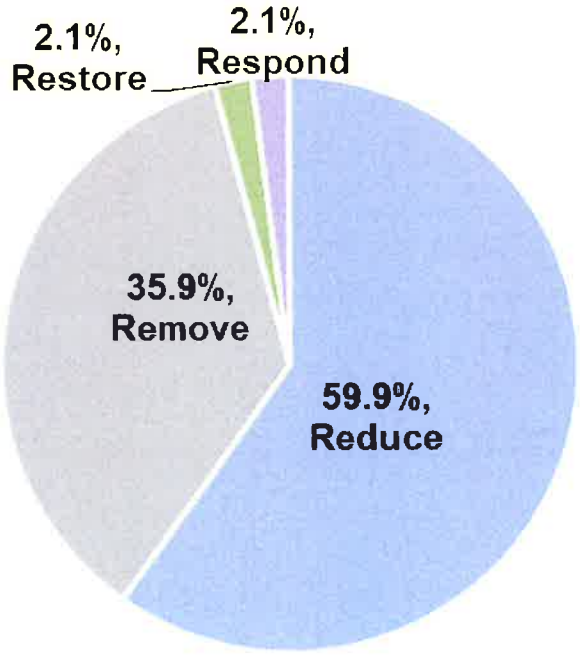


Figure 5-2. Evolution of Project Funding Allocations

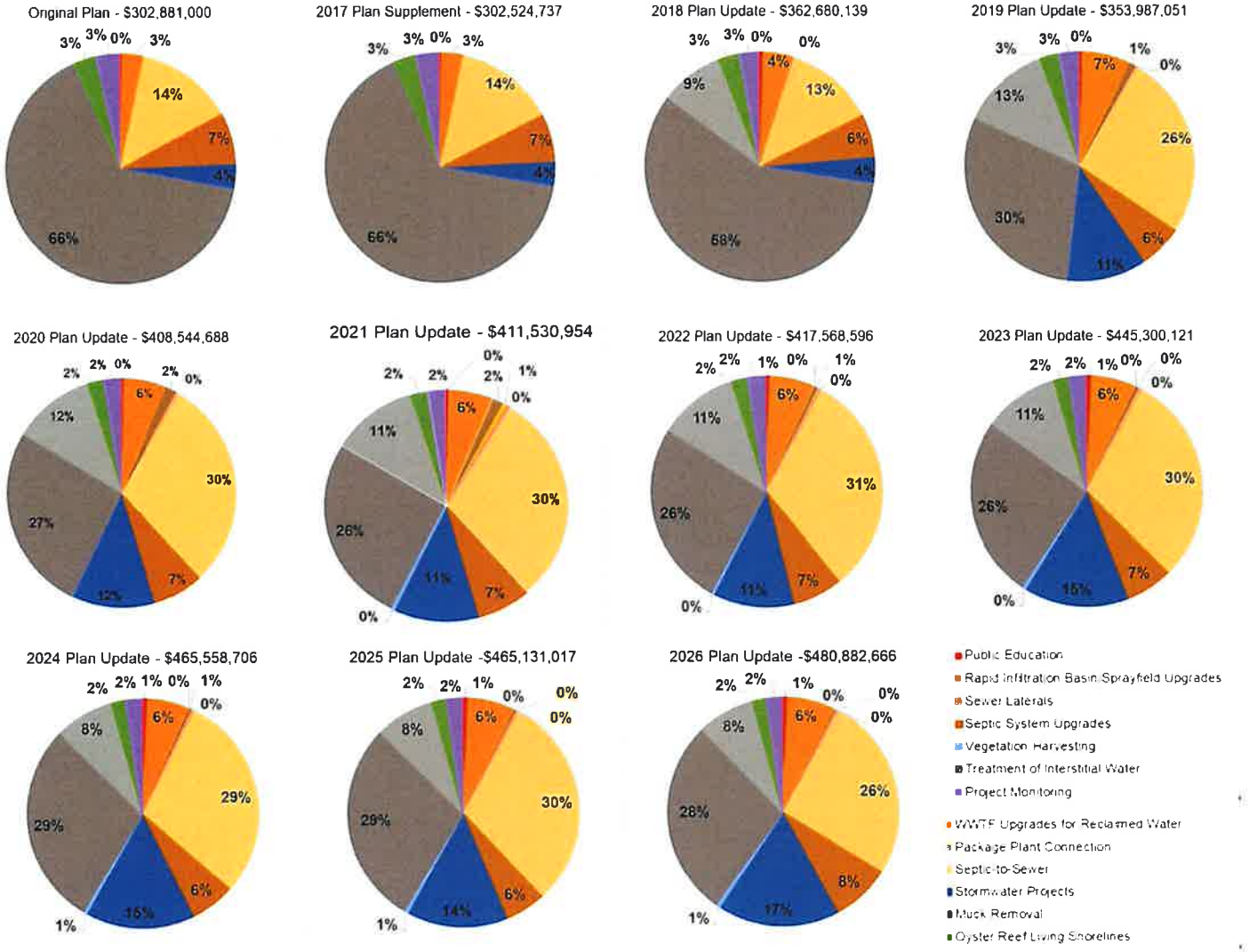


Figure 5-2 Long Description

Section 6. Summary of the Plan through the 2026 Update

6.1. Progress Toward the Local Targets for Maximum Total Loads

The County has been working with its municipalities, Florida Department of Transportation District 5, and Patrick Space Force Base to update total loading estimates to the Indian River Lagoon (IRL) and revise the total maximum daily loads for nitrogen and phosphorus using the best available data and more detailed modeling than previously available. Based on this process, five-month total maximum daily loads, which target the load reductions needed during the seagrass growing period (January – May), were proposed in addition to annual total maximum daily loads that protect water quality year-round. These load reductions specifically target water quality conditions needed for restoring IRL seagrass beds to provide crucial habitat for fish and other marine life. Therefore, as this Save Our Indian River Lagoon Project Plan was developed, the total nitrogen (TN) and total phosphorus (TP) reductions from the project types that **Reduce** incoming load were compared to the proposed five-month total maximum daily loads for each sub-lagoon. After satisfying the five-month total maximum daily loads, annual load reductions for each project were compared to the 12-month total maximum daily loads. In all cases, the projects identified to meet the five-month total maximum daily loads were sufficient to meet the proposed 12-month total maximum daily loads. As projects are implemented, progress toward meeting the five-month and full-year total maximum daily loads is being tracked.

Only the projects that reduce external loading to the lagoon, not muck removal or living shorelines, were used to meet the total maximum daily loads. Even though decades of treatment projects to reduce nutrient loads have been completed to date, only the reductions associated with basin management action plan projects that were completed between January 1, 2010 (the last year of the Spatial Watershed Iterative Loading model period) and February 29, 2016 (the end of the last basin management action plan reporting period when the Save Our Indian River Lagoon Project Plan was developed) were included in the load reduction calculations as these projects also provide nutrient load reductions that have occurred after the period of record used to develop the proposed total maximum daily load updates. In Zone A of the Central IRL, the reductions from the St. Johns River Water Management District's C-1 re-diversion project, which was implemented with cost-share funding from the Florida Department of Environmental Protection and Brevard County, were also included as this project results in significant load reductions that were not included in the February 29, 2016, basin management action plan annual progress report. As shown in **Table 6-1**, **Table 6-3**, and **Table 6-5**, the projects proposed in this plan plus the recently completed basin management action plan projects and C-1 re-diversion project exceed the five-month reductions called for by the proposed total maximum daily load updates.

The total project reductions were also compared to the full year estimated loading to the IRL from the Spatial Watershed Iterative Loading model. As shown in **Table 6-2**, **Table 6-4**, and **Table 6-6**, the proposed projects in this plan, as well as the recently completed basin management action plan projects and C-1 re-diversion project, achieve significant reductions of the overall loading to the lagoon and exceed the full year reductions called for by the proposed local total maximum daily loads.

Table 6-1. Banana River Lagoon Project Reductions to Meet Five-Month Total Maximum Daily Load

Project	Total Nitrogen Reductions (pounds per year)	Total Phosphorus Reductions (pounds per year)
Fertilizer Ordinance Implementation	2,945	603
Future Education	2,163	155
Wastewater Treatment Facility Upgrade for Reclaimed Water	1,050	285
Sewer Laterals	412	78
Septic-to-Sewer	12,909	204
Septic System Upgrade	1,312	0
Stormwater Projects	13,698	1,976
Vegetation Harvesting	2,791	426
Basin Management Action Plan Projects (2010-February 2016)	5,303	1,440
Total	***42,583***	***5,167***
Proposed Total Maximum Daily Load Reductions (five-month)	***30,337***	***2,737***
Percent of Proposed Total Maximum Daily Load Reductions Achieved	***140.4%***	***188.8%***

Table 6-2. Banana River Lagoon Project Reductions Compared to Full Year Loading

Project	Total Nitrogen Reductions (pounds per year)	Total Phosphorus Reductions (pounds per year)
Fertilizer Ordinance Implementation	7,068	1,446
Future Education	5,191	372
Wastewater Treatment Facility Upgrade for Reclaimed Water	2,520	685
Sewer Laterals	988	188
Septic-to-Sewer	30,982	489
Septic System Upgrade	3,149	0
Stormwater Projects	32,876	4,742
Vegetation Harvesting	6,698	1,022
Basin Management Action Plan Projects (2010-February 2016)	12,726	3,456
Total	***102,198***	***12,400***
Starting Load (full year)	***477,020***	***44,269***
Percent of Starting Load Reduced	***21.4%***	***28.0%***
Proposed Full-Year Total Maximum Daily Load Percent Reductions	***9.0%***	***9.6%***

Table 6-3. North IRL Project Reductions to Meet Five-Month Total Maximum Daily Load

Project	Total Nitrogen Reductions (pounds per year)	Total Phosphorus Reductions (pounds per year)
Fertilizer Ordinance Implementation	8,070	1,651
Future Education	5,927	424
Wastewater Treatment Facility Upgrade for Reclaimed Water	8,304	949
Sewer Laterals	1,118	To be determined
Package Plant Connection	380	To be determined
Septic-to-Sewer	20,809	150
Septic System Upgrade	7,258	0
Stormwater Projects	51,842	8,078
Vegetation Harvesting	2,698	287
Basin Management Action Plan Projects (2010-February 2016)	16,983	3,180
Total	***123,389***	***14,719***
Proposed Total Maximum Daily Load Reductions (five-month)	***61,447***	***7,410***
Percent of Proposed Total Maximum Daily Load Reductions Achieved	***200.8%***	***198.6%***

Table 6-4. North IRL Project Reductions Compared to Full Year Loading

Project	Total Nitrogen Reductions (pounds per year)	Total Phosphorus Reductions (pounds per year)
Fertilizer Ordinance Implementation	19,368	3,962
Future Education	14,225	1,018
Wastewater Treatment Facility Upgrade for Reclaimed Water	19,929	2,278
Sewer Laterals	2,682	To be determined
Package Plant Connection	911	To be determined
Septic-to-Sewer	49,941	360
Septic System Upgrade	17,420	0
Stormwater Projects	124,421	19,387
Vegetation Harvesting	6,475	689
Basin Management Action Plan Projects (2010-February 2016)	40,758	7,632
Total	***296,130***	***35,326***
Starting Load (full year)	***988,847***	***99,340***
Percent of Starting Load Reduced	***29.9%***	***35.6%***
Proposed Full-Year Total Maximum Daily Load Percent Reductions	***11.4%***	***11.4%***

Table 6-5. Central IRL Project Reductions to Meet Five-Month Total Maximum Daily Load

Project	Total Nitrogen Reductions (pounds per year)	Total Phosphorus Reductions (pounds per year)
Fertilizer Ordinance Implementation	8,108	1,659
Future Education	5,955	426
Wastewater Treatment Facility Upgrade for Reclaimed Water	24,885	6,285
Sewer Laterals	1,053	To be determined
Rapid Infiltration Basin/Sprayfield	132	To be determined
Septic-to-Sewer	9,411	62
Septic System Upgrade	9,475	0
Stormwater Projects	25,085	2,398
Vegetation Harvesting	8,558	693
C-1 Re-Diversion	61,667	5,417
Basin Management Action Plan Projects (2010-February 2016)	378	243
Total	***154,707***	***17,183***
Proposed Total Maximum Daily Load Reductions (five-month) *	***67,547***	***8,151***
Percent of Proposed Total Maximum Daily Load Reductions Achieved	***229.0%***	***210.8%***

* The total maximum daily load reductions are for Zone A only; however, some of the septic system projects are in Zone SEB. Sufficient projects exist to achieve the Zone A reductions without the Zone SEB projects (refer to **Section 2.1**).

Table 6-6. Central IRL Project Reductions Compared to Full Year Loading

Project	Total Nitrogen Reductions (pounds per year)	Total Phosphorus Reductions (pounds per year)
Fertilizer Ordinance Implementation	19,460	3,981
Future Education	14,293	1,023
Wastewater Treatment Facility Upgrade for Reclaimed Water	59,725	15,085
Sewer Laterals	2,526	To be determined
Rapid Infiltration Basin/Sprayfield	317	To be determined
Septic-to-Sewer	22,587	148
Septic System Upgrade	22,741	0
Stormwater Projects	60,204	5,754
Vegetation Harvesting	20,538	1,664
C-1 Re-Diversion	148,000	13,000
Basin Management Action Plan Projects (2010-February 2016)	908	582
Total	***371,299***	***41,237***
Starting Load (full year) *	***698,937***	***95,051***
Percent of Starting Load Reduced	***53.1%***	***43.4%***
Proposed Full-Year Total Maximum Daily Load Percent Reductions	***17.8%***	***16.3%***

* The total maximum daily load reductions are for Zone A only; however, some of the septic system projects are in Zone SEB. Sufficient projects exist to achieve the Zone A reductions without the Zone SEB projects (refer to **Section 2.1**).

In addition to the projects that address the external nutrient loading summarized above, the plan includes muck flux, interstitial water treatment, oyster bars, and planted shoreline projects that

will significantly reduce internal nutrient loading within the IRL itself. The annual reductions from these projects are summarized in **Table 6-7**, along with the percentage of nutrients from 2023 estimates of muck flux that would be reduced by these projects.

Table 6-7. Annual Muck Flux, Muck Interstitial Water, Oyster Bar, and Planted Shoreline Project Benefits by Sub-lagoon Compared to Annual Nutrient Loadings from Muck Flux

Project Type	Banana River Lagoon Total Nitrogen (pounds per year)	Banana River Lagoon Total Phosphorus (pounds per year)	North IRL Total Nitrogen (pounds per year)	North IRL Total Phosphorus (pounds per year)	Central A Total Nitrogen (pounds per year)	Central A Total Phosphorus (pounds per year)
Muck Flux Reduction	142,855	13,463	76,552	4,717	15,795	567
Total Removal of Nutrients from Interstitial Water/10 Years	39,361	1,967	10,642	954	0	69
Oyster Bars	5,193	168	12,043	308	5,025	149
Clams	284	0	2,087	528	1,870	330
Planted Shorelines	74	25	192	66	174	60
Total Project Reductions	***187,767***	***15,623***	***101,516***	***6,573***	***22,864***	***1,175***
Estimated Muck Flux Loading	***799,482***	***50,778***	***313,294***	***31,007***	***53,280***	***2,880***
Percent of Muck Flux Reduced	***23.5%***	***30.8%***	***32.4%***	***21.2%***	***42.9%***	***40.8%***

6.2. Plan Summary

Table 6-8 summarizes all the project types, as well as their estimated costs, total nitrogen (TN) and total phosphorus (TP) reductions, and costs per pound of TN and TP removed. **Table 6-9** presents cost-effectiveness in three ways: (1) based on allocation of Save Our Indian River Lagoon Trust Fund dollars when the project was added to the plan; (2) based on allocation after amendments, including addition of inflation and contingency funds; and (3) based on total costs, including all other sources of funds for the project including grants and city match.

The information from **Table 6-8** on the project reductions and cost effectiveness was used to determine the schedule for implementing the projects (see **Table 6-10**). Projects that could achieve large reductions quickly, such as fertilizer reductions and wastewater treatment facility upgrades, as well as the most cost-effective septic-to-sewer, and stormwater projects were prioritized for earliest implementation. This prioritization allows for the reductions to occur as quickly as possible while best using available funding sources. Project scheduling also considered the timing of upstream reductions with downstream removals, where feasible.

The timeline in **Table 6-10** is shown in years after funding from the Save Our Indian River Lagoon sales tax became available. Each year corresponds to the County's fiscal year, which is October 1st through September 30th. Year 1 started on October 1, 2017, which was just before revenues would have begun to accrue if the funding source had been a property tax, as initially considered. When the referendum approved by the voters was a sales tax, collections began in January 2017 and the first revenue check was received by the County in March 2017. Therefore, a plan update was adopted in March 2017 to begin plan implementation in Year 0. **Table 6-10** includes the cost estimates developed as part of the original plan or provided in the year new or substitute projects were added to the plan, adjusted for inflation.

As noted in **Section 4.4.1**, an adaptive management approach is being used in the implementation of this plan. As projects are completed and information on the actual

construction costs, timeline, and reductions are obtained, the plan will continue to be adjusted, as needed, to ensure that the most cost-effective projects are being used to meet the Indian River Lagoon (IRL) restoration goals.

Table 6-8. Summary of Projects, Estimated TN and TP Reductions, and Costs

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
-	**Public Education**	-	-	-	-	-
58a	Expanded Fertilizer Education	$881,000	6,613	$133	813	$1,084
58b	Grass Clippings Campaign	$306,000	17,800	$17	1,200	$255
58c	Septic System Maintenance Education	$431,000	4,466	$97	To be determined	To be determined
245	Irrigation Education Campaign	$306,000	1,530	$200	Not applicable	Not applicable
246	Stormwater Best Management Practice Maintenance Education	$306,000	3,300	$93	400	$765
193	Oyster Gardening Program	$300,000	Not applicable	Not applicable	Not applicable	Not applicable
227	Restore Our Shores: Community Collaborative	$1,000,000	Not applicable	Not applicable	Not applicable	Not applicable
-	**Wastewater Treatment Facility Upgrades for Reclaimed Water**	-	-	-	-	-
99	Cocoa Beach Water Reclamation Facility Upgrade	$945,000	2,520	$375	685	$1,380
2016-02a, 2016-2b	City of Titusville Osprey Wastewater Treatment Facility Phase 1 and 2	$8,219,826	12,286	$669	Not applicable	Not applicable
283	Port Saint John Wastewater Treatment Plant Replacement	$981,818	2,278	$431	2,278	$431
2016-17	City of Palm Bay Water Reclamation Facility	$3,634,900	20,240	$180	102	$35,636
59	City of Melbourne Grant Street Water Reclamation Facility	$6,769,500	18,052	$375	9,671	$700
138	Ray Bullard Water Reclamation Facility Biological Nutrient Removal Upgrades	$5,560,000	11,360	$489	3,302	$1,684
216	City of Rockledge Flow Equalization Basin Project	$2,344,222	5,365	$437	Not applicable	Not applicable
234	South Brevard Water Reclamation Facility	$1,653,028	4,316	$383	863	$1,915
282	South Beaches Wastewater Treatment Plant Upgrade	$2,471,354	5,734	$431	1,147	$2,155
286	The Cove Package Plant Upgrade	$9,913	23	$431	To be determined	To be determined
-	**Rapid Infiltration Basin/Sprayfield Upgrades**	-	-	-	-	-
6	Long Point Park Upgrade	$22,207	163	$136	To be determined	To be determined
196	Sterling House Condominium Sprayfield	$60,000	154	$390	To be determined	To be determined
-	**Package Plant Connection**	-	-	-	-	-
192	Oak Point Wastewater Treatment Facility Improvements	$279,000	186	$1,500	0	Not applicable
237	Willow Lakes Recreational Vehicle Park	$1,087,500	725	$1,500	To be determined	To be determined
-	**Sewer Laterals**	-	-	-	-	-
63a	Countywide Repair/Replacement	$633,808	6,196	$102	188	$3,371

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
63b	Satellite Beach Lateral Smoke Testing	$202,210	Not applicable	Not applicable	Not applicable	Not applicable
100	Osprey Basin Lateral Smoke Testing	$114,769	Not applicable	Not applicable	Not applicable	Not applicable
114	Barefoot Bay Lateral Smoke Testing	$32,873	Not applicable	Not applicable	Not applicable	Not applicable
115	South Beaches Lateral Smoke Testing	$84,304	Not applicable	Not applicable	Not applicable	Not applicable
116	Merritt Island Lateral Smoke Testing	$246,630	Not applicable	Not applicable	Not applicable	Not applicable
-	**Septic-to-Sewer**	-	-	-	-	-
2016-47	Sykes Creek - Zone N	$4,425,425	2,784	$1,590	26	$170,209
2016-48	Sykes Creek - Zone M	$2,858,087	1,798	$1,590	16	$178,630
2016-49	Sykes Creek - Zone T	$5,341,030	3,360	$1,590	43	$124,210
2019-29	South Banana - Zone B	$1,372,500	915	$1,500	12	$114,375
145	Merritt Island - Zone F	$1,100,000	1,292	$851	21	$52,381
146	Merritt Island - Zone C	$1,580,000	1,419	$1,113	13	$121,538
147	Sykes Creek - Zone R	$7,827,120	5,040	$1,553	64	$122,299
151	Merritt Island - Zone G	$11,784,164	7,588	$1,553	228	$51,685
222	Hedgecock/Grabowsky and Desoto Fields	$121,500	81	$1,500	1	$121,500
238	Kelly Park	$135,000	90	$1,500	0	Not applicable
240	Rotary Park	$156,000	104	$1,500	0	Not applicable
2016-16	Banana Septic System 144 Quick Connections	$1,908,000	3,224	$592	To be determined	To be determined
2016-31/32	City of Cocoa - Zones J and K	$5,622,000	3,748	$1,500	27	$208,222
2016-35	South Beaches - Zone A	$1,959,000	1,306	$1,500	11	$178,091
109	City of Titusville - Zones A-G	$1,201,392	1,563	$769	5	$240,278
203	South Central - Zone A	$8,258,854	5,318	$1,553	37	$223,212
150	South Central - Zone D (Brevard County)	$4,774,500	3,387	$1,410	27	$176,833
50b	South Central - Zone C	$5,492,332	5,146	$1,067	41	$133,959
2020-34	Pineapple Avenue Sewer Conversion	$1,701,972	1,688	$1,008	18	$94,554
2019-27	Sharpes - Zone A	$7,872,000	5,248	$1,500	54	$145,778
2019-36	South Beaches - Zone O	$133,488	54	$2,472	1	$133,488
2019-37	South Beaches - Zone P	$300,348	242	$1,241	3	$100,116
1	Breeze Swept Septic-to-Sewer Connection	$880,530	2,002	$440	41	$21,476
2a	Merritt Island Septic Phase Out Project	$320,268	2,501	$128	21	$15,251
61	Riverside Drive Septic-to-Sewer Conversion	$262,044	305	$859	3	$87,348
148	North Merritt Island - Zone E	$5,104,711	3,287	$1,553	65	$78,534
152	Sharpes - Zone B	$4,038,000	2,692	$1,500	39	$103,538

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
153	Cocoa - Zone C	$3,960,150	2,550	$1,553	18	$220,008
190	Bowers Septic-to-Sewer	$147,000	120	$1,225	2	$73,500
191	Kent and Villa Espana Septic-to-Sewer Conversion	$710,000	542	$1,310	10	$71,000
241	Manatee Cove	$36,000	24	$1,500	0	Not applicable
242	Riverwalk	$6,000	4	$1,500	0	Not applicable
295	South Tropical Trail/Kadlac Drive Sewer Extension	$251,586	162	$1,553	2	$125,793
2016-18	North IRL Septic System 463 Quick Connections	$6,018,000	11,339	$531	To be determined	To be determined
2016-39	City of Palm Bay – Zone A	$2,817,256	2,136	$1,319	22	To be determined
4	Hoag Sewer Conversion	$86,031	101	$852	1	To be determined
5	Pennwood Sewer Conversion	$81,000	103	$786	1	To be determined
60	Sylvan Estates Septic-to-Sewer Conversion	$1,561,215	1,073	$1,455	17	To be determined
62	Roxy Avenue Septic-to-Sewer Conversion	$88,944	102	$872	2	To be determined
136	Micco - Zone B	$10,069,652	6,484	$1,553	66	To be determined
3	Micco Sewer Line Extension (Phase I and II)	$2,239,500	1,493	$1,500	8	To be determined
189	Avendia del Rio Septic-to-Sewer	$70,000	71	$986	1	To be determined
224	Lake Ashley Circle	$1,704,000	1,136	$1,500	13	To be determined
225	Dundee Circle and Manor Place	$2,248,500	1,499	$1,500	17	To be determined
284	Sewer Available Not Connected Phase 2	$1,616,992	1,011	$1,599	To be determined	To be determined
2016-19	Central IRL Septic System 335 Quick Connections	$3,765,811	7,378	$510	To be determined	To be determined
-	**Septic System Upgrades**	-	-	-	-	-
51	Banana River Lagoon 262 Septic System Upgrades	$3,015,872	3,149	$958	To be determined	To be determined
52	North IRL 1,061 Septic System Upgrades	$16,248,000	17,420	$933	To be determined	To be determined
53	Central IRL 1,348 Septic System Upgrades	$20,794,000	22,741	$914	To be determined	To be determined
-	**Stormwater Projects**	-	-	-	-	-
2016-41	Banana River Lagoon 77 Basin Projects	$23,393,451	26,886	$870	3,940	$5,937
13	Central Boulevard Baffle Box	$34,700	481	$72	14	$2,479
16	Gleason Park Reuse	$4,224	48	$88	9	$469
64	Stormwater Low Impact Development Convair Cove 1 – Blakey Boulevard	$4,650	30	$155	3	$1,550
65	Stormwater Low Impact Development Convair Cove 2- Dempsey Drive	$4,495	29	$155	3	$1,498
66, 66b	Big Muddy at Cynthia Baffle Box	$59,631	436	$137	58	$1,028
85	Basin 1304 Bioreactor	$83,029	958	$87	127	$654
128	Jackson Court Stormwater Treatment Facility	$8,266	56	$148	8	$1,033

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
179	Lori Laine Basin Pipe Improvement Project	$17,525	117	$150	21	$835
215	Basin 960 Pioneer Road Denitrification	$38,850	105	$370	3	$12,950
219	McNabb Outfall Bioretention	$21,824	44	$496	7	$3,118
205	Basin 998 Hampton Homes	$63,618	312	$204	47	$1,354
206	Basin 1066 Angel Avenue	$232,200	1,150	$202	173	$1,342
207	Basin 1124 Elliot Drive	$354,158	617	$574	97	$3,651
235	Woodland Business Center Stormwater Retention	$5,200	11	$473	2	$2,600
247	Basin 998 Richland Avenue Canal	$130,782	641	$204	97	$1,348
250	Basin 1280B Flamingo Road	$71,645	161	$445	31	$2,311
251	Basin 1304B West Arlington Road	$73,600	216	$341	To be determined	To be determined
254	Maritime Hammock Preserve Floating Vegetative Islands	$8,500	174	$49	36	$236
258	Cocoa Beach Golf Course Floating Vegetative Islands	$87,248	152	$574	21	$4,155
259	Ramp Road Park - Stormwater Improvements	$16,796	41	$410	8	$2,100
280	Westside Basin Water Quality Improvements	$56,033	137	$409	24	$2,335
281	Cocoa Isles Boulevard Dry Pond	$5,726	14	$409	2	$2,863
293	Fillmore Avenue Streetscape Project	$34,440	60	$574	11	$3,131
2016-42	North IRL 68 Basin Projects	$35,646,671	72,074	$495	10,416	$3,422
14	Church Street Type II Baffle Box	$88,045	937	$94	135	$652
18	Denitrification Retrofit of Johns Road Pond	$105,512	1,199	$88	To be determined	To be determined
19	St. Teresa Basin Treatment	$272,800	3,100	$88	459	$594
20	South Street Basin Treatment	$86,856	987	$88	156	$557
21	La Paloma Basin Treatment	$208,296	2,367	$88	346	$602
22	Kingsmill-Aurora Phase Two	$367,488	4,176	$88	814	$451
23	Denitrification Retrofit of Huntington Pond	$104,720	1,190	$88	To be determined	To be determined
24	Denitrification Retrofit of Flounder Creek Pond	$102,876	856	$120	To be determined	To be determined
34	Cliff Creek Baffle Box	$347,781	3,952	$88	797	$436
35	Thrush Drive Baffle Box	$322,200	3,661	$88	773	$417
69	Apollo/GA Baffle Box	$297,522	3,381	$88	479	$621
89	Basin 1298 Bioreactor	$85,829	917	$94	116	$740
90	Johns Road Pond Biosorption Activated Media	$23,030	245	$94	37	$622
91	Burkholm Road Biosorption Activated Media	$64,390	685	$94	104	$619
92	Carter Road Biosorption Activated Media	$62,510	665	$94	101	$619
93	Wiley Avenue Biosorption Activated Media	$82,735	954	$87	144	$575

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
94	Broadway Pond Biosorption Activated Media	$42,864	456	$94	69	$621
96	Spring Creek Baffle Box	$330,841	1,057	$313	232	$1,426
97	Titusville High School Baffle Box	$111,813	1,190	$94	166	$674
98	Coleman Pond Managed Aquatic Plant System	$11,438	1,240	$9	198	$58
110	Osprey Plant Pond Managed Aquatic Plant Systems	$37,500	606	$62	88	$426
117	Basin 10 County Line Road Woodchip Bioreactor	$72,773	597	$122	90	$809
118	Basin 26 Sunset Avenue Serenity Park Woodchip Bioreactor	$73,810	605	$122	92	$802
119	Basin 141 Irwin Avenue Woodchip Bioreactor	$69,174	567	$122	86	$804
120	Draa Field Pond Managed Aquatic Plant Systems	$31,281	256	$122	38	$823
122	Basin 22 Huntington Road Serenity Park Woodchip Bioreactor	$0	329	Not applicable	50	$0
124	Floating Wetlands to Existing Stormwater Ponds	$1,497	12	$125	3	$499
127	Basin 5 Dry Retention	$16,680	113	$148	18	$927
169	Basin 1335 (Sherwood Park) Stormwater Quality Project	$392,108	3,214	$122	879	$446
174	St. Johns 2 Baffle Box	$243,070	1,992	$122	611	$398
175, 176	High School Baffle Box and Funeral Home Baffle Box	$203,008	1,664	$122	448	$453
177	North and South Lakemont Ponds Floating Wetlands	$13,054	107	$122	25	$522
178	Marina B Managed Aquatic Plant Systems	$6,670	55	$121	7	$953
213	Johnson Junior High Denitrification Media Chamber Modification	$40,815	206	$198	Not applicable	Not applicable
214	Sand Point Park Baffle Box	$52,155	438	$119	71	$735
220	Basin 1398 Sand Dollar Canal Bioreactor	$198,024	444	$446	70	$2,829
231	North Fiske Stormwater Pond Floating Wetlands	$50,000	200	$250	32	$1,563
232	Riverfront Center Nutrient Removing Filtrations Boxes	$242,403	679	$357	160	$1,515
233	Commons and City Hall Tree Boxes	$26,823	80	$335	15	$1,788
252	Basin 89 Scottsmoor I Aurantia	$152,573	1,706	$89	292	$523
269	Coleman Pond Circulator	$126,021	353	$357	55	$2,291
270	Tennessee Street Baffle Box	$514,794	1,442	$357	191	$2,695
271	Osprey Pond Circulator	$86,394	242	$357	35	$2,468
274	Basin 1263 Waelti Drive Pond Retrofit	$97,818	274	$357	40	$2,445
275	Basin 1349 Lake Washington & Croton Road Pond Retrofit	$56,406	158	$357	24	$2,350

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
276	Basin 1335 North Wickham & Conservation Place Wet Pond Retrofit	$93,177	261	$357	38	$2,452
279	Melbourne Cemetery Baffle Box	$216,342	606	$357	105	$2,060
290	South Street and US 1 Baffle Box	$400,652	698	$574	92	$4,355
291	535 Knox McRae Baffle Box	$328,328	572	$574	75	$4,378
292	Basin 212 East Main Street	$376,544	656	$574	115	$3,274
15	Bayfront Stormwater Project	$30,624	348	$88	83	$369
67	Grant Place Baffle Box	$82,481	937	$88	193	$427
68	Crane Creek/M-1 Canal Flow Restoration	$2,883,368	24,000	$120	3,100	$930
87	Fleming Grant Biosorption Activated Media	$56,588	602	$94	91	$622
88	Espanola Baffle Box	$105,186	1,119	$94	148	$711
121	Basin 2258 Babcock Road Woodchip Bioreactor	$50,203	412	$122	62	$810
123	Ray Bullard Water Reclamation Facility Stormwater Management Area	$111,847	1,317	$85	400	$280
256	C-10 Water Management Area	$10,460,100	29,300	$357	1,300	$8,046
257	Riverview Park Baffle Box	$308,091	863	$357	168	$1,834
277	Darrow Baffle Box	$191,352	536	$357	87	$2,199
278	Line Street Cemetery Baffle Box	$274,890	770	$357	122	$2,253
-	**Vegetation Harvesting**	-	-	-	-	-
111	Draa Field Vegetation Harvesting	$86,413	786	$110	99	$873
112	County Wide Stormwater Pond Harvesting	$14,000	931	$15	327	$43
171	Mechanical Aquatic Vegetation Harvesting	$1,011,976	20,538	$49	1,664	$608
172	Horseshoe Pond Vegetative Harvesting	$8,140	4,536	$2	242	$34
208	Maritime Hammock Preserve Stormwater Pond Harvesting	$14,480	143	$101	5	$2,896
209	Basin 1398 Sand Dollar Canal Harvesting	$24,420	222	$110	21	$1,163
210	Basin 958 Pioneer Road Vegetation Harvesting	$39,930	363	$110	47	$850
211	Cocoa Beach Golf Course Stormwater Ponds Harvesting	$218,267	1,984	$110	377	$579
228	Unincorporated Countywide Vegetation Harvesting	$477,000	9,263	$51	993	$480
264	Unincorporated Countywide Vegetation Harvesting 2	$472,758	4,208	$112	593	$797
285	Unincorporated Countywide Vegetation Harvesting 3	$515,736	4,524	$114	647	$797
-	**Muck Removal**	-	-	-	-	-
2016-10a	Canaveral South	$14,700,000	35,382	$415	1,925	$7,636

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
2016-5a	Pineda Banana River Lagoon	$6,825,000	15,033	$454	686	$9,949
2016-11a	Patrick Space Force Base	$7,175,000	6,497	$1,104	382	$18,783
168a	Cocoa Beach Golf	$21,350,000	29,694	$719	2,058	$10,374
41a	Grand Canal Muck	$2,719,178	10,469	$260	1,396	$1,948
42a	Sykes Creek Muck	$14,612,850	19,635	$744	2,618	$5,582
70a	Cocoa Beach Muck Dredging – Phase III	$1,376,305	4,095	$336	780	$1,764
71	Merritt Island Muck Removal – Phase 1	$7,733,517	8,085	$957	1,540	$5,022
72a	Muck Removal of Indian Harbour Beach Canals	$3,631,815	3,780	$961	720	$5,044
101	Cocoa Beach Muck Dredging Phase II-B	$5,911,150	6,300	$938	840	$7,037
144	Satellite Beach Muck Dredging	$1,884,225	3,885	$485	518	$3,638
2016-06a, 2016-08a	Titusville Railroad West and East	$7,175,000	19,799	$362	815	$8,804
2016-07a	National Aeronautics and Space Administration Causeway East	$9,975,000	21,872	$456	1,047	$9,527
2016-04a	Rockledge A	$4,375,000	7,581	$577	825	$5,303
54a	Eau Gallie Northeast	$8,750,000	10,476	$835	1,482	$5,904
2016-3a	Muck Re-dredging in Turkey Creek	$137,329	5,691	$24	221	$621
223	Spring Creek Dredging	$80,080	154	$520	21	$3,813
236	Sunnyland Canals Muck Removal	$5,215,600	10,030	$520	336	$15,523
260	Mims Rim Ditch Muck Removal Project	$10,036,138	16,602	$605	518	$19,375
262	Shore View Lane Dredging	$44,918	74	$607	10	$4,492
294	Tequesta Harbor Revitalization Project	$41,276	68	$607	9	$4,586
-	**Treatment of Interstitial Water**	-	-	-	-	-
40	Mims Muck Removal: Outflow Water Nutrient Removal	$0	2,803	Not applicable	244	Not applicable
2016-10b	Canaveral South	$2,134,419	42,688	$50	3,887	$549
2016-5b	Pineda Banana River Lagoon	$990,980	19,820	$50	1,804	$549
2016-11b	Patrick Space Force Base	$1,041,800	20,836	$50	1,897	$549
168b	Cocoa Beach Golf	$3,013,100	99,098	$30	9,022	$334
41b	Grand Canal Interstitial	$5,610,821	89,495	$63	To be determined	To be determined
42b	Sykes Creek Interstitial	$11,248,704	64,278	$175	To be determined	To be determined
72b	Muck Interstitial Water Treatment for Indian Harbour Beach Canals	$5,483,600	27,418	$200	To be determined	To be determined
113	Satellite Beach Interstitial Water Treatment	$3,057,756	29,978	$102	3,059	$1,000

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
2016-06b, 2016-08b	Titusville Railroad West and East	$1,041,799	20,836	$50	1,897	$549
2016-07c	National Aeronautics and Space Administration Causeway East	$1,448,355	28,967	$50	2,637	$549
2016-04b	Rockledge A	$635,244	12,705	$50	1,157	$549
54b	Eau Gallie Northeast	$1,270,487	25,410	$50	2,313	$549
2016-3b	Muck Interstitial Water Treatment for Turkey Creek	Included in muck project	Not applicable	Not applicable	688	Not applicable
261	Mims Rim Ditch Interstitial Treatment	$1,784,135	15,700	$114	1,292	$1,381
-	**Oyster Bars**	-	-	-	-	-
2016-55	Banana River Lagoon County Oyster Bars	$1,070,540	2,713	$395	68	$15,743
75	Marina Isles Oyster Bar	$26,700	60	$445	20	$1,335
76	Bettinger Oyster Bar	$10,680	24	$445	8	$1,335
78a	McNabb Park Oyster Bar	$9,134	47	$194	1	$9,134
79	Gitlin Oyster Bar	$16,020	36	$445	12	$1,335
104	Brevard Zoo Banana River Oyster Project	$583,020	1,476	$395	37	$15,757
141	Brevard Zoo Banana River Oyster Project 2	$264,800	662	$400	17	$15,576
143	Brevard Zoo Oyster Reef Adjustments Banana River	$12,800	32	$400	1	$12,800
188	Brevard Zoo Banana River Oyster Project 3	$56,771	143	$397	4	$14,193
2016-56	North IRL County Oyster Bars	$1,742,580	4,416	$395	110	$15,842
83	Bomalaski Oyster Bar	$8,900	20	$445	7	$1,271
106	Brevard Zoo North IRL Oyster Project	$475,438	864	$550	22	$21,611
139	Brevard Zoo North IRL Oyster Project 2	$485,292	841	$577	21	$23,109
142	Brevard Zoo Oyster Reef Adjustments North IRL	$27,200	68	$400	2	$13,600
184	Brevard Zoo North Indian River Lagoon Oyster Project 3	$419,232	1,056	$397	26	$16,124
186	Brevard Zoo North Indian River Lagoon Individual Oyster Project	$173,092	436	$397	11	$15,736
272	Brevard Zoo North Indian River Lagoon Oyster Project 4	$827,450	1,742	$475	44	$18,806
289	Brevard Zoo North Indian River Lagoon Oyster Project 5	$1,235,000	2,600	$475	65	$19,000
80	Coconut Point/Environmentally Endangered Lands Oyster Bar	$45,120	96	$470	2	$22,560
81	Wexford Oyster Bar	$31,150	70	$445	24	$1,298
73	Riverview Senior Resort Oyster Bar	$30,304	77	$394	2	$15,152
105	Brevard Zoo Central IRL Oyster Project	$161,160	408	$395	10	$16,116

Project Number	Project	Save Our Lagoon Project Cost	Total Nitrogen Reductions (pounds per year)	Cost per Pound per Year of Total Nitrogen	Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus
140	Brevard Zoo Central IRL Oyster Project 2	$270,800	677	$400	17	$15,929
185	Brevard Zoo Central Indian River Lagoon Tributary Pilot Oyster Project	$230,657	581	$397	15	$15,377
187	Brevard Zoo Central Indian River Lagoon Oyster Project 3	$86,546	218	$397	5	$17,309
217	Central IRL Oyster Project 4	$138,156	348	$397	9	$15,351
218	Central Oyster Project Offshore Reefs	$357,300	900	$397	23	$15,535
226	Hog Point Offshore Oyster Bar	$21,023	126	$167	3	$7,008
273	Brevard Zoo Central Indian River Lagoon Oyster Project 5	$714,400	1,504	$475	38	$18,800
288	The Zip Project: An Oyster Restoration Project	$5,500	20	$275	1	$5,500
-	**Planted Shorelines**	-	-	-	-	-
77a	Cocoa Beach Country Club Planted Shoreline	$16,080	67	$240	23	$699
78b	McNabb Park Planted Shoreline	$1,680	7	$240	2	$840
103	Brevard Zoo North IRL Plant Project	$720	3	$240	1	$720
130	Brevard Zoo North IRL Plant Project 2	$9,840	41	$240	14	$703
181	Riveredge	$4,080	17	$240	6	$680
212	Titusville Causeway Multi-Trophic Restoration and Living Shoreline	$35,326	131	$270	45	$785
77b	Lagoon House Shoreline Restoration Planting	$24,000	100	$240	34	$706
133	Fisherman's Landing	$4,800	20	$240	7	$686
135	Rotary Park	$4,800	20	$240	7	$686
286	Coconut Point Shoreline Stabilization and Living Shoreline Enhancement	$8,806	34	$259	12	$734
-	**Clam Restoration**	-	-	-	-	-
194	Aquaculture Stimulus Program	$100,000	1,667	$60	To be determined	To be determined
265	Restoration of Native Clams in the IRL – Titusville	$272,000	1,584	$172	528	$515
267	Restoration of Native Clams in the IRL - Grant Island	$170,000	990	$172	330	$515
-	**Projects Monitoring**	**$10,000,000**	-	-	-	-
-	**Contingency**	**$24,468,512**	-	-	-	-
	Total	***$505,351,178***	***1,297,302***	***$390 (average)***	***106,822***	***$4,731 (average)***

Table 6-9. Projects Cost-effectiveness

Project Number	Project	TN Reductions (Pounds per Year)	Approved Save Our Lagoon Project Cost	Approved Cost per Pound per Year of TN	Inflated/Final Save Our Lagoon Project Cost	Inflated/Final Cost per Pound per Year of TN	Total Project Cost (2025 Estimate)	Total Cost per Pound per Year of TN
-	**Public Education**	-	-	-	-	-	-	-
58a	Expanded Fertilizer Education	6,613	$881,000	$133	$968,194	$146	$881,000	$133
58b	Grass Clippings Campaign	17,800	$306,000	$17	$416,100	$23	$306,000	$17
58c	Septic System Maintenance Education	4,466	$431,000	$97	$517,203	$116	$431,000	$97
245	Irrigation Education Campaign	1,530	$306,000	$200	$338,166	$221	$306,000	$200
246	Stormwater Best Management Practice Maintenance Education	3,300	$306,000	$93	$336,558	$102	$306,000	$93
193	Oyster Gardening Program	Not applicable	$300,000	Not applicable	$300,000	Not applicable	$300,000	Not applicable
227	Restore Our Shores: Community Collaborative	Not applicable	$1,000,000	Not applicable	$1,124,521	Not applicable	$1,124,521	Not applicable
-	**Wastewater Treatment Facility Upgrades for Reclaimed Water**	-	-	-	-	-	-	-
99	Cocoa Beach Water Reclamation Facility Upgrade	2,520	$945,000	$375	$945,000	$375	$6,554,233	$2,601
2016-02a, 2016-2b	City of Titusville Osprey Wastewater Treatment Facility Phase 1 and 2	12,286	$8,219,826	$669	$8,219,826	$669	$11,926,910	$971
283	Port Saint John Wastewater Treatment Plant Replacement	2,278	$981,818	$431	$1,016,182	$446	$43,305,079	$19,010
2016-17	City of Palm Bay Water Reclamation Facility	20,240	$3,634,900	$180	$3,634,900	$180	$3,634,900	$180
59	City of Melbourne Grant Street Water Reclamation Facility	18,052	$6,769,500	$375	$9,596,607	$532	$10,776,660	$597
138	Ray Bullard Water Reclamation Facility Biological Nutrient Removal Upgrades	11,360	$5,560,000	$489	$7,806,916	$687	$11,421,281	$1,005
216	City of Rockledge Flow Equalization Basin Project	5,365	$2,344,222	$437	$2,344,222	$437	$9,976,198	$1,859
234	South Brevard Water Reclamation Facility	4,316	$1,653,028	$383	$1,832,742	$425	$2,200,000	$510
282	South Beaches Wastewater Treatment Plant Upgrade	5,734	$2,471,354	$431	$2,557,851	$446	$40,000,000	$6,976
286	The Cove Package Plant Upgrade	23	$9,913	$431	$9,913	$431	$500,000	$21,739
-	**Rapid Infiltration Basin/Sprayfield Upgrades**	-	-	-	-	-	-	-
6	Long Point Park Upgrade	163	$22,207	$136	$22,207	$136	$22,207	$136

Project Number	Project	TN Reductions (Pounds per Year)	Approved Save Our Lagoon Project Cost	Approved Cost per Pound per Year of TN	Inflated/Final Save Our Lagoon Project Cost	Inflated/Final Cost per Pound per Year of TN	Total Project Cost (2025 Estimate)	Total Cost per Pound per Year of TN
196	Sterling House Condominium Sprayfield	154	$60,000	$390	$70,847	$460	To be determined	To be determined
-	**Package Plant Connection**	-	-	-	-	-	-	-
192	Oak Point Wastewater Treatment Facility Improvements	186	$279,000	$1,500	$279,000	$1,500	$647,941	$3,484
237	Willow Lakes Recreational Vehicle Park	725	$1,087,500	$1,500	$1,205,731	$1,663	$2,169,000	$2,992
-	**Sewer Laterals**	-	-	-	-	-	-	-
63a	Countywide Repair/Replacement	6,196	$633,808	$102	$877,862	$142	$633,808	$102
63b	Satellite Beach Lateral Smoke Testing	Not applicable	$202,210	Not applicable	$202,210	Not applicable	$202,210	Not applicable
100	Osprey Basin Lateral Smoke Testing	Not applicable	$114,769	Not applicable	$114,769	Not applicable	$200,000	Not applicable
114	Barefoot Bay Lateral Smoke Testing	Not applicable	$32,873	Not applicable	$32,873	Not applicable	$83,564	Not applicable
115	South Beaches Lateral Smoke Testing	Not applicable	$84,304	Not applicable	$84,304	Not applicable	$192,297	Not applicable
116	Merritt Island Lateral Smoke Testing	Not applicable	$246,630	Not applicable	$246,630	Not applicable	$246,630	Not applicable
-	**Septic-to-Sewer**	-	-	-	-	-	-	-
2016-47	Sykes Creek - Zone N	2,784	$4,425,425	$1,590	$5,237,910	$1,881	$12,593,239	$4,523
2016-48	Sykes Creek - Zone M	1,798	$2,858,087	$1,590	$3,382,817	$1,881	$9,432,928	$5,246
2016-49	Sykes Creek - Zone T	3,360	$5,341,030	$1,590	$6,321,616	$1,881	$14,939,414	$4,446
2019-29	South Banana - Zone B	915	$1,372,500	$1,500	$1,962,756	$2,145	$3,640,315	$3,978
145	Merritt Island - Zone F	1,292	$1,100,000	$851	$1,586,864	$1,228	$4,300,954	$3,329
146	Merritt Island - Zone C	1,419	$1,580,000	$1,113	$2,279,314	$1,606	$4,000,750	$2,819
147	Sykes Creek - Zone R	5,040	$7,827,120	$1,553	$8,384,607	$1,664	$16,777,897	$3,329
151	Merritt Island - Zone G	7,588	$11,784,164	$1,553	$12,623,491	$1,664	$68,120,481	$8,977
222	Hedgecock/Grabowsky and Desoto Fields	81	$121,500	$1,500	$121,500	$1,500	$287,098	$3,544
238	Kelly Park	90	$135,000	$1,500	$149,677	$1,663	$659,337	$7,326
240	Rotary Park	104	$156,000	$1,500	$172,960	$1,663	$977,802	$9,402
2016-16	Banana Septic System 144 Quick Connections	3,224	$1,908,000	$592	$2,688,518	$834	To be determined	To be determined
2016-31/32	City of Cocoa - Zones J and K	3,748	$5,622,000	$1,500	$6,715,820	$1,792	$12,025,865	$3,209

Project Number	Project	TN Reductions (Pounds per Year)	Approved Save Our Lagoon Project Cost	Approved Cost per Pound per Year of TN	Inflated/Final Save Our Lagoon Project Cost	Inflated/Final Cost per Pound per Year of TN	Total Project Cost (2025 Estimate)	Total Cost per Pound per Year of TN
2016-35	South Beaches - Zone A	1,306	$1,959,000	$1,500	$2,340,144	$1,792	To be determined	To be determined
109	City of Titusville - Zones A-G	1,563	$1,201,392	$769	$1,435,136	$918	$1,000,000	$640
203	South Central - Zone A	5,318	$8,258,854	$1,553	$8,258,854	$1,553	$11,985,437	$2,254
150	South Central - Zone D (Brevard County)	3,387	$4,774,500	$1,410	$6,887,712	$2,034	$5,089,278	$1,503
50b	South Central - Zone C	5,146	$5,492,332	$1,067	$5,492,332	$1,067	$10,320,255	$2,005
2020-34	Pineapple Avenue Sewer Conversion	1,688	$1,701,972	$1,008	$2,433,921	$1,442	$1,701,972	$1,008
2019-27	Sharpes - Zone A	5,248	$7,872,000	$1,500	$11,257,428	$2,145	$8,936,805	$1,703
2019-36	South Beaches - Zone O	54	$133,488	$2,472	$190,896	$3,535	$230,225	$4,263
2019-37	South Beaches - Zone P	242	$300,348	$1,241	$429,515	$1,775	$714,800	$2,954
1	Breeze Swept Septic-to-Sewer Connection	2,002	$880,530	$440	$880,530	$440	$3,400,000	$1,698
2a	Merritt Island Septic Phase Out Project	2,501	$320,268	$128	$320,268	$128	$3,138,098	$1,255
61	Riverside Drive Septic-to-Sewer Conversion	305	$262,044	$859	$371,480	$1,218	$262,044	$859
148	North Merritt Island - Zone E	3,287	$5,104,711	$1,553	$5,468,294	$1,664	$14,493,227	$4,409
152	Sharpes - Zone B	2,692	$4,038,000	$1,500	$5,825,234	$2,164	$6,460,394	$2,400
153	Cocoa - Zone C	2,550	$3,960,150	$1,553	$4,242,212	$1,664	$4,150,210	$1,628
190	Bowers Septic-to-Sewer	120	$147,000	$1,225	$203,604	$1,697	$147,000	$1,225
191	Kent and Villa Espana Septic-to-Sewer Conversion	542	$710,000	$1,310	$983,393	$1,814	$993,500	$1,833
241	Manatee Cove	24	$36,000	$1,500	$39,914	$1,663	$1,322,826	$55,118
242	Riverwalk	4	$6,000	$1,500	$6,652	$1,663	$781,007	$195,252
295	South Tropical Trail/Kadlac Drive Sewer Extension	162	$251,586	$1,553	$251,586	$1,553	$368,204	$2,273
2016-18	North IRL Septic System 463 Quick Connections	11,339	$6,018,000	$531	$8,026,098	$708	To be determined	To be determined
2016-39	City of Palm Bay – Zone A	2,136	$2,817,256	$1,319	$3,317,208	$1,553	$5,635,000	$2,638
4	Hoag Sewer Conversion	101	$86,031	$852	$117,493	$1,163	$100,000	$990
5	Pennwood Sewer Conversion	103	$81,000	$786	$95,860	$931	$131,932	$1,281
60	Sylvan Estates Septic-to-Sewer Conversion	1,073	$1,561,215	$1,455	$1,561,215	$1,455	$2,431,490	$2,266
62	Roxy Avenue Septic-to-Sewer Conversion	102	$88,944	$872	$126,089	$1,236	$88,944	$872
136	Micco - Zone B	6,484	$10,069,652	$1,553	$10,786,863	$1,664	$12,294,552	$1,896
3	Micco Sewer Line Extension (Phase I and II)	1,493	$2,239,500	$1,500	$3,101,842	$2,078	$4,870,536	$3,262
189	Avendia del Rio Septic-to-Sewer	71	$70,000	$986	$96,954	$1,366	$70,000	$986
224	Lake Ashley Circle	1,136	$1,704,000	$1,500	$2,012,057	$1,771	$3,285,000	$2,892

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225	Dundee Circle and Manor Place	1,499	$2,248,500	$1,500	$2,654,994	$1,771	$4,105,000	$2,738
284	Sewer Available Not Connected Phase 2	1,011	$1,616,992	$1,599	$1,673,587	$1,655	$7,072,000	$6,995
2016-19	Central IRL Septic System 335 Quick Connections	7,378	$3,765,811	$510	$4,255,617	$577	To be determined	To be determined
-	**Septic System Upgrades**	-	-	-	-	-	-	-
51	Banana River Lagoon 262 Septic System Upgrades	3,149	$3,015,872	$958	$3,239,759	$1,029	To be determined	To be determined
52	North IRL 1,061 Septic System Upgrades	17,420	$16,248,000	$933	$18,481,017	$1,061	To be determined	To be determined
53	Central IRL 1,348 Septic System Upgrades	22,741	$20,794,000	$914	$23,463,052	$1,032	To be determined	To be determined
-	**Stormwater Projects**	-	-	-	-	-	-	-
2016-41	Banana River Lagoon 77 Basin Projects	26,886	$23,393,451	$870	$23,393,451	$870	To be determined	To be determined
13	Central Boulevard Baffle Box	481	$34,700	$72	$34,700	$72	$43,700	$91
16	Gleason Park Reuse	48	$4,224	$88	$4,224	$88	$7,193	$150
64	Stormwater Low Impact Development Convair Cove 1 – Blakey Boulevard	30	$4,650	$155	$4,650	$155	$216,995	$7,233
65	Stormwater Low Impact Development Convair Cove 2- Dempsey Drive	29	$4,495	$155	$4,495	$155	$216,995	$7,483
66, 66b	Big Muddy at Cynthia Baffle Box and Expansion	436	$59,631	$137	$59,631	$137	$288,640	$662
85	Basin 1304 Bioreactor	958	$83,029	$87	$83,029	$87	$141,988	$148
128	Jackson Court Stormwater Treatment Facility	56	$8,266	$148	$8,266	$148	$391,633	$6,993
179	Lori Laine Basin Pipe Improvement Project	117	$17,525	$150	$17,525	$150	$3,294,803	$28,161
215	Basin 960 Pioneer Road Denitrification	105	$38,850	$370	$45,873	$437	$609,916	$5,809
219	McNabb Outfall Bioretention	44	$21,824	$496	$21,824	$496	$420,840	$9,565
205	Basin 998 Hampton Homes	312	$63,618	$204	$70,534	$226	$727,618	$2,332
206	Basin 1066 Angel Avenue	1,150	$232,200	$202	$257,444	$224	$442,200	$385
207	Basin 1124 Elliot Drive	617	$354,158	$574	$354,158	$574	$598,930	$971
235	Woodland Business Center Stormwater Retention	11	$5,200	$473	$5,200	$473	$100,981	$9,180
247	Basin 998 Richland Avenue Canal	641	$130,782	$204	$145,000	$226	$414,782	$647
250	Basin 1280B Flamingo Road	161	$71,645	$445	$79,434	$493	$274,772	$1,707
251	Basin 1304B West Arlington Road	216	$73,600	$341	$73,600	$341	$179,327	$830

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254	Maritime Hammock Preserve Floating Vegetative Islands	174	$8,500	$49	$9,105	$52	$8,500	$49
258	Cocoa Beach Golf Course Floating Vegetative Islands	152	$87,248	$574	$87,248	$574	$1,162,000	$7,645
259	Ramp Road Park - Stormwater Improvements	41	$16,796	$410	$17,992	$439	$1,500,000	$36,585
280	Westside Basin Water Quality Improvements	137	$56,033	$409	$57,994	$423	$1,650,960	$12,051
281	Cocoa Isles Boulevard Dry Pond	14	$5,726	$409	$5,926	$423	$570,000	$40,714
293	Fillmore Avenue Streetscape Project	60	$34,440	$574	$34,440	$574	$3,382,316	$56,372
2016-42	North IRL 68 Basin Projects	72,074	$35,646,671	$495	$35,646,671	$495	To be determined	To be determined
14	Church Street Type II Baffle Box	937	$88,045	$94	$88,045	$94	$233,455	$249
18	Denitrification Retrofit of Johns Road Pond	1,199	$105,512	$88	$105,512	$88	$274,564	$229
19	St. Teresa Basin Treatment	3,100	$272,800	$88	$272,800	$88	$474,292	$153
20	South Street Basin Treatment	987	$86,856	$88	$86,856	$88	$683,969	$693
21	La Paloma Basin Treatment	2,367	$208,296	$88	$208,296	$88	$462,347	$195
22	Kingsmill-Aurora Phase Two	4,176	$367,488	$88	$501,882	$120	$3,531,543	$846
23	Denitrification Retrofit of Huntington Pond	1,190	$104,720	$88	$143,017	$120	$103,851	$87
24	Denitrification Retrofit of Flounder Creek Pond	856	$102,876	$120	$102,876	$120	$444,930	$520
34	Cliff Creek Baffle Box	3,952	$347,781	$88	$347,781	$88	$737,612	$187
35	Thrush Drive Baffle Box	3,661	$322,200	$88	$322,200	$88	$609,394	$166
69	Apollo/GA Baffle Box	3,381	$297,522	$88	$421,774	$125	$825,000	$244
89	Basin 1298 Bioreactor	917	$85,829	$94	$85,829	$94	$136,100	$148
90	Johns Road Pond Biosorption Activated Media	245	$23,030	$94	$23,030	$94	$154,000	$629
91	Burkholm Road Biosorption Activated Media	685	$64,390	$94	$64,390	$94	$141,457	$207
92	Carter Road Biosorption Activated Media	665	$62,510	$94	$62,510	$94	$146,950	$221
93	Wiley Avenue Biosorption Activated Media	954	$82,735	$87	$82,735	$87	$162,216	$170
94	Broadway Pond Biosorption Activated Media	456	$42,864	$94	$42,864	$94	$269,750	$592
96	Spring Creek Baffle Box	1,057	$330,841	$313	$473,122	$448	$1,500,000	$1,419
97	Titusville High School Baffle Box	1,190	$111,813	$94	$111,813	$94	$332,800	$280
98	Coleman Pond Managed Aquatic Plant System	1,240	$11,438	$9	$11,438	$9	$11,438	$9

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110	Osprey Plant Pond Managed Aquatic Plant Systems	606	$37,500	$62	$37,500	$62	$37,500	$62
117	Basin 10 County Line Road Woodchip Bioreactor	597	$72,773	$122	$72,773	$122	$166,174	$278
118	Basin 26 Sunset Avenue Serenity Park Woodchip Bioreactor	605	$73,810	$122	$73,810	$122	$242,532	$401
119	Basin 141 Irwin Avenue Woodchip Bioreactor	567	$69,174	$122	$69,174	$122	$146,926	$259
120	Draa Field Pond Managed Aquatic Plant Systems	256	$31,281	$122	$31,281	$122	$48,750	$190
122	Basin 22 Huntington Road Serenity Park Woodchip Bioreactor	329	$0	Not applicable	$0	Not applicable	$99,334	$302
124	Floating Wetlands to Existing Stormwater Ponds	12	$1,497	$125	$1,497	$125	$14,336	$1,195
127	Basin 5 Dry Retention	113	$16,680	$148	$16,680	$148	$62,718	$555
169	Basin 1335 (Sherwood Park) Stormwater Quality Project	3,214	$392,108	$122	$392,108	$122	$1,696,489	$528
174	St. Johns 2 Baffle Box	1,992	$243,070	$122	$243,070	$122	$465,000	$233
175, 176	High School Baffle Box and Funeral Home Baffle Box	1,664	$203,008	$122	$203,008	$122	$1,129,535	$679
177	North and South Lakemont Ponds Floating Wetlands	107	$13,054	$122	$13,054	$122	$38,250	$357
178	Marina B Managed Aquatic Plant Systems	55	$6,670	$121	$6,670	$121	$17,424	$317
213	Johnson Junior High Denitrification Media Chamber Modification	206	$40,815	$198	$40,815	$198	$51,675	$251
214	Sand Point Park Baffle Box	438	$52,155	$119	$52,155	$119	$281,155	$642
220	Basin 1398 Sand Dollar Canal Bioreactor	444	$198,024	$446	$233,824	$527	$1,162,973	$2,619
231	North Fiske Stormwater Pond Floating Wetlands	200	$50,000	$250	$50,000	$250	$50,000	$250
232	Riverfront Center Nutrient Removing Filtrations Boxes	679	$242,403	$357	$242,403	$357	$899,895	$1,325
233	Commons and City Hall Tree Boxes	80	$26,823	$335	$26,823	$335	$176,500	$2,206
252	Basin 89 Scottsmoor I Aurantia	1,706	$152,573	$89	$152,573	$89	$1,675,262	$982
269	Coleman Pond Circulator	353	$126,021	$357	$130,432	$369	$126,021	$357
270	Tennessee Street Baffle Box	1,442	$514,794	$357	$532,812	$369	$535,000	$371
271	Osprey Pond Circulator	242	$86,394	$357	$89,418	$369	$100,000	$413

