



## INDIAN RIVER LAGOON PROGRAM

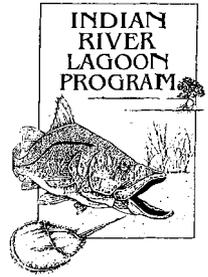
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March 30, 2004

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The Indian River Lagoon Program is pleased to submit the attached documentation and supporting materials in compliance with the 2004 National Estuary Program Implementation Review Guidance. I believe your review of this package and the subsequent collaborative conference calls, and on-site visit in May 2004, will demonstrate the Indian River Lagoon Program's successes in CCMP implementation progress and eligibility for continued funding.

Since the Indian River Lagoon Program's last implementation review, the NEP through the local sponsorship of the St. Johns River Water Management District, has seen a three-fold increase in implementation funding from \$6.7 million in 1999, to \$21.3 million in FY 2003. This funding is implementing CCMP recommendations that address storm water discharges from both large and small drainage basins, the targeted removal of over 2.6 million cubic yards of muck sediment deposits from lagoon tributaries, the reconnection of over 18,000 acres of impounded marsh wetlands, and the establishment of Pollutant Load Reduction Goals (PLRGs) that will help in the development of TMDLs and the implementation of the NPDES Program within the lagoon's northern and central watersheds.

The South Florida Water Management District is continuing to implement over \$10 million annually in storm water treatment and habitat enhancement projects in cooperation with the St. Lucie River Issues Team and county and city governments for projects such as canal and creek dredging, bank stabilization, agricultural BMP implementation and sediment trap installations in the southern lagoon watershed. They are also promoting the Indian River South Restoration Plan, a \$1 billion Everglades Restoration component, in partnership with the US Army Corps of Engineers being considered by Congress for authorization and appropriations under WRDA 2004. The water management districts, and the other 16 members of the Indian River Lagoon Advisory Board continue to support the Indian River Lagoon Program by overseeing the development of the Program's **Annual Work Plans (Attachment 1, tabs a-c)** and guiding the expenditure of the Program's annual funding allocations (**Table 1**).

In 2003, the Indian River Lagoon Program was successful in working with local governments and the state, taking a primary role in **funds leveraging** of \$12.1 million in CCMP implementation resources, ranking well above the overall leveraging mean, and third among all the NEP's. When both primary and significant roles were considered, the Lagoon Program leveraged \$13.3 million in resources, fourth among the 28 programs, and seventh overall when weighing all roles (**Attachment 2, Tables 2-4**). All of the local governments partnering with the Lagoon Program are implementing water quality improvement and stormwater retrofit projects, habitat restoration initiatives, and environmentally endangered land acquisition programs. Volusia County is cost-sharing sediment trap installations and partnering in marsh enhancement projects.



EPA

Brevard is implementing stormwater management treatment projects, and acquiring environmentally endangered lands for preservation. Brevard County's Surface Water Improvement Program was recently awarded top honors by the EPA, taking first place in the 2000 NPDES Program for Stormwater Control Excellence in the municipal category. Indian River County is partnering with the Lagoon Program in designing and implementing a stormwater management plan for over 50,000 acres, targeting the reduction in discharges of 100 million gallons per day of freshwater into the Lagoon; as well as implementing stormwater retrofits in urbanized communities throughout the county. St. Lucie is partnering with SFWMD in executing mosquito impoundment reconnections and public access projects, canal retrofits to improve discharges into the North fork of the St. Lucie River, and the preservation of the Savannas State Reserve. Martin County is implementing non-native plant removal and habitat restoration projects, surface water management systems in Kitching Creek, Salerno Creek and Manatee Pocket, assisting in the acquisition of thousands of acres of land for the IRL South Plan implementation, and constructing other urban non-point source retrofits and water quality improvement projects.

Federal and state agencies are also contributing important resources and funding toward CCMP implementation, including \$13.2 million in EPA/FDEP administered Section 319 nonpoint source grant funding since 1998, which has leveraged \$73.8 million in total project implementation within the IRL watershed. The US Army Corp of Engineer's is preparing the Central & South Florida Comprehensive Review Restudy and the associated Indian River Lagoon Feasibility Studies (North & South), as well as designing and planning the future construction of the C-1 Rediversion Project. The US Fish and Wildlife Service is implementing the Pelican Island National Wildlife Refuge Restoration Plan to restore and protect America's first National Wildlife Refuge established by President Teddy Roosevelt in 1903, and is continuing to restore impounded wetlands in the Merritt Island National Wildlife Refuge. The National Aeronautics and Space Administration (NASA) has recently partnered with the Lagoon Program in helping to make their extensive environmental monitoring data bases available to water managers and the public. The Florida Department of Environmental Protection is supporting water quality and biological monitoring throughout the lagoon, administering SRF loans for stormwater management and wastewater facility upgrades, and participating in habitat restoration, resource protection and enforcement actions. The US Department of Agriculture's Natural Resources Conservation Service is involved in assessing key environmental issues in the St. Lucie Estuary, implementing agricultural BMPs, and in educating farmers and citrus growers to decrease water use through the agricultural mobile irrigation labs; resulting in an estimated savings of over 2 billion gallons annually since 1999. The Florida Inland Navigation District has provided cost-share funding for environmental dredging projects in Turkey Creek, Taylor Creek and the St. Sebastian River, spoil island enhancement projects, intra coastal waterway navigation dredging and many habitat and educational improvement projects. The Florida Fish and Wildlife Conservation Commission is addressing resource protection zones and manatee protection rules. The Nature Conservancy is actively pursuing implementation of the Indian River Lagoon Blueway environmentally endangered lands acquisition program; recently brokering the acquisition of 290 acre Inlet Groves property on the southern Brevard barrier island that includes 1.7 miles of lagoon shoreline for preservation and will allow the reconnection of 50 additional acres of impounded marsh habitat. Since FY 2000 and the initiation of the **Government Performance and Results Act** reporting requirement for the NEP's, the Indian River Lagoon Program has reported over 33,000 acres of habitat as being restored, rehabilitated, re-established, enhanced or protected by Indian River Lagoon Advisory Board membership, and the NEP has initiated action on 100% of all CCMP priority actions as of 2003 (**Attachment 3**).

The level of progress made in implementing the CCMP is being tracked through a new **Implementation Tracking System** developed by the Lagoon Program in 2003-2004. This tracking system employs the versatile Project 2000 software program and meets many of EPA's criteria and suggested system components such as listing CCMP Action Plans, project descriptions, responsible parties, costs, project location, dates, project status, etc. A copy of a sample print-out from the tracking system is included as well as a CD with the tracking system data as **Attachment 4**.

In compliance with the Implementation Review Guidance, the Indian River Lagoon Program has opted to develop a public-friendly educational piece as an **Environmental Progress Report** to provide information on the health of the estuary and highlight the effectiveness of CCMP actions in achieving environmental results. This environmental report is being produced in cooperation with the St. Johns River Water Management District and the South Florida Water Management District as a 4-page broad-sheet newspaper insert that will be distributed in 7 area newspapers throughout the watershed on Saturday, April 24, 2004 reaching an estimated audience of over 500,000 residents from Daytona Beach in Volusia County to northern Palm Beach County. This environmental report is being joined with two additional broad-sheet newspaper inserts highlighting the status and overview of the Indian River Lagoon North Feasibility Study and the Indian River Lagoon South Restoration Project being implemented by the SJRWMD and SFWMD in partnership with the US Army Corps of Engineers. The total cost of this educational outreach effort is nearly \$80,000 with the NEP paying for approximately 58% of the printing and distribution costs. Copies of the final drafts are provided as **Attachment 5**. Copies of the final broad-sheet newspaper inserts will be sent to each member of the Implementation Review Team on April 26, 2004.

The Indian River Lagoon National Estuary Program's CCMP has adopted submerged aquatic vegetation (SAV) or seagrasses as the Lagoon's primary **Environmental Indicator** to measure environmental results. SAV represents one of the most diverse and productive habitat types in the Lagoon and an evaluation of the change in seagrass occurrence and response over time as determined from aerial photographs and existing mapping studies have been compared from 1943 to 1999 under the updated 2002 IRL SWIM Plan. As expected, seagrass losses have been greatest in areas adjacent to urbanized centers, however seagrass has remained stable or has increased in some areas where humans have not created significant impacts of storm water loadings in portions of the estuary. **Attachment 6** includes a 6-page summary of seagrass coverage patterns based upon the Indian River Lagoon System Segment Map.

The Indian River Lagoon Program has successfully partnered with the watershed's largest non-governmental organization – the Marine Resources Council (MRC), hosting quarterly citizen workshops (one per county, each quarter, over the past two years) to generate quality public involvement in lagoon management decisions. These workshops, and the highly regarded 'State of the Indian River Lagoon' Conference held in September 2000, showcased the efforts of scientists and environmental organizations in restoring the lagoon and raised public awareness about the ecological and economic importance of the estuary. The Indian River Lagoon Program is currently planning for the 2004 'State of the Indian River Lagoon' Conference on May 15, 2004, updating lessons learned and project results with a focus on the recreational fishing community. The Indian River Lagoon Program also organized and hosted the Regional Gulf, Caribbean and Florida East Coast Fisheries Workshop in September 2003, through an EPA grant to the Association of National Estuary Programs. This two-day workshop included panel discussions and presentations on fisheries regulations, estuarine management programs supporting fisheries, essential fish habitat, marine protected areas and case studies in estuarine management (**Attachment 7**).

In October 2003, the Lagoon Program also hosted a Community Culture and the Environment workshop under the leadership of Ms. Theresa Trainor and Ms. Noemi Mercado for watershed coordinators throughout the Central Florida region (**Attachment 8**). Additional **Voluntary Supplemental Information** is also included in this Implementation Review packet highlighting recent CCMP activities and outreach initiatives such as the annual IRL Photo Contest Calendar, quarterly NEP newsletters, and other publications (**Attachment 9**). In addition to these efforts, the Indian River Lagoon Program continues to sponsor the Smithsonian Marine Station's internet based – interactive Indian River Lagoon Species Inventory & Relational Data Base ([www.sms.si.edu](http://www.sms.si.edu)); support the Indian River Lagoon Resource Information Center run by the MRC; fund 100% of the nation's second largest citizen volunteer water quality monitoring network throughout the estuary, support the volunteer mangrove shoreline plantings project, oversee the EPA ANS grant for the Australian Spotted Jellyfish in cooperation with Mobile Bay and Barataria-Terrebonne NEPs, and participate in seasonal sport fishing shows, festivals and community events distributing educational literature and highlighting ongoing implementation activities.

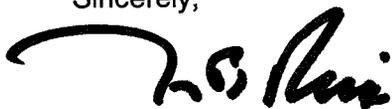
Finally, the Lagoon Program continues to manage the over \$3 million in revenue for lagoon restoration and public education that has been generated from the sales of the Indian River Lagoon License Plates throughout the State of Florida. These dollars are funding storm water treatment projects, habitat improvement efforts, and public involvement activities throughout the watershed.

This brief cover letter only highlights some of the current implementation activities in the Indian River Lagoon. For a more comprehensive review of implementation efforts the annual work plans provide a good overview of the numerous storm water and habitat improvement projects occurring throughout the watershed not mentioned here that are helping to protect and restore North America's most biologically diverse estuary system.

I would like to thank, Robert Day, Wayne Mozo, Kathy Recore and Linda Goode (Lagoon Program staff) for their assistance in preparing the information and attachments for this Implementation Review packet, as well as for their year's of dedicated service in CCMP implementation activities and most importantly for their unwavering commitment to protect and restore the health of the Lagoon's estuarine environment. I would also like to acknowledge the dedication of the federal, state and water management district's representatives and the agency managers and the local elected officials who serve on the Indian River Lagoon Advisory Board; and the staffs of the numerous agencies, ngos and local governments who work day-in and day-out to protect the lagoon's natural resources by enforcing environmental regulations, conducting environmental scientific studies and managing capital and habitat improvement contracts and projects that collectively have a significant impact on our understanding of the system, and its future viability.

If you have any questions or comments, please contact me at the number listed above.

Sincerely,

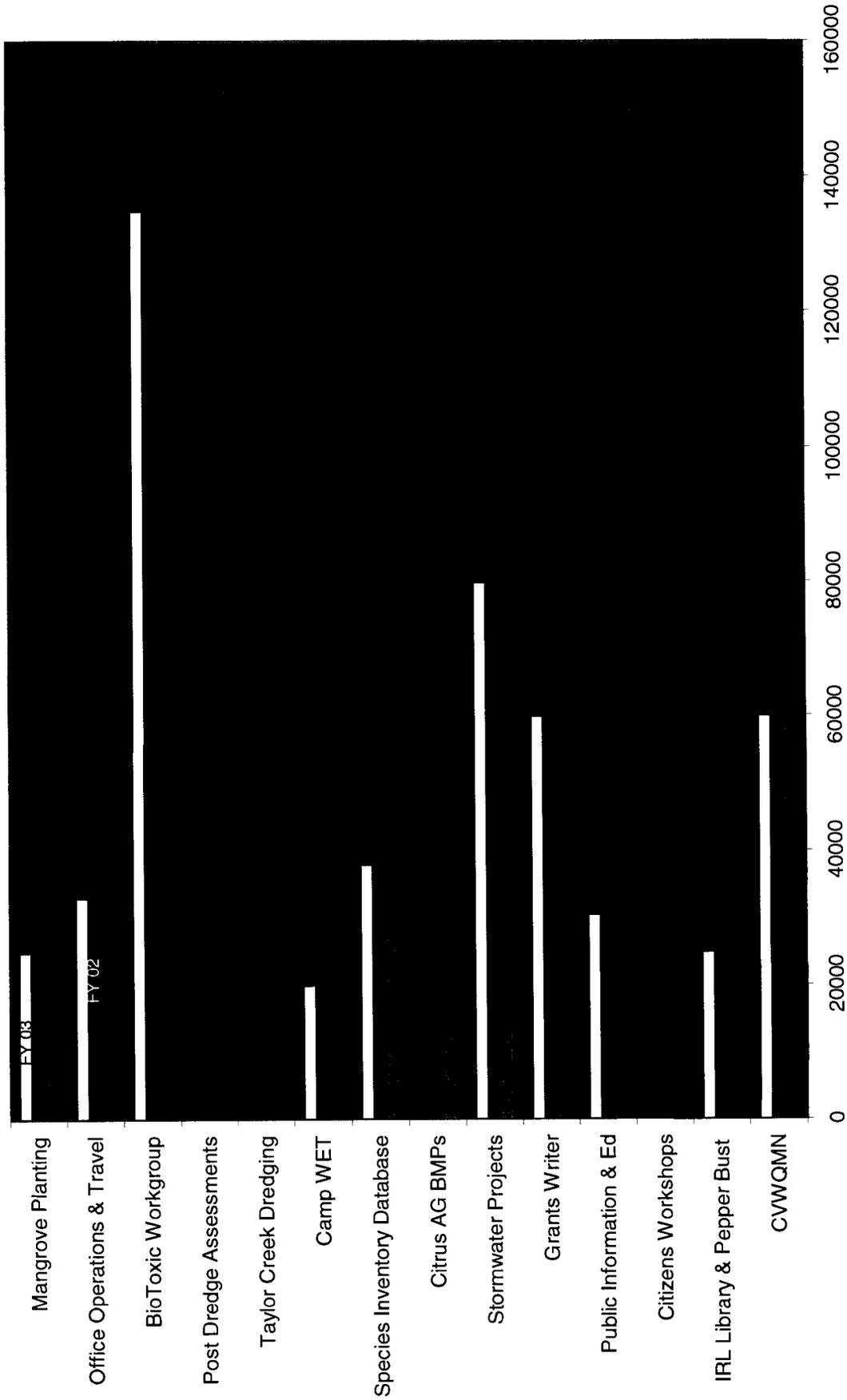


Troy Rice, Director  
Indian River Lagoon National Estuary Program

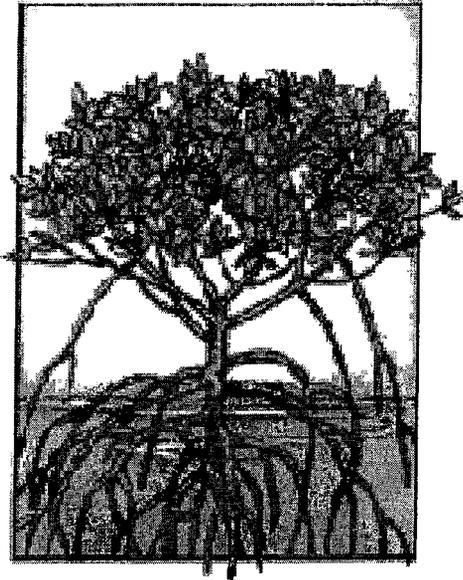
Attachments

TABLE 11

EPA Post-CCMP Funding Expenditures



**SIXTH YEAR WORK PLAN**  
**TO IMPLEMENT THE INDIAN RIVER LAGOON**  
**COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN**  
**FISCAL YEAR 2001 – 2002**



*Indian River Lagoon National Estuary Program*  
*525 Community College Parkway*  
*Palm Bay, FL 32907*

**APPROVED BY**

**THE INDIAN RIVER LAGOON BASIN ADVISORY BOARD**

May 30, 2001

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## ***SECTION 1. HIGHLIGHTS & INTRODUCTION:***

The Indian River Lagoon Basin Advisory Board, as the National Estuary Program's Management Conference, continues to actively implement the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP). During the fifth year of post-CCMP implementation, the Advisory Board has continued to increase the momentum of projects and activities, and has maintained effective lines of communication and facilitation between the lagoon's management agencies, local governments and citizens.

The Advisory Board consists of representatives from the US Environmental Protection Agency (EPA); the Florida Department of Environmental Protection (FDEP); the St. Johns River Water Management District (SJRWMD); the South Florida Water Management District (SFWMD); the counties of Volusia, Brevard, Indian River, St. Lucie and Martin; the chairs of the Technical and Citizens Advisory Committees; the US Army Corps of Engineers (USACOE); the National Aeronautics and Space Administration (NASA); the US Fish and Wildlife Service (USFWS); the US Department of Agriculture's Natural Resources Conservation Service (USDA/NRCS); the Florida Fish and Wildlife Conservation Commission (FWCC); the Florida Inland Navigation District (FIND); and The Nature Conservancy (TNC).

Considerable progress has been achieved in the Program's ongoing efforts to implement actions within the CCMP during 2000 and 2001. The SJRWMD & SFWMD continue to work in unison collecting and managing technical data to develop Pollutant Load Reduction Goals (PLRGs) as a precursor to the setting of Total Maximum Daily Load (TMDL) allocations by FDEP. The water management districts, USFWS and local mosquito control districts continue to monitor reconnected impounded wetlands for wildlife habitat and water quality improvements, while working to reconnect additional impoundments. Local governments continue to actively pursue partnerships with the water management districts, FDEP and other agencies to implement stormwater retrofit and habitat restoration projects. And The Nature Conservancy has partnered with the SJRWMD to facilitate the implementation of the Indian River Lagoon Blueway Program to acquire environmentally important wetlands and uplands along the lagoon.

Intergovernmental coordination activities are reported to elected officials, agency managers and the public on basin-wide work being conducted by federal, state and local programs. The Marine Resources Council, under contract with the National Estuary Program, has hosted local government workshops to brief local elected officials on the results of numerous regional lagoon citizen workshops. IRL Program staff continues to participate on localized or lagoon-wide resource management committees and in quarterly county stormwater working group meetings.

SJRWMD and SFWMD Environmental Sciences staff have taken the lead in updating the 1994 Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan, as the state-water management district's ecosystem restoration plan and sister document to the IRLCCMP. The publication of the CCMP Implementation Progress Report provides a useful roadmap to implementation activities with recommendations for improvements and noted accomplishments from past initiatives.

Successful state legislative funding appropriations from 2000, provided approximately \$18 million to the SJRWMD for lagoon restoration and water quality improvement projects. This funding is being applied towards local government cost-share stormwater projects, stormwater management master plan designs, the reconnection of salt marsh mosquito impoundments, and continuing project assessment research and data collection for use in developing PLRGs.

A portion of this state funding, \$3.1 million, is designated for the St. Sebastian River Dredging Project. This money is being used to design the project with the required permits and a proposed spoil management deposition site, and to begin construction.

Similarly to last year, the SJRWMD is pursuing a state legislative funding package for Fiscal Years 2001-02, to secure project dollars for numerous stormwater retrofit projects throughout the watershed. This "Water Resources Restoration Initiative" is being considered by the state's 2001 Florida Legislature. The draft state budget has appropriated \$4 million to implement the re- diversion of excess surface water drainage from urban and agricultural lands, remove muck sediments through hydraulic dredging, treat surface waters through local and regional water resource protection projects and restore critical habitat. Additional funding from Florida Forever is also being pursued.

The state and local partnership between the City of Palm Bay, SJRWMD, and the Florida Inland Navigation District resulted in the completion of Phase I of the Turkey Creek dredging project. Currently under way, Phase II of the project is removing an additional 190,000 cubic yards of organic-rich muck from this major tributary to the lagoon, preventing the flushing of accumulated silt into the lagoon during storm events, enhancing water quality and seagrasses, and improving navigation in the creek.

As reported in the approved Indian River Lagoon National Estuary Program's Biennial Review, significant progress has been made in achieving the goals and objectives of the IRLCCMP. Each member of the Basin Advisory Board continues to devote substantial resources and energy towards implementation. As reported, it is estimated that 97 percent of the CCMP's priority actions are being realized at some level (either: fully, substantially or moderately) according to their established timeline. About 3 percent reported minimal or no implementation progress.

Over \$2.2 million dollars has been raised for implementation projects through the sale of the Florida Indian River Lagoon specialty license plate. This unique funding vehicle has provided project dollars for sediment traps, mangrove plantings, shoreline enhancements, muck dredging, impoundment reconnections and environmental education programs. This funding tool has been so successful that Tampa Bay and the Everglades have initiated similar vehicle tags to raise money for their ecosystems.

The SFWMD continues to lead lagoon restoration efforts and CCMP implementation in the southern lagoon region. Partnerships between the SFWMD and St. Lucie have restored impounded mosquito marshes and constructed stormwater treatment projects. In Martin County, the SFWMD is continuing the implementation of Phase III of the Stuart SWIM project, and has funded stormwater retrofits in cooperation with the county's stormwater utility program. The Central and South Florida Project being led by the USACOE and SFWMD is addressing the issue of excessive freshwater discharges to the southern section of the lagoon system through the St. Lucie Estuary. The SFWMD is working with the St. Lucie River Initiative to initiate implementation projects in this important estuary. Special state appropriations are being requested to implement projects in the St. Lucie as a result of the Restudy. The Florida Legislature has appropriated \$4 million for the St. Lucie Issues Team in 2002, and SJRWMD has budgeted an additional \$250,000 for local government projects in St. Lucie and Martin counties, and the cities of Stuart, Ft. Pierce, and Sewall's Point.

Advocacy for lagoon restoration projects has increased through local, state and federal efforts. Public support for implementation of the CCMP continues to grow because of education and outreach activities. The use of informative multi-media outreach techniques including television, newsprint, inter-active CD-ROMS and hands-on educational displays are informing and educating the public and elected officials about CCMP implementation successes. The results of the measuring progress project by the Florida Audubon Society, provides an additional indicator of CCMP implementation activities.

Overall, the IRL Basin Advisory Board continues to effectively implement the CCMP through enhanced partnership opportunities, improved communications and aggressive education and outreach activities. Of special note for the fourth year, is the budgeting of over 90 percent of the Federal EPA/NEP funds for implementation projects, with all salaries and benefits for staff being paid through the SJRWMD's Indian River Lagoon Program budget. This continuing support is a reflection of the solid foundation of cooperation existing between the managing agencies, and of the desire for successful implementation of the CCMP. The momentum achieved during the first five years of implementation will continue to grow as additional funding sources are identified, more stormwater projects are completed, and as more stakeholders are educated on the ecological and economic importance of restoring North America's Most Diverse Estuary System.

The following summary lists the projects that were recommended by the IRL Advisory Board's Technical Advisory Committee and will be funded under this work plan with US EPA Section 320 funds and the non-federal matching dollars for the grant.

**SUMMARY OF 2001 – 2002 WORK PLAN EPA FUNDING REQUEST**

|   |                   |
|---|-------------------|
| Citizens Volunteer Water Quality Monitoring Network.....                | \$ 60,000         |
| CCMP Grants Writer.....   | \$ 60,000         |
| IRL Library & Shoreline Project (MRC).....                              | \$ 25,000         |
| Citizens Workshops (MRC).....   | \$ 25,000         |
| Shoreline Restoration (ELC).....  | \$ 15,000         |
| Public Information and Education .....                                  | \$ 20,000         |
| Stormwater Implementation Projects .....                                | \$ 18,500         |
| Citrus BMPs (IFAS).....   | \$ 20,000         |
| IRL Species Inventory (Smithsonian).....                                | \$ 35,000         |
| EPA Supplemental Funds - Centralized IRL Data Base (NASA).....          | \$ 30,000         |
| Operating & Travel Expenses.....  | <u>\$ 31,500</u>  |
|   | <b>\$ 340,000</b> |
| <br>  |                   |
| SJRWMD match.....   | \$ 199,500        |
| SFWMD match.....  | \$ 40,500         |
| Local Government match.....   | <u>\$ 100,000</u> |
|   | <b>\$ 340,000</b> |
|   | <b>\$ 680,000</b> |
| <br>  |                   |
| SJRWMD CASTnet NADP Site Maintenance... (not match for work plan) ..... | \$ 9,000          |

## **SECTION 2. INNOVATIVE IMPLEMENTATION ACTIVITIES TO DATE:**

Thirty-five projects have been funded under the Program's six implementation work plans since 1996. These projects range from the management of fresh/stormwater discharges, to wetlands protection; continuation of a grants writer consultant, water quality monitoring and improved biodiversity data management. The IRL Basin Advisory Board provides policy oversight and guidance for each project. This section provides a brief update on the innovative, ongoing or recently completed projects included within the post-CCMP implementation work plans. Section 3, provides a listing of other actions conducted by members of the Advisory Board that are not specifically referenced in the work plans, but provide additional insight into overall lagoon management activities and CCMP implementation. All of these projects demonstrate a strong commitment by the members of the IRL Basin Advisory Board for implementation action and outline future direction for the Program.