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274	Basin 1263 Waelti Drive Pond Retrofit	274	$97,818	$357	$97,818	$357	$235,000	$858
275	Basin 1349 Lake Washington & Croton Road Pond Retrofit	158	$56,406	$357	$56,406	$357	$198,000	$1,253
276	Basin 1335 North Wickham & Conservation Place Wet Pond Retrofit	261	$93,177	$357	$93,177	$357	$392,925	$1,505
279	Melbourne Cemetery Baffle Box	606	$216,342	$357	$223,914	$369	$2,180,000	$3,597
290	South Street and US 1 Baffle Box	698	$400,652	$574	$400,652	$574	$485,000	$695
291	535 Knox McRae Baffle Box	572	$328,328	$574	$328,328	$574	$435,000	$760
292	Basin 212 East Main Street	656	$376,544	$574	$376,544	$574	$574,263	$875
15	Bayfront Stormwater Project	348	$30,624	$88	$30,624	$88	$635,702	$1,827
67	Grant Place Baffle Box	937	$82,481	$88	$82,481	$88	$498,831	$532
68	Crane Creek/M-1 Canal Flow Restoration	24,000	$2,883,368	$120	$2,883,368	$120	$21,300,000	$888
87	Fleming Grant Biosorption Activated Media	602	$56,588	$94	$56,588	$94	$169,300	$281
88	Espanola Baffle Box	1,119	$105,186	$94	$150,422	$134	$550,000	$492
121	Basin 2258 Babcock Road Woodchip Bioreactor	412	$50,203	$122	$72,423	$176	$173,538	$421
123	Ray Bullard Water Reclamation Facility Stormwater Management Area	1,317	$111,847	$85	$111,847	$85	$1,604,860	$1,219
256	C-10 Water Management Area	29,300	$10,460,100	$357	$11,205,121	$382	$61,000,000	$2,082
257	Riverview Park Baffle Box	863	$308,091	$357	$330,035	$382	$951,500	$1,103
277	Darrow Baffle Box	536	$191,352	$357	$198,049	$369	$851,500	$1,589
278	Line Street Cemetery Baffle Box	770	$274,890	$357	$284,511	$369	$1,855,000	$2,409
-	**Vegetation Harvesting**	-	-	-	-	-	-	-
111	Draa Field Vegetation Harvesting	786	$86,413	$110	$86,413	$110	$115,261	$147
112	County Wide Stormwater Pond Harvesting	931	$14,000	$15	$14,000	$15	$14,777	$16
171	Mechanical Aquatic Vegetation Harvesting	20,538	$1,011,976	$49	$1,011,976	$49	$1,016,976	$50
172	Horseshoe Pond Vegetative Harvesting	4,536	$8,140	$2	$8,140	$2	$13,090	$3
208	Maritime Hammock Preserve Stormwater Pond Harvesting	143	$14,480	$101	$14,480	$101	$14,480	$101
209	Basin 1398 Sand Dollar Canal Harvesting	222	$24,420	$110	$24,420	$110	$54,000	$243
210	Basin 958 Pioneer Road Vegetation Harvesting	363	$39,930	$110	$47,149	$130	$186,000	$512
211	Cocoa Beach Golf Course Stormwater Ponds Harvesting	1,984	$218,267	$110	$218,267	$110	$449,890	$227

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228	Unincorporated Countywide Vegetation Harvesting	9,263	$477,000	$51	$477,000	$51	$477,000	$51
264	Unincorporated Countywide Vegetation Harvesting 2	4,208	$472,758	$112	$472,758	$112	$472,758	$112
285	Unincorporated Countywide Vegetation Harvesting 3	4,524	$515,736	$114	$515,736	$114	$575,000	$127
-	**Muck Removal**	-	-	-	-	-	-	-
2016-10a	Canaveral South	35,382	$14,700,000	$415	$17,560,041	$496	$21,454,295	$606
2016-5a	Pineda Banana River Lagoon	15,033	$6,825,000	$454	$8,152,876	$542	$17,746,000	$1,180
2016-11a	Patrick Space Force Base	6,497	$7,175,000	$1,104	$8,570,973	$1,319	$12,996,000	$2,000
168a	Cocoa Beach Golf	29,694	$21,350,000	$719	$25,503,868	$859	$45,997,054	$1,549
41a	Grand Canal Muck	10,469	$2,719,178	$260	$3,687,700	$352	$42,007,459	$4,013
42a	Sykes Creek Muck	19,635	$14,612,850	$744	$19,956,932	$1,016	$46,164,400	$2,351
70a	Cocoa Beach Muck Dredging – Phase III	4,095	$1,376,305	$336	$1,376,305	$336	$2,903,356	$709
71	Merritt Island Muck Removal – Phase 1	8,085	$7,733,517	$957	$10,963,220	$1,356	$40,942,740	$5,064
72a	Muck Removal of Indian Harbour Beach Canals	3,780	$3,631,815	$961	$5,148,548	$1,362	$24,011,645	$6,352
101	Cocoa Beach Muck Dredging Phase II-B	6,300	$5,911,150	$938	$5,911,150	$938	$7,417,650	$1,177
144	Satellite Beach Muck Dredging	3,885	$1,884,225	$485	$2,718,190	$700	$26,687,582	$6,869
2016-06a, 2016-08a	Titusville Railroad West and East	19,799	$7,175,000	$362	$8,570,974	$433	$55,594,000	$2,808
2016-07a	National Aeronautics and Space Administration Causeway East	21,872	$9,975,000	$456	$11,915,742	$545	$65,151,671	$2,979
2016-04a	Rockledge A	7,581	$4,375,000	$577	$5,226,203	$689	$14,978,409	$1,976
54a	Eau Gallie Northeast	10,476	$8,750,000	$835	$10,452,405	$998	$18,186,730	$1,736
2016-3a	Muck Re-dredging in Turkey Creek	5,691	$137,329	$24	$137,329	$24	$1,098,631	$193
223	Spring Creek Dredging	154	$80,080	$520	$94,557	$614	$1,500,000	$9,740
236	Sunnyland Canals Muck Removal	10,030	$5,215,600	$520	$5,782,629	$577	$13,624,000	$1,358
260	Mims Rim Ditch Muck Removal Project	16,602	$10,036,138	$605	$10,750,962	$648	$21,222,000	$1,278
262	Shore View Lane Dredging	74	$44,918	$607	$48,117	$650	$435,000	$5,878
294	Tequesta Harbor Revitalization Project	68	$41,276	$607	$41,276	$607	$45,000	$662
-	**Treatment of Interstitial Water**	-	-	-	-	-	-	-
40	Mims Muck Removal: Outflow Water Nutrient Removal	2,803	$0	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
2016-10b	Canaveral South	42,688	$2,134,419	$50	$2,549,693	$60	$5,904,000	$138

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2016-5b	Pineda Banana River Lagoon	19,820	$990,980	$50	$1,183,786	$60	$1,560,000	$79
2016-11b	Patrick Space Force Base	20,836	$1,041,800	$50	$1,244,493	$60	$1,640,000	$79
168b	Cocoa Beach Golf	99,098	$3,013,100	$30	$3,599,330	$36	$7,800,000	$79
41b	Grand Canal Interstitial	89,495	$5,610,821	$63	$7,609,294	$85	$3,829,600	$43
42b	Sykes Creek Interstitial	64,278	$11,248,704	$175	$15,362,481	$239	$5,288,000	$82
72b	Muck Interstitial Water Treatment for Indian Harbour Beach Canals	27,418	$5,483,600	$200	$7,773,684	$284	$1,466,630	$53
113	Satellite Beach Interstitial Water Treatment	29,978	$3,057,756	$102	$4,411,131	$147	$1,630,176	$54
2016-06b, 2016-08b	Titusville Railroad West and East	20,836	$1,041,799	$50	$1,244,492	$60	$7,208,000	$346
2016-07c	National Aeronautics and Space Administration Causeway East	28,967	$1,448,355	$50	$1,730,148	$60	$3,320,000	$115
2016-04b	Rockledge A	12,705	$635,244	$50	$758,837	$60	$920,000	$72
54b	Eau Gallie Northeast	25,410	$1,270,487	$50	$1,517,674	$60	$3,008,000	$118
2016-3b	Muck Interstitial Water Treatment for Turkey Creek	Not applicable	Included in muck project	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
261	Mims Rim Ditch Interstitial Treatment	15,700	$1,784,135	$114	$1,911,210	$122	$1,784,135	$114
-	**Oyster Bars**	-	-	-	-	-	-	-
2016-55	Banana River Lagoon County Oyster Bars	2,713	$1,070,540	$395	$1,278,824	$471	To be determined	To be determined
75	Marina Isles Oyster Bar	60	$26,700	$445	$26,700	$445	$26,700	$445
76	Bettinger Oyster Bar	24	$10,680	$445	$10,680	$445	$10,680	$445
78a	McNabb Park Oyster Bar	47	$9,134	$194	$9,134	$194	$37,192	$791
79	Gitlin Oyster Bar	36	$16,020	$445	$16,020	$445	$16,020	$445
104	Brevard Zoo Banana River Oyster Project	1,476	$583,020	$395	$833,753	$565	$812,207	$550
141	Brevard Zoo Banana River Oyster Project 2	662	$264,800	$400	$382,001	$577	$359,546	$543
143	Brevard Zoo Oyster Reef Adjustments Banana River	32	$12,800	$400	$18,465	$577	$17,380	$543
188	Brevard Zoo Banana River Oyster Project 3	143	$56,771	$397	$81,898	$573	$77,084	$539
2016-56	North IRL County Oyster Bars	4,416	$1,742,580	$395	$2,081,618	$471	To be determined	To be determined
83	Bomalaski Oyster Bar	20	$8,900	$445	$8,900	$445	$8,900	$445
106	Brevard Zoo North IRL Oyster Project	864	$475,438	$550	$475,438	$550	$475,438	$550
139	Brevard Zoo North IRL Oyster Project 2	841	$485,292	$577	$485,292	$577	$485,292	$577

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142	Brevard Zoo Oyster Reef Adjustments North IRL	68	$27,200	$400	$39,239	$577	$36,932	$543
184	Brevard Zoo North Indian River Lagoon Oyster Project 3	1,056	$419,232	$397	$580,662	$550	$528,046	$500
186	Brevard Zoo North Indian River Lagoon Individual Oyster Project	436	$173,092	$397	$239,743	$550	$218,019	$500
272	Brevard Zoo North Indian River Lagoon Oyster Project 4	1,742	$827,450	$475	$856,411	$492	$827,450	$475
289	Brevard Zoo North Indian River Lagoon Oyster Project 5	2,600	$1,235,000	$475	$1,235,000	$475	$1,235,000	$475
80	Coconut Point/Environmentally Endangered Lands Oyster Bar	96	$45,120	$470	$45,120	$470	$45,120	$470
81	Wexford Oyster Bar	70	$31,150	$445	$31,150	$445	$31,150	$445
73	Riverview Senior Resort Oyster Bar	77	$30,304	$394	$30,304	$394	$30,304	$394
105	Brevard Zoo Central IRL Oyster Project	408	$161,160	$395	$161,160	$395	$161,160	$395
140	Brevard Zoo Central IRL Oyster Project 2	677	$270,800	$400	$390,657	$577	$367,692	$543
185	Brevard Zoo Central Indian River Lagoon Tributary Pilot Oyster Project	581	$230,657	$397	$319,474	$550	$290,525	$500
187	Brevard Zoo Central Indian River Lagoon Oyster Project 3	218	$86,546	$397	$119,871	$550	$109,009	$500
217	Central IRL Oyster Project 4	348	$138,156	$397	$163,132	$469	$155,232	$446
218	Central Oyster Project Offshore Reefs	900	$357,300	$397	$421,894	$469	$401,462	$446
226	Hog Point Offshore Oyster Bar	126	$21,023	$167	$21,023	$167	$73,560	$584
273	Brevard Zoo Central Indian River Lagoon Oyster Project 5	1,504	$714,400	$475	$739,404	$492	$714,400	$475
288	The Zip Project: An Oyster Restoration Project	20	$5,500	$275	$5,500	$275	$5,500	$275
-	**Planted Shorelines**	-	-	-	-	-	-	-
77a	Cocoa Beach Country Club Planted Shoreline	67	$16,080	$240	$16,080	$240	$16,080	$240
78b	McNabb Park Planted Shoreline	7	$1,680	$240	$1,680	$240	$8,177	$1,168
103	Brevard Zoo North IRL Plant Project	3	$720	$240	$720	$240	$720	$240
130	Brevard Zoo North IRL Plant Project 2	41	$9,840	$240	$9,840	$240	$9,840	$240
181	Riveredge	17	$4,080	$240	$4,080	$240	$4,080	$240

Project Number	Project	TN Reductions (Pounds per Year)	Approved Save Our Lagoon Project Cost	Approved Cost per Pound per Year of TN	Inflated/Final Save Our Lagoon Project Cost	Inflated/Final Cost per Pound per Year of TN	Total Project Cost (2025 Estimate)	Total Cost per Pound per Year of TN
212	Titusville Causeway Multi-Trophic Restoration and Living Shoreline	131	$35,326	$270	$35,326	$270	$175,000	$1,336
77b	Lagoon House Shoreline Restoration Planting	100	$24,000	$240	$24,000	$240	$24,000	$240
133	Fisherman's Landing	20	$4,800	$240	$4,800	$240	$4,800	$240
135	Rotary Park	20	$4,800	$240	$4,800	$240	$4,800	$240
286	Coconut Point Shoreline Stabilization and Living Shoreline Enhancement	34	$8,806	$259	$8,806	$259	$122,168	$3,593
-	**Clam Restoration**	-	-	-	-	-	-	-
194	Aquaculture Stimulus Program	1,667	$100,000	$60	$100,000	$60	To be determined	To be determined
265	Restoration of Native Clams in the IRL – Titusville	1,584	$272,000	$172	$281,520	$178	$272,000	$172
267	Restoration of Native Clams in the IRL - Grant Island	990	$170,000	$172	$175,950	$178	$170,000	$172
-	**Projects Monitoring**	-	$10,000,000	Not applicable	$10,000,000	Not applicable	To be determined	Not applicable
	Total	***1,297,302***	***$480,882,666***	***$371 (average)***	***$558,966,024***	***$431 (average)***	***$1,080,157,941***	***$833 (average)***

Table 6-10. Timeline for Funding Needs (Table 46 in the Original Save Our Indian River Lagoon Project Plan)

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
Public Education	-	-	-	-	-	-	-	-	-	-	-
Fertilizer Management	-	Year 1 of Program*	Year 2 of Program*	Year 3 of Program*	Year 4 of Program*	Year 5 of Program*	Year 6 of Program*	Year 7 of Program*	Year 8 of Program*	Year 9 of Program	Year 10 of Program
$968,194	-	$0	$120,951	$49,477	$46,571	$35,834	$46,364	$95,886	$37,763	$267,674	$267,674
Grass Clippings	-	Year 1 of Program*	Year 2 of Program*	Year 3 of Program*	Year 4 of Program*	Year 5 of Program*	Year 6 of Program*	Year 7 of Program*	Year 8 of Program*	Year 9 of Program	Year 10 of Program
$416,100	-	$0	$20,000	$0	$6,638	$8,362	$0	$0	$7,368	$186,866	$186,866
Septic System Maintenance	-	Year 1 of Program*	Year 2 of Program*	Year 3 of Program*	Year 4 of Program*	Year 5 of Program*	Year 6 of Program*	Year 7 of Program*	Year 8 of Program*	Year 9 of Program	Year 10 of Program
$517,203	-	$0	$48,380	$49,245	$22,709	$11,497	$21,816	$60,235	$10,705	$146,309	$146,307
Irrigation	-	-	-	-	-	-	Year 1 of Program*	Year 2 of Program*	Year 3 of Program*	Year 4 of Program	Year 5 of Program
$338,166	-	-	-	-	-	-	$0	$0	$10,131	$164,018	$164,017
Stormwater Best Management Practice	-	-	-	-	-	-	Year 1 of Program*	Year 2 of Program*	Year 3 of Program*	Year 4 of Program	Year 5 of Program
$336,558	-	-	-	-	-	-	$0	$0	$24,932	$155,813	$155,813
Oyster Gardening	-	-	-	Year 1 of Program*	Year 2 of Program*	-	-	-	-	-	-
$300,000	-	-	-	$150,000	$150,000	-	-	-	-	-	-
Restore Our Shores	-	-	-	-	-	Year 1 of Program*	Year 2 of Program*	Year 3 of Program*	Year 4 of Program*	Year 5 of Program	Year 6 of Program
$1,124,521	-	-	-	-	-	$100,000	$200,000	$200,000	$238,203	$193,159	$193,159
WWTF Upgrades	-	-	-	-	-	-	-	-	-	-	-
Banana River Lagoon	-	-	Cocoa Beach*	-	-	-	-	-	-	-	-
$945,000	-	-	$945,000	-	-	-	-	-	-	-	-
North IRL	-	-	-	Titusville Osprey Design and Permitting*	Titusville Osprey Design and Start Construction*	Titusville Osprey Construction*	-	-	Port Saint John Wastewater Treatment Plant Replacement	-	-
$9,016,182	-	-	-	$1,000,000	$3,000,000	$4,000,000	-	-	$1,016,182	-	-
North IRL	-	-	-	-	Osprey Nutrient Upgrade Phase 2*	-	-	-	-	-	-
$219,826	-	-	-	-	$219,826	-	-	-	-	-	-
North IRL	-	-	-	-	-	Rockledge Flow Equalization Basin*	-	-	-	-	-
$2,344,222	-	-	-	-	-	$2,344,222	-	-	-	-	-
Central IRL	-	Palm Bay Permit and Engineering*	Palm Bay Construction*	Palm Bay Construction*	-	-	-	-	South Beaches Upgrade	-	-
$6,192,751	-	$200,000	$1,200,000	$2,234,900	-	-	-	-	$2,557,851	-	-
Central IRL	-	-	-	Melbourne Grant Street	-	-	-	-	-	-	-
$9,596,607	-	-	-	$9,596,607	-	-	-	-	-	-	-
Central IRL	-	-	-	Ray Bullard Biological Nutrient Removal	-	-	-	-	-	-	-
$6,506,916	-			$6,506,916							
Central IRL	-	-	-	-	-	-	South Brevard Water Reclamation Facility	-	-	The Cove Package Plant	-
$1,842,655	-	-	-	-	-	-	$1,832,742	-	-	$9,913	-
Rapid Infiltration Basin/ Sprayfield Upgrades	-	-	-	-	-	-	-	-	-	-	-
North IRL	-	-	-	-	-	-	-	-	Sterling House Condominium	-	-
$70,847	-	-	-	-	-	-	-	-	$70,847	-	-
Central IRL	Long Point*	-	-	-	-	-	-	-	-	-	-
$22,207	$22,207	-	-	-	-	-	-	-	-	-	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
Package Plant Connections	-	-	-	-	-	-	-	-	-	-	-
North IRL	-	-	-	-	Oak Point*	-	Willow Lakes Recreational Vehicle Park	-	-	-	-
$1,484,731	-	-	-	-	$279,000	-	$1,205,731	-	-	-	-
Sewer Laterals	-	-	-	-	-	-	-	-	-	-	-
Banana River Lagoon	-	-	-	-	Countywide Repair/ Replacement	-	-	-	-	-	-
$877,862	-	-	-	-	$877,862	-	-	-	-	-	-
Banana River Lagoon	-	-	-	-	Satellite Beach Smoke Testing*	-	-	-	-	-	-
$202,210	-	-	-	-	$202,210	-	-	-	-	-	-
North IRL	-	-	Titusville Osprey Basin*	-	-	-	-	-	-	-	-
$114,769	-	-	$114,769	-	-	-	-	-	-	-	-
North IRL	-	-	-	Merritt Island Lateral Smoke Testing*	-	-	-	-	-	-	-
$246,630	-	-	-	$246,630	-	-	-	-	-	-	-
Central IRL	-	-	-	Barefoot Bay Lateral Smoke Testing*	-	-	-	-	-	-	-
$32,873	-	-	-	$32,873	-	-	-	-	-	-	-
Central IRL	-	-	-	South Beaches Lateral Smoke Testing*	-	-	-	-	-	-	-
$84,304	-	-	-	$84,304	-	-	-	-	-	-	-
Septic-to-Sewer	-	-	-	-	-	-	-	-	-	-	-
Banana River Lagoon	Sykes M Engineering	-	Sykes Creek M	-	-	-	Kelly Park	-	-	-	-
$3,371,407	$298,640	-	$2,923,090	-	-	-	$149,677	-	-	-	-
Banana River Lagoon	-	Sykes Creek N	-	-	-	-	Rotary Park	-	-	-	-
$5,161,445	-	$4,988,485	-	-	-	-	$172,960	-	-	-	-
Banana River Lagoon	Sykes T Engineering	-	-	Sykes Creek T	-	-	-	-	-	-	-
$6,020,586	$298,640	-	-	$5,721,946	-	-	-	-	-	-	-
Banana River Lagoon	-	-	-	-	South Banana B Engineering	South Banana B	-	-	-	-	-
$1,962,756	-	-	-	-	$393,266	$1,569,490	-	-	-	-	-
Banana River Lagoon	-	-	-	-	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects	Quick Connects
$2,688,518	-	-	-	-	$18,407	$0	$14,688	$21,000	$38,999	$1,297,712	$1,297,712
Banana River Lagoon	-	-	-	-	Merritt Island C Engineering	Merritt Island C	Merritt Island C	-	-	-	-
$2,279,314	-	-	-	-	$209,178	$1,035,068	$1,035,068	-	-	-	-
Banana River Lagoon	-	-	-	-	Merritt Island F Engineering	-	Merritt Island F	-	-	-	-
$1,586,864	-	-	-	-	$144,260	-	$1,442,604	-	-	-	-
Banana River Lagoon	-	-	-	-	-	-	-	Sykes Creek R	-	-	-
$8,384,607	-	-	-	-	-	-	-	$8,384,607	-	-	-
Banana River Lagoon	-	-	-	-	-	-	-	Merritt Island G	-	-	-
$12,623,491	-	-	-	-	-	-	-	$12,623,491	-	-	-
Banana - Satellite Beach	-	-	-	-	-	Hedgecock/Grabowsky and Desoto Fields*	-	-	-	-	-
$121,500	-	-	-	-	-	$121,500	-	-	-	-	-
North IRL	South Central C Engineering*	South Central C*	-	-	South Central C*	-	Manatee Cove	-	-	-	-
$5,532,246	$450,000	$4,222,080	-	-	$820,252	-	$39,914	-	-	-	-
North IRL	Breeze Swept*	-	-	-	-	-	Riverwalk	-	-	-	-
$887,182	$880,530	-	-	-	-	-	$6,652	-	-	-	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
North IRL	Merritt Island Redevelopment Agency*	-	-	-	-	-	-	-	-	-	-
$320,000	$320,000	-	-	-	-	-	-	-	-	-	-
North IRL	-	-	-	-	-	-	-	North Merritt Island E	-	-	-
$5,468,294	-	-	-	-	-	-	-	$5,468,294	-	-	-
North IRL	-	-	Riverside Drive	-	-	-	-	-	-	-	-
$371,480	-	-	$371,480	-	-	-	-	-	-	-	-
North IRL	-	-	-	Cocoa J and K	-	-	-	-	-	-	-
$6,715,820	-	-	-	$6,715,820	-	-	-	-	-	-	-
North IRL	-	-	-	-	-	-	-	-	-	-	-
$0	-	-	-	-	-	-	-	-	-	-	-
North IRL	-	-	-	Titusville A-G	-	-	-	-	-	-	-
$1,435,136	-	-	-	$1,435,136	-	-	-	-	-	-	-
North IRL	-	-	-	-	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects	Quick Connects
$8,026,098	-	-	-	-	$534,000	$60,663	$78,264	$66,680	$609,041	$3,338,725	$3,338,725
North IRL	-	-	-	-	South Central D (Brevard) Engineering	South Central D (Brevard)	-	-	-	-	-
$6,887,712	-	-	-	-	$1,377,687	$5,510,025	-	-	-	-	-
North IRL	-	-	-	-	South Central A Engineering	South Central A	-	-	-	South Central A	-
$8,258,854	-	-	-	-	$806,328	$5,742,850	-	-	-	$1,709,676	-
North IRL	-	-	-	-	-	South Beaches A	South Beaches A	-	-	-	-
$2,340,144	-	-	-	-	-	$477,824	$1,862,320	-	-	-	-
North IRL	-	-	-	-	-	-	Pineapple Avenue Sewer Conversion	-	-	-	-
$2,433,921	-	-	-	-	-	-	$2,433,921	-	-	-	-
North IRL	-	-	-	South Beaches O	-	-	-	-	-	-	-
$190,896	-	-	-	$190,896	-	-	-	-	-	-	-
North IRL	-	-	-	South Beaches P	-	-	-	-	-	-	-
$429,515	-	-	-	$429,515	-	-	-	-	-	-	-
North IRL	-	-	-	-	Sharpes A Engineering	-	-	-	Sharpes A	-	-
$11,257,428	-	-	-	-	$1,780,424	-	-	-	$9,477,004	-	-
North IRL	-	-	-	-	-	-	-	-	-	South Tropical Trail / Kadlac Drive	-
$251,586	-	-	-	-	-	-	-	-	-	$251,586	-
North IRL	-	-	-	-	Sharpes B Engineering	-	-	-	Sharpes B	-	-
$5,825,234	-	-	-	-	$1,168,509	-	-	-	$4,656,725	-	-
North IRL	-	-	-	-	-	-	-	Cocoa C	-	-	-
$4,242,212	-	-	-	-	-	-	-	$4,242,212	-	-	-
North IRL	-	-	-	-	Bowers	-	-	-	-	-	-
$203,604	-	-	-	-	$203,604	-	-	-	-	-	-
North IRL	-	-	-	-	Kent and Villa Espana	-	-	-	-	-	-
$983,393	-	-	-	-	$983,393	-	-	-	-	-	-
Central IRL	-	-	-	-	Micco Phases I & II	-	-	-	-	-	-
$3,101,842	-	-	-	-	$3,101,842	-	-	-	-	-	-
Central IRL	Hoag	-	-	-	-	-	-	-	-	-	-
$117,493	$117,493	-	-	-	-	-	-	-	-	-	-
Central IRL	Pennwood	-	-	-	-	-	-	-	-	-	-
$55,492	$55,492	-	-	-	-	-	-	-	-	-	-
Central IRL	-	-	Roxy Avenue	-	-	-	-	-	-	-	-
$126,089	-	-	$126,089	-	-	-	-	-	-	-	-
Central IRL	-	-	-	-	-	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects*	Quick Connects	Quick Connects
$4,255,617	-	-	-	-	-	$11,880	$416,525	$1,597,556	$600,922	$814,367	$814,367
Central IRL	-	Sylvan Estates*	-	-	-	-	-	-	-	-	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
$1,561,215	-	$1,561,215	-	-	-	-	-	-	-	-	-
Central IRL	-	-	-	-	Palm Bay A	-	-	-	-	-	-
$3,069,596	-	-	-	-	$3,069,596	-	-	-	-	-	-
Central IRL	-	-	-	-	-	-	-	Micco B	-	-	-
$10,786,863	-	-	-	-	-	-	-	$10,786,863	-	-	-
Central IRL	-	-	-	-	Avendia del Rio	-	-	-	-	-	-
$96,954	-	-	-	-	$96,954	-	-	-	-	-	-
Central - West Melbourne	-	-	-	-	-	Lake Ashley Circle	-	-	-	-	-
$2,012,057	-	-	-	-	-	$2,012,057	-	-	-	-	-
Central - West Melbourne	-	-	-	-	-	Dundee Circle and Manor Place	-	-	-	-	-
$2,654,994	-	-	-	-	-	$2,654,994	-	-	-	-	-
Central - Palm Bay	-	-	-	-	-	-	-	-	Sewer Available Not Connected Phase 2	-	-
$1,673,587	-	-	-	-	-	-	-	-	$1,673,587	-	-
Septic Upgrades	-	-	-	-	-	-	-	-	-	-	-
Banana River Lagoon	-	-	-	-	-	5 Upgrades*	9 Upgrades*	14 Upgrades*	47 Upgrades*	94 Upgrades	93 Upgrades
$3,239,759	-	-	-	-	-	$54,384	$102,258	$217,515	$621,856	$1,142,434	$1,101,312
North IRL	-	-	-	10 Upgrades*	5 Upgrades*	20 Upgrades*	33 Upgrades*	32 Upgrades*	104 Upgrades*	429 Upgrades	428 Upgrades
$18,481,017	-	-	-	$176,100	$90,000	$163,855	$383,585	$388,885	$1,446,734	$7,928,358	$7,903,500
Central IRL	-	-	-	2 Upgrades*	26 Upgrades*	24 Upgrades*	67 Upgrades*	74 Upgrades*	109 Upgrades*	523 Upgrades	523 Upgrades
$23,463,052	-	-	-	$34,485	$427,428	$298,087	$835,256	$1,224,189	$1,562,818	$9,552,475	$9,528,314
Stormwater Projects	-	-	-	-	-	-	-	-	-	-	-
Banana - Cape Canaveral	Central Boulevard Baffle Box*	-	-	-	-	-	-	-	-	Fillmore Avenue	-
$69,140	$34,700	-	-	-	-	-	-	-	-	$34,440	-
Banana - Indian Harbour Beach	Gleason Park Reuse*	Big Muddy at Cynthia Baffle Box*	Big Muddy Expansion*	-	-	-	-	-	-	-	-
$63,855	$4,224	$41,695	$17,936	-	-	-	-	-	-	-	-
Banana - Cocoa Beach	-	-	-	-	Convair Cove 1 - Blakey Blvd*	McNabb Outfall Bioretention*	-	Maritime Hammock Vegetative Islands	-	-	-
$35,579	-	-	-	-	$4,650	$21,824	-	$9,105	-	-	-
Banana - Cocoa Beach	-	-	-	-	Convair Cove 2- Dempsey Drive *	-	-	Cocoa Beach Golf Vegetative Islands	-	-	-
$91,743	-	-	-	-	$4,495	-	-	$87,248	-	-	-
Banana - Cocoa Beach	-	-	-	-	-	-	-	Ramp Road Park	Cocoa Isles Dry Pond	-	-
$23,918	-	-	-	-	-	-	-	$17,992	$5,926	-	-
Banana - Satellite Beach	-	-	-	Jackson Court*	Lori Laine*	-	-	-	Westside Basin	-	-
$83,785	-	-	-	$8,266	$17,525	-	-	-	$57,994	-	-
Banana - Woodland	-	-	-	-	-	-	Woodland Business Center*	-	-	-	-
$5,200	-	-	-	-	-	-	$5,200	-	-	-	-
Banana - Brevard	-	-	Basin 1304 Bioreactor*	-	-	Basin 960 Pioneer Road	Basin 998 Hampton Homes	-	-	-	-
$199,436	-	-	$83,029	-	-	$45,873	$70,534	-	-	-	-
Banana - Brevard	-	-	-	-	-	-	Basin 1066 Angel Avenue	-	-	-	-
$257,444	-	-	-	-	-	-	$257,444	-	-	-	-
Banana - Brevard	-	-	-	-	-	-	Basin 1124 Elliot Drive	-	-	-	-
$354,158	-	-	-	-	-	-	$354,158	-	-	-	-
Banana - Brevard	-	-	-	-	-	-	Basin 998 Richland Avenue Canal	-	-	-	-
$145,000	-	-	-	-	-	-	$145,000	-	-	-	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
Banana - Brevard	-	-	-	-	-	-	Basin 1280B Flamingo Road	-	-	-	-
$79,434	-	-	-	-	-	-	$79,434	-	-	-	-
Banana - Brevard	-	-	-	-	-	-	Basin 1304 West Arlington Road*	-	-	-	-
$73,600	-	-	-	-	-	-	$73,600	-	-	-	-
Banana - Brevard	-	-	-	-	-	-	-	-	-	39 Projects	38 Projects
$23,393,451	-	-	-	-	-	-	-	-	-	$13,492,543	$9,900,908
North IRL - Cocoa	Church Street Type II Baffle Box*	-	-	Floating Wetlands*	North and South Lakemont*	-	North Fiske Floating Wetlands*	-	-	-	-
$152,596	$88,045	-	-	$1,497	$13,054	-	$50,000	-	-	-	-
North IRL - Titusville	-	St. Teresa Basin Treatment*	Titusville High School Baffle Box*	-	St. Johns 2 Baffle Box*	Sand Point Park Baffle Box*	Riverfront Center Nutrient Removing Boxes*	-	Coleman Pond Circulation	South Street and US 1	-
$1,435,914	-	$272,800	$111,813	-	$243,070	$52,155	$224,992	-	$130,432	$400,652	-
North IRL - Titusville	-	South Street Basin Treatment*	Coleman Pond Managed Aquatic Plant System*	Osprey Plant Managed Aquatic Plant Systems*	Marina B Managed Aquatic Plants*	-	Commons and City Hall Tree Boxes*	-	Tennessee Street Baffle Box	535 Knox McRae	-
$1,030,427	-	$86,856	$11,438	$37,500	$6,670	-	$26,823	-	$532,812	$328,328	-
North IRL - Titusville	-	La Paloma Basin Treatment*	-	Draa Pond Managed Aquatic Plant Systems*	-	-	-	-	Osprey Pond Circulator	-	-
$328,995	-	$208,296	-	$31,281	-	-	-	-	$89,418	-	-
North IRL - Melbourne	-	Cliff Creek Baffle Box*	Apollo/GA Baffle Box	-	High School and Funeral Home Baffle Boxes*	-	-	-	Melbourne Cemetery Baffle Box	-	-
$1,196,477	-	$347,781	$421,774	-	$203,008	-	-	-	$223,914	-	-
North IRL - Melbourne	-	Thrush Drive Baffle Box*	-	-	-	-	-	-	-	-	-
$322,200	-	$322,200	-	-	-	-	-	-	-	-	-
North IRL - Melbourne	-	-	Spring Creek Baffle Box	-	Basin 1335 (Sherwood Park)*	-	-	-	-	-	-
$765,522	-	-	$473,122	-	$292,400	-	-	-	-	-	-
North IRL - Indialantic	-	-	-	Basin 5 Dry Retention*	-	-	-	-	-	-	-
$16,680	-	-	-	$16,680	-	-	-	-	-	-	-
North IRL - Brevard	-	Kingsmill-Aurora Phase Two	Basin 1298 Bioreactor*	-	-	Basin 1398 Sand Dollar Canal Bioreactor	-	-	Basin 1263 Waelti Drive Pond Retrofit*	Basin 212 East Main Street	-
$1,295,897	-	$501,882	$85,829	-	-	$233,824	-	-	$97,818	$376,544	-
North IRL - Brevard	-	Denitrification Retrofit of Huntington Pond	Johns Road Pond*	Basin 10 County Line Road Bioreactor*	-	-	-	-	Basin 1349 Lake Washington & Croton Road Pond*	-	-
$295,226	-	$143,017	$23,030	$72,773	-	-	-	-	$56,406	-	-
North IRL - Brevard	-	Denitrification Retrofit of Flounder Creek Pond*	Burkholm Road*	Basin 26 Sunset Avenue Serenity Park Bioreactor*	-	Basin 89 Scottsmoor I Aurantia*	-	-	Basin 1335 North Wickham & Conservation Place Wet Pond*	-	-
$486,826	-	$102,876	$64,390	$73,810	-	$152,573	-	-	$93,177	-	-
North IRL - Brevard	-	Denitrification Retrofit of Johns Road Pond*	Carter Road*	Basin 141 Irwin Avenue Woodchip Bioreactor*	-	-	-	-	-	-	-
$237,196	-	$105,512	$62,510	$69,174	-	-	-	-	-	-	-
North IRL - Brevard	-	-	Wiley Avenue*	Basin 22 Huntington Road Serenity Park Bioreactor*	-	-	-	-	-	-	-
$82,735	-	-	$82,735	$0	-	-	-	-	-	-	-
North IRL - Brevard	-	-	Broadway Pond*	-	-	-	-	-	-	-	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
$42,864	-	-	$42,864	-	-	-	-	-	-	-	-
North IRL - Brevard	-	-	-	-	-	-	-	-	-	34 Projects	34 Projects
$35,646,671	-	-	-	-	-	-	-	-	-	$21,289,554	$14,357,117
North IRL - Brevard	-	-	-	-	-	Johnson Junior High Denitrification*	-	-	-	-	-
$40,815	-	-	-	-	-	$40,815	-	-	-	-	-
Central IRL - Palm Bay	Bayfront Stormwater Project*	-	-	-	-	-	-	-	-	-	-
$30,624	$30,624	-	-	-	-	-	-	-	-	-	-
Central IRL - Melbourne	-	-	Grant Place Baffle Box*	-	Ray Bullard Stormwater Management Area*	-	-	-	Darrow Baffle Box	-	-
$392,377	-	-	$82,481	-	$111,847	-	-	-	$198,049	-	-
Central IRL - Melbourne	-	-	Espanola Baffle Box	-	-	-	-	Riverview Park Baffle Box	Line Street Cemetery Baffle Box	-	-
$764,968	-	-	$150,422	-	-	-	-	$330,035	$284,511	-	-
Central - St. Johns River Water Management District	-	-	Crane Creek/M-1 Canal Flow Restoration*	-	-	-	-	C-10 Water Management Area	-	-	-
$14,088,489	-	-	$2,883,368	-	-	-	-	$11,205,121	-	-	-
Central IRL - Brevard	-	-	Fleming Grant*	Basin 2258 Babcock Road Bioreactor	-	-	-	-	-	-	-
$129,011	-	-	$56,588	$72,423	-	-	-	-	-	-	-
Vegetation Harvesting	-	-	-	-	-	-	-	-	-	-	-
Banana - Brevard	-	-	-	-	-	Basin 958 Pioneer Road	-	-	Unincorprated Countywide 2*	-	-
$519,907	-	-	-	-	-	$47,149	-	-	$472,758	-	-
Banana - Cocoa Beach	-	-	-	-	-	Maritime Hammock*	-	-	-	-	-
$7,700	-	-	-	-	-	$7,700	-	-	-	-	-
Banana - Cocoa Beach	-	-	-	-	-	-	Cocoa Beach Golf Course*	-			
$218,267	-	-	-	-	-	-	$218,267	-	-	-	-
North IRL - Brevard	-	-	-	County Wide Pond Harvesting*	Horseshoe Pond*	Basin 1398 Sand Dollar*	-	-	-	-	-
$46,560	-	-	-	$14,000	$8,140	$24,420	-	-	-	-	-
North IRL - Titusville	-	-	-	Draa Field Vegetation Harvesting*	-	-	-	-	-	-	-
$57,360	-	-	-	$57,360	-	-	-	-	-	-	-
Central IRL - Melbourne-Tillman	-	-	-	-	Mechanical Harvesting*	-	-	-	-	-	-
$1,011,976	-	-	-	-	$1,011,976	-	-	-	-	-	-
Countywide	-	-	-	-	-	-	Unincorporated Countywide*	-	-	Unincorporated Countywide 3	-
$992,736	-	-	-	-	-	-	$477,000	-	-	$515,736	-
Muck Removal & Interstitial Treatment	-	-	-	-	-	-	-	-	-	-	-
Banana River Lagoon	-	-	Cocoa Beach Phase III*	Cocoa Beach Ph II-B*	-	-	-	-	-	-	-
$7,287,455	-	-	$1,376,305	$5,911,150	-	-	-	-	-	-	-
Banana River Lagoon	-	-	Merritt Island	-	-	-	-	-	-	-	-
$10,963,220	-	-	$10,963,220	-	-	-	-	-	-	-	-
Banana River Lagoon	-	-	-	Indian Harbour Beach	Indian Harbour Beach	-	-	-	-	-	-
$12,922,232	-	-	-	$708,812	$12,213,420	-	-	-	-	-	-
Banana River Lagoon	-	-	29% Sykes Creek	-	71% Sykes Creek	-	-	-	-	-	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
$35,319,413	-	-	$10,242,630	-	$25,076,783	-	-	-	-	-	-
Banana River Lagoon	-	-	20% Grand Canal	25% Grand Canal	55% Grand Canal	-	-	-	-	-	-
$11,079,941	-	-	$2,215,988	$2,769,986	$6,093,967	-	-	-	-	-	-
Banana River Lagoon	-	-	-	2% Cocoa Beach Golf	2% Cocoa Beach Golf	8% Cocoa Beach Golf	8% Cocoa Beach Golf	20% Cocoa Beach Golf	20% Cocoa Beach Golf	20% Cocoa Beach Golf	20% Cocoa Beach Golf
$29,103,198	-	-	-	$597,280	$597,280	$2,090,481	$2,090,481	$5,931,919	$5,931,919	$5,931,919	$5,931,919
Banana River Lagoon	-	-	-	-	-	2% Canaveral South	25% Canaveral South	30% Canaveral South	35% Canaveral South	8% Canaveral South	-
$20,109,734	-	-	-	-	-	$477,824	$5,027,434	$6,032,921	$7,038,407	$1,533,148	-
Banana River Lagoon	-	-	-	-	-	3% Pineda	47% Pineda	50% Pineda	-	-	-
$9,336,662	-	-	-	-	-	$238,912	$4,429,419	$4,668,331	-	-	-
Banana River Lagoon	-	-	-	-	-	Patrick Space Force Base	-	-	-	-	-
$9,815,466	-	-	-	-	-	$9,815,466	-	-	-	-	-
Banana River Lagoon	-	-	-	Satellite Beach	Satellite Beach	-	-	-	-	-	-
$7,129,321	-	-	-	$721,302	$6,408,019	-	-	-	-	-	-
North IRL	-	-	2% Eau Gallie Northeast	49% Eau Gallie Northeast	49% Eau Gallie Northeast	-	-	-	-	-	-
$11,970,079	-	-	$239,401	$5,865,339	$5,865,339	-	-	-	-	-	-
North IRL	-	1% Titusville East	4% Titusville East	4% Titusville East	11% Titusville East	20% Titusville East	20% Titusville East	20% Titusville East	20% Titusville East	-	-
$5,506,238	-	$55,062	$220,250	$220,250	$605,686	$1,101,248	$1,101,248	$1,101,248	$1,101,246	-	-
North IRL	-	1% Titusville West	4% Titusville West	4% Titusville West	21% Titusville West	30% Titusville West	40% Titusville West	-	-	-	-
$4,309,228	-	$43,093	$172,369	$172,369	$904,938	$1,292,768	$1,723,691	-	-	-	-
North IRL	-	1% National Aeronautics and Space Administration East	4% National Aeronautics and Space Administration East	-	10% National Aeronautics and Space Administration East	10% National Aeronautics and Space Administration East	15% National Aeronautics and Space Administration East	18% National Aeronautics and Space Administration East	22% National Aeronautics and Space Administration East	20% National Aeronautics and Space Administration East	-
$13,645,890	-	$136,459	$545,835	-	$1,364,590	$1,364,590	$2,046,883	$2,495,696	$2,962,660	$2,729,177	
North IRL	-	-	-	4% Rockledge A	48% Rockledge A	48% Rockledge A	-	-	-	-	-
$5,985,040	-	-	-	$238,912	$2,873,064	$2,873,064	-	-	-	-	-
North IRL - Melbourne	-	-	-	-	-	Spring Creek	-	-	-	-	-
$94,557	-	-	-	-	-	$94,557	-	-	-	-	-
North IRL - Melbourne	-	-	-	-	-	-	-	Mims Rim Ditch	-	-	-
$12,662,172	-	-	-	-	-	-	-	$12,662,172	-	-	-
North IRL	-	-	-	-	-	-	-	-	-	Tequesta Harbor	-
$41,276	-	-	-	-	-	-	-	-	-	$41,276	-
Central IRL	-	Turkey Creek*	-	-	-	-	-	-	-	-	-
$137,329	-	$137,329	-	-	-	-	-	-	-	-	-
Central IRL	-	-	-	-	-	-	Sunnyland Canals	-	-	-	-
$5,782,629	-	-	-	-	-	-	$5,782,629	-	-	-	-
Central IRL	-	-	-	-	-	-	-	Shore View Lane	-	-	-
$48,117	-	-	-	-	-	-	-	$48,117	-	-	-
Oyster Bars	-	-	-	-	-	-	-	-	-	-	-
Banana - Brevard Zoo	-	Marina Isles*	Brevard Zoo Banana River	Brevard Zoo Banana River Oyster Project 2	Brevard Zoo Banana River Oyster Project 3	-	-	-	-	-	-
$1,324,352	-	$26,700	$833,753	$382,001	$81,898	-	-	-	-	-	-
Banana - Brevard Zoo	-	Bettinger*	-	Brevard Zoo Oyster Reef Adjustments	-	-	-	-	-	-	-
$29,145	-	$10,680	-	$18,465	-	-	-	-	-	-	-
Banana - Cocoa Beach	-	-	-	-	McNabb*	-	-	-	-	-	-
$9,134	-	-	-	-	$9,134	-	-	-	-	-	-
Banana - Brevard Zoo	-	Gitlin*	-	-	-	-	-	-	-	-	-
$16,020	-	$16,020	-	-	-	-	-	-	-	-	-
Banana - Brevard	-	-	-	-	-	-	-	-	-	33,914.7 square feet Oysters	33,914.7 square feet Oysters
$1,278,824	-	-	-	-	-	-	-	-	-	$639,412	$639,412

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
North IRL - Brevard Zoo	-	Bomalaski*	Brevard Zoo North IRL*	Brevard Zoo North IRL Oyster Project 2*	Brevard Zoo North Indian River Lagoon Oyster Project 3	-	-	-	Brevard Zoo North Indian River Lagoon Oyster Project 4	Brevard Zoo North Indian River Lagoon Oyster Project 5	-
$3,641,703	-	$8,900	$475,438	$485,292	$580,662	-	-	-	$856,411	$1,235,000	-
North IRL - Brevard	-	-	-	-	-	-	-	-	-	55,205 square feet Oysters	55,205 square feet Oysters
$2,081,618	-	-	-	-	-	-	-	-	-	$1,040,809	$1,040,809
North IRL - Brevard Zoo	-	-	-	Brevard Zoo Oyster Reef Adjustments	Brevard Zoo North Indian River Lagoon Individual Oyster Project	-	-	-	-	-	-
$278,982	-	-	-	$39,239	$239,743	-	-	-	-	-	-
Central IRL - Brevard Zoo	-	Coconut Point*	Brevard Zoo Central IRL*	Brevard Zoo Central IRL Oyster Project 2	Brevard Zoo Central Indian River Lagoon Oyster Project 3	-	-	-	Brevard Zoo Central Indian River Lagoon Oyster Project 5	-	-
$1,456,212	-	$45,120	$161,160	$390,657	$119,871	-	-	-	$739,404	-	-
Central IRL - Brevard Zoo	-	Wexford*	-	-	Brevard Zoo Central Indian River Lagoon Tributary Pilot Oyster Project	Central IRL Oyster Project 4	-	-	-	-	-
$513,756	-	$31,150	-	-	$319,474	$163,132	-	-	-	-	-
Central IRL - Brevard Zoo	-	-	-	-	-	Central Oyster Project Offshore Reefs	-	-	-	-	-
$421,894	-	-	-	-	-	$421,894	-	-	-	-	-
Central IRL - Brevard	-	-	-	-	-	Hog Point*	-	-	-	-	-
$21,023	-	-	-	-	-	$21,023	-	-	-	-	-
Central IRL - Brevard	-	Riverview Senior Resort*	-	-	-	-	-	-	-	-	-
$30,304	-	$30,304	-	-	-	-	-	-	-	-	-
Central IRL	-	-	-	-	-	-	-	-	-	The Zip Project	-
$5,500	-	-	-	-	-	-	-	-	-	$5,500	-
Planted Shorelines	-	-	-	-	-	-	-	-	-	-	-
Banana - Marine Resources Council	-	Cocoa Beach*	-	-	-	-	-	-	-	-	-
$16,014	-	$16,014	-	-	-	-	-	-	-	-	-
Banana - Cocoa Beach	-	-	-	-	McNabb*	-	-	-	-	-	-
$1,680	-	-	-	-	$1,680	-	-	-	-	-	-
North IRL - Brevard Zoo	-	-	Brevard Zoo North IRL*	Brevard Zoo North IRL Plant Project 2*	-	-	-	-	-	-	-
$10,560	-	-	$720	$9,840	-	-	-	-	-	-	-
North IRL - Marine Resources Council	-	-	-	-	Riveredge*	-	-	-	-	-	-
$4,080	-	-	-	-	$4,080	-	-	-	-	-	-
North IRL - Brevard	-	-	-	-	-	Titusville Causeway*	-	-	-	-	-
$35,326	-	-	-	-	-	$35,326	-	-	-	-	-
Central IRL - Marine Resources Council	-	Lagoon House*	-	Fisherman's Landing*	-	-	-	-	-	-	-
$28,761	-	$23,961	-	$4,800	-	-	-	-	-	-	-
Central IRL - Marine Resources Council	-	-	-	Rotary Park*	-	-	-	-	-	-	-
$4,800	-	-	-	$4,800	-	-	-	-	-	-	-
Central IRL - Hubbs SeaWorld	-	-	-	-	-	-	-	-	-	Coconut Point Shoreline	-
$8,806	-	-	-	-	-	-	-	-	-	$8,806	-

Project Name/Total Project Cost	Year 0 (Fiscal Year 2016-2017)	Year 1 (Fiscal Year 2017-2018)	Year 2 (Fiscal Year 2018-2019)	Year 3 (Fiscal Year 2019-2020)	Year 4 (Fiscal Year 2020-2021)	Year 5 (Fiscal Year 2021-2022)	Year 6 (Fiscal Year 2022-2023)	Year 7 (Fiscal Year 2023-2024)	Year 8 (Fiscal Year 2024-2025)	Year 9 (Fiscal Year 2025-2026)	Year 10 (Fiscal Year 2026-2027)
Clam Restoration	-	-	-	-	-	-	-	-	-	-	-
All	-	-	-	-	Aquaculture Stimulus*	Aquaculture Stimulus*	-	-	-	Aquaculture Stimulus	-
$100,000	-	-	-	-	$36,000	$24,000	-	-	-	$40,000	-
North IRL - IRL Clam Restoration	-	-	-	-	-	-	-	-	Titusville	-	-
$281,520	-	-	-	-	-	-	-	-	$281,520	-	-
Central IRL - IRL Clam Restoration	-	-	-	-	-	-	-	-	Grant Island	-	-
$175,950	-	-	-	-	-	-	-	-	$175,950	-	-
Project Monitoring	Year 0 Monitoring*	Year 1 Monitoring*	Year 2 Monitoring*	Year 3 Monitoring*	Year 4 Monitoring*	Year 5 Monitoring*	Year 6 Monitoring*	Year 7 Monitoring	Year 8 Monitoring	Year 9 Monitoring	Year 10 Monitoring
$10,000,000	$17,105	$170,279	$371,712	$858,018	$594,114	$887,709	$619,473	$590,784	$1,362,045	$2,264,381	$2,264,380
Contingency	-	-	-	-	-	-	-	-	-	-	-
Banana - Brevard	-	-	-	-	Grand Canal (Berkeley)	-	-	-	-	-	-
$217,053	-	-	-	-	$217,053	-	-	-	-	-	-
Banana - Cocoa Beach	-	Cocoa Beach Planted*	-	-	-	-	Maritime Hammock*	-	-	-	-
$6,846	-	$66	-	-	-	-	$6,780	-	-	-	-
Banana River Lagoon	-	-	-	-	-	-	-	Sykes M	-	-	-
$161,087	-	-	-	-	-	-	-	$161,087	-	-	-
Banana River Lagoon	-	-	-	-	-	-	-	Sykes N	-	-	-
$249,425	-	-	-	-	-	-	-	$249,425	-	-	-
Banana River Lagoon	-	-	-	-	-	-	-	Sykes T	-	-	-
$301,030	-	-	-	-	-	-	-	$301,030	-	-	-
Central IRL	-	Lagoon House Planted*	-	-	-	-	-	-	-	Ray Bullard Biological Nutrient Removal	-
$1,300,039	-	$39	-	-	-	-	-	-	-	$1,300,000	-
North IRL	Merritt Island Redevelopment Agency*	-	-	-	-	-	-	-	-	-	-
$268	$268	-	-	-	-	-	-	-	-	-	-
North IRL - Titusville	-	-	-	-	-	-	-	Riverfront Center Nutrient Removing Boxes*	-	-	-
$17,411	-	-	-	-	-	-	-	$17,411	-	-	-
North IRL - Titusville	-	-	-	-	Draa Field Vegetation Harvesting*	-	-	-	-	-	-
$29,053	-	-	-	-	$29,053	-	-	-	-	-	-
North IRL - Melbourne	-	-	-	-	Basin 1335 (Sherwood Park)*	-	-	-	-	-	-
$99,708	-	-	-	-	$99,708	-	-	-	-	-	-
Central IRL - Melbourne	-	-	-	-	Pennwood	-	-	-	-	-	-
$40,368	-	-	-	-	$40,368	-	-	-	-	-	-
Central IRL	-	-	-	-	-	-	-	Palm Bay A	-	-	-
$247,612	-	-	-	-	-	-	-	$247,612	-	-	-
All	Year 0 Contingency	Year 1 Contingency	Year 2 Contingency	Year 3 Contingency	Year 4 Contingency	Year 5 Contingency	Year 6 Contingency	Year 7 Contingency	Year 8 Contingency	Year 9 Contingency	Year 10 Contingency
$24,468,512	$38,513	$293,400	$1,494,971	$2,139,694	$3,877,882	$1,963,155	$1,664,497	$4,304,769	$2,003,138	$3,840,096	$2,848,397
$583,434,536	***$2,656,481***	***$14,149,271***	***$39,836,840***	***$56,647,820***	***$90,200,585***	***$49,704,074***	***$38,755,332***	***$95,839,436***	***$49,357,583***	***$84,206,406***	***$62,080,708***

* Completed project with actual Save Our Indian River Lagoon Trust Fund cost.

Appendix A: Funding Needs and Leveraging Opportunities

Brevard County explored a variety of possible mechanisms to fund the Indian River Lagoon (IRL) projects in this plan, including:

- Special Taxing District approved by referendum to allow an ad valorem tax levy and bonds
- Special Act by the legislature allowing ad valorem tax levy by referendum to issue bonds
- Local government surtax (0.5 cent sales tax)
- Altering legislation to allow for Tourist Development Council funding to be used for lagoon restoration
- Municipal Service Taxing Unit/Special District
- Increased stormwater utility assessment

The County placed a referendum on the November 8, 2016, ballot for the 0.5 cent sales tax, and this referendum passed by more than 60% of the vote. The Save Our Indian River Lagoon 0.5 cent sales tax will generate approximately $58.3 million per year. The proposed 1 mill increase would have generated approximately $32 million per year, whereas the proposed increase of 0.5 mill would have only generated $16 million per year. To implement the projects in a timely manner according to the schedule in **Table 6-10**, and to accelerate the projects where possible, the County will seek to use funds generated from the sales tax to leverage matching funding from grants and appropriations. If additional funding is provided through matching funds from other sources, additional projects may be implemented, which would increase the overall plan cost, and/or project timelines may be moved up to allow the benefits of those projects to occur earlier than planned.

The following includes examples of other funding programs.

IRL Water Quality Improvement Grants – This grant began in 2023 with $100 million allocated to local governments and nonstate entities to strengthen ongoing efforts to protect the IRL. In 2024, the Legislature allocated $75 million to this grant program. In 2025, the Legislature allocated $25 million. Project proposals can include wastewater improvements (including septic-to-sewer), stormwater management, and other projects that will help improve water quality and support the IRL Protection Program.

Section 319 grant program – The Florida Department of Environmental Protection administers funds received from United States Environmental Protection Agency to implement projects or programs that reduce nonpoint sources of pollution. Projects or programs must benefit Florida's impaired waters, and local sponsors must provide at least a 40% match or in-kind contribution. Eligible activities include demonstration and evaluation of urban and agricultural stormwater best management practices, stormwater retrofits, public education, and costs for homeowners to connect to sewer.

State water quality assistance grants – Funding may be available through periodic legislative appropriations to the Florida Department of Environmental Protection. When funds are available, the program prioritizes stormwater construction projects to benefit impaired waters, similar to the Section 319 grant program.

Water management district funding – Florida's five regional water management districts offer financial assistance for a variety of water-related projects, for water supply development, water resource development, and surface water restoration. Assistance may be provided from ad

valorem tax revenues or from periodic legislative appropriations for alternative water supply development, springs restoration, and Surface Water Improvement and Management projects. The amount of funding available, matching requirements, and types of assistance may vary from year to year. Since 2023, funding has been directed to water supply, not water quality.

Budget Appropriation – The Florida Legislature may solicit applications directly for projects, including water projects, in anticipation of upcoming legislative sessions. This process is an opportunity to secure legislative sponsorship of project funding through the state budget.

IRL National Estuary Program – The IRL Council funds projects each year through their work plan process.

Tourism + Lagoon Grant Program – The Brevard County Tourism Development Council has approved funding for the development of projects that demonstrate a benefit to the health of the IRL and a positive impact to Brevard County for litter control along shorelines and causeways/entryways, restoration and protection of living shorelines, habitat restoration to support fish and wildlife viewing, and waterway destinations and access for improved and sustainable recreational waterway access. Due to revenue shortfalls in 2020, this program has been placed on an indefinite hold.

Clean Water State Revolving Fund loan program – This program provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. Discounted assistance for small communities is available. Interest rates on loans are below market rates and vary based on the economic wherewithal of the community. The Clean Water State Revolving Fund is Florida's largest financial assistance program for water infrastructure.

Resilient Florida Grants – The Resilient Florida Program was created in 2021 and is made up of several components including grants that are available to counties, municipalities, water management districts, flood control districts and regional resilience entities. The purpose of these grants is to help address the impacts of flooding and sea level rise by providing funding assistance to analyze and plan for vulnerabilities and implement projects for adaptation and mitigation.

Florida Rural Water Association Loan Program – This program provides low-interest bond or bank financing for community utility projects in coordination with the Florida Department of Environmental Protection's State Revolving Fund program. Other financial assistance may also be available.

Rural Development Rural Utilities Service Guaranteed and Direct Loans and Grants – The United States Department of Agriculture's program provides a combination of loans and grants for water, wastewater, and solid waste projects to rural communities and small incorporated municipalities.

Small Cities Community Development Block Grant Program – The Florida Department of Commerce makes funds available annually for water and sewer projects that benefit low- and moderate-income persons.

State Housing Initiatives Partnership Program – Florida Housing administers the program, which provides funds to local governments as an incentive to create partnerships that produce and preserve affordable homeownership and multifamily housing. The program is designed to

provide very low, low, and moderate income families with assistance. Funding may be used for emergency repairs, new construction, rehabilitation, down payment and closing cost assistance, impact fees, construction and gap financing, mortgage buy-downs, acquisition of property for affordable housing, matching dollars for federal housing grants and programs, and homeownership counseling.

Rural Development Funding – The United States Department of Agriculture provides funds that will cover the repair and maintenance of private septic systems. The amount of funds available, as well as the specific purposes for which grants are intended, changes from year to year.

American Rescue Plan Act – The American Rescue Plan Act went into place in 2021 to help address the economic impacts from COVID-19. Funding from this act can be used by the state and local governments for a variety of projects including improvements to wastewater and stormwater infrastructure. Three projects received partial cost-share from American Rescue Plan Act funds.

Federal Community Requests – Congress may solicit applications directly for projects, including water projects, for federal appropriation. This process is an opportunity to secure legislative sponsorship of project funding through the federal budget.

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Appendix C: Seagrasses

Loss of Seagrass

In partnership, the St. Johns River Water Management District, South Florida Water Management District, and Florida Department of Environmental Protection mapped seagrass from aerial imagery taken in 1943 and every two to three years since 1986 (**Figure C-1**). Through 2009, the areal footprint of seagrass generally expanded, with some areas nearing their targets, which are benchmarks to evaluate the success of reducing nutrient loads to the Indian River Lagoon (IRL) system. Unfortunately, the areal extent of seagrass in the IRL began to decline in 2011 when mapping documented a loss of almost 43% of the acreage present in 2009. Most of this loss occurred in the reaches adjacent to Brevard County, with extensive losses in Banana River Lagoon (an 88% reduction from 24,000 to 3,000 acres) and in the IRL north of Sebastian Inlet (a 60% reduction from 50,000 to 20,000 acres). The losses resulted from several intense phytoplankton blooms (primarily single-celled algae) that reached unprecedented concentrations for a record duration as indicated by concentrations of chlorophyll-a (**Figure C-2**). Beyond the shallowest water, the bloom effectively reduced the amount of light reaching seagrasses below what they required for survival. As a result, the remaining canopies moved shoreward and to shallower depths, with decreased cover, and a disruption to the species distribution (Morris et al., 2021).