### **ADVISORY BOARD IMPLEMENTATION FUNCTIONS**

#### **a. Technical Program Management**

The SJRWMD and SFWMD are leading development of the Pollutant Load Reduction (PLR) Model for the lagoon in order to set PLRGs or numerical targets for the reduction of nitrogen, phosphorous, dissolved organic matter, and/or suspended matter loadings. These PLRGs will provide the basis for the setting of future Total Maximum Daily Load (TMDLs) allowances. The development and use of the model is based on the premise that sufficient water clarity is needed to restore seagrasses - a major goal of the CCMP and SWIM plan, and that good water clarity can be achieved by the measured reduction of the loadings on some or all of the constituents stated above.

The PLR Model's usefulness will lie in its predictive power. Once the model is calibrated and verified for a full range of expected meteorological and hydrological conditions in the lagoon, it will then be able to describe the lagoon's response to any realistic combination of hypothetical conditions, man-made influences or management criteria. More specifically, the PLR Model will predict changes in light attenuation (water clarity) resulting from actions that cause changes in tributary discharges, nutrient loadings, sediment characteristics or other conditions in the Indian River Lagoon. Therefore, the model will be a useful tool in determining PLRGs and in allocating pollutant load reductions among the major loading sources in the lagoon's watershed.

Interim PRLGs have been presented for the Crane Creek and Turkey Creek basins. These preliminary goals provide local governments within these basin's water quality improvement targets for all types of discharges including non-point discharges of stormwater. Many local governments have expressed a willingness to meet PLRGs once established, but fear making sizable investments in stormwater management infrastructure improvements until targets can be provided. Until PLRGs are translated into TMDLs and/or incorporated into rule, compliance in meeting PLRGs will be largely voluntary. Furthermore, as management strategies are enacted to achieve PLRGs, the corresponding monitoring network will help gauge their effectiveness in improving water quality in the lagoon.

The seagrass preservation and restoration efforts of the IRL Program are being accomplished with the assistance of NOAA's Coastal Services' Center - Coastal Change Analysis Program (C-CAP). C-CAP helped to digitize and photo interpret 1996 seagrass maps that will be used in

analyzing seagrass coverage changes. Regional watershed planning activities for the St. Lucie Estuary and Indian River Lagoon include projects to document historical and existing seagrass coverages through a combination of photo interpretation, mapping and ground truthing. This information is being used to determine changes in the abundance and distribution of critical components of the ecosystem due to human activities in the watershed, develop PLRGs for freshwater, total suspended solids and nutrients, and to predict potential recovery with the implementation of stormwater and water quality management options. To document existing seagrass bed locations and to gain an understanding of temporal changes in seagrass distribution, aerial photography of the entire lagoon is needed on a regular basis. The SFWMD is currently producing a map of Indian River Lagoon seagrasses based upon aerial photographs taken in April 1999.

The listing of Johnson's seagrass under the Endangered Species Act has provided greater protection for 10 areas designated as critical habitat for this unique species found only in the Indian River Lagoon, south of the Sebastian Inlet, and in Biscayne Bay. Johnson's seagrass grows from the intertidal zone down to subtidal depths of 12 feet, shallower and deeper than most seagrasses in the lagoon, with a greater tolerance of temperature and salinity variations. Johnson's seagrass is the first seagrass species listed under the Act by the National Marine Fisheries Service.

Reconnection and monitoring of impounded estuarine wetlands continues to be a major cooperative effort between the SJRWMD, the US Fish and Wildlife Service, NASA, National Park Service and several Mosquito Control Districts. Since 1991, the Merritt Island National Wildlife Refuge has partnered with the SJRWMD to reconnect over 18,000 acres of impoundments. This represents 67% of the target acreage of 27,000 acres. The SFWMD has assisted St. Lucie Mosquito Control District in reconnecting 4,800 acres of wetlands since 1987. The EPA Region IV award for the Merritt Island Wetlands Initiative will help to determine if the re-establishment of the hydrologic connection between impounded marshes and the lagoon can restore the ecological function of the impoundments to "native" marshes functionality.

**b. Project Management**

The SJRWMD has continued its outstanding support of the IRL Basin Advisory Board through continuing NEP Program sponsorship, contracts and procurement management, printing and computer services, administrative and operational support, and by providing significant annual non-federal program match. The SJRWMD incorporation of NEP staff positions into the District's budget has 'freed-up' federal dollars usually assigned for salaries for implementation activities. During FY 1999/00, the SJRWMD provided salary funding of approximately \$150,000, enabling the use of federal dollars for stormwater management projects in the lagoon.

The SFWMD has also continued its important financial and operational support for the Program. The invaluable assistance provided by the SFWMD's Martin/St. Lucie Service Center has benefited the outreach efforts of the IRL Program immensely by partnering in several educational events and exhibit displays.

IRL Basin Advisory Board oversight of the program during the past year has included a review of federal funding programs within the watershed under Section 319, totaling over \$2.6 million, and support for the IRL Blueway Land Acquisition Proposal through a joint effort of the SJRWMD, SFWMD and The Nature Conservancy. The Board has also directed research into the impacts of Reverse Osmosis Water Treatment (RO) brine discharges on the surface waters of the lagoon; and has reviewed the options for replacement of the Stuart causeway bridge,

endorsing the plan which uses the same footprint as the existing bridge to limit impacts on seagrass habitats in the vicinity.

Additional activities supported by the Advisory Board include review of the 5-year Water Resource Restoration Initiative through the state legislative process; supporting the Congressional Reauthorization of Section 320 of the Clean Water Act granting authority for the NEP Programs; reviewing the findings from the OSDS National Demonstration Project; discussing potential alternative beneficial uses for spoil materials resulting from muck dredging projects.

Upcoming or ongoing activities for the Advisory Board include the implementation of the mission and goals recommendations resulting from the December 2000 workshop; reviewing legislative initiatives and funding appropriations from 2001 and establishing an advocacy strategy for the 2002 legislative session; and initiating an update of the Citizen's Progress Report on CCMP implementation for the period 1999-2001.

**c. Intergovernmental Coordination**

The enhanced communication and cooperation established during the CCMP development process between agencies, local governments and other organizations involved in lagoon management are continuing through the activities of the IRL Basin Advisory Board. This NEP facilitated process provides coordinated program budgets for lagoon activities, and the oversight and setting of funding priorities for the lagoon in future fiscal year budget cycles.

IRL Program staff and Advisory Board members continue to participate in national, state and regional intergovernmental coordination conferences, meeting and presentations. Several staff recently attended the annual NEP Director's meeting and associated ANEP coordination meeting in Washington to discuss common issues of concern, the relationship between EPA and ANEP, and data and information sharing. Additional coordination meetings have been held in Atlanta with Region IV EPA managers.

**d. Facilitation, Conflict Resolution and Consistency Review**

Several Army Corps of Engineers dredge and fill projects have been reviewed by staff for consistency with the goals and objectives of the CCMP. And numerous local governments have requested assistance in reviewing their Comprehensive Plan Evaluation and Appraisal Report (EAR) before they are submitted to the state for approval. Many local government's Comprehensive Growth Management Plans now include CCMP recommendations.

**e. Fund Raising**

The IRL Program has been very active in identifying and securing funding to support implementation of the CCMP. State legislative funding appropriations from 2000 provided \$18 million to the SJRWMD for lagoon restoration and water quality improvement projects. This funding is being applied towards local government cost-share stormwater projects, stormwater management master plan designs, reconnection of salt marsh mosquito impoundments, and continuing project assessment, and data collection for use in developing PLRGs. A separate state appropriation of \$300,000 was also granted to SJRWMD, through FDEP, for Phase I of the St. Sebastian River Dredging Project. This money is being used to determine the extent, volume and characterization of muck sediments within the St. Sebastian River, and to design the project with the required permits and a proposed spoil management deposition site.

Over \$2.2 million has been raised for projects through the sale of the Florida Indian River Lagoon License Tag since 1995. This funding has been divided between the SJRWMD and

SFWMD for restoration and education projects based upon the percentage of tag sales in each district's respective counties. Numerous stormwater retrofit projects, mosquito impoundment reconnections and environmental education outreach efforts have been supported through this innovative revenue source. The IRL Program has been successful in leveraging License Tag revenue to provide match for Florida Inland Navigation District (FINN) monies for the dredging of Turkey Creek.

Implementation Project FI-1(c): CCMP - Grants Writer/Facilitator

The project has been supported by the IRL Program to assist local governments in meeting the challenges of financing CCMP implementation projects. The fourth year of work under this project has continued to demonstrate an ongoing desire by the lagoon area's municipalities, water control districts and counties to partner with state and federal agencies in implementation activities. Several local governments have utilized the services of this NEP consultant to identify new funding sources, prepare grant proposals and join with other partners to help implement CCMP recommendations. Local governments have been provided grants writer tool kits with pertinent information for the preparation of grant applications for implementing stormwater master plans and to retrofit existing urban drainage basins. This consultant assisted three local governments in preparing three Section 319 nonpoint source stormwater grant applications for FY 1999-2000. Of these applications, three were successfully awarded EPA funding totaling \$1.3 million in assistance. Other grant applications have also been completed under this project to assist local governments with funding implementation efforts. This project was recently re-bid and a new contract is being prepared to continue this service to local governments through June 2002.

Status: Complete (December 2000)

Funding: \$116,350.

**f. Advocacy**

In addition to the initiatives previously described, support for lagoon-related programs has also been generated through the Association of National Estuary Programs (ANEP). ANEP is the non-profit organization charged with coordinating and advocating for the 28 National Estuary Programs in their efforts to develop and implement CCMPs.

ANEP was instrumental in advocating for the reauthorization of Section 320 of the Clean Water Act granting authority for the National Estuary Program. Clarification on the use of Section 320 funds for implementation of CCMPs was granted and an increase in annual NEP appropriations through 2004 was authorized. ANEP is currently tracking congressional support for the appropriation of the increased NEP authorization in the 107 Congress.

**g. Progress Reporting**

In July 1999, the IRLNEP was officially notified by Headquarters US EPA that the program had "passed" the biennial review process. Comments from the review noted that the IRL is making good progress in implementing the CCMP, recognizing the program for developing innovative financing mechanisms, progress tracking systems, good use of environmental indicators, and producing quantitative environmental results. The second "Implementation Review" was submitted to EPA in March 2001. The Project Office has not received any notification of this review as of May 2001.

Implementation Project FI-2: Measure the Progress of CCMP Implementation Activities

To support this required function, the Florida Audubon Society established a progress reporting system. Florida Audubon as an independent, non-implementing organization, worked with the IRL Basin Advisory Board to establish a weighting/ranking system and survey tool for the "progress report." They recruited and trained Audubon members to execute the surveys and conduct analysis of findings. A preliminary measure of progress criteria for each recommended action within the CCMP was accomplished, and served as a basis in determining appropriate measurement mechanisms. Florida

Audubon also dedicated an entire issue of their quarterly publication the Florida Naturalist, to the lagoon, highlighting the successful implementation activities of the NEP. The Progress Report was developed as an important tool in adaptive management for the restoration of the IRL. The report identifies those organizations that have made a difference and also provides a 'call' to those who are not doing their fair share, or failed to respond. Most importantly, the report begins the process of identifying barriers to implementation activities and how these may be addresses in the future.

Status: Complete (April 2000)

Funding: \$58,445

#### ***h. Education and Outreach***

The continuation of the general public and elected official's workshops, and the establishment of a new IRL Resource Library and Research Center in cooperation with the MRC represent projects promoting lagoon education and information benefiting residents throughout the watershed. IRL Program staff continue to make numerous presentations to civic and community organizations, man display booths at environmental festivals and sport fishing shows, and deliver quality educational programs throughout the region.

A portion of the revenue generated from the sale of the IRL License Plate has helped fund the improvement of educational exhibits at the Wabasso Environmental Learning Center, provided start-up funds for a Nature Wetlands Walk at the Brevard Zoo, and provided needed funding for signs at lagoon-side parks, publications and educational materials for distribution.

The IRL Program Office also continues to produce a quarterly newsletter of lagoon information and project updates, which is distributed to over 7,000 subscribers nationwide and has a pass-on readership of over 10,000.

Implementation Project PIE-2(b): Inform the public and governments about the resources of the IRL, the value of these resources and threats to the continued viability of these resources.

The successful implementation of the CCMP depends upon public support for actions included within the plan. Development of this support relies on the public's understanding of the values of the resources, the threats to their continued viability and the specific actions proposed to protect and enhance these resources. Educating the public about the IRL generates public support for management activities. Developing and distributing printed materials such a the quarterly Indian River Lagoon Update Newsletter, flyers, brochures, fact sheets and booklets is a primary way to insure that needed support is developed and implementation success stories are relayed to the widest possible audience. Current information can also be accessed on-line through the SJRWMD website (<http://sjr.state.fl.us>) and EPA's website through the Office of Water.

Status: Ongoing (September 2001)

Funding: \$17,500

Implementation Project PIE-2(c): Indian River Lagoon Resource Information Center and Shoreline Habitat Restoration Project.

This project is being performed under contract to the Marine Resources Council who has established an IRL Public Information Center as a multi-media information and research library to provide free and open access to research and education materials. This center is assisting students and citizens requesting information on the lagoon and includes the IRLSIS electronic database of lagoon publications. Additionally, volunteer education and outreach are being performed through the shoreline habitat restoration project where invasive, exotic nuisance plants are removed and replantings with native vegetation are conducted.

Status: Year 1 Complete, Year 2 Ongoing (September 2001)

Funding: \$25,000 Year 2

Implementation Project PIE-4(a): Increase public and government involvement in restoration activities.

In 2000, the IRL Program awarded the Marine Resources Council a grant to host the second biennial 'State of the Lagoon' conference in September 2000, and to continue to organize a series of ongoing public information workshops. These workshops are held throughout the lagoon to inform residents and elected officials about restoration projects, generate feedback from citizens, and improve the lines of communication between the residents and water managers.

Status: Ongoing (June 2001)

Funding: \$25,000

## **CCMP ACTION PLAN PROJECTS**

### **a. *Biological Diversity***

Implementation Project BD-1(a): IRL Species Inventory & Relational Data Base

The Indian River Lagoon Species Inventory has been developed by the Smithsonian Marine Station and is up and running at [www.sms.si.edu](http://www.sms.si.edu). Smithsonian has created a species master list with extensive cross-referencing, conducted an exhaustive literature search on selected species with bibliographic documentation and accumulated several valuable data bases for incorporation into the inventory including: marine fisheries recreational and commercial landings from five counties surrounding the lagoon over the past decade and commercial and fisheries regulations. The US Fish and Wildlife Service has also provided a current federal listing of threatened and endangered species for the five lagoon counties. Under the renewed contract to continue this project, Smithsonian is currently updating and expanding the inventory to accommodate a suite of ecological and taxonomic information, which will store, sort, retrieve, and format data quickly, efficiently and automatically. This project was initiated as a result of an identified lack of documentation available to lagoon managers in developing strategies for the protection of biodiversity and to assist in the broader scientific understanding of diversity, as well as increasing educational and public awareness of the biological value of the lagoon.

Status: Ongoing (June 2001)

Funding: \$59,929

### **b. *Wetlands Protection***

The IRL Program was awarded a grant by EPA Region IV in 1999, under the State Wetlands Protection Development Program for \$550,000 to fund an intensive study of wetland functions regarding nutrient cycling, sediment biogeochemistry, organic matter accumulation, and the value of wetlands in the regulation of water quality in the lagoon. The goal of this project is to determine if re-establishment of the hydrologic connection between impounded marshes and the lagoon can restore the ecological function of the impoundments to a state similar to that of "native" marshes, and to determine how continued hydrologic management will affect the restoration process. This project is being carried out with the assistance of the USFWS at Merritt Island National Wildlife Refuge, NASA at Kennedy Space Center, and local mosquito control districts in Brevard and Volusia Counties.

Implementation Project W-6(a): Northern Savannas State Preserve Ecosystem Management

The Savannas Ecosystem Management Project, being conducted by the Savannas Task Force, is assessing the most effective management options to reduce the impacts of residential stormwater discharges into the Preserve and the north fork of the St. Lucie Estuary. The task force has evaluated potential options that may be used individually or in combination to address these impacts and the upland flooding of the residential areas. The methodologies employed by this project will be transferable to assessing other similar situations existing throughout the urbanized portions of the watershed.

Status: Complete

Funding: \$55,000

Implementation Project W-6(b): Restore Wetlands and Shorelines

The IRL mangrove planting program has continued to add new sites in the fourth year of operation, and maintain existing sites for the 'encased' mangrove planting method. The successful partnership forged between the SJRWMD, SFWMD, USFWS and the Environmental Learning Center and numerous civic organizations and volunteers, continues to enhance shoreline habitat throughout the southern lagoon region. Identification and ranking of future potential project sites to judge their probability of success is ongoing. Agencies, local governments, developers seeking mitigation sites, and groups seeking a public service project have participated in this successful habitat enhancement program.

Status: Ongoing (December 2001)

Funding: \$40,500

Implementation Project W-6(c): Pelican Island National Wildlife Refuge Restoration – Phase I

The USFWS has proposed a partnership project with the SJRWMD and FIND to protect and restore Pelican Island, the nation's first wildlife refuge, a national historic landmark, a national wilderness area and a wetlands of international importance. Pelican Island has been impacted by the wave energy of boat traffic along the Intracoastal Waterway resulting in the erosion of approximately 3 acres of habitat. This project will arrest the erosion through the planting of red mangroves and saltmarsh cordgrass and the construction of a coquina rock/shell material wave break to provide additional protection and habitat for foraging shorebirds.

Status: Construction and Plantings Complete, Monitoring Ongoing

Funding: \$115,600

**c. Land Acquisition**

The SJRWMD has acquired over 21,600 acres of environmentally sensitive lands within the lagoon watershed. Additional acreage has recently been acquired in northern Brevard County to assist with the Chain of Lakes Regional Stormwater Park near Titusville, land within the Sebastian River Buffer Preserve, and acquisition of 33 additional acres in Sebastian for the creation of stormwater detention systems.

The SJRWMD has contracted with The Nature Conservancy (TNC) to perform pre-acquisition contacts with potential land sellers, coordinate property appraisals, resolve title issues and insurance questions, and any other activity required to bring Blueway land acquisitions to a successful conclusion. TNC has developed a data base of Blueway properties and their owners and has sent letters of interest for possible acquisition to the property owners to determine their willingness to sell. TNC has recently completed the acquisition of the Inlet Groves Property under the Blueway Program, in partnership with Brevard County. This acquisition includes 290 acres in Snagg Point with 1.7 miles of lagoon shoreline and 50 acres of impounded marsh habitat to be reconnected to the lagoon.

**d. Fresh/Stormwater Discharges**

The IRL Program has been very active in partnering with numerous local governments during CCMP implementation to address freshwater and stormwater discharges to the lagoon. The SJRWMD's successful competitive local government cost-share program has been administered in 2000 and 2001, awarding over \$1.1 million in district, license plate and NEP funding to twenty-one projects totaling over \$8.2 million in stormwater retrofit project work. These projects include constructing stormwater detention systems in Port St. John, Merritt Island and northern Brevard County in cooperation with Brevard County; stormwater detention and erosion control projects with the City of Palm Bay; stormwater master planning with the City of Sebastian and Indian River County; surface water treatment systems in Gifford and Roseland in partnership with Indian River County; and various water quality improvement projects with other municipal and county stormwater utility programs.

Stormwater master planning in cooperation with SJRWMD, Brevard County and the City of Melbourne is complete for the 16,000 acre Crane Creek/Hickory Ditch sub-basin. And the Cities of Satellite Beach and Palm Bay have each recently completed master planning efforts for their cities with the assistance of the IRL Program. FDEP has provided over \$27.2 million in low interest loans to municipalities within the lagoon watershed for construction of stormwater and wastewater facility improvements since 1996 (nearly \$50 million since 1994).

The environmental muck dredging of Turkey Creek started in 1999, has removed over 380,000 cubic yards of organic-rich muck sediment from the creek's bottom. This cooperative project between SJRWMD, FIND, and the City of Palm Bay will reduce the flushing of these muck deposits into the lagoon during storm events, thereby increasing water quality and promoting the reintroduction of seagrasses into the area.

The SJRWMD is also assisting the City of Palm Bay in implementing the related middle-reach sand delta navigation dredging project within the creek, which is targeting approximately 60,000 cubic yards of accumulated sand.

Additional dredging projects are also currently in the planning and permitting phases for St. Sebastian River and Taylor Creek. The dredging of the St. Sebastian River is tentatively scheduled to begin in 2002; however, the identification, design and construction of an appropriate disposal site, and permits must first be completed. An estimate of the muck volume and characterization of sediments has been completed for the St. Sebastian River with an estimated 2 million cubic yards of sediments.

Implementation Project FSD-3(e): Stormwater Master Plan Development for Melbourne – Crane Creek (Hickory Ditch)

This project produced an updated master plan for the 16,350-acre Crane Creek/Hickory Ditch basin through a partnership between the SJRWMD, Brevard County, and the City of Melbourne. The original drainage plan produced in 1996 was updated with water quality improvement projects identified within the plan.

Status: Complete  
Funding: \$160,450

Implementation Project FSD-3(g): Stormwater Master Plan Development for Sebastian

This master plan will address the 9,000+ acre watershed between the west shore of the IRL and the south prong of the St. Sebastian River. The plan will identify BMPs to improve the water quality of discharges with a goal of 65% or greater reductions in annual pollutant loadings.

Status: Ongoing (July 2001)  
Funding: \$150,000

Implementation Project FSD-3(h): Stormwater Master Plan Development for Indian River Farms Water Control District

This WCD averages discharges of approximately 100 million gallons of freshwater per day from three primary canals to the IRL over 50,000 acres. This plan will perform surveying, engineering and design work to reduce these impacts on the lagoon with the creation of possible regional stormwater detention systems. In 2000, the state legislature appropriated \$4.1 million to begin implementation of BMPs to reduce the discharges from this WCD.

Status: Ongoing (October 2001)  
Funding: \$160,000

Implementation Project FSD-3(i): Stormwater Utility Implementation for Cape Canaveral

In September 2000, the City completed and adopted its Stormwater Master Plan. This project was awarded funding under the local government cost-share program to create a Stormwater Utility for the City of Cape Canaveral. Stormwater Utility assessments will be used for the construction of BMPs identified in the City's Stormwater Master Plan. These BMPs include detention ponds with aeration fountains, stormwater reuse ponds, and baffle boxes.

Status: Scheduled for May 2001-March 2002

Funding: \$73,500

Implementation Project FSD-3(j): Stormwater Master Plan Development for Melbourne Beach

At several locations in the Town of Melbourne Beach, streets and yards have been affected by flooding and homes have experienced property damage due to stormwater collecting at the end of cul-de-sac developments. Funded under the competitive local government cost-share program, this plan will address flood protection and remediation, as well as, retrofitting for water quality treatment of all the Town's outfalls. The majority of projects will be for reduction of stormwater pollution with target pollutant load reductions of 50%.

Status: Scheduled for August 2001-February 2002

Funding: Estimated \$ 140,000

Implementation Project FSD-6(b): Reduce the impacts of muck in the IRL – Turkey Creek Dredging

Environmental muck dredging in Turkey Creek started in January 1999, targeting the removal of over 380,000 cubic yards of sediment from the creek bottom over a two- year period. This cooperative project between SJRWMD, FIND, and the City of Palm Bay will reduce the flushing of these muck deposits into the lagoon during storm events, thereby increasing water quality and promoting the reintroduction of seagrasses into the area. This project, similar to the successful Crane Creek dredging project in 1998, is demonstrating the value of muck removal and assessing management methods for possible application toward other tributaries and impacted areas in the lagoon.

Status: Ongoing (Phase I Complete) Phase II (May 2001)

Funding: Phase I \$150,000, Phase II Year 1 \$1,550,000 / Year 2 \$4,223,000

Implementation Project FSD-6(f): Reduce the impacts of muck in the IRL – St. Sebastian River Dredging Phase I

In 1999, the state legislature appropriated \$300,000 to FDEP for the SJRWMD to conduct a St. Sebastian River Muck Deposit Assessment and Management Project. This project will assess the present location, extent, depth, and volume of muck in the St. Sebastian River; characterize the physical and chemical components of this sediment; identify appropriate muck management (spoil) sites; and to develop and analyze alternative muck removal project designs with cost estimates with the final goal to be the receipt of a noticed general permit to begin project construction. In 2000, the state legislature appropriated an additional \$3.1 million to begin construction and dredging.

Status: Ongoing

Funding: \$300,000

Implementation Project FSD-13(d): Stormwater Treatment Implementation in Palm Bay

This project includes stormwater retrofits for two sub-basins within Palm Bay. Basin 1 incorporates BMP construction to improve water quality treatment, and reduce peak flows, flooding and loadings to the IRL. The construction of a 1.5-acre detention pond, sediment trap and culvert installation of an open ditch running through a auto salvage yard will provide a treatment train to substantially alter the current untreated conveyance system. Basin 13, will construct a 3-acre detention pond, stabilize and expand the conveyance canal for additional retention before release to Turkey Creek. Water quality monitoring will be performed for both retrofits to determine the levels of pollutant reduction achieved.

Status: Ongoing (April 2002)

Funding: \$540,000

Implementation Project FSD-13(d-1): Stormwater Treatment Implementation in Palm Bay

This project was selected for funding under the competitive local government cost-share program to perform erosion control improvements within the Perimeter Canal that forms the eastern border between the City of Palm Bay and Town of Malabar. This project will help to demonstrate to FIND that SJRMWD and Palm Bay are addressing sediment source controls for Turkey Creek in conjunction with the dredging of the creek.

Status: Ongoing (May 2001)

Funding: \$290,000

Implementation Project FSD-13(e): Stormwater Treatment Implementation in Satellite Beach

The IRL Program is participating in the City's awarded FY'99 Section 319 nonpoint source grant for the Jackson Avenue sub-basin, to apply the lessons learned from the successful Wilson Avenue retrofit, in constructing exfiltration trenches, pervious concrete paving, and catch-basins to control runoff to the Banana River, reduce flooding and recharge the aquifer.

Status: Complete

Funding: \$548,500

Implementation Project FSD-13(e-1): Stormwater Treatment Implementation in Satellite Beach

This project was funded under the local government competitive cost-share program to install stormwater inlet protectors for 30 of the city's inlets along its canal-front neighborhoods. Citizen volunteers will assist the city in maintaining and monitoring the debris collected in these protectors.

Status: Ongoing (March 2002)

Funding: \$12,600

Implementation Project FSD-13(e-2): Stormwater Treatment Implementation in Satellite Beach, Jamaica Boulevard Stormwater Diversion

Funded under the local government competitive cost-share program, this project will intercept and treat stormwater from 201 acres of the DeSoto Parkway watershed by creating three ponds (with associated connections and control structures) for wet detention and percolation of runoff. It will use BMPs to address stormwater quality problems and flooding within the Jamaica Boulevard and DeSoto Parkway sub-basins.

Status: Scheduled for July 2001-February 2004

Funding: \$646,700

Implementation Project FSD-13(f-1): Cocoa Beach Brevard Ave. Bioretention System

This project was awarded funding under the local government cost-share program to construct a 1,350 foot linear landscape retention area to treat 2 acres of city road runoff.

Status: Complete

Funding: \$31,150

Implementation Project FSD-13(f-2): Stormwater Treatment Implementation in Cocoa Beach, Second Street South Sediment/Oil and Grease Trap

This project was awarded funding from IRL License Plate revenues to construct a baffle box with oil and grease removal at the intersection of Second Street South and Brevard Avenue in downtown Cocoa Beach. This water quality retrofit will treat runoff from an 83-acre watershed. Presently this runoff flows directly into the Brevard/Sunset canal that is directly connected to the Banana River. This canal is documented as the city's worst for water quality due to high pollutant quantity and rapid rate of discharge. This BMP will reduce both adverse factors using an offline system that stores the captured pollutants away from the high flows, thereby minimizing the resuspension and discharge of pollutants.

Status: Scheduled for August 2001-February 2002

Funding: \$71,200

Implementation Project FSD-13(h): Stormwater Treatment Implementation in Brevard County

This project includes the construction of stormwater detention ponds at two sites in cooperation with Brevard County's Surface Water Management Program. The first site is located in Port St. John adjacent to Broadway Blvd. The County has already acquired 5 acres for the construction of a detention pond to treat the first 1" of runoff from this 127-acre, high-density residential area. The second site is at the Merritt Island Airport. This project will convert the airport's borrow pit into a regional detention pond serving 190 acres of residential area, and provide sedimentation and nutrient uptake before discharge to Newfound Harbor, part of the Banana River aquatic preserve and an outstanding Florida water body.

Status: Ongoing (October 2001)

Funding: \$820,000

Implementation Project FSD-13(h-1): Stormwater Treatment Implementation in Brevard County

This project was recently selected under the competitive local government cost-share program to construct a stormwater weir at Kennedy Point Marina, located just south of the City of Titusville. This weir will collect sediments from a 320-acre drainage basin, with regular maintenance and monitoring to be performed by the county.

Status: Ongoing (April 2002)

Funding: \$110,000

Implementation Project FSD-13(h-2): Stormwater Treatment Implementation in Brevard County, Channel Stabilization

This project was selected under the competitive local government cost-share program to stabilize the banks of a channel section along Crane Creek in the City of Melbourne. This section of channel extends from its confluence with Crane Creek south approximately 700 feet, discharging into Crane Creek approximately 5,000 feet upstream of the Indian River Lagoon. The channel section has severe side slope erosion and contributes large quantities of sediment to Crane Creek and the Lagoon. The project will demonstrate the use of geoweb confinement systems and erosion control mats as Best Management Practices.

Status: Scheduled for January 2002-September 2002

Funding: \$148,000

Implementation Project FSD-13(h-3): Stormwater Treatment Implementation in Brevard County, Chain of Lakes - Phase I

This project was selected under the competitive local government cost-share program to provide first flush treatment from an 850-acre watershed, reducing pollutant loadings to the Indian River Lagoon associated with untreated stormwater runoff from the upstream drainage area. Phase I of the project will construct three detention facilities totaling approximately 22 acres in surface area and provide additional crossdrains under U.S. Highway 1 and the Florida East Coast Railroad.

Status: Scheduled for June 2001-June 2003

Funding: \$3,005,000

Implementation Project FSD-13(i): Stormwater Treatment Implementation in Indian River County

This project includes two water quality improvement cost-share agreements with Indian River County's Public Works Department. The first project is the Gifford area stormwater retrofit to construct a 4.5-acre detention pond and conveyance swale to provide flood protection, erosion control and water quality treatment in an area of low income homes north of Vero and just west of the Lagoon. The second project is for the construction of a wet detention pond and control structure in the Roseland area to reduce frequent and severe flooding within the natural slough which drains to the St. Sebastian River.

Status: Ongoing (October 2002)

Funding: \$ 580,000

Implementation Project FSD-13(i-1): Stormwater Treatment Implementation in Indian River County

This project also includes two water quality improvement cost-share agreements with Indian River County's Public Works Department. The first project is construction of the Vero Lakes Estates Stormwater System Retrofit to reduce loadings from a 1,461-acre subdivision draining into the South Fork of the St. Sebastian River. The second project is the Wabasso Causeway Park Improvement Project to reduce erosion and stabilize the shoreline along the causeway. This project is complete.

Status: Ongoing (July 2003)

Funding: \$ 1,188,180

Implementation Project FSD-13(j-1): Stormwater Treatment Implementation in Titusville

This project recently was selected under the local government competitive cost-share program to construct a treatment train throughout the Garden Street Basin including swale improvements, check dams, inlet skimmers, and a diversion baffle box upstream of a primary retention area.

Status: Ongoing (September 2001)

Funding: \$1,564,352

Implementation Project FSD-13(k): Stormwater Treatment Implementation in Cocoa

The City of Cocoa was awarded a FY'99 Section 319 nonpoint EPA grant to construct an underground stormwater utility retrofit park, east of the historic Cocoa Village area. The IRL Program is participating with the City in this project to re-route runoff from the drainage system and capture it for treatment and subsequent reuse. The City has constructed three sediment traps within the system to provide treatment before the stormwater is collected in the underground system and then pumped to the wastewater treatment plant for additional treatment and reuse.

Status: Ongoing (February 2002)

Funding: \$364,900

Implementation Project FSD-13(k-1): Stormwater Treatment Implementation in Cocoa, Florida Avenue Rockledge/Cocoa Stormwater Facility

This project represents the City of Cocoa's part of a joint project with the City of Rockledge to collaboratively take control of a natural low point on their border. The two municipalities finalized the purchase of a parcel of land for a stormwater treatment facility in December 2000. Currently, untreated runoff from this watershed discharges to the Indian River Lagoon during any substantial rainfall event. Obtaining and designating this site as a future stormwater treatment facility provides a highly feasible retrofit for approximately 45.8 acres between both municipalities. This project was awarded IRL License Plate funding for the engineering design and construction of conveyance facilities from the City of Cocoa to the site of the new stormwater storage basin.

Status: Scheduled for May-August 2001

Funding: \$36,170

Implementation Project FSD-13(l): City of Cape Canaveral Stormwater Pilot Test

This project was selected under the local government competitive cost-share program to construct a stormwater control pilot system to pre-treat and divert runoff into the city's wastewater treatment plant to augment the production of reclaimed water.

Status: Ongoing (March 2002)

Funding: \$41,800

Implementation Project FSD-13(m): City of Edgewater Stormwater Improvements & Reclamation

The City of Edgewater has proposed a project to convert a borrow pit adjacent to their wastewater plant into a stormwater/reclaimed water retention facility reducing stormwater and wet weather discharges to the Mosquito Lagoon.

Status: Ongoing (March 2003)

Funding: \$370,000

Implementation Project FSD-13(n): City of Fellsmere Carter, Hall, and James Subdivision Storm Water/Pollution Control – Phase I

The project was selected under the local government competitive cost-share program to provide surveying, engineering design, and permitting of a 5.5-acre retention pond in Fellsmere. After heavy rains, yards in the Carter, Hall, and James subdivision flood and trapped water becomes ponded, causing septic systems and drain fields to malfunction. Streets are unpaved and no secondary drainage swales exist to transport stormwater to the primary drainage canal on State Street. The retention pond, a box culvert along the State Street ditch with catch basins and drainage flow structures, will provide adequate right-of-way for paving of the street, helping to reduce erosion and sedimentation and dumping of debris within the road side ditch. The project will enable the management of stormwater discharges, reduce sediment transport into the Sebastian River, and enhance pesticide (metals) management from the sub-basin.

Status: Scheduled to begin in mid-2001. Duration 9 months.

Funding: \$130,000

Implementation Project FSD-13(o): Melbourne Beach Stormwater Improvements, Urban Stormwater Correction and Improvements for Anchor and Pelican Keys

The project was awarded IRL License Plate funding to capture stormwater runoff from a 6.4-acre drainage basin in the Town of Melbourne Beach and route the water through baffle boxes and exfiltration systems, reducing the sediment load and untreated stormwater volume flowing from Pelican and Anchor Keys into the Indian River Lagoon. Presently, there are no stormwater treatment facilities in these drainage areas and no stormdrain pipes to convey water from the end of cul-de-sacs to the canal, so stormwater runoff reaches the canals by overland flow, causing considerable erosion and seawall collapse. Pollutants entering the canals will be reduced at both Anchor and Pelican Keys by creating a stormwater treatment train.

Status: Scheduled for July 2001-June 2003

Funding: \$139,438

Implementation Project FSD-13(p): County of Volusia Silver Sands Stormwater Improvements

The project was awarded a local government cost-share grant to design and install a sediment, oil and grease collection structure on the Hiles Boulevard outfall, one of the main stormwater outfalls in the Silver Sands community of southeast Volusia County. A Storm Ceptor sediment collection system will be installed to provide treatment of stormwater before discharge to the Mosquito Lagoon. The Storm Ceptor system implements an innovative technology that achieves 50% to 80% removal of the suspended solids load from stormwater.

Status: Scheduled for June 2001-February 2002

Funding: \$61,000

Implementation Project FSD-13(q): City of Melbourne Baffle Boxes

The project was awarded funding from IRL License Plate revenues to install two baffle boxes at selected locations in the City of Melbourne.

Status: Estimated Timeframe June-December 2001

Funding: Estimated \$100,000

Implementation Project FSD-13(r): City of Rockledge Sweet Street Baffle Box

The project was awarded funding from IRL License Plate revenues to install a CDS baffle box at Sweet Street in Rockledge.

Status: Scheduled to begin in mid-2001. Duration 10 months.

Funding: Estimated \$78,000

**e. Point Sources: CCMP Action Plan PS-1**

FDEP continues to monitor wastewater treatment plants throughout the lagoon watershed for compliance with the Indian River Lagoon Act. Efforts to encourage municipalities to include a reference to the Act during their Comp Plan updates, to insure continued compliance, are ongoing. The State Revolving Loan Trust Fund, traditionally reserved for construction and upgrades to wastewater treatment plants, has repeated the 10 percent funding cap for stormwater projects allowing more funding for local government non-point source projects.

**f. Marinas and Boats: CCMP Action Plan MB-6**

IRL Program staff participates in boater education programs and events to provide information on resource protection and practices boaters can perform to reduce their impacts on the lagoon. The IRL Boater's Guide remains a popular publication for boaters that includes information on the boating community and ways they may reduce their impacts on the water quality, habitats and endangered species within the IRL. This guide has been added to the IRL web page under the SJRWMD's web site.

**g. Monitoring and Data Management**

The SJRWMD and SFWMD continue to work with county governments to coordinate the ambient water quality monitoring network throughout the lagoon. Quarterly meetings with the network participants are being held and quality control information is being presented. Calculations of tributary loadings are being developed and enhanced synoptic water quality sampling is being conducted for the PLR Model.

Implementation Project MON-2(a): Citizens Volunteer Water Quality Monitoring Network

This is the ongoing continuation of the agreement with the Marine Resources Council, originally initiated in 1994, to collect water quality data through the use of its citizen's monitoring program. MRC maintains 78 monitoring stations on the IRL from Brevard County to Martin County and has continued to collect reliable long-term water quality data for trends analysis. Several data reports have been produced showing salinity trends, impacts of freshwater discharges, and other results produced by the nation's second largest volunteer water quality monitoring network.

Status: Ongoing (September 2001)

Funding: \$60,000

Implementation Project MON-2(c): CASTnet National Atmospheric Deposition Program Site

The establishment of a CASTnet site at Sebastian Inlet will significantly improve the IRL Program's quantification of nutrient loadings from airborne deposition. The data from this site will be joined with atmospheric deposition site data in the northern and central portions of the watershed to estimate the total loadings of nutrients to the watershed from airborne deposition. The EPA selected laboratory for this work is ESE Labs in Gainesville. Construction is complete. Operation is scheduled to begin in May 2001.

Status: Ongoing

Funding: \$60,000

### **SECTION 3. IRL BASIN ADVISORY BOARD**

This section briefly describes additional projects and programs being completed by members of the IRL Basin Advisory Board (and other agencies), which are not included within the annual work plan as IRLNEP projects but do contribute toward overall CCMP implementation and restoration of the IRL. These projects demonstrate a strong commitment to CCMP implementation by members of the IRL Basin Advisory Board. Each of these projects, and those in Section 4, detail the future direction of CCMP implementation activities.

#### **a. CCMP Implementation Activities 2001-2002**

##### ***St. Johns River Water Management District***

- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 - The District has entered into fourteen partnership agreements with the counties of Volusia, Brevard and Indian River, and the cities of Cape Canaveral, Cocoa, Cocoa Beach, Satellite Beach, Melbourne, Melbourne Beach, Fellsmere, and Rockledge. These stormwater management projects target identified problem areas to improve water quality and flood protection within the IRL watershed. The District provided \$520,000 to fund these projects, which amounts to a total contribution of \$5,415,000 after including matching funds from the local governments.
- FSD-13: IRL License Plate Funding FY 2000-01 – The District has entered into five partnership agreements with the cities of Cocoa, Cocoa Beach, Rockledge, Melbourne, and Melbourne Beach. These stormwater management projects will improve water quality and flood protection within the IRL watershed through the installation of baffle boxes and the construction of retention basins. The District provided \$139,000 to fund these projects, which amounts to a total contribution of \$489,000 after including matching funds from the local governments.
- FSD-1&3: The C-1 Re-Diversion internal design work has been accelerated. Land acquisition is complete with 3,964 acres acquired. SJRWMD and MTWCD are continuing to pursue additional federal and state support for the project.
- FSD-6: The first year of the Turkey Creek Muck Dredging Project is complete, and FIND funding for year two is secured.
- FSD-1 & FSD-13: The City of Sebastian sub-basin surface water management plan is ongoing with design work for the master plan and stormwater park and water quality monitoring. A separate agreement for installation of a sediment trap on Main Street is complete. The Sebastian shoreline restoration project is complete; an expanded observation pier has been constructed. The Sebastian River water quality model has been delivered by FL Tech.
- FSD-1: Phase I for the Town of Malabar's surface water management plan is complete. Phase II includes detailed plans and PLR targets. The interim report from Palm Bay under Phase I has been submitted. Work is proceeding into Phase II detailed plans and Phase III implementation. Future efforts include installation and monitoring of BMPs to meet sub-basin PLR targets.
- FSD-4 & 13: Paradise Blvd. sediment trap installed with City of Melbourne. The Melbourne Harbor sediment trap is also continuing to collect sediments with regular maintenance and cleaning.
- FSD-4 & 13: Wayne Ave. sediment trap with City of New Smyrna Beach is complete.
- FSD-13: The City of Titusville's Basin II implementation is complete.
- W-6: The Mangrove Planting project is ongoing throughout Brevard, Indian River, St. Lucie, and Martin counties with additional funding assistance from USFWS.
- SG-1: Seagrass aerial photos from 1996 have been photointerpreted, draft historical land use and seagrass coverage maps are complete. Research project addressing light requirements for Johnson's seagrass continues.
- FSD-3 & SG-1: The IRL Bathymetric survey is complete. Water level and salinity measurements for FDEP are ongoing. Flow and salinity measurements for hydrologic monitoring also continue.
- FSD-9 & 13: CCMP/SWIM Plan Implementation Stormwater Retrofit Projects identified through basin plans.

- PIE-2: IRL Aquarium and Wetlands Nature Walk at Brevard Zoo are underway.
- W-5 & 6: Rehabilitation of Impounded and Degraded Wetlands through dike removal, culvert installation and dragline ditch restoration are ongoing.
- MON-1: Inter-agency IRL Water Quality Monitoring Network to calibrate the PLR model with Brevard, Indian River and Volusia County is ongoing.
- FSD-3: Water Level, Salinity and Wind Data Collection, Inlet Tidal Cycle Flow Measurements, Tributary Flow Monitoring and Velocity Profile Measurements are being conducted in the ICWW.

### ***US EPA 319 Grant Projects***

- FSD-13: Granted to Indian River County on FY 2000 for Vero Lake Estates Stormwater Retention, Phase I.
- FSD-13: Granted to Volusia County Stormwater Utility on FY 2000 for Riverbreeze Park Wetland Stormwater Treatment System.
- FSD-13: Granted to Martin County on FY 2000 for Salerno Creek Stormwater Retrofit.
- FSD-13: Proposed to be granted to the Town of Melbourne Beach on FY 2001 for Urban Stormwater Retrofitting at Anchor and Pelican Keys.
- FSD-13: Proposed to be granted to Martin County Public Services Department on FY 2001 for Golden Gate Water Quality Improvements.
- FSD-13: Proposed to be granted to Indian River County Public Works Department on FY 2001 for East Gifford Area Stormwater Improvement.
- FSD-13: Proposed to be granted to City of Satellite Beach on FY 2001 for Jamaica Boulevard Stormwater Diversion.
- FSD-13: Proposed to be granted to Brevard County Surface Water Improvement on FY 2001 for Indian Trail Water Quality Enhancement.
- FSD-13: Proposed to be granted to City of Melbourne - Brevard County Surface Water Improvement on FY 2001 for Dove Street Water Quality Enhancement.
- FSD-13: The Cocoa Village and Satellite Beach stormwater retrofits are ongoing.
- FSD-13: Brevard County awarded a grant for Sarno Lakes Watershed Phase 1 Rediversion.
- FSD-13: SJRWMD awarded a grant for Town of Malabar Implementation of a Master Stormwater Management System - Phase 1.
- FSD-13: Indian River County awarded a grant for Vero Lakes Estates Retention Ponds.

### ***South Florida Water Management District***

- FSD-13, W-6 & BD-3: IRL License Plate Funding FY 2000-01 – The SFWMD provided \$133,280 for projects in partnership with local governments and organizations in St. Lucie, Martin, and Palm Beach counties. The projects funded address issues such as exotic plant removal and shoreline revegetation, mosquito impoundment enhancement, public access and awareness, and siltation removal.
- FSD-12: FDEP/SFWMD - St. Lucie River Issues Team Project 2000-01: North Fork Restoration.
- FSD-4: IFAS/SFWMD - St. Lucie River Issues Team 2001-02 Project Application List: Agricultural BMP Implementation Certification.
- FSD-6 & 3: St. Lucie River Issues Team 1999-2000: C-23 Dredging, C-24 Bank Stabilization, and IRL Water Quality Model.
- FSD-12, 4, W-6, and MON-1: St. Lucie River Issues Team 2000-01: C-44 STA, Ten Mile Creek, Agricultural BMP Cost-Share, Oyster Restoration, PC-38, and SLE Water Quality.
- FSD-3, 12, and W-6: St. Lucie River Issues Team 2001-02 Project Application List: C-23, C-24, C-44 STA, Ten Mile Creek, Oyster Restoration, and Water Quality Model - Phase 3.
- FSD-13: Several SWIM Projects are ongoing: Sewall's Point, Krueger Creek, and Stuart III.
- FSD-3: PLRG development and SAV distribution mapping is ongoing within the St. Lucie Estuary, as well as circulation models and IRL bathymetry. Winter seagrass transects for the southern lagoon are complete.
- FSD-6: Taylor Creek environmental muck dredging, Phase I.

- MON-1: Water quality monitoring and nutrient sediment loadings analysis in the IRL and St. Lucie Estuary at 41 stations are ongoing.
- DIMS-3: Update of the IRLSIS is complete.
- PIE-4, FSD-13 & SG-1: Habitat restoration projects, such as mangrove planting and education projects, have been funded through IRL License Plate revenue.
- W-5: Mosquito Impoundment Reconnections in partnership with FDEP.
- FSD-12: Ten Mile Creek land acquisition and project design - a Critical Restoration Project. Program with USACOE to construct a 1500-acre water preserve area for stormwater retention to the North Fork of the St. Lucie River Estuary.
- W-5: St. Lucie River Estuary Mosquito Impoundment Reconnections.
- FSD-13: Indian River Estates Stormwater Retrofits.
- FSD-13: Fort Pierce Retrofit.
- FSD-12 & 13: Martin County Stormwater Retrofits.
- FSD-13: Airport Ditch project.
- PIE-1, 2 & 3: Environmental Education Programs such as Student Field Studies.
- FSD-12 & BD-3: The SFWMD is conducting the following projects in partnership with the US Army Corps of Engineers: Muck removal feasibility study in the St. Lucie Estuary, C&SF Indian River Lagoon Restoration Feasibility Study and public and government awareness program, and control or eradication of invasive non-native plant species in the North Fork of the St. Lucie Estuary.
- SWIM Plan Update in conjunction with SJRWMD/SWIM.

#### ***Florida Dept. of Environmental Protection***

- W-6: DEP-CAMA - St. Lucie River Issues Team Project 1999-2000: NFSLR Wetland Connection.
- FSD-12: FDEP/SFWMD - St. Lucie River Issues Team Project 2000-01: North Fork Restoration.
- MON-1: Water Quality Monitoring Station at the mouth of Turkey Creek.
- MON-1: Water Quality and Biological monitoring in Turnbull basin.
- FSD-13: Stormwater Management SRF loan to New Smyrna Beach.
- PS-4: Wastewater Treatment Facility SRF loan New Smyrna Beach.
- PS-4: Reclaimed water reuse facility SRF loan City of Rockledge.
- PS-1: Monitoring Compliance with the IRL Act for wastewater discharges.
- FI-1: EMAT implementation of CCMP.
- SG-1: Seagrass and clammers working group.
- PS-3: Biological monitoring of Reverse Osmosis discharge plants.
- W-3 & 6: Continuing support for the Savanna's Ecosystem Restoration Team.
- FSD-13: Administers the EPA Section 319 Program for state including over \$1.9 million to lagoon counties and cities in FY 1999-2000 for water quality improvement projects.
- PS-4: Wastewater Treatment Facility & Reclaim/Reuse with the City of Cape Canaveral.
- PS-4: Southeast Regional Wastewater Treatment Facility in Volusia County.

#### ***Volusia County***

- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – The Silver Sands Stormwater Improvement Project, located in a barrier island of south east Volusia County, will construct a sediment collection structure (StormCeptor) on the Hiles Blvd. outfall. The District has entered into a contract with the County of Volusia and provided \$30,000 to execute this project (total after Volusia County's match is \$61,000). The project will be completed by February 2002.
- SG-1: Seagrass Monitoring.
- PS-1: New Smyrna Beach Waste Water Treatment Plant and extension of reuse lines to Bouchell Island.
- FSD-14: Stormwater Utility fee in place for unincorporated Volusia.
- FSD-13: Basin planning for stormwater problems.

- MON 1 & 2: County and Citizen water quality monitoring.
- PIE-2: Construction of an Environmental Learning Center at Ponce Inlet.
- PIE-2: Investment in Eco-tourism promotions
- ETS-1: Manatee Protection Plan adoption.