After the 2011 losses, the meadows showed some recovery in 2013 and 2015. However, a brown tide (*Aureoumbra lagunensis*) bloom in 2016 reversed recovery such that, in 2019, the areal extent of seagrasses decreased further to only 58% of that present in 2009. The prognosis is not good because, even where seagrass survives, the cover of seagrass is often less than 5%, which is a record drop from the prior 30–50% (Morris et al., 2021).

Figure C-1. Mean Areal Extent of Seagrass, Mean Length of Transects, and Mean Transect Percent Cover

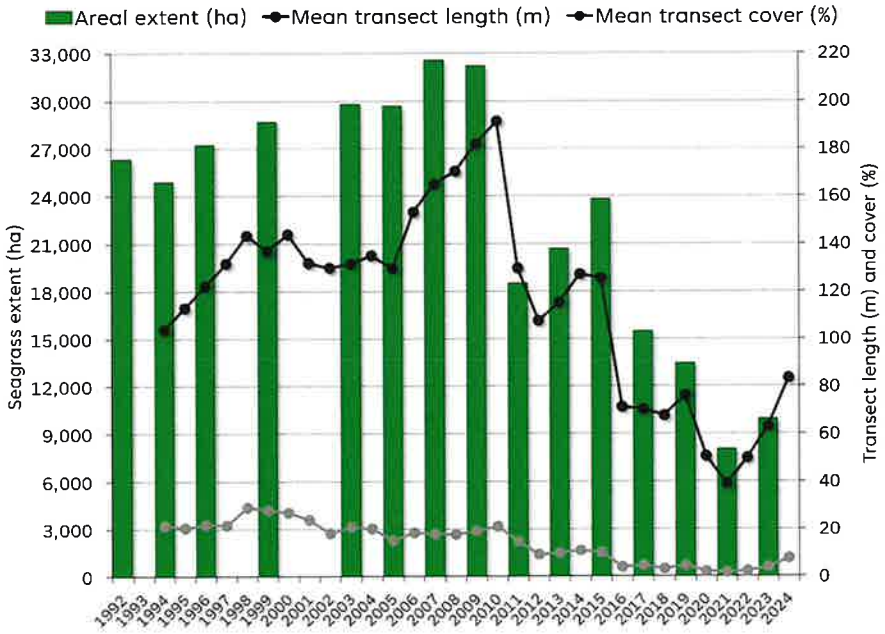


Figure C-1 Long Description

Figure C-2. Mean Chlorophyll-a Concentrations

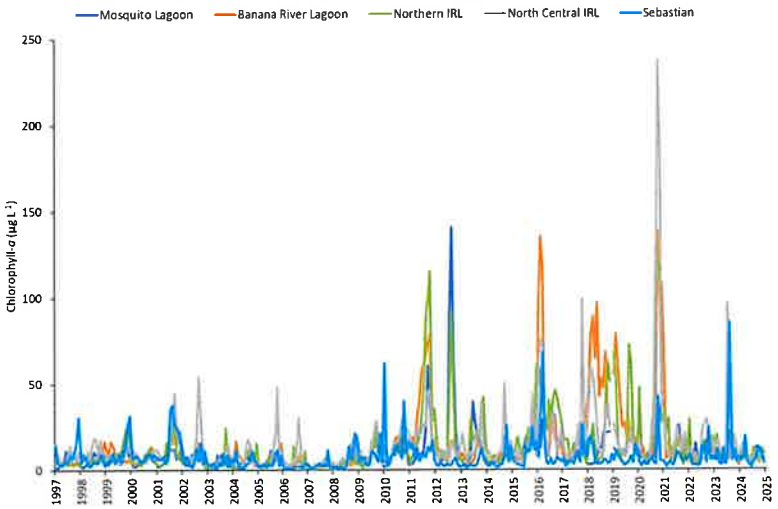
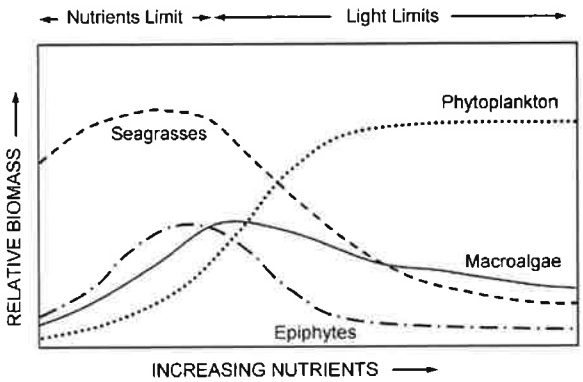


Figure C-2 Long Description

Unfortunately, the IRL appears to be following a pattern described for systems that receive increased loads of nutrients (Duarte, 1995; Burkholder et al., 2007). The pattern involves a shift in the composition of the primary producer assemblage, with higher nutrient loads differentially promoting faster growing macroalgae and ultimately phytoplankton (**Figure C-3**). The macroalgae and phytoplankton can exacerbate loss of seagrasses, primarily through shading. Loss of seagrass and macroalgae makes more nutrients available to phytoplankton through decreased competition (Schmidt et al. 2012), and loss of seagrass means that the sediments may be more prone to resuspension, which also reduces light penetration. Overall, the change in the system becomes self-perpetuating. Reducing nutrient loads represents a critical first step in efforts to reverse the shift in primary producers. However, a return to the previous areal coverage of seagrass may take some time, especially if too few recruits are available and sediments are too destabilized for colonization. Fortunately, field work conducted by the St. Johns River Water Management District in 2023 and 2024, shown in **Figure C-1**, documented seagrass expansion along some transects.

Figure C-3. Conceptual Model Illustrating a Shift in Biomass Among Major Primary Producers with Increasing Nutrient Enrichment



Note: Adapted from Burkholder et al. 2007

Nutrient Content of Seagrass

Halodule wrightii stores nutrients in its aboveground and belowground biological material, or biomass. The biomass of this and other seagrasses changes seasonally, with peak growth of aboveground shoots occurring in April and May and the greatest aboveground biomass recorded during summer. These seasonal changes introduce uncertainty into estimates of nutrient storage, but mean values will suffice for estimating return on investment in the long-term (**Table C-1**). For example, a single shoot of *Halodule wrightii* may contain up to five or more leaves in the summer, whereas in the winter this same shoot may contain only one leaf (Dunton 1996). For this estimate of nutrient content, we will assume that spring-summer growth and fall-winter senescence are equal. Thus, we will focus on our recent estimates of an average amount of aboveground and belowground biomass or standing stock of *Halodule wrightii* (**Table C-1** and **Table C-2**).

Table C-1. Estimates of Biomass for *Halodule* Species

Location	Total Biomass (grams dry weight per square meter)	Reference
Texas (Laguna Madre)	10–400	Zieman and Zieman, 1989
North Carolina (multiple locations)	22–208	Zieman and Zieman, 1989
South Florida and Tampa Bay	10–300	Zieman and Zieman, 1989
IRL (Fort Pierce Inlet)	124–198	Hefferman and Gibson, 1983
IRL (Grand Harbor/Vero)	45	Hefferman and Gibson, 1983
IRL (Link Port)	20–140	Virnstein unpublished
IRL (Brevard County)	53*	Morris, Chamberlain, and Jacoby unpublished
Texas (Laguna Madre)	10–400	Zieman and Zieman, 1989

* Mean aboveground biomass = 23 grams dry weight meters^{-2} = [(mean percent cover × 30.533) × 0.019]; mean belowground biomass = 30 grams dry weight meters^{-2} = 1.3 × aboveground biomass.

Table C-2. Total Biomass in Seagrasses Along Brevard County

Sub-lagoon	Description	Total Biomass (grams dry weight per square meter)
Mosquito Lagoon	Brevard County line to southern end of sub-lagoon	74
Banana River Lagoon	National Aeronautics and Space Administration restricted area	64
Banana River Lagoon	Remainder of Banana River Lagoon	44
IRL	North of State Road 405	51
IRL	State Road 405 to Pineda Causeway	35
IRL	Pineda Causeway to Hog Point	28
IRL	Hog Point to Brevard County line	51
Mean	***Not applicable***	***50***

Duarte (1990) compared nutrient contents of 27 species of seagrass, including *Halodule wrightii*. He determined that nitrogen and phosphorus represent about 2.2% and 0.2% of the dry weight of aboveground and belowground tissue of *Halodule wrightii*, respectively. These values are similar to those calculated during a recent study in the IRL (**Table C-3**). Morris et al. (2022) determined elemental composition of Halodule wrightii, the most common and abundant species of seagrass species in the IRL. Using biomass (Hanisak, 2001), nitrogen and phosphorus composition can be calculated:

Biomass (grams of dry weight per square meter) = (percent cover x 0.723) + 0.588

Nitrogen (grams per square meter) = Biomass (grams of dry weight per square meter) x 0.0236

Phosphorus (grams per square meter) = Biomass (grams of dry weight per square meter) x 0.0023

Seagrass extent and coverage data from the St. Johns River Water Management District allows for nutrient approximations based on the formulas above. Nitrogen and phosphorus no longer stored in seagrass are available in the water column for other primary producers, such as macroalgae and phytoplankton. Comparing the extent and coverage of seagrass from 2005–2009 to the year 2023, there is approximately 169,000 pounds of nitrogen and approximately 16,000 pounds of phosphorus available in the IRL due to seagrass loss (**Table C-4**).

Table C-3. Estimates of Nutrient Content for *Halodule wrightii* (percentage of dry weight)

Location	Carbon Above Ground	Nitrogen Above Ground	Phosphorus Above Ground	Carbon Below Ground	Nitrogen Below Ground	Phosphorus Below Ground
BRL-1	29.60	2.02	0.17	30.60	1.24	0.14
BRL-2	30.60	2.36	0.24	29.08	1.47	0.27
BRL-3	29.60	2.66	0.26	28.09	1.48	0.25
IRL-1	31.74	2.39	0.18	31.69	1.42	0.15
IRL-2	30.08	2.56	0.26	30.48	1.74	0.27
IRL-3	28.26	2.08	0.25	23.86	1.36	0.20
Mean	***29.98***	***2.35***	***0.23***	***28.97***	***1.45***	***0.21***

BRL = Banana River Lagoon, IRL = Indian River Lagoon

Table C-4. Average Seagrass Lost and Nutrients Made Available to Other Primary Producers from 2005–2009 to 2023

Sub-lagoon	Reduction in Acres	Change In Seagrass (pounds)	Pounds of Nitrogen Available	Pounds of Phosphorus Available
Southern Mosquito Lagoon	1,230	+24,556	-580	-57
Banana River Lagoon	22,827	-4,356,694	102,818	10,020
North IRL	18,684	-2,272,528	53,632	5,227
Central IRL	5,465	-562,374	13,272	1,294

* Changes in seagrass cover yield changes in biomass of seagrass within the same number of acres.

Draft Evaluation Criteria for Planting Seagrass

Part of the wisdom accumulated from past seagrass restoration projects is the importance of selecting sites that will support seagrass growth. Key information has been synthesized into an initial guide, with higher scores and more certainty indicating better sites for planting seagrass (**Table C-5**). Please note that the presence of seagrass leads to a lower score based on the premise that natural recruitment represents the most cost-effective option for restoring seagrass. In addition, a high level of uncertainty can suggest targets for further study. This guide can be refined following pilot studies to determine optimal methods for planting seagrass (e.g., type of planting units, use of chemicals to enhance growth, and density of initial planting) and protecting it from disturbance (e.g., grazing, waves, exposure, and low salinity) until it is established.

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Table C-5. Guide for Ranking Potential Seagrass Restoration Sites

Category	Metric	Timeframe	Attributes for Score = 0	Attributes for Score = 2	Attributes for Score = 4	Attributes for Score = 6	Score	Uncertainty (1 = low, 3 = high)
Critical Depth Zone 0.5-0.8 meters below mean sea level	**Width of Critical Depth Zone** (distance perpendicular to shore)	**Recent**	**Very narrow:** < 25 meters wide (< 82 feet)	**Narrow:** 25-50 meters (82-164 feet)	**Moderately wide:** 50-100 meters (164-328 feet)	**Broad:** > 100 meters (> 328 feet)		
Critical Depth Zone 0.5-0.8 meters below mean sea level	**Distance to seagrass** (identified via the most recent map or targeted reconnaissance)	**Recent**	**Continuous seagrass at site and within 1 kilometer (land use code = 9116):** seagrass is a dominant feature (restoration not needed)	**Isolated:** no seagrass within 1 kilometers (0.6 miles) so conditions may be unfavorable	**Discontinuous seagrass at site and within 1 kilometers (land use code = 9113):** seagrass is patchy, so restoration may connect patches	**Seagrass nearby:** seagrass within 0.5-1.0 kilometers (0.3-0.6 miles)		
Critical Depth Zone 0.5-0.8 meters below mean sea level	**Percent cover in Critical Depth Zone** (derived from the closest transect, paired considerations)	**Past** (2000-2009)	**High:** > 30%	**Low:** 10-20%	**Moderate:** 20-30%	**High:** > 30%		
Critical Depth Zone 0.5-0.8 meters below mean sea level	**Percent cover in Critical Depth Zone** (derived from the closest transect, paired considerations)	**Last 3 Years**	**High:** > 10% (restoration not needed)	**Low:** < 10% (restoration may not help)	**Low:** < 10% (restoration may help but ultimate gain is likely limited)	**Low:** < 10% (potentially optimum site for restoration)		
Potential stressors	**Water quality** (salinity and light availability derived from the closest station)	**Last 3 Years**	**Bad:** salinity < 10 ppt anytime and < 18 ppt for > 3 consecutive months, or annual mean salinity -1 standard deviation < 17 ppt, Secchi depth < 0.5 m (1.6ft) anytime and < 0.65 m (2.1ft) for > 3 consecutive months, or annual mean Secchi depth -1 standard deviation < 0.65 m.	**Poor:** salinity < 18 ppt for 3 consecutive months but never < 12 ppt, or annual mean salinity -1 standard deviation < 17 ppt, Secchi depth < 0.65 m for < 3 consecutive months but never < 0.5 m, or annual mean Secchi depth -1 standard deviation < 0.65 m.	**Supportive:** salinity always > 18 Secchi depth always > 0.65 meters and may be 0.65-1.0 meters (2.1-3.3 feet) for 3 consecutive months	**Good:** salinity consistently > 23 Secchi depth consistently > 1.0 meters		
Potential stressors	**Sediment** (assessed via visits to the site or other current information)	**Present**	**Not supportive:** anoxic and sulfidic near the surface or easily resuspended or moved	**Minimally supportive:** hard bottom (e.g., compact sand or shells), not conducive for growth of rhizomes and roots, porewater may lack nutrients	**Generally supportive:** unconsolidated sediment that holds plants with relatively little resuspension and movement observed, porewater nutrients not limiting	**Fully supportive:** loosely consolidated sediment with firmly anchored plants if present, anoxic and sulfidic layers located below the zone occupied by roots and rhizomes, porewater rich in nutrients		
Potential stressors	**Water movement** (assessed via visits to the site or other current information)	**Present**	**High currents - possible scouring:** frequent and strong currents or waves that may cause ripples in the sediment and uproot new plants	**Moderate to high currents:** currents and waves bend plants, sweep fragments of seagrass away before they can gain a foothold, and cause some resuspension of sediment	**Moderate currents:** plants often stand upright, fragments of seagrass may be trapped, sediment typically not resuspended	**Low currents:** mild currents or waves, sediment not disturbed, no apparent negative effects on any seagrass that is present		
Potential stressors	**Shoreline characteristics** (assessed via visits the site or other current information)	**Present**	**Unnatural shoreline:** Critical Depth Zone in close proximity to urban development, including canals, and a hardened shoreline (e.g., riprap or bulkhead)	**Semi-natural shoreline:** Critical Depth Zone near moderate development and some shoreline is vegetated	**Mostly natural shoreline:** Critical Depth Zone near low to moderate development, most of the shoreline is vegetated shoreline or the site is associated with living shoreline project	**All natural shoreline:** vegetated shoreline with very limited development		
Potential stressors	**Public use** (assessed via visits to the site visits or other current information, including recent aerial photographs)	**Present**	**High use:** Critical Depth Zone adjacent to or within an area with frequent boating, swimming or fishing (e.g., aerial photographs show prop scars)	**Near high use:** Critical Depth Zone within 0.5 kilometers (0.3 miles) of a highly used area	**Not near high use:** Critical Depth Zone more than 0.5 kilometers from a highly used area	**Low use:** no public facilities nearby and limited signs of use		
Potential stressors	**Biota** (assessed via visits to the site or other current information on grazing or physical disturbance)	**Present**	**Heavy use:** site adjacent to deep water or manatee zone, power plant within 10 kilometers (6.2 miles), freshwater nearby, manatees and rays observed frequently, disturbance or grazing evident in > 50% of the area on a weekly-monthly basis	**Moderate use:** power plant > 10 kilometers away, deep water and manatee zones > 0.5 kilometers away, no freshwater nearby, disturbance or grazing evident in < 50% of the area on a monthly basis	**Intermittent use:** disturbance or grazing evident in < 25% of the area on a quarterly basis	**Rare use:** disturbance or grazing hardly evident		
Logistics	**Enhancement or protection** (assessed via visits to the site)	**Present**	**Extensive need:** dense planting required due to absence of seagrass, fencing or caging required due to grazing, other enhancement or protection required, including living shorelines, sediment barriers, wave baffles	**Substantial need:** moderately dense planting required because only 1-2% cover present, fencing or caging required, few additional enhancements or protections required	**Moderate need:** low density planting sufficient because at least 2% cover present, fencing or caging required for a limited time, other enhancements or protections beneficial but not critical	**Limited need:** minimal density planting or no planting required because > 2% cover present and protection from grazing may result in spread of seagrass, no other enhancements or protections required		
Logistics	**Maintenance** (assessed via visits to the site)	**Anticipated**	**High maintenance:** weekly cleaning	**Moderate maintenance:** monthly cleaning	**Low maintenance:** quarterly cleaning	**Minimum maintenance:** maintain as needed		
Logistics	**Staging and accessibility** (assessed via visits to the site)	**Present**	**Very difficult:** substantial impediments that may include boat ramps > 10 kilometer away, soft sediment that is easily disturbed, permitting and access issues	**Moderately difficult:** boat ramp within 10 kilometers, somewhat firm sediment, tractable permitting and access issues	**Relatively simple:** boat ramp nearby and few other issues	**No issues**		
Logistics	**Monitoring** (relevant past, current and future information on water quality and seagrasses available)	**Present**	**No external support:** no sampling of seagrass within 5 kilometers (3.1 miles), nearest water quality station not representative of conditions at the site	**Minimal external support:** seagrass surveyed within 3-5 kilometers (1.9-3.1 miles); water quality station is representative of conditions at the site	**Moderate external support:** seagrass and water quality sampled within 3 kilometers, so both are representative of conditions at the site	**Considerable external support:** seagrasses and water quality sampled at or adjacent to the site		
Total								

Notes:
Optimize potential for success by planting: a) within the Critical Depth Zone (e.g., at 0.6-0.8 meters below mean sea level) with due recognition of tides and annual changes in water levels; or b) during the spring (e.g., late March to May) when water clarity is best, water temperatures are warming, and grazing by fish is relatively low.
Scoring: if conditions do not match the attributes provided, then assign a score between the two that are most applicable.

Appendix D: Unfunded Projects

Throughout initial development and annual updates of this plan, there have been projects considered that are not funded due to being less cost-effective than similar projects that were selected for funding. If some of the recommended projects in the plan receive funding from outside sources, such as grants or legislative appropriations, additional projects could be implemented using the Save Our Indian River Lagoon Trust Fund. If funding becomes available, the projects listed in **Table D-1** through **Table D-6** include numerous unfunded opportunities sorted by the next most cost-effective projects based on total nitrogen (TN) and total phosphorus (TP) load reductions in pounds per year available for each major type of pollution reduction strategy. Most of the cost estimates in the following unfunded project tables are from 2016 and would need to be updated to current costs if considered for future funding.

Table D-1. Unfunded Wastewater Treatment Facility Reclaimed Water Upgrade Projects

Facility	Cost to Upgrade	Total Nitrogen Removed after Attenuation (pounds per year)	Cost per Pound per Year of Total Nitrogen Removed	Total Phosphorus Removed after Attenuation (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
Cape Canaveral Air Force Station	$6,000,000	3,653	$1,642	To be determined	To be determined
Brevard County South Central Regional	$6,000,000	2,053	$2,923	To be determined	To be determined
Total	***$12,000,000***	***5,706***	***$2,103 (average)***	***To be determined***	***To be determined***

Table D-2. Unfunded Sprayfield or Rapid Infiltration Basin Upgrade Projects

Facility	Type	Estimated Cost to Upgrade	Total Nitrogen Removed from Upgrade (pounds per year)	Cost per Pound per Year of Total Nitrogen Removed
Aquarina Beach Community	Sprayfield	$82,511	730	$113
Indian River Shores Trailer Park	Rapid Infiltration Basin	$42,257	311	$136
River Grove Mobile Home Village	Rapid Infiltration Basin	$200,529	1,460	$137
South Shores Utility	Sprayfield	$330,620	929	$356
Housing Authority of Brevard County	Rapid Infiltration Basin	$57,499	152	$378
Pelican Bay Mobile Home	Rapid Infiltration Basin	$244,372	542	$451
Merritt Island Utility Company	Rapid Infiltration Basin	$544,805	1,200	$454
Enchanted Lakes Estates	Sprayfield	$39,600	62	$639
Lighthouse Cove	Sprayfield	$132,000	157	$841
River Forest Mobile Home Park	Sprayfield	$86,246	92	$937
Riverview Mobile Home and Recreational Vehicle Park	Sprayfield	$366,557	175	$2,095
Treetop Villas	Sprayfield	$115,500	54	$2,139
Tropical Trail Village	Rapid Infiltration Basin	$99,186	46	$2,156
Palm Harbor Mobile Home Park	Sprayfield	$330,620	95	$3,480
Harris Malabar Facility	Rapid Infiltration Basin	$2,293,500	494	$4,643
Camelot Recreational Vehicle Park Inc	Sprayfield	Unknown size	To be determined	To be determined
Southern Comfort Mobile Home Park	Rapid Infiltration Basin	To be determined	To be determined	To be determined
Space X Launch Complex 39A	Sprayfield	To be determined	To be determined	To be determined

Facility	Type	Estimated Cost to Upgrade	Total Nitrogen Removed from Upgrade (pounds per year)	Cost per Pound per Year of Total Nitrogen Removed
Total	-	***$4,965,802***	***6,499***	***$764 (average)***

Table D-3. Unfunded Package Plant Connection Projects

Facility Name	Number of Units	Cost to Connect to Sewer	Total Nitrogen Load Reduction (pounds per year)	Cost per Pound Per Year of Total Nitrogen Removed
Canebreaker Condo	24	$643,046	827	$778
Merritt Island Utility Company*	198	$1,493,195	1,446	$1,033
River Grove I & II Mobile Home Park	200	$1,904,918	1,759	$1,083
South Shores Utility	134	$1,444,904	1,120	$1,290
Summit Cove Condominium	84	$859,982	525	$1,638
Pelican Bay Mobile Home (also known as Riverview)	200	$1,172,552	653	$1,796
Housing Authority of Brevard County	26	$595,125	184	$3,234
Sterling House Condominium	45	$804,195	212	$3,793
Riverview Mobile Home and Recreational Vehicle Park	110	$907,684	211	$4,302
Lighthouse Cove	80	$1,1,326,456	189	$7,018
Palm Harbor Mobile Home Park	130	$872,609	115	$7,588
Tropical Trail Village	74	$791,775	104	$7,613
Enchanted Lakes Estates	190	$1,040,796	75	$13,877
Treetop Villas	28	$1,301,547	65	$20,024
The Cove at South Beaches	40	5,000,000	81	$61,728
Camelot Recreational Vehicle Park Inc.	178	To be determined	No data	To be determined
Southern Comfort Mobile Home Park	40	To be determined	No data	To be determined
Total	***1,781***	***$18,832,328***	***7,566***	***$2,489 (average)***

* As of 2022, the private entity that owns this package plant was not interested in connecting to central sewer.

Table D-4. Unfunded Septic-to Sewer-Projects

Service Area	Number of Lots	Cost	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound Per Year
Grant-Valkaria – Zone G	30	$1,688,550	1,418	$1,191
Grant-Valkaria – Zone E	128	$7,204,480	5,862	$1,229
Grant-Valkaria – Zone B	34	$1,913,690	1,501	$1,275
Grant-Valkaria – Zone F	17	$956,845	688	$1,390
Grant-Valkaria – Zone D	18	$1,013,130	690	$1,469
Grant-Valkaria – Zone A	42	$2,363,970	1,296	$1,824
Malabar – Zone B	64	$3,602,240	1,929	$1,867
Grant-Valkaria – Zone C	30	$1,688,550	853	$1,979
Malabar – Zone A	430	$24,202,550	11,456	$2,113
Valkaria – Zone I	223	$12,551,555	5,380	$2,333
South Beaches – Zone F	3	$168,855	70	$2,420
Valkaria – Zone J	503	$28,311,355	11,507	$2,460
Malabar – Zone C	14	$787,990	289	$2,727
South Central – Zone B	180	$10,131,300	3,700	$2,738
Sharpes – Zone B	136	$7,654,760	2,692	$2,844
South Beaches – Zone E	387	$21,782,295	7,491	$2,908
Rockledge – Zone C	91	$5,121,935	1,736	$2,950
South Beaches – Zone K	21	$1,181,985	397	$2,978
North Merritt Island – Zone F	34	$1,913,690	830	$2,306
North Merritt Island – Zone D	29	$1,632,265	685	$2,383

Service Area	Number of Lots	Cost	Total Nitrogen Reduction (pounds per year)	Total Nitrogen Cost per Pound Per Year
City of West Melbourne	60	$3,377,100	1,041	$3,244
Pineda	27	$1,519,695	644	$2,360
Sykes Creek – Zone IJ	77	$4,333,945	62	$4,504
South Beaches – Zone L	178	$10,018,730	2,973	$3,370
Sykes Creek – Zone J	63	$3,545,955	1,028	$3,448
South Banana – Zone A	88	$4,953,080	1,444	$3,430
South Central – Zone BC	13	$731,705	582	$1,257
South Beaches – Zone G	112	$6,303,920	1,764	$3,573
City of West Melbourne – Zone B	60	$3,377,100	894	$3,778
Malabar – Zone D	24	$1,350,840	352	$3,842
North Merritt Island – Zone A	107	$6,022,495	1,821	$3,307
South Beaches – Zone D	89	$5,009,365	1,273	$3,936
South Central – Zone E	411	$23,133,135	5,761	$4,015
South Beaches – Zone M	334	$18,799,190	4,293	$4,379
Grant-Valkaria – Zone H	100	$5,628,500	1,272	$4,426
Malabar – Zone F	14	$787,990	174	$4,525
Melbourne Village – Zone B	224	$12,607,840	2,705	$4,661
Sykes Creek – Zone H	74	$4,165,090	887	$4,693
South Central – Zone I	72	$4,052,520	772	$5,249
Sykes Creek – Zone G	52	$2,926,820	602	$4,858
South Beaches – Zone N	103	$5,797,355	1,193	$4,860
Sykes Creek – Zone C	81	$4,559,085	929	$4,907
Melbourne Village – Zone A	85	$4,784,225	918	$5,213
South Central – Zone H	165	$9,287,025	1,779	$5,221
South Central – Zone G	196	$11,031,860	2,090	$5,277
North Merritt Island – Zone C	71	$3,996,235	737	$5,425
Merritt Island – Zone H	285	$16,041,225	5,464	$2,936
Sykes Creek – Zone S	164	$9,230,740	1,584	$5,827
North Merritt Island – Zone B	56	$3,151,960	1,066	$2,957
Merritt Island – Zone A	249	$14,014,965	3,440	$4,074
South Beaches – Zone C	118	$6,641,630	683	$9,719
Total	***6,166***	***$347,053,310***	***111,598***	***$3,110 (average)***

Table D-5. Unfunded Stormwater Projects

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
2159	Central IRL	$882,111	2,754	$320	350	$2,520
1736	Central IRL	$1,509,976	4,263	$354	552	$2,735
2163	Central IRL	$452,289	1,264	$358	90	$5,025
2185	Central IRL	$434,139	1,208	$359	94	$4,619
2191	Central IRL	$705,277	1,925	$366	185	$3,812
951	Banana River	$576,647	1,563	$369	154	$3,744
1933	Central IRL	$1,116,514	2,996	$373	435	$2,567
1615	Central IRL	$1,143,821	3,053	$375	439	$2,606
911	North IRL	$378,324	1,004	$377	90	$4,204
2222	Central IRL	$579,815	1,534	$378	226	$2,566
2239	Central IRL	$622,075	1,643	$379	261	$2,383
1508	Central IRL	$919,018	2,424	$379	356	$2,582
1497	Central IRL	$832,033	2,164	$384	309	$2,693
1803	Central IRL	$1,091,847	2,814	$388	393	$2,778
1500	Central IRL	$816,974	2,082	$392	289	$2,827

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1472	Central IRL	$655,308	1,670	$392	241	$2,719
1977	Central IRL	$634,466	1,615	$393	203	$3,125
1654	Central IRL	$1,077,080	2,738	$393	381	$2,827
1856	Central IRL	$921,110	2,340	$394	336	$2,741
1831	Central IRL	$862,210	2,181	$395	318	$2,711
2209	Central IRL	$552,270	1,389	$398	193	$2,862
1884	Central IRL	$713,718	1,795	$398	204	$3,499
1419	North IRL	$692,131	1,735	$399	249	$2,780
2032	Central IRL	$445,976	1,118	$399	98	$4,551
1637	Central IRL	$578,647	1,448	$400	235	$2,462
984	Banana River	$568,173	1,413	$402	144	$3,946
1788	Central IRL	$473,277	1,174	$403	144	$3,287
1866	Central IRL	$779,057	1,929	$404	281	$2,772
1430	North IRL	$959,789	2,362	$406	348	$2,758
2092	Central IRL	$603,100	1,484	$406	212	$2,845
1869	Central IRL	$718,898	1,765	$407	224	$3,209
SJR-90	North IRL	$1,233,824	3,022	$408	439	$2,811
1605	Central IRL	$608,741	1,490	$409	240	$2,536
2045	Central IRL	$869,198	2,124	$409	313	$2,777
2046	Central IRL	$596,720	1,455	$410	234	$2,550
2167	Central IRL	$417,012	1,014	$411	96	$4,344
1720	Central IRL	$593,458	1,443	$411	228	$2,603
1562	Central IRL	$1,320,540	3,206	$412	462	$2,858
2024	Central IRL	$488,284	1,175	$416	99	$4,932
2131	Central IRL	$593,809	1,423	$417	212	$2,801
1773	Central IRL	$731,147	1,750	$418	230	$3,179
CCB-E	Banana River	$558,100	1,335	$418	210	$2,658
1633	Central IRL	$765,485	1,821	$420	263	$2,911
1476	Central IRL	$479,541	1,140	$421	162	$2,960
2215	Central IRL	$517,302	1,222	$423	207	$2,499
2105	Central IRL	$552,256	1,301	$424	224	$2,465
1600	Central IRL	$532,315	1,252	$425	199	$2,675
2148	Central IRL	$606,660	1,424	$426	185	$3,279
1990	Central IRL	$463,322	1,084	$427	112	$4,137
1727	Central IRL	$923,964	2,160	$428	289	$3,197
CO-2QA	North IRL	$579,319	1,354	$428	200	$2,897
1463	Central IRL	$569,974	1,330	$429	187	$3,048
895	North IRL	$485,279	1,130	$429	136	$3,568
1642	Central IRL	$689,047	1,598	$431	229	$3,009
1493	Central IRL	$592,669	1,371	$432	204	$2,905
TV-South Marine Basin	North IRL	$540,687	1,252	$432	177	$3,055
2062	Central IRL	$427,118	984	$434	84	$5,085
1622	Central IRL	$629,394	1,443	$436	211	$2,983
2129	Central IRL	$464,838	1,061	$438	172	$2,703
2138	Central IRL	$577,764	1,316	$439	176	$3,283
1825	Central IRL	$944,403	2,143	$441	308	$3,066
1568	Central IRL	$494,457	1,122	$441	180	$2,747
1630	Central IRL	$604,741	1,372	$441	203	$2,979
1563	Central IRL	$513,424	1,163	$441	184	$2,790

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1517	Central IRL	$478,748	1,084	$442	171	$2,800
1849	Central IRL	$679,700	1,537	$442	224	$3,034
1516	Central IRL	$489,163	1,101	$444	179	$2,733
2271	Central IRL	$432,106	972	$445	148	$2,920
1835	Central IRL	$592,538	1,332	$445	192	$3,086
1377	North IRL	$590,292	1,325	$446	201	$2,937
1561	Central IRL	$502,348	1,124	$447	176	$2,854
2075	Central IRL	$1,145,377	2,560	$447	414	$2,767
1738	Central IRL	$579,808	1,286	$451	189	$3,068
1843	Central IRL	$1,023,025	2,267	$451	275	$3,720
2227	Central IRL	$456,996	1,012	$452	136	$3,360
1597	Central IRL	$766,160	1,687	$454	241	$3,179
1688	Central IRL	$709,557	1,561	$455	236	$3,007
1582	Central IRL	$944,747	2,075	$455	320	$2,952
1781	Central IRL	$595,039	1,298	$458	189	$3,148
1555	Central IRL	$544,180	1,186	$459	179	$3,040
SJR-57	North IRL	$801,319	1,740	$461	227	$3,530
1908	Central IRL	$980,316	2,124	$462	300	$3,268
1537	Central IRL	$497,937	1,078	$462	150	$3,320
1512	Central IRL	$525,286	1,137	$462	171	$3,072
2104	Central IRL	$541,931	1,172	$462	186	$2,914
1681	Central IRL	$567,823	1,224	$464	182	$3,120
1571	Central IRL	$614,932	1,325	$464	176	$3,494
1798	Central IRL	$579,590	1,246	$465	181	$3,202
1758	Central IRL	$565,478	1,215	$465	160	$3,534
72	North IRL	$483,586	1,039	$465	150	$3,224
2047	Central IRL	$664,614	1,426	$466	194	$3,426
2195	Central IRL	$386,054	828	$466	78	$4,949
2021	Central IRL	$1,011,650	2,156	$469	298	$3,395
1671	Central IRL	$718,812	1,530	$470	218	$3,297
1626	Central IRL	$476,960	1,015	$470	119	$4,008
1581	Central IRL	$449,073	952	$472	153	$2,935
2241	Central IRL	$419,083	888	$472	135	$3,104
2142	Central IRL	$501,932	1,062	$473	161	$3,118
1813	Central IRL	$582,230	1,227	$475	119	$4,893
2141	Central IRL	$450,899	950	$475	142	$3,175
2188	Central IRL	$354,339	744	$476	71	$4,991
2175	Central IRL	$337,410	707	$477	55	$6,135
2219	Central IRL	$428,133	897	$477	83	$5,158
1695	Central IRL	$491,593	1,028	$478	169	$2,909
1717	Central IRL	$557,333	1,162	$480	168	$3,317
2199	Central IRL	$407,813	848	$481	129	$3,161
2048	Central IRL	$342,488	712	$481	65	$5,269
816	North IRL	$327,054	678	$482	130	$2,516
1744	Central IRL	$464,886	963	$483	130	$3,576
1963	Central IRL	$987,280	2,042	$483	286	$3,452
1464	North IRL	$468,716	968	$484	134	$3,498
1741	Central IRL	$516,343	1,062	$486	158	$3,268
2013	Central IRL	$580,360	1,193	$486	140	$4,145
1518	Central IRL	$362,700	744	$488	93	$3,900

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1750	Central IRL	$630,764	1,293	$488	141	$4,474
CCB-G	Banana River	$467,196	957	$488	148	$3,157
2168	Central IRL	$352,487	720	$490	72	$4,896
1811	Central IRL	$519,491	1,061	$490	156	$3,330
1906	Central IRL	$504,427	1,030	$490	116	$4,349
1569	Central IRL	$517,449	1,054	$491	172	$3,008
1544	Central IRL	$619,092	1,261	$491	181	$3,420
1737	Central IRL	$619,352	1,260	$492	176	$3,519
1940	Central IRL	$358,847	729	$492	61	$5,883
1708	Central IRL	$507,927	1,029	$494	149	$3,409
1834	Central IRL	$1,108,217	2,244	$494	297	$3,731
1759	Central IRL	$536,485	1,084	$495	158	$3,395
1847	Central IRL	$549,038	1,108	$496	161	$3,410
1992	Central IRL	$720,413	1,444	$499	169	$4,263
1888	Central IRL	$454,322	908	$500	98	$4,636
2149	Central IRL	$944,403	1,887	$500	253	$3,733
2066	Central IRL	$390,387	778	$502	95	$4,109
1609	Central IRL	$436,862	869	$503	131	$3,335
2139	Central IRL	$657,898	1,308	$503	179	$3,675
1789	Central IRL	$534,248	1,062	$503	144	$3,710
1753	Central IRL	$392,355	779	$504	104	$3,773
2206	Central IRL	$360,146	715	$504	55	$6,548
1608	Central IRL	$432,758	859	$504	131	$3,303
1752	Central IRL	$473,504	939	$504	124	$3,819
1627	Central IRL	$872,505	1,719	$508	239	$3,651
1772	Central IRL	$524,830	1,027	$511	121	$4,337
1635	Central IRL	$475,674	930	$511	135	$3,524
1823	Central IRL	$406,658	794	$512	96	$4,236
1534	Central IRL	$399,022	775	$515	126	$3,167
1760	Central IRL	$493,465	956	$516	137	$3,602
1625	Central IRL	$409,916	793	$517	124	$3,306
1731	Central IRL	$406,672	786	$517	121	$3,361
1979	Central IRL	$576,400	1,113	$518	143	$4,031
2039	Central IRL	$322,846	623	$518	48	$6,726
1524	Central IRL	$697,820	1,346	$518	194	$3,597
1699	Central IRL	$499,982	963	$519	140	$3,571
1585	Central IRL	$417,027	803	$519	125	$3,336
2051	Central IRL	$549,968	1,058	$520	173	$3,179
1819	Central IRL	$480,035	922	$521	146	$3,288
1950	Central IRL	$424,607	815	$521	82	$5,178
2231	Central IRL	$535,416	1,027	$521	113	$4,738
1489	Central IRL	$418,434	801	$522	118	$3,546
1855	Central IRL	$461,272	882	$523	126	$3,661
1612	Central IRL	$397,192	759	$523	118	$3,366
1545	Central IRL	$593,996	1,133	$524	164	$3,622
1980	Central IRL	$561,839	1,071	$525	145	$3,875
1778	Central IRL	$495,871	945	$525	138	$3,593
2098	Central IRL	$376,506	716	$526	113	$3,332
2110	Central IRL	$447,671	851	$526	86	$5,205
2196	Central IRL	$406,278	772	$526	80	$5,078

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
2127	Central IRL	$523,324	990	$529	108	$4,846
2161	Central IRL	$659,899	1,248	$529	139	$4,747
2020	Central IRL	$737,250	1,394	$529	194	$3,800
1858	Central IRL	$677,712	1,278	$530	168	$4,034
1824	Central IRL	$356,089	671	$531	67	$5,315
1817	Central IRL	$420,365	792	$531	99	$4,246
1631	Central IRL	$583,058	1,098	$531	169	$3,450
1723	Central IRL	$546,092	1,026	$532	141	$3,873
2064	Central IRL	$487,793	916	$533	134	$3,640
1527	Central IRL	$478,072	896	$534	126	$3,794
CC-B2A	Banana River	$413,659	775	$534	125	$3,309
1587	Central IRL	$575,149	1,077	$534	132	$4,357
1521	Central IRL	$644,337	1,204	$535	175	$3,682
1535	Central IRL	$378,033	705	$536	120	$3,150
1468	Central IRL	$606,185	1,130	$536	149	$4,068
1694	Central IRL	$450,695	839	$537	120	$3,756
1692	Central IRL	$451,019	839	$538	108	$4,176
1721	Central IRL	$392,721	730	$538	110	$3,570
1401	North IRL	$474,736	882	$538	128	$3,709
1889	Central IRL	$541,628	1,006	$538	143	$3,788
1964	Central IRL	$562,238	1,044	$539	150	$3,748
1546	Central IRL	$374,652	695	$539	109	$3,437
1767	Central IRL	$560,300	1,039	$539	138	$4,060
1488	Central IRL	$358,882	664	$540	111	$3,233
1911	Central IRL	$463,375	855	$542	125	$3,707
1589	Central IRL	$336,607	619	$544	118	$2,853
1425	Central IRL	$371,410	683	$544	109	$3,407
1662	Central IRL	$379,624	698	$544	104	$3,650
1698	Central IRL	$455,915	837	$545	123	$3,707
1632	Central IRL	$453,869	832	$546	106	$4,282
1796	Central IRL	$452,546	828	$547	120	$3,771
1766	Central IRL	$436,167	797	$547	113	$3,860
1787	Central IRL	$446,694	816	$547	120	$3,722
1974	Central IRL	$493,877	900	$549	123	$4,015
2089	Central IRL	$465,191	847	$549	91	$5,112
2247	Central IRL	$321,336	585	$549	94	$3,418
2177	Central IRL	$402,910	733	$550	92	$4,379
1629	Central IRL	$467,632	850	$550	120	$3,897
1747	Central IRL	$452,831	823	$550	112	$4,043
2165	Central IRL	$416,280	756	$551	100	$4,163
1732	Central IRL	$451,608	820	$551	120	$3,763
1836	Central IRL	$541,497	977	$554	110	$4,923
1453	Central IRL	$773,639	1,395	$555	188	$4,115
1616	Central IRL	$427,282	770	$555	110	$3,884
825	North IRL	$329,187	593	$555	89	$3,699
1818	Central IRL	$440,596	793	$556	117	$3,766
1861	Central IRL	$406,515	730	$557	102	$3,985
763	North IRL	$394,610	708	$557	107	$3,688
2166	Central IRL	$375,154	673	$557	57	$6,582
1961	Central IRL	$929,266	1,666	$558	222	$4,186

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1777	Central IRL	$475,036	851	$558	124	$3,831
1716	Central IRL	$447,797	801	$559	117	$3,827
1614	Central IRL	$385,200	689	$559	98	$3,931
1647	Central IRL	$845,152	1,510	$560	211	$4,005
1802	Central IRL	$447,801	800	$560	117	$3,827
1729	Central IRL	$375,337	670	$560	85	$4,416
2106	Central IRL	$388,359	693	$560	86	$4,516
1492	Central IRL	$399,218	711	$561	86	$4,642
2038	Central IRL	$421,202	746	$565	81	$5,200
1529	Central IRL	$409,202	723	$566	105	$3,897
2176	Central IRL	$382,674	676	$566	66	$5,798
1657	Central IRL	$427,468	755	$566	109	$3,922
1426	Central IRL	$398,163	703	$566	111	$3,587
1978	Central IRL	$622,584	1,099	$567	137	$4,544
1445	Central IRL	$889,959	1,570	$567	212	$4,198
2193	Central IRL	$354,484	625	$567	87	$4,075
1748	Central IRL	$480,681	846	$568	122	$3,940
CCB-I	Banana River	$761,006	1,338	$569	188	$4,048
1480	Central IRL	$344,112	605	$569	93	$3,700
1885	Central IRL	$489,249	860	$569	128	$3,822
1367	North IRL	$485,096	850	$571	128	$3,790
1718	Central IRL	$516,228	904	$571	122	$4,231
1880	Central IRL	$381,520	668	$571	66	$5,781
1826	Central IRL	$425,772	743	$573	108	$3,942
2008	Central IRL	$486,030	848	$573	118	$4,119
1417	Central IRL	$401,059	698	$575	106	$3,784
1865	Central IRL	$539,794	938	$575	134	$4,028
797	North IRL	$328,490	570	$576	83	$3,958
1496	Central IRL	$394,330	680	$580	99	$3,983
1665	Central IRL	$367,962	632	$582	95	$3,873
1927	Central IRL	$366,979	628	$584	69	$5,319
1674	Central IRL	$440,986	751	$587	97	$4,546
1478	Central IRL	$311,990	531	$588	71	$4,394
1782	Central IRL	$433,153	737	$588	107	$4,048
1452	Central IRL	$374,119	636	$588	92	$4,067
2197	Central IRL	$388,461	659	$589	58	$6,698
1790	Central IRL	$410,440	696	$590	92	$4,461
2012	Central IRL	$588,028	992	$593	134	$4,388
2094	Central IRL	$314,279	530	$593	77	$4,082
774	North IRL	$319,931	539	$594	98	$3,265
2217	Central IRL	$372,703	627	$594	64	$5,823
1439	North IRL	$861,286	1,448	$595	197	$4,372
1928	Central IRL	$379,494	638	$595	66	$5,750
1548	Central IRL	$528,319	887	$596	127	$4,160
2169	Central IRL	$445,029	747	$596	108	$4,121
1892	Central IRL	$565,566	948	$597	133	$4,252
1384	North IRL	$552,725	925	$598	137	$4,034
1740	Central IRL	$429,391	718	$598	89	$4,825
1502	Central IRL	$373,893	625	$598	88	$4,249
1678	Central IRL	$430,527	719	$599	103	$4,180

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
2189	Central IRL	$376,089	628	$599	96	$3,918
1638	Central IRL	$343,821	574	$599	90	$3,820
76	North IRL	$333,126	556	$599	83	$4,014
1565	Central IRL	$409,847	684	$599	80	$5,123
1755	Central IRL	$366,125	610	$600	90	$4,068
759	North IRL	$387,176	643	$602	94	$4,119
1076	North IRL	$390,661	648	$603	94	$4,156
1722	Central IRL	$394,382	654	$603	95	$4,151
1967	Central IRL	$467,052	774	$603	112	$4,170
1997	Central IRL	$334,344	553	$605	54	$6,192
1482	Central IRL	$382,316	632	$605	94	$4,067
1756	Central IRL	$379,174	625	$607	92	$4,121
1359	North IRL	$480,190	791	$607	127	$3,781
1735	Central IRL	$466,202	767	$608	111	$4,200
1749	Central IRL	$392,287	645	$608	97	$4,044
2158	Central IRL	$321,507	528	$609	44	$7,307
2072	Central IRL	$597,983	981	$610	141	$4,241
1363	North IRL	$342,552	562	$610	90	$3,806
SJR-14	North IRL	$337,700	554	$610	88	$3,838
2003	Central IRL	$330,492	542	$610	50	$6,610
2173	Central IRL	$285,365	467	$611	41	$6,960
1644	Central IRL	$386,752	632	$612	92	$4,204
1232	North IRL	$412,522	673	$613	99	$4,167
2182	Central IRL	$397,670	648	$614	95	$4,186
SJR-74	North IRL	$394,102	642	$614	85	$4,636
2216	Central IRL	$402,012	654	$615	94	$4,277
1960	Central IRL	$476,571	775	$615	113	$4,217
885	North IRL	$272,515	443	$615	107	$2,547
138	North IRL	$305,771	497	$615	87	$3,515
1301	North IRL	$586,974	954	$615	138	$4,253
1418	North IRL	$507,448	824	$616	107	$4,743
1655	Central IRL	$471,280	765	$616	111	$4,246
1593	Central IRL	$416,136	675	$616	83	$5,014
CO-6H	North IRL	$347,319	563	$617	82	$4,236
1620	Central IRL	$339,414	549	$618	77	$4,408
1559	Central IRL	$336,338	543	$619	88	$3,822
212	North IRL	$413,299	667	$620	90	$4,592
2049	Central IRL	$363,484	586	$620	74	$4,912
1494	Central IRL	$333,215	537	$621	76	$4,384
1776	Central IRL	$402,121	647	$622	94	$4,278
1461	Central IRL	$406,325	653	$622	93	$4,369
1619	Central IRL	$342,107	549	$623	83	$4,122
1618	Central IRL	$407,353	653	$624	93	$4,380
921	North IRL	$409,282	656	$624	88	$4,651
1595	Central IRL	$357,669	573	$624	82	$4,362
1584	Central IRL	$365,926	586	$624	90	$4,066
1944	Central IRL	$447,504	716	$625	103	$4,345
1726	Central IRL	$376,877	602	$626	88	$4,283
860	North IRL	$305,704	488	$626	67	$4,563
1751	Central IRL	$337,101	538	$627	72	$4,682

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1931	Central IRL	$449,961	718	$627	81	$5,555
2254	Central IRL	$332,815	531	$627	72	$4,622
1900	Central IRL	$491,666	783	$628	94	$5,230
1636	Central IRL	$330,975	527	$628	76	$4,355
83	North IRL	$327,093	520	$629	79	$4,140
1797	Central IRL	$365,147	580	$630	80	$4,564
1742	Central IRL	$380,476	603	$631	87	$4,373
889	North IRL	$353,264	559	$632	87	$4,061
1991	Central IRL	$468,314	741	$632	104	$4,503
1986	Central IRL	$347,079	549	$632	60	$5,785
1607	Central IRL	$347,172	548	$634	69	$5,031
1438	Central IRL	$449,391	709	$634	81	$5,548
1707	Central IRL	$361,422	570	$634	83	$4,354
1221	North IRL	$375,433	592	$634	83	$4,523
1934	Central IRL	$336,202	530	$634	75	$4,483
2111	Central IRL	$314,440	495	$635	77	$4,084
1503	Central IRL	$439,691	692	$635	102	$4,311
1352	North IRL	$434,044	683	$635	99	$4,384
920	North IRL	$362,995	571	$636	84	$4,321
1704	Central IRL	$369,064	580	$636	85	$4,342
1624	Central IRL	$348,993	548	$637	70	$4,986
2069	Central IRL	$381,705	599	$637	77	$4,957
2057	Central IRL	$319,358	500	$639	47	$6,795
1380	North IRL	$433,905	679	$639	95	$4,567
2178	Central IRL	$325,850	509	$640	49	$6,650
1240	North IRL	$380,274	594	$640	90	$4,225
1685	Central IRL	$516,255	806	$641	110	$4,693
2099	Central IRL	$348,927	544	$641	58	$6,016
1557	Central IRL	$341,664	532	$642	82	$4,167
TV-Garden Street Basin	North IRL	$304,070	473	$643	66	$4,607
1907	Central IRL	$401,983	625	$643	90	$4,466
1993	Central IRL	$446,394	693	$644	80	$5,580
1659	Central IRL	$347,989	540	$644	79	$4,405
1746	Central IRL	$347,818	539	$645	73	$4,765
1579	Central IRL	$370,655	574	$646	77	$4,814
1954	Central IRL	$302,652	468	$647	42	$7,206
1660	Central IRL	$336,661	519	$649	77	$4,372
2015	Central IRL	$531,859	819	$649	115	$4,625
806	North IRL	$422,113	649	$650	97	$4,352
1902	Central IRL	$342,948	527	$651	67	$5,119
1523	Central IRL	$376,881	579	$651	85	$4,434
1711	Central IRL	$363,582	558	$652	81	$4,489
1754	Central IRL	$372,163	571	$652	83	$4,484
1588	Central IRL	$329,638	505	$653	80	$4,120
1661	Central IRL	$395,174	604	$654	93	$4,249
2115	Central IRL	$323,247	494	$654	80	$4,041
2065	Central IRL	$376,487	575	$655	89	$4,230
1634	Central IRL	$421,885	644	$655	71	$5,942
1952	Central IRL	$465,285	710	$655	86	$5,410

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1942	Central IRL	$430,964	657	$656	79	$5,455
1953	Central IRL	$344,481	525	$656	54	$6,379
1730	Central IRL	$375,596	572	$657	79	$4,754
43	North IRL	$344,672	523	$659	79	$4,363
1837	Central IRL	$329,297	499	$660	77	$4,277
1702	Central IRL	$359,271	544	$660	77	$4,666
1815	Central IRL	$318,531	482	$661	48	$6,636
1774	Central IRL	$348,541	527	$661	56	$6,224
890	North IRL	$404,223	611	$662	82	$4,930
1313	North IRL	$405,139	612	$662	78	$5,194
2186	Central IRL	$278,590	420	$663	38	$7,331
2093	Central IRL	$381,522	575	$664	64	$5,961
903	North IRL	$485,091	730	$665	102	$4,756
1530	Central IRL	$327,462	492	$666	76	$4,309
1873	Central IRL	$474,648	713	$666	92	$5,159
2250	Central IRL	$318,093	477	$667	74	$4,299
1505	Central IRL	$354,193	531	$667	77	$4,600
1648	Central IRL	$374,421	561	$667	57	$6,569
1466	Central IRL	$366,810	549	$668	81	$4,529
1437	Central IRL	$345,830	517	$669	69	$5,012
1955	Central IRL	$363,370	543	$669	66	$5,506
1921	Central IRL	$325,280	486	$669	46	$7,071
1621	Central IRL	$368,237	550	$670	78	$4,721
1645	Central IRL	$375,210	560	$670	72	$5,211
1413	North IRL	$331,906	495	$671	72	$4,610
1786	Central IRL	$395,929	590	$671	56	$7,070
100	North IRL	$357,146	532	$671	75	$4,762
1228	North IRL	$432,352	644	$671	79	$5,473
2211	Central IRL	$287,771	428	$672	49	$5,873
2009	Central IRL	$518,961	770	$674	107	$4,850
1339	North IRL	$488,736	723	$676	92	$5,312
1828	Central IRL	$402,319	595	$676	106	$3,795
1590	Central IRL	$359,337	531	$677	64	$5,615
1522	Central IRL	$379,656	561	$677	81	$4,687
2130	Central IRL	$323,109	477	$677	58	$5,571
1498	Central IRL	$356,195	525	$678	77	$4,626
1962	Central IRL	$383,435	565	$679	64	$5,991
2147	Central IRL	$340,076	501	$679	69	$4,929
2150	Central IRL	$303,802	447	$680	39	$7,790
1968	Central IRL	$537,895	791	$680	103	$5,222
1443	Central IRL	$321,676	473	$680	62	$5,188
TV-Miracle City Basin	North IRL	$274,193	403	$680	55	$4,985
1712	Central IRL	$427,843	628	$681	77	$5,556
1877	Central IRL	$444,014	651	$682	90	$4,933
1504	Central IRL	$348,558	511	$682	78	$4,469
893	North IRL	$339,037	497	$682	73	$4,644
2103	Central IRL	$450,434	660	$682	89	$5,061
1806	Central IRL	$334,880	490	$683	74	$4,525
2118	Central IRL	$415,348	606	$685	72	$5,769

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
2109	Central IRL	$438,366	639	$686	91	$4,817
2256	Central IRL	$387,116	563	$688	67	$5,778
1241	North IRL	$385,187	560	$688	74	$5,205
1706	Central IRL	$345,461	501	$690	70	$4,935
1898	Central IRL	$335,948	486	$691	47	$7,148
1994	Central IRL	$338,072	488	$693	49	$6,899
1643	Central IRL	$520,548	751	$693	104	$5,005
1352C	North IRL	$365,150	526	$694	73	$5,002
1244	North IRL	$448,183	643	$697	90	$4,980
1929	Central IRL	$386,312	552	$700	63	$6,132
1881	Central IRL	$498,162	711	$701	99	$5,032
2152	Central IRL	$295,075	421	$701	32	$9,221
862	North IRL	$332,283	474	$701	73	$4,552
2228	Central IRL	$365,032	520	$702	69	$5,290
2095	Central IRL	$344,080	490	$702	60	$5,735
1987	Central IRL	$334,670	476	$703	55	$6,085
1805	Central IRL	$375,113	533	$704	74	$5,069
867	North IRL	$295,025	419	$704	42	$7,024
2120	Central IRL	$383,833	545	$704	74	$5,187
1354	North IRL	$361,369	513	$704	75	$4,818
1532	Central IRL	$296,913	421	$705	66	$4,499
794	North IRL	$289,900	411	$705	61	$4,752
1403	North IRL	$352,678	500	$705	76	$4,640
1757	Central IRL	$344,743	488	$706	68	$5,070
2080	Central IRL	$466,714	660	$707	93	$5,018
884	North IRL	$341,774	483	$708	71	$4,814
2225	Central IRL	$292,760	413	$709	40	$7,319
2071	Central IRL	$467,836	658	$711	100	$4,678
1930	Central IRL	$374,165	526	$711	59	$6,342
2190	Central IRL	$308,738	434	$711	60	$5,146
1833	Central IRL	$515,051	724	$711	100	$5,151
1862	Central IRL	$362,369	509	$712	70	$5,177
1883	Central IRL	$343,338	482	$712	63	$5,450
950	North IRL	$336,054	471	$713	70	$4,801
1348	North IRL	$426,498	596	$716	82	$5,201
1330	North IRL	$415,175	580	$716	84	$4,943
SJR-91	North IRL	$400,220	558	$717	74	$5,408
2208	Central IRL	$273,373	381	$718	29	$9,427
2145	Central IRL	$349,832	487	$718	55	$6,361
1915	Central IRL	$573,384	798	$719	111	$5,166
12	North IRL	$280,949	391	$719	63	$4,460
2262	Central IRL	$381,717	531	$719	63	$6,059
1914	Central IRL	$476,688	663	$719	83	$5,743
2132	Central IRL	$481,763	669	$720	93	$5,180
1800	Central IRL	$342,833	476	$720	68	$5,042
1899	Central IRL	$479,704	666	$720	86	$5,578
2210	Central IRL	$300,404	417	$720	65	$4,622
1390	North IRL	$334,485	464	$721	68	$4,919
1765	Central IRL	$340,357	472	$721	63	$5,402
1822	Central IRL	$299,271	415	$721	67	$4,467

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
2420	North IRL	$330,461	458	$722	71	$4,654
1652	Central IRL	$476,353	657	$725	92	$5,178
2037	Central IRL	$369,747	509	$726	59	$6,267
1428	North IRL	$335,821	462	$727	68	$4,939
2076	Central IRL	$350,889	482	$728	54	$6,498
1423	North IRL	$365,789	502	$729	74	$4,943
1501	Central IRL	$342,473	470	$729	66	$5,189
1670	Central IRL	$483,909	664	$729	93	$5,203
1739	Central IRL	$322,228	442	$729	62	$5,197
922	North IRL	$377,667	518	$729	74	$5,104
152	North IRL	$274,704	376	$731	57	$4,819
2194	Central IRL	$298,445	408	$731	59	$5,058
2170	Central IRL	$283,122	387	$732	31	$9,133
1506	Central IRL	$364,526	498	$732	70	$5,208
1969	Central IRL	$407,276	556	$733	78	$5,221
1649	Central IRL	$370,256	505	$733	70	$5,289
1679	Central IRL	$319,415	435	$734	61	$5,236
2267	Central IRL	$305,469	416	$734	65	$4,700
1549	Central IRL	$385,042	524	$735	74	$5,203
1656	Central IRL	$335,313	455	$737	65	$5,159
CO-2N	North IRL	$292,256	396	$738	53	$5,514
2031	Central IRL	$353,193	478	$739	53	$6,664
1543	Central IRL	$365,149	494	$739	72	$5,072
1870	Central IRL	$328,111	443	$741	59	$5,561
1599	Central IRL	$305,271	412	$741	67	$4,556
1734	Central IRL	$376,573	508	$741	73	$5,159
1257	North IRL	$354,973	478	$743	63	$5,634
1719	Central IRL	$410,085	551	$744	77	$5,326
1989	Central IRL	$456,813	613	$745	85	$5,374
1841	Central IRL	$351,205	471	$746	68	$5,165
1294	North IRL	$381,207	511	$746	76	$5,016
1536	Central IRL	$369,328	495	$746	69	$5,353
1602	Central IRL	$337,288	452	$746	66	$5,110
1465	Central IRL	$383,043	513	$747	69	$5,551
2419	North IRL	$359,294	481	$747	61	$5,890
2036	Central IRL	$343,221	459	$748	53	$6,476
1959	Central IRL	$388,019	518	$749	68	$5,706
1573	Central IRL	$341,207	455	$750	61	$5,594
2113	Central IRL	$378,276	504	$751	66	$5,731
1854	Central IRL	$491,032	653	$752	88	$5,580
2063	Central IRL	$356,818	474	$753	93	$3,837
2033	Central IRL	$373,632	496	$753	75	$4,982
1483	Central IRL	$323,858	429	$755	63	$5,141
2097	Central IRL	$357,139	473	$755	63	$5,669
1807	Central IRL	$310,540	411	$756	47	$6,607
2192	Central IRL	$266,391	352	$757	22	$12,109
2006	Central IRL	$370,312	488	$759	66	$5,611
2090	Central IRL	$318,226	419	$759	41	$7,762
762	North IRL	$301,611	397	$760	49	$6,155
1378	North IRL	$330,582	435	$760	62	$5,332