### ***Brevard County***

- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – Phase I of the Chain of Lakes Project, located in the Titusville area, will construct three detention facilities and additional crossdrains under U.S. Highway 1 and Florida East Coast Railroad that will provide first flush treatment in the amount of ¾” from an 850-acre watershed. The District has entered into a contract with the Brevard County Surface Water Improvement department and provided \$130,000 to execute this project (total after Brevard County’s match and other funding sources is \$3,005,000). Installation will be completed by December 2002 and monitoring will continue through June 2003.
- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – The Channel Stabilization Project, located in the City of Melbourne, will repair a 700-foot section of canal with severe slope erosion that contributes large quantities of sediment to Crane Creek and the IRL. The District has entered into a contract with Brevard County and provided \$50,000 to execute this project (total after Brevard County’s match is \$148,000). The project will be completed by September 2002.
- FSD-14: Stormwater Management Cost-Share Program FY 2000-01 – The Melbourne Beach Stormwater Master Plan Project will identify flooding problems within the Town and recommend solutions for remediation, and will implement the Town’s stormwater utility. The District has entered into a contract with the Town of Melbourne Beach and provided \$25,000 to execute this project (total after Town of Melbourne Beach’s match is \$140,000). The project will be completed by February 2002.
- FSD-14: Stormwater Management Cost-Share Program FY 2000-01 – The Cape Canaveral Stormwater Utility Implementation Project will create a stormwater utility for the City and will fund implementation of BMPs identified in the City’s Stormwater Master Plan. The District has entered into a contract with the City of Cape Canaveral and provided \$35,000 to execute this project (total after City of Cape Canaveral’s match is \$73,500). The project will be completed by March 2002.
- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – The Jamaica Boulevard Stormwater Diversion Project, located in the City of Satellite Beach, will intercept and treat stormwater from 201 acres of the DeSoto Parkway watershed by creating three wet detention ponds. The District has entered into a contract with the City of Satellite Beach and provided \$100,000 to execute this project (total after City of Satellite Beach’s match and funds from a 319(h) grant is \$646,700). The project will be completed by February 2004.
- FSD-13: IRL License Plate Funding FY 2000-01 – The Melbourne Baffle Boxes Project will purchase and install four baffle boxes, one at each of the following locations: Eau Gallie Boulevard/Stewart Road, Rio Villa/South Patrick Drive, Garfield/Jackson Avenue, and Bell Avenue. The District has entered into a contract with the City of Melbourne and provided \$40,000 to execute this project (total after City of Melbourne’s match is \$80,000). The project will be completed one year after receipt of funding.
- FSD-13: IRL License Plate Funding FY 2000-01 – The Urban Stormwater Correction and Improvements for Anchor and Pelican Keys Project will improve water quality in the IRL by capturing stormwater runoff from a 6.4-acre drainage area and routing the water through baffle boxes and exfiltration systems. The District has entered into a contract with the Town of Melbourne Beach and provided \$25,000 to execute this project (total after Town of Melbourne Beach’s match and funds from a 319(h) grant is \$139,438). The project will be completed June 2003.
- FSD-13: IRL License Plate Funding FY 2000-01 – The Sweet Street Baffle Box Project will install a baffle box at the intersection of Sweet Street and Rockledge Drive, the discharge point of a stormwater pipe draining from a 2.2-acre retention basin. The District has entered into a contract with the City of Rockledge and provided \$26,000 to execute this project (total after City

of Rockledge's match is \$78,000). The project will be completed one year after receipt of funding.

- FSD-13: IRL License Plate Funding FY 2000-01 – The 2<sup>nd</sup> Street South Sediment/Oil & Grease Trap Project will construct a baffle box with oil and grease removal at the northwest intersection of 2<sup>nd</sup> Street South and Brevard Avenue in downtown Cocoa Beach, which will treat 83 acres of public drainage runoff that flows directly into a City canal connected to the Thousand Island area of the IRL. The District has entered into a contract with the City of Cocoa Beach Stormwater Utility and provided \$30,000 to execute this project (total after City of Cocoa Beach Stormwater Utility's match is \$71,200). The project will be completed by February 2002.
- FSD-13: IRL License Plate Funding FY 2000-01 – The Florida Avenue Rockledge/Cocoa Stormwater Facility Project will purchase a parcel of land for a stormwater treatment facility. The District has entered into a contract with the City of Cocoa and provided \$18,000 to execute this project (total after City of Cocoa's match is \$36,170). The project will be completed by August 2001.
- FSD-13: Surface Water Improvement FY 2000-01: The Fay Lake Phase II District I project will design and construct Port St. John outfall canals into Fay Lake, which will serve as a regional stormwater treatment pond. Total cost \$148,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Indian Trail Pond [Fairglen] District I project will construct a regional stormwater pond adjacent to Fairglen Elementary School in conjunction with the new overpass at U.S. 1. Total cost \$420,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Kennedy Point Weir District I project will construct a weir across a small inlet on the IRL that will trap sediment for removal prior to entering the Lagoon. Design and permitting has been completed for this project. SJRWMD Grant \$44,000. Total cost \$129,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Florida Boulevard Pond District II project will construct a regional stormwater pond at the site of the abandoned Carlton Groves Wastewater Treatment Plant. Total cost \$500,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Oak Street/Gemini Elementary District III project will design and construct retention ponds, pipes, and ditches to provide flood relief and water quality treatment along Oak street and around Gemini Elementary School. Total cost \$300,000. The Gemini component was completed in February 2001. The expected completion date of the Oak Street component is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Parkway Drive Phase II District IV project will construct a regional detention pond in Wickham Park to provide water quality treatment and provide passive recreation opportunity. Total cost \$750,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Dove Street Pond project in Melbourne will construct an online treatment pond on approximately 1.5 acres on a canal flowing into the IRL. Total cost \$250,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Hickory Ditch Stabilization project in Melbourne will stabilize approximately 700 feet of unstable channel flowing into Crane Creek near its confluence with the IRL. SJRWMD Grant \$50,000. Total cost \$145,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2000-01: The Shannon Avenue project in West Melbourne will pipe an unstable ditch and add a baffle box to reduce sediment to the IRL. Total cost \$120,000. Expected project completion date is FY 2000-01.
- FSD-13: Surface Water Improvement FY 2001-02: The Merritt Island Airport Pond District II project will enlarge an existing pond adjacent to the airport to provide water quality treatment. SJRWMD Grant \$100,000. Total cost \$450,000. Expected project completion date is FY 2001-02.
- FSD-13: Surface Water Improvement FY 2001-02: The North Merritt Island Improvements Phase I District II project will provide flood relief and water quality treatment through pipe and ditch

improvements throughout North Merritt Island and will install two large pump stations. Phase I consists of the Pine Island pump station and diversions. Total cost of Phase I \$2,470,000. Expected project completion date is FY 2001-02.

- FSD-13: Surface Water Improvement FY 2001-02: The Sarno Lakes Phase I District IV project will convert three existing borrow pits west of Interstate 95 near Eau Gallie Boulevard into a regional retention pond, will provide water quality treatment for the Hopkins Canal, and will reduce flooding along Harlock Road. Total cost \$850,000. Expected project completion date is FY 2001-02.
- FSD-13: Surface Water Improvement FY 2001-02: The Pontiac Circle Drainage project in Melbourne will provide flood control and water quality through pipe replacement and in-stream treatment. Total cost \$200,000. Expected project completion date is FY 2001-02.
- FSD-13: Surface Water Improvement FY 2001-02: The East-West Haven Avenue project in West Melbourne will pipe two unstable ditches and add two baffle boxes to reduce sediment to the IRL. Total cost \$240,000. Expected project completion date is FY 2001-02.
- FSD-14: Surface Water Improvement FY 2001-02: The Crane Creek-Hickory Ditch Master Plan Implementation project is expected to be completed in 1-2 months. Brevard County and the cities of Melbourne and West Melbourne are committed to implement projects identified in this report. SJRWMD will be asked to participate in the funding of the water quality projects through grants and other sources. Brevard County budgeted through FY 2001-02 \$900,000. Engineering and Permitting to begin in FY 2000-2001.
- PS-1: Insure compliance with IRL Act.
- PS-5: South Beaches alternative effluent disposal evaluation complete.
- OSDS-2: Implemented semi-annual inspection program for all aerobic OSDS.
- OSDS-2: Implemented annual inspection for industrial manufacturing OSDS uses.
- FSD-1: Design and constructed >\$8.2 million in stormwater retrofit projects, implemented stormwater utility assessment credit program for owners of stormwater treatment systems, financial incentive program for adoption of soil conservation plans on agricultural lands.
- FSD-2: County-wide inventory of drainage systems and structural controls, GIS comprehensive county-wide stormwater master plan.
- FSD-3: Partnering in water quality monitoring to develop and calibrate modeling for PRLGs.
- FSD-4: Development of innovative stormwater treatment methods, installation of sediment traps and stormwater inlet collection devices, constructing an alum injection demonstration.
- FSD-4: Installed, evaluated, and assisted in development of innovative stormwater inlet collection devices.
- FSD-4: Installed over 140 sediment removal devices in areas where no treatment existed and little or no land was available for other BMPs.
- MB-2: Appointed a "live aboard task force" to address issues related to live aboard vessels.
- MB-3 & ETS-1: Manatee Protection Plan approval still pending, including a section on boat facility siting.
- MB-7: County submitted request through state legislative delegation for additional Marine Patrol officers in County.
- BD-3: Coordinating "Pepper Buster" training and activities.
- SG-1: Assist in semiannual seagrass coverage inventory with SJRWMD and the IRL WQMN.
- IM-1 & 2: Cooperating with SJRWMD to reconnect impounded marshes and initiated a marsh acquisition effort with Mosquito Control District.
- LA-1, ETS-3, IM-2, W-4, BD-2 & 3: Established the EELs acquisition program in 1991, implemented numerous acquisition initiatives, developing and implementing management plans, protecting critical habitats, acquiring impoundments, essential wetlands, and lands to protect biodiversity and control exotic plants.
- LA-2: County wetlands acquisitions and cost sharing projects ongoing.
- W-3: Adopted a shoreline protection ordinance.
- W-7: Contracting with Keep Brevard Beautiful to sponsor trash bashes, using county community service persons to clean beaches.
- F-1: Working with FDEP to coordinate aquaculture-leasing activities.

- PIE-3 & 4: Public education on stormwater utility's scope of services, high school student stormwater sampling program, volunteer identification of illegal discharges into stormwater systems, implementation of Florida Yards & Neighborhoods Program.
- MON-1 & 3: Participation in IRL water quality monitoring network, continued monitoring of selected non-point sources throughout county.
- FSD-4: Water Quality Retrofit Projects: Kennedy Point Marina, N. Merritt Island Master plan, Crane Creek Stabilization, and Wickham Pond.

### *Indian River County*

- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – The Vero Lake Estates Stormwater Improvement Project, located west of the City of Sebastian, will modify existing upland ponds for stormwater detention and water quality treatment of a 3,871-acre watershed, which will help improve the water quality in the St. Sebastian River and the IRL. The District has amended the contract with Indian River County's Board of County Commissioners and provided an additional \$50,000 for a total of \$335,000 from SJRWMD to execute this project (total after Indian River County's match, a 319(h) grant and other funding sources is \$1,188,180). The project will be completed by July 2003.
- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – The Roseland Area East Stormwater Improvement Project, located north of the City of Sebastian between Bay Street and Roseland Road, will provide flood control and stormwater quality treatment for a 211-acre section of the community of Roseland, which will relieve flooding and reduce pollutant loadings to the St. Sebastian River and the IRL. The District has amended the contract with the Indian River County's Board of County Commissioners and provided an additional \$50,000 for a total of \$285,000 from SJRWMD to execute this project (total cost for the entire project after Indian River County's match is \$580,000). Construction will be completed by October 2001.
- FSD-13: Stormwater Management Cost-Share Program FY 2000-01 – Phase I of the Carter, Hall & James Subdivision Stormwater/Pollution Control Project, located in the City of Fellsmere, will provide the Planning and Engineering necessary to manage stormwater and pollution in the subdivision, including the land acquisition and the design of a 5.5-acre retention pond, the culverts, and the drainage inflow structures. The District has entered into a contract with the City of Fellsmere and provided \$50,000 to execute this project (total after City of Fellsmere's match is \$130,000). The project will be completed nine months after contract execution.
- FSD-13: The East Gifford Stormwater Improvement project will provide flood protection by collecting stormwater runoff and routing it into an approximate 6-acre detention pond that will provide a regulated discharge into a new culvert underneath the railroad track and into a ditch leading to the IRL. The project is approximately 90% designed. Estimated total cost \$580,000.
- FSD-12: The East Indian River County's Master Stormwater Management Plan addresses the stormwater runoff from over 50,000 acres of land, which includes the urban center of Vero Beach. The Indian River Farms Water Control District discharges over 100 million gallons/day of untreated water into the IRL. The first Phase of a Master Plan Study, scheduled to begin soon, will reduce the pollution into the Lagoon, recharge the shallow aquifer, provide water for farmers and others, and ultimately, increase the overall economic health of the county. Phase I will target the areas of the Main and South Relief Canals, and Phase II will expand the system to the North relief Canal and the major north/south lateral canals. An integrated stormwater treatment, storage, and recharge/reuse system will be created. The stormwater facilities will also incorporate educational accommodations, wildlife habitat, and passive and active parks connected by greenways and bike paths along the canal right-of-ways, providing multi-use opportunities for the public. On a yearly basis, this integrated pollution removal system will remove an estimated 70% of sediments, metals, nutrients, pesticides, and other pollutants associated with large urban and agricultural areas. Estimated project cost is \$8.9 million, not including land acquisition costs.
- W-4, 5 & 6: Mosquito Impoundment Reconnections.
- FSD-13: South Kings Highway Roadway and Stormwater Improvements.
- FSD-13: Oslo Road, 43<sup>rd</sup> Ave., 66<sup>th</sup> Ave. & 4<sup>th</sup> St. Roadway and Stormwater Improvements.
- FSD-13: Fellsmere Road Roadway and Stormwater Improvements Phase III.

- W-6: Wabasso Causeway shoreline erosion project.
- FSD-7: Comprehensive Land Use Plan - stormwater element inclusion.
- LA-1: \$26 million land acquisition bond approved enabling \$50 million worth of land bought through partnership with SJRWMD so far.
- PS-1: Utility sewer line expansion along US 1.
- MON-1: Participation in IRL water quality monitoring network.

### *St. Lucie County*

- W-5: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with the St. Lucie County Mosquito Control District and provided \$38,753 to execute a Mosquito Impoundment Enhancement and Public Access/Awareness project.
- FSD-13: St. Lucie River Issues Team 2001-02 Project Application List: River Park Water Quality Improvement, and White City Canal F.
- W-5: SWIM Grant FY 2000 – Impoundment 16 A: add pump station, new pumps, pump upgrades, 200 acres wetland benefit. \$50,000 received / \$19,142 local match.
- W-5: IRL License Plate Grant FY 2000 – Impoundment 17 A: improve pump station, 50-acre wetland benefit. Impoundment 18 A: improve pump station, 78-acre wetland benefit. Impoundment 14 B: web cam ADA access. \$38,753 received / \$2,419 local.
- BD-3: Removal of 69, 035 LF exotic damaged trees along IRL shoreline due to Hurricane Irene. \$90,159 (includes 75% federal funding, 12.5% state, and 12.5% local).
- W-5: IRL License Plate Grant FY 2001 – Impoundment 1: improve pump station, 100-acre wetland benefit. Impoundments 3, 17 A, 19 A: install 4 culverts, 60-acre wetland benefit. Impoundment 19 A: construct 2 outlooks, 1 boardwalk, 2 bike racks, public access. \$51,236 application-only/\$5,000 local.
- W-4: Land Preservation/Acquisition in 2000: Queens Island Phase I (Fed/SOR/Local complete), Phase II (FCT/Local Ongoing; Fed/State/Local complete), Donation, and Conservation. Bear Point Phase I (State 3 FCT/State SOC/Local 2 MSQ/FWS), II (CARL & Fed), III (State 1 CARL/FWS), and Donation. Bear Point: Isabella (Local), and Middle Cove Park (State 3 FCT/Local 2 MSQ/FWS/Donation). Pepper Park (FCT/SOC/Local Ongoing). Kings Island (State 3 FCT/Local 1 ESL/FWS). Blind Creek (State 1 CARL/State 2 SOR/Local 1 ESL/FWS). Dollman (Local SOC). Impoundments 10A & B (Donation). Impoundments 11 & 12, 14 B; and 6, 7, 8, and 9 (Conservation). Avalon Addition (State 4 INH/Local 1 ESL/Local 2 MSQ). Envirolands (Local 2 MSQ). Green Turtle Beach and Addition (State SOC). Ft. Pierce Inlet State Park (State SOC). Jack Island (Retained). Ocean Bay (State 3 FCT/Local 1 ESL). Avalon (State 1 CARL/Local SOC). Beach Accesses (Local). Recreation only.
- FSD-13: Water Quality Improvement Projects FY 2001-02: Platt's Creek Water Quality/Wetland Restoration project will purchase and decommission approximately 102 acres of existing citrus groves adjacent to Platt's Creek and the North Fork of St. Lucie River. Improvements include the construction of a 16-acre wet detention basin adjacent to Platt's Creek which will provide water quality treatment for the approximate 1,000 acre drainage basin and the removal of 86 acres of citrus groves to be replaced by restored floodplain forest, marsh, and wet flatwood communities adjacent Platt's Creek and the North Fork of St. Lucie River. The project is currently in design and construction is expected to begin in FY 2001-02. Total cost \$3,604,360.
- FSD-13: Water Quality Improvement Projects FY 2001-02: The Hidden River Estates Stormwater Retrofit project will provide water quality treatment and flood protection for a residential neighborhood on the North Fork of the St. Lucie River. Vacant lots in the neighborhood have been acquired for the construction of stormwater retention areas to provide water quality treatment. The project is currently in design and construction is expected to begin in FY 2001-02. Total cost \$308,420.
- FSD-13: Water Quality Improvement Projects FY 2001-02: The Indian River Estates/Savannas Ecosystem Management project will design a stormwater management plan for the Indian River Estates subdivision to improve flood protection and the quality of the stormwater runoff which currently discharges from the subdivision into the Savannas State Reserve whose outfall drains to

- the North Fork of the St. Lucie River and the Indian River Lagoon. The project is currently in design. Construction funding has not yet been established. Total cost \$5,495,700.
- FSD-13: Water Quality Improvement Projects FY 2001-02: The Taylor Creek Restoration project will evaluate and design for the removal and disposal of muck sediments that have accumulated in the navigation channel of Taylor Creek, Fort Pierce. Approximately 90,000 cyds of sediment are estimated for removal from a 2,300 lft section of the navigation channel east of the FEC railroad up to the Intracoastal Waterway, and approximately other 90,000 cyds of sediment are estimated for removal from a 2,850 lft section of the navigation channel west of the FEC railroad extending up to the spillways at the C-25 Canal and North Canal. The project is currently in design/planning. Total cost \$1,785,000.
  - FSD-13: Water Quality Improvement Projects FY 2001-02: The Canals 23 and 28 Basin Retrofit project will provide water quality treatment for the entire interconnected basin of the North St. Lucie River Water Control District Canals 23 and 28 which discharges to the North Fork of the St. Lucie River. This fiscal year, weir type spillways are being constructed at the outfalls of both of these canals to provide a measure of water quality treatment of the drainage basin. The cost for the construction of these water control structures is \$346,000. The second phase will be to build stormwater retention ponds to provide the full amount of water quality treatment. The pond design is currently in the preliminary design phase at a cost of \$51,700. No construction estimates have been determined.
  - FSD-13: Water Quality Improvement Projects FY 2001-02: The River Park Baffle Boxes project will provide water quality treatment for stormwater runoff from the River Park subdivision. Baffle boxes will be constructed at the two main outfalls to the North Fork in order to trap sediment and other floating debris prior to the stormwater discharging to the North Fork. The project is currently in design. Construction funding has not yet been established. Total cost \$102,270.
  - W-5: St. Lucie River Issues Team 2001-02 Project Application List: Impoundment Restoration IX.
  - FSD-14: MSTU approved at 0.35 mills projected to raise \$1.4 million in 1<sup>st</sup> year for water quality and flooding issues; restoration of 38 miles of roadway swales.
  - FSD-13: Moore's Creek Retrofit canal improvements.
  - FSD-13: Stormwater out fall retrofits along Indian River Drive, two sediment traps currently installed through FDEP grant.
  - FSD-13: North St. Lucie River Canal Retrofits.
  - W-5: East A1A Mosquito Impoundment Reconnections & 9 miles of exotic plant removal.
  - PS-1: Centralized sewer plant and water reuse facility on barrier island.
  - FSD-11: Public education program in stormwater issues.
  - PIE-3: Children's Environmental Learning Museum.

### *Martin County*

- W-6: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with the Environmental Learning Center and provided \$2,775 to execute a Red Mangrove Planting project in Martin County.
- W-6: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with The Florida Oceanographic Society and provided \$2,850 to execute a Mangrove Marsh Impoundment Habitat Restoration Pilot project in Martin County.
- W-6: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with The Nature Conservancy and provided \$26,714 to execute a Non-Native Plant Removal and Habitat Restoration project in Martin County.
- W-6: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with Martin County Parks and Recreation and provided \$13,662 to execute the Indian Riverside Park/Florida Institute of Technology Mangrove Lagoon Restoration project.
- FSD-14: Martin County's Lands for Healthy Rivers and Natural Resources Protection Program: On November 3, 1998, the voters of Martin County voted to add a one-cent sales tax for a period of three years and dedicate the revenues to the acquisition of land for river restoration, matching

funds for conservation lands purchase, and to fund capital projects for water quality improvement. The tax is estimated to provide \$38 million over the three years ending on December 31, 2001. The proposed purchases are composed of priority parcels identified within the CARL Program and the Comprehensive Everglades Restoration Plan (CERP). As of December 31, 2000, cumulative receipts from the additional sales tax totaled \$26,734,200. To date (February 20, 2001), \$6,548,693 has been spent on Preservation Lands purchases. Approximately, \$12.6 million is still available for land acquisition and another \$19 million will be used to match federal dollars for designated CERP projects.

- FSD-13: Stormwater Capital Improvements 2000-2001: The East Fork/Manatee Creek project addresses flood attenuation and overdrainage. FY 2000 Ad-Valorem \$262,000, FY 2001 Ad-Valorem \$43,000. Total cost \$368,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Fern Creek Retrofit project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$58,000, FY 2001 Ad-Valorem \$144,000. Total cost \$655,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Golden Gate project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$200,000, FY 2001 Ad-Valorem \$201,000. Total cost \$2,088,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Hibiscus Park project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$115,000, FY 2001 No scheduled contribution. Total cost \$275,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Kitching Creek project provides ecosystem restoration and overall surface water management system improvement. FY 2000 Ad-Valorem \$370,000, FY 2001 Ad-Valorem \$140,000. Total cost \$1,367,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Manatee Pocket – Salerno Creek Retrofit project provides regional stormwater facility development. FY 2000 Ad-Valorem \$482,000, FY 2001 Ad-Valorem \$310,000. Total cost \$2,143,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The North County Water Quality Retrofit project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$500,000, FY 2001 No scheduled contribution. Total cost \$1,000,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Old Palm City Retrofit project provides a stormwater management system. FY 2000 Ad-Valorem \$152,000, FY 2001 Ad-Valorem \$375,000. Total cost \$3,051,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Palm Lake Park project provides a stormwater management system. FY 2000 Ad-Valorem \$113,000, FY 2001 Ad-Valorem \$200,000. Total cost \$2,176,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Poinciana Gardens project provides ecosystem restoration and overall surface water management system improvement. FY 2000 Ad-Valorem \$73,000, FY 2001 Ad-Valorem \$25,000. Total cost \$2,338,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Rio – St. Lucie Surface Water Management Improvements project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$20,000, FY 2001 No scheduled contribution. Total cost \$1,220,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The South County – Tropic Vista project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$785,000, FY 2001 Ad-Valorem \$307,000. Total cost \$2,598,000.
- FSD-13: Stormwater Capital Improvements 2000-2001: The Vista Solerno project provides for the construction of stormwater treatment facilities. FY 2000 No scheduled contribution, FY 2001 Ad-Valorem \$155,000. Total cost \$155,000.
- FSD-13: St. Lucie River Issues Team Project 1999-2000: Weirs, Baffle Boxes, and Vacuum Truck.
- FSD-13: St. Lucie River Issues Team Project 2000-01: Willoughby Creek.
- FSD-14: MSTU approved at 0.5 mills for stormwater issues expected to raise over \$3 million in 1<sup>st</sup> year.
- FSD-13: Jensen Beach Blvd. baffle box design complete, construction in 2000.
- FSD-13: Sandcastle Estates water quality treatment design complete, permit challenged.

- FSD-13: North River Shores sediment trap construction in 2000.
- FSD-13: East Hanson Grant Flow through Marsh ongoing maintenance.
- FSD-14: Regular street sweeping, purchase of a vacuum truck for cleaning sediment traps.
- FSD-14: Development, approval and implementation of stormwater land development regulations.
- FSD-13: Airport Ditch Water Quality Improvements construction.
- FSD-13: Half Mile Lake sediment trap installation complete.
- FSD-13: Normand Street Weir design and permitting initiated.
- FSD-13: Gleason St./ Colby Ave. Stormwater feasibility study initiated.
- FSD-13: Palm Lake Park Improvements design ongoing.
- FSD-13: Little Club Area Stormwater and Water Quality Improvements – design and permitting ongoing.
- FSD-13: Yacht and Country outfall weir design and permitting initiated.
- FSD-10: FY&N Program environmental landscape education programs.

### ***US Army Corps of Engineers***

- FSD-14: Section 1135 Project Recovery Plan at Sebastian Inlet: \$10,000.
- FSD-14: C-1 Rediversion Study: \$12,800.
- ETS-3: Manatee Protection at Canaveral Lock: \$3,000.
- FSD-13: St. Lucie Inlet Construction General: \$76,000.
- Ponce Inlet navigation work, operation and maintenance.
- FSD-14: Ponce Inlet Sec. 1135 study ecosystem restoration.
- Canaveral Inlet operation and maintenance.
- FSD-14: Indian River Lagoon Feasibility Study.
- FSD-14: Pelican Island Sec. 1135 studies initiated.