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1312	North IRL	$318,579	419	$760	61	$5,223
1943	Central IRL	$407,254	534	$763	67	$6,078
1262	North IRL	$331,805	435	$763	64	$5,184
1920	Central IRL	$321,462	421	$764	52	$6,182
1251	North IRL	$335,594	439	$764	64	$5,244
1999	Central IRL	$418,534	547	$765	70	$5,979
2154	Central IRL	$282,846	369	$767	32	$8,839
2260	Central IRL	$322,388	420	$768	46	$7,008
1580	Central IRL	$331,058	431	$768	64	$5,173
1673	Central IRL	$419,453	546	$768	77	$5,447
1896	Central IRL	$344,916	448	$770	49	$7,039
1594	Central IRL	$374,402	486	$770	64	$5,850
1467	Central IRL	$351,415	455	$772	63	$5,578
1710	Central IRL	$359,415	465	$773	65	$5,529
1859	Central IRL	$334,414	432	$774	51	$6,557
1769	Central IRL	$320,504	412	$778	60	$5,342
2246	Central IRL	$298,166	383	$779	33	$9,035
1610	Central IRL	$332,282	426	$780	63	$5,274
1985	Central IRL	$332,018	425	$781	61	$5,443
1966	Central IRL	$327,376	418	$783	57	$5,743
1554	Central IRL	$344,701	440	$783	61	$5,651
2238	Central IRL	$309,588	395	$784	41	$7,551
2410	Central IRL	$271,602	346	$785	33	$8,230
851	North IRL	$308,675	393	$785	59	$5,232
2171	Central IRL	$280,629	357	$786	31	$9,053
1701	Central IRL	$351,047	445	$789	58	$6,053
1891	Central IRL	$471,623	597	$790	83	$5,682
2259	Central IRL	$280,659	355	$791	32	$8,771
1924	Central IRL	$378,200	478	$791	62	$6,100
1361	North IRL	$370,929	468	$793	70	$5,299
1293	North IRL	$344,083	434	$793	63	$5,462
2164	Central IRL	$312,780	394	$794	34	$9,199
28	North IRL	$264,666	333	$795	28	$9,452
1623	Central IRL	$332,586	418	$796	58	$5,734
1570	Central IRL	$365,678	459	$797	62	$5,898
2126	Central IRL	$290,829	365	$797	59	$4,929
1863	Central IRL	$370,491	464	$798	66	$5,613
1850	Central IRL	$402,585	504	$799	66	$6,100
2275	Central IRL	$299,600	373	$803	59	$5,078
1429	Central IRL	$376,756	469	$803	61	$6,176
1220	North IRL	$322,659	401	$805	59	$5,469
1905	Central IRL	$348,725	431	$809	51	$6,838
1761	Central IRL	$310,817	384	$809	53	$5,864
2183	Central IRL	$288,626	354	$815	29	$9,953
1951	Central IRL	$280,067	343	$817	32	$8,752
1352D	North IRL	$346,261	423	$819	61	$5,676
SJR-119	Central IRL	$268,704	328	$819	31	$8,668
166	North IRL	$263,790	322	$819	55	$4,796
2004	Central IRL	$281,692	343	$821	32	$8,803
771	North IRL	$267,877	326	$822	44	$6,088

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1936	Central IRL	$337,768	411	$822	60	$5,629
217	North IRL	$330,254	401	$824	53	$6,231
1872	Central IRL	$462,939	562	$824	78	$5,935
2207	Central IRL	$294,906	358	$824	70	$4,213
1821	Central IRL	$402,070	488	$824	64	$6,282
1874	Central IRL	$454,212	551	$824	77	$5,899
1448	Central IRL	$395,093	479	$825	63	$6,271
2100	Central IRL	$280,393	339	$827	33	$8,497
2034	Central IRL	$335,317	404	$830	64	$5,239
1922	Central IRL	$364,635	439	$831	62	$5,881
1553	Central IRL	$341,042	410	$832	53	$6,435
2240	Central IRL	$305,784	367	$833	34	$8,994
2040	Central IRL	$319,369	382	$836	47	$6,795
871	North IRL	$346,125	414	$836	59	$5,867
1668	Central IRL	$328,223	392	$837	57	$5,758
2204	Central IRL	$290,560	347	$837	39	$7,450
1640	Central IRL	$377,398	450	$839	62	$6,087
223	North IRL	$308,179	367	$840	51	$6,043
1887	Central IRL	$277,889	330	$842	27	$10,292
2155	Central IRL	$320,517	378	$848	44	$7,284
817	North IRL	$237,764	279	$852	26	$9,145
2043	Central IRL	$344,257	403	$854	60	$5,738
1982	Central IRL	$393,055	460	$854	64	$6,141
2018	Central IRL	$365,326	424	$862	54	$6,765
1292	North IRL	$339,585	394	$862	59	$5,756
1292A	North IRL	$303,952	352	$864	56	$5,428
2108	Central IRL	$329,669	379	$870	52	$6,340
2001	Central IRL	$273,037	313	$872	33	$8,274
194	North IRL	$293,874	336	$875	37	$7,943
1893	Central IRL	$325,510	372	$875	43	$7,570
2248	Central IRL	$334,564	382	$876	45	$7,435
2035	Central IRL	$291,940	333	$877	37	$7,890
1444	Central IRL	$398,759	454	$878	60	$6,646
2213	Central IRL	$274,709	312	$880	29	$9,473
RL-1A	North IRL	$289,866	328	$884	50	$5,797
2230	Central IRL	$267,338	302	$885	20	$13,367
1693	Central IRL	$327,572	369	$888	50	$6,551
1945	Central IRL	$303,127	340	$892	39	$7,772
1344	North IRL	$342,229	383	$894	48	$7,130
1697	Central IRL	$328,378	367	$895	42	$7,819
2218	Central IRL	$247,058	276	$895	20	$12,353
1867	Central IRL	$302,825	338	$896	50	$6,056
2088	Central IRL	$327,172	365	$896	44	$7,436
2162	Central IRL	$326,382	364	$897	45	$7,253
1956	Central IRL	$282,448	315	$897	36	$7,846
1520	Central IRL	$303,192	338	$897	49	$6,188
2058	Central IRL	$312,586	348	$898	44	$7,104
1641	Central IRL	$290,685	323	$900	50	$5,814
1916	Central IRL	$351,602	390	$902	54	$6,511
882	North IRL	$300,852	333	$903	52	$5,786

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1795	Central IRL	$329,086	364	$904	55	$5,983
2044	Central IRL	$331,388	365	$908	54	$6,137
1904	Central IRL	$340,871	374	$911	47	$7,253
1574	Central IRL	$304,299	333	$914	43	$7,077
2073	Central IRL	$354,872	388	$915	56	$6,337
TV-Oleander Basin	North IRL	$269,828	295	$915	46	$5,866
1913	Central IRL	$303,999	332	$916	35	$8,686
1233A	North IRL	$284,942	311	$916	43	$6,627
1851	Central IRL	$381,150	416	$916	58	$6,572
1709	Central IRL	$293,448	320	$917	47	$6,244
1474	Central IRL	$291,564	317	$920	47	$6,203
2214	Central IRL	$265,927	288	$923	23	$11,562
1320	North IRL	$288,336	312	$924	44	$6,553
753	North IRL	$255,008	275	$927	23	$11,087
2124	Central IRL	$318,724	343	$929	44	$7,244
113	North IRL	$278,780	298	$936	44	$6,336
749	North IRL	$260,337	278	$936	24	$10,847
923	North IRL	$260,384	277	$940	36	$7,233
1923	Central IRL	$350,781	373	$940	50	$7,016
1224	North IRL	$291,597	310	$941	41	$7,112
910	North IRL	$296,820	315	$942	42	$7,067
79	North IRL	$286,475	303	$945	35	$8,185
1525	Central IRL	$298,702	315	$948	45	$6,638
2096	Central IRL	$286,479	302	$949	32	$8,952
760	North IRL	$289,092	304	$951	45	$6,424
RL-FDOT	North IRL	$279,250	293	$953	39	$7,160
2125	Central IRL	$295,758	310	$954	47	$6,293
1973	Central IRL	$252,647	264	$957	22	$11,484
IHB-13	Banana River	$287,772	300	$959	45	$6,395
952	North IRL	$287,177	299	$960	44	$6,527
2091	Central IRL	$311,577	324	$962	42	$7,419
1391	North IRL	$289,673	300	$966	45	$6,437
2054	Central IRL	$276,443	286	$967	45	$6,143
1606	Central IRL	$285,785	295	$969	40	$7,145
1245	North IRL	$330,046	340	$971	47	$7,022
1248	North IRL	$297,310	306	$972	45	$6,607
216	North IRL	$260,245	267	$975	31	$8,395
2119	Central IRL	$284,329	291	$977	27	$10,531
902	North IRL	$330,706	338	$978	48	$6,890
1526	Central IRL	$327,625	334	$981	49	$6,686
RL-2C	North IRL	$313,143	319	$982	43	$7,282
1404	North IRL	$267,289	272	$983	41	$6,519
2068	Central IRL	$276,626	281	$984	28	$9,879
2133	Central IRL	$270,881	275	$985	20	$13,544
2421	North IRL	$242,017	245	$988	35	$6,915
1382	North IRL	$312,385	316	$989	45	$6,942
98	North IRL	$275,089	278	$990	42	$6,550
1333	North IRL	$281,854	280	$1,007	42	$6,711
1775	Central IRL	$277,026	275	$1,007	31	$8,936

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
212A	North IRL	$285,228	283	$1,008	41	$6,957
1882	Central IRL	$317,857	315	$1,009	40	$7,946
1412	North IRL	$277,529	275	$1,009	39	$7,116
1596	Central IRL	$269,774	267	$1,010	43	$6,274
2251	Central IRL	$266,604	263	$1,014	29	$9,193
2000	Central IRL	$323,450	318	$1,017	45	$7,188
1909	Central IRL	$285,032	280	$1,018	38	$7,501
1253	North IRL	$326,210	320	$1,019	44	$7,414
2123	Central IRL	$290,229	283	$1,026	35	$8,292
2245	Central IRL	$269,830	263	$1,026	24	$11,243
751	North IRL	$310,986	303	$1,026	45	$6,911
RL-3F	North IRL	$314,082	306	$1,026	44	$7,138
1231	North IRL	$311,971	302	$1,033	44	$7,090
1890	Central IRL	$315,240	305	$1,034	45	$7,005
2022	Central IRL	$286,492	277	$1,034	39	$7,346
1296	North IRL	$280,669	270	$1,040	40	$7,017
111	North IRL	$239,176	230	$1,040	20	$11,959
1844	Central IRL	$294,298	283	$1,040	28	$10,511
795	North IRL	$285,977	274	$1,044	37	$7,729
994	North IRL	$275,975	264	$1,045	41	$6,731
5	North IRL	$244,267	232	$1,053	21	$11,632
954	North IRL	$268,018	253	$1,059	35	$7,658
748A	North IRL	$249,159	235	$1,060	38	$6,557
2270	Central IRL	$272,810	257	$1,062	39	$6,995
96	North IRL	$255,551	239	$1,069	31	$8,244
1528	Central IRL	$312,096	291	$1,072	41	$7,612
SJR-80	North IRL	$257,640	239	$1,078	33	$7,807
CO-8A	North IRL	$276,408	256	$1,080	37	$7,470
953	North IRL	$287,560	266	$1,081	42	$6,847
1490	Central IRL	$262,351	242	$1,084	27	$9,717
2011	Central IRL	$308,207	284	$1,085	36	$8,561
1938	Central IRL	$280,903	257	$1,093	35	$8,026
CO-2QB	North IRL	$261,986	239	$1,096	34	$7,705
1379	North IRL	$275,758	251	$1,099	39	$7,071
1226	North IRL	$295,861	269	$1,100	38	$7,786
812	North IRL	$272,150	246	$1,106	35	$7,776
2107	Central IRL	$264,545	239	$1,107	19	$13,923
857	North IRL	$277,839	251	$1,107	36	$7,718
2263	Central IRL	$277,907	251	$1,107	25	$11,116
2070	Central IRL	$286,525	258	$1,111	38	$7,540
RL-4H	North IRL	$269,557	242	$1,114	32	$8,424
938	North IRL	$249,310	221	$1,128	23	$10,840
1273	North IRL	$280,901	248	$1,133	39	$7,203
1233	North IRL	$284,942	251	$1,135	35	$8,141
TV-Riveredge-Horizon Basin	North IRL	$300,902	265	$1,135	34	$8,850
1239	North IRL	$300,985	265	$1,136	45	$6,689
174	North IRL	$250,483	220	$1,139	36	$6,958

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1431	North IRL	$265,307	233	$1,139	32	$8,291
1578	Central IRL	$259,520	227	$1,143	37	$7,014
1675	Central IRL	$289,292	253	$1,143	31	$9,332
63	North IRL	$259,712	227	$1,144	45	$5,771
1895	Central IRL	$274,944	240	$1,146	34	$8,087
CO-6I	North IRL	$268,942	234	$1,149	35	$7,684
1613	Central IRL	$248,700	215	$1,157	36	$6,908
1213	North IRL	$269,538	233	$1,157	33	$8,168
1783	Central IRL	$270,116	233	$1,159	34	$7,945
1809	Central IRL	$260,913	225	$1,160	36	$7,248
2061	Central IRL	$266,168	229	$1,162	33	$8,066
61A	North IRL	$252,279	217	$1,163	50	$5,046
1078A	North IRL	$278,601	239	$1,166	35	$7,960
1838	Central IRL	$307,282	262	$1,173	37	$8,305
2134A	Central IRL	$292,895	249	$1,176	33	$8,876
2059	Central IRL	$271,375	230	$1,180	34	$7,982
1551	Central IRL	$296,236	251	$1,180	36	$8,229
1984	Central IRL	$302,216	256	$1,181	34	$8,889
TV-Coleman Basin	North IRL	$272,214	230	$1,184	29	$9,387
1297	North IRL	$277,186	234	$1,185	34	$8,153
SJR-77	North IRL	$258,431	216	$1,196	36	$7,179
1925	Central IRL	$277,596	232	$1,197	36	$7,711
1864	Central IRL	$304,054	252	$1,207	35	$8,687
991	North IRL	$274,634	226	$1,215	32	$8,582
1838A	Central IRL	$298,035	244	$1,221	34	$8,766
SJR-112	Central IRL	$271,965	222	$1,225	22	$12,362
1667	Central IRL	$285,754	233	$1,226	30	$9,525
1937	Central IRL	$273,623	222	$1,233	29	$9,435
2224	Central IRL	$247,866	201	$1,233	20	$12,393
1515	Central IRL	$278,809	222	$1,256	33	$8,449
2269	Central IRL	$267,088	212	$1,260	23	$11,613
2234	Central IRL	$252,538	200	$1,263	34	$7,428
80B	North IRL	$295,881	233	$1,270	33	$8,966
1347	North IRL	$262,522	204	$1,287	34	$7,721
RL-4G	North IRL	$271,555	211	$1,287	32	$8,486
2292	Central IRL	$281,446	218	$1,291	30	$9,382
1724	Central IRL	$257,028	198	$1,298	28	$9,180
SJR-123	Central IRL	$237,570	183	$1,298	17	$13,975
883	North IRL	$252,319	194	$1,301	32	$7,885
2243A	Central IRL	$262,186	201	$1,304	21	$12,485
TV-Knox McRae Basin	North IRL	$244,281	187	$1,306	29	$8,423
2286	Central IRL	$282,314	216	$1,307	30	$9,410
TV-US-1 Basin	North IRL	$299,906	229	$1,310	31	$9,674
802	North IRL	$256,420	194	$1,322	26	$9,862
2277	Central IRL	$259,531	196	$1,324	30	$8,651
2153	Central IRL	$242,784	183	$1,327	12	$20,232

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
2023	Central IRL	$274,741	206	$1,334	30	$9,158
TV-Hopkins Road Basin	North IRL	$241,615	180	$1,342	30	$8,054
876	North IRL	$223,113	166	$1,344	15	$14,874
1558	Central IRL	$250,889	186	$1,349	29	$8,651
1410	North IRL	$245,497	181	$1,356	27	$9,092
2157	Central IRL	$277,731	203	$1,368	27	$10,286
CO-2P	North IRL	$241,601	176	$1,373	24	$10,067
1572	Central IRL	$254,746	185	$1,377	28	$9,098
2112	Central IRL	$251,137	182	$1,380	28	$8,969
1475	North IRL	$246,538	177	$1,393	24	$10,272
2182A	Central IRL	$259,184	186	$1,393	27	$9,599
1323	North IRL	$277,725	199	$1,396	28	$9,919
1871	Central IRL	$250,922	178	$1,410	29	$8,652
1433	Central IRL	$259,542	184	$1,411	23	$11,284
2255	Central IRL	$246,895	174	$1,419	17	$14,523
1792	Central IRL	$262,716	185	$1,420	58	$4,530
958	Banana River	$258,660	182	$1,421	27	$9,580
73	North IRL	$226,522	159	$1,425	14	$16,180
164	North IRL	$239,797	167	$1,436	37	$6,481
1307A	North IRL	$268,678	187	$1,437	23	$11,682
2236	Central IRL	$267,506	186	$1,438	20	$13,375
1770	Central IRL	$266,478	183	$1,456	24	$11,103
990	Banana River	$250,952	172	$1,459	26	$9,652
TV-Coranada Basin	North IRL	$240,989	162	$1,488	24	$10,041
1259	North IRL	$263,939	177	$1,491	27	$9,776
2418	North IRL	$245,127	164	$1,495	24	$10,214
2025	Central IRL	$269,599	180	$1,498	23	$11,722
CO-2O	North IRL	$250,531	166	$1,509	24	$10,439
1252	North IRL	$269,979	178	$1,517	23	$11,738
CO-2R	North IRL	$248,233	162	$1,532	22	$11,283
1785	Central IRL	$256,233	167	$1,534	16	$16,015
2014	Central IRL	$251,667	164	$1,535	26	$9,679
1875	Central IRL	$255,384	166	$1,538	19	$13,441
RL-4A	North IRL	$264,326	171	$1,546	25	$10,573
1564	Central IRL	$252,507	163	$1,549	16	$15,782
1408	North IRL	$255,167	164	$1,556	24	$10,632
SJR-7	North IRL	$230,543	148	$1,558	23	$10,024
1998	Central IRL	$266,666	171	$1,559	22	$12,121
2233	Central IRL	$250,315	160	$1,564	17	$14,724
2283	Central IRL	$265,004	169	$1,568	24	$11,042
2146	Central IRL	$240,256	153	$1,570	12	$20,021
1845	Central IRL	$254,409	162	$1,570	17	$14,965
90	North IRL	$260,117	165	$1,576	21	$12,387
2205	Central IRL	$226,910	143	$1,587	8	$28,364
2121	Central IRL	$243,527	153	$1,592	22	$11,069
2181	Central IRL	$249,158	156	$1,597	23	$10,833
1341	North IRL	$250,327	155	$1,615	23	$10,884

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
80	North IRL	$240,993	149	$1,617	15	$16,066
2249	Central IRL	$256,686	158	$1,625	18	$14,260
2187	Central IRL	$233,292	143	$1,631	14	$16,664
2202	Central IRL	$242,168	148	$1,636	20	$12,108
964	Banana River	$234,531	143	$1,640	20	$11,727
41	North IRL	$232,388	140	$1,660	22	$10,563
1853	Central IRL	$254,307	153	$1,662	23	$11,057
1038	Banana River	$240,778	143	$1,684	22	$10,944
2082	Central IRL	$241,156	143	$1,686	22	$10,962
644	North IRL	$248,666	147	$1,692	19	$13,088
1912	Central IRL	$258,902	153	$1,692	20	$12,945
1995	Central IRL	$254,301	150	$1,695	20	$12,715
42	North IRL	$259,640	153	$1,697	18	$14,424
SJR-101	North IRL	$238,710	140	$1,705	23	$10,379
1510	Central IRL	$259,406	152	$1,707	22	$11,791
2081	Central IRL	$246,368	144	$1,711	19	$12,967
2151	Central IRL	$237,291	137	$1,732	12	$19,774
1983	Central IRL	$259,987	150	$1,733	21	$12,380
80C	North IRL	$256,747	146	$1,759	22	$11,670
1745	Central IRL	$234,043	133	$1,760	23	$10,176
1691	Central IRL	$249,146	141	$1,767	18	$13,841
1764	Central IRL	$237,875	134	$1,775	20	$11,894
2041	Central IRL	$251,583	141	$1,784	19	$13,241
1677	Central IRL	$243,997	136	$1,794	20	$12,200
IHB-52	Banana	$259,974	144	$1,805	21	$12,380
990B	Banana River	$235,149	130	$1,809	14	$16,796
1035	North IRL	$242,930	134	$1,813	21	$11,568
IHB-48A	Banana River	$234,593	129	$1,819	23	$10,200
929A	North IRL	$264,116	145	$1,821	20	$13,206
2220	Central IRL	$229,678	126	$1,823	10	$22,968
2203	Central IRL	$229,754	126	$1,823	8	$28,719
IHB-44A	Banana River	$237,377	130	$1,826	21	$11,304
CO-9A	North IRL	$241,983	132	$1,833	19	$12,736
RL-1G	North IRL	$252,314	137	$1,842	19	$13,280
RL-1N	North IRL	$252,452	137	$1,843	20	$12,623
1159	Banana River	$242,076	130	$1,862	19	$12,741
979E	Banana River	$236,737	126	$1,879	18	$13,152
CC-B3	Banana River	$239,287	127	$1,884	19	$12,594
IHB-50	Banana River	$250,359	132	$1,897	19	$13,177
2261	Central IRL	$239,044	126	$1,897	13	$18,388
SJR-79	North IRL	$235,438	124	$1,899	18	$13,080
1050	Banana River	$234,415	123	$1,906	13	$18,032
939D	North IRL	$258,137	135	$1,912	18	$14,341
2201	Central IRL	$231,665	121	$1,915	9	$25,741
1715	Central IRL	$240,019	125	$1,920	18	$13,334
979G	Banana River	$238,323	124	$1,922	18	$13,240
IHB-36	Banana River	$240,313	123	$1,954	18	$13,351
98A	North IRL	$232,768	119	$1,956	17	$13,692
1315	Banana River	$236,690	121	$1,956	18	$13,149
CC-B4G	Banana River	$237,542	121	$1,963	20	$11,877

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
859	North IRL	$230,986	117	$1,974	20	$11,549
RL-1I	North IRL	$246,782	125	$1,974	18	$13,710
940A	North IRL	$239,716	121	$1,981	18	$13,318
RL-1M	North IRL	$236,190	119	$1,985	19	$12,431
1332	Banana River	$242,254	122	$1,986	18	$13,459
884A	North IRL	$245,347	123	$1,995	18	$13,630
1092	Banana River	$234,020	117	$2,000	12	$19,502
1225	North IRL	$240,808	120	$2,007	18	$13,378
SJR-53	North IRL	$236,832	117	$2,024	20	$11,842
2114	Central IRL	$229,894	113	$2,034	18	$12,772
SJR-89	North IRL	$242,918	119	$2,041	11	$22,083
1226A	North IRL	$253,181	124	$2,042	17	$14,893
1556	Central IRL	$232,393	113	$2,057	17	$13,670
IHB-17A	Banana River	$232,608	112	$2,077	20	$11,630
RL-4E	North IRL	$247,354	119	$2,079	16	$15,460
SB-P-1	Banana River	$235,898	113	$2,088	16	$14,744
100A	North IRL	$228,193	109	$2,094	18	$12,677
1960A	Central IRL	$235,481	112	$2,103	17	$13,852
1011	Banana River	$235,707	112	$2,105	16	$14,732
TV-Titusville High School 2 Basin	North IRL	$235,843	112	$2,106	16	$14,740
839	North IRL	$232,076	110	$2,110	16	$14,505
99	North IRL	$221,968	105	$2,114	9	$24,663
887	North IRL	$228,572	108	$2,116	14	$16,327
1307B	North IRL	$248,732	117	$2,126	16	$15,546
921/939B	North IRL	$232,057	108	$2,149	13	$17,851
1305	North IRL	$236,425	110	$2,149	16	$14,777
2274	Central IRL	$253,781	117	$2,169	15	$16,919
2243	Central IRL	$253,784	117	$2,169	15	$16,919
1733	Central IRL	$230,232	105	$2,193	16	$14,390
1167	Banana River	$234,891	107	$2,195	16	$14,681
1006	Banana River	$234,320	106	$2,211	16	$14,645
2198	Central IRL	$227,757	103	$2,211	13	$17,520
RL-1O	North IRL	$219,189	99	$2,214	13	$16,861
IHB-59	Banana River	$230,510	104	$2,216	16	$14,407
2421A	Banana River	$242,017	108	$2,241	15	$16,134
2265	Central IRL	$244,905	109	$2,247	13	$18,839
RL-1V	North IRL	$234,147	104	$2,251	15	$15,610
773	North IRL	$224,617	99	$2,269	9	$24,957
2272	Central IRL	$229,629	101	$2,274	14	$16,402
IHB-45	Banana River	$223,436	98	$2,280	14	$15,960
RL-2B	North IRL	$233,907	102	$2,293	11	$21,264
1583	Central IRL	$229,556	100	$2,296	16	$14,347
769	North IRL	$223,255	97	$2,302	11	$20,296
1016B	Banana River	$224,421	96	$2,338	14	$16,030
1163	Banana River	$228,034	97	$2,351	10	$22,803
818	North IRL	$223,438	95	$2,352	16	$13,965
RL-1K	North IRL	$231,625	98	$2,364	14	$16,545
979D	Banana River	$227,171	96	$2,366	10	$22,717

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CO-2D	North IRL	$231,344	97	$2,385	14	$16,525
1048	Banana River	$226,622	95	$2,385	14	$16,187
SJR-120	Central IRL	$224,257	94	$2,386	9	$24,917
1311	North IRL	$236,770	99	$2,392	14	$16,912
869	North IRL	$234,524	98	$2,393	14	$16,752
2030	Central IRL	$239,456	100	$2,395	13	$18,420
97	North IRL	$216,705	90	$2,408	8	$27,088
228	North IRL	$491,331	204	$2,408	31	$15,849
CO-2B	North IRL	$231,521	95	$2,437	14	$16,537
IHB-20	Banana River	$232,341	95	$2,446	14	$16,596
870	North IRL	$238,110	97	$2,455	14	$17,008
1229	Banana River	$227,905	92	$2,477	16	$14,244
1319	Banana River	$235,427	95	$2,478	14	$16,816
SJR-60	North IRL	$233,100	94	$2,480	13	$17,931
CO-6E	North IRL	$219,470	88	$2,494	12	$18,289
SB-GS-17	Banana River	$237,964	95	$2,505	14	$16,997
TV-Brevard Basin	North IRL	$220,835	88	$2,509	12	$18,403
1103	Banana River	$227,919	90	$2,532	9	$25,324
1669	Central IRL	$238,712	94	$2,539	12	$19,893
1180	Banana River	$225,641	88	$2,564	9	$25,071
1105	Banana River	$226,015	88	$2,568	9	$25,113
SJR-100	North IRL	$231,729	90	$2,575	13	$17,825
1291	North IRL	$303,952	118	$2,576	16	$18,997
1077	North IRL	$443,240	172	$2,577	25	$17,730
IHB-15D	Banana River	$223,015	86	$2,593	15	$14,868
970B	Banana River	$225,920	87	$2,597	10	$22,592
SJR-117	Central IRL	$233,991	90	$2,600	12	$19,499
1650	Central IRL	$227,243	87	$2,612	12	$18,937
1070	Banana River	$225,452	86	$2,622	9	$25,050
1309A	Banana River	$227,594	86	$2,646	13	$17,507
TV-Grace Basin	North IRL	$223,016	84	$2,655	12	$18,585
CO-2G	North IRL	$228,574	86	$2,658	12	$19,048
RL-3H	North IRL	$242,015	91	$2,660	12	$20,168
SB-LIB-1	Banana River	$242,047	91	$2,660	13	$18,619
2221	Central IRL	$228,798	86	$2,660	9	$25,422
SB-C-3	Banana River	$237,117	89	$2,664	12	$19,760
1382A	North IRL	$227,251	85	$2,674	13	$17,481
89A	North IRL	$228,043	85	$2,683	12	$19,004
1947	Central IRL	$233,988	87	$2,690	12	$19,499
1495	Central IRL	$229,477	85	$2,700	12	$19,123
IHB-35	Banana River	$240,563	89	$2,703	12	$20,047
RL-1J	North IRL	$219,079	81	$2,705	11	$19,916
SB-C-11	Banana River	$228,814	84	$2,724	13	$17,601
1651	Central IRL	$229,001	84	$2,726	11	$20,818
CC-B5C	Banana River	$232,282	85	$2,733	14	$16,592
2028	Central IRL	$235,219	86	$2,735	11	$21,384
1592	Central IRL	$225,209	82	$2,746	14	$16,086
750	North IRL	$237,732	86	$2,764	13	$18,287

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1903	Central IRL	$225,607	81	$2,785	9	$25,067
1306A	North IRL	$225,741	81	$2,787	10	$22,574
1016A	Banana River	$228,660	82	$2,789	11	$20,787
944	Banana River	$307,021	110	$2,791	14	$21,930
SJR-96	North IRL	$230,947	82	$2,816	12	$19,246
IHB-1B	Banana River	$230,955	82	$2,817	14	$16,497
2053	Central IRL	$223,635	79	$2,831	10	$22,363
1473	Central IRL	$223,675	79	$2,831	10	$22,368
68	North IRL	$224,597	79	$2,843	38	$5,910
1743	Central IRL	$230,407	81	$2,845	11	$20,946
SB-D-9	Banana River	$231,662	81	$2,860	11	$21,060
SB-N-2	Banana River	$235,036	82	$2,866	12	$19,586
1306	North IRL	$227,458	79	$2,879	10	$22,746
939A	North IRL	$233,238	81	$2,879	11	$21,203
1011B	Banana River	$224,920	78	$2,884	10	$22,492
143	North IRL	$222,271	77	$2,887	8	$27,784
1100	Banana River	$223,594	77	$2,904	8	$27,949
CC-B7	Banana River	$230,750	79	$2,921	11	$20,977
1414A	North IRL	$226,335	77	$2,939	11	$20,576
SB-D-5	Banana River	$226,567	77	$2,942	11	$20,597
TV-Washington-Cheney Basin	North IRL	$221,937	75	$2,959	10	$22,194
IHB-16	Banana River	$222,976	75	$2,973	13	$17,152
938A	North IRL	$226,251	76	$2,977	10	$22,625
SJR-107	Central IRL	$228,728	76	$3,010	12	$19,061
IHB-56	Banana River	$232,494	77	$3,019	11	$21,136
970F	Banana River	$223,465	74	$3,020	10	$22,346
2422	Banana River	$232,894	77	$3,025	10	$23,289
SB-SD-6	Banana River	$235,997	78	$3,026	11	$21,454
SJR-115	Central IRL	$223,999	74	$3,027	12	$18,667
IHB-54	Banana River	$233,435	77	$3,032	11	$21,221
1228A	North IRL	$227,652	75	$3,035	10	$22,765
SB-SD-5	Banana River	$225,001	74	$3,041	11	$20,455
SB-C-9	Banana River	$225,611	74	$3,049	11	$20,510
SJR-50	North IRL	$221,153	72	$3,072	11	$20,105
939C	North IRL	$231,283	75	$3,084	10	$23,128
1846	Central IRL	$229,071	74	$3,096	13	$17,621
1917	Central IRL	$226,457	72	$3,145	9	$25,162
SB-FDOT	Banana River	$217,614	69	$3,154	10	$21,761
1414B	North IRL	$224,184	71	$3,158	10	$22,418
91	North IRL	$216,348	68	$3,182	6	$36,058
SJR-99	North IRL	$219,828	69	$3,186	12	$18,319
SJR-59	North IRL	$236,597	74	$3,197	10	$23,660
939E	North IRL	$224,402	70	$3,206	10	$22,440
948A	Banana River	$221,397	69	$3,209	9	$24,600
46C	North IRL	$223,007	69	$3,232	11	$20,273
1083	Banana River	$226,580	70	$3,237	9	$25,176
1686	Central IRL	$223,600	69	$3,241	10	$22,360

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
CC-B9A	Banana River	$215,281	66	$3,262	9	$23,920
SB-C-17	Banana River	$220,350	67	$3,289	11	$20,032
918	North IRL	$225,617	68	$3,318	10	$22,562
1299	Banana River	$229,880	69	$3,332	9	$25,542
770C	Banana River	$220,247	66	$3,337	7	$31,464
CO-6C	North IRL	$217,173	65	$3,341	11	$19,743
1617	Central IRL	$222,560	66	$3,372	9	$24,729
TV-Broad Street Basin	North IRL	$216,915	63	$3,443	9	$24,102
CO-1G	North IRL	$216,123	62	$3,486	9	$24,014
1036	Banana River	$219,644	63	$3,486	10	$21,964
CO-6N	North IRL	$221,321	63	$3,513	9	$24,591
2174	Central IRL	$222,594	63	$3,533	9	$24,733
1857	Central IRL	$222,959	63	$3,539	10	$22,296
RL-1F	North IRL	$222,133	62	$3,583	9	$24,681
IHB-43	Banana River	$218,557	61	$3,583	11	$19,869
CC-B13D	Banana River	$218,805	61	$3,587	11	$19,891
1689	Central IRL	$229,568	64	$3,587	9	$25,508
RL-1W	North IRL	$222,546	62	$3,589	9	$24,727
1190	Banana River	$219,138	61	$3,592	6	$36,523
SB-C-13	Banana River	$219,412	61	$3,597	10	$21,941
944B	Banana River	$227,451	63	$3,610	9	$25,272
SB-R-13	Banana River	$220,409	61	$3,613	10	$22,041
110	North IRL	$214,297	59	$3,632	5	$42,859
IHB-55	Banana River	$227,613	62	$3,671	9	$25,290
CC-B8A	Banana River	$217,694	59	$3,690	11	$19,790
1033	Banana River	$347,694	94	$3,699	13	$26,746
1249	North IRL	$222,021	60	$3,700	9	$24,669
2276	Central IRL	$222,182	60	$3,703	9	$24,687
748	North IRL	$249,159	67	$3,719	7	$35,594
970A	Banana River	$220,976	59	$3,745	9	$24,553
1340	Banana River	$221,133	59	$3,748	9	$24,570
1397	North IRL	$221,286	59	$3,751	9	$24,587
1034	North IRL	$289,866	77	$3,764	12	$24,155
SB-SD-3	Banana River	$222,498	59	$3,771	9	$24,722
IHB-11	Banana River	$220,839	57	$3,874	8	$27,605
1253B	North IRL	$220,891	57	$3,875	9	$24,543
SJR-64	North IRL	$221,171	57	$3,880	7	$31,596
IHB-1A	Banana River	$218,489	56	$3,902	8	$27,311
1393	North IRL	$218,765	56	$3,907	8	$27,346
SB-C-12	Banana River	$220,053	56	$3,930	9	$24,450
1830	Central IRL	$220,949	56	$3,946	8	$27,619
1154	Banana River	$217,614	55	$3,957	6	$36,269
711	North IRL	$218,397	55	$3,971	5	$43,679
1352B	North IRL	$223,667	56	$3,994	8	$27,958
RL-1R	North IRL	$220,628	55	$4,011	8	$27,578
2229	Central IRL	$221,045	55	$4,019	6	$36,841
2077	Central IRL	$218,540	54	$4,047	6	$36,423
937	North IRL	$218,603	54	$4,048	7	$31,229
CO-2J	North IRL	$214,873	53	$4,054	7	$30,696

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
979B	Banana River	$219,786	54	$4,070	8	$27,473
SJR-98	North IRL	$215,717	53	$4,070	8	$26,965
1939	Central IRL	$220,054	54	$4,075	8	$27,507
969B	Banana River	$221,141	54	$4,095	8	$27,643
CO-6D	North IRL	$217,188	53	$4,098	8	$27,148
1336B	Banana River	$225,399	55	$4,098	8	$28,175
1676	Central IRL	$221,542	54	$4,103	8	$27,693
2172	Central IRL	$221,569	54	$4,103	8	$27,696
IHB-14	Banana River	$216,642	52	$4,166	10	$21,664
TV-Habor Pointe Basin	North IRL	$220,841	53	$4,167	9	$24,538
1763	Central IRL	$220,863	53	$4,167	8	$27,608
2055	Central IRL	$224,244	53	$4,231	6	$37,374
1540	Central IRL	$220,225	51	$4,318	7	$31,461
IHB-30	Banana River	$216,115	50	$4,322	9	$24,013
51A	North IRL	$216,346	50	$4,327	7	$30,907
CC-B4A	Banana River	$216,999	50	$4,340	9	$24,111
RL-1D	North IRL	$218,383	50	$4,368	7	$31,198
1011A	Banana River	$223,000	51	$4,373	7	$31,857
IHB-24	Banana River	$219,238	50	$4,385	7	$31,320
2101	Central IRL	$219,395	50	$4,388	6	$36,566
1672	Central IRL	$221,785	50	$4,436	6	$36,964
173	North IRL	$222,026	50	$4,441	7	$31,718
1054	Banana River	$217,944	49	$4,448	5	$43,589
997B	Banana River	$218,280	49	$4,455	7	$31,183
863	North IRL	$222,898	50	$4,458	7	$31,843
RL-1S	North IRL	$218,470	49	$4,459	7	$31,210
IHB-37	Banana River	$218,959	49	$4,469	7	$31,280
1001A	Banana River	$216,366	48	$4,508	7	$30,909
959B	Banana River	$221,251	49	$4,515	7	$31,607
IHB-42	Banana River	$216,759	48	$4,516	6	$36,127
SB-GS-1	Banana River	$216,960	48	$4,520	8	$27,120
SJR-76	Banana River	$217,724	48	$4,536	6	$36,287
970G	Banana River	$217,845	48	$4,538	7	$31,121
970H	Banana River	$218,011	48	$4,542	7	$31,144
997E	Banana River	$218,096	48	$4,544	7	$31,157
1151	North IRL	$242,015	53	$4,566	7	$34,574
2237	Central IRL	$223,981	49	$4,571	6	$37,330
IHB-15A	Banana River	$219,955	48	$4,582	7	$31,422
1001B	Banana River	$216,235	47	$4,601	7	$30,891
SB-GS-11	Banana River	$216,568	47	$4,608	7	$30,938
CO-1B	North IRL	$216,823	47	$4,613	7	$30,975
1876	Central IRL	$221,726	48	$4,619	7	$31,675
1316	North IRL	$222,126	48	$4,628	7	$31,732
1700	Central IRL	$217,882	47	$4,636	7	$31,126
IHB-9	Banana River	$217,969	47	$4,638	7	$31,138
1829	Central IRL	$218,217	47	$4,643	7	$31,174
995	Banana River	$307,987	66	$4,666	10	$30,799
2102	Central IRL	$215,888	46	$4,693	7	$30,841
1414	North IRL	$226,335	48	$4,715	7	$32,334

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
CO-3	North IRL	$212,738	45	$4,728	6	$35,456
1780	Central IRL	$217,752	46	$4,734	7	$31,107
948	Banana River	$222,961	47	$4,744	6	$37,160
SB-GS-18	Banana River	$218,229	46	$4,744	7	$31,176
2351	Banana River	$214,420	45	$4,765	5	$42,884
IHB-5	Banana River	$215,065	45	$4,779	7	$30,724
CC-B5F	Banana River	$216,043	45	$4,801	6	$36,007
1545A	Central IRL	$216,976	45	$4,822	7	$30,997
1252B	North IRL	$222,088	46	$4,828	6	$37,015
CO-6F	North IRL	$212,592	44	$4,832	6	$35,432
SB-C-10	Banana River	$217,679	45	$4,837	7	$31,097
1682	Central IRL	$219,494	45	$4,878	6	$36,582
1008	Banana River	$219,644	45	$4,881	6	$36,607
CC-B10B	Banana River	$215,523	44	$4,898	7	$30,789
1814	Central IRL	$220,663	45	$4,904	6	$36,777
RL-1L	North IRL	$216,176	44	$4,913	7	$30,882
1971	Central IRL	$216,598	44	$4,923	6	$36,100
IHB-53	Banana River	$220,994	44	$5,023	6	$36,832
2104A	Central IRL	$216,837	43	$5,043	6	$36,140
1182	Banana River	$216,971	43	$5,046	6	$36,162
1860	Central IRL	$217,548	43	$5,059	6	$36,258
1771	Central IRL	$218,646	43	$5,085	5	$43,729
1878	Central IRL	$219,003	43	$5,093	5	$43,801
IHB-47	Banana River	$213,982	42	$5,095	8	$26,748
1219	North IRL	$494,782	97	$5,101	13	$38,060
SB-C-16	Banana River	$214,251	42	$5,101	8	$26,781
1176	Banana River	$215,055	42	$5,120	5	$43,011
944C	Banana River	$220,569	43	$5,130	6	$36,762
1012	Banana River	$220,606	43	$5,130	5	$44,121
1217	Banana River	$215,722	42	$5,136	5	$43,144
SB-C-14	Banana River	$216,192	42	$5,147	6	$36,032
940C	Banana River	$216,719	42	$5,160	6	$36,120
CO-4	North IRL	$211,730	41	$5,164	5	$42,346
CC-B5B	Banana River	$216,972	42	$5,166	6	$36,162
1935	Central IRL	$212,730	41	$5,189	6	$35,455
SB-C-5	Banana River	$218,398	42	$5,200	6	$36,400
TV-Vectorspace-Columbia Basin	North IRL	$218,838	42	$5,210	6	$36,473
793	North IRL	$214,503	41	$5,232	5	$42,901
1910	Central IRL	$219,789	42	$5,233	5	$43,958
RL-1X	North IRL	$217,332	41	$5,301	6	$36,222
1784	Central IRL	$217,921	41	$5,315	5	$43,584
990D	Banana River	$218,294	41	$5,324	5	$43,659
CC-B9B	Banana River	$214,311	40	$5,358	7	$30,616
1178	Banana River	$214,350	40	$5,359	4	$53,588
1519	Central IRL	$214,378	40	$5,359	8	$26,797
1107	Banana River	$214,505	40	$5,363	4	$53,626
929	North IRL	$264,116	49	$5,390	8	$33,014

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SB-C-7	Banana River	$215,998	40	$5,400	6	$36,000
1996	Central IRL	$216,403	40	$5,410	6	$36,067
970	Banana River	$276,245	51	$5,417	8	$34,531
1001	Banana River	$234,320	43	$5,449	6	$39,053
CO-7	North IRL	$212,537	39	$5,450	5	$42,507
80A	North IRL	$218,554	40	$5,464	6	$36,426
2253	Central IRL	$213,318	39	$5,470	4	$53,329
IHB-80	Banana River	$214,091	39	$5,490	7	$30,584
SB-C-8	Banana River	$215,682	39	$5,530	6	$35,947
1827	Central IRL	$216,123	39	$5,542	6	$36,020
231	North IRL	$216,319	39	$5,547	4	$54,080
IHB-15B	Banana River	$217,347	39	$5,573	5	$43,469
SJR-16	North IRL	$217,416	39	$5,575	5	$43,483
IHB-15C	Banana River	$217,891	39	$5,587	5	$43,578
2295	Central IRL	$212,895	38	$5,602	3	$70,965
SJR-102	North IRL	$213,411	38	$5,616	6	$35,568
46A	North IRL	$214,329	38	$5,640	6	$35,722
TV-Washington Basin	North IRL	$214,531	38	$5,646	6	$35,755
1011D	Banana River	$215,092	38	$5,660	5	$43,018
IHB-21	Banana River	$215,450	38	$5,670	5	$43,090
SB-SD-7	Banana River	$221,239	39	$5,673	5	$44,248
108	North IRL	$211,147	37	$5,707	3	$70,382
CO-2A1	North IRL	$213,211	37	$5,762	5	$42,642
TV-Pelican Point Basin	North IRL	$213,279	37	$5,764	6	$35,547
CO-1H	North IRL	$214,816	37	$5,806	6	$35,803
948B	Banana River	$214,531	36	$5,959	5	$42,906
1360	Banana River	$214,705	36	$5,964	5	$42,941
CO-6M	North IRL	$214,990	36	$5,972	5	$42,998
IHB-32	Banana River	$215,132	36	$5,976	5	$43,026
IHB-23	Banana River	$215,153	36	$5,976	5	$43,031
1714	Central IRL	$215,248	36	$5,979	5	$43,050
IHB-18	Banana River	$215,363	36	$5,982	5	$43,073
SB-R-1	Banana River	$215,436	36	$5,984	5	$43,087
1422	North IRL	$218,138	36	$6,059	5	$43,628
CO-2E	North IRL	$212,559	35	$6,073	5	$42,512
SB-WS-21	Banana River	$213,578	35	$6,102	5	$42,716
SJR-29	North IRL	$213,816	35	$6,109	5	$42,763
TV-Ponce De Leon Basin-A	North IRL	$220,292	36	$6,119	5	$44,058
SB-WS-5	Banana River	$214,332	35	$6,124	5	$42,866
2122	Central IRL	$214,487	35	$6,128	3	$71,496
1139	Banana River	$214,646	35	$6,133	4	$53,662
SB-GS-10	Banana River	$214,729	35	$6,135	5	$42,946
IHB-26	Banana River	$214,755	35	$6,136	5	$42,951
1598	Central IRL	$215,491	35	$6,157	5	$43,098
1479	Central IRL	$216,410	35	$6,183	5	$43,282

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1810	Central IRL	$217,222	35	$6,206	4	$54,305
IHB-34	North IRL	$217,262	35	$6,207	5	$43,452
TV-Indian River Basin	North IRL	$212,579	34	$6,252	5	$42,516
SB-J-2	Banana River	$212,595	34	$6,253	5	$42,519
1820	Central IRL	$212,620	34	$6,254	5	$42,524
CO-1E	North IRL	$213,352	34	$6,275	5	$42,670
SJR-103	Central IRL	$213,472	34	$6,279	5	$42,694
1970	Central IRL	$214,141	34	$6,298	4	$53,535
RL-1C	North IRL	$214,284	34	$6,302	5	$42,857
1804	Central IRL	$214,522	34	$6,309	5	$42,904
IHB-25	Banana River	$214,536	34	$6,310	5	$42,907
RL-4D	North IRL	$212,061	33	$6,426	5	$42,412
CC-B5D	Banana River	$219,002	34	$6,441	5	$43,800
1149	Banana River	$213,696	33	$6,476	4	$53,424
2017	Central IRL	$214,199	33	$6,491	5	$42,840
SB-D-10	Banana River	$214,223	33	$6,492	5	$42,845
SB-GS-16	Banana River	$214,263	33	$6,493	5	$42,853
1280C	Banana River	$214,337	33	$6,495	5	$42,867
IHB-17B	Banana River	$217,969	33	$6,605	5	$43,594
SJR-22	North IRL	$212,347	32	$6,636	6	$35,391
1118	Banana River	$212,713	32	$6,647	3	$70,904
SJR-9	North IRL	$213,182	32	$6,662	5	$42,636
IHB-31	Banana River	$213,551	32	$6,673	5	$42,710
1658	Central IRL	$213,682	32	$6,678	5	$42,736
CC-B4F	Banana River	$213,727	32	$6,679	5	$42,745
IHB-88	Banana River	$213,886	32	$6,684	5	$42,777
IHB-40	Banana River	$213,972	32	$6,687	5	$42,794
2084	Central IRL	$214,879	32	$6,715	4	$53,720
SB-GS-13	Banana River	$216,364	32	$6,761	5	$43,273
117	North IRL	$209,746	31	$6,766	3	$69,915
CO-1J	North IRL	$209,953	31	$6,773	4	$52,488
891	North IRL	$210,701	31	$6,797	4	$52,675
CC-B12	Banana River	$218,245	32	$6,820	5	$43,649
SB-WS-1	Banana River	$213,092	31	$6,874	5	$42,618
979F	Banana River	$213,362	31	$6,883	5	$42,672
IHB-83	Banana River	$213,530	31	$6,888	5	$42,706
SB-TIB-1	Banana River	$213,615	31	$6,891	5	$42,723
RL-1T	North IRL	$213,887	31	$6,900	5	$42,777
65	North IRL	$209,181	30	$6,973	3	$69,727
1369	North IRL	$211,857	30	$7,062	5	$42,371
1376	North IRL	$212,068	30	$7,069	5	$42,414
1000A	Banana River	$213,222	30	$7,107	5	$42,644
2005	Central IRL	$214,499	30	$7,150	5	$42,900
SB-GS-12	Banana River	$217,293	30	$7,243	4	$54,323
1153	Banana River	$212,134	29	$7,315	5	$42,427
2050	Central IRL	$212,762	29	$7,337	3	$70,921
1455	North IRL	$213,110	29	$7,349	4	$53,277
RL-3D	North IRL	$213,527	29	$7,363	4	$53,382
2160	Central IRL	$215,572	29	$7,434	4	$53,893

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SB-GS-14	Banana River	$210,836	28	$7,530	5	$42,167
SB-GS-7	Banana River	$211,452	28	$7,552	5	$42,290
970D	Banana River	$211,579	28	$7,556	4	$52,895
IHB-61	Banana River	$212,778	28	$7,599	4	$53,195
898	North IRL	$214,381	28	$7,656	4	$53,595
SB-N-3	Banana River	$215,603	28	$7,700	5	$43,121
IHB-15E	Banana River	$210,182	27	$7,785	4	$52,545
SB-GS-21	Banana River	$210,491	27	$7,796	5	$42,098
16A	North IRL	$210,547	27	$7,798	3	$70,182
CC-B8C	Banana River	$210,730	27	$7,805	5	$42,146
2016	Central IRL	$210,839	27	$7,809	5	$42,168
2252	Central IRL	$210,878	27	$7,810	3	$70,293
IHB-92	Banana River	$211,321	27	$7,827	5	$42,264
1696	Central IRL	$211,618	27	$7,838	3	$70,539
975A	Banana River	$212,320	27	$7,864	4	$53,080
1628	Central IRL	$212,653	27	$7,876	4	$53,163
SJR-25	North IRL	$212,801	27	$7,882	4	$53,200
1345	North IRL	$213,732	27	$7,916	4	$53,433
TV-Riveredge Basin	North IRL	$213,843	27	$7,920	4	$53,461
951A	Banana River	$214,169	27	$7,932	4	$53,542
2291	Central IRL	$216,824	27	$8,031	4	$54,206
151	North IRL	$209,969	26	$8,076	4	$52,492
SJR-70	North IRL	$211,916	26	$8,151	5	$42,383
IHB-65	Banana River	$211,978	26	$8,153	4	$52,995
800	North IRL	$211,981	26	$8,153	3	$70,660
1840	Central IRL	$212,079	26	$8,157	3	$70,693
SB-GS-4	Banana River	$212,129	26	$8,159	4	$53,032
IHB-38	Banana River	$212,224	26	$8,162	4	$53,056
IHB-64	Banana River	$213,237	26	$8,201	4	$53,309
1236	North IRL	$213,919	26	$8,228	4	$53,480
IHB-90	Banana River	$214,334	26	$8,244	4	$53,583
CC-B4C	Banana River	$210,082	25	$8,403	4	$52,520
1484	Central IRL	$210,669	25	$8,427	4	$52,667
1093	Banana River	$211,038	25	$8,442	3	$70,346
SB-WS-7	Banana River	$211,544	25	$8,462	4	$52,886
IHB-62	Banana River	$211,726	25	$8,469	4	$52,932
1253A	North IRL	$212,004	25	$8,480	4	$53,001
IHB-46	Banana River	$213,277	25	$8,531	4	$53,319
990C	Banana River	$210,220	24	$8,759	3	$70,073
1011E	Banana River	$211,116	24	$8,796	3	$70,372
IHB-39	Banana River	$211,806	24	$8,825	4	$52,951
1948	Central IRL	$209,189	23	$9,095	2	$104,594
SJR-86	Banana River	$210,221	23	$9,140	4	$52,555
SJR-75	Banana River	$211,009	23	$9,174	4	$52,752
SB-GS-2	Banana River	$211,226	23	$9,184	3	$70,409
SJR-56	North IRL	$211,273	23	$9,186	3	$70,424
1109	Banana River	$211,302	23	$9,187	3	$70,434
SB-GS-19	Banana River	$211,378	23	$9,190	4	$52,845

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
IHB-68A	Banana River	$211,384	23	$9,191	4	$52,846
1653	Central IRL	$211,549	23	$9,198	4	$52,887
2007	Central IRL	$211,551	23	$9,198	3	$70,517
CO-2L	North IRL	$211,824	23	$9,210	3	$70,608
IHB-19A	Banana River	$211,826	23	$9,210	3	$70,609
2029	Central IRL	$211,882	23	$9,212	4	$52,970
1957	Central IRL	$211,939	23	$9,215	3	$70,646
1477	Central IRL	$212,274	23	$9,229	3	$70,758
RL-3C	North IRL	$212,408	23	$9,235	3	$70,803
CO-1F	North IRL	$214,085	23	$9,308	3	$71,362
1197	North IRL	$264,326	28	$9,440	4	$66,082
CO-6J	North IRL	$210,452	22	$9,566	3	$70,151
SB-WS-14	Banana River	$210,627	22	$9,574	3	$70,209
1734B	Central IRL	$210,800	22	$9,582	3	$70,267
IHB-91	Banana River	$211,126	22	$9,597	3	$70,375
1214	North IRL	$314,082	32	$9,815	4	$78,520
CC-B4E	Banana River	$208,162	21	$9,912	3	$69,387
IHB-48B	Banana River	$209,889	21	$9,995	4	$52,472
191	North IRL	$210,014	21	$10,001	2	$105,007
970J	Banana River	$210,664	21	$10,032	3	$70,221
SB-WS-13	Banana River	$210,735	21	$10,035	3	$70,245
SB-GS-3	Banana River	$210,799	21	$10,038	3	$70,266
SB-WS-8	Banana River	$210,811	21	$10,039	3	$70,270
IHB-89	Banana River	$211,027	21	$10,049	3	$70,342
1666	Central IRL	$211,160	21	$10,055	2	$105,580
IHB-57A	Banana River	$211,185	21	$10,056	4	$52,796
IHB-58	Banana River	$211,674	21	$10,080	4	$52,918
997C	Banana River	$208,335	20	$10,417	3	$69,445
TV-Commons Basin	North IRL	$209,307	20	$10,465	3	$69,769
2268	Central IRL	$209,736	20	$10,487	3	$69,912
1533	Central IRL	$209,872	20	$10,494	3	$69,957
SJR-85	North IRL	$209,931	20	$10,497	3	$69,977
IHB-69	Banana River	$210,305	20	$10,515	3	$70,102
CO-6L	North IRL	$210,359	20	$10,518	3	$70,120
SB-WS-11	Banana River	$210,465	20	$10,523	3	$70,155
SB-R-2	Banana River	$210,514	20	$10,526	3	$70,171
IHB-81	Banana River	$210,581	20	$10,529	3	$70,194
2027	Central IRL	$211,047	20	$10,552	3	$70,349
SB-C-2	Banana River	$211,116	20	$10,556	3	$70,372
RL-3G	North IRL	$212,377	20	$10,619	3	$70,792
IHB-19B	Banana River	$212,998	20	$10,650	3	$70,999
60	North IRL	$208,757	19	$10,987	6	$34,793
2156	Central IRL	$208,974	19	$10,999	1	$208,974
1208	Banana River	$209,357	19	$11,019	2	$104,678
1191	Banana River	$209,408	19	$11,021	2	$104,704
228A	North IRL	$209,546	19	$11,029	3	$69,849
1055	Banana River	$209,649	19	$11,034	2	$104,825
IHB-74	Banana River	$209,802	19	$11,042	3	$69,934

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
SB-WS-3	Banana River	$210,062	19	$11,056	3	$70,021
1560	Central IRL	$210,104	19	$11,058	3	$70,035
SB-WS-25	Banana River	$210,183	19	$11,062	3	$70,061
IHB-66	Banana River	$210,191	19	$11,063	3	$70,064
SB-WS-26	Banana River	$210,231	19	$11,065	3	$70,077
2074	Central IRL	$211,229	19	$11,117	2	$105,614
SB-N-4	Banana River	$211,681	19	$11,141	3	$70,560
SB-GS-8	Banana River	$208,271	18	$11,571	3	$69,424
SB-C-1	Banana River	$208,364	18	$11,576	3	$69,455
CC-B8B	Banana River	$208,787	18	$11,599	3	$69,596
1173	Banana River	$209,272	18	$11,626	3	$69,757
CO-6B	North IRL	$209,321	18	$11,629	3	$69,774
IHB-72	Banana River	$209,502	18	$11,639	3	$69,834
RL-1B	North IRL	$209,505	18	$11,639	3	$69,835
1427	Central IRL	$209,576	18	$11,643	3	$69,859
SB-WS-23	Banana River	$209,599	18	$11,644	3	$69,866
IHB-27	Banana River	$209,817	18	$11,657	3	$69,939
CO-9B	North IRL	$209,891	18	$11,661	3	$69,964
IHB-63	Banana River	$210,001	18	$11,667	3	$70,000
IHB-10	Banana River	$210,129	18	$11,674	3	$70,043
IHB-22	Banana River	$210,185	18	$11,677	3	$70,062
SB-C-6	Banana River	$210,217	18	$11,679	3	$70,072
2180	Central IRL	$210,446	18	$11,691	2	$105,223
2086	Central IRL	$211,296	18	$11,739	2	$105,648
1795B	Central IRL	$211,547	18	$11,753	3	$70,516
IHB-57B	Banana River	$212,176	18	$11,788	3	$70,725
1405	North IRL	$212,319	18	$11,795	3	$70,773
996	Banana River	$218,280	18	$12,127	3	$72,760
SJR-95	North IRL	$208,259	17	$12,251	3	$69,420
884B	North IRL	$209,257	17	$12,309	3	$69,752
SJR-49	North IRL	$209,265	17	$12,310	3	$69,755
770B	Banana River	$209,540	17	$12,326	3	$69,847
SB-R-9	Banana River	$209,574	17	$12,328	2	$104,787
SJR-45	North IRL	$209,626	17	$12,331	2	$104,813
IHB-75	Banana River	$209,645	17	$12,332	3	$69,882
SB-R-5	Banana River	$209,670	17	$12,334	2	$104,835
SB-GS-15	Banana River	$209,706	17	$12,336	3	$69,902
SB-R-6	Banana River	$209,712	17	$12,336	3	$69,904
SB-R-7	Banana River	$209,741	17	$12,338	3	$69,914
1779	Central IRL	$209,847	17	$12,344	3	$69,949
234	North IRL	$210,177	17	$12,363	2	$105,089
2019	Central IRL	$211,367	17	$12,433	2	$105,683
CC-B5E	Banana River	$211,786	17	$12,458	2	$105,893
IHB-41	Banana River	$211,789	17	$12,458	2	$105,895
CO-6P	North IRL	$207,061	16	$12,941	2	$103,530
836	North IRL	$208,543	16	$13,034	3	$69,514
CC-B10D	Banana River	$208,893	16	$13,056	2	$104,446
SB-R-11	Banana River	$209,393	16	$13,087	2	$104,697
SB-R-8	Banana River	$209,393	16	$13,087	2	$104,697
SB-R-4	Banana River	$209,445	16	$13,090	2	$104,723

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
SJR-94	Banana River	$209,527	16	$13,095	3	$69,842
SB-GS-5	Banana River	$209,536	16	$13,096	2	$104,768
IHB-7B	Banana River	$209,706	16	$13,107	3	$69,902
CO-6A	North IRL	$209,724	16	$13,108	2	$104,862
2078	Central IRL	$210,306	16	$13,144	2	$105,153
1010A	Banana River	$210,762	16	$13,173	2	$105,381
IHB-76	Banana River	$210,785	16	$13,174	2	$105,392
TV-Washington-Marina Basin	North IRL	$211,175	16	$13,198	2	$105,587
TV-Kennedy Point Park Basin	North IRL	$211,472	16	$13,217	2	$105,736
CO-6G	North IRL	$207,252	15	$13,817	2	$103,626
106	North IRL	$207,320	15	$13,821	1	$207,320
SJR-108	Central IRL	$208,068	15	$13,871	3	$69,356
SB-WS-27	Banana River	$208,279	15	$13,885	3	$69,426
SJR-81	North IRL	$208,414	15	$13,894	2	$104,207
1104	Banana River	$208,417	15	$13,894	1	$208,417
1110	Banana River	$208,522	15	$13,901	1	$208,522
1156	Banana River	$208,536	15	$13,902	1	$208,536
IHB-70	Banana River	$208,635	15	$13,909	2	$104,317
IHB-7C	Banana River	$208,748	15	$13,917	2	$104,374
SB-P-2	Banana River	$208,820	15	$13,921	2	$104,410
RL-4F	North IRL	$208,921	15	$13,928	2	$104,460
SB-TIB-2	Banana River	$209,168	15	$13,945	2	$104,584
SB-R-10	Banana River	$209,178	15	$13,945	2	$104,589
997D	Banana River	$209,182	15	$13,945	2	$104,591
1420	North IRL	$209,196	15	$13,946	2	$104,598
SB-R-12	Banana River	$209,198	15	$13,947	2	$104,599
SB-D-8	Banana River	$209,219	15	$13,948	2	$104,609
IHB-73	Banana River	$209,243	15	$13,950	2	$104,621
SB-R-3	Banana River	$209,271	15	$13,951	2	$104,635
SJR-19	North IRL	$209,603	15	$13,974	2	$104,801
1030	North IRL	$210,507	15	$14,034	2	$105,253
1514	Central IRL	$210,878	15	$14,059	2	$105,439
1338	Banana River	$259,974	18	$14,443	3	$86,658
SJR-104	Central IRL	$207,507	14	$14,822	1	$207,507
1143	Banana River	$208,245	14	$14,875	1	$208,245
SJR-92	Banana River	$208,321	14	$14,880	3	$69,440
SJR-83	North IRL	$208,617	14	$14,901	2	$104,309
SJR-52	North IRL	$208,739	14	$14,910	2	$104,370
SB-WS-16	Banana River	$208,742	14	$14,910	2	$104,371
IHB-28	Banana River	$208,770	14	$14,912	2	$104,385
SB-WS-18	Banana River	$208,790	14	$14,914	2	$104,395
SB-WS-15	Banana River	$208,794	14	$14,914	2	$104,397
79A	North IRL	$208,807	14	$14,915	1	$208,807
SB-WS-4	Banana River	$208,809	14	$14,915	2	$104,405
IHB-85	Banana River	$208,867	14	$14,919	2	$104,434
IHB-8	Banana River	$208,978	14	$14,927	2	$104,489

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1249A	North IRL	$208,985	14	$14,928	2	$104,493
SJR-42	North IRL	$208,989	14	$14,928	2	$104,494
RL-4C	North IRL	$209,124	14	$14,937	2	$104,562
TV-Somerset Riverfront Basin	North IRL	$209,256	14	$14,947	2	$104,628
2083	Central IRL	$209,346	14	$14,953	2	$104,673
CO-8B	North IRL	$209,621	14	$14,973	2	$104,811
2244	Central IRL	$210,563	14	$15,040	2	$105,281
1981	Central IRL	$210,608	14	$15,043	2	$105,304
SB-GS-20	Banana River	$207,284	13	$15,945	2	$103,642
IHB-93	Banana River	$207,509	13	$15,962	2	$103,755
990A	Banana River	$207,725	13	$15,979	1	$207,725
SB-WS-28	Banana River	$207,737	13	$15,980	2	$103,868
SB-WS-12	Banana River	$207,799	13	$15,985	2	$103,899
SB-WS-30	Banana River	$208,195	13	$16,015	2	$104,097
1358	Banana River	$208,432	13	$16,033	2	$104,216
SB-WS-20	Banana River	$208,536	13	$16,041	2	$104,268
998A	Banana River	$208,557	13	$16,043	2	$104,279
SB-WS-22	Banana River	$208,571	13	$16,044	2	$104,286
SJR-51	North IRL	$208,658	13	$16,051	2	$104,329
1852	Central IRL	$208,738	13	$16,057	2	$104,369
1136	Banana River	$208,741	13	$16,057	1	$208,741
970I	Banana River	$208,846	13	$16,065	1	$208,846
SB-WS-24	Banana River	$207,576	12	$17,298	2	$103,788
1160	Banana River	$207,635	12	$17,303	1	$207,635
1051	Banana River	$207,818	12	$17,318	1	$207,818
964A	Banana River	$208,154	12	$17,346	2	$104,077
IHB-60	Banana River	$208,228	12	$17,352	2	$104,114
IHB-86	Banana River	$208,274	12	$17,356	2	$104,137
IHB-4	Banana River	$208,510	12	$17,376	2	$104,255
SB-J-1	Banana River	$208,516	12	$17,376	2	$104,258
CO-2F	North IRL	$208,689	12	$17,391	2	$104,345
1352A	North IRL	$208,946	12	$17,412	2	$104,473
SJR-106	Central IRL	$208,976	12	$17,415	2	$104,488
44	North IRL	$206,697	11	$18,791	1	$206,697
SJR-121	Central IRL	$207,075	11	$18,825	1	$207,075
SB-GS-9	Banana River	$207,126	11	$18,830	2	$103,563
2280	Central IRL	$207,414	11	$18,856	1	$207,414
CC-B6A	Banana River	$207,519	11	$18,865	2	$103,759
SB-WS-6	Banana River	$207,575	11	$18,870	2	$103,787
1185	Banana River	$207,617	11	$18,874	1	$207,617
SB-SD-4	Banana River	$207,808	11	$18,892	2	$103,904
46B	North IRL	$207,989	11	$18,908	2	$103,994
IHB-12	Banana River	$208,080	11	$18,916	2	$104,040
IHB-44B	Banana River	$208,572	11	$18,961	1	$208,572
IHB-82	Banana River	$209,052	11	$19,005	2	$104,526
TV-Mount Vernon Basin	North IRL	$206,874	10	$20,687	1	$206,874

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20	North IRL	$207,060	10	$20,706	1	$207,060
CC-B8D	Banana River	$207,124	10	$20,712	2	$103,562
SJR-67	North IRL	$207,247	10	$20,725	2	$103,623
TV-Riverside Basin	North IRL	$207,522	10	$20,752	2	$103,761
1116	Banana River	$207,536	10	$20,754	1	$207,536
1547	Central IRL	$207,634	10	$20,763	1	$207,634
SJR-18	North IRL	$207,671	10	$20,767	1	$207,671
SB-SD-1	Banana River	$207,731	10	$20,773	2	$103,865
1586	Central IRL	$207,973	10	$20,797	1	$207,973
1009	Banana River	$208,095	10	$20,810	1	$208,095
SJR-17	North IRL	$208,294	10	$20,829	1	$208,294
1531	Central IRL	$208,494	10	$20,849	1	$208,494
722	North IRL	$454,536	20	$22,727	3	$151,512
SB-WS-2	Banana River	$206,373	9	$22,930	1	$206,373
1794	Central IRL	$206,903	9	$22,989	1	$206,903
1513	Central IRL	$207,105	9	$23,012	1	$207,105
1199	Banana River	$207,165	9	$23,018	1	$207,165
SJR-87	North IRL	$207,222	9	$23,025	1	$207,222
1011C	Banana River	$207,309	9	$23,034	1	$207,309
SB-WS-17	Banana River	$207,407	9	$23,045	1	$207,407
1791	Central IRL	$207,487	9	$23,054	1	$207,487
1577	Central IRL	$207,498	9	$23,055	1	$207,498
RL-1H	North IRL	$207,504	9	$23,056	1	$207,504
1879	Central IRL	$207,507	9	$23,056	1	$207,507
SB-D-7	Banana River	$207,517	9	$23,057	1	$207,517
IHB-84	Banana River	$207,579	9	$23,064	1	$207,579
1690	Central IRL	$207,767	9	$23,085	1	$207,767
CC-B4D	Banana River	$207,992	9	$23,110	1	$207,992
1816	Central IRL	$208,018	9	$23,113	1	$208,018
2279	Central IRL	$208,063	9	$23,118	1	$208,063
SJR-55	North IRL	$208,088	9	$23,121	1	$208,088
IHB-3	Banana River	$208,110	9	$23,123	1	$208,110
SJR-65	North IRL	$208,269	9	$23,141	1	$208,269
IHB-77	Banana River	$208,797	9	$23,200	1	$208,797
170	North IRL	$205,908	8	$25,739	0	Not applicable
151A	North IRL	$206,234	8	$25,779	1	$206,234
CC-B13B	Banana River	$206,431	8	$25,804	1	$206,431
SJR-105	Central IRL	$206,491	8	$25,811	1	$206,491
1487	Central IRL	$206,665	8	$25,833	1	$206,665
SB-WS-10	Banana River	$206,676	8	$25,834	1	$206,676
1091	Banana River	$206,692	8	$25,836	1	$206,692
SJR-109	Central IRL	$206,710	8	$25,839	1	$206,710
1090	Banana River	$206,805	8	$25,851	1	$206,805
1192	Banana River	$206,958	8	$25,870	1	$206,958
CO-2C	North IRL	$207,113	8	$25,889	1	$207,113
1975	Central IRL	$207,137	8	$25,892	1	$207,137
1394	North IRL	$207,166	8	$25,896	1	$207,166
2056	Central IRL	$207,255	8	$25,907	1	$207,255
RL-1U	North IRL	$207,316	8	$25,914	1	$207,316

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
IHB-51	Banana River	$207,356	8	$25,920	1	$207,356
SJR-84	North IRL	$207,394	8	$25,924	1	$207,394
IHB-49	Banana River	$207,405	8	$25,926	1	$207,405
1680	Central IRL	$207,643	8	$25,955	1	$207,643
CO-1C	North IRL	$207,974	8	$25,997	1	$207,974
214	North IRL	$206,343	7	$29,478	0	Not applicable
693	North IRL	$206,482	7	$29,497	0	Not applicable
CC-B13C	Banana River	$206,505	7	$29,501	1	$206,505
1237	Banana River	$206,637	7	$29,520	1	$206,637
1179	Banana River	$206,662	7	$29,523	1	$206,662
1201	Banana River	$206,700	7	$29,529	1	$206,700
IHB-87	Banana River	$206,796	7	$29,542	1	$206,796
SJR-114	Central IRL	$206,878	7	$29,554	1	$206,878
2257	Central IRL	$207,165	7	$29,595	1	$207,165
RL-1E	North IRL	$207,322	7	$29,617	1	$207,322
IHB-29	Banana River	$207,356	7	$29,622	1	$207,356
2266	Central IRL	$207,410	7	$29,630	1	$207,410
SJR-93	North IRL	$207,468	7	$29,638	1	$207,468
2242	Central IRL	$208,164	7	$29,738	1	$208,164
988	Banana River	$288,232	9	$32,026	1	$288,232
109	North IRL	$205,909	6	$34,318	0	Not applicable
CC-B4I	Banana River	$205,985	6	$34,331	1	$205,985
999	Banana River	$206,256	6	$34,376	1	$206,256
1207	Banana River	$206,362	6	$34,394	0	Not applicable
1053	Banana River	$206,390	6	$34,398	0	Not applicable
2200	Central IRL	$206,406	6	$34,401	0	Not applicable
1209	Banana River	$206,502	6	$34,417	0	Not applicable
SB-GS-6	Banana River	$206,578	6	$34,430	1	$206,578
1365	Banana River	$206,648	6	$34,441	1	$206,648
SJR-88	North IRL	$206,708	6	$34,451	0	Not applicable
IHB-67	Banana River	$206,737	6	$34,456	1	$206,737
SJR-111	Central IRL	$206,857	6	$34,476	1	$206,857
1421	North IRL	$207,000	6	$34,500	1	$207,000
SJR-82	North IRL	$207,176	6	$34,529	1	$207,176
SJR-48	North IRL	$205,534	5	$41,107	0	Not applicable
CO-1K	North IRL	$205,821	5	$41,164	1	$205,821
213	North IRL	$205,863	5	$41,173	0	Not applicable
CO-2A2	North IRL	$205,870	5	$41,174	0	Not applicable
24	North IRL	$205,927	5	$41,185	0	Not applicable
1206	Banana River	$206,017	5	$41,203	0	Not applicable
SJR-113	Central IRL	$206,079	5	$41,216	1	$206,079
1137	Banana River	$206,091	5	$41,218	0	Not applicable
2143	Central IRL	$206,094	5	$41,219	0	Not applicable
SJR-78	Banana River	$206,148	5	$41,230	1	$206,148
SJR-36	North IRL	$206,215	5	$41,243	0	Not applicable
1211	Banana River	$206,216	5	$41,243	0	Not applicable
SJR-6	North IRL	$206,291	5	$41,258	0	Not applicable
1049	Banana River	$206,313	5	$41,263	0	Not applicable
1901	Central IRL	$206,330	5	$41,266	0	Not applicable
1683	Central IRL	$206,348	5	$41,270	0	Not applicable

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
799	North IRL	$206,348	5	$41,270	0	Not applicable
1550	Central IRL	$206,355	5	$41,271	1	$206,355
SJR-38	North IRL	$206,395	5	$41,279	1	$206,395
SJR-41	North IRL	$206,401	5	$41,280	0	Not applicable
1734A	Central IRL	$206,448	5	$41,290	1	$206,448
1868	Central IRL	$206,453	5	$41,291	1	$206,453
SJR-61	North IRL	$206,462	5	$41,292	1	$206,462
2052	Central IRL	$206,492	5	$41,298	1	$206,492
CC-B10C	Banana River	$206,579	5	$41,316	1	$206,579
70	North IRL	$206,612	5	$41,322	5	$41,322
SB-C-4	Banana River	$206,615	5	$41,323	0	Not applicable
RL-1Y	North IRL	$206,650	5	$41,330	0	Not applicable
TV-Powerplant Basin	North IRL	$206,782	5	$41,356	0	Not applicable
TV-Harrison-Washington Basin	North IRL	$206,854	5	$41,371	1	$206,854
1189	Banana River	$207,006	5	$41,401	1	$207,006
2010	Central IRL	$207,051	5	$41,410	1	$207,051
SJR-122	Central IRL	$205,624	4	$51,406	0	Not applicable
2137	Central IRL	$205,748	4	$51,437	0	Not applicable
SJR-28	North IRL	$205,773	4	$51,443	0	Not applicable
1161	Banana River	$205,793	4	$51,448	0	Not applicable
IHB-71	Banana River	$205,830	4	$51,457	0	Not applicable
1793	Central IRL	$205,831	4	$51,458	0	Not applicable
1106	Banana River	$205,873	4	$51,468	0	Not applicable
1218	Banana River	$205,962	4	$51,490	0	Not applicable
1177	Banana River	$205,962	4	$51,491	0	Not applicable
888	North IRL	$206,029	4	$51,507	0	Not applicable
SJR-43	North IRL	$206,040	4	$51,510	0	Not applicable
919	North IRL	$206,116	4	$51,529	0	Not applicable
1687	Central IRL	$206,136	4	$51,534	0	Not applicable
2128	Central IRL	$206,164	4	$51,541	0	Not applicable
2140	Central IRL	$206,239	4	$51,560	0	Not applicable
1919	Central IRL	$206,469	4	$51,617	0	Not applicable
798	North IRL	$205,524	3	$68,508	0	Not applicable
1045	Banana River	$205,608	3	$68,536	0	Not applicable
1166	Banana River	$205,645	3	$68,548	0	Not applicable
1052	Banana River	$205,645	3	$68,548	0	Not applicable
86	North IRL	$205,656	3	$68,552	0	Not applicable
1212	Banana River	$205,670	3	$68,557	0	Not applicable
1196	Banana River	$205,688	3	$68,563	0	Not applicable
1138	Banana River	$205,701	3	$68,567	0	Not applicable
1102	Banana River	$205,704	3	$68,568	0	Not applicable
1343	Banana River	$274,287	4	$68,572	0	Not applicable
TV-S. Washington East Basin	North IRL	$205,756	3	$68,585	0	Not applicable
1280A	Banana River	$205,774	3	$68,591	0	Not applicable
SJR-34	North IRL	$205,774	3	$68,591	0	Not applicable

Basin	Sub-Lagoon	Estimated Cost	Annual Total Nitrogen Reductions (pounds per year)	Cost per year Pound per Year of Total Nitrogen Removed	Annual Total Phosphorus Reductions (pounds per year)	Cost per Pound per Year of Total Phosphorus Removed
1988	Central IRL	$205,781	3	$68,594	0	Not applicable
SJR-116	Central IRL	$205,790	3	$68,597	0	Not applicable
IHB-Ret	Banana River	$205,800	3	$68,600	0	Not applicable
CO-6O	North IRL	$205,813	3	$68,604	0	Not applicable
SJR-20	North IRL	$205,817	3	$68,606	0	Not applicable
1114	Banana River	$205,830	3	$68,610	0	Not applicable
SJR-39	North IRL	$205,844	3	$68,615	0	Not applicable
SJR-46	North IRL	$205,873	3	$68,624	0	Not applicable
IHB-68B	Banana River	$205,898	3	$68,633	0	Not applicable
1639	Central IRL	$206,063	3	$68,688	0	Not applicable
SJR-24	North IRL	$206,140	3	$68,713	0	Not applicable
SJR-23	North IRL	$206,442	3	$68,814	0	Not applicable
1194	Banana River	$205,372	2	$102,686	0	Not applicable
2223	Central IRL	$205,437	2	$102,718	0	Not applicable
712	North IRL	$205,568	2	$102,784	0	Not applicable
SJR-110	Central IRL	$205,670	2	$102,835	0	Not applicable
SJR-27	North IRL	$205,684	2	$102,842	0	Not applicable
SJR-118	Central IRL	$205,724	2	$102,862	0	Not applicable
SJR-63	North IRL	$205,765	2	$102,882	0	Not applicable
1308B	Banana River	$205,210	1	$205,210	0	Not applicable
1243	Banana River	$205,244	1	$205,244	0	Not applicable
1795A	Central IRL	$205,263	1	$205,263	0	Not applicable
1042	Banana River	$205,360	1	$205,360	0	Not applicable
2235	Central IRL	$205,555	1	$205,555	0	Not applicable
CO-2H	North IRL	$206,520	1	$206,520	0	Not applicable
1215	North IRL	$1,291,630	6	$215,272	1	$1,291,630
1337	Banana River	$267,190	1	$267,190	0	Not applicable
2226	Central IRL	$205,000	0	Not applicable	0	Not applicable
1200	Banana River	$205,112	0	Not applicable	0	Not applicable
CO-2S	North IRL	$205,151	0	Not applicable	0	Not applicable
Total	**-**	**$510,090,769**	**568,932**	**$897 (average)**	**77,579**	**$6,575 (average)**

Table D-6. Unfunded Muck Dredging and Interstitial Treatment Projects

Sub-Lagoon	Indian River Lagoon Muck Sites	Dredging Cost (2025 Estimate)	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Interstitial Water Treatment Cost (2024 Estimate)	Total Cost (2025 Estimate)
Central IRL	Mullet Creek Islands Area*	$35,739,882	55,875	$640	861	$41,510	$2,078,488	$37,818,370
North IRL	National Aeronautics and Space Administration Causeway to 528^	$64,637,500	95,643	$676	4,589	$14,085	$3,800,000	$68,437,500
North IRL	Pineda to Eau Gallie ^	$118,353,289	69,153	$1,711	4,662	$25,387	$7,000,000	$125,353,289
North IRL	520 to Pineda ^	$121,710,526	69,776	$1,744	4,704	$25,874	$7,200,000	$128,910,526
Banana	Banana Venetian Collector Canals/Channels^	$457,434,211	252,672	$1,810	11,054	$41,380	$27,200,000	$484,634,211
North IRL	North IRL Venetian Canals/Channels^	$52,551,447	29,232	$1,798	1,827	$28,764	$3,080,000	$55,631,447
Banana	Mathers Bridge Area^	$47,851,316	25,200	$1,899	1,575	$30,382	$2,800,000	$50,651,316
Banana	Cocoa Beach High School^	$27,036,447	13,776	$1,963	861	$31,401	$1,560,000	$28,596,447
Central IRL	Central IRL Venetian Collector Canals/Channels^	$25,022,105	12,432	$2,013	777	$32,203	$1,440,000	$26,462,105
Banana	National Aeronautics and Space Administration Area*	$376,860,526	151,307	$2,491	22,995	$16,389	$22,400,000	$399,260,526
Banana	Patrick Space Force Base Borrow Pit-4^	$6,221,579	1,215	$5,121	44	$141,400	$120,000	$6,341,579
Banana	Kent Drive ^	$7,564,474	2,836	$2,667	182	$41,563	$400,000	$7,964,474
Banana	Newfound Harbor South^	$18,979,079	6,679	$2,842	365	$51,997	$1,080,000	$20,059,079
Banana	Brightwaters^	$32,408,026	11,054	$2,932	604	$53,656	$1,880,000	$34,288,026
Banana	Newfound Harbor North^	$12,936,053	4,376	$2,956	239	$54,126	$720,000	$13,656,053
North IRL	Max Brewer Causeway^	$11,593,158	3,915	$2,961	214	$54,174	$640,000	$12,233,158
Banana	Sunset Café^	$15,621,842	5,067	$3,083	277	$56,397	$880,000	$16,501,842
Banana	528 East^	$5,550,132	1,842.0	$3,013	196	$28,317	$280,000	$5,830,132
Banana	Cape Canaveral Hospital^	$8,907,368	2,764	$3,223	151	$58,989	$480,000	$9,387,368
Banana	520 Borrow Pit-1^	$6,221,579	1,842	$3,378	101	$61,600	$320,000	$6,541,579
Banana	520 Borrow Pit-4^	$6,221,579	1,842	$3,378	101	$61,600	$320,000	$6,541,579
Banana	520 Borrow Pit-5^	$4,878,684	1,382	$3,530	76	$64,193	$240,000	$5,118,684
North IRL	National Aeronautics and Space Administration Causeway West*	$17,636,184	4,673	$3,774	193	$91,379	$1,000,000	$18,636,184
Central IRL	Melbourne Causeway North^	$4,207,237	1,152	$3,652	63	$66,782	$200,000	$4,407,237
Central IRL	Front St Park^	$4,207,237	1,152	$3,652	63	$66,782	$200,000	$4,407,237
Banana	520 Borrow Pit-2^	$3,535,789	921	$3,839	50	$70,716	$160,000	$3,695,789
Banana	520 Borrow Pit-7^	$3,535,789	921	$3,839	50	$70,716	$160,000	$3,695,789

Sub-Lagoon	Indian River Lagoon Muck Sites	Dredging Cost (2025 Estimate)	Total Nitrogen Reduction (pounds per year)	Cost per Pound of Total Nitrogen Removed	Total Phosphorus Reduction (pounds per year)	Cost per Pound of Total Phosphorus Removed	Interstitial Water Treatment Cost (2024 Estimate)	Total Cost (2025 Estimate)
North IRL	Warwick Dr^	$3,535,789	921	$3,839	50	$70,716	$160,000	$3,695,789
North IRL	Crab Shack^	$3,535,789	921	$3,839	50	$70,716	$160,000	$3,695,789
North IRL	Pineda*	$20,993,421	4,610	$4,554	492	$42,661	$1,200,000	$22,193,421
Central IRL	Turkey Creek*	$19,650,526	4,298	$4,572	140	$140,361	$1,120,000	$20,770,526
Banana	520 Borrow Pit-3^	$2,864,342	691	$4,145	38	$75,377	$120,000	$2,984,342
Banana	520 Borrow Pit-6^	$2,864,342	691	$4,145	38	$75,377	$120,000	$2,984,342
North IRL	Cocoa South*	$20,993,421	4,368	$4,806	182	$115,348	$1,200,000	$22,193,421
Banana	Port Canaveral*	$36,436,711	5,285	$6,894	245	$148,721	$2,120,000	$38,556,711
North IRL	Rockledge A*	$114,324,605	14,015	$8,157	1,184	$96,525	$6,760,000	$121,084,605
Central IRL	Trout Creek^	$1,521,447	230	$6,615	13	$117,034	$40,000	$1,561,447
Central IRL	Goat Creek ^	$2,192,895	236	$9,308	98	$22,376	$80,000	$2,272,895
North IRL	Cocoa 520-528^	$15,621,842	1,194	$13,084	40	$391,525	$880,000	$16,501,842
North IRL	Eau Gallie Northwest*	$74,306,342	5,422	$13,705	244	$305,034	$4,376,000	$78,682,342
Banana	Patrick Space Force Base Borrow Pit-2^	$18,979,079	921	$20,607	50	$379,582	$1,080,000	$20,059,079
North IRL	Eau Gallie South*	$103,532,895	4,610	$22,458	777	$133,247	$9,200,000	$46,094,241
-	***Total***	***$1,938,776,488***	***877,112***	***$2,210 (average)***	***60,516***	***$32,038 (average)***	***$116,254,488***	***$1,988,392,322***

*Flux rate from Fox and Trefry, 2022.
^Flux rate from Fox and Trefry, 2023.

Appendix E: Withdrawn Projects

Some of the projects submitted and approved as part of a plan update were determined to be less cost-effective and/or infeasible to implement after further investigation. Stormwater basin delineations were updated in 2019 with some basins merged or renamed in the 2020 Plan Update. Therefore, these projects were removed from the Save Our Indian River Lagoon Project Plan so that the funding could be used for other projects. **Table E-1** lists the projects that have been removed from the plan at the request of the responsible entity.

Table E-1: Summary of Project Withdrawals from the Plan

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2018	Holman Road Baffle Box	City of Cape Canaveral	Banana	71	2	$6,248
2018	Center Street Baffle Box	City of Cape Canaveral	Banana	297	9	$26,136
2018	International Drive Baffle Box	City of Cape Canaveral	Banana	443	4	$34,700
2018	Angel Isles Baffle Box	City of Cape Canaveral	Banana	131	3	$11,528
2018	Cherie Down Park Swale	City of Cape Canaveral	Banana	27	9	$2,376
2018	Norwood Baffle Box Retrofit	City of Palm Bay	Central IRL	1,631	254	$143,528
2018	Victoria Pond	City of Palm Bay	Central IRL	267	42	$23,486
2018	Goode Park	City of Palm Bay	Central IRL	794	121	$69,872
2018	Florin Pond	City of Palm Bay	Central IRL	75	11	$6,600
2018	Airport Boulevard Dry Retrofit	City of Melbourne	North IRL	99	23	$8,718
2018	National Aeronautics and Space Administration Boulevard Pond Retrofit	City of Melbourne	Central IRL	1,097	157	$96,532
2018	General Aviation Drive Retrofit	City of Melbourne	Central IRL	158	10	$13,937
2018	L-1 Canal Bank Stabilization	Brevard County	North IRL	995	383	$87,560
2018	Stormwater project in Basin 979	Brevard County	Banana	3,275	448	$225,000
2018	Stormwater project in Basin 1280	Brevard County	Banana	1,735	236	$175,000
2018	Stormwater project in Basin 1063	Brevard County	Banana	1,235	192	$100,000
2018	Stormwater project in Basin 970	Brevard County	Banana	1,092	185	$100,000
2018	Stormwater project in Basin 995	Brevard County	Banana	1,048	169	$100,000
2018	Stormwater project in Basin 754	Brevard County	Banana	734	95	$100,000
2018	Stormwater project in Basin 327	Brevard County	North IRL	1,999	283	$125,000
2018	Stormwater project in Basin 1582	Brevard County	Central IRL	2,402	443	$200,000
2019	Cocoa Beach Muck Dredging – Phase III Interstitial	City of Cocoa Beach	Banana	2,942	To be determined	$514,809

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2019	Indian River Drive Oyster Bar (reduction from 1,900 to 140 feet)	Brevard County	North IRL	422	10	$166,672
2019	Indian River Drive Planted Shoreline (reduction from 1,900 to 140 feet)	Brevard County	North IRL	118	41	$20,620
2019	Stormwater project in Basin 905	Brevard County	Banana	1,143	178	$150,000
2019	Stormwater project in Basin 492	Brevard County	Banana	1,020	117	$100,000
2019	Stormwater project in Basin 522	Brevard County	Banana	795	110	$125,000
2019	Stormwater project in Basin 705	Brevard County	Banana	650	95	$100,000
2019	Stormwater project in Basin 821	Brevard County	Banana	627	123	$100,000
2019	Stormwater project in Basin 820	Brevard County	Banana	597	112	$100,000
2019	Stormwater project in Basin 47	Brevard County	North IRL	1,348	139	$125,000
2019	Stormwater project in Basin 219	Brevard County	North IRL	956	113	$125,000
2020	Cape Canaveral Air Force Station Upgrade	Cape Canaveral Air Force Station	Banana	25,627	To be determined	$6,000,000
2020	Malabar - Zone B	Brevard County	Central IRL	1,929	Not applicable	$2,135,808
2020	Malabar - Zone A	Brevard County	Central IRL	11,456	Not applicable	$14,349,960
2020	South Beaches - Zone F	Brevard County	Central IRL	70	Not applicable	$100,116
2020	Carver Cove Swale	City of Cape Canaveral	Banana	32	9	$2,816
2020	Cocoa Palms Low Impact Development	City of Cape Canaveral	Banana	13	10	$1,144
2020	M1 Canal Biosorption Activated Media	Brevard County	Central IRL	1,433	191	$66,300
2020	Oliver Oyster Bar	Brevard Zoo	North IRL	116	39	$51,620
2020	Coconut Point/Environmentally Endangered Lands Oyster Bar (reduction from 27,125 square feet to 2,400 square feet)	Brevard Zoo	Central IRL	989	367	$464,830
2020	Turkey Creek Shoreline Restoration – Oysters	City of Palm Bay	Central IRL	309	8	$122,055
2020	Eden Isles Lane Oyster Bar	Brevard Zoo	Banana	49	17	$21,805
2020	Turkey Creek Shoreline Restoration – Planted	City of Palm Bay	Central IRL	104	36	$24,960
2020	Stormwater project in Basin 388	Brevard County	Banana	1,390	138	$100,000
2020	Stormwater project in Basin 451	Brevard County	Banana	1,168	121	$100,000
2020	Stormwater project in Basin 815	Brevard County	Banana	698	113	$100,000
2020	Stormwater project in Basin 829	Brevard County	Banana	630	145	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 865	Brevard County	Banana	454	151	$100,000
2020	Stormwater project in Basin 889	Brevard County	Banana	539	85	$100,000
2020	Stormwater project in Basin 901	Brevard County	Banana	1,658	196	$150,000
2020	Stormwater project in Basin 912	Brevard County	Banana	1,025	34	$100,000
2020	Stormwater project in Basin 929	Brevard County	Banana	304	41	$100,000
2020	Stormwater project in Basin 933	Brevard County	Banana	302	38	$100,000
2020	Stormwater project in Basin 934	Brevard County	Banana	365	42	$100,000
2020	Stormwater project in Basin 938	Brevard County	Banana	424	160	$100,000
2020	Stormwater project in Basin 940	Brevard County	Banana	816	106	$100,000
2020	Stormwater project in Basin 943	Brevard County	Banana	708	90	$100,000
2020	Stormwater project in Basin 944	Brevard County	Banana	614	83	$100,000
2020	Stormwater project in Basin 955	Brevard County	Banana	522	60	$100,000
2020	Stormwater project in Basin 957	Brevard County	Banana	586	53	$100,000
2020	Stormwater project in Basin 958	Brevard County	Banana	164	26	$100,000
2020	Stormwater project in Basin 960	Brevard County	Banana	537	80	$100,000
2020	Stormwater project in Basin 961	Brevard County	Banana	431	57	$100,000
2020	Stormwater project in Basin 963	Brevard County	Banana	2,092	396	$150,000
2020	Stormwater project in Basin 969	Brevard County	Banana	528	78	$100,000
2020	Stormwater project in Basin 973	Brevard County	Banana	2,048	311	$175,000
2020	Stormwater project in Basin 975	Brevard County	Banana	521	75	$100,000
2020	Stormwater project in Basin 977	Brevard County	Banana	558	59	$100,000
2020	Stormwater project in Basin 980	Brevard County	Banana	836	127	$100,000
2020	Stormwater project in Basin 981	Brevard County	Banana	993	179	$100,000
2020	Stormwater project in Basin 982	Brevard County	Banana	642	68	$100,000
2020	Stormwater project in Basin 988	Brevard County	Banana	621	108	$100,000
2020	Stormwater project in Basin 989	Brevard County	Banana	1,030	110	$100,000
2020	Stormwater project in Basin 990	Brevard County	Banana	634	102	$100,000
2020	Stormwater project in Basin 992	Brevard County	Banana	1,244	195	$100,000
2020	Stormwater project in Basin 1000	Brevard County	Banana	277	40	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 1001	Brevard County	Banana	401	54	$100,000
2020	Stormwater project in Basin 1010	Brevard County	Banana	374	55	$100,000
2020	Stormwater project in Basin 1014	Brevard County	Banana	333	50	$100,000
2020	Stormwater project in Basin 1016	Brevard County	Banana	920	136	$100,000
2020	Stormwater project in Basin 1018	Brevard County	Banana	389	54	$100,000
2020	Stormwater project in Basin 1026	Brevard County	Banana	1,073	180	$100,000
2020	Stormwater project in Basin 1033	Brevard County	Banana	1,113	152	$100,000
2020	Stormwater project in Basin 1038	Brevard County	Banana	157	25	$100,000
2020	Stormwater project in Basin 1039	Brevard County	Banana	708	104	$100,000
2020	Stormwater project in Basin 1041	Brevard County	Banana	273	47	$100,000
2020	Stormwater project in Basin 1048	Brevard County	Banana	107	20	$100,000
2020	Stormwater project in Basin 1070	Brevard County	Banana	113	12	$100,000
2020	Stormwater project in Basin 1071	Brevard County	Banana	1,082	144	$100,000
2020	Stormwater project in Basin 1082	Brevard County	Banana	264	39	$100,000
2020	Stormwater project in Basin 1098	Brevard County	Banana	341	53	$100,000
2020	Stormwater project in Basin 1104	Brevard County	Banana	701	106	$100,000
2020	Stormwater project in Basin 1117	Brevard County	Banana	282	43	$100,000
2020	Stormwater project in Basin 1120	Brevard County	Banana	313	50	$100,000
2020	Stormwater project in Basin 1121	Brevard County	Banana	186	27	$100,000
2020	Stormwater project in Basin 1125	Brevard County	Banana	307	51	$100,000
2020	Stormwater project in Basin 1133	Brevard County	Banana	562	90	$100,000
2020	Stormwater project in Basin 1142	Brevard County	Banana	534	73	$100,000
2020	Stormwater project in Basin 1152	Brevard County	Banana	245	30	$100,000
2020	Stormwater project in Basin 1159	Brevard County	Banana	134	20	$100,000
2020	Stormwater project in Basin 1167	Brevard County	Banana	180	28	$100,000
2020	Stormwater project in Basin 1175	Brevard County	Banana	394	42	$100,000
2020	Stormwater project in Basin 1183	Brevard County	Banana	272	39	$100,000
2020	Stormwater project in Basin 1188	Brevard County	Banana	166	29	$100,000
2020	Stormwater project in Basin 1198	Brevard County	Banana	365	62	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 1220	Brevard County	Banana	396	61	$100,000
2020	Stormwater project in Basin 1223	Brevard County	Banana	561	86	$100,000
2020	Stormwater project in Basin 1225	Brevard County	Banana	122	19	$100,000
2020	Stormwater project in Basin 1231	Brevard County	Banana	300	58	$100,000
2020	Stormwater project in Basin 1248	Brevard County	Banana	306	46	$100,000
2020	Stormwater project in Basin 1250	Brevard County	Banana	188	26	$100,000
2020	Stormwater project in Basin 1251	Brevard County	Banana	448	66	$100,000
2020	Stormwater project in Basin 1262	Brevard County	Banana	443	80	$100,000
2020	Stormwater project in Basin 1265	Brevard County	Banana	743	98	$100,000
2020	Stormwater project in Basin 1270	Brevard County	Banana	187	28	$100,000
2020	Stormwater project in Basin 1296	Brevard County	Banana	241	48	$100,000
2020	Stormwater project in Basin 1302	Brevard County	Banana	172	25	$100,000
2020	Stormwater project in Basin 1303	Brevard County	Banana	166	24	$100,000
2020	Stormwater project in Basin 1305	Brevard County	Banana	119	25	$100,000
2020	Stormwater project in Basin 1310	Brevard County	Banana	583	106	$100,000
2020	Stormwater project in Basin 1311	Brevard County	Banana	104	15	$100,000
2020	Stormwater project in Basin 1314	Brevard County	Banana	170	26	$100,000
2020	Stormwater project in Basin 1317	Brevard County	Banana	1,679	143	$125,000
2020	Stormwater project in Basin 1319	Brevard County	Banana	117	16	$100,000
2020	Stormwater project in Basin 1327	Brevard County	Banana	352	52	$100,000
2020	Stormwater project in Basin 1328	Brevard County	Banana	617	89	$100,000
2020	Stormwater project in Basin 1332	Brevard County	Banana	303	47	$100,000
2020	Stormwater project in Basin 1334	Brevard County	Banana	795	130	$100,000
2020	Stormwater project in Basin 1336	Brevard County	Banana	470	68	$100,000
2020	Stormwater project in Basin 1337	Brevard County	Banana	1,121	186	$100,000
2020	Stormwater project in Basin 1338	Brevard County	Banana	256	37	$100,000
2020	Stormwater project in Basin 1343	Brevard County	Banana	1,388	142	$100,000
2020	Stormwater project in Basin 1346	Brevard County	Banana	189	28	$100,000
2020	Stormwater project in Basin 1350	Brevard County	Banana	1,049	165	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 1351	Brevard County	Banana	129	19	$100,000
2020	Stormwater project in Basin 1357	Brevard County	Banana	338	56	$100,000
2020	Stormwater project in Basin 1362	Brevard County	Banana	476	71	$100,000
2020	Stormwater project in Basin 1366	Brevard County	Banana	1,483	242	$100,000
2020	Stormwater project in Basin 1371	Brevard County	Banana	273	39	$100,000
2020	Stormwater project in Basin 1372	Brevard County	Banana	720	113	$100,000
2020	Stormwater project in Basin 1378	Brevard County	Banana	744	104	$100,000
2020	Stormwater project in Basin 2421	Brevard County	Banana	343	49	$100,000
2020	Stormwater project in Basin 83	Brevard County	North IRL	452	61	$100,000
2020	Stormwater project in Basin 100	Brevard County	North IRL	888	115	$100,000
2020	Stormwater project in Basin 105	Brevard County	North IRL	549	72	$100,000
2020	Stormwater project in Basin 212	Brevard County	North IRL	693	89	$100,000
2020	Stormwater project in Basin 228	Brevard County	North IRL	684	131	$100,000
2020	Stormwater project in Basin 262	Brevard County	North IRL	794	126	$100,000
2020	Stormwater project in Basin 263	Brevard County	North IRL	469	65	$100,000
2020	Stormwater project in Basin 288	Brevard County	North IRL	732	78	$100,000
2020	Stormwater project in Basin 289	Brevard County	North IRL	1,112	223	$100,000
2020	Stormwater project in Basin 290	Brevard County	North IRL	1,116	193	$100,000
2020	Stormwater project in Basin 291	Brevard County	North IRL	485	82	$100,000
2020	Stormwater project in Basin 294	Brevard County	North IRL	551	84	$100,000
2020	Stormwater project in Basin 335	Brevard County	North IRL	1,187	206	$100,000
2020	Stormwater project in Basin 353	Brevard County	North IRL	497	86	$100,000
2020	Stormwater project in Basin 354	Brevard County	North IRL	555	115	$100,000
2020	Stormwater project in Basin 392	Brevard County	North IRL	840	155	$100,000
2020	Stormwater project in Basin 408	Brevard County	North IRL	1,179	170	$125,000
2020	Stormwater project in Basin 454	Brevard County	North IRL	1,996	302	$150,000
2020	Stormwater project in Basin 510	Brevard County	North IRL	586	92	$100,000
2020	Stormwater project in Basin 512	Brevard County	North IRL	364	53	$100,000
2020	Stormwater project in Basin 513	Brevard County	North IRL	1,137	183	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 544	Brevard County	North IRL	624	98	$100,000
2020	Stormwater project in Basin 568	Brevard County	North IRL	534	85	$100,000
2020	Stormwater project in Basin 578	Brevard County	North IRL	430	68	$100,000
2020	Stormwater project in Basin 594	Brevard County	North IRL	833	135	$100,000
2020	Stormwater project in Basin 597	Brevard County	North IRL	800	142	$100,000
2020	Stormwater project in Basin 624	Brevard County	North IRL	860	134	$100,000
2020	Stormwater project in Basin 626	Brevard County	North IRL	1,602	193	$150,000
2020	Stormwater project in Basin 644	Brevard County	North IRL	686	94	$100,000
2020	Stormwater project in Basin 660	Brevard County	North IRL	844	212	$100,000
2020	Stormwater project in Basin 677	Brevard County	North IRL	709	136	$100,000
2020	Stormwater project in Basin 751	Brevard County	North IRL	532	121	$100,000
2020	Stormwater project in Basin 759	Brevard County	North IRL	614	98	$100,000
2020	Stormwater project in Basin 796	Brevard County	North IRL	639	98	$100,000
2020	Stormwater project in Basin 805	Brevard County	North IRL	645	94	$100,000
2020	Stormwater project in Basin 806	Brevard County	North IRL	622	100	$100,000
2020	Stormwater project in Basin 827	Brevard County	North IRL	639	96	$100,000
2020	Stormwater project in Basin 838	Brevard County	North IRL	658	135	$100,000
2020	Stormwater project in Basin 840	Brevard County	North IRL	619	84	$100,000
2020	Stormwater project in Basin 862	Brevard County	North IRL	416	72	$100,000
2020	Stormwater project in Basin 871	Brevard County	North IRL	366	53	$100,000
2020	Stormwater project in Basin 884	Brevard County	North IRL	437	68	$100,000
2020	Stormwater project in Basin 889	Brevard County	North IRL	539	85	$100,000
2020	Stormwater project in Basin 890	Brevard County	North IRL	533	110	$100,000
2020	Stormwater project in Basin 894	Brevard County	North IRL	794	116	$100,000
2020	Stormwater project in Basin 896	Brevard County	North IRL	581	123	$100,000
2020	Stormwater project in Basin 902	Brevard County	North IRL	276	35	$100,000
2020	Stormwater project in Basin 903	Brevard County	North IRL	631	88	$100,000
2020	Stormwater project in Basin 920	Brevard County	North IRL	511	87	$100,000
2020	Stormwater project in Basin 921	Brevard County	North IRL	743	96	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 922	Brevard County	North IRL	601	107	$100,000
2020	Stormwater project in Basin 938	Brevard County	North IRL	424	160	$100,000
2020	Stormwater project in Basin 939	Brevard County	North IRL	502	71	$100,000
2020	Stormwater project in Basin 940	Brevard County	North IRL	816	106	$100,000
2020	Stormwater project in Basin 952	Brevard County	North IRL	1,251	212	$100,000
2020	Stormwater project in Basin 960	Brevard County	North IRL	537	80	$100,000
2020	Stormwater project in Basin 962	Brevard County	North IRL	527	75	$100,000
2020	Stormwater project in Basin 980	Brevard County	North IRL	836	127	$100,000
2020	Stormwater project in Basin 985	Brevard County	North IRL	687	99	$100,000
2020	Stormwater project in Basin 987	Brevard County	North IRL	1,099	172	$100,000
2020	Stormwater project in Basin 993	Brevard County	North IRL	611	93	$100,000
2020	Stormwater project in Basin 1002	Brevard County	North IRL	1,181	159	$100,000
2020	Stormwater project in Basin 1016	Brevard County	North IRL	920	136	$100,000
2020	Stormwater project in Basin 1027	Brevard County	North IRL	560	84	$100,000
2020	Stormwater project in Basin 1029	Brevard County	North IRL	685	93	$100,000
2020	Stormwater project in Basin 1032	Brevard County	North IRL	719	115	$100,000
2020	Stormwater project in Basin 1033	Brevard County	North IRL	1,113	152	$100,000
2020	Stormwater project in Basin 1034	Brevard County	North IRL	902	132	$100,000
2020	Stormwater project in Basin 1037	Brevard County	North IRL	533	105	$100,000
2020	Stormwater project in Basin 1039	Brevard County	North IRL	708	104	$100,000
2020	Stormwater project in Basin 1067	Brevard County	North IRL	463	67	$100,000
2020	Stormwater project in Basin 1071	Brevard County	North IRL	1,082	144	$100,000
2020	Stormwater project in Basin 1073	Brevard County	North IRL	428	61	$100,000
2020	Stormwater project in Basin 1076	Brevard County	North IRL	595	91	$100,000
2020	Stormwater project in Basin 1077	Brevard County	North IRL	1,687	289	$150,000
2020	Stormwater project in Basin 1080	Brevard County	North IRL	861	134	$100,000
2020	Stormwater project in Basin 1081	Brevard County	North IRL	1,281	210	$100,000
2020	Stormwater project in Basin 1112	Brevard County	North IRL	1,032	166	$100,000
2020	Stormwater project in Basin 1113	Brevard County	North IRL	416	93	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 1124	Brevard County	North IRL	681	99	$100,000
2020	Stormwater project in Basin 1128	Brevard County	North IRL	279	77	$100,000
2020	Stormwater project in Basin 1150	Brevard County	North IRL	476	57	$100,000
2020	Stormwater project in Basin 1151	Brevard County	North IRL	1,057	141	$125,000
2020	Stormwater project in Basin 1172	Brevard County	North IRL	852	123	$100,000
2020	Stormwater project in Basin 1197	Brevard County	North IRL	609	82	$100,000
2020	Stormwater project in Basin 1213	Brevard County	North IRL	904	131	$100,000
2020	Stormwater project in Basin 1214	Brevard County	North IRL	727	84	$100,000
2020	Stormwater project in Basin 1215	Brevard County	North IRL	382	52	$100,000
2020	Stormwater project in Basin 1219	Brevard County	North IRL	512	60	$100,000
2020	Stormwater project in Basin 1220	Brevard County	North IRL	396	61	$100,000
2020	Stormwater project in Basin 1221	Brevard County	North IRL	545	85	$100,000
2020	Stormwater project in Basin 1222	Brevard County	North IRL	888	171	$100,000
2020	Stormwater project in Basin 1224	Brevard County	North IRL	401	111	$100,000
2020	Stormwater project in Basin 1228	Brevard County	North IRL	501	83	$100,000
2020	Stormwater project in Basin 1231	Brevard County	North IRL	300	58	$100,000
2020	Stormwater project in Basin 1233	Brevard County	North IRL	605	101	$100,000
2020	Stormwater project in Basin 1240	Brevard County	North IRL	638	100	$100,000
2020	Stormwater project in Basin 1241	Brevard County	North IRL	584	83	$100,000
2020	Stormwater project in Basin 1244	Brevard County	North IRL	576	78	$100,000
2020	Stormwater project in Basin 1245	Brevard County	North IRL	356	49	$100,000
2020	Stormwater project in Basin 1251	Brevard County	North IRL	448	66	$100,000
2020	Stormwater project in Basin 1253	Brevard County	North IRL	379	54	$100,000
2020	Stormwater project in Basin 1259	Brevard County	North IRL	450	106	$100,000
2020	Stormwater project in Basin 1262	Brevard County	North IRL	443	80	$100,000
2020	Stormwater project in Basin 1273	Brevard County	North IRL	1,964	288	$175,000
2020	Stormwater project in Basin 1291	Brevard County	North IRL	518	79	$100,000
2020	Stormwater project in Basin 1292	Brevard County	North IRL	386	60	$100,000
2020	Stormwater project in Basin 1293	Brevard County	North IRL	461	67	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 1294	Brevard County	North IRL	628	94	$100,000
2020	Stormwater project in Basin 1295	Brevard County	North IRL	800	121	$100,000
2020	Stormwater project in Basin 1301	Brevard County	North IRL	1,025	154	$125,000
2020	Stormwater project in Basin 1307	Brevard County	North IRL	431	47	$100,000
2020	Stormwater project in Basin 1312	Brevard County	North IRL	549	120	$100,000
2020	Stormwater project in Basin 1313	Brevard County	North IRL	619	92	$100,000
2020	Stormwater project in Basin 1316	Brevard County	North IRL	557	68	$100,000
2020	Stormwater project in Basin 1318	Brevard County	North IRL	1,124	148	$100,000
2020	Stormwater project in Basin 1324	Brevard County	North IRL	1,422	176	$150,000
2020	Stormwater project in Basin 1330	Brevard County	North IRL	639	89	$100,000
2020	Stormwater project in Basin 1331	Brevard County	North IRL	1,000	159	$100,000
2020	Stormwater project in Basin 1339	Brevard County	North IRL	857	103	$100,000
2020	Stormwater project in Basin 1344	Brevard County	North IRL	459	61	$100,000
2020	Stormwater project in Basin 1348	Brevard County	North IRL	723	102	$100,000
2020	Stormwater project in Basin 1354	Brevard County	North IRL	597	86	$100,000
2020	Stormwater project in Basin 1359	Brevard County	North IRL	887	142	$100,000
2020	Stormwater project in Basin 1361	Brevard County	North IRL	524	79	$100,000
2020	Stormwater project in Basin 1363	Brevard County	North IRL	715	123	$100,000
2020	Stormwater project in Basin 1367	Brevard County	North IRL	1,042	146	$100,000
2020	Stormwater project in Basin 1372	Brevard County	North IRL	720	113	$100,000
2020	Stormwater project in Basin 1378	Brevard County	North IRL	744	104	$100,000
2020	Stormwater project in Basin 1380	Brevard County	North IRL	929	134	$100,000
2020	Stormwater project in Basin 1382	Brevard County	North IRL	622	88	$100,000
2020	Stormwater project in Basin 1384	Brevard County	North IRL	923	142	$100,000
2020	Stormwater project in Basin 1389	Brevard County	North IRL	822	134	$100,000
2020	Stormwater project in Basin 1390	Brevard County	North IRL	612	92	$100,000
2020	Stormwater project in Basin 1391	Brevard County	North IRL	887	142	$100,000
2020	Stormwater project in Basin 1395	Brevard County	North IRL	768	114	$100,000
2020	Stormwater project in Basin 1398	Brevard County	North IRL	449	74	$100,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2020	Stormwater project in Basin 1401	Brevard County	North IRL	953	147	$100,000
2020	Stormwater project in Basin 1403	Brevard County	North IRL	558	88	$100,000
2020	Stormwater project in Basin 1413	Brevard County	North IRL	528	78	$100,000
2020	Stormwater project in Basin 1416	Brevard County	North IRL	1,799	229	$150,000
2020	Stormwater project in Basin 1417	Brevard County	North IRL	771	117	$100,000
2020	Stormwater project in Basin 1418	Brevard County	North IRL	832	111	$100,000
2020	Stormwater project in Basin 1423	Brevard County	North IRL	487	73	$100,000
2020	Stormwater project in Basin 1425	Brevard County	North IRL	690	113	$100,000
2020	Stormwater project in Basin 1426	Brevard County	North IRL	720	116	$100,000
2020	Stormwater project in Basin 1428	Brevard County	North IRL	440	65	$100,000
2020	Stormwater project in Basin 1429	Brevard County	North IRL	477	55	$100,000
2020	Stormwater project in Basin 1434	Brevard County	North IRL	932	112	$125,000
2020	Stormwater project in Basin 1435	Brevard County	North IRL	328	43	$100,000
2020	Stormwater project in Basin 1441	Brevard County	North IRL	1,034	149	$100,000
2020	Stormwater project in Basin 1459	Brevard County	North IRL	895	132	$100,000
2020	Stormwater project in Basin 1463	Brevard County	North IRL	1,321	195	$100,000
2020	Stormwater project in Basin 1491	Brevard County	North IRL	641	93	$100,000
2020	Stormwater project in Basin 1498	Brevard County	North IRL	483	74	$100,000
2020	Stormwater project in Basin 2419	Brevard County	North IRL	381	43	$100,000
2020	Stormwater project in Basin 2420	Brevard County	North IRL	450	121	$100,000
2020	Stormwater project in Basin 2421	Brevard County	North IRL	343	49	$100,000
2020	Stormwater project in Basin 1439	Brevard County	Central IRL	1,413	183	$200,000
2020	Stormwater project in Basin 1445	Brevard County	Central IRL	1,493	198	$200,000
2020	Stormwater project in Basin 1470	Brevard County	Central IRL	2,813	452	$200,000
2020	Stormwater project in Basin 1508	Brevard County	Central IRL	2,459	356	$200,000
2020	Stormwater project in Basin 1562	Brevard County	Central IRL	3,314	449	$275,000
2020	Stormwater project in Basin 1615	Brevard County	Central IRL	2,815	390	$200,000
2020	Stormwater project in Basin 1803	Brevard County	Central IRL	2,227	318	$200,000
2020	Stormwater project in Basin 1825	Brevard County	Central IRL	1,896	394	$200,000

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2021	Cape Shores Swales	City of Cape Canaveral	Banana	31	15	$2,746
2021	Justamere Road Swale	City of Cape Canaveral	Banana	6	3	$528
2021	Hitching Post Berms	City of Cape Canaveral	Banana	29	22	$2,552
2021	Oyster Bar	Brevard County	Banana	120	3	$47,350
2021	Stewart Road Dry Retrofit	City of Melbourne	North IRL	208	47	$18,344
2021	Stormwater project in Basin 1349	Brevard County	North IRL	1,747	268	$354,400
2021	Stormwater project in Basin 1409	Brevard County	North IRL	1,375	209	$293,800
2021	Indian River Drive Oyster Bar	Brevard County	North IRL	34	1	$13,258
2021	Indian River Drive Planted Shoreline	Brevard County	North IRL	9	3	$2,240
2021	Stormwater project in Basin 2191	Brevard County	Central IRL	1,925	185	$326,500
2021	Stormwater project in Basin 1511	Brevard County	Central IRL	2,409	378	$410,300
2022	Cape Canaveral Air Force Station Regional – Rapid Infiltration Basin	Brevard County	Banana	4,625	1,226	$5,227,200
2022	Brevard Zoo Banana River Plant Project	Brevard Zoo	Banana	13	4	$3,120
2022	Brevard Zoo Banana River Plant Project 2	Brevard Zoo	Banana	2	1	$480
2022	Newfound Harbor Drive	Marine Resources Council	Banana	7	2	$1,680
2022	Port St. John Wastewater Treatment Plant – Rapid Infiltration Basin	Brevard County	North IRL	4,116	915	$980,100
2022	Brevard Zoo North Indian River Lagoon Plant Project 3	Brevard Zoo	North IRL	4	1	$960
2022	Brevard Zoo Central IRL Plant Project	Brevard Zoo	Central IRL	8	3	$1,920
2022	Canebreaker Condo – Sprayfield	Brevard County	North IRL	61	To be determined	$36,000
2023	Burris Way Alley West Stormwater Low Impact Development Improvement	City of Cocoa Beach	Banana	3	0	$1,249
2023	Stormwater project in Basin CC-B2C	Brevard County	Banana	430	63	$128,000
2023	Stormwater project in Basin CC-B4B	Brevard County	Banana	411	66	$125,100
2023	Stormwater project in Basin 592	Brevard County	Banana	359	34	$109,500
2024	South Central – Zone D (Melbourne)	City of Melbourne	North IRL	177	Not applicable	$265,500
2024	City of Melbourne Septic-to-Sewer	City of Melbourne	North IRL	878	Not applicable	$867,672
2024	Diamond Square Stormwater Pond	City of Cocoa	North IRL	85	23	$10,383
2024	Stormwater project in Basin 1280B	Brevard County	Banana	390	50	$149,036

Year Removed	Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
2024	Stormwater project in Basin 1304	Brevard County	Banana	181	To be determined	$84,534
2024	Stormwater project in Basin 959A	Brevard County	Banana	108	15	$143,436
2024	Stormwater project in Basin 10	Brevard County	North IRL	356	To be determined	$235,599
2024	Stormwater project in Basin 115	Brevard County	North IRL	707	98	$330,570
2024	Stormwater project in Basin 1298	Brevard County	North IRL	750	113	$459,774
2024	Stormwater project in Basin 141	Brevard County	North IRL	482	77	$232,093
2024	Stormwater project in Basin 1434	Brevard County	North IRL	959	131	$400,567
2024	Stormwater project in Basin 193	Brevard County	North IRL	343	49	$297,091
2024	Stormwater project in Basin 22	Brevard County	North IRL	293	19	$164,250
2024	Stormwater project in Basin 26	Brevard County	North IRL	295	46	$195,366
2024	Stormwater project in Basin 832	Brevard County	North IRL	506	90	$259,955
2024	Stormwater project in Basin 1604	Brevard County	Central IRL	2,916	425	$697,286
2024	Stormwater project in Basin 1762	Brevard County	Central IRL	4,250	621	$1,009,602
2024	Stormwater project in Basin SJR-97	Brevard County	Central IRL	14,851	2,094	$3,207,859
2025	City of Titusville - Zone H	Brevard County	North IRL	910	Not applicable	$1,168,020
2025	Basin 116 Lionel Road	Brevard County Natural Resources	North IRL	936	142	$185,700
2025	Cherry Street Baffle Box	City of Melbourne	North IRL	980	174	$306,740
2025	Hamilton Avenue Baffle Box	City of Titusville	North IRL	1,550	209	$350,000
2025	North and South Lakemont Ponds Vegetation Harvesting	City of Cocoa	North IRL	18	4	$1,980
2025	Riverview Park Oyster Bar	City of Melbourne	Central IRL	230	78	$108,790
2025	Riverview Park Planted Shoreline	City of Melbourne	Central IRL	77	26	$18,480
2025	Indian River Shores Trailer Park	Property Owner	Central IRL	450	To be determined	$528,627
2026	City of Palm Bay – Zone B	City of Palm Bay	Central IRL	6,809	Not applicable	$8,309,628
2026	City of Rockledge	City of Rockledge	North IRL	712	Not applicable	$500,580
2026	Rockledge - Zone B	City of Rockledge	North IRL	4,037	Not applicable	$5,339,520
2026	Forrest Avenue 72-inch Outfall Baseflow Capture/Treatment	City of Cocoa	North IRL	94	12	$13,956
2026	Scottsmoor Impoundment	Marine Resources Council	North IRL	44	15	$10,560

Appendix F. Loading Estimates from Stormwater Basins on Federal Lands

The following 593 stormwater basins are located on federal lands which are not accessible to Brevard County for project implementation.