### ***US Fish and Wildlife Service***

- W-6: Merritt Island National Wildlife Refuge FY 2000-2001: The Refuge completely restored a 54-acre impoundment on the west side of Titan III road in the north Banana River on Cape Canaveral Air Force Station. This was a mitigation project funded by the Air Force. This work included the removal of two miles of perimeter and interior dikes and the removal of approximately 18 acres of exotic vegetation. Total cost \$62,000.
- W-6: Merritt Island National Wildlife Refuge FY 2000-2001: The Refuge in conjunction with SJRWMD, East Volusia Mosquito Control District, and the FWS (Division of Fisheries) worked to restore 340 acres of marshland in Mosquito Lagoon. Total cost \$73,000.
- W-5: Merritt Island National Wildlife Refuge FY 2001-2002: The Refuge will continue the Mosquito Lagoon project which will include the reconnection of 602 acres of habitat within two impoundments. Total cost \$87,000.
- LA-2: Pelican Island National Wildlife Refuge FY 2000-01: The Refuge has acquired barrier island lands adjacent to the IRL. The removing from utilization these citrus grove lands, including 53 acres of the Lier Tract, should improve water quality in the area.
- LA-2: Pelican Island National Wildlife Refuge FY 2001-02: The Refuge will acquire the remaining 42 acres of the Lier Tract for \$3.1 million and a portion of the Michaels Tract for \$2.8 million. The Refuge in conjunction with SJRWMD and FIND will complete Phases I and II of the restoration of Pelican Island by airlifting shell material to the island and planting native plants.
- W-1: Partner in MINWR Wetlands Management Initiative.
- ETS-1: Development of a MINWR Comprehensive Conservation Plan.

### ***National Aeronautics and Space Administration***

- FSD-13: Region 1 Stormwater Facility for Kennedy Space Center Industrial Area.
- DIM-2: Data Sharing Memorandum of Understanding with SJRWMD.

### ***USDA Natural Resources Conservation Service***

- MON-1: USDA/SFWMD - St. Lucie River Issues Team Project 1999-2000: Watershed and Aquatic Research Assessing Key Environmental Issues in the St. Lucie Estuary.
- FSD-4: St. Lucie River Issues Team Project 2000-01: St. Lucie County Urban Mobile Lab, Martin County Urban Mobile Lab, and Citrus Irrigation.
- FSD-4: St. Lucie River Issues Team 2001-02 Project Application List: St. Lucie and Martin Counties Urban Mobile Labs.
- FSD-4 & 10, W-4, ETS-3, and PIE-3: St. Lucie FY 2000 – Wrote conservation plans on 788 acre of grove land; conducted determinations on 4,074 acres of wetlands; applied 2,240 acres of wildlife habitat management on ranches; converted 70 acres of flood irrigated citrus to micro-irrigation; completed designs on an additional 842 acres (20 groves); applied 2,385 acres of conservation to grove land (completed conservation plans); applied 3,342 acres of nutrient and pest management to grove land; applied 435,822 feet of conservation buffers; applied 1,779 acres of irrigation water management to grove land; performed 80 urban mobile lab evaluations; and assisted 3,052 customers from the office and 285 on their farms.
- FSD-4 & 10, W-4, ETS-3, and PIE-3: Martin County FY 2000 – Wrote conservation plans for 900 acres; applied conservation plans to 30 acres of grazing lands; applied nutrient management to 127 acres of farms; pest management applied to 197 acres of farms; irrigation water management applied to 1,232 acres of farms; applied conservation buffers to 442,170 feet; enrolled 4 ranches (5 sections of land) into the USDA Wetlands Reserve Program; performed 140 urban mobile lab evaluations; and assisted 173 customers from the office.
- FSD-4 & 10, W-4, ETS-3, and PIE-3: Indian River FY 2000 – Wrote conservation plans for 1,725 acres of farm land; installed BMPs on 42,601 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 232 natural resources conservation requests for assistance; performed 67 mobile lab evaluations on 1,806 acres of mainly citrus land; provided technical and conservation education assistance to 3,248 customers.
- FSD-4 & 10, and ETS-3: Brevard FY 2000 – Wrote conservation plans for 2,500 acres of citrus; applied BMPs, nutrient management, and pest management on 1,000 acres of citrus; applied irrigation water management on 1,240 acres of citrus.
- FSD-4: Agricultural Mobil Irrigation Lab to decrease water use in irrigation with potential water savings of over 2 billion gallons in 1999.
- FSD-4: BMP implementation on agricultural lands using 1997 Farm Bill funding.
- W-6: USDA Wetlands Reserve Program obtaining conservation easement on 405 acres with wetlands being restored.

### ***Florida Inland Navigation District***

- W-6 & 7, and PIE-3: FY 1999-2000: Shoreline Rehabilitation Site M-5 – sponsored by FIND, Indian River KFB, Brevard KFB, and Martin KFB; \$289,000 (total project cost) FIND assistance. Waterway Cleanup - \$15,000 FIND assistance of \$75,000 total budget. Peck Lake Environmental Education Signs – sponsored by Martin County; \$22,550 (total project cost) FIND assistance. Main Street Ramp Repairs – sponsored by City of Sebastian; \$62,500 FIND assistance of \$125,000 total budget. Indian River Memorial Park – sponsored by City of Ft. Pierce; \$204,505 FIND assistance of \$409,000. Fishermans Wharf Piers – sponsored by City of Ft. Pierce; \$54,448 FIND assistance of \$200,000 total budget. So. County Boat Ramp – sponsored by Martin County; \$220,000 FIND assistance of \$940,000 total budget.
- FSD-6 & 13: FY 2000-2001: FIND provided \$3,936,350 in assistance to local governments, which after local matching contributions amounted to \$9,200,969 for projects in Brevard, Martin and Indian River counties. Major projects included: Martin County's – sponsored by the County and the Marine Industry Association of Treasure Coast; \$217,563 FIND assistance of \$250,563 total budget. Turkey Creek Channel Dredging – sponsored by SJRWMD; \$750,000 FIND assistance of \$2,200,000 total budget. Stuart Anchorage, Phase II – sponsored by the city of Stuart; \$312,750 FIND assistance of \$625,500. Lee Wenner Park Improvement, Phase II – sponsored by Brevard County; \$279,469 FIND assistance of \$566,436 total budget. Indian River Waterway Enhancement – sponsored by the City of Sebastian; \$170,000 FIND assistance of

\$425,000 total budget. Ft. Pierce Inlet Boat Launch – sponsored by St. Lucie County; \$251,986 FIND assistance of \$825,900 total budget.

- FSD-6: Funding Partner in Taylor Creek Environmental Dredging Project.
- ICW Economic Studies, St. Lucie & Indian River Counties Phase II Studies.
- W-3: Spoil Island Enhancement and Restoration.
- FSD-6: ICW Dredging.
- MON-2: MRC Citizens Water Quality Monitoring Program.
- W-6: Ballard Park Shoreline Stabilization.
- W-6: Wabasso Causeway Park Improvements.
- MB-6: Marine Enforcement Program, Police Marine Patrol Boat.
- FSD-13: Castaways Point Park Improvements.
- PIE-2: Educational Nature Trail.
- W-6: GIS Spoil Island Project.

#### ***Florida Fish and Wildlife Conservation Commission***

- ETS-1: Establishment of manatee refuges, sanctuaries, and slow speed zones.

#### ***The Nature Conservancy***

- LA-2: Indian River Lagoon Blueway implementation.

#### **Other Organizations' Activities**

##### ***Palm Beach County***

- BD-3: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with the Environmental Learning Center and provided \$925 to execute a Red Mangrove Planting project in Palm Beach County.
- FSD-6: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with the Jupiter Inlet District and provided \$25,000 to execute the Sims Creek Siltation Removal project.
- BD-3: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with Palm Beach County Parks and Recreation and provided \$22,600 to execute the Coral Cove Park Exotic Plant Removal and Shoreline Revegetation Enhancement project.

##### ***US Geological Survey***

- MON-1: St. Lucie River Issues Team Project 1999-2000: Pesticide Reconnaissance within St. Lucie Estuary.

##### ***National Ocean Service and National Oceanic and Atmospheric Administration***

- MON-1: St. Lucie River Issues Team Project 1999-2000: Environmental Toxicity in SLE/IRL.
- MON-1: St. Lucie River Issues Team 2001-02 Project Application List: Environmental Toxicity in SLE/IRL.

##### ***National Marine Fisheries Service and National Oceanic and Atmospheric Administration***

- F-2 & ETS-4: St. Lucie River Issues Team Project 1999-2000: Fish Health Problems in the SLE.
- F-2 & ETS-4: St. Lucie River Issues Team 2001-02 Project Application List: Fish Health Problems in the SLE.

##### ***Institute of Food and Agricultural Sciences***

- FSD-10: St. Lucie River Issues Team Project 1999-2000: Florida Yards and Neighborhoods.
- FSD-4: St. Lucie River Issues Team Project 2000-01: Golf, Urban, Past Water Quality; Citrus and Vegetable Water Quality; Citrus Pesticide BMP, and Water Table Management as a BMP.

- FSD-4 & 6: St. Lucie River Issues Team 2001-02 Project Application List: Water Table Management as a BMP, Phase 3; Golf, Urban, Past Water Quality; Citrus and Vegetable Water Quality; and Muck.
- FSD-4: UF-IFAS - St. Lucie River Issues Team Project 1999-2000: N, P, and Heavy Metals in Surface Water Runoff from Citrus Groves and Vegetable Fields in the Indian River Area.
- FSD-4: UF-IFAS - St. Lucie River Issues Team Project 1999-2000: Water Table Management as a BMP for Reducing Discharges from Indian River Citrus Groves.
- MON-1: UF-IFAS - St. Lucie River Issues Team Project 1999-2000: Characterization of Agrochemical and Nutrient Loadings in Runoff from Pastures, Golf Courses, and Urban Areas in the SLE Basin and N, P, and Metals from Citrus and Vegetables.
- FSD-4: IFAS/SFWMD - St. Lucie River Issues Team 2001-02 Project Application List: Agricultural BMP Implementation Certification.

***Treasure Coast Resource Conservation District***

- FSD-4: St. Lucie River Issues Team Project 1999-2000: Irrigation Conversion.

***Martin County Soil and Water Conservation District***

- FSD-4: St. Lucie River Issues Team Project 1999-2000: Martin Mobile Irrigation Lab, and RUSS.

***St. Lucie County Soil Conservation Service***

- FSD-4: St. Lucie River Issues Team Project 1999-2000: St. Lucie Mobile Irrigation Lab.

***St. Lucie County Cooperative Extension Unit***

- FSD-13: St. Lucie River Issues Team Project 2000-01: Dupuis Restoration.

***North St. Lucie Water Control District***

- FSD-4: St. Lucie River Issues Team Project 2000-01: NSLWCD BMP.
- FSD-6: St. Lucie River Issues Team 2001-02 Project Application List: NSLWCD Water Control, and NSLWCD Vegetation Control and Bank Stabilization.

***Fort Pierce Farms Water Control District***

- FSD-13: St. Lucie River Issues Team 2001-02 Project Application List: Vegetation Control and Bank Stabilization.

***City of Stuart***

- FSD-13: St. Lucie River Issues Team Project 1999-2000: Poppleton Creek, and Haney Creek.
- FSD-13: St. Lucie River Issues Team Project 2000-01: Haney Creek, Frazier Creek, Krueger Creek, and North Point CRA.
- FSD-13: St. Lucie River Issues Team 2001-02 Project Application List: Poppleton Creek, and Frazier Creek.

***City of Ft. Pierce***

- FSD-13: St. Lucie River Issues Team 2001-02 Project Application List: Moore's Creek Stormwater Retrofit.

***Town of Sewall's Point***

- FSD-13: St. Lucie River Issues Team 2001-02 Project Application List: Rio Vista Outfall Retention Area Retrofit, and Island Road Baffle Box.

#### ***SECTION 4. FY 2001-2002 IMPLEMENTATION PROJECTS***

This section describes the projects that were recommended by the IRL Advisory Board's Technical Advisory Committee and will be funded under this work plan with US EPA Section 320 funds and the non-federal matching dollars for the grant.

The following project descriptions are brief, conceptual summaries. Detailed scopes of work will be developed for each project for contract negotiations and implementation.

##### **Implementation Project MON-2(a) Year 6: Citizens Volunteer Water Quality Monitoring Network**

Continuation of the ongoing volunteer water quality monitoring program initiated by the Marine Resources Council. Data produced by this network is uploaded to STORET on a regular basis and is made available to agencies and local governments.

Estimated Date of Completion: September 2002

Budget: \$ 60,000

Funding Sources: EPA/NEP

##### **Implementation Project FI-1(c) Year 5: CCMP – Grants Writer/Facilitator**

Contracted grant writing support provided to local governments in the IRL basin. Through this project 26 proposals (primarily stormwater projects) have been submitted with 22 grants awarded providing \$4.2 million in assistance since 1997.

Estimated Date of Completion: June 2002

Budget: \$ 60,000 (\$40,000 base funding; \$20,000 incremental incentive bonus for each 5% increase in successful grants awarded in addition to the total grant amount from the previous fiscal year)

Funding Sources: EPA/NEP

##### **Implementation Project: PIE-2(c) Year 3: IRL Information Library and Shoreline Restoration Project**

Continuation of ongoing efforts by MRC to develop and operate a centralized repository of IRL publications and other resource materials. This center provides assistance to students and citizens requesting additional information about the IRL. In addition, support is provided to MRC's exotic plant removal/ shoreline habitat restoration program.

Estimated Date of Completion: November 2002

Budget: \$ 25,000

Funding Sources: EPA/NEP

##### **Implementation Project PIE-4(a) Year 4: Increase Involvement in Implementation**

Support of ongoing quarterly Citizen Workshops conducted by MRC held in each county in the IRL region on a quarterly basis. These forums provide an opportunity for citizens to learn more about the IRL and to discuss issues of concern related to the Lagoon.

Estimated Date of Completion: June 2003

Budget: \$ 25,000

Funding Sources: EPA/NEP

##### **Implementation Project W-6(b) Year 6: Establishment of Fringing Mangrove Habitat**

Support of ongoing shoreline restoration program undertaken by the Environmental Learning Center. To date, more than a mile of shoreline has been planted and monitored at sites ranging from Jupiter Inlet to Merritt Island. Project partners include SFWMD, USFWS, FIND and FDEP.

Estimated Date of Completion: September 2003

Budget: \$ 25,500

Funding Sources: EPA/NEP: \$15,000; SFWMD: \$10,500

Implementation Project PIE-2(b): Educate the Public and Governments about the Resources of the IRL

Provides funds for the development, publication and distribution of outreach materials (newsletter, brochures, fact sheets, etc.) by the IRL Program and support of outreach programs.

Estimated Date of Completion: September 2001

Budget: \$ 20,000

Funding Sources: EPA/NEP

Implementation Project FSD-13: Stormwater Implementation Projects

Support for implementation of prioritized urban drainage system retrofits. These funds are often combined with SJRWMD or SFWMD ad valorem monies, state legislative appropriations, or with funds generated by the IRL license plate to support regional retrofit or upgrade projects.

Estimated Date of Completion: September 2003

Budget: \$ 284,000

Funding Sources: EPA/NEP \$18,500, SJRWMD \$149,500, Local Government \$100,000 (in-kind)

Implementation Project FSD-4: BMP Implementation in the Citrus Industry

The IRL's citrus industry has an annual economic impact of over \$2.1 billion dollars in the lagoon's watershed. The implementation of Best Management Practices (BMPs) to achieve economic and environmental benefits will be continued in cooperation with SFWMD, University of Florida-IFAS, and the Indian River Citrus League. Water furrow sediment traps and installation of riser-board water control structures are two BMPs being investigated in 2001. The benefit of additional alternative BMPs will be investigated under this project. The goal of these BMPs is to reduce the harmful discharge of nutrients and suspended solids from citrus production to the lagoon. The performance of environmental assessments of crop management operations, reducing aquatic plants within canals and waterways, off-site transport of pesticides, metals, sediments and fertilizers, and the control of agricultural runoff as a source for irrigation are other BMPs being monitored for effectiveness and cost/benefit.

Estimated Date of Completion: January 2004

Budget: \$ 20,000

Funding Sources: EPA/NEP

Implementation Project BD-1(a) Year 3: IRL Species Inventory & Relational Data Base (Smithsonian)

Development and inclusion of additional species reports in the existing on-line species inventory developed by the Smithsonian Marine Station at Fort Pierce (<http://www.sms.si.edu>). This information has proven quite valuable to students and educators throughout the IRL region.

Estimated Date of Completion: June 2002

Budget: \$ 35,000

Funding Sources: EPA/NEP

Implementation Project PIE-2(c): EPA Supplemental Funds - Centralized IRL Data Base

Support for development and implementation of a comprehensive and centralized electronic database for the IRL in cooperation with NASA.

Estimated Date of Completion: September 2003

Budget: \$ 30,000

Funding Sources: EPA Supplemental Funds

Implementation Project IM-1(b): Wetland Restoration (Impoundment Reconnection)

This project will implement wetland restoration and impoundment reconnection. Funds will be used to purchase culverts and pumps for the reconnection and management of impounded wetlands, to restore impoundment shorelines to near pre-impoundment condition, to restore wetlands damaged by dragline ditching for mosquito control, and other wetland restoration efforts.

Estimated Time for Completion: 2005

Budget: \$ 50,000

Funding Sources: SJRWMD

Implementation Project SG-1: Multi-Spectral Mapping of Seagrass and Water Quality in the IRL

Building on a successful, but limited, pilot project, this project will develop the protocol and specific procedures for mapping seagrass and detecting water quality conditions using multi-spectral imagery processed with conventionally available image processing software. The contractor will obtain the imagery and develop a specific protocol for the routine production of seagrass maps of the IRL and will perform the same for certain water quality parameters whose characteristics lend themselves well to this technology. Besides the advantages of distinguishing SAV types and allowing a shorter turnaround time, this method could provide new and spatial information on wetlands vegetation status and on water quality parameters such as chlorophyll. Additionally, the multi-spectral imagery can be converted to GIS maps using available conventional imaging processing software.

Estimated Completion: 2003

Budget: \$ 320,000

Funding Sources: Federal-NASA "Broad Agency Announcement" Program grant (\$300,000);  
SFWMD \$20,000

Implementation Project MON-2(c): CASTnet National Atmospheric Deposition Program Site

This project continues the support of the established CASTnet site at Sebastian Inlet being used to improve the IRL Program's quantification of nutrient loadings from airborne deposition. The data from this site, will be joined with atmospheric deposition site data in the northern and central portions of the watershed to estimate the total loadings of nutrients to the watershed from airborne deposition. The EPA selected laboratory for this work is ESE Labs in Gainesville.

Estimated Date of Completion: March 2004

Budget: \$9,000

Funding Source: SJRWMD (match toward CASTnet Grant, not NEP grant)

**TABLE 1**  
*Annual Budget*

|   |                  |
|---|------------------|
| US EPA Implementation Grant               | \$300,000        |
| US EPA Outreach Grant                     | 10,000           |
| US EPA Supplemental Environmental Results | 30,000           |
| St. Johns River Water Management District | 199,500          |
| South Florida Water Management District   | 40,500           |
| County / Municipality (in-kind) match     | <u>100,000</u>   |
| <b>Total</b>                              | <b>\$680,000</b> |

---

**Projected Expenses:**

**Travel**

|                      |               |
|----------------------|---------------|
| Per Diem and Mileage | 8,500         |
| Air Travel           | 6,000         |
| Car Rental           | <u>500</u>    |
| <b>Total</b>         | <b>15,000</b> |

**Equipment & Supplies**

|                            |              |
|----------------------------|--------------|
| Photography                | 1,000        |
| Field Supplies & Equipment | 5,200        |
| Stationary & office        | <u>2,000</u> |
| <b>Total</b>               | <b>8,200</b> |

**Contractual/Consultant Services\***

|                                |          |
|--------------------------------|----------|
| CCMP Implementation Activities | 648,500* |
|--------------------------------|----------|

**Other**

|                          |              |
|--------------------------|--------------|
| Advertisements           | 300          |
| Printing                 | 5,000        |
| Registration/Conferences | <u>3,000</u> |
| <b>Total</b>             | <b>8,300</b> |

|                                 |                  |
|---------------------------------|------------------|
| <b>TOTAL PROJECTED EXPENSES</b> | <b>\$680,000</b> |
|---------------------------------|------------------|

\*Contractual/Consultant Services includes SJRWMD, SFWMD, & County Non-Federal Program Match of 25%.

**TABLE 2**  
*Work Plan Implementation Projects*

| <b>Project</b>   | <b>EPA/NEP</b> | <b>SJRWMD</b>  | <b>SFWMD</b>  | <b>LOCAL</b>   | <b>TOTAL</b>   |
|--|----------------|----------------|---------------|----------------|----------------|
| <i>Action Plan</i>   |                |                |               |                |                |
| MON-2(a) CVWQMN  | 60,000         | 0              | 0             | 0              | 60,000         |
| CCMP Grants Writer   | 60,000         | 0              | 0             | 0              | 60,000         |
| IRL Library & Shoreline Project (MRC)                              | 25,000         | 0              | 0             | 0              | 25,000         |
| Citizens Workshops (MRC)   | 25,000         | 0              | 0             | 0              | 25,000         |
| Shoreline Restoration (ELC)  | 15,000         | 0              | 10,500        | 0              | 25,500         |
| Public Information and Education                                   | 20,000         | 0              | 0             | 0              | 20,000         |
| Stormwater Implementation Projects                                 | 18,500         | 149,500        | 0             | 100,000        | 268,000        |
| Citrus BMPs (IFAS)   | 20,000         | 0              | 0             | 0              | 20,000         |
| IRL Species Inventory (Smithsonian)                                | 35,000         | 0              | 0             | 0              | 35,000         |
| EPA Supplemental Funds –<br>Centralized IRL Data Base (NASA)       | 30,000         | 0              | 0             | 0              | 30,000         |
| Operating & Travel Expenses  | 31,500         | 0              | 0             | 0              | 31,500         |
| Wetland Restoration<br>(Impoundment Reconnection)                  | 0              | 50,000         | 0             | 0              | 50,000         |
| Multi-Spectral Mapping of Seagrass and<br>Water Quality in the IRL | 0              | 0              | 20,000        | 0              | 20,000         |
| SFWMD Cash Match   | 0              | 0              | 10,000        | 0              | 10,000         |
| <b>TOTAL</b>   | <b>340,000</b> | <b>199,500</b> | <b>40,500</b> | <b>100,000</b> | <b>680,000</b> |

## APPENDIX I

### ALLOCATION OF FY 2000-2001 EPA TRAVEL FUNDS

In compliance with the requirement to document the use of EPA outreach/travel funds as specified in the NEP FY 1998 Budget and Selected Guidance Topics memo from Acting Director of the Oceans and Coastal Protection Division, Ms. Suzanne Schwartz, the following details these expenditures for the period October 2000 through March 2001.

The Indian River Lagoon National Estuary Program has expended 103 percent of the \$10,000 in EPA travel funds during the first six months of the fiscal year. The availability of these funds continues to be an important component of the Indian River Lagoon NEP's outreach and coordination efforts with other programs around the nation, the EPA Regional Office and Headquarters, and the Association of National Estuary Programs. The Indian River Lagoon NEP has utilized these funds to provide BASINS training to staff at the University of Texas in Austin and to attend the annual National Estuary Program Conference in Maine, the ANEP meeting in Washington D.C., a Florida NEPs meeting in St. Petersburg addressing the financing of Estuary Program activities, and a conference on Watershed Science, Policy, Planning and Management in Tampa.

| TRAVEL DATES | LOCATION & PURPOSE  | COST      |
|--------------|---|-----------|
| 10/01-04/00  | Sebasco Harbor, Maine –<br>Association of National Estuary Programs Conference    | \$ 2,178  |
| 01/23-24/01  | St. Petersburg, Florida –<br>Financing Estuary Program Activities                 | \$ 180    |
| 03/04-09/01  | Austin, Texas –<br>BASINS Training  | \$ 1,617  |
| 03/11-15/01  | Washington, D.C. –<br>NEP National Meeting US EPA/ANEP                            | \$ 4,356  |
| 05/20-24/01  | Thibodaux, Louisiana –<br>FEMA/NEP Workshop Barataria-Terrebonne NEP              | \$ 1,250  |
| 06/20-21/01  | Tampa, Florida –<br>Watershed Science, Policy, Planning & Management<br>(UF/IFAS) | \$ 730    |
| Total        |   | \$ 10,311 |

EPA Government Performance and Results Act

Indian River Lagoon National Estuary Program CCMP Priority Actions Initiated

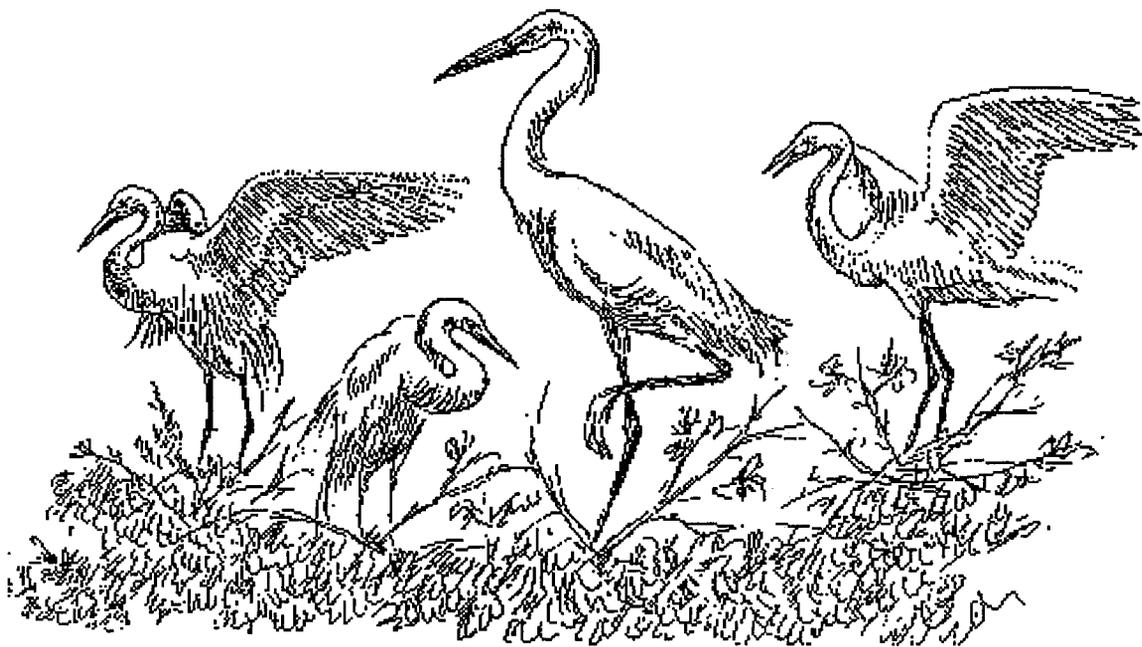
| <b>Total Priority Actions in CCMP</b> | <b>Actions Initiated Baseline (1999)</b> | <b>CCMP Actions Initiated This Year</b>                                     | <b>Total Actions Initiated This Year (2000)</b> | <b>Cumulative Total Initiated</b> | <b>Target of Actions Initiated by 9/2001</b> |
|---------------------------------------|--|---|---|-----------------------------------|--|
| 46                                    | 67                                       | 67<br>All but one CCMP action have at least minimal implementation progress | 67<br>Continuing implementation activities      | 67                                | 68   |

Indian River Lagoon Habitat Restoration

| <b>CCMP ACTION</b> | <b>Project Name</b>  | <b>Habitat Types</b>  | <b>Description of Project</b>  | <b>Action/ Activity</b> | <b>Partners</b>  | <b>Impact / Acreage</b> | <b>Project Costs</b>                         |
|--------------------|--|---|--|-------------------------|--|-------------------------|--|
| W-5                | Wetland and Impoundment reconnection / restoration                     | Coastal Wetlands (Impounded salt marshes & mangrove swamps) | Reconnection, breaching and restoring isolated wetlands impounded for mosquito control | Reestablishment         | SJRWMD<br>SFWMD<br>USFWS<br>NASA<br>Brevard Co.<br>Mosquito Cntr.<br>Volusia Co.<br>Mosquito Cntr.                     | 27,500 acres            | \$1.9 million (1991-2001)                    |
| W-6 & BD-3         | Restore Wetlands & Shorelines<br><br>Eradicate invasive exotic species | Wetlands & shorelines                                       | Exotic species removal of Brazilian Pepper and plantings of native red mangroves       | Rehabilitation          | SJRWMD<br>SFWMD<br>USFWS<br>NPOs<br>Volunteers   | 500 acres               | \$500,000 (1995-2001)                        |
| BD-2               | Acquisition of environmental endangered lands                          | Uplands Wetlands<br>Shoreline                               | Fee simple purchases<br>Conservation easements   | Protection              | SJRWMD<br>SFWMD<br>Florida CARL<br>USFWS<br>Volusia Co.<br>Brevard Co.<br>Indian R. Co.<br>St. Lucie Co.<br>Martin Co. | 52,600+ acres           | \$162 million (1994-2001)<br>Budget / Bonded |
| FSD-6              | Reduce the impacts of muck   | Benthic Seagrass<br>Surface waters                          | Environmental muck dredging in Crane Creek and Turkey Creek tributaries                | Restoration             | SJRWMD<br>SFWMD<br>FIND<br>USACE<br>Melbourne<br>Palm Bay  | ~445,000 c.y.           | \$3.3 million                                |



**SEVENTH YEAR WORK PLAN  
TO IMPLEMENT THE INDIAN RIVER LAGOON  
COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN  
FISCAL YEAR 2002 – 2003**



*Indian River Lagoon National Estuary Program  
525 Community College Parkway  
Palm Bay, FL 32909*

**APPROVED BY**

**THE INDIAN RIVER LAGOON BASIN ADVISORY BOARD**

May 22, 2002

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## ***SECTION 1. HIGHLIGHTS & INTRODUCTION***

The Indian River Lagoon Basin Advisory Board, as the National Estuary Program's Management Conference, continues to actively implement the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP). During the sixth year of post-CCMP implementation, the Advisory Board has continued to increase the momentum of projects and activities, and has maintained effective lines of communication and facilitation between the lagoon's management agencies, local governments and citizens.

The Advisory Board consists of representatives from the US Environmental Protection Agency (EPA); the Florida Department of Environmental Protection (FDEP); the St. Johns River Water Management District (SJRWMD); the South Florida Water Management District (SFWMD); the counties of Volusia, Brevard, Indian River, St. Lucie and Martin; the chairs of the Technical and Citizens Advisory Committees; the US Army Corps of Engineers (USACE); the National Aeronautics and Space Administration (NASA); the US Fish and Wildlife Service (USFWS); the US Department of Agriculture's Natural Resources Conservation Service (USDA/NRCS); the Florida Fish and Wildlife Conservation Commission (FFWCC); the Florida Inland Navigation District (FIND); and The Nature Conservancy (TNC).

Considerable progress has been achieved in the Program's ongoing efforts to implement actions within the CCMP during 2001 and 2002. The SJRWMD & SFWMD continue to work in unison collecting and managing technical data to develop Pollutant Load Reduction Goals (PLRGs) as a precursor to the setting of Total Maximum Daily Load (TMDL) allocations by FDEP, estimated in the lagoon in 2004-05. The water management districts, USFWS and local mosquito control districts continue to monitor reconnected impounded wetlands for wildlife habitat and water quality improvements, while working to reconnect additional impoundments. Local governments continue to actively pursue partnerships with the water management districts, FDEP and other agencies to implement stormwater retrofit and habitat restoration projects.

Intergovernmental coordination activities are reported to elected officials, agency managers and the public on basin-wide work being conducted by federal, state and local programs. The Marine Resources Council, under contract with the National Estuary Program, has hosted numerous regional lagoon quarterly citizen workshops. IRL Program staff continues to participate on localized or lagoon-wide resource management committees and in quarterly county stormwater working group meetings.

SJRWMD and SFWMD Environmental Sciences staff are finalizing updates to the Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan, as the state-water management district's ecosystem restoration plan and sister document to the IRLCCMP.

Successful state legislative funding appropriations from 2001 of Ecosystem Management Trust and Florida Forever funds provided approximately \$7 million to the SJRWMD for lagoon restoration and water quality improvement projects. This funding is being applied towards local government cost-share stormwater projects, stormwater management master plan designs, the reconnection of salt marsh mosquito impoundments, and continuing project assessment research and data collection for use in developing PLRGs.

A portion of this state funding, \$1.9 million, is designated for the St. Sebastian River Dredging Project. In 1999, a state legislative appropriation provided the engineering, diagnostic and characterization work for obtaining state and federal permits for muck sediment removal in the Sebastian River. A \$3.1 million appropriation in 2000, was provided to construct the spoil

disposal site and initiate muck removal. This project will provide immediate improvements in water quality and habitat in the Sebastian River system and the IRL. This project will also contribute to the implementation of future total maximum daily loads (TMDLs) applied to the Sebastian River.

SJRWMD is pursuing a state legislative funding package for Fiscal Years 2002-03, to secure project dollars for numerous stormwater retrofit projects throughout the watershed. This "Water Resources Restoration Initiative" is being considered by the state's 2002 Florida Legislature. The SJRWMD request total \$13.1 million, and the District has prioritized \$8 million of this total for the fiscal year to implement the re-diversion of excess surface water drainage from urban and agricultural lands, remove muck sediments through hydraulic dredging, treat surface waters through local and regional water resource protection projects and restore critical habitat.

The state and local partnership between the City of Palm Bay, SJRWMD, and the Florida Inland Navigation District resulted in the completion of the Turkey Creek dredging project, removing over 400,000 cubic yards of organic-rich muck from this major tributary to the lagoon, preventing the flushing of accumulated silt into the lagoon during storm events, enhancing water quality and seagrasses, and improving navigation in the creek.

As reported in the approved Indian River Lagoon National Estuary Program's Biennial Review, significant progress has been made in achieving the goals and objectives of the IRLCCMP. Each member of the Basin Advisory Board continues to devote substantial resources and energy towards implementation. As reported, it is estimated that 97 percent of the CCMP's priority actions are being realized at some level (either: fully, substantially or moderately) according to their established timeline. About 3 percent reported minimal or no implementation progress.

Over \$2.3 million dollars has been raised for implementation projects through the sale of the Florida Indian River Lagoon specialty license plate. This unique funding vehicle has provided project dollars for sediment traps, mangrove plantings, shoreline enhancements, muck dredging, impoundment reconnections and environmental education programs. The IRL License Plate ranks 11<sup>th</sup> in number of tags sold and 17<sup>th</sup> in revenue raised from among the 52 specialty plates offered in Florida.

The SFWMD continues to lead lagoon restoration efforts and CCMP implementation in the southern lagoon region. Partnerships between the SFWMD and St. Lucie have restored impounded mosquito marshes and constructed stormwater treatment projects. In Martin County, the SFWMD is continuing the implementation of the Stuart SWIM project, and has funded stormwater retrofits in cooperation with the county's stormwater utility program. The SFWMD in partnership with USACE has completed the IRL South Feasibility Study Plan and is pursuing congressional funding under WRDA 2002 to implement the Plan's recommended priorities.

The SFWMD is also working with the St. Lucie River Initiative to implement projects in this important estuary. Special state appropriations are being requested to implement projects in the St. Lucie as a result of the Restudy. The Florida Legislature appropriated \$4 million for the St. Lucie Issues Team in 2001 and SFWMD is requesting \$9 million in FY 2002-03.

Advocacy for lagoon restoration projects has increased through local, state and federal efforts. Public support for implementation of the CCMP continues to grow because of education and outreach activities. The use of informative multi-media outreach techniques including newsprint, hands-on educational displays, and printed materials are informing and educating the public and elected officials about CCMP implementation successes.

Overall, the IRL Basin Advisory Board continues to effectively implement the CCMP through enhanced partnership opportunities, improved communications and aggressive education and outreach activities. Of special note for the fifth year, is the budgeting of over 90 percent of the Federal EPA/NEP funds for implementation projects, with all salaries and benefits for staff being paid through the SJRWMD's Indian River Lagoon Program budget. This continuing support is a reflection of the solid foundation of cooperation existing between the managing agencies, and of the desire for successful implementation of the CCMP. The momentum achieved during the first six years of implementation will continue to grow as additional funding sources are identified, more stormwater projects are completed, and as more stakeholders are educated on the ecological and economic importance of restoring North America's Most Diverse Estuary System.

The following summary lists the recommended projects to be funded under this work plan with US EPA Section 320 funds and the non-federal matching dollars for the grant. This Program budget reflects the \$4 million increase in Congressional funding appropriations for EPA's National Estuaries Program, and results in a \$ 190,000 funding increase for the IRLNEP over last year's federal funding. This increase is a direct result of the advocacy efforts of the ANEP and the member NEP's around the nation.

**SUMMARY OF 2002 – 2003 WORK PLAN EPA FUNDING REQUEST**

|  |                     |
|--|---------------------|
| Post Dredge Assessment .....                             | \$ 69,000           |
| Citizens Volunteer Water Quality Monitoring Network..... | \$ 60,000           |
| CCMP Grants Writer.....                                  | \$ 64,000           |
| Taylor Creek Restoration Dredging.....                   | \$ 50,000           |
| Martin County Youth Education Project.....               | \$ 20,000           |
| IRL Library & Shoreline Project (MRC).....               | \$ 25,000           |
| Shoreline Restoration (ELC).....                         | \$ 15,000           |
| Public Information and Education .....                   | \$ 33,600           |
| Stormwater Implementation Projects .....                 | \$ 62,000           |
| Citrus BMPs.....   | \$ 40,000           |
| IRL Species Inventory (Smithsonian).....                 | \$ 35,000           |
| Operating, Travel Expenses, and Other .....              | <u>\$ 36,400</u>    |
|  | <b>\$ 510,000</b>   |
| SJRWMD match.....  | \$ 365,000          |
| SFWMD match (Cash and In-kind).....                      | \$ 45,000           |
| Local Government match (In-kind).....                    | <u>\$ 100,000</u>   |
|  | <b>\$ 510,000</b>   |
| ANS Grant Australian Spotted Jellyfish.....              | \$ 40,000           |
| IRLNEP & MBNEP in-kind .....                             | \$ 4,000            |
|  | <b>\$ 1,064,000</b> |

**SECTION 2. PROGRAM ACCOMPLISHMENTS AND TRANSFERABLE SUCCESS STORIES**

Fifty-one projects have been funded under the Program’s six implementation work plans since 1996. These projects range from the management of fresh/stormwater discharges, to wetlands protection; continuation of a grants writer consultant, water quality monitoring and improved biodiversity data management. The IRL Basin Advisory Board provides policy oversight and guidance for each project. This section provides a brief update on the innovative, ongoing or recently completed projects included within the post-CCMP implementation work plans. Section 3, provides a listing of other actions conducted by members of the Advisory Board that are not specifically referenced in the work plans, but provide additional insight into overall lagoon management activities and CCMP implementation. All of these projects demonstrate a strong commitment by the members of the IRL Basin Advisory Board for implementation action and outline future direction for the Program.

**2001-2002 WORK PLAN IMPLEMENTATION PROJECTS**

| Project   | Funding Source |        |        |       | TOTAL  | Completion Date | Deliverable  | Organization Responsible      |
|---|----------------|--------|--------|-------|--------|-----------------|--|-------------------------------|
|   | EPA/NEP        | SJRWMD | SFWMD  | LOCAL |        |                 |  |                               |
| <i>Action Plan</i>  |                |        |        |       |        |                 |  |                               |
| <u>MON-2(a) Year 6:</u><br>Citizens Volunteer Water Quality Monitoring Network  | 60,000         | 0      | 0      | 0     | 60,000 | Sep 2002        | IRL water quality data uploaded to STORET.   | Marine Resources Council      |
| <u>FI-1(c) Year 5:</u> CCMP Grants Writer/Facilitator                           | 44,000         | 0      | 0      | 0     | 44,000 | Jun 2002        | EPA 319 and other grant applications and awards for local governments  | Cape Canaveral Scientific     |
| <u>PIE-2(c) Year 3:</u> IRL Information Library & Shoreline Restoration Project | 25,000         | 0      | 0      | 0     | 25,000 | Sep 2002        | Centralized repository of IRL publications and resource materials. Exotic plant removal/shoreline habitat restoration.                 | Marine Resources Council      |
| <u>PIE4(a) Year 4:</u> Citizens Workshops                                       | 25,000         | 0      | 0      | 0     | 25,000 | Jan 2003        | Public awareness and education about IRL issues through quarterly workshops.   | Marine Resources Council      |
| <u>W-6(b) Year 6:</u> Shoreline Restoration with Mangrove Habitat               | 15,000         | 0      | 10,500 | 0     | 25,500 | Feb 2002        | Establishment and monitoring of fringing mangrove habitat (spanning over a mile) along shoreline from Jupiter Inlet to Merritt Island. | Environmental Learning Center |
| <u>PIE-2(b):</u> Public Information and Education                               | 20,000         | 0      | 0      | 0     | 20,000 | Sep 2002        | Development and distribution of IRL publications and other outreach materials.   | SJRWMD                        |

**2001-2002 WORK PLAN IMPLEMENTATION PROJECTS**

Continued

| Project   | Funding Source |         |        |         | TOTAL   | Completion Date | Deliverable   | Organization Responsible  |
|---|----------------|---------|--------|---------|---------|-----------------|---|---|
|   | EPA/NEP        | SJRWMD  | SFWMD  | LOCAL   |         |                 |   |   |
| <u>FSD-13</u> : Stormwater Implementation Projects  | 18,500         | 139,500 | 0      | 100,000 | 258,000 | Feb 2004        | Urban drainage system retrofits and stormwater master plans.  | Local governments within the IRL basin: Counties of Volusia, Brevard and Indian River; Town of Melbourne Beach, and cities of Satellite Beach, Fellsmere, Melbourne, Cape Canaveral, Rockledge, Cocoa, and Cocoa Beach. |
| <u>FSD-4</u> : Implementation of Best Management Practices (BMPs) in the Citrus Industry              | 20,000         | 0       | 0      | 0       | 20,000  | Aug 2003        | Citrus BMP implementation to reduce nutrient and suspended solid discharges to the IRL.                             | Institute of Food and Agricultural Sciences - University of Florida   |
| <u>BD-1(a) Year 3</u> : IRL Species Inventory & Relational Data Base                                  | 35,000         | 0       | 0      | 0       | 35,000  | Jun 2002        | Additional species reports included in the existing on-line IRL species inventory.                                  | Smithsonian Marine Station at Fort Pierce   |
| <u>DIMS</u> : Centralized IRL Data Base – EPA Supplemental Funds                                      | 20,000         | 0       | 0      | 0       | 20,000  | Jul 2004        | Comprehensive and centralized electronic data base for the IRL.   | National Aeronautics and Space Administration   |
| <u>DIMS</u> : IRL Pollutant Load Reduction Goals (PLRG) Data Base Management – EPA Supplemental Funds | 10,000         | 0       | 0      | 0       | 10,000  | Complete        | Working IRL PLR model running on upgraded Beowulf computer cluster at SJRWMD.                                       | SJRWMD  |
| <u>IM-1(b)</u> : Wetland Restoration (Impoundment Reconnection)                                       | 0              | 50,000  | 0      | 0       | 50,000  | 2005            | Restored wetlands and damaged by dragline ditching for mosquito control. Reconnected mosquito control impoundments. | SJRWMD, and Volusia, Brevard and Indian River counties.   |
| <u>SG-1</u> : Multi-Spectral Mapping of Seagrass and Water Quality in the IRL                         | 0              | 0       | 20,000 | 0       | 20,000  | Sep 2003        | Protocol and procedures for mapping seagrass and detecting water quality conditions using multi-spectral imagery.   | SFWMD   |

## ADVISORY BOARD IMPLEMENTATION FUNCTIONS

### *a. Technical Program Management*

The SJRWMD and SFWMD are leading development of the Pollutant Load Reduction (PLR) Model for the lagoon in order to set PLRGs or numerical targets for the reduction of nitrogen, phosphorous, dissolved organic matter, and/or suspended matter loadings. These PLRGs will provide the basis for the setting of future Total Maximum Daily Load (TMDLs) allowances. The development and use of the model is based on the premise that sufficient water clarity is needed to restore seagrasses - a major goal of the CCMP and SWIM plan, and that good water clarity can be achieved by the measured reduction of the loadings on some or all of the constituents stated above.

The PLR Model's usefulness will lie in its predictive power. Once the model is calibrated and verified for a full range of expected meteorological and hydrological conditions in the lagoon, it will then be able to describe the lagoon's response to any realistic combination of hypothetical conditions, man-made influences or management criteria. More specifically, the PLR Model will predict changes in light attenuation (water clarity) resulting from actions that cause changes in tributary discharges, nutrient loadings, sediment characteristics or other conditions in the Indian River Lagoon. Therefore, the model will be a useful tool in determining PLRGs and in allocating pollutant load reductions among the major loading sources in the lagoon's watershed.

Interim PRLGs have been presented for the Crane Creek and Turkey Creek basins. These preliminary goals provide local governments within these basin's water quality improvement targets for all types of discharges including non-point discharges of stormwater. Many local governments have expressed a willingness to meet PLRGs once established, but fear making sizable investments in stormwater management infrastructure improvements until targets can be provided. Until PLRGs are translated into TMDLs and/or incorporated into rule, compliance in meeting PLRGs will be largely voluntary. Furthermore, as management strategies are enacted to achieve PLRGs, the corresponding monitoring network will help gauge their effectiveness in improving water quality in the lagoon.

The seagrass preservation and restoration efforts of the IRL Program are being accomplished with the assistance of NOAA's Coastal Services' Center - Coastal Change Analysis Program (C-CAP). C-CAP helped to digitize and photo interpret 1996 seagrass maps that will be used in analyzing seagrass coverage changes. Regional watershed planning activities for the St. Lucie Estuary and Indian River Lagoon include projects to document historical and existing seagrass coverages through a combination of photo interpretation, mapping and ground truthing. This information is being used to determine changes in the abundance and distribution of critical components of the ecosystem due to human activities in the watershed, develop PLRGs for freshwater, total suspended solids and nutrients, and to predict potential recovery with the implementation of stormwater and water quality management options. To document existing seagrass bed locations and to gain an understanding of temporal changes in seagrass distribution, aerial photography of the entire lagoon is needed on a regular basis. The SFWMD is currently producing a map of Indian River Lagoon seagrasses based upon aerial photographs taken in April 1999.

The listing of Johnson's seagrass under the Endangered Species Act has provided greater protection for 10 areas designated as critical habitat for this unique species found only in the Indian River Lagoon, south of the Sebastian Inlet, and in Biscayne Bay. Johnson's seagrass grows from the intertidal zone down to subtidal depths of 12 feet, shallower and deeper than

most seagrasses in the lagoon, with a greater tolerance of temperature and salinity variations. Johnson's seagrass is the first seagrass species listed under the Act by the National Marine Fisheries Service.

Reconnection and monitoring of impounded estuarine wetlands continues to be a major cooperative effort between the SJRWMD, the US Fish and Wildlife Service, NASA, National Park Service and several Mosquito Control Districts. Since 1991, SJRWMD has partnered to reconnect over 18,750 acres of impoundments. When combined with reconnections made through mitigation and by other agencies, this represents 70% of the target of 33,000 acres. The SFWMD has assisted St. Lucie Mosquito Control District in reconnecting 4,800 acres of wetlands since 1987. The EPA grant award for the Merritt Island Wetlands Initiative will help to determine if the re-establishment of the hydrologic connection between impounded marshes and the lagoon can restore the ecological function of the impoundments to "native" marshes functionality.

**b. Project Management**

The SJRWMD has continued its outstanding support of the IRL Basin Advisory Board through continuing NEP Program sponsorship, contracts and procurement management, printing and computer services, administrative and operational support, and by providing significant annual non-federal program match. The SJRWMD incorporation of NEP staff positions into the District's budget has 'freed-up' federal dollars usually assigned for salaries for implementation activities. During FY 2001/02, the SJRWMD provided salary funding of approximately \$150,000, enabling the use of federal dollars for stormwater management projects in the lagoon.

The SFWMD has also continued its important financial and operational support for the Program. The invaluable assistance provided by the SFWMD's Martin/St. Lucie Service Center has benefited the outreach efforts of the IRL Program immensely by partnering in several educational events and exhibit displays. In 2001, the IRLNEP and SFWMD joined several local partners in supporting the construction of the Smithsonian Marine Ecosystems Exhibit at the St. Lucie County Marine Center in Fort Pierce. This exhibit provides public awareness and education about the diverse habitats and biological resources of the Indian River Lagoon to a wide audience of local citizens and Florida visitors attracted to the renowned facilities of the Smithsonian Institution.

In 2001, the IRL Advisory Board developed through a facilitated process the Board's mission and goals. Board members were selected for participation in the various committees, including the Lagoon Legislation Committee. The Legislation Committee will conduct lobbying activities in support of IRL CCMP implementation efforts via members whose positions permit them to engage in lobbying. It will develop a regional lobbying entity that coordinates the ongoing efforts of local governments, water management districts, and others for the benefit of the entire IRL watershed.

IRL Basin Advisory Board oversight of the program during the past year has included the review and approval of the CCMP Implementation Activity Report, the draft USACE/SJRWMD Project Management Plan for IRL North Feasibility Study, Other Entities' Actions, and IRL Program Office functions; and approval of IRL Legislative Funding Initiatives for FY 2002-03 and Letters of Support to the Chairs of the House and Senate General Government Appropriations Committees.

Additional activities supported by the Advisory Board include review of the 5-year Water Resource Restoration Initiative through the state legislative process; supporting the Congressional Reauthorization of Section 320 of the Clean Water Act granting authority for the NEP Programs; reviewing the findings from the study on Cost/Benefit Analysis of Wastewater Treatment and Treatment Options by Horsley and Witten, Inc.; and discussing potential alternative beneficial uses for spoil materials resulting from muck dredging projects.

**c. Intergovernmental Coordination**

The enhanced communication and cooperation established during the CCMP development process between agencies, local governments and other organizations involved in lagoon management are continuing through the activities of the IRL Basin Advisory Board. This NEP facilitated process provides coordinated program budgets for lagoon activities, and the oversight and setting of funding priorities for the lagoon in future fiscal year budget cycles.

IRL Program staff and Advisory Board members continue to participate in national, state and regional intergovernmental coordination conferences, meeting and presentations. In March 2001, several staff participated in the annual NEP Directors' meeting and associated ANEP coordination meeting in Washington to discuss common issues of concern, the relationship between EPA and ANEP, and data and information sharing. In November 2001, staff attended ANEP's Fall Meeting held in St. Pete Beach. Common issues addressed included the development of a national advertising campaign for ANEP promoting estuarine protection, NEP funding guidance, Implementation Review feedback, and EPA oversight of NEP project activities.

**d. Facilitation, Conflict Resolution and Consistency Review**

Several Army Corps of Engineers dredge and fill projects have been reviewed by staff for consistency with the goals and objectives of the CCMP. And numerous local governments have requested assistance in reviewing their Comprehensive Plan Evaluation and Appraisal Report (EAR) before they are submitted to the state for approval. Many local government's Comprehensive Growth Management Plans now include CCMP recommendations.

**e. Fund Raising**

The IRL Program has been very active in identifying and securing funding to support implementation of the CCMP. State legislative funding appropriations from 2001 provided \$7 million to the SJRWMD for lagoon restoration and water quality improvement projects, and \$4 million to SFWMD. This funding is being applied towards local government cost-share stormwater projects, stormwater management master plan designs, reconnection of salt marsh mosquito impoundments, and continuing project assessment, and data collection for use in developing PLRGs.

Over \$2.3 million has been raised for projects through the sale of the Florida Indian River Lagoon License Tag since 1995. This funding has been divided between the SJRWMD and SFWMD for restoration and education projects based upon the percentage of tag sales in each district's respective counties. Numerous stormwater retrofit projects, mosquito impoundment reconnections and environmental education outreach efforts have been supported through this innovative revenue source.