Table F-1: Summary of Stormwater Basins on Federal Lands

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 1317A	Patrick Space Force Station	Banana	33	5	$216,705
Stormwater Project in Basin 1317B	Patrick Space Force Station	Banana	24	3	$213,762
Stormwater Project in Basin 1317C	Patrick Space Force Station	Banana	1	0	$205,369
Stormwater Project in Basin 1317D	Patrick Space Force Station	Banana	74	10	$231,880
Stormwater Project in Basin 350	Cape Canaveral Space Force Station	Banana	694	85	$431,942
Stormwater Project in Basin 351	Cape Canaveral Space Force Station	Banana	12	1	$208,119
Stormwater Project in Basin 414	Cape Canaveral Space Force Station	Banana	252	31	$279,371
Stormwater Project in Basin 427	Cape Canaveral Space Force Station	Banana	3	0	$205,525
Stormwater Project in Basin 428	Cape Canaveral Space Force Station	Banana	158	18	$247,400
Stormwater Project in Basin 433	Cape Canaveral Space Force Station	Banana	21	2	$209,225
Stormwater Project in Basin 434	Cape Canaveral Space Force Station	Banana	15	1	$208,860
Stormwater Project in Basin 435	Cape Canaveral Space Force Station	Banana	10	1	$207,280
Stormwater Project in Basin 436	Cape Canaveral Space Force Station	Banana	5	0	$205,317
Stormwater Project in Basin 437	Cape Canaveral Space Force Station	Banana	8	1	$206,728
Stormwater Project in Basin 440	Cape Canaveral Space Force Station	Banana	27	3	$213,701
Stormwater Project in Basin 442	Cape Canaveral Space Force Station	Banana	21	2	$210,162
Stormwater Project in Basin 452	Cape Canaveral Space Force Station	Banana	250	22	$230,607
Stormwater Project in Basin 453	Cape Canaveral Space Force Station	Banana	405	51	$340,765
Stormwater Project in Basin 458	Cape Canaveral Space Force Station	Banana	29	3	$214,777
Stormwater Project in Basin 460	Cape Canaveral Space Force Station	Banana	18	2	$211,118
Stormwater Project in Basin 461	Cape Canaveral Space Force Station	Banana	25	3	$213,410
Stormwater Project in Basin 464	Cape Canaveral Space Force Station	Banana	297	31	$282,514

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 476	Cape Canaveral Space Force Station	Banana	680	78	$424,429
Stormwater Project in Basin 477	Cape Canaveral Space Force Station	Banana	14	1	$207,600
Stormwater Project in Basin 479	Cape Canaveral Space Force Station	Banana	445	42	$292,698
Stormwater Project in Basin 481	Cape Canaveral Space Force Station	Banana	301	30	$274,482
Stormwater Project in Basin 483	Cape Canaveral Space Force Station	Banana	708	84	$431,850
Stormwater Project in Basin 484	Cape Canaveral Space Force Station	Banana	445	40	$276,179
Stormwater Project in Basin 485	Cape Canaveral Space Force Station	Banana	75	7	$218,594
Stormwater Project in Basin 490	Cape Canaveral Space Force Station	Banana	195	17	$232,223
Stormwater Project in Basin 492	Cape Canaveral Space Force Station	Banana	410	48	$337,847
Stormwater Project in Basin 496	Cape Canaveral Space Force Station	Banana	75	7	$220,590
Stormwater Project in Basin 497	Cape Canaveral Space Force Station	Banana	952	95	$426,628
Stormwater Project in Basin 502	Cape Canaveral Space Force Station	Banana	157	15	$234,835
Stormwater Project in Basin 503	Cape Canaveral Space Force Station	Banana	245	23	$250,910
Stormwater Project in Basin 504	Cape Canaveral Space Force Station	Banana	213	22	$259,462
Stormwater Project in Basin 505	Cape Canaveral Space Force Station	Banana	11	1	$207,389
Stormwater Project in Basin 507	Cape Canaveral Space Force Station	Banana	115	12	$232,743
Stormwater Project in Basin 508	Cape Canaveral Space Force Station	Banana	546	59	$360,926
Stormwater Project in Basin 516	Cape Canaveral Space Force Station	Banana	4	0	$205,800
Stormwater Project in Basin 517	Cape Canaveral Space Force Station	Banana	14	1	$209,492
Stormwater Project in Basin 518	Cape Canaveral Space Force Station	Banana	147	18	$260,414
Stormwater Project in Basin 519	Cape Canaveral Space Force Station	Banana	5	0	$206,252
Stormwater Project in Basin 520	Cape Canaveral Space Force Station	Banana	400	35	$269,299
Stormwater Project in Basin 522	Cape Canaveral Space Force Station	Banana	123	17	$258,870
Stormwater Project in Basin 524	Cape Canaveral Space Force Station	Banana	14	1	$208,166
Stormwater Project in Basin 525	Cape Canaveral Space Force Station	Banana	5	0	$206,415
Stormwater Project in Basin 526	Cape Canaveral Space Force Station	Banana	3	0	$205,607

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 530	Cape Canaveral Space Force Station	Banana	4	0	$206,066
Stormwater Project in Basin 532	Cape Canaveral Space Force Station	Banana	2	0	$205,668
Stormwater Project in Basin 535	Cape Canaveral Space Force Station	Banana	174	15	$227,799
Stormwater Project in Basin 537	Cape Canaveral Space Force Station	Banana	591	68	$376,670
Stormwater Project in Basin 538	Cape Canaveral Space Force Station	Banana	2	0	$205,052
Stormwater Project in Basin 539	Cape Canaveral Space Force Station	Banana	936	98	$455,545
Stormwater Project in Basin 542	Cape Canaveral Space Force Station	Banana	2	0	$205,648
Stormwater Project in Basin 543	Cape Canaveral Space Force Station	Banana	511	54	$331,763
Stormwater Project in Basin 545	Cape Canaveral Space Force Station	Banana	247	22	$238,476
Stormwater Project in Basin 546	Cape Canaveral Space Force Station	Banana	219	22	$247,985
Stormwater Project in Basin 558	Cape Canaveral Space Force Station	Banana	338	34	$271,746
Stormwater Project in Basin 565	Cape Canaveral Space Force Station	Banana	8	1	$207,150
Stormwater Project in Basin 566	Cape Canaveral Space Force Station	Banana	18	2	$209,314
Stormwater Project in Basin 567	Cape Canaveral Space Force Station	Banana	35	5	$219,192
Stormwater Project in Basin 574	Cape Canaveral Space Force Station	Banana	328	39	$302,897
Stormwater Project in Basin 581	Cape Canaveral Space Force Station	Banana	40	3	$207,806
Stormwater Project in Basin 583	Cape Canaveral Space Force Station	Banana	9	1	$205,599
Stormwater Project in Basin 584	Cape Canaveral Space Force Station	Banana	204	16	$224,972
Stormwater Project in Basin 585	Cape Canaveral Space Force Station	Banana	474	48	$318,000
Stormwater Project in Basin 586	Cape Canaveral Space Force Station	Banana	236	22	$248,408
Stormwater Project in Basin 587	Cape Canaveral Space Force Station	Banana	158	13	$226,182
Stormwater Project in Basin 588	Cape Canaveral Space Force Station	Banana	26	2	$208,098
Stormwater Project in Basin 591	Cape Canaveral Space Force Station	Banana	399	37	$276,842
Stormwater Project in Basin 592	Cape Canaveral Space Force Station	Banana	359	35	$274,908
Stormwater Project in Basin 601	Cape Canaveral Space Force Station	Banana	506	52	$317,009
Stormwater Project in Basin 602	Cape Canaveral Space Force Station	Banana	1,134	122	$524,766

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 611	Cape Canaveral Space Force Station	Banana	1,354	115	$379,461
Stormwater Project in Basin 631	Cape Canaveral Space Force Station	Banana	3	0	$205,884
Stormwater Project in Basin 638	Cape Canaveral Space Force Station	Banana	446	47	$315,556
Stormwater Project in Basin 641	Cape Canaveral Space Force Station	Banana	70	8	$221,883
Stormwater Project in Basin 648	Cape Canaveral Space Force Station	Banana	176	20	$238,845
Stormwater Project in Basin 650	Cape Canaveral Space Force Station	Banana	1,251	160	$650,812
Stormwater Project in Basin 673	Cape Canaveral Space Force Station	Banana	595	70	$395,508
Stormwater Project in Basin 674	Cape Canaveral Space Force Station	Banana	1,206	145	$623,997
Stormwater Project in Basin 675	Cape Canaveral Space Force Station	Banana	158	17	$238,668
Stormwater Project in Basin 678	Cape Canaveral Space Force Station	Banana	368	36	$282,497
Stormwater Project in Basin 680	Cape Canaveral Space Force Station	Banana	32	3	$211,443
Stormwater Project in Basin 685	Cape Canaveral Space Force Station	Banana	200	21	$250,533
Stormwater Project in Basin 686	Cape Canaveral Space Force Station	Banana	234	27	$277,215
Stormwater Project in Basin 688	Cape Canaveral Space Force Station	Banana	97	8	$223,564
Stormwater Project in Basin 691	Cape Canaveral Space Force Station	Banana	1,749	183	$653,370
Stormwater Project in Basin 698	Cape Canaveral Space Force Station	Banana	100	9	$225,474
Stormwater Project in Basin 700	Cape Canaveral Space Force Station	Banana	1	0	$205,243
Stormwater Project in Basin 702	Cape Canaveral Space Force Station	Banana	194	18	$237,347
Stormwater Project in Basin 703	Cape Canaveral Space Force Station	Banana	300	27	$261,423
Stormwater Project in Basin 704	Cape Canaveral Space Force Station	Banana	198	20	$253,553
Stormwater Project in Basin 717	Cape Canaveral Space Force Station	Banana	194	19	$247,908
Stormwater Project in Basin 720	Cape Canaveral Space Force Station	Banana	29	2	$208,756
Stormwater Project in Basin 730	Cape Canaveral Space Force Station	Banana	576	62	$344,232
Stormwater Project in Basin 739	Cape Canaveral Space Force Station	Banana	287	22	$247,534
Stormwater Project in Basin 740	Cape Canaveral Space Force Station	Banana	68	5	$212,018
Stormwater Project in Basin 741	Cape Canaveral Space Force Station	Banana	232	24	$259,683

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 742	Cape Canaveral Space Force Station	Banana	251	20	$235,070
Stormwater Project in Basin 743	Cape Canaveral Space Force Station	Banana	251	26	$267,463
Stormwater Project in Basin 766	Cape Canaveral Space Force Station	Banana	212	20	$244,227
Stormwater Project in Basin 767	Cape Canaveral Space Force Station	Banana	192	17	$234,064
Stormwater Project in Basin 775	Cape Canaveral Space Force Station	Banana	6	0	$206,051
Stormwater Project in Basin 776	Cape Canaveral Space Force Station	Banana	13	1	$206,942
Stormwater Project in Basin 777	Cape Canaveral Space Force Station	Banana	65	4	$211,644
Stormwater Project in Basin 778	Cape Canaveral Space Force Station	Banana	166	11	$218,641
Stormwater Project in Basin 780	Cape Canaveral Space Force Station	Banana	1	0	$205,210
Stormwater Project in Basin 781	Cape Canaveral Space Force Station	Banana	817	82	$391,550
Stormwater Project in Basin 782	Cape Canaveral Space Force Station	Banana	240	16	$237,817
Stormwater Project in Basin 813	Cape Canaveral Space Force Station	Banana	37	3	$210,467
Stormwater Project in Basin 828	Cape Canaveral Space Force Station	Banana	1,397	127	$480,424
Stormwater Project in Basin 834	Cape Canaveral Space Force Station	Banana	198	18	$232,556
Stormwater Project in Basin 843	Cape Canaveral Space Force Station	Banana	154	12	$217,279
Stormwater Project in Basin 846	Cape Canaveral Space Force Station	Banana	226	16	$219,939
Stormwater Project in Basin 856	Cape Canaveral Space Force Station	Banana	291	25	$250,056
Stormwater Project in Basin 858	Cape Canaveral Space Force Station	Banana	152	16	$241,113
Stormwater Project in Basin 861	Cape Canaveral Space Force Station	Banana	56	5	$213,201
Stormwater Project in Basin 873	Cape Canaveral Space Force Station	Banana	775	69	$327,313
Stormwater Project in Basin 899	Cape Canaveral Space Force Station	Banana	176	14	$228,690
Stormwater Project in Basin 900	Cape Canaveral Space Force Station	Banana	96	9	$221,099
Stormwater Project in Basin 914	Cape Canaveral Space Force Station	Banana	45	5	$215,601
Stormwater Project in Basin 915	Cape Canaveral Space Force Station	Banana	143	17	$242,695
Stormwater Project in Basin 925	Cape Canaveral Space Force Station	Banana	895	90	$397,437
Stormwater Project in Basin 925A	Cape Canaveral Space Force Station	Banana	4	0	$206,019

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 931	Cape Canaveral Space Force Station	Banana	9	1	$207,737
Stormwater Project in Basin 933	Cape Canaveral Space Force Station	Banana	206	27	$259,410
Stormwater Project in Basin 943	Cape Canaveral Space Force Station	Banana	155	19	$244,428
Stormwater Project in Basin CCAFS-10A	Cape Canaveral Space Force Station	Banana	296	50	$296,379
Stormwater Project in Basin CCAFS-11A	Cape Canaveral Space Force Station	Banana	31	5	$215,436
Stormwater Project in Basin CCAFS-11B	Cape Canaveral Space Force Station	Banana	27	3	$212,910
Stormwater Project in Basin CCAFS-11C	Cape Canaveral Space Force Station	Banana	44	5	$214,841
Stormwater Project in Basin CCAFS-12A	Cape Canaveral Space Force Station	Banana	45	16	$220,994
Stormwater Project in Basin CCAFS-12B	Cape Canaveral Space Force Station	Banana	38	16	$217,928
Stormwater Project in Basin CCAFS-12C	Cape Canaveral Space Force Station	Banana	118	29	$247,050
Stormwater Project in Basin CCAFS-12D	Cape Canaveral Space Force Station	Banana	23	3	$211,466
Stormwater Project in Basin CCAFS-12E	Cape Canaveral Space Force Station	Banana	14	2	$208,734
Stormwater Project in Basin CCAFS-13A	Cape Canaveral Space Force Station	Banana	371	56	$346,737
Stormwater Project in Basin CCAFS-13B	Cape Canaveral Space Force Station	Banana	109	46	$245,190
Stormwater Project in Basin CCAFS-13C	Cape Canaveral Space Force Station	Banana	28	4	$212,827
Stormwater Project in Basin CCAFS-1A	Cape Canaveral Space Force Station	Banana	2,531	390	$1,276,498
Stormwater Project in Basin CCAFS-1B	Cape Canaveral Space Force Station	Banana	69	9	$231,273
Stormwater Project in Basin CCAFS-1C	Cape Canaveral Space Force Station	Banana	19	3	$210,170
Stormwater Project in Basin CCAFS-1D	Cape Canaveral Space Force Station	Banana	23	4	$212,118
Stormwater Project in Basin CCAFS-1E	Cape Canaveral Space Force Station	Banana	139	22	$261,801
Stormwater Project in Basin CCAFS-2A	Cape Canaveral Space Force Station	Banana	1,778	309	$965,391
Stormwater Project in Basin CCAFS-2B	Cape Canaveral Space Force Station	Banana	14	2	$208,728
Stormwater Project in Basin CCAFS-2C	Cape Canaveral Space Force Station	Banana	33	5	$216,017
Stormwater Project in Basin CCAFS-2D	Cape Canaveral Space Force Station	Banana	62	8	$221,751
Stormwater Project in Basin CCAFS-3A	Cape Canaveral Space Force Station	Banana	2,896	450	$1,403,847
Stormwater Project in Basin CCAFS-3B	Cape Canaveral Space Force Station	Banana	54	7	$223,637

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin CCAFS-3C	Cape Canaveral Space Force Station	Banana	55	8	$220,002
Stormwater Project in Basin CCAFS-4A	Cape Canaveral Space Force Station	Banana	2,091	297	$953,621
Stormwater Project in Basin CCAFS-4B	Cape Canaveral Space Force Station	Banana	440	59	$365,680
Stormwater Project in Basin CCAFS-4C	Cape Canaveral Space Force Station	Banana	801	115	$544,622
Stormwater Project in Basin CCAFS-5A	Cape Canaveral Space Force Station	Banana	1,967	281	$976,538
Stormwater Project in Basin CCAFS-5B	Cape Canaveral Space Force Station	Banana	133	19	$252,188
Stormwater Project in Basin CCAFS-5C	Cape Canaveral Space Force Station	Banana	459	64	$377,400
Stormwater Project in Basin CCAFS-6A	Cape Canaveral Space Force Station	Banana	734	81	$415,472
Stormwater Project in Basin CCAFS-6B	Cape Canaveral Space Force Station	Banana	3,907	545	$1,799,618
Stormwater Project in Basin CCAFS-6C	Cape Canaveral Space Force Station	Banana	55	6	$215,355
Stormwater Project in Basin CCAFS-6D	Cape Canaveral Space Force Station	Banana	905	108	$495,674
Stormwater Project in Basin CCAFS-6E	Cape Canaveral Space Force Station	Banana	165	21	$261,797
Stormwater Project in Basin CCAFS-7A	Cape Canaveral Space Force Station	Banana	125	17	$252,093
Stormwater Project in Basin CCAFS-7B	Cape Canaveral Space Force Station	Banana	328	44	$332,341
Stormwater Project in Basin CCAFS-7C	Cape Canaveral Space Force Station	Banana	65	8	$228,198
Stormwater Project in Basin CCAFS-7D	Cape Canaveral Space Force Station	Banana	95	13	$241,700
Stormwater Project in Basin CCAFS-8A	Cape Canaveral Space Force Station	Banana	468	59	$354,489
Stormwater Project in Basin CCAFS-9A	Cape Canaveral Space Force Station	Banana	613	129	$399,413
Stormwater Project in Basin PAFB-10A	Patrick Space Force Station	Banana	92	12	$238,687
Stormwater Project in Basin PAFB-10B	Patrick Space Force Station	Banana	160	22	$267,190
Stormwater Project in Basin PAFB-10C	Patrick Space Force Station	Banana	20	3	$212,468
Stormwater Project in Basin PAFB-11A	Patrick Space Force Station	Banana	56	8	$228,170
Stormwater Project in Basin PAFB-11B	Patrick Space Force Station	Banana	30	4	$217,597
Stormwater Project in Basin PAFB-11C	Patrick Space Force Station	Banana	5	0	$206,804
Stormwater Project in Basin PAFB-11D	Patrick Space Force Station	Banana	23	3	$214,381
Stormwater Project in Basin PAFB-12A	Patrick Space Force Station	Banana	32	5	$217,431

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin PAFB-12B	Patrick Space Force Station	Banana	8	1	$208,134
Stormwater Project in Basin PAFB-13A	Patrick Space Force Station	Banana	322	44	$307,626
Stormwater Project in Basin PAFB-13B	Patrick Space Force Station	Banana	36	5	$218,156
Stormwater Project in Basin PAFB-14A	Patrick Space Force Station	Banana	270	38	$262,667
Stormwater Project in Basin PAFB-14B	Patrick Space Force Station	Banana	5	0	$205,629
Stormwater Project in Basin PAFB-14C	Patrick Space Force Station	Banana	14	2	$208,405
Stormwater Project in Basin PAFB-14D	Patrick Space Force Station	Banana	0	0	$205,077
Stormwater Project in Basin PAFB-14E	Patrick Space Force Station	Banana	12	1	$209,267
Stormwater Project in Basin PAFB-15	Patrick Space Force Station	Banana	7	1	$206,485
Stormwater Project in Basin PAFB-16	Patrick Space Force Station	Banana	36	5	$219,016
Stormwater Project in Basin PAFB-17A	Patrick Space Force Station	Banana	54	9	$220,189
Stormwater Project in Basin PAFB-17B	Patrick Space Force Station	Banana	1	0	$205,299
Stormwater Project in Basin PAFB-17C	Patrick Space Force Station	Banana	22	3	$212,836
Stormwater Project in Basin PAFB-18A	Patrick Space Force Station	Banana	223	31	$292,527
Stormwater Project in Basin PAFB-18B	Patrick Space Force Station	Banana	25	4	$214,803
Stormwater Project in Basin PAFB-18C	Patrick Space Force Station	Banana	9	1	$208,104
Stormwater Project in Basin PAFB-18D	Patrick Space Force Station	Banana	2	0	$205,840
Stormwater Project in Basin PAFB-18E	Patrick Space Force Station	Banana	9	1	$208,623
Stormwater Project in Basin PAFB-1A	Patrick Space Force Station	Banana	9	1	$208,903
Stormwater Project in Basin PAFB-1B	Patrick Space Force Station	Banana	35	5	$219,243
Stormwater Project in Basin PAFB-1C	Patrick Space Force Station	Banana	75	10	$229,058
Stormwater Project in Basin PAFB-1D	Patrick Space Force Station	Banana	348	48	$353,431
Stormwater Project in Basin PAFB-1E	Patrick Space Force Station	Banana	131	18	$255,729
Stormwater Project in Basin PAFB-1F	Patrick Space Force Station	Banana	68	9	$225,077
Stormwater Project in Basin PAFB-1G	Patrick Space Force Station	Banana	28	4	$217,526
Stormwater Project in Basin PAFB-1H	Patrick Space Force Station	Banana	86	12	$241,291

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin PAFB-1K	Patrick Space Force Station	Banana	18	2	$209,970
Stormwater Project in Basin PAFB-1L	Patrick Space Force Station	Banana	13	2	$209,964
Stormwater Project in Basin PAFB-1M	Patrick Space Force Station	Banana	7	1	$207,357
Stormwater Project in Basin PAFB-2A	Patrick Space Force Station	Banana	184	26	$282,568
Stormwater Project in Basin PAFB-2B	Patrick Space Force Station	Banana	176	24	$279,325
Stormwater Project in Basin PAFB-2C	Patrick Space Force Station	Banana	212	27	$281,004
Stormwater Project in Basin PAFB-2D	Patrick Space Force Station	Banana	174	23	$269,126
Stormwater Project in Basin PAFB-2E	Patrick Space Force Station	Banana	170	23	$275,159
Stormwater Project in Basin PAFB-2F	Patrick Space Force Station	Banana	396	54	$368,298
Stormwater Project in Basin PAFB-2H	Patrick Space Force Station	Banana	17	2	$210,584
Stormwater Project in Basin PAFB-3A	Patrick Space Force Station	Banana	135	18	$262,572
Stormwater Project in Basin PAFB-3B	Patrick Space Force Station	Banana	74	10	$235,398
Stormwater Project in Basin PAFB-4A	Patrick Space Force Station	Banana	266	36	$314,643
Stormwater Project in Basin PAFB-5A	Patrick Space Force Station	Banana	551	74	$440,605
Stormwater Project in Basin PAFB-5B	Patrick Space Force Station	Banana	174	23	$277,587
Stormwater Project in Basin PAFB-6A	Patrick Space Force Station	Banana	59	8	$228,936
Stormwater Project in Basin PAFB-6B	Patrick Space Force Station	Banana	14	2	$210,466
Stormwater Project in Basin PAFB-6C	Patrick Space Force Station	Banana	18	2	$212,339
Stormwater Project in Basin PAFB-7A	Patrick Space Force Station	Banana	400	53	$358,881
Stormwater Project in Basin PAFB-7F	Patrick Space Force Station	Banana	92	13	$241,520
Stormwater Project in Basin PAFB-7G	Patrick Space Force Station	Banana	123	17	$255,535
Stormwater Project in Basin PAFB-8A	Patrick Space Force Station	Banana	101	12	$240,989
Stormwater Project in Basin PAFB-9A	Patrick Space Force Station	Banana	55	7	$226,291
Stormwater Project in Basin SJR-44	Cape Canaveral Space Force Station	Banana	1	0	$205,632
Stormwater Project in Basin SJR-47	Cape Canaveral Space Force Station	Banana	158	21	$273,115
Stormwater Project in Basin SJR-54	Cape Canaveral Space Force Station	Banana	5	1	$206,870

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin SJR-58	Cape Canaveral Space Force Station	Banana	3	0	$206,138
Stormwater Project in Basin SJR-62	Cape Canaveral Space Force Station	Banana	1	0	$205,462
Stormwater Project in Basin SJR-66	Cape Canaveral Space Force Station	Banana	4	0	$206,168
Stormwater Project in Basin SJR-68	Cape Canaveral Space Force Station	Banana	3	0	$206,138
Stormwater Project in Basin SJR-69	Cape Canaveral Space Force Station	Banana	6	1	$206,617
Stormwater Project in Basin SJR-71	Cape Canaveral Space Force Station	Banana	12	2	$208,855
Stormwater Project in Basin SJR-72	Cape Canaveral Space Force Station	Banana	4	0	$205,946
Stormwater Project in Basin SJR-73	Cape Canaveral Space Force Station	Banana	2	0	$205,547
Stormwater Project in Basin 101	Cape Canaveral Space Force Station	North IRL	135	18	$264,734
Stormwater Project in Basin 102	Cape Canaveral Space Force Station	North IRL	24	2	$209,871
Stormwater Project in Basin 103	Cape Canaveral Space Force Station	North IRL	5	0	$206,127
Stormwater Project in Basin 104	Cape Canaveral Space Force Station	North IRL	2	0	$206,019
Stormwater Project in Basin 11	Cape Canaveral Space Force Station	North IRL	8	1	$208,538
Stormwater Project in Basin 114	Cape Canaveral Space Force Station	North IRL	235	25	$270,930
Stormwater Project in Basin 119	Cape Canaveral Space Force Station	North IRL	131	13	$234,046
Stormwater Project in Basin 120	Cape Canaveral Space Force Station	North IRL	162	22	$277,213
Stormwater Project in Basin 121	Cape Canaveral Space Force Station	North IRL	27	4	$216,843
Stormwater Project in Basin 122	Cape Canaveral Space Force Station	North IRL	77	8	$222,493
Stormwater Project in Basin 124	Cape Canaveral Space Force Station	North IRL	209	25	$268,828
Stormwater Project in Basin 125	Cape Canaveral Space Force Station	North IRL	0	0	$205,084
Stormwater Project in Basin 127	Cape Canaveral Space Force Station	North IRL	1	0	$205,326
Stormwater Project in Basin 128	Cape Canaveral Space Force Station	North IRL	11	1	$209,731
Stormwater Project in Basin 129	Cape Canaveral Space Force Station	North IRL	146	20	$270,278
Stormwater Project in Basin 130	Cape Canaveral Space Force Station	North IRL	45	6	$225,116
Stormwater Project in Basin 131	Cape Canaveral Space Force Station	North IRL	137	17	$253,121
Stormwater Project in Basin 132	Cape Canaveral Space Force Station	North IRL	0	0	$205,144

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 133	Cape Canaveral Space Force Station	North IRL	181	25	$286,596
Stormwater Project in Basin 134	Cape Canaveral Space Force Station	North IRL	395	54	$384,820
Stormwater Project in Basin 136	Cape Canaveral Space Force Station	North IRL	474	65	$428,698
Stormwater Project in Basin 137	Cape Canaveral Space Force Station	North IRL	407	42	$305,829
Stormwater Project in Basin 139	Cape Canaveral Space Force Station	North IRL	3	0	$206,037
Stormwater Project in Basin 140	Cape Canaveral Space Force Station	North IRL	9	1	$206,955
Stormwater Project in Basin 142	Cape Canaveral Space Force Station	North IRL	212	24	$269,354
Stormwater Project in Basin 144	Cape Canaveral Space Force Station	North IRL	7	1	$206,668
Stormwater Project in Basin 145	Cape Canaveral Space Force Station	North IRL	5	0	$206,182
Stormwater Project in Basin 147	Cape Canaveral Space Force Station	North IRL	8	1	$206,810
Stormwater Project in Basin 154	Cape Canaveral Space Force Station	North IRL	2	0	$205,398
Stormwater Project in Basin 155	Cape Canaveral Space Force Station	North IRL	914	94	$440,142
Stormwater Project in Basin 156	Cape Canaveral Space Force Station	North IRL	280	31	$285,917
Stormwater Project in Basin 157	Cape Canaveral Space Force Station	North IRL	898	90	$421,603
Stormwater Project in Basin 158	Cape Canaveral Space Force Station	North IRL	11	1	$207,669
Stormwater Project in Basin 160	Cape Canaveral Space Force Station	North IRL	13	1	$207,947
Stormwater Project in Basin 161	Cape Canaveral Space Force Station	North IRL	44	5	$218,948
Stormwater Project in Basin 162	Cape Canaveral Space Force Station	North IRL	92	13	$246,159
Stormwater Project in Basin 163	Cape Canaveral Space Force Station	North IRL	467	50	$329,935
Stormwater Project in Basin 165	Cape Canaveral Space Force Station	North IRL	5	0	$206,247
Stormwater Project in Basin 167	Cape Canaveral Space Force Station	North IRL	11	1	$208,358
Stormwater Project in Basin 17	Cape Canaveral Space Force Station	North IRL	34	5	$220,376
Stormwater Project in Basin 175	Cape Canaveral Space Force Station	North IRL	98	9	$226,325
Stormwater Project in Basin 176	Cape Canaveral Space Force Station	North IRL	797	74	$348,856
Stormwater Project in Basin 177	Cape Canaveral Space Force Station	North IRL	42	4	$214,119
Stormwater Project in Basin 178	Cape Canaveral Space Force Station	North IRL	700	72	$377,744

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 18	Cape Canaveral Space Force Station	North IRL	12	1	$209,285
Stormwater Project in Basin 181	Cape Canaveral Space Force Station	North IRL	193	16	$225,661
Stormwater Project in Basin 182	Cape Canaveral Space Force Station	North IRL	350	35	$286,931
Stormwater Project in Basin 183	Cape Canaveral Space Force Station	North IRL	175	14	$222,710
Stormwater Project in Basin 185	Cape Canaveral Space Force Station	North IRL	1	0	$205,598
Stormwater Project in Basin 186	Cape Canaveral Space Force Station	North IRL	184	19	$250,326
Stormwater Project in Basin 189	Cape Canaveral Space Force Station	North IRL	344	44	$341,646
Stormwater Project in Basin 196	Cape Canaveral Space Force Station	North IRL	11	1	$208,881
Stormwater Project in Basin 197	Cape Canaveral Space Force Station	North IRL	59	5	$216,945
Stormwater Project in Basin 198	Cape Canaveral Space Force Station	North IRL	482	46	$299,355
Stormwater Project in Basin 199	Cape Canaveral Space Force Station	North IRL	1,125	108	$462,157
Stormwater Project in Basin 200	Cape Canaveral Space Force Station	North IRL	8	1	$207,120
Stormwater Project in Basin 201	Cape Canaveral Space Force Station	North IRL	360	29	$255,868
Stormwater Project in Basin 202	Cape Canaveral Space Force Station	North IRL	5	0	$206,554
Stormwater Project in Basin 204	Cape Canaveral Space Force Station	North IRL	622	55	$297,147
Stormwater Project in Basin 205	Cape Canaveral Space Force Station	North IRL	54	5	$218,689
Stormwater Project in Basin 207	Cape Canaveral Space Force Station	North IRL	13	1	$206,031
Stormwater Project in Basin 208	Cape Canaveral Space Force Station	North IRL	726	75	$391,687
Stormwater Project in Basin 21	Cape Canaveral Space Force Station	North IRL	257	28	$296,443
Stormwater Project in Basin 210	Cape Canaveral Space Force Station	North IRL	236	23	$249,532
Stormwater Project in Basin 211	Cape Canaveral Space Force Station	North IRL	568	56	$324,433
Stormwater Project in Basin 218	Cape Canaveral Space Force Station	North IRL	491	39	$251,329
Stormwater Project in Basin 219	Cape Canaveral Space Force Station	North IRL	908	103	$512,346
Stormwater Project in Basin 220	Cape Canaveral Space Force Station	North IRL	246	25	$260,710
Stormwater Project in Basin 222	Cape Canaveral Space Force Station	North IRL	293	22	$227,410
Stormwater Project in Basin 224	Cape Canaveral Space Force Station	North IRL	571	55	$323,313

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 227	Cape Canaveral Space Force Station	North IRL	550	50	$305,029
Stormwater Project in Basin 229	Cape Canaveral Space Force Station	North IRL	206	14	$216,573
Stormwater Project in Basin 23	Cape Canaveral Space Force Station	North IRL	1	0	$205,340
Stormwater Project in Basin 230	Cape Canaveral Space Force Station	North IRL	95	8	$212,852
Stormwater Project in Basin 235	Cape Canaveral Space Force Station	North IRL	459	45	$307,516
Stormwater Project in Basin 237	Cape Canaveral Space Force Station	North IRL	128	14	$238,589
Stormwater Project in Basin 238	Cape Canaveral Space Force Station	North IRL	225	14	$217,641
Stormwater Project in Basin 239	Cape Canaveral Space Force Station	North IRL	262	21	$234,211
Stormwater Project in Basin 240	Cape Canaveral Space Force Station	North IRL	102	6	$209,585
Stormwater Project in Basin 241	Cape Canaveral Space Force Station	North IRL	37	3	$208,254
Stormwater Project in Basin 242	Cape Canaveral Space Force Station	North IRL	153	11	$215,343
Stormwater Project in Basin 243	Cape Canaveral Space Force Station	North IRL	35	2	$208,602
Stormwater Project in Basin 244	Cape Canaveral Space Force Station	North IRL	184	16	$229,126
Stormwater Project in Basin 246	Cape Canaveral Space Force Station	North IRL	63	6	$219,302
Stormwater Project in Basin 247	Cape Canaveral Space Force Station	North IRL	232	23	$243,878
Stormwater Project in Basin 248	Cape Canaveral Space Force Station	North IRL	428	44	$286,838
Stormwater Project in Basin 249	Cape Canaveral Space Force Station	North IRL	44	3	$210,021
Stormwater Project in Basin 250	Cape Canaveral Space Force Station	North IRL	239	25	$260,374
Stormwater Project in Basin 251	Cape Canaveral Space Force Station	North IRL	290	31	$277,581
Stormwater Project in Basin 252	Cape Canaveral Space Force Station	North IRL	78	8	$230,912
Stormwater Project in Basin 253	Cape Canaveral Space Force Station	North IRL	1,242	131	$460,651
Stormwater Project in Basin 254	Cape Canaveral Space Force Station	North IRL	581	45	$285,506
Stormwater Project in Basin 255	Cape Canaveral Space Force Station	North IRL	28	3	$214,046
Stormwater Project in Basin 259	Cape Canaveral Space Force Station	North IRL	88	9	$226,034
Stormwater Project in Basin 260	Cape Canaveral Space Force Station	North IRL	29	4	$215,241
Stormwater Project in Basin 261	Cape Canaveral Space Force Station	North IRL	255	35	$317,855

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 264	Cape Canaveral Space Force Station	North IRL	72	7	$219,367
Stormwater Project in Basin 265	Cape Canaveral Space Force Station	North IRL	323	31	$268,841
Stormwater Project in Basin 266	Cape Canaveral Space Force Station	North IRL	395	54	$384,480
Stormwater Project in Basin 267	Cape Canaveral Space Force Station	North IRL	18	3	$213,006
Stormwater Project in Basin 269	Cape Canaveral Space Force Station	North IRL	3	0	$206,344
Stormwater Project in Basin 271	Cape Canaveral Space Force Station	North IRL	14	2	$210,259
Stormwater Project in Basin 272	Cape Canaveral Space Force Station	North IRL	10	1	$208,357
Stormwater Project in Basin 273	Cape Canaveral Space Force Station	North IRL	2	0	$205,799
Stormwater Project in Basin 274	Cape Canaveral Space Force Station	North IRL	200	18	$234,126
Stormwater Project in Basin 275	Cape Canaveral Space Force Station	North IRL	544	51	$310,776
Stormwater Project in Basin 276	Cape Canaveral Space Force Station	North IRL	388	45	$239,679
Stormwater Project in Basin 277	Cape Canaveral Space Force Station	North IRL	214	23	$265,329
Stormwater Project in Basin 278	Cape Canaveral Space Force Station	North IRL	7	1	$208,050
Stormwater Project in Basin 279	Cape Canaveral Space Force Station	North IRL	35	5	$220,065
Stormwater Project in Basin 280	Cape Canaveral Space Force Station	North IRL	8	1	$206,489
Stormwater Project in Basin 281	Cape Canaveral Space Force Station	North IRL	1	0	$205,485
Stormwater Project in Basin 285	Cape Canaveral Space Force Station	North IRL	11	1	$210,002
Stormwater Project in Basin 286	Cape Canaveral Space Force Station	North IRL	838	63	$297,898
Stormwater Project in Basin 287	Cape Canaveral Space Force Station	North IRL	39	5	$222,582
Stormwater Project in Basin 288	Cape Canaveral Space Force Station	North IRL	318	44	$347,291
Stormwater Project in Basin 293	Cape Canaveral Space Force Station	North IRL	122	15	$239,735
Stormwater Project in Basin 295	Cape Canaveral Space Force Station	North IRL	302	32	$278,552
Stormwater Project in Basin 296	Cape Canaveral Space Force Station	North IRL	81	11	$238,173
Stormwater Project in Basin 298	Cape Canaveral Space Force Station	North IRL	208	29	$298,604
Stormwater Project in Basin 299	Cape Canaveral Space Force Station	North IRL	376	38	$286,777
Stormwater Project in Basin 3	Cape Canaveral Space Force Station	North IRL	48	6	$225,658

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 300	Cape Canaveral Space Force Station	North IRL	27	4	$217,405
Stormwater Project in Basin 301	Cape Canaveral Space Force Station	North IRL	447	47	$318,644
Stormwater Project in Basin 304	Cape Canaveral Space Force Station	North IRL	234	19	$228,650
Stormwater Project in Basin 305	Cape Canaveral Space Force Station	North IRL	260	28	$274,595
Stormwater Project in Basin 306	Cape Canaveral Space Force Station	North IRL	5	0	$206,891
Stormwater Project in Basin 308	Cape Canaveral Space Force Station	North IRL	4	0	$206,630
Stormwater Project in Basin 311	Cape Canaveral Space Force Station	North IRL	1	0	$205,384
Stormwater Project in Basin 313	Cape Canaveral Space Force Station	North IRL	299	41	$338,334
Stormwater Project in Basin 314	Cape Canaveral Space Force Station	North IRL	827	86	$400,808
Stormwater Project in Basin 315	Cape Canaveral Space Force Station	North IRL	410	57	$394,662
Stormwater Project in Basin 316	Cape Canaveral Space Force Station	North IRL	343	32	$267,896
Stormwater Project in Basin 318	Cape Canaveral Space Force Station	North IRL	48	3	$207,622
Stormwater Project in Basin 319	Cape Canaveral Space Force Station	North IRL	270	20	$228,873
Stormwater Project in Basin 32	Cape Canaveral Space Force Station	North IRL	5	0	$206,879
Stormwater Project in Basin 322	Cape Canaveral Space Force Station	North IRL	398	25	$243,160
Stormwater Project in Basin 323	Cape Canaveral Space Force Station	North IRL	343	47	$358,340
Stormwater Project in Basin 328	Cape Canaveral Space Force Station	North IRL	169	16	$236,243
Stormwater Project in Basin 329	Cape Canaveral Space Force Station	North IRL	26	3	$210,033
Stormwater Project in Basin 330	Cape Canaveral Space Force Station	North IRL	14	2	$209,950
Stormwater Project in Basin 331	Cape Canaveral Space Force Station	North IRL	181	25	$286,617
Stormwater Project in Basin 332	Cape Canaveral Space Force Station	North IRL	230	32	$308,641
Stormwater Project in Basin 333	Cape Canaveral Space Force Station	North IRL	420	42	$293,287
Stormwater Project in Basin 336	Cape Canaveral Space Force Station	North IRL	342	36	$288,844
Stormwater Project in Basin 337	Cape Canaveral Space Force Station	North IRL	268	27	$262,578
Stormwater Project in Basin 338	Cape Canaveral Space Force Station	North IRL	1,938	211	$737,036
Stormwater Project in Basin 339	Cape Canaveral Space Force Station	North IRL	23	3	$214,205

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 340	Cape Canaveral Space Force Station	North IRL	329	32	$271,285
Stormwater Project in Basin 343	Cape Canaveral Space Force Station	North IRL	181	14	$226,083
Stormwater Project in Basin 344	Cape Canaveral Space Force Station	North IRL	239	19	$232,781
Stormwater Project in Basin 345	Cape Canaveral Space Force Station	North IRL	422	37	$267,890
Stormwater Project in Basin 346	Cape Canaveral Space Force Station	North IRL	281	22	$232,262
Stormwater Project in Basin 347	Cape Canaveral Space Force Station	North IRL	75	9	$234,001
Stormwater Project in Basin 348	Cape Canaveral Space Force Station	North IRL	197	26	$273,366
Stormwater Project in Basin 349	Cape Canaveral Space Force Station	North IRL	270	33	$290,956
Stormwater Project in Basin 355	Cape Canaveral Space Force Station	North IRL	5	0	$206,185
Stormwater Project in Basin 358	Cape Canaveral Space Force Station	North IRL	252	31	$286,946
Stormwater Project in Basin 359	Cape Canaveral Space Force Station	North IRL	330	43	$318,734
Stormwater Project in Basin 361	Cape Canaveral Space Force Station	North IRL	124	17	$260,528
Stormwater Project in Basin 362	Cape Canaveral Space Force Station	North IRL	15	2	$211,054
Stormwater Project in Basin 364	Cape Canaveral Space Force Station	North IRL	269	37	$325,105
Stormwater Project in Basin 365	Cape Canaveral Space Force Station	North IRL	30	3	$212,063
Stormwater Project in Basin 366	Cape Canaveral Space Force Station	North IRL	178	18	$245,637
Stormwater Project in Basin 367	Cape Canaveral Space Force Station	North IRL	25	2	$206,572
Stormwater Project in Basin 369	Cape Canaveral Space Force Station	North IRL	16	1	$206,136
Stormwater Project in Basin 37	Cape Canaveral Space Force Station	North IRL	79	11	$239,680
Stormwater Project in Basin 370	Cape Canaveral Space Force Station	North IRL	173	11	$217,872
Stormwater Project in Basin 371	Cape Canaveral Space Force Station	North IRL	513	49	$304,945
Stormwater Project in Basin 373	Cape Canaveral Space Force Station	North IRL	469	56	$353,585
Stormwater Project in Basin 374	Cape Canaveral Space Force Station	North IRL	13	1	$207,976
Stormwater Project in Basin 376	Cape Canaveral Space Force Station	North IRL	7	0	$205,721
Stormwater Project in Basin 377	Cape Canaveral Space Force Station	North IRL	68	6	$216,741
Stormwater Project in Basin 378	Cape Canaveral Space Force Station	North IRL	16	2	$208,499

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 379	Cape Canaveral Space Force Station	North IRL	141	11	$219,139
Stormwater Project in Basin 380	Cape Canaveral Space Force Station	North IRL	107	12	$234,044
Stormwater Project in Basin 382	Cape Canaveral Space Force Station	North IRL	18	2	$208,219
Stormwater Project in Basin 383	Cape Canaveral Space Force Station	North IRL	36	3	$207,351
Stormwater Project in Basin 384	Cape Canaveral Space Force Station	North IRL	986	84	$355,591
Stormwater Project in Basin 385	Cape Canaveral Space Force Station	North IRL	323	45	$349,969
Stormwater Project in Basin 387	Cape Canaveral Space Force Station	North IRL	290	18	$226,750
Stormwater Project in Basin 388	Cape Canaveral Space Force Station	North IRL	1,203	130	$545,725
Stormwater Project in Basin 389	Cape Canaveral Space Force Station	North IRL	198	27	$293,992
Stormwater Project in Basin 391	Cape Canaveral Space Force Station	North IRL	360	45	$328,768
Stormwater Project in Basin 393	Cape Canaveral Space Force Station	North IRL	3	0	$205,658
Stormwater Project in Basin 394	Cape Canaveral Space Force Station	North IRL	2	0	$205,503
Stormwater Project in Basin 395	Cape Canaveral Space Force Station	North IRL	168	12	$221,556
Stormwater Project in Basin 396	Cape Canaveral Space Force Station	North IRL	438	50	$326,767
Stormwater Project in Basin 398	Cape Canaveral Space Force Station	North IRL	6	1	$207,391
Stormwater Project in Basin 399	Cape Canaveral Space Force Station	North IRL	43	6	$223,564
Stormwater Project in Basin 4	Cape Canaveral Space Force Station	North IRL	40	5	$216,657
Stormwater Project in Basin 401	Cape Canaveral Space Force Station	North IRL	450	52	$338,543
Stormwater Project in Basin 403	Cape Canaveral Space Force Station	North IRL	4	0	$206,756
Stormwater Project in Basin 404	Cape Canaveral Space Force Station	North IRL	228	19	$234,225
Stormwater Project in Basin 405	Cape Canaveral Space Force Station	North IRL	307	27	$254,476
Stormwater Project in Basin 406	Cape Canaveral Space Force Station	North IRL	14	1	$209,072
Stormwater Project in Basin 407	Cape Canaveral Space Force Station	North IRL	271	23	$242,913
Stormwater Project in Basin 409	Cape Canaveral Space Force Station	North IRL	2	0	$205,165
Stormwater Project in Basin 410	Cape Canaveral Space Force Station	North IRL	1,323	158	$604,820
Stormwater Project in Basin 411	Cape Canaveral Space Force Station	North IRL	3	0	$205,627

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 412	Cape Canaveral Space Force Station	North IRL	2	0	$205,271
Stormwater Project in Basin 413	Cape Canaveral Space Force Station	North IRL	915	103	$459,270
Stormwater Project in Basin 415	Cape Canaveral Space Force Station	North IRL	709	77	$377,988
Stormwater Project in Basin 416	Cape Canaveral Space Force Station	North IRL	6	0	$206,638
Stormwater Project in Basin 418	Cape Canaveral Space Force Station	North IRL	12	1	$208,243
Stormwater Project in Basin 419	Cape Canaveral Space Force Station	North IRL	50	4	$209,068
Stormwater Project in Basin 421	Cape Canaveral Space Force Station	North IRL	10	1	$206,448
Stormwater Project in Basin 422	Cape Canaveral Space Force Station	North IRL	5	0	$206,378
Stormwater Project in Basin 423	Cape Canaveral Space Force Station	North IRL	3	0	$205,675
Stormwater Project in Basin 424	Cape Canaveral Space Force Station	North IRL	3	0	$205,560
Stormwater Project in Basin 425	Cape Canaveral Space Force Station	North IRL	255	20	$231,400
Stormwater Project in Basin 439	Cape Canaveral Space Force Station	North IRL	585	53	$304,156
Stormwater Project in Basin 443	Cape Canaveral Space Force Station	North IRL	14	1	$208,084
Stormwater Project in Basin 444	Cape Canaveral Space Force Station	North IRL	32	3	$212,061
Stormwater Project in Basin 445	Cape Canaveral Space Force Station	North IRL	403	32	$251,616
Stormwater Project in Basin 446	Cape Canaveral Space Force Station	North IRL	18	2	$208,024
Stormwater Project in Basin 447	Cape Canaveral Space Force Station	North IRL	14	1	$208,368
Stormwater Project in Basin 448	Cape Canaveral Space Force Station	North IRL	7	1	$206,665
Stormwater Project in Basin 450	Cape Canaveral Space Force Station	North IRL	34	4	$212,341
Stormwater Project in Basin 451	Cape Canaveral Space Force Station	North IRL	1,076	123	$493,065
Stormwater Project in Basin 455	Cape Canaveral Space Force Station	North IRL	8	1	$207,234
Stormwater Project in Basin 456	Cape Canaveral Space Force Station	North IRL	296	30	$275,156
Stormwater Project in Basin 457	Cape Canaveral Space Force Station	North IRL	658	66	$355,690
Stormwater Project in Basin 465	Cape Canaveral Space Force Station	North IRL	6	0	$206,140
Stormwater Project in Basin 466	Cape Canaveral Space Force Station	North IRL	9	1	$207,137
Stormwater Project in Basin 467	Cape Canaveral Space Force Station	North IRL	18	2	$209,159

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 468	Cape Canaveral Space Force Station	North IRL	2	0	$205,489
Stormwater Project in Basin 47	Cape Canaveral Space Force Station	North IRL	617	80	$482,277
Stormwater Project in Basin 470	Cape Canaveral Space Force Station	North IRL	4	0	$205,904
Stormwater Project in Basin 471	Cape Canaveral Space Force Station	North IRL	2	0	$205,544
Stormwater Project in Basin 472	Cape Canaveral Space Force Station	North IRL	16	2	$208,696
Stormwater Project in Basin 473	Cape Canaveral Space Force Station	North IRL	9	1	$207,519
Stormwater Project in Basin 474	Cape Canaveral Space Force Station	North IRL	801	77	$373,702
Stormwater Project in Basin 475	Cape Canaveral Space Force Station	North IRL	409	41	$297,670
Stormwater Project in Basin 478	Cape Canaveral Space Force Station	North IRL	896	80	$396,366
Stormwater Project in Basin 48	Cape Canaveral Space Force Station	North IRL	21	3	$214,013
Stormwater Project in Basin 480	Cape Canaveral Space Force Station	North IRL	116	12	$234,197
Stormwater Project in Basin 488	Cape Canaveral Space Force Station	North IRL	23	2	$210,542
Stormwater Project in Basin 489	Cape Canaveral Space Force Station	North IRL	661	65	$358,385
Stormwater Project in Basin 491	Cape Canaveral Space Force Station	North IRL	465	46	$327,857
Stormwater Project in Basin 495	Cape Canaveral Space Force Station	North IRL	460	49	$336,004
Stormwater Project in Basin 498	Cape Canaveral Space Force Station	North IRL	1,243	118	$514,254
Stormwater Project in Basin 499	Cape Canaveral Space Force Station	North IRL	761	77	$393,357
Stormwater Project in Basin 500	Cape Canaveral Space Force Station	North IRL	517	52	$325,659
Stormwater Project in Basin 509	Cape Canaveral Space Force Station	North IRL	474	46	$304,705
Stormwater Project in Basin 514	Cape Canaveral Space Force Station	North IRL	300	31	$284,819
Stormwater Project in Basin 515	Cape Canaveral Space Force Station	North IRL	29	3	$213,835
Stormwater Project in Basin 521	Cape Canaveral Space Force Station	North IRL	247	21	$246,396
Stormwater Project in Basin 523	Cape Canaveral Space Force Station	North IRL	657	67	$365,321
Stormwater Project in Basin 527	Cape Canaveral Space Force Station	North IRL	30	3	$213,080
Stormwater Project in Basin 53	Cape Canaveral Space Force Station	North IRL	44	5	$216,145
Stormwater Project in Basin 533	Cape Canaveral Space Force Station	North IRL	344	34	$285,207

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 534	Cape Canaveral Space Force Station	North IRL	20	2	$209,901
Stormwater Project in Basin 536	Cape Canaveral Space Force Station	North IRL	324	36	$283,302
Stormwater Project in Basin 54	Cape Canaveral Space Force Station	North IRL	33	3	$212,095
Stormwater Project in Basin 548	Cape Canaveral Space Force Station	North IRL	144	12	$219,729
Stormwater Project in Basin 549	Cape Canaveral Space Force Station	North IRL	161	19	$261,504
Stormwater Project in Basin 55	Cape Canaveral Space Force Station	North IRL	11	1	$209,394
Stormwater Project in Basin 550	Cape Canaveral Space Force Station	North IRL	117	12	$230,150
Stormwater Project in Basin 552	Cape Canaveral Space Force Station	North IRL	113	9	$217,501
Stormwater Project in Basin 553	Cape Canaveral Space Force Station	North IRL	289	23	$241,063
Stormwater Project in Basin 554	Cape Canaveral Space Force Station	North IRL	243	20	$246,771
Stormwater Project in Basin 555	Cape Canaveral Space Force Station	North IRL	4	0	$206,308
Stormwater Project in Basin 557	Cape Canaveral Space Force Station	North IRL	14	2	$209,739
Stormwater Project in Basin 559	Cape Canaveral Space Force Station	North IRL	504	69	$443,666
Stormwater Project in Basin 56	Cape Canaveral Space Force Station	North IRL	4	0	$205,784
Stormwater Project in Basin 560	Cape Canaveral Space Force Station	North IRL	572	41	$240,119
Stormwater Project in Basin 57	Cape Canaveral Space Force Station	North IRL	2	0	$205,376
Stormwater Project in Basin 570	Cape Canaveral Space Force Station	North IRL	27	4	$215,551
Stormwater Project in Basin 573	Cape Canaveral Space Force Station	North IRL	247	19	$240,353
Stormwater Project in Basin 575	Cape Canaveral Space Force Station	North IRL	662	54	$320,410
Stormwater Project in Basin 576	Cape Canaveral Space Force Station	North IRL	323	29	$252,168
Stormwater Project in Basin 577	Cape Canaveral Space Force Station	North IRL	374	51	$374,536
Stormwater Project in Basin 589	Cape Canaveral Space Force Station	North IRL	208	28	$296,189
Stormwater Project in Basin 59	Cape Canaveral Space Force Station	North IRL	14	2	$211,162
Stormwater Project in Basin 590	Cape Canaveral Space Force Station	North IRL	208	15	$223,680
Stormwater Project in Basin 593	Cape Canaveral Space Force Station	North IRL	11	1	$206,729
Stormwater Project in Basin 595	Cape Canaveral Space Force Station	North IRL	261	17	$219,285

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 598	Cape Canaveral Space Force Station	North IRL	352	32	$262,119
Stormwater Project in Basin 599	Cape Canaveral Space Force Station	North IRL	217	18	$229,161
Stormwater Project in Basin 604	Cape Canaveral Space Force Station	North IRL	249	23	$215,707
Stormwater Project in Basin 606	Cape Canaveral Space Force Station	North IRL	144	13	$226,614
Stormwater Project in Basin 607	Cape Canaveral Space Force Station	North IRL	3	0	$205,147
Stormwater Project in Basin 608	Cape Canaveral Space Force Station	North IRL	744	69	$244,830
Stormwater Project in Basin 609	Cape Canaveral Space Force Station	North IRL	148	18	$218,233
Stormwater Project in Basin 610	Cape Canaveral Space Force Station	North IRL	379	44	$276,609
Stormwater Project in Basin 612	Cape Canaveral Space Force Station	North IRL	158	22	$276,328
Stormwater Project in Basin 614	Cape Canaveral Space Force Station	North IRL	149	20	$270,442
Stormwater Project in Basin 615	Cape Canaveral Space Force Station	North IRL	36	5	$220,921
Stormwater Project in Basin 616	Cape Canaveral Space Force Station	North IRL	73	10	$237,264
Stormwater Project in Basin 617	Cape Canaveral Space Force Station	North IRL	211	29	$299,560
Stormwater Project in Basin 618	Cape Canaveral Space Force Station	North IRL	324	40	$317,566
Stormwater Project in Basin 622	Cape Canaveral Space Force Station	North IRL	1,171	86	$332,237
Stormwater Project in Basin 646	Cape Canaveral Space Force Station	North IRL	95	9	$220,216
Stormwater Project in Basin 647	Cape Canaveral Space Force Station	North IRL	35	3	$207,947
Stormwater Project in Basin 649	Cape Canaveral Space Force Station	North IRL	204	17	$225,216
Stormwater Project in Basin 651	Cape Canaveral Space Force Station	North IRL	7	0	$205,666
Stormwater Project in Basin 652	Cape Canaveral Space Force Station	North IRL	334	23	$224,344
Stormwater Project in Basin 659	Cape Canaveral Space Force Station	North IRL	784	56	$281,618
Stormwater Project in Basin 662	Cape Canaveral Space Force Station	North IRL	977	100	$407,236
Stormwater Project in Basin 666	Cape Canaveral Space Force Station	North IRL	312	27	$243,113
Stormwater Project in Basin 667	Cape Canaveral Space Force Station	North IRL	4	0	$205,372
Stormwater Project in Basin 668	Cape Canaveral Space Force Station	North IRL	1,508	139	$521,811
Stormwater Project in Basin 671	Cape Canaveral Space Force Station	North IRL	225	19	$231,481

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 672	Cape Canaveral Space Force Station	North IRL	57	4	$208,967
Stormwater Project in Basin 676	Cape Canaveral Space Force Station	North IRL	9	1	$207,076
Stormwater Project in Basin 679	Cape Canaveral Space Force Station	North IRL	264	20	$226,353
Stormwater Project in Basin 692	Cape Canaveral Space Force Station	North IRL	234	15	$215,092
Stormwater Project in Basin 694	Cape Canaveral Space Force Station	North IRL	334	31	$268,353
Stormwater Project in Basin 695	Cape Canaveral Space Force Station	North IRL	388	45	$311,477
Stormwater Project in Basin 701	Cape Canaveral Space Force Station	North IRL	193	14	$217,654
Stormwater Project in Basin 715	Cape Canaveral Space Force Station	North IRL	380	35	$290,936
Stormwater Project in Basin 716	Cape Canaveral Space Force Station	North IRL	1,157	84	$280,201
Stormwater Project in Basin 724	Cape Canaveral Space Force Station	North IRL	222	16	$223,129
Stormwater Project in Basin 729	Cape Canaveral Space Force Station	North IRL	8	0	$205,355
Stormwater Project in Basin 731	Cape Canaveral Space Force Station	North IRL	301	34	$264,513
Stormwater Project in Basin 737	Cape Canaveral Space Force Station	North IRL	69	9	$212,829
Stormwater Project in Basin 738	Cape Canaveral Space Force Station	North IRL	497	50	$260,394
Stormwater Project in Basin 744	Cape Canaveral Space Force Station	North IRL	247	19	$225,987
Stormwater Project in Basin 745	Cape Canaveral Space Force Station	North IRL	2	0	$205,406
Stormwater Project in Basin 746	Cape Canaveral Space Force Station	North IRL	155	23	$236,691
Stormwater Project in Basin 747	Cape Canaveral Space Force Station	North IRL	238	37	$264,745
Stormwater Project in Basin 752	Cape Canaveral Space Force Station	North IRL	572	74	$319,137
Stormwater Project in Basin 758	Cape Canaveral Space Force Station	North IRL	533	50	$281,630
Stormwater Project in Basin 761	Cape Canaveral Space Force Station	North IRL	386	31	$232,086
Stormwater Project in Basin 77	Cape Canaveral Space Force Station	North IRL	6	0	$206,691
Stormwater Project in Basin 791	Cape Canaveral Space Force Station	North IRL	266	30	$262,005
Stormwater Project in Basin 8	Cape Canaveral Space Force Station	North IRL	18	2	$212,798
Stormwater Project in Basin 81	Cape Canaveral Space Force Station	North IRL	276	32	$297,247
Stormwater Project in Basin 826	Cape Canaveral Space Force Station	North IRL	506	71	$313,387

Project Name	Responsible Entity	Sub-Lagoon	Total Nitrogen Reduction (pounds per year)	Total Phosphorus Reduction (pounds per year)	Plan Funding
Stormwater Project in Basin 84	Cape Canaveral Space Force Station	North IRL	5	0	$206,103
Stormwater Project in Basin 85	Cape Canaveral Space Force Station	North IRL	20	3	$213,146
Stormwater Project in Basin 875	Cape Canaveral Space Force Station	North IRL	524	54	$331,548
Stormwater Project in Basin 92	Cape Canaveral Space Force Station	North IRL	44	6	$224,025
Stormwater Project in Basin 93	Cape Canaveral Space Force Station	North IRL	113	15	$250,697
Stormwater Project in Basin SJR-1	Cape Canaveral Space Force Station	North IRL	0	0	$205,154
Stormwater Project in Basin SJR-10	Cape Canaveral Space Force Station	North IRL	6	0	$206,351
Stormwater Project in Basin SJR-11	Cape Canaveral Space Force Station	North IRL	6	1	$207,690
Stormwater Project in Basin SJR-12	Cape Canaveral Space Force Station	North IRL	5	0	$206,987
Stormwater Project in Basin SJR-13	Cape Canaveral Space Force Station	North IRL	4	0	$206,521
Stormwater Project in Basin SJR-15	Cape Canaveral Space Force Station	North IRL	161	22	$274,028
Stormwater Project in Basin SJR-2	Cape Canaveral Space Force Station	North IRL	3	0	$206,292
Stormwater Project in Basin SJR-21	Cape Canaveral Space Force Station	North IRL	1	0	$205,344
Stormwater Project in Basin SJR-26	Cape Canaveral Space Force Station	North IRL	4	0	$205,277
Stormwater Project in Basin SJR-3	Cape Canaveral Space Force Station	North IRL	2	0	$205,735
Stormwater Project in Basin SJR-30	Cape Canaveral Space Force Station	North IRL	2	0	$205,735
Stormwater Project in Basin SJR-31	Cape Canaveral Space Force Station	North IRL	16	2	$207,764
Stormwater Project in Basin SJR-32	Cape Canaveral Space Force Station	North IRL	2	0	$205,641
Stormwater Project in Basin SJR-33	Cape Canaveral Space Force Station	North IRL	257	30	$285,520
Stormwater Project in Basin SJR-35	Cape Canaveral Space Force Station	North IRL	437	56	$336,622
Stormwater Project in Basin SJR-37	Cape Canaveral Space Force Station	North IRL	10	1	$208,072
Stormwater Project in Basin SJR-4	Cape Canaveral Space Force Station	North IRL	3	0	$206,380
Stormwater Project in Basin SJR-40	Cape Canaveral Space Force Station	North IRL	106	10	$223,691
Stormwater Project in Basin SJR-5	Cape Canaveral Space Force Station	North IRL	16	2	$211,860
Stormwater Project in Basin SJR-8	Cape Canaveral Space Force Station	North IRL	3	0	$205,924
Total	-	-	***143,578***	***15,857***	***$158,997,709***

Appendix G. Long Descriptions of Figures

Figure 1-1. Decline of Commercial Fishing in Brevard County

The graph shows the declining value of the commercial fishery in Brevard County using Florida Fish and Wildlife Conservation Commission data from 1995 through 2023. The commercial fishery values drop over time while fish kill counts increase with the largest peaks in 2007 and 2016. The following table is a summary of the values represented in the graph.

Reporting Year	Value of Commercial Fishery
1995	$21,808,095
1996	$24,052,219
1997	$15,027,821
1998	$11,264,215
1999	$14,765,165
2000	$15,879,487
2001	$13,096,088
2002	$6,253,406
2003	$7,155,669
2004	$8,219,153
2005	$6,314,361
2006	$6,216,198
2007	$5,127,527
2008	$8,207,268
2009	$6,166,197
2010	$6,499,390
2011	$8,354,718
2012	$7,932,126
2013	$7,278,107
2014	$6,588,523
2015	$7,960,368
2016	$6,647,791
2017	$8,444,720
2018	$6,747,679
2019	$7,925,947
2020	$6,964,288
2021	$8,575,781
2022	$9,617,469
2023	$6,623,340

Return to **Figure 1-1**.

Figure 2-2. Summary of the Save Our Indian River Lagoon Outputs and Outcomes

Graphic showing output of Public Education will result in years 0–5 early adopters lead, years 6–10 supporters join, and years 10+ Indian River Lagoon (IRL) friendly lifestyles are normal. Output of Reclaimed Water Upgrades, Sewer Later Rehabilitation, Septic-to-Sewer and Septic System Upgrades, and Stormwater Treatment will result in years 0–5 cleaner ground and surface water, years 6–10 cleaner IRL water, and years 10+ lush seagrass beds. Outputs of Muck Removal and Treatment of Muck Interstitial Water will result in years 0–5 exposed sandy sediments and tons of pollution removed, years 5–10 plentiful bottom dwelling marine life, and years 10+ abundant fishes. Output of Oyster Reefs and Living Shorelines will result in years 0–5

increased filtration, years 5–10 faster storm recovery, and years 10+ healthy stability. Outputs of Project Performance Monitoring and Plan Updates will result in years 0–5 increased efficiency and cost effectiveness, years 5–10 IRL report card shows improvement, and years 10+ the IRL economy grows.

Return to **Figure 2-2**.

Figure 4-1. Grass Clippings Example for a Typical Lot

Example graphic showing the potential for grass clippings to get onto and be left on a road. For a 100 foot by 100 foot lot with a 2,500 square foot home and driveway, it will produce an estimated 3,000 pounds of grass clippings per year containing 75 pounds of total nitrogen and 10.4 pounds of total phosphorus. Grass clippings can be blown into the road from an approximately 2-foot-wide strip of lawn.

Return to **Figure 4-1**.

Figure 4-2. Septic-to-Sewer Projects in Banana River Lagoon

Map showing the locations of the highest priority and high priority sewer locations within the northern portion of the Banana River Lagoon. The five areas with the highest loading, which include Sykes Creek – Kelly Park, Sykes Creek Zone N, Merritt Island Zone C, Merritt Island Zone F, and Sykes Creek Zone M, are funded for septic removal. The map also shows the locations of all individual septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. Most are concentrated along the water in the west and southeast portions of Merritt Island with the areas closest to water being either 10–30 pounds or 30–50 pounds. The areas further from the water are 0–10 pounds. Areas are scattered across the north-central portion of Merritt Island. A line running north to south in the west shows the drainage divide. The Bennett Causeway runs east to west through the top of the map and East Merritt Island Causeway runs east to west through the bottom of the map.

Return to **Figure 4-2**.

Figure 4-3. Septic-to-Sewer Projects in Banana River Lagoon, continued

Map showing the locations of the highest priority and high priority sewer locations within the southern portion of the Banana River Lagoon. The five areas with the highest loading, which include Sykes Creek – Rotary Park, Sykes Creek Zone R, Merritt Island Zone G, South Banana Zone B, and Sykes Creek Zone T, are funded. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover most of the areas near the water with the areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water, including the center of Merritt Island, are 0–10 pounds. A line running north to south in the west shows the drainage divide. South Tropical Trail runs north to south through most of the septic areas on this map.

Return to **Figure 4-3**.

Figure 4-4. Septic-to-Sewer Projects in Banana River Lagoon, continued

Map showing the locations of the highest priority and high priority sewer locations within the central portion of the Banana River Lagoon. The funded areas include City of Satellite Beach – Hedgecock and City of Satellite Beach – Desoto. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. Most of Merritt Island is 10–30 pounds with a scattering of 30–50 pounds in the north portion. A few areas of 0–10 pounds are located in the center north part of the island. A line running north to south in the west shows the drainage divide. Pineda Causeway runs east to west and Rockledge Boulevard runs north to south in this area.