Implementation Project FI-1(a): CCMP - Grants Writer/Facilitator

The project has been supported by the IRL Program to assist local governments in meeting the challenges of financing CCMP implementation projects. The fifth year of work under this project has continued to demonstrate an ongoing desire by the lagoon area's municipalities, water control districts and counties to partner with state and federal agencies in implementation activities. Several local governments have utilized the services of this NEP consultant to identify new funding sources, prepare grant proposals and join with other partners to help implement CCMP recommendations. Through this project 32 grant proposals have been submitted since 1997, primarily for stormwater projects, with 24 grants awarded to date providing \$11.3 million in assistance for a total of \$63.6 million in project implementation. In 2001-2002, this consultant assisted five local governments in preparing five Section 319 nonpoint source stormwater grant applications and two State Revolving Fund loan applications, which have been awarded \$6.0 million totaling \$17.4 million in Lagoon projects. Other grant applications, including two to Department of Community Affairs' (DCA) Emergency Management Competitive Grant program and two to DCA's Emergency Management Preparedness and Assistance Trust Fund requesting \$700,000 to assist local governments with funding implementation efforts, have also been completed and are currently pending approval. This service to local governments will continue through a contract ending June 2002.  
Status: Ongoing (June 2002)  
Funding: \$176,350

**f. Advocacy**

In addition to the initiatives previously described, support for lagoon-related programs has also been generated through the Association of National Estuary Programs (ANEP). ANEP is the non-profit organization charged with coordinating and advocating for the 28 National Estuary Programs in their efforts to develop and implement CCMPs.

ANEP was instrumental in advocating for the reauthorization of Section 320 of the Clean Water Act granting authority for the National Estuary Program. Clarification on the use of Section 320 funds for implementation of CCMPs was granted and an increase in annual NEP appropriations through 2004 was authorized. ANEP is tracking congressional support for the appropriation of the increased NEP authorization in the U.S. Congress.

**g. Progress Reporting**

The second "Implementation Review" of the IRLNEP was submitted to EPA in March 2001. Comments from the review noted that the IRL has done a very good job on all aspects of CCMP implementation. It recognized the Program for the effective role it plays in preserving critical habitats through participating and facilitating land acquisition activities such as the IRL Blueway Acquisition Initiative. The Program was commended for achieving a three-fold increase in funding from FY 1999 to FY 2001 through the sponsorship of the SJRWMD, a dedicated source of revenue for implementation activities from local stormwater utility fees, and innovative funding strategies such as license tag sales. The Review identified as an important strength of the Program that IRLNEP staff are employees of the SJRWMD, which reduces turnover thus allowing seasoned staff to remain with the Program. The Program was encouraged to continue efforts for engaging the public and local industry in CCMP implementation activities. The next review of the Program will be on 2004.

**h. Education and Outreach**

The hosting of general public workshops, and the establishment of a IRL Resource Library and Research Center in cooperation with the MRC have been projects implemented to promote lagoon education and information benefiting residents throughout the watershed. IRL Program staff continue to make numerous presentations to civic and community organizations, man display booths at environmental festivals and sport fishing shows, and deliver quality educational programs throughout the region.

IRL NEP funding from the USEPA contributed to the construction of the Smithsonian Marine Ecosystems Exhibit at the St. Lucie Marine Center in Fort Pierce, which was unveiled in August 2001. This project represents a collaborative effort between St. Lucie County, the City of Fort Pierce, SFWMD, and the IRL NEP Program. The goal of the Marine Ecosystems Exhibit is to build public awareness and education about the diverse living resources of the Indian River Lagoon. The exhibit will foster a better understanding of the fragile marine ecosystems of the Lagoon and adjacent offshore waters, instilling a sense of responsibility and protection for these invaluable marine resources.

During FY 2001-02, a portion of the revenue generated from the sale of the IRL License Plate has helped fund the Marine Discovery Center in New Smyrna Beach, and the newly built Marine Science Center near Ponce Inlet. In previous years, License Plate funds provided for the improvement of educational exhibits at the Wabasso Environmental Learning Center, provided start-up funds for a Nature Wetlands Walk at the Brevard Zoo, and provided needed funding for signs at lagoon-side parks, publications and educational materials for distribution.

The IRL Program Office also continues to produce a quarterly newsletter of lagoon information and project updates, which is forwarded to over 8,200 subscribers nation-wide with over 3,000 additional copies distributed through local government agencies, environmental organizations, and public education events. The newsletter is also made widely available to the general public through the IRL web site (<http://www.sjrwmd.com/programs/Acquisition, Restoration, and Public Works/IRL Basin>).

Implementation Project PIE-2(a): Inform the public and governments about the resources of the IRL, the value of these resources and threats to the continued viability of these resources.

The successful implementation of the CCMP depends upon public support for actions included within the plan. Development of this support relies on the public's understanding of the values of the resources, the threats to their continued viability and the specific actions proposed to protect and enhance these resources. Educating the public about the IRL generates public support for management activities. Developing and distributing printed materials such as the quarterly Indian River Lagoon Update Newsletter, flyers, brochures, fact sheets and booklets is a primary way to insure that needed support is developed and implementation success stories are relayed to the widest possible audience. Current information can also be accessed on-line through the SJRWMD website (<http://www.sjrwmd.com>) and EPA's website through the Office of Water.

Status: Ongoing

Implementation Project PIE-2(b): Indian River Lagoon Resource Information Center and Shoreline Habitat Restoration Project.

This project is being performed under contract to the Marine Resources Council who has established an IRL Public Information Center as a multi-media information and research library to provide free and open access to research and education materials. This center is assisting students and citizens requesting information on the lagoon and includes the IRLSIS electronic database of lagoon publications. Additionally, volunteer education and outreach are being performed through the shoreline habitat restoration project where invasive, exotic nuisance plants are removed and replantings with native vegetation are conducted.

Status: Ongoing (September 2003)

Funding: \$24,900 Year 3; Total \$ \$73,100

Implementation Project PIE-3(c): Adopt a Drop – be river friendly Program

This program was developed and is being implemented by the St. Lucie River Initiative with funding support from the SFWMD. Adopt a Drop is an educational program informing homeowners and businesses how they can prevent pollution through stormwater runoff by using pesticides and fertilizers sparingly, avoid over-watering, and never pouring petroleum products into the ground or river.

Status: Ongoing

Implementation Project PIE-4(a): Increase public and government involvement in restoration activities.

The IRL Program continues to work with the Marine Resources Council to host a series of ongoing, quarterly public information workshops. These workshops are held throughout the lagoon to inform residents and elected officials about restoration projects, generate feedback from citizens, and improve the lines of communication between the residents and water managers. A 'State of the Lagoon' conference or similar regional estuaries conference will be held in the Fall/Winter of 2002.

Status: Ongoing (January 2003)

Funding: \$25,000 Year 2; Total \$47,226

## **CCMP ACTION PLAN PROJECTS**

### **a. *Biological Diversity***

Implementation Project BD-1(a): IRL Species Inventory & Relational Data Base

The Indian River Lagoon Species Inventory has been developed by the Smithsonian Marine Station and is up and running at [www.sms.si.edu](http://www.sms.si.edu). Smithsonian has created a species master list with extensive cross-referencing, conducted an exhaustive literature search on selected species with bibliographic documentation and accumulated several valuable data bases for incorporation into the inventory including: marine fisheries recreational and commercial landings from five counties surrounding the lagoon over the past decade and commercial and fisheries regulations. The US Fish and Wildlife Service has also provided a current federal listing of threatened and endangered species for the five lagoon counties. Under the renewed contract to continue this project, Smithsonian is updating and expanding the inventory to accommodate a suite of ecological and taxonomic information, which will store, sort, retrieve, and format data quickly, efficiently and automatically. This project was initiated as a result of an identified lack of documentation available to lagoon managers in developing strategies for the protection of biodiversity and to assist in the broader scientific understanding of diversity, as well as increasing educational and public awareness of the biological value of the lagoon.

Status: Ongoing (April 2002)

Funding: \$33,000 Year 5; Total \$85,929

Implementation Project F-3: Oyster Restoration

By definition, an estuary is a place where fresh and salt water meet and mix. Historically, salt water entering the SLE varied due to the ephemeral nature of the inlets along the barrier island. There were periods of time when the SLE was predominantly fresh. As the area became settled, inlets were stabilized and major canals were constructed for drainage. This allowed an increase in population along the coast as well as in the western portion of the counties. The area, which originally drained slowly by overland flow into the SLE, increased in size, and subsequently drainage increased. As a result, the amount, quality and timing of fresh water entering the system was drastically altered. Certain estuarine species such as the American oyster, *Crassostrea virginica*, have been negatively impacted. Woodward-Clyde Consultants (1998) discussed historical and 1998 oyster distribution and suggested a loss of about 250 acres of oyster habitat since the 1940's. In order to undertake a restoration project in the SLE, basic biological information must be obtained for the local oyster population. This project will provide basic information needed to reestablish and enhance oyster beds in areas with the greatest potential for success. The American oyster, is considered an indicator of a healthy estuarine system by the SFWMD and a Valued Ecosystem Component. Evaluating this species is critical in determining water management practices.

Funding: \$1,148,000

**b. Wetlands Protection**

The SJRWMD was awarded a grant by EPA Region IV in 1999, under the State Wetlands Protection Development Program for \$550,000 to fund an intensive study of wetland functions regarding nutrient cycling, sediment biogeochemistry, organic matter accumulation, and the value of wetlands in the regulation of water quality in the lagoon. The goal of this project is to determine if re-establishment of the hydrologic connection between impounded marshes and the lagoon can restore the ecological function of the impoundments to a state similar to that of "native" marshes, and to determine how continued hydrologic management will affect the restoration process. This project is being carried out with the assistance of the USFWS at Merritt Island National Wildlife Refuge, NASA at Kennedy Space Center, and local mosquito control districts in Brevard and Volusia Counties.

Implementation Project W-5: St. Lucie County Mosquito Impoundment Reconnection

Big Mud Creek suffers loss of thousands of fish each year due to seasonal turnover of hypoxic/anoxic bottom waters. A Circulation enhancement/aeration device is proposed to be installed to alleviate this recurring problem. The device would be placed on a pier structure to be located immediately west of A1A at the Big Mud Creek Bridge. Water quality, sediment quality, and benthos will be monitored before installation and during operation of the flow enhancement/aeration. Additional units would be installed in adjacent waters contingent upon meeting target objectives.

Funding: \$130,000

Implementation Project W-6(a): Restore Wetlands and Shorelines

The IRL mangrove planting program has continued to add new sites for the fifth year of operation, and maintain existing sites for the 'encased' mangrove planting method. The successful partnership forged between the SJRWMD, SFWMD, USFWS and the Environmental Learning Center and numerous civic organizations and volunteers, continues to enhance shoreline habitat throughout the southern lagoon region. Identification and ranking of future potential project sites to judge their probability of success is ongoing. Agencies, local governments, developers seeking mitigation sites, and groups seeking a public service project have participated in this successful habitat enhancement program.

Status: Ongoing (February 2003).

Funding: 25,500 Year 8; Total \$116,300

Implementation Project W-6(b): Pelican Island National Wildlife Refuge Restoration

The USFWS proposed a partnership project with the SJRWMD and FIND to protect and restore Pelican Island, the nation's first wildlife refuge, a national historic landmark, a national wilderness area and a wetlands of international importance. Pelican Island has been impacted by the wave energy of boat traffic along the Intracoastal Waterway resulting in the erosion of approximately 3 acres of habitat. The goal of the project was to arrest the erosion through the planting of red mangroves and saltmarsh cordgrass and the construction of a coquina rock/shell material wave break to provide additional protection and habitat for foraging shorebirds. The project was successfully completed in February 2001. While PINWR staff continue to monitor the effectiveness of the project, other techniques are under consideration which will afford additional protection to the refuge.

Status: Construction and Plantings Complete, Monitoring Ongoing

Funding: \$115,600

Implementation Project IM-1(a): Wetland Restoration (Impoundment Reconnection)

This project is implementing wetland restoration and impoundment reconnections. Funds are used to purchase culverts and pumps for the reconnection and management of impounded wetlands, to restore impoundment shorelines to near pre-impoundment condition, to restore wetlands damaged by dragline ditching for mosquito control, and other wetland restoration efforts.

Estimated Time for Completion: 2005

Budget: \$ 100,000

Funding Sources: SJRWMD

**c. Land Acquisition**

The SJRWMD has acquired over 52,600 acres of environmentally sensitive lands within the lagoon watershed. Additional acreage has been acquired in northern Brevard County to assist with the Chain of Lakes Regional Stormwater Park near Titusville, land within the Sebastian River Buffer Preserve, and acquisition of 200 additional acres in Sebastian for the creation of stormwater detention systems.

The Nature Conservancy has helped acquire the Inlet Groves Property under the Blueway Program, in partnership with Brevard County. This acquisition includes 290 acres in Snagg Point with 1.7 miles of lagoon shoreline and 50 acres of impounded marsh habitat to be reconnected to the lagoon. Martin County's one-cent sales tax referendum for land acquisition and capital projects was used to purchase 3,100 acres in the Atlantic Coastal Ridge Ecosystem.

Additional acquisition opportunities will be pursued under the Blueway Program and in conjunction with the requirements of the IRL South and North Feasibility Studies with the USACE.

**d. Fresh/Stormwater Discharges**

The IRL Program has been very active in partnering with numerous local governments during CCMP implementation to address freshwater and stormwater discharges to the lagoon. The SJRWMD's successful competitive local government cost-share program has been administered since 2000, awarding over \$1.6 million in district, license plate and NEP funding to twenty-one projects totaling over \$12.9 million in stormwater retrofit project work. These projects include constructing stormwater detention systems in Port St. John, Merritt Island and northern Brevard County in cooperation with Brevard County; stormwater detention and erosion control projects with the City of Palm Bay and Indian River County; stormwater master planning with the City of Sebastian, the Town of Melbourne Village, Indian River County, and the Fellsmere Water Control District; surface water treatment systems in Gifford and Roseland in partnership with Indian River County, and the cities of Satellite Beach and New Smyrna Beach; and various water quality improvement projects with other municipal and county stormwater utility programs.

Stormwater master planning in cooperation with SJRWMD, Brevard County and the City of Melbourne is complete for the 16,000 acre Crane Creek/Hickory Ditch sub-basin. The Cities of Satellite Beach and Palm Bay have also completed master planning efforts for their cities with the assistance of the IRL Program. FDEP has provided over \$27.2 million in low interest loans to municipalities within the lagoon watershed for construction of stormwater and wastewater facility improvements since 1996 (nearly \$50 million since 1994).

The environmental muck dredging of Turkey Creek, which started in 1999 and was completed in 2001, removed over 400,000 cubic yards of organic-rich muck sediment from the creek's bottom. This cooperative project between SJRWMD, FIND, and the City of Palm Bay will reduce the flushing of these muck deposits into the lagoon during storm events, thereby increasing water quality and promoting the reintroduction of seagrasses into the area.

The SJRWMD also assisted the City of Palm Bay in implementing the related middle-reach sand delta navigation dredging project within the creek, which removed approximately 60,000 cubic yards of accumulated sand.

The SJRWMD has initiated the St. Sebastian River dredging project and will begin disposal site construction during the spring of 2002. The determination of muck volume and characterization of sediments for the St. Sebastian River indicated that an estimated 2 million cubic yards of

sediments may need to be dredged through this project based on available funding. In St. Lucie, the planning phase for Taylor Creek's dredging is near completion and construction is scheduled to begin during the summer of 2002.

Implementation Project FSD-3(a): Stormwater Utility Implementation for Cape Canaveral

In September 2000, the City completed and adopted its Stormwater Master Plan. This project was awarded funding under the local government cost-share program to create a Stormwater Utility for the City of Cape Canaveral. Stormwater Utility assessments will be used for the construction of BMPs identified in the City's Stormwater Master Plan. These BMPs include detention ponds with aeration fountains, stormwater reuse ponds, and baffle boxes.

Status: Ongoing (October 2002)

Funding: \$73,500

Implementation Project FSD-3(b): Stormwater Master Plan Development for Melbourne Beach

At several locations in the Town of Melbourne Beach, streets and yards have been affected by flooding and homes have experienced property damage due to stormwater collecting at the end of cul-de-sac developments. Funded under the competitive local government cost-share program, this plan will address flood protection and remediation, as well as, retrofitting for water quality treatment of all the Town's outfalls. Projects will reduce stormwater pollution with target pollutant load reductions of 50%.

Status: Ongoing (March 2002)

Funding: \$60,746

Implementation Project FSD-3(c): Stormwater Master Plan Development for Melbourne Village

Funded under the local government cost-share program, this stormwater master plan will assess the needs for stormwater improvements in the Town of Melbourne Village and identify specific drainage and water quality treatment opportunities within the Crane Creek basin. The project will reduce flooding at problem areas and provide water quality treatment. Stormwater management options and BMPs will be selected to decrease sediment and nutrient loadings and excessive freshwater discharges to Crane Creek and the IRL.

Status: Scheduled for March 2002-November 2002

Funding: \$38,800

Implementation Project FSD-3(d): Stormwater Master Plan Development for Fellsmere Water Control District East, Master Drainage Plan

This project was selected under the local government cost-share program to develop a stormwater master plan for the eastern portion of the Fellsmere Water Control District. The Plan will include an inventory of major structures, cross sections of drainage canals, a hydrologic model (AdICPR) of the system, and will identify BMPs to improve water quality and reduce flooding within the District. It will identify practical stormwater treatment retrofit projects that can be constructed on presently vacant land, mostly under private ownership. Thus, the plan will prioritize acquisition of those parcels and provide a stormwater BMP implementation schedule.

Status: Scheduled for May 2002-March 2003

Funding: \$160,800

Implementation Project FSD-3(e): Water Quality Model, Phase 3

The water quality model that was developed in Phase I & II will be extended south to include Jupiter Inlet/Loxahatchee River. In phase III, the model will be applied to pollution reduction target study and the establishment of minimum flows and levels and total maximum daily load. The project will be a multiple year contract and the \$80,000 in SFWMD FY2001 budget can fund the first stage of the project only. At the first stage the consultant will review the field data that SFWMD has collected and have a preliminary model calibrated. Tasks: (1) applications of the model that was calibrated in the first stage; (2) model improvements; (3) additional data collection if such needs are identified during data review; (4) extension of the model to Fort Pierce Inlet and Jupiter Inlet.

Funding: \$260,000

Implementation Project FSD-6(a): Reduce the impacts of muck in the IRL – Turkey Creek Dredging  
Environmental muck dredging in Turkey Creek was completed in 2001, removing over 400,000 cubic yards of sediment from the creek bottom over a two- year period. This cooperative project between SJRWMD, FIND, and the City of Palm Bay will reduce the flushing of muck deposits into the lagoon during storm events, thereby increasing water quality and promoting the reintroduction of seagrasses into the area. This project, similar to the successful Crane Creek dredging project in 1998, is demonstrating the value of muck removal and assessing management methods for possible application toward other tributaries and impacted areas in the lagoon.

Status: Complete

Funding: \$5,923,000

Implementation Project FSD-6(b): Reduce the impacts of muck in the IRL –  
St. Sebastian River Dredging Phase I

In 1999, the state legislature appropriated \$300,000 to FDEP for the SJRWMD to conduct a St. Sebastian River Muck Deposit Assessment and Management Project. This project assessed the present location, extent, depth, and volume of muck in the St. Sebastian River; characterized the physical and chemical components of this sediment; identified appropriate muck management (spoil) sites; and developed and analyzed alternative muck removal project designs with cost estimates with the final goal of receiving a noticed general permit to begin project construction. In 2000, the state legislature appropriated \$3.1 million for construction and dredging, and in 2001 the SJRWMD allocated an additional \$1.9 million.

Status: Ongoing

Funding: \$5.3 million

Implementation Project FSD-6(c): Taylor Creek/C-25 Canal Restoration Project

The Taylor Creek/C-25 Canal Restoration Project involves the dredging of Taylor Creek from the C-25 spillway structures, and the Ft. Pierce Farms C-1 Canal spillway structures to the IRL. The project will involve the removal of approximately 210,000 cubic yards of dredged material to restore Taylor Creek to its original design depth. Over the last 50 years, fine-grained, organic silt sediments have accumulated in the creek to a depth of about 6-7 feet deep in the center channel. Additionally, the project will evaluate the removal of muck sediments from an area approximately 1,000 feet west of each spillway structure, and the respective north and south banks of the canal.

Status: Ongoing (2004)

Funding: (EPA/NEP \$188,000 FY99, FL Seaport Transportation & Economic Development Council \$1,400,000, SFWMD \$1,100,000, St. Lucie County \$650,000, FIND \$700,000)

Implementation Project FSD-10: Implementation of Surface Water Quality and Quantity BMPs for Indian River Citrus

Widespread concern about water quality in the St. Lucie Estuary has created considerable consensus about the need for improving water quality. Since citrus production is a major land use (120,000 acres) within the estuary drainage basin, Indian River (IR) citrus growers decided to develop proactive best management practices (BMPs) to reduce their contribution to water quality problems. IR growers worked in collaboration with the University of Florida, FDACS, SFWMD, FDEP, and other concerned citizens to develop a process for identifying appropriate practices and together have developed a manual describing these BMPs. The BMPs that have been developed should significantly decrease citrus industry contributions of pesticides, nutrients, water volume, sediments, and aquatic weeds into surface waters. A coordinated program of educational events to make growers aware of these BMPs has been designed and is ongoing, but widespread and rapid implementation is only likely if a team, committed solely to BMP implementation and quality assurance, is coupled with cost-sharing funds to help growers implement these often costly practices.

Funding: \$3,480,685

Implementation Project FSD-12(a): Ten Mile Creek

Ten Mile Creek is the first CERP-type project to be constructed in the Treasure Coast area. It is designated as a Critical Restoration Project, and is located west of the Florida Turnpike and south of SR 70 on Ten Mile Creek, the headwaters for the North Fork of the St. Lucie Estuary. This 900-acre stormwater retention and treatment area is a joint project between the SFWMD and USACE. The facility will allow flexibility in the basin relating to storing peak flows during the wet season, and providing a base flow during the dry season to the North Fork of the St. Lucie River. Although it is on a quicker time schedule, Ten Mile Creek will be incorporated as an IRL Restoration Feasibility Study component.

Status: Ongoing (Implementation to begin Fall 2002)

Funding: \$30 million (SFWMD \$14,822,000, USACE \$15,178,000)

Implementation Project FSD-12(b): C-23 and C-28 Basin Retrofit

The Canals 23 and 28 Basin Retrofit project will provide water quality treatment for the entire interconnected basin (1,400 acres) of the North St. Lucie River Water Control District Canals 23 and 28, which discharges to the North Fork of the St. Lucie River. In FY 2001-02, weir type spillways were constructed at the outfalls of both of these canals to provide a measure of water quality treatment of the drainage basin. The cost for the construction of these water control structures is \$346,000. The second phase will be to build stormwater retention ponds to provide the full amount of water quality treatment. Status: Pond design is currently in the preliminary design phase at a cost of \$51,700. No construction estimates have been determined.

Funding: \$929,000

Implementation Project FSD-12(c): C-24 Bank Stabilization

This project involves the stabilization of approximately 4,000 linear feet of the south bank of the C-24 canal, beginning at the canal's intersection with I-95 and extending westward. This section of the canal bank exhibits significant erosion and sloughing, thus increasing the sediment load within the canal and downstream to the St. Lucie River. This project proposes to stabilize the canal bank through standard engineering practices, by reshaping the canal bank, installing rip rap and or aquatic stabilizing vegetation at the toe of slope, then placing filter fabric or other such geotextile material and sodding the upper slopes to prevent continuous erosion and sloughing of the bank, thus reducing sediment load to the canal.

Funding: \$576,489

Implementation Project FSD-12(d): North Fork Restoration

This project consists of feasibility planning for reconnecting wetlands and oxbows within the floodplain of the N. Fork St. Lucie River that are currently isolated (partially or completely) from the river's main branch because of historical dredging. These wetlands are crucial for water filtration, nutrient uptake, habitat for juvenile aquatic animals, and the survival of native oligohaline communities. Some areas (roughly 9 miles of shoreline) have been identified with dredge spoil deposition in need of breaching. Oxbows currently cut off from the river should be reconnected. Topographic surveys are needed to plan reconnection efforts. Also, surveys including coring must be conducted to elucidate the potential for additional shoreline spoil deposition in questionable areas.

Funding: \$420,270

Implementation Project FSD-13(a-1): Stormwater Treatment Implementation in Palm Bay

This project includes stormwater retrofits for two sub-basins within Palm Bay. Basin 1 incorporates BMP construction to improve water quality treatment, and reduce peak flows, flooding and loadings to the IRL. The construction of a 1.5-acre detention pond, sediment trap and culvert installation of an open ditch running through a auto salvage yard will provide a treatment train to substantially alter the current untreated conveyance system. Basin 13, will construct a detention pond, stabilize and expand the conveyance canal for additional retention before release to Turkey Creek. Water quality monitoring will be performed for both retrofits to determine the levels of pollutant reduction achieved.

Status: Ongoing (April 2002)

Funding: \$540,000

Implementation Project FSD-13(a-2): Stormwater Treatment Implementation in Palm Bay Perimeter Canal Rehabilitation, Phases I and II

This project has received two grants under the competitive local government cost-share program to rehabilitate the Perimeter Canal, which provides stormwater drainage for 250 acres in the City of Palm Bay and additional 200 acres in the Town of Malabar. The Canal has been identified as the largest single non-treated source of sediments to lower Turkey Creek. Phase I of the project installed a baffle box at the outfall to Turkey Creek to reduce sediments in the stormwater outflow, and provided bank stabilization along a major section of the canal. Phase II will construct a treatment pond in the upstream section of the canal, install a weir to control flows, and conduct further bank stabilization.