Return to **Figure 4-4**.

Figure 4-5. Septic-to-Sewer Projects in North IRL

Map showing the locations of the highest priority and high priority sewer locations within the northern portion of the North Indian River Lagoon. The areas with the highest loading, which include Titusville Zones A–G, are funded. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. The zones previously mentioned have loading in the 10–30 pounds and 30–50 pounds range. A sparse scatter of 0–10 pound zones occur over the rest of the map with two dense concentrations in the northern half of the map. A line running north to south in the west shows the drainage divide. Garden Street runs east to west in the northern portion of the map and Cheney Highway/Orlando Road runs east to west in the southern part of the map.

Return to **Figure 4-5**.

Figure 4-6. Septic-to-Sewer Projects in North IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the north-central portion of the North Indian River Lagoon. The five areas with the highest loading, which include Sharpes Zone A, Sharpes Zone B, Cocoa Zone C, Manatee Cove Park, and North Merritt Zone E, are funded. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover most of the areas near the water with the areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water are 0–10 pounds. A line running north to south in the west shows the drainage divide. Bennett Causeway is at the bottom of the map running east to west.

Return to **Figure 4-6**.

Figure 4-7. Septic-to-Sewer Projects in North IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the central portion of the central North Indian River Lagoon. The six areas with the highest loading, which include Cocoa Zones J and K, City of Rockledge Breeze Swept, South Central Zone A, Merritt Island Redevelopment Agency Phase 1, Merritt Island Redevelopment Agency Phase 2 Cone Road, and South Tropical Zone A. All are funded. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover most of the areas near the water with the areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water are 0–10 pounds. A line

running north to south in the west shows the drainage divide. King Street/Hubert Humphrey Causeway/Merritt Island Causeway runs east to west in the middle of the map. Cocoa Boulevard runs north to south in the western portion of the map and North Courtenay Parkway runs north to south in the eastern portion of the map.

Return to **Figure 4-7**.

Figure 4-8. Septic-to-Sewer Projects in North IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the south-central portion of the North Indian River Lagoon. The areas of South Central Zone A, Riverwalk Park, and South Central Zone C are funded. The map also shows the locations of all septic systems with loading estimates of 0-10 pounds, 10–30 pounds, and 30–50 pounds. These cover most of the areas near the water with the areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water are 0–10 pounds. A line running north to south in the west shows the drainage divide. Pineda Causeway runs east to west at the bottom of the map. South Tropical Trail runs north to south in the eastern portion of the map.

Return to **Figure 4-8**.

Figure 4-9. Septic-to-Sewer Projects in North IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the southern portion of the North Indian River Lagoon. The areas of South Central Zone D (Brevard), City of Melbourne Riverside, City of Melbourne Kent, City of Melbourne Villa Espana, City of Melbourne Bowers, South Beaches Zone A, South Beaches Zone P, and South Beaches Zone O. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover most of the areas near the water with the areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water are 0–10 pounds. A line running north to south in the west shows the drainage divide. Eau Gallie Causeway runs east to west in the middle of the map.

Return to **Figure 4-9**.

Figure 4-10. Septic-to-Sewer Projects in Central IRL

Map showing the locations of the highest priority and high priority sewer locations within the northern portion of the Central Indian River Lagoon. The funded areas include City of West Melbourne Dundee Place and Manor Place, City of West Melbourne Lake Ashley Circle, City of West Melbourne Sylvan Estates, City of Melbourne Roxy, City of Melbourne Pennwood, City of Melbourne Hoag, and City of Melbourne Avenida del Rio are funded. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover some of the areas near the water with the areas closest to the water being 30–50 pounds. The areas further from the water are 0–10 pounds and 10–30 pounds mostly clustered in the center of the map just west of the Melbourne Causeway along U.S. 192 and approximately 4 miles west of U.S. 192 in West Melbourne. New Haven Avenue/Melbourne Causeway runs east to west through the middle of the map. Babcock Street runs north to south in the middle of the map and Dixie Highway runs north to south closer to the eastern portion of the map.

Return to **Figure 4-10**.

Figure 4-11. Septic-to-Sewer Projects in Central IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the southern portion of the Central Indian River Lagoon. The funded area is the City of Palm Bay Zone A. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover about 30% of the map with a few areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water are 0–10 pounds and tightly clustered in the western part of the map west of Babcock Street in the Malabar area. Clusters of all three types of loading are located away from the water in the central and south central part of the map. Babcock Street runs north to south in the western portion of the map and Dixie Highway runs north to south in the western portion.

Return to **Figure 4-11**.

Figure 4-12. Septic-to-Sewer Projects in Central IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the south central portion of the Central Indian River Lagoon. None of the areas on this map are funded. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover half of the areas near the water on the Barrier Island on the eastern portion of the map. Isolated clusters of high loading areas are located along the waterfront on the mainland or western side of the map. Clusters of all three types of loading are located away from the water in the west-central and southwest part of the map. Highway A1A runs north to south in the middle of the map.

Return to **Figure 4-12**.

Figure 4-13. Septic-to-Sewer Projects in Central IRL, continued

Map showing the locations of the highest priority and high priority sewer locations within the southern portion of the Central Indian River Lagoon. The funded areas include Micco Zones A and B. The map also shows the locations of all septic systems with loading estimates of 0–10 pounds, 10–30 pounds, and 30–50 pounds. These cover most of the areas near the water and along the Saint Sebastian River with the areas closest to the water being either 10–30 pounds or 30–50 pounds. The areas further from the water in the northwestern portion of the map are 30–50 pounds. Clusters of all three types of loading are located in the northwestern and southern part of the map. Dixie Highway runs north to south in the middle of the map and Highway A1A runs north to south in the western portion of the map.

Return to **Figure 4-13**.

Figure 4-14. Quick Connection Septic-to-Sewer Locations in North Brevard County

Map showing the locations of properties eligible to receive reimbursement to connect to a sewer system in the northern portion of the north Indian River Lagoon. Dots scattered along the map indicate whether the owner can connect to a force main or gravity type sewer and whether the parcel is a high priority. On this map, the dots are mostly near the water. Approximately half are for force main connections and half are for gravity sewer connections. A line running north to south in the west shows the drainage divide. These sites are located north and south of the National Aeronautics and Space Administration Causeway on the western side of the IRL.

Return to **Figure 4-14**.

Figure 4-15. Quick Connection Septic-to-Sewer Locations in Central Brevard County

Map showing the locations of properties eligible to receive reimbursement to connect to a sewer system in the central Indian River Lagoon. Dots scattered along the map indicate whether the owner can connect to a force main or gravity type sewer and whether the parcel is a high priority. On this map, the dots are mostly near the water and tightly clustered in the northern portion of the map on Merritt Island. A few are scattered near the water in the southern portion of the map south of the Pineda Causeway. Approximately half are for force main connections and half are for gravity sewer connections. A line running north to south in the west shows the drainage divide. The sites are located near the Merritt Island Causeway to the northern portion of the map and Pineda Causeway to the southern portion of the map.

Return to **Figure 4-15**.

Figure 4-16. Quick Connection Septic-to-Sewer Locations in South Brevard County

Map showing the locations of properties eligible to receive reimbursement to connect to a sewer system in the southern portion of the Indian River Lagoon in Brevard County. Dots scattered along the map indicate whether the owner can connect to a force main or gravity type sewer and whether the parcel is a high priority. On this map, the dots are mostly near the water and tightly clustered in the northern portion of the map near Melbourne and Eau Gallie. A few are scattered near the water in the central portion of the map near Malabar. Approximately 20% are for force main connections and approximately 80% are for gravity sewer connections. A line running north to south in the west shows the drainage divide.

Return to **Figure 4-16**.

Figure 4-17. Example In-Ground Nitrogen-Reducing Biofilter Septic System

This a diagram showing how an in-ground nitrogen reducing biofilter is constructed. It shows a septic tank to the left with a pipe leading out of it with an arrow showing the direction of water flow to the drainfield. The drainfield area is depicted as an 18-inch layer of soil above a 12-inch layer of woodchips or other denitrification media. A layer below these shows an empty space which indicates native soil that should be at least six inches above the seasonal high water table.

Return to **Figure 4-17**.

Figure 4-18. Septic System Upgrades in North Brevard County

Map showing the locations of properties eligible to receive reimbursement to install an upgraded septic system in the northern portion of Brevard County along the Indian River Lagoon. Dots scattered along the map indicate whether the owner is eligible to receive reimbursement. On this map, the dots are mostly near the water and scattered from north to south. A line running north to south in the west shows the drainage divide. The National Aeronautics and Space Administration Causeway runs east to west near the southern part of the map.

Return to **Figure 4-18**.

Figure 4-19. Septic System Upgrades in Central Brevard County

Map showing the locations of properties eligible to receive reimbursement to install an upgraded septic system in the central portion of Brevard County along the Indian River Lagoon. Dots scattered along the map indicate whether the owner is eligible to receive reimbursement. On this map, the dots are mostly near the water and scattered from north to south on Merritt Island. A line running north to south in the west shows the drainage divide. The Bennett Causeway and Merritt Island Causeway run east to west in the northern portion of the map. Rockledge Parkway runs north to south on the western side and Courtenay Parkway runs north to south on the eastern side of the IRL.

Return to **Figure 4-19**.

Figure 4-20. Septic System Upgrades in South Brevard County

Map showing the locations of properties eligible to receive reimbursement to install an upgraded septic system in the southern portion of Brevard County along the Indian River Lagoon. Dots scattered along the map indicate whether the owner is eligible to receive reimbursement. On this map, the dots are mostly near the water and scattered from north to south on along U.S. 1 and about one to three miles inland. A line running north to south in the west shows the drainage divide. The Eau Gallie Causeway and 5th Avenue run east to west near the top of the map Babcock Street runs north to south in the middle of the map.

Return to **Figure 4-20**.

Figure 4-21. Stormwater Projects in North Brevard County

Map showing the selected basins for stormwater treatment in the northern portion of the Banana River Lagoon and North Indian River Lagoon in Brevard County. Project areas cover most of the shoreline on the mainland and are all part of the North Indian River Lagoon. Project areas cover the southern portion of North Merritt Island and half are part of the North Indian River Lagoon while the other half are part of the Banana River Lagoon. Project areas cover the southern part of the Barrier Island and all are part of the Banana River Lagoon.

Return to **Figure 4-21**.

Figure 4-22. Stormwater Projects in Central Brevard County

Map showing the selected basins for stormwater treatment in the southern portion of the Banana River Lagoon and North Indian River Lagoon in Brevard County. Project areas cover roughly 80% of the shoreline on the mainland and are all part of the North Indian River Lagoon. Project areas cover the southern portion of South Merritt Island and 40% are part of the North Indian River Lagoon while 60% are part of the Banana River Lagoon. Project areas cover a portion of the Barrier Island and all are part of the Banana River Lagoon.

Return to **Figure 4-22**.

Figure 4-23. Stormwater Projects in South Brevard County

Map showing the selected basins for stormwater treatment in the Central Indian River Lagoon for Brevard County. Project areas the northern part of the shoreline on the mainland and are part of the North Indian River Lagoon. Project areas cover roughly 80% of the Barrier Island and mostly part of the Banana River Lagoon with one that is North Indian River Lagoon.

Return to **Figure 4-23**.

Figure 4-24. Location of Muck Removal Projects in the Northern Banana River Lagoon

Map of the northern Banana River Lagoon in Brevard County showing the locations of the funded and unfunded muck removal projects. Four unfunded projects are in the very northern part of the Banana River Lagoon near the top of the map. Towards the bottom of the map, just south of State Highway 528, are three funded projects: Canaveral South is along the Barrier Island shoreline, Merritt Island Phase I is along the Merritt Island shoreline, and Sykes Creek is a little further south and west. Additional unfunded projects are located at the bottom of the map, as well as the canals on Merritt Island.

Return to **Figure 4-24**.

Figure 4-25. Location of Muck Removal Projects in the Southern Banana River Lagoon

Map of the southern Banana River Lagoon in Brevard County showing the locations of the funded and unfunded muck removal projects. Towards the top of the map, just south of State Highway 528, are three funded projects. Canaveral South is along the Barrier Island shoreline. Merritt Island Phase I is just to the south and west along the Merritt Island shoreline. The Sykes Creek project is a little further south and west from that project. Further south, below State Highway 520, is the Cocoa Beach IIB project along the Barrier Island shoreline. South of that is the Cocoa Beach Phase III project. To the west of that is the Cocoa Beach Golf project. About six miles south along the Barrier Island is the Patrick Space Force Base project. To the west of that is the Pineda Banana River Lagoon project near the Merritt Island shoreline. South of that project, and south of State Highway 404 is the Grand Canal project on the Barrier Island. South of that project is the Satellite Beach project followed by the Indian Harbour Beach project.

Return of **Figure 4-25**.

Figure 4-26. Location of Muck Removal Projects in North IRL

Map of the North Indian River Lagoon in Brevard County showing the locations of the funded and unfunded muck removal projects. Eight funded projects are shown. Mims Rim Ditch is at the top of the map along the mainland shoreline. To the south of that is the Titusville Railroad West project. Just east of that on the Merritt Island shoreline is the Titusville Railroad East project. The National Aeronautics and Space Administration Causeway East project is about 10 miles south along the Merritt Island shoreline and just north of State Highway 405. The Rockledge A project is about 15 miles south along the Merritt Island shoreline. The Tequesta Harbor project is a little to the south and west. The Eau Gallie Northeast project is about 9 miles south near the Merritt Island shoreline. The Spring Creek project is located about two miles south and near the bottom of the map on the mainland.

Return to **Figure 4-26**.

Figure 4-27. Location of Muck Removal Projects in Central IRL

Map of the Central Indian River Lagoon in Brevard County showing the locations of the funded and unfunded muck removal projects. The only funded projects are the Turkey Creek project, which is about three miles south of U.S. Highway 192 along the mainland shoreline, and Sunnyland, which is on the barrier island near the south end of the map.

Return to **Figure 4-27**.

Figure 4-28. Phase I Potential Enhanced Circulation Project Locations

Map of Brevard County showing a 40 square mile area where potential enhanced circulation projects could be located. The St. Johns River Water Management District identified potential projects the following areas: one in the southern part of the Mosquito Lagoon, one in the northern part of the Banana River Lagoon, two in Cape Canaveral, one at Patrick Air (Space) Force Base, and one at Malabar. They identified four internal projects with one at the north end of Merritt Island, two around Haulover Canal, and one in central Merritt Island. CDM Smith identified 23 additional potential project locations both internal and external spread throughout Brevard County with a heavy concentration around central Merritt Island.

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Figure 4-29. Shoreline Survey to Identify Locations Appropriate for Oyster Bars and Planted Shorelines

Map of Brevard County showing the shoreline survey edge types including bulkhead and seawall, hardened slope and riprap, and no structures. No structures were found mainly in the northern portion of Brevard County on the mainland and also around the central part of Merritt Island near Kennedy Space Center. There were also small concentrations on the southern part of Merritt Island in the Banana River Lagoon and on the southern portion of the Barrier Island. The rest of the shoreline was interspersed with both bulkhead and seawall types and hardened slope and riprap types. A large concentration of bulkhead and seawall was found on the western shore of Merritt Island, along Sykes Creek, in Cocoa Beach, and much of the west coast of the central Barrier Island.

Return to **Figure 4-29**.

Figure 4-30. Estimated Economic Value of Some Seagrass Services

Graphic showing the economic value provided by seagrass adapted from Dewsbury et. al. (2016). Seagrasses provide direct grazing by turtles, manatees, fish, and snails, which has an unknown economic value. It is also nursery grounds for fish and crabs and benefit coral reefs, commercial fisheries, and recreation for a $4,600 per acre per year economic value. Additionally, it sequesters carbon, which reduces carbon dioxide for a $162 per acre per year economic value. It also reduces wave energy, which leads to sediment stability and improved water quality for an unknown economic benefit. Finally, it cycles and sequesters nutrients for an economic value of $7,695 per acre per year. Seagrasses provide a total economic benefit of $12,457 per acre per year. In 2007, there were 72,400 acres providing a total benefit of more than $902,000,000.

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Figure 4-31. Completed Projects in North Brevard County

Map of North Brevard County showing locations of 24 completed projects. Near the top of the map, the Basin 10 County Line Road woodchip bioreactor is located at the north end on the west shore of the Indian River Lagoon. About two miles southeast of that is the Basin 26 Sunset Road Serenity Park woodchip bioreactor. About a half mile southeast of that is the Basin 22 Huntington Road Serenity Park woodchip bioreactor. One mile southwest of that is the Basin 51 Johns Road pond biosorption activated media and Basin 62 denitrification retrofit of Johns Road Pond. About a half mile southeast of that is the County stormwater pond harvesting and denitrification of Flounder Creek pond. One mile south of that is the Basin 89 Scottsmoor I Aurantia Road denitrification. One mile south of that is Basin 100 Burkholm Road biosorption activated media. A half mile south of that is Basin 115 Carter Road biosorption activated media. One mile south of that is the Basin 141 Irwin Avenue woodchip bioreactor. One mile south of that is the Basin 193 Wiley Avenue biosorption activated media. To the east of that is Mims muck removal. About three miles south is the Unincorporated Countywide Vegetation Harvesting. About a mile to the west is the Coleman Pond managed aquatic plant system. About a mile southeast is the Osprey Plant pond managed aquatic plant system, Osprey Wastewater Treatment Facility, and Marina B managed aquatic plant system. About a half mile southwest is the Draa Field vegetation harvesting and Draa Field pond managed aquatic plant systems. One mile to the east is the Commons and City Hall Tree Boxes and San Point Park. A half mile south is the South Street baffle box. About a half mile southwest is the St. Johns 2 baffle box project.

Return to **Figure 4-31**.

Figure 4-32. Completed Projects in North Central Brevard County

Map of North Central Brevard County showing locations of 7 completed projects. Near the top of the map is the St. Johns 2 baffle box. About one and half miles to the southeast is the Titusville High School baffle box along the western shore of the Indian River Lagoon. One mile south of that is St. Theresa baffle box. About a half mile south of that is the La Paloma baffle box. About three miles south of that is the Riverfront Center Nutrient Removing Filtration Boxes. About 2 miles south of that is the Oak Point Wastewater Treatment Facility improvements. About three miles south of that is the Basin 832 Broadway biosorption activated media project.

Return to **Figure 4-32**.

Figure 4-33. Completed Projects in Central Brevard County

Map of North Central Brevard County showing locations of 18 completed projects. Near the top of the map is the floating wetlands to existing stormwater ponds. About a quarter mile to the southeast is the North Fiske stormwater pond floating wetlands and North and South Lakemont ponds floating wetlands. Two miles south of that is the Church Street baffle box. One and half miles south of that is the City of Rockledge flow equalization basin. A half mile southeast of that is the Breeze Swept septic removal. At the northern part of Merritt Island is the Unincorporated Countywide vegetation harvesting 2 project. In the middle part of Merritt Island is the Merritt Island lateral smoke testing. About one and a half miles south of that is the Merritt Island Redevelopment Agency Septic Removal Phase 1 and Phase 2 septic removal projects. Near the top of the map on the barrier island is the Central Boulevard baffle box. About three and a half miles south of that is the Cocoa Beach muck dredging Phase II-b. One mile south of that is

the Maritime Hammock Preserve stormwater pond vegetation harvesting and Woodland Business Center stormwater retention. About a half mile southwest of that is the Convair Cove 1 stormwater and Convair Cove 2 stormwater projects. About one mile south of that is the Cocoa Beach muck dredging Phase III. To the west of that is the Cocoa Beach Water Reclamation Facility upgrade. About a half mile southwest of that is the Cocoa Beach golf course stormwater pond harvesting.

Return to **Figure 4-33**.

Figure 4-34. Completed Projects in South Central Brevard County

Map of South Central Brevard County showing locations of 25 completed projects. Near the top of the map is the South Central Zone C septic system project. About a mile to the south is the Waelti Drive pond retrofit. A mile and half to the couth is the Horseshoe Pond vegetative harvesting and Basin 1298 bioreactor. Two miles south of that is the North Wickham and Conservation Place wet pond retrofit. About a mile to the east is the Sherwood Park stormwater quality project. One mile south of that is the Thrush Drive baffle box. About a mile south is the Lake Washington and Croton Road pond retrofit. One mile southeast of that is the Cliff Creek baffle box. One mile to the west of that is the Johnson Junior High denitrification media chamber modification. About four miles southeast is the high school and funeral home baffle box. About one mile south of that is the Grant Place baffle box. About two miles to the Crane Creek/M-1 Canal flow restoration. About one mile southwest of that is the Ray Bullard Water Reclamation Facility stormwater management area. About two miles to the southwest of that is the Sylvan Estates septic-to-sewer conversion project. On the barrier island towards the top of the map is the Basin 1304 bioreactor and Basin 1340B West Arlington Road denitrification. Two miles south of that is the Jackson Court stormwater treatment facility. About a half mile south of that is the Lori Laine Basin pipe improvement project. About a half mile south of that is the Hedgecock/Grabowsky and Desoto Fields septic-to-sewer conversion. About one mile south of that is the Satellite Beach lateral smoke testing. One mile south of that is the Big Muddy at Cynthia baffle box. About one mile southwest of that is the Gleason Park reuse. About one and half miles south of that is the Basin 1398 Sand Dollar canal harvesting. About two miles south of that is the Basin 5 dry retention project.

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Figure 4-35. Completed Projects in South Brevard County

Map of south Brevard County showing locations of 7 completed projects. Near the top of the map is the Bayfront stormwater project and Turkey Creek muck removal. About two miles southwest of that is the City of Palm Bay Water Reclamation Facility. About 9 miles southeast of that is the Barefoot Bay lateral smoke testing project. About 3 miles south of that is the Basin 2134 Fleming Grant biosorption activated media. Near the top of the map on the barrier island is the South Beach lateral smoke testing. Near the bottom of the map on the barrier island is the Long Point package plant upgrade.

Return to **Figure 4-35**.

Figure 4-36. Countywide Groundwater Nutrient Concentrations for TN (top) and TP (bottom)

Bar graphs showing the total nitrogen (TN) and total phosphorus (TP) concentrations in groundwater for four areas: natural or undeveloped, septic system communities, sewer

communities, and reclaimed water communities. The following table summarizes the values shown in the bar graphs.

Area	Total Nitrogen Median Concentration (milligrams per liter)	Total Phosphorus Median Concentration (milligrams per liter)
Natural, Undeveloped Area	0.29	0.10
Septic Communities	2.71	0.65
Sewer Communities	1.17	0.14
Reclaimed Water Communities	4.11	0.12

Return to **Figure 4-36**.

Figure 4-37. Monitoring Sensor Locations at the Grand Canal Dredge Material Management Area from May 1 – 31, 2024

Map showing the locations of air monitor stations placed downwind of construction activities, which were relocated daily based on prevailing wind direction from the National Oceanic and Atmospheric Administration forecast. Starting in the northwest corner is the May 4 location, going to the east is the May 8 location, then the May 30 and 31 location, and then the May 9 location. South of those, going from west to east are the May 16, May 13, May 14, and May 24 locations. South of those, going from west to east, are the May 6 and 28, May 1, May 17, and May 1 locations. Going further to the southwest is the May 15 location. South of those, going from west to east, are the May 20, May 11, May 10, May 29, and May 7 locations. The furthest south, going from west to east are the May 23, May 21 and 22, May 2, May 3, and May 18 locations. In addition, in the very south-central portion is the location for stationary air monitor for the construction area closest to the Tortoise Island homes.

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Figure 4-38. Effluent Concentrations from Interstitial Water Treatment at Grand Canal

A scatterplot showing the effluent concentrations from interstitial water treatment at Grand Canal with total nitrogen (TN) on the left axis and total phosphorus (TP) on the right axis. The blue horizontal line indicates the nitrogen effluent target (3 milligrams per liter) while the green line indicates the phosphorus effluent target (0.075 milligrams per liter). The following table summarizes the values shown in the chart.

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
11/5/2019	3.80	0.2700	7/1/2023	0.88	0.0061
11/6/2019	4.00	0.3600	7/3/2023	1.30	0.0210
11/7/2019	9.60	0.7300	7/5/2023	1.20	0.0061
11/8/2019	14.50	1.2000	7/7/2023	0.83	0.0061
11/9/2019	15.30	1.3000	7/8/2023	0.42	0.0061
11/11/2019	13.20	1.2000	7/12/2023	0.90	0.0061
11/12/2019	10.90	0.9000	7/13/2023	1.30	0.0061

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
11/13/2019	19.40	1.6000	7/14/2023	1.00	0.0061
11/14/2019	14.30	1.2000	7/15/2023	1.30	0.0061
11/15/2019	12.00	1.1000	7/18/2023	0.82	0.0061
11/16/2019	14.90	1.3000	7/19/2023	1.50	0.0061
11/18/2019	9.90	0.9500	7/20/2023	1.70	0.0061
11/19/2019	3.80	1.5000	7/21/2023	1.50	0.0061
11/19/2019	20.00	1.5000	7/22/2023	1.60	0.0061
11/20/2019	24.00	1.7000	7/24/2023	1.50	0.0254
8/28/2020	20.00	1.8000	7/25/2023	0.09	0.0061
8/31/2020	19.00	1.9000	7/26/2023	0.67	0.0061
9/1/2020	16.00	1.6000	7/27/2023	0.08	0.0061
9/2/2020	1.20	0.9700	7/28/2023	0.58	0.0061
9/3/2020	2.70	2.0000	7/29/2023	0.67	0.0157
9/4/2020	1.40	0.1200	7/31/2023	0.76	0.0061
9/5/2020	4.10	0.1800	8/1/2023	1.70	0.0061
9/8/2020	8.20	1.0000	8/2/2023	0.51	0.0061
9/9/2020	6.70	0.1400	8/3/2023	1.70	0.0061
9/10/2020	0.58	0.0450	8/4/2023	0.69	0.0061
9/11/2020	1.50	0.1300	8/5/2023	1.00	0.0100
9/12/2020	1.30	0.1300	8/7/2023	1.10	0.0061
9/14/2020	0.94	0.1400	8/8/2023	1.10	0.0061
9/15/2020	1.30	0.2800	8/9/2023	0.17	0.0100
9/18/2020	0.66	0.2600	8/10/2023	0.84	0.0072
9/19/2020	6.70	0.1300	8/11/2023	1.20	0.0061
9/21/2020	2.00	0.0600	8/12/2023	1.20	0.0061
9/22/2020	2.80	0.0890	8/14/2023	1.30	0.0061
9/23/2020	1.90	0.1400	8/15/2023	1.40	0.0061
9/24/2020	2.60	0.0790	8/16/2023	0.11	0.0061
9/25/2020	2.50	0.0960	8/17/2023	0.43	0.0061
9/26/2020	2.10	0.0680	8/18/2023	1.40	0.0061
9/28/2020	1.20	0.0630	8/19/2023	1.00	0.0061
3/30/2021	5.20	0.5400	8/21/2023	0.54	0.0061
3/31/2021	38.00	1.7000	8/22/2023	1.20	0.0061
4/1/2021	37.00	1.9000	8/23/2023	1.30	0.0132
4/2/2021	53.00	0.3600	8/24/2023	1.10	0.0061
4/3/2021	47.00	1.8000	8/25/2023	1.30	0.0061
4/5/2021	35.00	0.1600	8/26/2023	0.78	0.0061
4/7/2021	1.80	0.1500	8/28/2023	1.30	0.0061
4/8/2021	1.50	0.1100	8/29/2023	1.40	0.0061

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
4/9/2021	11.00	0.0390	8/30/2023	2.10	0.0061
4/12/2021	1.00	0.0720	8/31/2023	1.80	0.0061
4/13/2021	1.20	0.1400	9/1/2023	0.71	0.0061
4/14/2021	0.69	0.1300	9/2/2023	1.20	0.0061
4/15/2021	1.30	0.0750	9/5/2023	1.10	0.0061
4/16/2021	1.60	0.1400	9/7/2023	0.78	0.0268
4/21/2021	1.20	0.1500	9/8/2023	0.92	0.0061
4/22/2021	0.91	0.0770	9/11/2023	0.96	0.0061
4/23/2021	1.30	0.0740	9/12/2023	1.20	0.0061
4/24/2021	0.74	0.0690	9/13/2023	0.85	0.0061
4/26/2021	0.83	0.0670	9/16/2023	0.74	0.0061
4/27/2021	2.10	0.0700	9/18/2023	1.10	0.0061
4/28/2021	1.70	0.0700	9/19/2023	0.55	0.0061
4/29/2021	1.20	0.1600	9/20/2023	1.40	0.0061
4/30/2021	1.40	0.0820	9/21/2023	0.45	0.0061
5/1/2021	2.20	0.0580	9/22/2023	6.60	0.0061
5/3/2021	1.00	0.0330	9/23/2023	0.70	0.0061
5/4/2021	1.30	0.0830	9/25/2023	1.30	0.0061
5/5/2021	1.30	0.1400	9/28/2023	0.74	0.0061
5/6/2021	11.00	0.1100	9/29/2023	0.76	0.0061
5/7/2021	2.20	0.1000	9/30/2023	0.66	0.0061
5/8/2021	33.00	0.0860	10/2/2023	0.48	0.0061
5/10/2021	1.90	0.1000	10/3/2023	0.61	0.0061
5/11/2021	1.60	0.1700	10/4/2023	0.75	0.1830
5/12/2021	1.80	0.1900	10/5/2023	0.61	0.0061
5/13/2021	1.50	0.0200	10/6/2023	0.83	0.0061
5/14/2021	2.00	0.0560	10/7/2023	0.66	0.0061
5/15/2021	1.90	0.2400	10/10/2023	0.87	0.0061
5/17/2021	2.30	0.0980	10/11/2023	0.67	0.0061
5/18/2021	2.10	0.2200	10/12/2023	1.20	0.0061
5/19/2021	13.00	0.2100	10/13/2023	1.30	0.0061
5/20/2021	29.00	0.2100	10/14/2023	1.10	0.0061
5/21/2021	19.00	0.0360	10/16/2023	0.62	0.0085
5/22/2021	16.00	0.5800	10/17/2023	0.92	0.0061
5/24/2021	4.10	0.4200	10/18/2023	1.10	0.0061
5/25/2021	2.30	0.4900	10/19/2023	0.44	0.0061
5/26/2021	19.00	0.2800	10/20/2023	5.10	0.0061
5/27/2021	2.20	0.2800	10/21/2023	0.90	0.0061
5/28/2021	1.30	0.2600	10/23/2023	0.92	0.0061

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
5/29/2021	1.30	0.1800	10/24/2023	0.86	0.0061
6/2/2021	0.83	1.0000	10/25/2023	0.43	0.0061
6/3/2021	1.30	0.4100	10/26/2023	0.65	0.0061
6/4/2021	1.40	0.1200	10/27/2023	0.37	0.0061
6/5/2021	24.00	0.2800	10/28/2023	0.52	0.0061
6/7/2021	34.00	0.9100	10/30/2023	0.77	0.0061
6/8/2021	35.00	0.1200	10/31/2023	1.30	0.0061
6/9/2021	6.00	0.1200	11/1/2023	0.56	0.0061
6/14/2021	2.60	0.1100	11/2/2023	0.75	0.0061
6/15/2021	9.50	0.1600	11/3/2023	0.66	0.0061
6/16/2021	1.70	0.3100	11/6/2023	0.85	0.0061
6/17/2021	1.90	0.2500	11/9/2023	0.20	0.0061
6/18/2021	2.40	0.2700	11/10/2023	0.39	0.0061
6/19/2021	0.30	0.1000	11/11/2023	0.62	0.0061
6/21/2021	0.44	0.0840	11/13/2023	2.00	0.0061
6/22/2021	0.27	0.0940	11/14/2023	2.40	0.0061
6/23/2021	0.88	0.1400	11/15/2023	2.10	0.0061
6/24/2021	1.10	0.1000	11/16/2023	2.00	0.0343
6/25/2021	0.84	0.2000	11/17/2023	1.20	0.5100
6/26/2021	1.40	0.1400	11/18/2023	0.32	0.2360
6/28/2021	1.20	0.0780	11/20/2023	0.46	0.0061
6/29/2021	1.40	0.1600	11/21/2023	1.50	0.0061
6/30/2021	28.00	0.2000	11/22/2023	0.74	0.0061
7/1/2021	2.40	0.1100	11/27/2023	0.02	0.0171
7/2/2021	1.80	0.1200	11/28/2023	33.00	0.0203
7/6/2021	4.30	0.0780	11/29/2023	1.70	0.0832
7/7/2021	3.00	0.1100	11/30/2023	3.70	0.0061
7/8/2021	1.40	0.0420	4/1/2024	8.90	0.0061
7/9/2021	6.80	0.0770	4/2/2024	14.00	0.0061
7/12/2021	2.10	0.0520	4/3/2024	19.00	0.0877
7/13/2021	1.60	0.0400	4/4/2024	1.10	0.0061
7/14/2021	2.20	0.0820	4/5/2024	1.60	0.0061
7/15/2021	2.80	0.0710	4/6/2024	0.81	0.0061
7/16/2021	2.80	0.0640	4/8/2024	0.63	0.0061
7/17/2021	1.90	0.0890	4/9/2024	0.82	0.0061
7/19/2021	1.30	0.0700	4/10/2024	0.65	0.0061
7/20/2021	0.90	0.0800	4/12/2024	0.76	0.0061
7/21/2021	1.30	0.0820	4/13/2024	1.10	0.0061
7/22/2021	1.20	0.0680	4/15/2024	0.62	0.0061
7/23/2021	1.80	0.0990	4/16/2024	0.72	0.0061

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
7/24/2021	1.90	0.1600	4/17/2024	1.20	0.0061
7/29/2021	1.50	0.1600	4/18/2024	1.40	0.0061
7/30/2021	1.60	0.0820	4/19/2024	1.60	0.0248
8/2/2021	1.20	0.1100	4/22/2024	1.50	0.0061
8/3/2021	0.80	0.0800	4/30/2024	1.60	0.0061
8/4/2021	1.60	0.0200	5/1/2024	2.10	0.0061
8/5/2021	2.80	0.0200	5/2/2024	2.50	0.0061
8/6/2021	3.00	0.0390	5/3/2024	1.10	0.0061
8/9/2021	22.00	0.0930	5/6/2024	2.10	0.0061
8/10/2021	21.00	1.4000	5/7/2024	2.10	0.0061
8/11/2021	2.70	0.0200	5/8/2024	2.40	0.0061
8/12/2021	2.10	0.0540	5/9/2024	1.80	0.0061
8/13/2021	2.70	0.0690	5/10/2024	1.90	0.0061
8/14/2021	2.20	0.0450	5/11/2024	1.10	0.0061
8/16/2021	14.00	0.0450	5/13/2024	1.50	0.0061
8/17/2021	2.00	0.1000	5/14/2024	1.50	0.0061
8/18/2021	2.40	0.0960	5/15/2024	1.80	0.0061
8/19/2021	1.40	0.0600	5/16/2024	1.50	0.0061
8/20/2021	3.30	0.0790	5/17/2024	0.32	0.0061
8/23/2021	3.90	0.0610	5/18/2024	0.09	0.0061
8/24/2021	1.40	0.0500	5/21/2024	0.20	0.0061
8/25/2021	1.60	0.0480	5/22/2024	0.50	0.0061
8/26/2021	1.20	0.0310	5/23/2024	1.50	0.0090
8/27/2021	1.20	0.0620	5/24/2024	1.80	0.0061
8/30/2021	1.50	0.1100	5/28/2024	1.10	0.0088
8/31/2021	4.90	0.0640	5/29/2024	0.73	0.0061
9/1/2021	2.30	0.0520	5/30/2024	0.28	0.0136
9/2/2021	2.00	0.1100	5/31/2024	4.40	0.0850
9/3/2021	2.60	0.0360	6/1/2024	0.09	0.0097
9/7/2021	1.80	0.0760	6/3/2024	20.00	0.0929
9/8/2021	2.40	0.0410	6/4/2024	18.00	0.0886
9/9/2021	2.00	0.0440	6/5/2024	7.10	0.0273
9/10/2021	1.20	0.0510	6/6/2024	2.50	0.0174
9/11/2021	1.80	0.0790	6/7/2024	0.39	0.0123
9/13/2021	1.90	0.0220	6/8/2024	2.60	0.0202
9/14/2021	4.00	0.0430	6/10/2024	2.70	0.0321
9/15/2021	2.20	0.0610	6/13/2024	0.86	0.0163
9/18/2021	1.60	0.0550	6/14/2024	0.91	0.0244
9/20/2021	0.64	0.0710	6/15/2024	1.50	0.0172
9/21/2021	1.40	0.0820	6/17/2024	0.33	0.0106

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
9/22/2021	2.70	0.0880	6/18/2024	0.38	0.0092
9/23/2021	2.10	0.0790	6/19/2024	0.18	0.0061
9/24/2021	1.90	0.0900	6/20/2024	0.58	0.0061
9/25/2021	9.50	0.0870	6/21/2024	2.30	0.0070
9/27/2021	3.20	0.1000	6/22/2024	1.10	0.0110
9/28/2021	4.30	0.0690	6/25/2024	0.44	0.0061
9/29/2021	1.70	0.0500	6/26/2024	0.66	0.0061
9/30/2021	1.50	0.0590	6/27/2024	0.18	0.0211
10/1/2021	1.60	0.0550	6/28/2024	0.69	0.0208
10/2/2021	1.90	0.0320	6/29/2024	1.30	0.0061
10/4/2021	1.80	0.0290	7/1/2024	0.89	0.0061
10/8/2021	3.60	0.0340	7/2/2024	0.70	0.0061
10/9/2021	1.70	0.1600	7/8/2024	1.00	0.0061
10/11/2021	5.00	0.2400	7/9/2024	0.62	0.0061
10/12/2021	1.50	0.1300	7/10/2024	2.00	0.0079
10/13/2021	1.60	0.2100	7/11/2024	0.85	0.0061
10/14/2021	1.90	0.1000	7/13/2024	1.10	0.0061
10/15/2021	1.10	0.1100	7/15/2024	2.50	0.0061
10/16/2021	1.90	0.2600	7/16/2024	0.96	0.0061
10/18/2021	3.50	0.1700	7/17/2024	0.96	0.0061
10/19/2021	1.20	0.2000	7/19/2024	0.93	0.0061
10/20/2021	1.50	0.0520	7/20/2024	2.40	0.0061
10/21/2021	3.10	0.4000	7/22/2024	2.50	0.0061
10/22/2021	1.00	0.1300	7/23/2024	1.20	0.0061
10/23/2021	1.30	0.3000	7/24/2024	1.80	0.0061
10/25/2021	1.40	0.2500	7/25/2024	1.60	0.0061
10/26/2021	1.10	0.3200	7/26/2024	1.40	0.0061
10/27/2021	1.60	0.2600	7/27/2024	0.38	0.0061
10/28/2021	1.40	0.3600	7/29/2024	0.76	0.0090
10/29/2021	1.30	0.1500	7/30/2024	0.61	0.0190
10/30/2021	1.20	0.0820	7/31/2024	0.57	0.0061
11/1/2021	1.00	0.2800	8/1/2024	0.91	0.0061
11/2/2021	0.99	0.1000	8/2/2024	1.30	0.0061
11/3/2021	1.30	0.1400	8/3/2024	0.98	0.0102
11/4/2021	1.40	0.1700	8/5/2024	0.07	0.0061
11/5/2021	1.40	0.2800	8/6/2024	0.21	0.0061
11/6/2021	1.10	0.4000	8/7/2024	0.85	0.0061
11/7/2021	0.94	0.5400	8/8/2024	1.10	0.0061
11/8/2021	1.20	0.4700	8/9/2024	2.60	0.0061
11/9/2021	1.00	0.3300	8/10/2024	7.90	0.0061

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
11/10/2021	1.10	0.3000	8/12/2024	5.00	0.0061
11/11/2021	1.80	0.4100	8/13/2024	1.00	0.0061
11/12/2021	1.70	0.3300	8/15/2024	0.67	0.0061
11/15/2021	1.10	0.0920	8/16/2024	0.77	0.0061
11/16/2021	0.99	0.1500	8/17/2024	0.79	0.0061
11/17/2021	1.70	0.1500	8/20/2024	1.90	0.0061
11/18/2021	1.70	0.2100	8/21/2024	1.60	0.0061
11/19/2021	1.50	0.2900	8/22/2024	1.30	0.0205
11/20/2021	0.30	0.2200	8/23/2024	0.87	0.0205
11/21/2021	0.45	0.2600	8/26/2024	0.85	0.0122
11/22/2021	0.60	0.1600	8/27/2024	0.92	0.0112
11/23/2021	0.45	0.4300	8/28/2024	0.77	0.0091
11/24/2021	1.10	0.1500	8/29/2024	1.60	0.0061
11/27/2021	1.20	0.1700	8/30/2024	1.70	0.0061
11/28/2021	1.50	0.2600	9/3/2024	2.00	0.0061
11/29/2021	1.50	0.2500	9/4/2024	1.80	0.0061
11/30/2021	1.60	0.2500	9/5/2024	0.38	0.0061
3/22/2022	27.00	0.3000	9/6/2024	0.17	0.0061
3/23/2022	37.00	0.3500	9/7/2024	0.20	0.0061
3/24/2022	25.00	0.2300	9/9/2024	0.35	0.0061
3/25/2022	26.00	0.3000	9/10/2024	0.25	0.0061
3/26/2022	38.00	0.2000	9/11/2024	0.68	0.0328
3/28/2022	36.00	0.3200	9/12/2024	0.45	0.0206
3/29/2022	33.00	0.2100	9/13/2024	0.69	0.0230
3/30/2022	33.00	0.4500	9/14/2024	0.47	0.0148
3/31/2022	18.00	0.1900	9/16/2024	0.85	0.0061
4/1/2022	14.00	0.1600	9/17/2024	2.00	0.0061
4/2/2022	11.00	0.0500	9/18/2024	0.73	0.0061
4/4/2022	16.00	0.0760	9/19/2024	2.90	0.0371
4/5/2022	19.00	0.1000	9/20/2024	0.56	0.0119
4/18/2022	5.70	0.0710	9/21/2024	1.30	0.0127
4/20/2022	2.80	0.0104	9/23/2024	0.97	0.0061
4/21/2022	1.40	0.0435	9/24/2024	0.94	0.0061
4/22/2022	1.30	0.0332	9/25/2024	1.20	0.0061
4/23/2022	2.30	0.0256	9/26/2024	1.10	0.0061
4/25/2022	9.40	0.0097	9/27/2024	1.90	0.0061
4/26/2022	7.80	0.0424	9/28/2024	1.80	0.0061
4/27/2022	3.60	0.0262	9/30/2024	1.80	0.0061
4/28/2022	2.10	0.0585	10/1/2024	1.50	0.0061
4/29/2022	1.40	0.0097	10/5/2024	0.98	0.0061
5/2/2022	1.10	0.0097	10/14/2024	1.40	0.0061
5/3/2022	2.10	0.0097	10/15/2024	2.00	0.0061
5/5/2022	1.50	0.0097	10/16/2024	2.50	0.0123

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
5/6/2022	1.70	0.0097	10/17/2024	1.50	0.0182
5/7/2022	3.50	0.0212	10/18/2024	4.60	0.0061
5/9/2022	2.40	0.0097	10/19/2024	3.20	0.0061
5/11/2022	2.50	0.0097	10/21/2024	3.30	0.0061
5/12/2022	1.50		10/22/2024	5.30	0.0236
5/13/2022	2.40	0.0551	10/23/2024	2.30	0.0061
5/14/2022	1.40	0.1230	10/24/2024	2.80	0.0061
5/16/2022	1.40	0.0816	10/25/2024	1.90	0.0061
5/17/2022	1.60	0.0377	10/26/2024	1.70	0.0061
5/18/2022	1.70	0.0529	10/28/2024	3.80	0.0096
5/19/2022	3.70	0.0333	10/29/2024	2.90	0.0370
5/20/2022	1.30	0.0388	10/30/2024	0.89	0.0337
5/21/2022	1.70	0.0111	10/31/2024	2.20	0.0061
5/23/2022	1.60	0.0114	11/1/2024	2.60	0.0063
5/24/2022	0.86	0.0105	11/2/2024	1.00	0.0061
5/25/2022	1.00	0.0112	11/4/2024	4.20	0.0061
5/26/2022	1.60	0.0205	11/5/2024	2.40	0.0061
5/27/2022	0.91	0.0642	11/6/2024	0.66	0.0061
5/28/2022	0.66	0.0147	11/7/2024	1.30	0.0061
5/31/2022	0.66	0.0175	11/8/2024	1.60	0.0061
6/1/2022	1.80	0.1470	11/9/2024	1.50	0.0061
6/2/2022	2.10	0.0465	11/11/2024	1.70	0.0061
6/3/2022	1.80	0.0828	11/12/2024	0.37	0.0061
6/6/2022	0.98	0.0755	11/13/2024	0.85	0.0061
6/9/2022	1.10	0.0490	11/14/2024	1.30	0.0061
6/10/2022	1.20	0.5030	11/15/2024	2.90	0.0061
6/11/2022	22.00	0.0169	11/16/2024	1.60	0.0061
6/13/2022	13.00	0.0629	11/18/2024	1.60	0.0094
6/14/2022	5.80	0.0774	11/19/2024	2.70	0.0061
6/15/2022	5.30	0.0594	11/20/2024	2.40	0.0061
6/16/2022	1.60	0.0621	11/21/2024	0.02	0.0061
6/17/2022	1.80	0.0644	11/22/2024	1.80	0.0090
6/20/2022	1.90	0.0693	11/23/2024	2.50	0.0061
6/21/2022	1.30	0.0448	11/25/2024	0.17	0.0061
6/22/2022	1.10	0.0435	11/26/2024	1.40	0.0061
6/23/2022	5.90	0.0207	3/20/2025	1.10	0.0061
6/24/2022	4.50	0.0931	3/21/2025	0.92	0.0061
6/25/2022	1.10	0.0790	3/22/2025	0.09	0.0061
6/27/2022	18.00	0.0591	3/24/2025	0.24	0.0061
6/28/2022	12.00	0.0674	3/25/2025	0.59	0.0061
6/29/2022	24.00	0.0523	3/26/2025	0.84	0.0061
6/30/2022	1.10	0.0497	3/27/2025	0.17	0.0061
7/1/2022	1.10	0.0685	3/28/2025	0.49	0.0061
7/2/2022	1.10	0.0634	3/29/2025	0.11	0.0061
7/5/2022	1.10	0.0623	3/31/2025	0.48	0.0061
7/6/2022	1.10	0.0903	4/1/2025	0.18	0.0061
7/7/2022	1.30	0.1060	4/2/2025	0.50	0.0061
7/11/2022	4.50	0.0982	4/3/2025	0.85	0.0061
7/12/2022	4.10	0.1790	4/4/2025	0.34	0.0061
7/13/2022	1.00	0.0097	4/5/2025	0.61	0.0061
7/14/2022	1.10	0.0143	4/7/2025	0.28	0.0061
7/15/2022	1.10	0.0167	4/8/2025	0.24	0.0061
7/16/2022	1.10	0.0167	4/9/2025	0.22	0.0061
7/18/2022	0.95	0.0158	4/10/2025	0.25	0.0061
7/19/2022	0.93	0.0153	4/11/2025	0.83	0.0061

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
7/20/2022	0.82	0.0316	4/12/2025	0.23	0.0061
7/21/2022	1.00	0.0392	4/14/2025	0.52	0.0095
7/22/2022	0.98	0.0377	5/1/2025	1.40	0.0061
7/23/2022	0.84	0.0395	5/2/2025	1.10	0.0061
7/25/2022	0.85	0.0097	5/3/2025	1.50	0.0061
7/26/2022	0.93	0.0097	5/6/2025	2.20	0.0061
7/27/2022	0.94	0.0164	5/7/2025	3.40	0.0061
7/28/2022	5.90	0.0097	5/8/2025	1.30	0.0061
7/29/2022	6.10	0.0097	5/9/2025	0.00	0.0061
7/30/2022	2.50	0.0097	5/10/2025	1.40	0.0061
8/1/2022	2.30	0.0097	5/12/2025	0.45	0.0061
8/2/2022	2.20	0.0097	5/13/2025	0.06	0.0061
8/4/2022	1.90	0.0141	5/14/2025	0.17	0.0061
8/5/2022	0.86	0.0097	5/15/2025	0.07	0.0061
8/6/2022	0.89	0.0097	5/16/2025	1.20	0.0093
8/8/2022	1.80	0.0097	5/17/2025	0.06	0.0061
8/9/2022	2.70	0.0097	5/19/2025	0.10	0.0061
8/10/2022	2.40	0.0097	5/20/2025	1.00	0.0061
8/11/2022	3.00	0.0097	5/21/2025	0.10	0.0061
8/12/2022	1.30	0.0177	5/22/2025	1.20	0.0061
8/13/2022	1.20	0.0097	5/27/2025	0.04	0.0061
8/15/2022	1.10	0.0097	5/28/2025	0.71	0.0072
8/18/2022	1.20	0.0190	5/29/2025	0.56	0.0061
8/19/2022	-	-	5/30/2025	0.24	0.0061
8/20/2022	1.10	0.0127	6/2/2025	0.61	0.0061
8/22/2022	1.10	0.0179	6/3/2025	0.24	0.0107
8/23/2022	0.97	0.0097	6/4/2025	0.55	0.0061
8/24/2022	1.00	0.0097	6/5/2025	5.50	0.0166
8/25/2022	0.98	0.0097	6/6/2025	5.20	0.0423
8/26/2022	0.63	0.0097	6/9/2025	3.30	0.0061
8/27/2022	1.70	0.0097	6/10/2025	0.10	0.0083
8/29/2022	0.91	0.0152	6/11/2025	4.60	0.0112
8/30/2022	1.60	0.0097	6/12/2025	1.70	0.3720
8/31/2022	1.30	0.0097	6/13/2025	0.99	0.2580
9/10/2022	1.70	0.0097	6/16/2025	0.05	0.0062
9/12/2022	1.60	0.0137	6/17/2025	0.08	0.0061
9/13/2022	1.70	0.0097	6/18/2025	0.07	0.0061
9/14/2022	1.00	0.0273	6/19/2025	0.13	0.0061
9/15/2022	1.40	0.0097	6/20/2025	0.11	0.0061
9/16/2022	1.40	0.0097	6/21/2025	0.06	0.0061
9/17/2022	1.00	0.2080	6/23/2025	0.11	0.0061
9/19/2022	1.10	0.1490	6/27/2025	0.44	0.0061
9/20/2022	0.93	0.0097	6/30/2025	0.12	0.0061
9/21/2022	2.20	0.0105	7/1/2025	0.18	0.0061
9/22/2022	1.10	0.0097	7/3/2025	0.14	0.0061
9/23/2022	1.30	0.1560	7/7/2025	0.15	0.0143
9/24/2022	1.30	0.0185	7/8/2025	0.15	0.0255
9/26/2022	43.00	0.0097	7/9/2025	0.15	0.0061
10/1/2022	1.50	0.0097	7/10/2025	0.04	0.0106
10/4/2022	0.63	0.0097	7/11/2025	0.36	0.0061
10/5/2022	1.20	0.0097	7/12/2025	0.35	0.0288
10/6/2022	1.60	0.0097	7/14/2025	0.54	0.0100
10/7/2022	1.80	0.0097	7/22/2025	0.18	0.0063
10/8/2022	1.60	0.0097	7/23/2025	2.50	0.0061
10/10/2022	1.60	0.0097	7/24/2025	1.40	0.0121

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
10/12/2022	1.10	0.0097	7/25/2025	0.65	0.0187
10/13/2022	0.71	0.0097	7/26/2025	0.19	0.0061
10/14/2022	0.63	0.0097	7/28/2025	0.70	0.0314
10/15/2022	6.80	0.0097	7/29/2025	0.97	0.0061
10/17/2022	6.50	0.0097	7/30/2025	0.10	0.0061
10/18/2022	0.12	0.0097	7/31/2025	0.04	0.0061
10/19/2022	0.62	0.0097	8/1/2025	0.69	0.0477
10/20/2022	0.10	0.0097	8/2/2025	0.02	0.0566
10/21/2022	2.70	0.0097	8/4/2025	1.70	0.0464
10/22/2022	1.30	0.0097	8/5/2025	0.43	0.0323
10/24/2022	1.30	0.0097	8/6/2025	0.08	0.0393
10/25/2022	4.50	0.0097	8/7/2025	0.61	0.0197
10/26/2022	2.60	0.0097	8/8/2025	0.18	0.0367
10/27/2022	2.00	0.0097	8/9/2025	1.30	0.0061
10/28/2022	1.30	0.0097	8/11/2025	0.33	0.0198
10/29/2022	2.20	0.0097	8/13/2025	0.53	0.0208
10/31/2022	2.10	0.0097	8/14/2025	0.78	0.0061
11/1/2022	0.84	0.0097	8/15/2025	0.95	0.0061
11/2/2022	1.20	0.0097	8/18/2025	0.81	0.0221
11/3/2022	0.90	0.0097	8/19/2025	1.10	0.0061
11/4/2022	1.40	0.0097	8/20/2025	0.59	0.0061
11/5/2022	1.10	0.0097	8/21/2025	0.19	0.0061
11/7/2022	0.43	0.0097	8/22/2025	0.47	0.0082
11/8/2022	1.30	0.0097	8/23/2025	0.41	0.0142
11/11/2022	2.40	0.0097	8/25/2025	0.41	0.0081
11/15/2022	1.10	0.0097	8/26/2025	0.66	0.0162
11/16/2022	1.20	0.0097	8/27/2025	0.65	0.0061
11/17/2022	1.80	0.0097	8/28/2025	1.70	0.0065
11/18/2022	1.50	0.0097	9/2/2025	1.70	0.0061
11/19/2022	1.30	0.0097	9/3/2025	1.70	0.0061
11/20/2022	3.00	0.0097	9/4/2025	1.30	0.0062
11/21/2022	1.60	0.0097	9/5/2025	1.70	0.0061
11/22/2022	2.80	0.3110	9/6/2025	1.50	0.0061
11/23/2022	6.90	0.6640	9/8/2025	0.92	0.0061
11/28/2022	4.90	0.7610	9/9/2025	1.30	0.0061
6/24/2023	12.00	0.0061	9/10/2025	1.50	0.0135
6/26/2023	18.00	0.0061	9/11/2025	1.30	0.0061
6/27/2023	1.40	0.0061	9/12/2025	2.20	0.0190
6/28/2023	2.80	0.0061	9/13/2025	0.89	0.0061
6/29/2023	1.30	0.0061	9/15/2025	1.30	0.0142
6/30/2023	1.10	0.0061	9/16/2025	0.94	0.0061

Return to **Figure 4-38**.

Figure 4-39. Effluent Concentrations from Interstitial Water Treatment at Sykes Creek

A scatterplot showing the effluent concentrations from interstitial water treatment at Sykes Creek with total nitrogen (TN) on the left axis and total phosphorus (TP) on the right axis. The blue horizontal line indicates the nitrogen effluent target (3 milligrams per liter) while the green line indicates the phosphorus effluent target (0.075 milligrams per liter). The following table summarizes the values shown in the chart.

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
8/16/2022	3.00	0.0323	1/24/2023	2.50	0.0097
8/17/2022	13.00	0.0097	1/27/2023	0.28	0.0770
8/18/2022	12.00	0.0273	1/28/2023	0.08	0.0521
8/19/2022	1.90	0.0097	1/30/2023	0.05	0.0097
8/20/2022	2.10	0.0097	1/31/2023	1.30	0.0097
8/21/2022	1.80	0.0097	2/3/2023	2.30	0.0097
8/22/2022	0.77	0.0097	2/4/2023	1.90	0.0097
8/24/2022	3.40	0.0097	2/6/2023	1.50	0.0097
8/26/2022	1.00	0.0097	2/8/2023	1.40	0.0097
8/29/2022	1.80	0.0300	2/9/2023	4.20	0.0097
8/30/2022	1.10	0.0097	2/10/2023	1.60	0.0097
8/31/2022	2.50	0.0097	2/11/2023	5.00	0.0097
9/1/2022	1.20	0.0214	2/13/2023	2.30	0.0097
9/2/2022	1.70	0.0097	2/14/2023	1.40	0.0097
9/6/2022	0.84	0.0097	2/15/2023	1.30	0.0097
9/7/2022	1.30	0.0438	2/16/2023	1.20	0.0097
9/8/2022	0.63	0.0097	2/17/2023	1.00	0.0097
9/9/2022	2.40	0.0131	2/18/2023	1.60	0.0097
9/10/2022	1.40	0.0097	2/23/2023	1.50	0.0097
9/12/2022	1.40	0.0097	2/24/2023	4.00	0.0097
9/13/2022	0.79	0.0259	2/25/2023	2.90	0.0097
9/14/2022	0.57	0.0328	2/27/2023	1.50	0.0097
9/15/2022	1.60	0.0147	3/2/2023	1.60	0.0097
9/16/2022	5.80	0.0303	3/3/2023	1.20	0.0623
9/20/2022	1.30	0.0097	3/8/2023	1.00	0.0097
9/21/2022	0.84	0.0161	3/9/2023	1.50	0.0270
9/22/2022	1.80	0.0097	3/14/2023	1.50	0.0097
9/23/2022	0.61	0.0204	3/15/2023	1.20	0.0501
9/24/2022	1.90	0.0327	3/16/2023	1.40	0.0371
9/26/2022	1.40	0.0097	3/17/2023	2.00	0.0276
10/3/2022	2.40	0.0097	3/18/2023	3.70	0.0097
10/4/2022	5.10	0.0097	3/20/2023	2.40	0.0166
10/5/2022	8.00	0.0097	3/22/2023	0.89	0.0108
10/6/2022	4.40	0.0097	3/23/2023	0.98	0.0232
10/7/2022	2.20	0.0097	3/27/2023	1.80	0.0144
10/8/2022	3.50	0.0097	3/28/2023	1.20	0.0212
10/10/2022	4.80	0.0097	3/29/2023	1.10	0.0308
10/11/2022	0.99	0.0160	3/30/2023	1.10	0.0097
10/12/2022	1.20	0.0097	3/31/2023	1.80	0.0418
10/13/2022	0.89	0.0097	4/1/2023	0.80	0.0097

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
10/14/2022	0.46	0.0097	4/3/2023	1.70	0.0222
10/15/2022	1.30	0.0097	4/4/2023	1.80	0.0097
10/18/2022	0.08	0.0269	4/5/2023	1.50	0.0275
10/19/2022	0.59	0.0097	4/17/2023	1.10	0.0410
10/20/2022	0.04	0.0097	4/18/2023	1.20	0.0123
10/21/2022	1.70	0.0097	4/19/2023	0.80	0.0097
10/22/2022	3.30	0.0097	4/20/2023	2.60	0.0097
10/24/2022	0.97	0.0097	4/21/2023	1.70	0.0097
10/25/2022	4.50	0.0097	4/22/2023	1.90	0.0230
10/26/2022	2.60	0.0180	4/24/2023	5.20	0.0097
10/27/2022	2.00	0.0097	4/25/2023	1.80	0.0097
10/28/2022	0.86	0.0210	4/26/2023	1.80	0.0097
10/29/2022	1.00	0.0097	4/27/2023	3.00	0.0138
10/31/2022	0.98	0.0097	4/28/2023	3.00	0.0097
11/1/2022	2.20	0.0097	5/1/2023	1.30	0.0218
11/2/2022	1.60	0.0097	5/2/2023	3.30	0.0149
11/3/2022	1.70	0.0097	5/8/2023	2.20	0.0270
11/4/2022	0.90	0.0097	5/9/2023	1.10	0.0097
11/7/2022	0.37	0.0097	5/10/2023	1.00	0.0438
11/8/2022	1.20	0.0097	5/11/2023	0.96	0.0097
11/11/2022	2.80	0.0097	5/12/2023	1.50	0.0097
11/12/2022	3.80	0.0097	5/13/2023	1.20	0.0097
11/14/2022	1.40	0.0097	5/15/2023	1.10	0.0097
11/17/2022	0.57	0.0097	5/16/2023	1.30	0.0097
11/18/2022	3.50	0.0097	5/18/2023	1.40	0.0097
11/19/2022	1.70	0.0097	5/19/2023	1.50	0.0097
12/3/2022	4.30	0.0097	5/20/2023	0.15	0.0097
12/5/2022	5.00	0.0097	5/22/2023	0.95	0.0097
12/6/2022	2.40	0.0097	6/2/2023	1.30	0.0097
12/7/2022	6.10	0.0097	6/3/2023	1.00	0.0097
12/8/2022	1.10	0.0097	6/4/2023	0.93	0.0097
12/9/2022	7.10	0.0097	6/5/2023	0.87	0.0097
12/10/2022	7.80	0.0097	6/6/2023	1.60	0.0097
12/12/2022	8.40	0.0097	6/7/2023	0.50	0.0097
12/13/2022	14.00	0.0097	6/8/2023	0.72	0.0097
12/14/2022	6.50	0.0097	6/10/2023	1.90	0.0097
12/17/2022	1.20	0.0097	6/11/2023	1.70	0.0097
12/19/2022	8.10	0.0097	6/19/2023	6.80	0.0224
12/20/2022	2.00	0.0623	6/21/2023	2.00	0.0097
12/21/2022	6.90	0.0097	6/22/2023	2.00	0.0097
12/22/2022	4.20	0.0097	6/27/2023	3.90	0.0065

Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)	Sample Date	Total Nitrogen (milligrams per liter)	Total Phosphorus (milligrams per liter)
12/27/2022	1.10	0.0097	6/28/2023	1.50	0.0061
12/28/2022	2.00	0.0097	6/29/2023	3.60	0.0061
12/29/2022	1.00	0.0097	6/30/2023	1.70	0.0107
12/30/2022	1.20	0.0097	7/1/2023	1.40	0.0061
1/2/2023	3.60	0.0097	7/5/2023	4.20	0.0096
1/3/2023	1.50	0.0378	7/6/2023	1.60	0.1730
1/5/2023	1.20	0.0097	7/8/2023	1.60	0.0061
1/6/2023	0.88	0.0097	7/11/2023	2.20	0.0061
1/7/2023	13.00	0.0097	7/12/2023	1.60	0.0061
1/9/2023	1.50	0.0097	7/14/2023	1.10	0.0061
1/10/2023	1.70	0.0097	7/21/2023	0.79	0.0191
1/11/2023	0.80	0.0262	7/25/2023	4.80	0.1020
1/12/2023	0.79	0.0097	7/26/2023	1.00	0.0993
1/13/2023	0.65	0.0097	7/27/2023	3.80	0.0760
1/16/2023	2.20	0.0097	7/28/2023	1.30	0.0350
1/17/2023	1.50	0.0097	7/29/2023	1.10	0.0462
1/18/2023	1.70	0.0097	7/31/2023	1.70	0.0446
1/19/2023	0.05	0.0097	8/1/2023	1.10	0.0399
1/20/2023	1.30	0.0097	8/2/2023	8.30	0.2940
1/23/2023	1.50	0.0097	-	-	-

Return to **Figure 4-39**.

Figure 4-40. Distribution of Oyster Sizes, Age, and Average Number of Measured Oysters Per Sample Unit

A bar chart showing the distribution of oyster sizes, as of most recent monitoring, for oyster sites within the Banana River Lagoon, North Indian River Lagoon, and Central Indian River Lagoon. At each site, the average number of measured oysters per size class per sample for the most recent monitoring event are shown. The number of settlers, subadults, adults, and large adults are shown. The following table summarizes the values shown in the bar graph.

Location	Monitoring Date	Settler	Subadult	Adult	Large Adult
Bomalaski 4.5 years	1/2023	0.00000	0.33333	3.33330	1.33330
Bettinger 3 years	12/2021	0.00000	0.00000	0.25000	0.00000
Gitlin 2.5 years	12/2021	0.00000	0.00000	0.40000	0.60000
Marina Isles 4.5 years	1/2024	0.00000	0.16667	1.33333	1.16667
Coconut Point 3 years	1/2023	0.33333	0.00000	0.00000	0.00000
Hog Point 2 years	4/2022	3.00000	10.80000	20.80000	5.00000
Maritime Hammock 2 years	4/2022	6.80000	13.80000	21.60000	4.40000
Riverview Senior 3.5 years	1/2022	30.80000	10.00000	7.90000	0.00000
Ahmed Niland 3.5 years	3/2024	6.00000	8.11111	4.77778	1.00000
MacNiel Pitner 4.0 years	3/2024	3.50000	6.37500	6.00000	2.37500
Riverside Drive 3.5 years	2/2024	2.92308	5.30769	3.00000	0.38462
Dragon Point 1.0 year	12/2021	11.00000	13.12500	5.00000	0.00000
Sands 2.0 years	1/2023	0.00000	5.80000	12.00000	8.60000

Location	Monitoring Date	Settler	Subadult	Adult	Large Adult
Wexford 3.0 years	1/2024	14.80000	19.20000	7.40000	1.00000
Central One 2.0 years	1/2024	13.75000	11.79000	7.36000	1.29000
Indialantic/Melbourne 3.0 years	1/2025	3.33000	13.29000	17.33000	0.79200
Ryckman 2.0 years	4/2024	24.62500	6.50000	4.87500	1.50000
Satellite Beach/Tropical Trail 1.0 year	5/2023	0.70000	3.50000	14.90000	7.10000
Castaway 2.0 years	9/2024	23.18750	12.93750	8.31250	5.75000
Tropical Trail 1.0 year	7/2024	19.60000	24.30000	5.50000	0.60000
Indialantic 2.0 years	12/2024	7.33000	18.44000	15.89000	6.67000
Rainwater 1.5 year	4/2025	7.54000	10.75000	21.75000	9.96000
Turkey Creek Offshsore 0.5 years	4/2025	16.25000	14.12500	18.25000	1.00000
Banana River Pilot 0.25 years	2/2025	3.75000	8.42000	20.42000	11.83000
Brevard County Hog Point 1 year	6/2025	40.50000	4.12500	4.25000	1.00000

Return to **Figure 4-40**.

Figure 4-41. Average Oyster Density Per Square Foot

A bar graph showing the average oyster density per square foot at the most recent fully censused monitoring event for all monitoring areas compared to a success criteria of 4.65 oysters per square foot. The following table summarizes the values shown in the bar graph.

Location	Monitoring Date	Average Oyster Density (oysters per square foot)
Bomalaski 4.5 years	1/2023	2.32
Bettinger 3 years	12/2021	0.12
Gitlin 2.5 years	12/2021	0.46
Marina Isles 4.5 years	1/2024	1.24
Coconut Point 3 years	1/2023	0.00
Hog Point 2 years	4/2022	14.03
Maritime Hammock 2 years	4/2022	95.23
Riverview Senior 3.5 years	1/2022	98.94
Ahmed Niland 3.5 years	3/2024	8.15
MacNiel Pitner 4.0 years	3/2024	8.42
Riverside Drive 3.5 years	2/2024	5.40
Dragon Point 1.0 year	12/2021	14.56
Sands 2.0 years	1/2023	13.20
Wexford 3.0 years	1/2024	22.67
Central One 2.0 years	1/2024	30.26
Indialantic/Melbourne 3.0 years	1/2025	33.60
Ryckman 2.0 years	4/2024	24.38
Satellite Beach/Tropical Trail 1.0 year	5/2023	11.98
Castaway 2.0 years	9/2024	134.53
Tropical Trail 1.0 year	7/2024	140.85
Indialantic 2.0 years	12/2024	44.59
Rainwater 1.5 years	4/2025	93.87
Turkey Creek Offshore 0.5 year	4/2025	130.30
Banana River Pilot 0.25b year	2/2025	22.05
Brevard County Hog Point 1.0 year	6/2025	493.64

Return to **Figure 4-41**

Figure 4-42. Average Dry Total Weight Per Square Foot

A bar graph showing the average dry total weight in pounds per square foot at the most recent fully censused monitoring event for all monitoring areas compared to a success criteria of

0.01022 pounds per square foot. The following table summarizes the values shown in the bar graph.

Location	Monitoring Date	Average Dry Total Weight (pounds per square foot)
Bomalaski 4.5 years	1/2023	0.00368
Bettinger 3 years	12/2021	0.00020
Gitlin 2.5 years	12/2021	0.00098
Marina Isles 4.5 years	1/2024	0.00235
Coconut Point 3 years	1/2023	0.00000
Hog Point 2 years	4/2022	0.01393
Maritime Hammock 2 years	4/2022	0.04855
Riverview Senior 3.5 years	1/2022	0.02769
Ahmed Niland 3.5 years	3/2024	0.00383
MacNiel Pitner 4.0 years	3/2024	0.00731
Riverside Drive 3.5 years	2/2024	0.00308
Dragon Point 1.0 year	12/2021	0.00513
Sands 2.0 years	1/2023	0.01054
Wexford 3.0 years	1/2024	0.00979
Central One 2.0 years	1/2024	0.01387
Indialantic/Melbourne 3.0 years	1/2025	0.02213
Ryckman 2.0 years	4/2024	0.02002
Satellite Beach/Tropical Trail 1.0 year	5/2023	0.01096
Castaway 2.0 years	9/2024	0.01398
Tropical Trail 1.0 year	7/2024	0.04371
Indialantic 2.0 years	12/2024	0.03826
Rainwater 1.5 years	4/2025	0.02112
Turkey Creek Offshore 0.5 year	4/2025	0.01043
Banana River Pilot 0.25b year	2/2025	0.02379
Brevard County Hog Point 1.0 year	6/2025	0.00533

Return to **Figure 4-42**

Figure 4-43. Average Number of Measured Oysters in Each Size Class for Ultraviolet Stabilized Plastic Mesh Bags (left) and Galvanized After Welding Steel Gabions (right)

A bar chart showing the average number of measured oysters in each size class per monitored unit at the Wexford oyster bar for modules constructed from ultraviolet stabilized plastic mesh bags and galvanized after welding steel gabions. Each bar represents the age of the project for each monitoring event. The number of settlers, subadults, adults, and large adults are shown. The following table summarizes the values shown in the bar graph.

Location	Settler	Subadult	Adult	Large Adult
Wexford Bags 0 year	Not applicable	Not applicable	Not applicable	Not applicable
Wexford Bags 0.08 year	5.8	0.2	0.0	0.0
Wexford Bags 0.25 year	8.5	0.8	0.0	0.0
Wexford Bags 0.5 year	6.3	17.5	0.8	0.0
Wexford Bags 1 year	14.8	29.3	5.0	0.0
Wexford Bags 1.5 years	36.8	7.7	4.3	0.0
Wexford Bags 2.0 years	17.0	15.2	10.67	0.2
Wexford Gabions 0 year	Not applicable	Not applicable	Not applicable	Not applicable
Wexford Gabions 0.08 year	32.2	2.3	0.0	0.0
Wexford Gabions 0.25 year	32.2	11.0	1.0	0.0
Wexford Gabions 0.5 year	12.0	25.2	5.5	0.0
Wexford Gabions 1 year	9.3	22.3	17.2	1.2

Location	Settler	Subadult	Adult	Large Adult
Wexford Gabions 1.5 years	31.5	8.8	7.7	2.0
Wexford Gabions 2.0 years	13.0	14.7	14.7	7.7

Return to **Figure 4-43**.

Figure 4-44. Comparison of Corral Wall and Stacked Gabion Oyster Module Performance

A line chart showing the average number of oysters per sample comparing corral walls and stacked gabions modules over one year of monitoring. The following table summarizes the values shown in the line chart.

Location and Module	Number of Oysters Per Sample at 1 Month	Number of Oysters Per Sample at 3 Months	Number of Oysters Per Sample at 6 Months	Number of Oysters Per Sample at 1 Year	Number of Oysters Per Sample at 1.5 Years	Number of Oysters Per Sample at 2 Years
Castaway Cove Narrow Gabion	32.8	54.5	47.3	377.3	296.3	401.0
Castaway Cove Wide Gabion	22.3	65.5	39.8	251.8	219.3	249.0
Castaway Cove Narrow Corral	31.0	81.5	70.0	252.5	185.3	216.8
Castaway Cove Wide Corral	20.3	65.8	65.0	210.0	150.0	209.5

Return to **Figure 4-44**

Figure 4-45. Comparison of Gabion Corral Wall and Coquina Corral Wall Performance

A line chart showing the average oyster density per square meter for each module at the Rainwater reef. Comparing gabion corral walls with coquina corral walls and a gabion control module for the first 18 months of monitoring. The following table summarizes the values shown in the line chart.

Module Number	Module Description	1 Month	3 Months	6 Months	12 Months	18 Months
1	Coquina Corral	5,420.7	4,862.9	2,583.3	2,028.5	1,767.7
2	Gabion Corral	4,189.8	3,154.6	2,711.0	4,117.2	2,154.8
3	Gabion Corral	1,381.7	2,560.5	2,051.1	3,111.8	1,841.4
4	Gabion Control Module	10,532.3	5,411.3	3,752.7	3,273.1	1,544.6
5	Gabion Corral	7,437.1	4,635.1	2,619.6	2,094.1	811.8
6	Gabion Corral	4,533.9	4,638.4	2,639.4	2,563.4	908.6
7	Coquina Corral	3,072.6	3,932.8	2,515.1	1,166.7	478.5

Return to **Figure 4-45**

Figure 4-46. Comparison of North to South and East to West Gabion Corral Wall and Coquina Corral Wall Modules at Turkey Creek Offshore

A line chart showing the average oyster density per square meter for each module at the Turkey Creek offshore reef. Comparing gabion corral walls with coquina corral walls and north to south versus east to west module orientation for the first six months of monitoring. The following table summarizes the values shown in the line chart.

Module Number	Module Description	1 Month	3 Months	6 Months
C	Gabion Corral North to South	2,365	2,722	1,118
D	Coquina Corral North to South	2,593	1,844	1,353
E	Coquina Corral East to West	2,834	4,277	1,956
F	Gabion Corral East to West	1,589	2,440	1,183

Return to **Figure 4-46**

Figure 5-2. Evolution of Project Funding Allocations

Series of pie charts showing the percent distribution of funding from the original plan to each of the plan updates in 2017–2026. Public education makes up less than 1% of the total funding in 2017–2021 and is about 1% in 2022–2026. Wastewater facility upgrades for reclaimed water were 3% of the costs in the original plan and 2017 Supplement; 4% in the 2018 Update; 7% in the 2019 Update; 6% in the 2020–2025 Updates; and 7% in the 2026 Update. Rapid infiltration basins/sprayfield upgrades were added in the 2019 Update as 1% of the cost, 2% in the 2020 and 2021 Updates, and less than 1% in the 2022–2026 Updates. Package plant connections were added in the 2021 Update and represent 1% of the costs, also in the 2022 Update and less than 1% of the costs in the 2023–2026 Updates. Sewer laterals were added in the 2019 Update and represent less than 1% of the cost in all years. Septic-to-sewer was 14% of the cost in the original plan and 2017 Supplement, 13% in the 2018 Update, 26% in the 2019 Update, 30% in the 2020 and 2021 Updates, 31% in the 2022 Update, 30% in the 2023 Update, 29% in the 2024 and 2025 Updates, and 27% in the 2026 Update. Septic system upgrades were 7% of the cost in the original plan and 2017 Supplement, 6% in the 2018 and 2019 Updates, 7% in the 2020–2023 Updates, 6% in the 2024 and 2025 Updates, and 9% in the 2026 Update. Stormwater projects were 4% of the costs in the original plan and 2017 and 2018 Updates; 11% in the 2019 Update; 12% in the 2020 Update; 11% in the 2021 and 2022 Updates; 15% in the 2023 and 2024 Updates; 14% in the 2025 Update; and 18% in the 2026 Update. Vegetation harvesting was added in the 2021 Update and is less than 1% of the cost in the 2021 and 2022 Updates, 1% of the costs in the 2023 Update, less than 1% of the costs in the 2024 Update, and 1% of the costs in the 2025 and 2026 Updates. Muck removal was 66% of the cost in the original plan and 2017 Supplement, 58% in the 2018 Update, 30% in the 2019 Update, 27% in the 2020 Update, 26% in the 2021–2023 Updates, and 29% in the 2024–2026 Updates. Treatment of interstitial water was added in the 2019 Update at 13% of the costs, 12% in the 2020 Update, 11% in the 2021–2023 Updates, and 8% of the costs in the 2024–2026 Updates. Oyster bars and living shorelines were 3% of the costs in the original plan through the 2019 Update, and 2% in the 2020–2026 Updates. Project monitoring was 3% of the costs in the original plan through the 2019 Update, and 2% in the 2020–2026 Updates.

Return to **Figure 5-2**.

Figure C-1. Mean Areal Extent of Seagrass, Mean Length of Transects, and Mean Transect Percent Cover

A line and bar graph showing seagrass extent in hectares, mean transect length in meters, and mean transect percent cover. The date range is 1943 and then every year from 1992 to 2024. In 1943, the seagrass extent was 29,538 hectares. In 1992 the extent was 26,333 hectares. The extent gradually climbed to a peak of around 32,000 hectares in 2007 and 2009. The extent then drastically dropped in 2011 to 18,506 hectares. It slowly increased to 23,797 hectares in 2015 and then dropped to 13,438 hectares in 2019. A further drop to 8,021 hectares occurred in 2021. There was an increase in 2023 to 9,924 hectares. The mean transect length followed a similar trend in years starting at 104 meters in 1994 with a peak of 192 meters in 2010. It dropped to 68 meters in 2018 and increased to 76 meters in 2016. It then dropped to a low of 39 meters in 2021, but increased to 50 meters in 2022, 63 meters in 2023, and 83 meters in 2024.The following table summarizes the data shown in the graph.

Year	Seagrass extent (hectares)	Mean transect length (meters)	Mean transect cover (percent)
1943	29,538	No data	No data
1992	26,333	No data	No data
1994	24,893	104	21.46
1995	No data	113	20.45
1996	27,230	122	21.76
1997	No data	132	21.55
1998	No data	143	29.17
1999	28,699	137	27.83
2000	No data	144	26.90
2001	No data	132	23.87
2002	No data	130	18.16
2003	29,799	132	20.78
2004	No data	135	20.06
2005	29,691	130	15.13
2006	No data	153	18.46
2007	32,551	165	17.70
2008	No data	170	17.73
2009	32,209	182	19.10
2010	No data	192	21.02
2011	18,506	130	14.72
2012	No data	108	9.13
2013	20,703	115	9.79
2014	No data	127	10.90
2015	23,797	125	10.02
2016	No data	71	3.91
2017	15,463	70	4.55
2018	No data	68	3.13
2019	13,438	76	4.47
2020	No data	51	1.95
2021	8,021	39	1.61
2022	No data	50	2.23
2023	9,924	63	3.85
2024	No data	83	7.57

Return to **Figure C-1**.

Figure C-2. Mean Chlorophyll-a Concentrations

Line chart of mean chlorophyll-a in micrograms per liter showing lines for the Mosquito Lagoon, Banana River Lagoon, Northern Indian River Lagoon (IRL), North Central IRL, and Sebastian. The following table summarizes the data shown in the graph.

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
1997	1	1.56	12.40	4.46	15.36	14.03
1997	2	1.15	9.61	5.44	5.39	4.38
1997	3	2.43	5.61	3.80	5.15	3.11
1997	4	3.43	2.69	4.88	3.65	3.22
1997	5	4.74	3.25	3.86	3.39	3.45
1997	6	11.16	4.83	5.39	5.09	4.30
1997	7	7.94	3.13	2.87	9.64	5.29
1997	8	10.07	3.44	4.91	14.34	8.60
1997	9	10.52	3.52	4.60	6.13	6.42
1997	10	8.29	2.95	3.88	7.23	9.61
1997	11	6.16	5.62	3.89	6.64	16.48
1997	12	3.64	9.06	3.03	10.43	30.58
1998	1	2.25	6.48	3.18	5.15	4.82
1998	2	1.25	10.03	5.98	9.20	8.61
1998	3	2.73	6.18	7.78	6.63	8.03
1998	4	4.61	7.58	6.27	11.35	3.70
1998	5	5.76	2.41	3.20	6.37	1.92
1998	6	5.32	3.30	2.97	13.82	3.46
1998	7	10.51	6.24	6.99	18.83	4.58
1998	8	8.60	6.34	4.90	17.54	4.09
1998	9	9.61	7.70	3.99	8.77	4.48
1998	10	9.06	9.22	7.38	17.88	8.92
1998	11	6.52	9.00	4.72	4.89	8.65
1998	12	8.62	17.00	9.49	5.09	2.61
1999	1	2.78	11.95	7.53	8.74	3.51
1999	2	4.95	9.40	3.31	5.82	4.16
1999	3	4.59	16.71	7.45	7.37	8.12
1999	4	7.19	14.16	7.24	7.01	9.90
1999	5	7.25	10.33	9.70	3.54	4.06
1999	6	8.83	5.92	9.62	4.46	6.19
1999	7	9.71	3.74	8.80	4.83	9.03
1999	8	10.94	3.39	10.24	7.21	4.10
1999	9	4.90	7.31	17.21	10.97	10.80
1999	10	19.08	5.16	23.13	16.00	15.10
1999	11	10.57	4.98	26.20	13.62	25.90
1999	12	5.33	7.58	15.15	10.35	31.40
2000	1	4.53	7.08	2.90	12.47	8.20
2000	2	1.68	4.61	6.96	10.24	6.95
2000	3	2.32	4.12	10.23	9.75	7.93
2000	4	3.51	4.36	6.65	6.11	6.52

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2000	5	4.89	5.82	2.43	5.36	4.81
2000	6	6.35	5.61	4.20	5.38	4.68
2000	7	5.14	4.85	9.55	4.19	5.92
2000	8	6.78	5.04	8.23	4.60	8.54
2000	9	9.70	8.18	12.49	9.24	9.70
2000	10	8.40	14.05	10.75	8.64	6.83
2000	11	5.08	8.45	10.20	11.71	9.09
2000	12	5.40	5.33	4.34	11.99	7.76
2001	1	1.68	7.64	3.24	11.50	6.61
2001	2	2.23	7.87	2.24	8.17	5.94
2001	3	2.86	7.80	3.24	5.82	6.35
2001	4	4.75	6.76	4.18	5.98	8.13
2001	5	4.96	5.19	15.89	5.88	3.71
2001	6	10.66	13.24	5.10	5.13	9.13
2001	7	11.85	14.57	13.77	21.93	34.82
2001	8	11.68	15.57	25.63	29.22	37.70
2001	9	11.92	30.51	21.25	44.84	25.30
2001	10	6.22	13.74	9.73	27.02	24.25
2001	11	8.94	19.90	6.36	16.40	22.20
2001	12	6.03	18.53	13.40	22.36	14.40
2002	1	3.80	8.61	3.48	13.68	8.01
2002	2	3.23	7.60	5.26	4.12	3.75
2002	3	2.65	6.65	4.70	3.94	7.65
2002	4	5.90	4.85	4.80	7.76	3.15
2002	5	9.28	3.78	6.80	5.41	1.30
2002	6	5.38	4.20	7.07	9.83	4.20
2002	7	9.43	8.25	13.13	18.66	11.70
2002	8	5.25	16.08	12.53	53.96	5.90
2002	9	7.20	11.85	14.23	31.78	15.55
2002	10	7.65	14.60	10.83	12.10	3.40
2002	11	4.95	6.18	1.17	7.58	11.00
2002	12	0.98	3.00	1.13	5.52	3.90
2003	1	0.78	3.55	1.70	3.48	3.00
2003	2	0.88	1.40	0.90	2.10	2.75
2003	3	1.70	2.58	3.00	4.70	3.70
2003	4	0.98	2.28	3.30	2.62	1.40
2003	5	8.98	1.53	4.00	2.52	1.15
2003	6	6.15	4.18	5.60	7.08	4.10
2003	7	8.83	4.03	6.53	5.18	2.60
2003	8	9.73	8.88	2.80	6.71	8.55
2003	9	5.83	15.58	24.57	9.90	3.40
2003	10	2.08	11.35	6.33	15.40	8.30
2003	11	2.00	9.10	3.93	5.60	2.45
2003	12	2.03	5.05	0.67	3.84	6.30
2004	1	0.80	7.60	3.13	4.16	4.30

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2004	2	1.30	16.90	0.77	7.18	11.15
2004	3	1.03	9.25	2.37	3.52	3.15
2004	4	4.03	7.75	3.20	2.24	1.00
2004	5	4.44	5.50	0.77	1.34	1.35
2004	6	4.03	3.98	2.73	5.64	1.15
2004	7	8.95	3.18	13.24	15.21	3.45
2004	8	6.28	3.85	8.47	18.12	3.85
2004	9	13.33	5.40	13.77	11.48	6.20
2004	10	5.68	4.48	5.43	9.32	10.70
2004	11	4.68	2.78	3.93	4.16	5.95
2004	12	2.23	5.00	15.67	5.64	3.65
2005	1	3.85	3.25	4.53	3.16	1.60
2005	2	0.85	2.05	1.07	1.72	1.80
2005	3	1.75	2.28	1.23	2.94	3.40
2005	4	2.45	2.85	1.37	2.08	2.45
2005	5	5.65	2.85	1.47	1.62	1.60
2005	6	4.38	1.85	8.67	2.34	3.60
2005	7	11.28	3.13	2.13	3.66	2.65
2005	8	10.63	9.28	10.57	11.94	3.00
2005	9	5.23	8.20	21.53	18.10	9.50
2005	10	10.60	5.33	39.87	47.88	11.40
2005	11	4.03	6.58	5.00	3.92	2.25
2005	12	5.08	15.80	4.63	10.90	8.25
2006	1	1.66	2.90	1.80	2.88	0.90
2006	2	1.17	4.73	1.03	5.02	0.85
2006	3	1.33	2.25	1.80	2.16	0.90
2006	4	1.45	1.38	3.13	1.46	0.65
2006	5	1.58	3.60	2.73	4.02	1.15
2006	6	1.48	2.30	13.83	4.46	1.10
2006	7	6.00	3.05	4.97	4.18	2.00
2006	8	4.53	5.15	4.40	30.56	1.60
2006	9	4.98	10.55	5.90	14.08	2.25
2006	10	0.83	1.20	1.40	1.54	0.50
2006	11	2.98	2.68	10.90	3.62	3.40
2006	12	1.68	2.83	1.07	3.92	3.65
2007	1	1.38	3.20	1.07	2.26	2.50
2007	2	1.13	0.83	0.77	1.20	1.15
2007	3	1.03	0.35	0.50	0.92	0.40
2007	4	1.25	1.25	1.70	3.82	1.80
2007	5	1.55	1.48	2.70	1.84	2.00
2007	6	3.08	1.58	1.37	1.28	4.10
2007	7	2.38	0.73	2.57	3.30	2.50
2007	8	4.09	2.10	3.30	6.24	2.25
2007	9	2.43	2.75	1.67	6.50	2.25
2007	10	7.45	5.88	3.30	5.10	11.50

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2007	11	1.80	5.20	1.50	5.54	2.00
2007	12	0.40	3.65	0.33	1.64	1.60
2008	1	0.49	3.33	1.33	4.82	0.90
2008	2	0.93	1.95	0.43	1.20	2.05
2008	3	1.60	2.25	1.97	3.18	0.90
2008	4	1.58	3.08	4.57	5.00	0.65
2008	5	2.40	6.68	2.43	6.46	0.70
2008	6	5.83	5.45	3.90	4.24	1.15
2008	7	5.20	6.03	3.00	6.16	1.80
2008	8	4.80	7.08	7.30	10.10	13.45
2008	9	5.35	1.95	15.07	9.10	6.15
2008	10	5.48	4.33	9.23	17.44	9.35
2008	11	5.35	4.23	2.70	7.38	21.05
2008	12	4.18	13.70	10.10	19.08	18.05
2009	1	3.08	3.95	7.27	11.62	4.55
2009	2	2.48	4.75	2.83	10.90	7.50
2009	3	1.25	2.40	0.60	3.64	6.65
2009	4	7.28	5.80	6.30	5.90	3.35
2009	5	5.23	3.18	5.53	6.00	2.70
2009	6	5.38	8.20	2.57	5.86	3.65
2009	7	11.53	16.48	16.47	11.80	10.75
2009	8	16.63	18.07	12.72	21.06	10.14
2009	9	13.42	17.65	28.27	28.07	7.01
2009	10	15.93	13.64	9.34	20.82	4.64
2009	11	7.99	15.99	6.06	10.54	20.85
2009	12	2.93	8.79	3.63	2.96	4.43
2010	1	1.25	14.46	5.09	14.32	62.15
2010	2	2.22	8.31	5.46	11.37	2.98
2010	3	4.57	2.93	3.62	2.50	3.00
2010	4	7.77	8.06	6.99	5.58	8.17
2010	5	9.37	13.05	13.71	14.83	8.94
2010	6	8.36	18.15	9.21	12.64	14.38
2010	7	12.28	19.45	10.08	16.72	10.88
2010	8	17.77	17.94	10.14	21.49	9.75
2010	9	15.68	18.05	20.99	28.86	6.41
2010	10	8.89	19.34	17.46	26.14	39.91
2010	11	13.02	12.82	11.30	22.88	11.14
2010	12	3.00	13.73	8.03	22.23	16.42
2011	1	2.96	16.66	3.53	15.72	12.13
2011	2	3.76	19.14	9.16	16.61	15.18
2011	3	5.70	15.52	7.92	11.11	5.86
2011	4	7.62	29.88	15.16	24.25	12.40
2011	5	8.82	38.79	18.76	20.01	5.13
2011	6	8.93	55.84	29.90	21.81	7.09
2011	7	10.99	61.33	46.03	26.55	9.59

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2011	8	23.22	65.85	86.44	25.16	7.00
2011	9	60.49	74.03	99.05	45.71	13.35
2011	10	37.42	78.74	115.39	45.96	10.49
2011	11	16.28	16.13	28.59	21.92	16.76
2011	12	18.23	17.66	35.42	7.14	6.20
2012	1	17.13	10.35	20.02	10.21	2.57
2012	2	8.47	7.69	5.42	5.06	2.14
2012	3	5.47	10.85	8.55	11.75	4.25
2012	4	5.63	8.09	7.18	10.83	2.15
2012	5	6.80	5.32	10.23	6.00	1.86
2012	6	6.69	4.72	8.31	12.52	3.53
2012	7	88.79	16.30	47.09	5.13	2.11
2012	8	140.54	16.09	91.27	16.79	2.94
2012	9	63.23	16.68	42.75	12.92	5.65
2012	10	22.66	7.89	6.97	7.74	6.41
2012	11	8.11	5.25	6.08	7.33	2.44
2012	12	7.81	7.94	7.43	12.53	1.44
2013	1	3.87	9.55	3.95	20.70	2.02
2013	2	3.51	5.72	6.01	13.30	2.43
2013	3	2.32	7.72	5.20	6.39	1.05
2013	4	2.77	3.17	6.51	7.13	1.83
2013	5	7.79	3.72	29.62	9.91	3.25
2013	6	39.47	4.34	16.74	8.52	2.02
2013	7	28.34	7.09	17.95	9.81	1.88
2013	8	20.52	16.71	22.46	20.08	3.21
2013	9	17.18	14.02	19.03	21.01	7.82
2013	10	11.75	9.66	37.88	39.74	12.02
2013	11	7.93	12.32	42.17	8.80	6.76
2013	12	4.34	8.04	17.82	7.35	3.78
2014	1	1.85	4.87	2.08	11.31	3.17
2014	2	2.44	5.29	3.87	9.28	2.02
2014	3	3.37	3.52	5.01	4.52	4.18
2014	4	4.94	5.03	8.25	4.43	3.31
2014	5	4.50	5.62	7.02	6.64	1.23
2014	6	7.68	9.15	3.58	9.24	1.23
2014	7	5.63	6.44	6.17	10.29	3.28
2014	8	9.59	14.36	4.87	11.40	2.73
2014	9	7.40	19.04	9.89	50.05	7.57
2014	10	7.48	17.62	7.85	16.97	25.55
2014	11	6.51	8.83	4.23	12.27	4.46
2014	12	5.92	14.95	16.50	16.14	13.30
2015	1	8.79	9.69	4.17	7.69	6.05
2015	2	7.54	6.02	13.44	8.85	3.62
2015	3	5.43	6.21	19.10	12.57	2.95
2015	4	9.50	5.53	11.96	5.42	2.93

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2015	5	9.84	7.41	12.35	4.41	1.80
2015	6	12.58	5.36	3.54	6.05	1.25
2015	7	18.72	10.07	11.34	8.70	12.89
2015	8	19.47	15.92	23.91	13.11	9.80
2015	9	18.69	19.41	17.09	18.88	11.20
2015	10	14.07	22.07	19.50	44.60	24.50
2015	11	24.91	20.64	19.81	17.60	11.00
2015	12	16.31	8.01	60.99	17.62	15.65
2016	1	20.38	91.83	61.37	60.34	6.92
2016	2	12.57	135.25	50.65	75.95	35.27
2016	3	29.18	117.50	40.00	74.24	67.80
2016	4	25.44	23.98	29.05	20.24	12.52
2016	5	23.12	12.19	24.34	9.65	3.48
2016	6	25.78	7.07	40.23	8.96	3.27
2016	7	27.81	36.49	27.03	16.65	6.61
2016	8	33.06	24.13	41.19	32.68	2.85
2016	9	29.92	29.54	46.01	17.12	3.82
2016	10	15.68	8.45	41.75	9.91	7.16
2016	11	13.02	15.23	34.53	15.01	6.00
2016	12	15.90	12.33	28.38	23.09	4.33
2017	1	7.49	10.42	18.98	14.15	6.30
2017	2	4.91	6.29	16.82	8.63	1.62
2017	3	4.29	6.87	17.39	5.45	3.20
2017	4	4.41	4.55	5.97	7.40	4.58
2017	5	6.76	10.12	10.05	10.42	4.35
2017	6	7.26	14.13	15.06	6.41	2.85
2017	7	10.24	11.20	5.56	11.84	9.38
2017	8	10.80	20.83	7.78	26.45	8.85
2017	9	9.41	11.10	6.67	9.51	4.05
2017	10	23.66	25.27	9.02	99.15	26.02
2017	11	6.70	21.81	7.68	12.02	11.27
2017	12	3.84	34.65	2.93	10.93	7.53
2018	1	2.70	44.47	13.04	39.06	16.78
2018	2	3.20	79.15	18.32	59.67	19.10
2018	3	2.72	89.25	26.41	53.59	12.57
2018	4	4.53	64.56	12.99	42.67	4.32
2018	5	7.30	97.11	3.13	22.99	2.94
2018	6	13.09	42.39	6.15	10.85	3.60
2018	7	12.10	53.19	6.87	8.75	3.09
2018	8	22.33	47.41	10.35	10.48	5.74
2018	9	21.25	68.53	39.11	30.21	5.50
2018	10	21.47	31.14	63.07	38.95	3.61
2018	11	21.82	27.03	51.14	25.07	3.67
2018	12	-	-	-	-	8.77
2019	1	12.12	55.24	68.44	26.24	5.03
2019	2	10.67	78.77	52.45	19.75	10.35
2019	3	9.03	60.29	15.51	13.78	7.54
2019	4	7.26	41.96	6.38	11.67	5.86

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2019	5	11.25	24.51	8.49	10.72	4.02
2019	6	7.43	27.45	7.88	7.00	2.20
2019	7	16.38	16.40	9.52	9.83	3.38
2019	8	15.59	29.01	72.60	16.77	4.55
2019	9	19.39	18.11	62.30	22.20	7.86
2019	10	12.81	13.16	21.49	11.23	3.75
2019	11	17.63	18.26	10.35	9.53	14.15
2019	12	12.58	7.84	8.13	12.11	9.80
2020	1	8.94	30.35	47.61	17.72	3.93
2020	2	6.39	14.68	7.76	9.00	2.05
2020	3	7.09	11.42	8.15	7.12	4.74
2020	4	5.54	4.48	7.14	3.39	2.83
2020	5	9.21	2.90	3.82	2.69	2.91
2020	6	10.10	7.56	10.90	7.32	5.10
2020	7	23.68	7.00	12.77	29.37	7.09
2020	8	6.97	23.11	41.69	19.39	3.59
2020	9	46.25	51.49	129.39	96.34	3.07
2020	10	22.45	138.02	118.90	236.89	42.21
2020	11	31.60	99.11	108.93	185.26	5.06
2020	12	39.82	108.32	27.30	32.17	4.74
2021	1	26.19	65.37	35.87	27.93	4.39
2021	2	6.62	5.85	21.57	13.08	1.45
2021	3	10.32	15.90	29.73	8.21	3.33
2021	4	3.91	7.85	5.23	6.10	4.27
2021	5	8.71	6.83	5.66	13.31	2.36
2021	6	15.22	11.21	5.93	12.88	4.16
2021	7	16.78	18.17	14.14	25.53	10.00
2021	8	25.66	13.41	18.13	18.74	8.99
2021	9	13.83	18.49	10.28	10.95	5.91
2021	10	11.31	17.66	2.50	16.23	4.10
2021	11	10.84	7.71	15.47	21.36	5.60
2021	12	6.11	3.71	5.13	7.27	6.62
2022	1	8.46	7.80	31.96	11.36	7.96
2022	2	3.03	6.83	5.54	11.95	3.92
2022	3	5.05	4.73	5.24	7.48	2.30
2022	4	14.95	4.31	10.23	9.05	2.58
2022	5	6.93	3.08	2.55	4.79	2.03
2022	6	5.13	9.59	2.99	4.39	2.43
2022	7	15.22	6.08	7.43	22.16	12.82
2022	8	15.47	6.90	17.55	26.36	13.96
2022	9	14.89	6.20	21.75	29.29	3.76
2022	10	14.66	13.22	17.48	24.51	24.28
2022	11	7.16	9.69	12.75	15.34	5.28
2022	12	7.41	12.12	20.01	16.03	6.37
2023	1	6.52	7.36	13.08	11.52	5.24
2023	2	5.39	11.65	19.93	16.73	11.38
2023	3	6.00	8.88	13.26	13.33	3.59
2023	4	5.93	5.70	5.84	9.06	2.67
2023	5	4.01	3.03	8.59	4.98	12.36
2023	6	3.85	13.92	8.92	5.27	2.70
2023	7	14.81	12.55	16.53	96.79	6.49
2023	8	21.20	5.91	21.87	73.80	84.79
2023	9	6.00	6.07	9.60	6.58	5.44
2023	10	8.23	7.25	10.89	19.85	11.48
2023	11	6.33	4.38	11.58	12.39	3.96
2023	12	3.12	2.70	6.45	5.07	6.84
2024	1	5.42	5.90	8.68	12.27	4.87

Year	Month	Mosquito Lagoon	Banana River Lagoon	Northern IRL	North Central IRL	Sebastian
2024	2	6.51	8.79	5.15	14.80	6.36
2024	3	7.20	5.92	8.40	9.70	19.21
2024	4	4.58	3.66	6.65	6.49	4.67
2024	5	6.18	3.03	6.64	4.52	2.41
2024	6	4.96	5.32	7.14	3.42	0.97
2024	7	7.50	7.75	12.22	7.63	4.64
2024	8	12.52	5.82	10.37	11.08	5.25
2024	9	7.23	4.74	7.44	9.55	12.98
2024	10	4.42	3.78	4.73	10.14	11.75
2024	11	7.08	7.30	11.66	5.66	7.78
2024	12	6.78	6.50	8.85	4.12	3.32

Return to **Figure C-2**.

Save Our Indian River Lagoon Funding Application Short Form:

Unincorporated Countywide Vegetation Harvesting 3

Project Details
Entity: Brevard County Stormwater Management

Project Type: Aquatic Vegetation Harvesting

Sub Lagoon: All

Location:

Project Description: Brevard County seeks to further expand its aquatic vegetation harvesting program through the acquisition of a large capacity (20 cubic yards) amphibious aquatic weed harvester, plus a dedicated truck and trailer suitable for transport, at an estimated total cost of $575,000. This request will allow the initial removal of 3,000,000 pounds of excess vegetation from stormwater management sites throughout Brevard situated within the Indian River Lagoon watershed.

Education and Outreach:

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 4,524

Total Phosphorus Reduction (lbs/year): 647

Costs
Total Project Cost: $575,000

Estimated Cost per Pound Total Nitrogen Removed: $127

Estimated Cost per Pound Total Phosphorus Removed: $889

Eligible Tax Funding Cost Share: $515,736

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $60,000

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits:

Notes: Removal of 3,000,000 pounds of aquatic vegetation over 2 years.

Save Our Indian River Lagoon Funding Application Short Form: **Coconut Point Shoreline Stabilization and Living Shoreline Enhancement**

Project Details
Entity: Hubbs SeaWorld Research Institute

Project Type: Planted Shoreline

Sub Lagoon: Central Indian River Lagoon

Location: 28.010594, -80.536315; 4020 S. Hwy A1A, Melbourne Beach, FL 32951

Project Description: The Coconut Point shoreline restoration project is an urgent, multi-phase effort to mitigate ongoing shoreline erosion and enhance impaired shoreline habitat along the Indian River Lagoon (IRL). Phase 1 focuses on removing a 250 foot seawall and restoring up to 500 feet of historic seagrass, shellfish, and shoreline habitat on adjoining properties managed by Hubbs-SeaWorld Research Institute (HSWRI) and the Brevard County Environmentally Endangered Lands (EEL) program. This site represents critical conservation assets that are increasingly threatened by erosion and flooding. Funding has been secured to conduct the design and engineering work; however, recent cost increases have created a $44,000 budget shortfall. Additional support is needed to maintain the original scope of work, which includes surveys, planning, and modeling to support installation of offshore wave attenuation to maximize seagrass and living shoreline restoration potential. Support for the unanticipated additional design and engineering expenses is the focus of this request.

SOIRL support, taken together with secured support from both HSWRI and the IRL National Estuary Program (IRLNEP), will deliver a shovel-ready restoration design that when implemented will stabilize rapidly eroding shoreline and maximize the success of 500 feet of restored seagrass and shoreline habitat to help improve recovery and resilience of the IRL ecosystem.

Education and Outreach: We will pair technical deliverables with targeted public outreach through events and partner social media channels to explain links between shoreline restoration, water quality, and fish and wildlife conservation. In the last year, HSWRI outreach engaged more than 5,200 residents and students across 59 events, capacity we will leverage to promote findings from this project. We will also provide technical briefings to restoration practitioners and decision makers in the IRL through established partnerships with the IRLNEP STEM Committee and FWC's North and Central Florida Estuary Restoration Teams.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 34

Total Phosphorus Reduction (lbs/year): 12

Costs

Total Project Cost: $122,168 (Design only)

Estimated Cost per Pound Total Nitrogen Removed: $3,593

Estimated Cost per Pound Total Phosphorus Removed: $10,180

Eligible Tax Funding Cost Share: $8,806

Project Funding

Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $71,962

Dollar Amount Secured Grant(s): $41,400 IRLNEP

Additional Information

Other Indian River Lagoon Benefits: In addition to providing new and restored habitat, the project will provide protection for HSWRI's Coconut Point Marine Mammal Lab and an adjacent portion of the Brevard County Coconut Point Sanctuary that are undergoing significant shoreline erosion. The anticipated long-term project outcome is significant improvement to the ecological conditions of the restoration site, with establishment of a resilient, self-sustaining shoreline ecosystem. This would include natural expansion of critical habitats, particularly seagrass beds, to foster biodiversity and enhance the overall health of the IRL.

Notes: 500 linear feet of shoreline.

Save Our Indian River Lagoon Funding Application Short Form: **The Cove at South Beaches**

Project Details
Entity: The Cove at South Beaches

Project Type: Wastewater Treatment Facility Upgrade for Reclaimed Water

Sub Lagoon: Central

Location: 28.005386, -80.528294

Project Description: Proposed system to upgrade wastewater plant that serves 40 homes.

Education and Outreach: Discussed project with Crotty Services and had engineer do report detailing elements of system to update the package plant.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 23

Total Phosphorus Reduction (lbs/year): To be determined

Costs
Total Project Cost: $500,000

Estimated Cost per Pound Total Nitrogen Removed: $21,739

Estimated Cost per Pound Total Phosphorus Removed: To be determined

Eligible Tax Funding Cost Share: $9,913

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $490,087

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits: Present system is open in-ground and above ground. Thus it is susceptible to possible flooding into surrounding area and also is smelly at times, which pollutes the air.

Notes: Upgrading package plant.

*Package plant connection to sewer was previously approved with $1,139,710 in secured state grant and $130,154 in SOIRL funds; Home owners association withdrew because costs to connect exceeded budget.

Save Our Indian River Lagoon Funding Application Short Form: **The Zip Project: An Oyster Restoration Project**

Project Details
Entity: The Zip Project

Project Type: Oyster Bar

Sub Lagoon: Central Indian River Lagoon

Location: Latitude: 27.96486, -80.51393

Project Description: The Zip Project is an oyster reef restoration initiative in Washburn Cove on Lease 1071, a 34.42-acre submerged water column property owned by the Stewart Family. This 370 lease, one of the few remaining in Florida, allows use of the entire water column for restoration rather than limiting activities to the surface or bottom. The project deploys a patented modular reef design combining vertical and horizontal structures to maximize oyster settlement, habitat complexity, and shoreline protection. The reefs will improve water quality by filtering excess nitrogen and phosphorus, provide essential habitat for fish, crabs, and other aquatic species, and buffer wave energy to reduce erosion. In addition, the project incorporates community engagement and education through volunteer events, on-site demonstrations, and outreach materials, while ongoing monitoring of water quality and reef health will support research and inform future restoration efforts in Washburn Cove and the Central Indian River Lagoon.

Education and Outreach: The Zip Project aims to actively engage the community in oyster reef restoration and lagoon stewardship. We plan to incorporate hands-on volunteer restoration events, on-site demonstrations, and educational materials to teach participants about oyster ecology, water filtration, habitat creation, and shoreline protection. We are open to additional ideas and partnerships to expand outreach opportunities, including school programs, local organization collaborations, and public learning experiences. Through these efforts, we hope to foster community involvement, raise awareness about the importance of oyster reefs, and inspire ongoing stewardship of Washburn Cove and the Central Indian River Lagoon.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 20

Total Phosphorus Reduction (lbs/year): 1

Costs
Total Project Cost: $5,500

Estimated Cost per Pound Total Nitrogen Removed: $275

Estimated Cost per Pound Total Phosphorus Removed: $5,500

Eligible Tax Funding Cost Share: $5,500

Project Funding
Is Local Match in Adopted Budget: Yes

Dollar Amount of Local Cost Share: $1,500

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits: The Zip Project provides multiple ecological benefits beyond oyster habitat restoration and water filtration. By increasing oyster populations, the reefs help reduce biochemical oxygen demand (BOD) in the water, improving dissolved oxygen levels for fish and other aquatic species. The project also reduces the risk of nutrient-driven harmful algal blooms and bacterial overflows by filtering excess nitrogen and phosphorus from the water column. Additionally, the restored reefs stabilize sediments, enhance water clarity, and support overall lagoon resilience, contributing to healthier ecosystems and improved conditions for recreational and commercial uses throughout Washburn Cove and the Central Indian River Lagoon.

Notes: 500 square feet of oyster bar

Save Our Indian River Lagoon Funding Application Short Form: **Brevard Zoo North IRL Oyster Project 5**

Project Details
Entity: Brevard Zoo

Project Type: Oyster Bar

Sub Lagoon: North Indian River Lagoon

Location: Proposed sites, substitutions will be selected as needed: 28.094052, -80.609551; 28.208028, -80.662288; 28.155068, -80.638820

Project Description: Brevard Zoo intends to construct 65,000 square feet of oyster projects in the North Basin of the IRL. The designs will be site specific and will be approved by the County before construction begins. We will consult with the County to determine whether or not live oysters need to be added to each specific location.

Education and Outreach: Brevard Zoo regularly engages the community in restoration efforts and education. We attend community events, hold presentations in schools, host volunteer opportunities and bring people into the Zoo to learn about the state of the lagoon and current conservation efforts, including oyster projects. We are not asking for any additional funding to continue this effort.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 2,600

Total Phosphorus Reduction (lbs/year): 65

Costs
Total Project Cost: $1,235,000

Estimated Cost per Pound Total Nitrogen Removed: $475

Estimated Cost per Pound Total Phosphorus Removed: $19,000

Eligible Tax Funding Cost Share: $1,235,000

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: 0

Dollar Amount Secured Grant(s): n/a

Additional Information
Other Indian River Lagoon Benefits: Oyster reef installations not only reduce nutrients, but they also support hundreds of species in the Indian River Lagoon.

Notes: 65,000 square feet of oyster bar

Save Our Indian River Lagoon Funding Application Short Form: **South St & US1 Baffle Box**

Project Details
Entity: City of Titusville

Project Type: Stormwater

Sub Lagoon: North Indian River Lagoon

Location: 28.608028; -80.807230; South St & US1, Titusville, FL 32780

Project Description: Installation of a third generation baffle box with nutrient reducing filtration media within the right of way of South St in Titusville. This baffle box will treat 202 acres of highly developed land prior to discharging into the Indian River Lagoon. This project will remove 698.2 lb/yr of total nitrogen and 92.53 lb/yr of total phosphorus.

Education and Outreach: Signage will be placed near the site during construction that lists Save Our Indian River Lagoon as a funding partner and includes information about the project.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 698

Total Phosphorus Reduction (lbs/year): 92

Costs
Total Project Cost: $485,000

Estimated Cost per Pound Total Nitrogen Removed: $695

Estimated Cost per Pound Total Phosphorus Removed: $5,272

Eligible Tax Funding Cost Share: $400,652

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $84,348

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits:

Notes: Baffle box with media treating 202 acres.

Save Our Indian River Lagoon Funding Application Short Form: **535 Knox McRae Baffle Box**

Project Details
Entity: City of Titusville

Project Type: Stormwater

Sub Lagoon: North Indian River Lagoon

Location: 28.564450, -80.807443; 535 Knox McRae Dr, Titusville, FL 32780

Project Description: Installation of a 3rd generation baffle box with nutrient reducing filtration media on City owned property located at 535 Knox McRae Dr. This baffle box will treat 168 acres of highly developed land prior to the stormwater discharging into the Indian River lagoon. This project will remove 572.39 lb/yr of total nitrogen and 75.12 lb/yr of total phosphorus.

Education and Outreach: A sign will be placed at the project during construction that lists SOIRL as a funding partner along with information about the project.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 572

Total Phosphorus Reduction (lbs/year): 75

Costs
Total Project Cost: $435,000

Estimated Cost per Pound Total Nitrogen Removed: $760

Estimated Cost per Pound Total Phosphorus Removed: $5,800

Eligible Tax Funding Cost Share: $328,328

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $106,328

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits:

Notes: Baffle box with media treating 168 acres.

Save Our Indian River Lagoon Funding Application Short Form: **Basin 212 East Main Street**

Project Details
Entity: Brevard County Natural Resources

Project Type: Stormwater

Sub Lagoon: North Indian River Lagoon

Location: 28.666597, -80.827801

Project Description: Install a denitrification treatment system by diverting an existing ditch flow into a new treatment swale with the side banks and bottom containing Bold & Gold biosorption activated media.

Education and Outreach:

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 656

Total Phosphorus Reduction (lbs/year): 115

Costs
Total Project Cost: $574,263

Estimated Cost per Pound Total Nitrogen Removed: $875

Estimated Cost per Pound Total Phosphorus Removed: $4,994

Eligible Tax Funding Cost Share: $376,544

Project Funding
Is Local Match in Adopted Budget: Yes

Dollar Amount of Local Cost Share: $197,719

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits:

Notes: Denitrification treatment system treating 140 acres.

Save Our Indian River Lagoon Funding Application Short Form: **Basin 1124 Elliot Drive**

Project Details
Entity: Brevard County Natural Resources

Project Type: Stormwater

Sub Lagoon: Banana River

Location: 28.321037, -80.68241

Project Description: Brevard County to install an offline pump that pumps existing canal flow through a denitrification system in the existing canal right of way. This project was originally approved for in the 2023 plan update and this application acts as an update to the original application with revised reductions now that design is underway, now greater than originally anticipated. Construction cost and timeframe are estimates, and will be updated according in a quarterly report once design is finished. Although the County has budgeted enough to nearly fully fund the project, these funds will allow for the remaining budget be used for additional stormwater projects treating the lagoon.

Education and Outreach:

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 617

Total Phosphorus Reduction (lbs/year): 97

Costs
Total Project Cost: $598,930

Estimated Cost per Pound Total Nitrogen Removed: $971

Estimated Cost per Pound Total Phosphorus Removed: $6,175

Eligible Tax Funding Cost Share: $354,158

Project Funding
Is Local Match in Adopted Budget: Yes

Dollar Amount of Local Cost Share: $244,772

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits:

Notes: Revising denitrification project with updated nutrient reduction treating 140 acres for an additional $195,510

Save Our Indian River Lagoon Funding Application Short Form: **Cocoa Beach Golf Course Floating Vegetative Islands**

Project Details
Entity: City of Cocoa Beach

Project Type: Stormwater

Sub Lagoon: Banana River

Location: 500 Tom Warriner Blvd, Cocoa Beach, FL 32931

Project Description: The Cocoa Beach Golf Course is located directly next to the Banana River Lagoon. In FY24 the City harvested aquatic vegetation from all 19 stormwater ponds located on the golf course. The addition of floating vegetative islands after aquatic vegetation harvesting will ensure increased nutrient removal capacity of the ponds as well as beautify the ponds with native wetland vegetation and prevent future use of aquatic herbicides. The golf course uses reclaim water to irrigate the course, so the reclaim water has the potentially to flow off the course into the ponds. With the use of fertilizer on the course, there is also the potential for the fertilizer to enter the ponds then the Lagoon. The addition of floating vegetative islands will ensure increased nutrient removal capacity of the ponds.

The 19 ponds have an estimated area of 1,010,000 square feet, which means there would be a total area of 50,500 SF of floating vegetation islands. The islands will cover 5% of the ponds.

Education and Outreach: The City' target audience is the golf course members, visitors and residents. The City will post about the recent improvements and benefits of the floating vegetative islands to the Banana River Lagoon on the City's website and social media pages.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 152

Total Phosphorus Reduction (lbs/year): 21

Costs
Total Project Cost: $1,162,000

Estimated Cost per Pound Total Nitrogen Removed: $7,645

Estimated Cost per Pound Total Phosphorus Removed: $55,333

Eligible Tax Funding Cost Share: $87,248

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $1,074,752

Dollar Amount Secured Grant(s): N/A

Additional Information

Other Indian River Lagoon Benefits: The floating vegetative islands will help compete with invasive vegetation that tends to grow in the ponds and that may enter the lagoon. Transforming the ponds into areas thriving with native wetland vegetation provide additional habitat for lagoon animal species such as wading birds. These ponds may serve as areas of refuge for these animals in times when the lagoon is experiencing intense algae blooms.

Notes: Revising project with updated nutrient reduction for an additional $49,150.

Save Our Indian River Lagoon Funding Application Short Form: **Fillmore Avenue Streetscape Project**

Project Details
Entity: City of Cape Canaveral

Project Type: Stormwater

Sub Lagoon: Banana River

Location: 28.383062, -80.605177 - 28.383239, -80.599688 - All of Fillmore Ave.

Project Description: The Fillmore Avenue Project is a comprehensive infrastructure improvement initiative designed to address flooding concerns, enhance water quality, and modernize essential public utilities while creating a safer and more pedestrian-friendly corridor. This multi-faceted project encompasses upgrades to the stormwater system, sanitary sewer network, reclaimed water lines, and pedestrian walkways/pedways.

The stormwater management system will be significantly improved through the installation of underground stormwater chambers to increase capacity and reduce localized flooding. Additionally, pervious pavers will be incorporated to allow rainwater to infiltrate naturally, reducing runoff volume and pollutant loads. To further enhance stormwater treatment and provide visible, community-friendly green infrastructure, the project also proposes the installation of rain gardens strategically placed along the corridor. These features will filter stormwater through vegetation and soil media, improving water quality before it enters the Indian River Lagoon.

Together, these improvements will provide long-term resilience against increasing storm intensity, promote sustainable water management, and support the City's commitment to environmental stewardship while simultaneously improving neighborhood connectivity and pedestrian safety.

Education and Outreach:

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 60

Total Phosphorus Reduction (lbs/year): 11

Costs
Total Project Cost: $3,382,316

Estimated Cost per Pound Total Nitrogen Removed: $56,372

Estimated Cost per Pound Total Phosphorus Removed: $307,483

Eligible Tax Funding Cost Share: $34,440

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $3,347,876

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits: Reduction in Nutrient Pollution: The combination of underground chambers, pervious pavers, and rain gardens helps capture nitrogen and phosphorus before they can enter the Lagoon, directly addressing algae bloom drivers.

Improved Habitat Support: Cleaner freshwater discharges benefit seagrasses, oysters, and fish populations in the Lagoon by reducing turbidity and nutrient overload.

Temperature Moderation of Runoff: Green infrastructure (rain gardens and pervious surfaces) reduces the "first flush" of hot pavement runoff, lowering thermal stress on Lagoon ecosystems.

Microplastic & Sediment Capture: Filtration through soils and vegetation captures sediments and debris, limiting the transport of microplastics and fine particulates into the Lagoon.

Hydrologic Balance Restoration: Infiltration features recharge groundwater and restore more natural freshwater flow patterns, helping maintain salinity balance critical for estuarine species.

Public Stewardship & Education: Visible green infrastructure (rain gardens, pervious pavers) provides daily, real-world examples of Lagoon-friendly design that raise community awareness and foster stewardship.

Notes: Rain garden project treating 11 acres.

Save Our Indian River Lagoon Funding Application Short Form: **Tequesta Harbor Revitalization Project**

Project Details
Entity: Tequesta Harbor Yacht Club Association

Project Type: Muck Removal

Sub Lagoon: North Indian River Lagoon

Location: 212 Tequesta Harbor Drive in Merritt Island, FL 32952

Project Description: Tequesta Harbor, located on Merritt Island, is a small residential harbor of approximately 0.65 acres that has become heavily impacted by muck accumulation over the past several decades. The buildup has reduced water depth and quality, limiting navigation, diminishing habitat value, and contributing to poor lagoon health.

This project seeks funding to remove approximately 3,000-3,200 cubic yards of muck from Tequesta Harbor through a dredging project. Dredging will restore safe water depths, improve water circulation, and reduce nutrient loading—directly benefiting the harbor, the Indian River Lagoon, and community members.

In addition, the community is seeking to rebuild deteriorating docks and install a coquina rock ridge to protect the mouth of the harbor, stabilize the shoreline, and reduce future erosion. While these elements are critical to the long-term health and usability of the harbor, the community does not currently have sufficient funding to cover all aspects of the project. Grant support will allow us to address the most urgent need—muck removal—while continuing to pursue funding for these complementary improvements.

The community is also committed to long-term stewardship of the harbor and lagoon. Homeowners are working with Brevard County, the Brevard Zoo, and other partners to explore additional restoration measures such as oyster or seagrass projects, as well as stormwater improvements. The ultimate goal is not only to restore the harbor to a usable and healthy state, but also to ensure it becomes part of the solution rather than a burden on the lagoon.

Education and Outreach: The Tequesta Harbor community is committed to pairing this dredging project with education and outreach to foster long-term stewardship. We plan to host informational sessions for residents on the causes of muck, stormwater management best practices, and ways homeowners can reduce nutrient loading. We are also exploring partnerships with local organizations to bring additional resources, volunteer opportunities, and hands-on conservation activities (e.g., oyster gardening, native plant landscaping). These efforts will ensure residents are not only informed but actively engaged in protecting the harbor and contributing positively to the health of the Indian River Lagoon.

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 68

Total Phosphorus Reduction (lbs/year): 9

Costs
Total Project Cost: $45,000

Estimated Cost per Pound Total Nitrogen Removed: $662

Estimated Cost per Pound Total Phosphorus Removed: $5,000

Eligible Tax Funding Cost Share: $41,276

Project Funding
Is Local Match in Adopted Budget: Yes

Dollar Amount of Local Cost Share: $15,000

Dollar Amount Secured Grant(s):

Additional Information
Other Indian River Lagoon Benefits: The dredging will restore safe water depths, improve water circulation, and reduce nutrient loading of harbor

Notes: Remove approximately 3,200 cubic yards of muck from Tequesta Harbor.

Save Our Indian River Lagoon Funding Application Short Form: **South Central A**

Project Details
Entity: Brevard County

Project Type: Septic to Sewer

Sub Lagoon: North Indian River Lagoon

Location: 28.290215, -80.695486; Unincorporated Rockledge Drive.

Project Description: Modifying the existing South Central Zone A to include all lots within the sewer design area. It was determined during planning of the sewer system the the most efficient path to bring sewer to the existing South Central A would create an opportunity to provide sewer to the properties along Rockledge Drive, south of the existing project area.

Education and Outreach:

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 5,318

Total Phosphorus Reduction (lbs/year): To be determined

Costs
Total Project Cost: $11,629,426

Estimated Cost per Pound Total Nitrogen Removed: $2,187

Estimated Cost per Pound Total Phosphorus Removed: To be determined

Eligible Tax Funding Cost Share: $8,258,854

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share:

Dollar Amount Secured Grant(s): $3,370,572 from Florida Department of Environmental Protection and $6,549,178 from Save Our Indian River Lagoon

Additional Information
Other Indian River Lagoon Benefits: In addition to removal of a nitrogen source, septic removal will also remove a source of phosphorus, bacteria, and contaminates of concern.

Notes: Revising the project from 101 to 129 connections; eligible for an additional $1,709,676.

Save Our Indian River Lagoon Funding Application Short Form: **South Tropical Trail / Kadlac Drive Sewer Extension**

Project Details
Entity: Brevard County Utility Services Department

Project Type: Septic to Sewer

Sub Lagoon: North Indian River Lagoon

Location: 28.348491, -80.702617

Project Description: Septic to sewer conversion of 6 properties. Project includes: sewer connection to County system.

Education and Outreach: Letters to be sent out

Estimated Water Quality Benefits
Total Nitrogen Reduction (lbs/year): 162

Total Phosphorus Reduction (lbs/year):

Costs
Total Project Cost: $368,204

Estimated Cost per Pound Total Nitrogen Removed: $2,273

Estimated Cost per Pound Total Phosphorus Removed: To be determined

Eligible Tax Funding Cost Share: $251,586

Project Funding
Is Local Match in Adopted Budget: No

Dollar Amount of Local Cost Share: $196,898

Dollar Amount Secured Grant(s): N/A

Additional Information
Other Indian River Lagoon Benefits: Septic to sewer conversion of 6 properties. Project includes: sewer connections to County system.

Notes: Septic to sewer conversion of 6 properties.