Status: Phase I complete (May 2001). Phase II scheduled for April 2002-April 2003.

Funding: Phase I \$290,000. Phase II \$97,000. Total \$387,000.

Implementation Project FSD-13(a-3): Stormwater Treatment Implementation in Palm Bay PMU 38/40 Stormwater Improvements

This project was selected for funding under the competitive local government cost-share program to correct flooding and water quality problems associated with stormwater flows from the PMU 38/40 subdivision. It will divert peak flows from the subdivision to C-78, and will modify this canal to accommodate the additional flows. Stormwater runoff treatment will be provided by a series of three ponds within the subdivision. The project is estimated to reduce annual pollutant loadings to Turkey Creek by up to 75,615 pounds of TSS, 969 pounds of TN, and 244 pounds of TP.

Status: Scheduled for March-November 2002

Funding: \$46,000

Implementation Project FSD-13(a-4): Stormwater Treatment Implementation in Palm Bay Turkey Creek Subdivision Stormwater Improvements

Funded under the competitive local government cost-share program, this project will improve the City's stormwater drainage system by providing treatment for outfalls from Turkey Creek subdivision, reducing flooding and erosion along Mandarin ditch, and obtaining field data on the suitability of various BMPs for future implementation in the City.

Status: Scheduled for April 2002 – April 2003

Funding: \$298,000

Implementation Project FSD-13(b-1): Cocoa Beach Brevard Ave. Bioretention System

This project was awarded funding under the local government cost-share program to construct a 1,350 foot linear landscape retention area to treat 2 acres of city road runoff.

Status: Ongoing (April 2003)

Funding: \$48,592

Implementation Project FSD-13(b-2): Stormwater Treatment Implementation in Cocoa Beach Second Street South Sediment/Oil and Grease Trap

This project was awarded funding from IRL License Plate revenues to construct a baffle box with oil and grease removal at the intersection of Second Street South and Brevard Avenue in downtown Cocoa Beach. This water quality retrofit will treat runoff from an 83-acre watershed. Presently this runoff flows directly into the Brevard/Sunset canal that is directly connected to the Banana River. This canal is documented as the city's worst for water quality due to high pollutant quantity and rapid rate of discharge. This BMP will reduce both adverse factors using an offline system that stores the captured pollutants away from the high flows, thereby minimizing the resuspension and discharge of pollutants.

Status: Ongoing (September 2002)

Funding: \$71,200

Implementation Project FSD-13(b-3): Melbourne Beach Stormwater Improvements, Urban Storm water Correction and Improvements for Anchor and Pelican Keys

The project was awarded IRL License Plate funding to capture stormwater runoff from a 6.4-acre drainage basin in the Town of Melbourne Beach and route the water through baffle boxes and exfiltration systems, reducing the sediment load and untreated stormwater volume flowing from Pelican and Anchor Keys into the IRL. Presently, there are no stormwater treatment facilities in these drainage areas and no stormdrain pipes to convey water from the end of cul-de-sacs to the canal, so stormwater runoff reaches the canals by overland flow, causing considerable erosion and seawall collapse. Pollutants entering the canals will be reduced at both Anchor and Pelican Keys by creating a stormwater treatment train.

Status: Ongoing (July 2003)

Funding: \$139,438

Implementation Project FSD-13(c): Stormwater Treatment Implementation City of New Smyrna Beach – East Circle Culvert Repair and Water Quality Retrofit

Funded under the competitive local government cost-share program, this project will replace an existing collapsed culvert and provide retrofits upstream of the culvert to improve water quality in the north Mosquito Lagoon. Because of the severely restricted capacity of the culvert, there is periodic flooding of East Circle Street and an adjacent parking lot. Retrofits will add a retention swale with an overflow inlet and a short section of exfiltration trench connecting the overflow inlet to the existing street inlet.

Status: Scheduled for June 2002-March 2003.

Funding: \$60,960

Implementation Project FSD-13(d-1): Stormwater Treatment Implementation in Brevard County

This project was selected under the competitive local government cost-share program to construct a stormwater weir at Kennedy Point Marina, located just south of the City of Titusville. This weir will collect sediments from a 320-acre drainage basin, with regular maintenance and monitoring to be performed by the county.

Status: Ongoing (April 2002)

Funding: \$110,000

Implementation Project FSD-13(d-2): Stormwater Treatment Implementation in Brevard County Channel Stabilization

This project was selected under the competitive local government cost-share program to stabilize the banks of Hickory Ditch along Crane Creek in the City of Melbourne. This section of channel extends from its confluence with Crane Creek south approximately 700 feet, discharging into Crane Creek approximately 5,000 feet upstream of the Indian River Lagoon. The channel section has severe side slope erosion and contributes large quantities of sediment to Crane Creek and the Lagoon. The project will demonstrate the use of geoweb confinement systems and erosion control mats as Best Management Practices.

Status: Ongoing (September 2002)

Funding: \$148,000

Implementation Project FSD-13(d-3): Stormwater Treatment Implementation in Brevard County Chain of Lakes - Phase I

This project was selected under the competitive local government cost-share program to provide first flush treatment from an 850-acre watershed, reducing pollutant loadings to the Indian River Lagoon associated with untreated stormwater runoff from the upstream drainage area. Phase I of the project will construct three detention facilities totaling approximately 22 acres in surface area and provide additional crossdrains under U.S. Highway 1 and the Florida East Coast Railroad.

Status: Ongoing (June 2003)

Funding: \$3,005,000

Implementation Project FSD-13(d-4): Stormwater Treatment Implementation in Brevard County  
Merritt Island Airport Pond

This project was selected under the competitive local government cost-share program to construct a regional detention pond at Merritt Island Airport that will provide stormwater treatment for a 190-acre watershed. In addition, approximately 0.6 acres of highly distributed marsh on the west side of the pond will be enhanced by removing Brazilian peppers and re-establishing native species. This will be a cooperative effort with the Merritt Island Airport, which will donate an easement for the property.

Status: Scheduled for June 2002-February 2005

Funding: \$440,000

Implementation Project FSD-13(e-1): Stormwater Treatment Implementation in Indian River County

This project includes two water quality improvement cost-share agreements with Indian River County's Public Works Department. The first project is the Gifford area stormwater retrofit to construct a 4.5-acre detention pond and conveyance swale to provide flood protection, erosion control and water quality treatment in an area of low income homes north of Vero and just west of the Lagoon. The second project is for the construction of a wet detention pond and control structure in the Roseland area to reduce frequent and severe flooding within the natural slough which drains to the St. Sebastian River.

Status: Ongoing (October 2002)

Funding: \$580,000

Implementation Project FSD-13(e-2): Stormwater Treatment Implementation in Indian River County

This project also includes two water quality improvement cost-share agreements with Indian River County's Public Works Department. The first project is construction of the Vero Lakes Estates Stormwater System Retrofit to reduce loadings from a 1,461-acre subdivision draining into the South Fork of the St. Sebastian River. The second project is the Wabasso Causeway Park Improvement Project to reduce erosion and stabilize the shoreline along the causeway. This project is complete.

Status: Ongoing (July 2003)

Funding: \$1,232,180

Implementation Project FSD-13(e-3): Erosion Control and Stormwater Treatment in Indian River County  
Roadway Paving and Drainage Improvements

This project will pave approximately 7.2 miles of roads that drain directly or indirectly into the IRL, amounting to nearly 21 acres of land area that will no longer contribute fine suspended solids to stormwater runoff entering the IRL. Another 40 acres will receive improved stormwater treatment through the construction of grass swales or other treatment systems. It is estimated suspended solid loadings to the lagoon may be reduced by up to 1,985 tons annually.

Status: Scheduled for January 2002-November 2003

Funding: \$3,449,980

Implementation Project FSD-13(f): Stormwater Treatment Implementation in Titusville

This project will construct a treatment train throughout the Garden Street Basin including swale improvements, check dams, inlet skimmers, and a wet detention pond in this highly urbanized basin.

Status: Ongoing (June 2003)

Funding: \$1,116,360

Implementation Project FSD-13(g-1): Stormwater Treatment Implementation in Cocoa

The City of Cocoa was awarded a FY'99 Section 319 nonpoint EPA grant to construct an underground stormwater utility retrofit park, east of the historic Cocoa Village area. The IRL Program is participating with the City in this project to re-route runoff from the drainage system and capture it for treatment and subsequent reuse. The City has constructed three sediment traps within the system to provide treatment before the stormwater is collected in the underground system and then pumped to the wastewater treatment plant for additional treatment and reuse.

Status: Complete

Funding: \$364,900

Implementation Project FSD-13(g-2): Stormwater Treatment Implementation in Cocoa Florida Avenue Rockledge/Cocoa Stormwater Facility

This project represents the City of Cocoa's part of a joint project with the City of Rockledge to collaboratively take control of a natural low point on their border. The two municipalities finalized the purchase of a parcel of land for a stormwater treatment facility in December 2000. Currently, untreated runoff from this watershed discharges to the Indian River Lagoon during any substantial rainfall event. Obtaining and designating this site as a future stormwater treatment facility provides a highly feasible retrofit for approximately 45.8 acres between both municipalities. This project was awarded IRL License Plate funding for the engineering design and construction of conveyance facilities from the City of Cocoa to the site of the new stormwater storage basin.

Status: Ongoing (March 2002)

Funding: \$46,170

Implementation Project FSD-13(h-1): Stormwater Treatment Implementation in Satellite Beach

This project was funded under the local government competitive cost-share program to install stormwater inlet protectors for 30 of the city's inlets along its canal-front neighborhoods. Citizen volunteers will assist the city in maintaining and monitoring the debris collected in these protectors.

Status: Ongoing (March 2002)

Funding: \$12,600

Implementation Project FSD-13(h-2): Stormwater Treatment Implementation in Satellite Beach Jamaica Boulevard Stormwater Diversion

Funded under the local government competitive cost-share program, this project will intercept and treat stormwater from 201 acres of the DeSoto Parkway watershed by creating three ponds (with associated connections and control structures) for wet detention and percolation of runoff. It will use BMPs to address stormwater quality problems and flooding in Jamaica Boulevard and DeSoto Parkway sub-basins.

Status: Ongoing (February 2004)

Funding: \$646,700

Implementation Project FSD-13(h-3): Stormwater Treatment Implementation in Satellite Beach Modular Filtering Stormwater Inlets

This project will install modular stormwater inlet structures, incorporating skimmer baskets in paired inlet boxes under grates in curbing at ten intersections in the City. It will address chronic maintenance deficiencies and lack of stormwater treatment associated with existing stormwater inlets. The project will improve water quality by removing an estimated 1,800-3,600 pounds of suspended solids and debris annually from the City's stormwater runoff directly discharging into the Banana River.

Status: Scheduled for July 2002-March 2003

Funding: \$61,300

Implementation Project FSD-13(h-4): Stormwater Treatment Implementation in Satellite Beach Grant Avenue Baffle Box

This project will install a baffle box to treat stormwater from 96 acres of the City's 139-acre Grant Avenue drainage sub-basin before discharging into the Banana River. Baffle box design improvements will facilitate removal of fine material and prevent water in the inlet and outlet pipes from flowing into the box during maintenance cleaning. This baffle box will remove approximately 14 tons of sediment annually from stormwater entering the River.

Status: Scheduled for July 2002-March 2003

Funding: \$52,100

Implementation Project FSD-13(i): City of Cape Canaveral Stormwater Pilot Test

This project was selected under the local government competitive cost-share program to construct a stormwater control pilot system to pre-treat and divert runoff into the city's wastewater treatment plant to augment the production of reclaimed water.

Status: Construction complete, monitoring ongoing (March 2002)

Funding: \$41,800

Implementation Project FSD-13(j): City of Edgewater Stormwater Improvements & Reclamation

The City of Edgewater has proposed a project to construct a storage tank adjacent to their wastewater plant into a reclaimed water retention facility reducing stormwater and wet weather discharges to the Mosquito Lagoon.

Status: Ongoing (March 2003)

Funding: \$370,000

Implementation Project FSD-13(k): City of Fellsmere: Carter, Hall, and James Subdivision Storm Water/Pollution Control – Phase I

The project, selected under the local government competitive cost-share program, will provide surveying, engineering design, and permitting of a 5.5-acre retention pond in Fellsmere. After heavy rains, yards in the Carter, Hall, and James subdivision flood and trapped water becomes ponded, causing septic systems and drain fields to malfunction. The retention pond, a box culvert along State Street ditch with catch basins and drainage flow structures, will provide adequate right-of-way for paving of the street, helping to reduce erosion and sedimentation. The project will enable the management of stormwater discharges, and reduce sediment transport into the Sebastian River. Phase II is budgeted for construction in the summer/fall of 2002.

Status: Ongoing (May 2002)

Funding: \$130,000

Implementation Project FSD-13(l): County of Volusia Silver Sands Stormwater Improvements

The project received a local government cost-share grant to design and install a sediment, oil and grease collection structure on Hiles Boulevard outfall, one of the main stormwater outfalls in the Silver Sands community of southeast Volusia County. A Storm Ceptor sediment collection system will be installed to provide treatment of stormwater before discharge to Mosquito Lagoon. The Storm Ceptor implements an innovative technology that achieves 50-80% removal of suspended solids load from stormwater.

Status: Ongoing (June 2002)

Funding: \$61,000

Implementation Project FSD-13(m): City of Melbourne Baffle Boxes

The project was awarded funding from IRL License Plate revenues to install two baffle boxes at selected locations in the City of Melbourne.

Status: Ongoing (June 2002)

Funding: \$85,000

Implementation Project FSD-13(n): City of Rockledge Knollwood Gardens Outfall Baffle Box

The project was awarded funding from IRL License Plate revenues to install a CDS baffle box at the outfall of Knollwood Gardens subdivision in Rockledge.

Status: Ongoing (October 2003)

Funding: Estimated \$81,250

Implementation Project FSD-13(o): Moore's Creek Stormwater Retrofit

The project will install ten baffle boxes and four water control structures with associated sediment collection areas, and reshape slopes in the entire creek for increased storage. Public education was incorporated throughout all phases of construction. Runoff is discharged through Moore's Creek directly into the IRL near Ft. Pierce Inlet. The current drainage system provides little treatment prior to discharge. The project will provide detention and water quality treatment for a 10-year/3-day storm, thus reducing discharges, attenuating peak flows, reducing sediment loadings, and providing additional storage.

Status: Phase I – Design and Permitting, Complete

Phases II, III, and IV – Construction, Ongoing (Phase II April 2003, Phases III & IV July 2004)

Funding: Total \$2,788,118 (Phase I \$1,187,468; Phases II, III, and IV \$1,600,650)

Implementation Project FSD-13(p): Poppleton Creek Urban Water Quality Project

This project will provide increased groundwater storage upstream, add wet retention area and flow-through marsh, remove exotic vegetation and plant native vegetation, and remove muck sediments throughout Poppleton Creek which drains into the St. Lucie Estuary. Phase I will construct a weir, flow-through marsh and retention area below 5,000 lf of presently uncontrolled tidal ditch discharging into the Creek. Phase II will acquire adjacent native lands including rare and endangered uplands and the entire Creek floodplain, and will extend exotic plant and muck sediment removal within tidal Poppleton Creek. Phase I is on hold due to detection of environmental contamination. Phase II will begin in two months. Status: Ongoing (Phase I extended through July 2003; Phase II work will take one a year to complete). Funding: \$3,150,500

Implementation Project FSD-13(g): Platt's Creek Water Quality/Wetland Restoration

This project involves the purchase and decommission approximately 102 acres of existing citrus groves adjacent to Platt's Creek and the North Fork of St. Lucie River. Improvements include the construction of a 16-acre wet detention basin adjacent to Platt's Creek which will provide water quality treatment for the approximate 1,000-acre drainage basin and the removal of 86 acres of citrus groves to be replaced by restored floodplain forest, marsh, and wet flatwood communities adjacent Platt's Creek and the North Fork of St. Lucie River. The stormwater detention area will have the capability of releasing treated runoff to the created wetlands for hydration and further water quality treatment. The restored floodplain will also provide additional water quality treatment for water flowing from Five and Ten Mile Creeks. The project is currently in the permitting stage, and construction of the wet detention area is expected to begin in late FY 2001-02 and continue into FY 2002-03. Construction of the restoration area will then follow. Status: Ongoing 2004  
Funding: \$3,604,360 (Total)

Implementation Project FSD-13(r): White City Canal F Project

This project is a surface water conveyance system for an approximately 102-acre drainage basin (primarily residential land use). Currently, the basin has no means of providing water quality treatment or discharge attenuation prior to direct discharge to the North Fork of the St. Lucie River. The project will include the construction of improvements along Canal F (low flow weirs) and online wet detention pond (approximately 0.7 acres) at the downstream end of Canal F. These improvements will provide water quality and quantity benefits for the drainage basin. Status: Construction is expected to begin in FY 2002-03.  
Funding: \$276,710.

Implementation Project FSD-13(s): Frazier Creek Restoration

Three phase project to provide increased groundwater storage upstream, additional wet retention area, remove exotic vegetation and plant native vegetation, and remove muck sediments, throughout the length of Frazier Creek. Phase 1 constructed in 1995 included muck removal, exotic removal, and construction of a weir and a sediment basin/retention area in 1400 lf of formerly uncontrolled tidal ditch at the upper reaches of the Creek east of Colorado Avenue. It also included stormwater retention improvements upstream in the tributary basin. Phase 2 consists of purchase of property adjacent to the existing weir, removal of that high-density septic tank land use, and expansion of the existing retention area above the Frazier Creek weir into the purchased lands. The resultant large and highly visible water quality treatment lake will become the centerpiece for community redevelopment on both sides of Martin Luther King Boulevard. The third phase of the project will be extension of exotic removal and muck sediments removal within tidal Frazier Creek from Colorado Avenue west to Sheppard Park at the mouth of the St. Lucie River. Improvement of this segment of Frazier Creek will enable canoe and kayak trails to extend from the St. Lucie River to the present weir and future improved retention lake and public park area, augmenting the City's blueways system and passive recreation opportunities. Completion of this third phase will present a restored tidal Creek and water quality retrofit within the Frazier Creek Basin, from its uppermost reaches to the River itself.  
Funding: \$1,730,000

Implementation Project FSD-13(t): Golden Gate

Water Quality Retrofit is designed to improve water quality leaving area between Kensington and Jefferson streets between CRA1A (Dixie Highway) and Crooked Creek. The proposed 1.6-acre retention area will provide water quality for an existing discharge into the Crooked Creek. This outfall presently discharges sediment and nutrient loading in the St. Lucie Estuary. This project incorporates a stormwater treatment area (STA), which will include the purchase of vacant lots along the Barbershop Ditch right-of-way. Weir structures and this STA will be utilized to improve quality and reduce timing of fresh water going to Estuary. It will also reduce sediment and nutrients within the Estuary. Prior to connection, stormwater improvements will also include retrofitting of eight (8) baffle boxes upstream of the retrofits providing further sediment and nutrient removal. The proposed area presently obtains no water quality treatment and entails 29.4 acres of land, which directly discharges into Crooked Creek. Water Quality Retrofit Improvements include: Design, Permitting, Property acquisition, Construction, Project Certification, Maintenance of Facility.

Funding: \$2,508,000

Implementation Project FSD-13(u): Palm Lake Drive

The Palm Lake Park Water Quality Retrofit is designed to improve water quality leaving the subdivision. The 292-lot development was first platted in 1958 and has little treatment with significant stormwater problems. The project will be to improve the roadside swale system in Palm Lake Park, improve system hydraulics throughout Palm Lake Park and enhance the Lake as an aquifer recharge and Retrofit Basin. Palm Lake Park Retrofit is located west of SR 5 (US Highway #1), north of SR 707, south of Britt Road and adjacent to Baker Road in Martin County, Florida. The Palm Lake Park Drainage System is comprised of the 292-lot Palm Lake Park Subdivision, which presently discharges to the North River Shore East/West ditch which is at the Palm Lake Parks southern boundary of the East/West ditch. North River Shores east/west ditch has two discharges: west into twin culverts under Spruce Ridge Drive to a canal (Half Mile Lake) directly connected to the St. Lucie River; and east into existing concrete box culverts under U.S. Highway No. 1 to Haney Creek which flows eventually to the St. Lucie River.

Funding: \$2,240,000

Implementation Project FSD-13(v): Fern Creek

The Fern Creek Basin Water Quality Retrofit (Phase II Construction) is a 10-acre retrofit to improve the quality of stormwater coming from areas developed previous to 1979 (estimated at 200 acres more or less) in the Fern Creek Basin (basin area approximately 1,360 acres). Design, surveying and modeling activities are under way. Fern Creek Retrofit project is located east of SR 76 (Kanner Highway) and adjacent to the Ronnie Mobile Home Park, St. Lucie Inlet Farms and Southwood Subdivision in Martin County, Florida. The project connects to the South Fork of the St. Lucie River and Southern Indian River Lagoon.

Funding: \$1,255,000

Implementation Project FSD-13(w): Rio Vista Outfall Retention Area

The Rio area is an older developed area in Martin County north of the St. Lucie River and east of the Roosevelt Bridge. There are several drainage basins in the area which discharge untreated stormwater runoff from developed areas directly to the St. Lucie River. The Sylvia Street outfall serves probably the easternmost of these drainage basins. The area of this basin is approximately 104 acres. Land uses are residential, commercial and roadway development which occur prior to stormwater runoff treatment requirements. The outlet for this drainage basin flows south along Sylvia Street, east along the north side of S.R. 707, across the highway to a 1.2-acre lake on the south side of S.R. 707 which is connected to an uncontrolled 48-inch concrete culvert discharging directly to the River. An opportunity exists to maximize the storage and water quality treatment provided by the lake through implementation of a weir on the upstream end of the pipe/outlet of the pond to meter discharges while maintaining flood protection provided by the existing facility.

Funding: \$150,000

Implementation Project FSD-13(x): River Park Water Quality Improvement

The proposed project consists of the installation of structural best management practices (BMPs) on two stormwater outfalls within the River Park development of St. Lucie County. These two outfalls have a combined contributing drainage area of 147± acres (reference Attachment 2- Location Map/Aerial) and consists of single family residential development. There is presently only a limited amount of stormwater treatment provided in the watershed through vegetated roadside swales. However these systems were initially constructed well before the evolution of stormwater treatment in the 1970s therefore the swales were constructed for the purpose of rapid surface water drainage conveyance offsite. Three baffle box BMPs and a sedimentation basin are proposed at the outfalls of the two drainage basins. The proposed BMPs will capture the majority of the total suspended solids load presently discharging to the North Fork. Funding: \$176,155

Implementation Project FSD-13(y): Island Road Baffle Boxes

The Island Road Subdivision of approximately 23 lots is completely surrounded by the Indian River Lagoon. The lots presently drain (approximately 50% of each lot) to the street and then discharge directly into the Indian River Lagoon. The proposed improvements include two baffle boxes and exfiltration pipe to prevent sediment from discharging directly into the Indian River Lagoon. In addition, the exfiltration pipe will provide water quality retention. Approximately 300 linear feet of exfiltration is proposed. Funding: \$45,000

Implementation Project FSD-13(z): Airport Ditch

The main airport ditch is the primary drainage conveyance for a developed basin. The lower reaches fall from the upstream control elevation of 3.3 feet NGVD to tidewater over a length of 4,759 feet. This section of ditch has no control structures above elevation -2.0 feet NGVD. It rapidly conveys largely untreated stormwater runoff directly to the Estuary. During dry periods, this segment of ditch bisects and bleeds groundwater from a 414-acre sub-basin to tide elevation. The uncontrolled southern tributary ditch drains another 100 acres to tide over a length of approximately 2,500 feet. There are three main components of this project: 1) installation of weirs in two ditches near existing outfalls to tidewater; 2) installation of a weir and bleeder at a secondary uncontrolled ditch; and 3) related elements of project construction.

Funding: \$832,169

Implementation Project FSD-13(aa): Krueger Creek

Krueger Creek is a channelized tributary to the St. Lucie Estuary which serves as the major drainage outfall for a large developed basin in the City of Stuart. It has not been maintained since its original construction in the 1950's, and has become choked with sand and fine muck sediments. The surrounding basin provides no formal stormwater treatment facilities except for roadside swales. This project consists of retrofit of an existing mixed use and fully developed urban drainage basin with baffle boxes at the three City controlled outfall points to the Creek; and removal of sand and fine muck sediments which have accumulated in the Creek over decades. This will restore the Creek to design depth and control future accumulations of sediments in the Creek. Restoration of design depth will prevent re-suspension of muck sediments due to boat traffic and wind shear, and prevent migration of these sediments into the Estuary. It will also provide improved benthic habitat and improved tidal flushing.

Funding: \$363,000

**e. Point Sources: CCMP Action Plan PS-1**

FDEP continues to monitor wastewater treatment plants throughout the lagoon watershed for compliance with the Indian River Lagoon Act. Efforts to encourage municipalities to include a reference to the Act during their Comp Plan updates, to ensure continued compliance, are ongoing. The State Revolving Loan Trust Fund, traditionally reserved for construction and upgrades to wastewater treatment plants, is continuing the 10 percent funding allowance for stormwater allocation low interest loans for local government non-point source projects.

**f. *Marinas and Boats: CCMP Action Plan MB-6***

IRL Program staff participates in boater education programs and events to provide information on resource protection and practices boaters can perform to reduce their impacts on the lagoon. The IRL Boater's Guide remains a popular publication for boaters that includes information on the boating community and ways they may reduce their impacts on the water quality, habitats and endangered species in the IRL. The guide is posted in the IRL page of SJRWMD's web site.

**g. *Monitoring and Data Management***

The SJRWMD and SFWMD continue to work with county governments to coordinate the ambient water quality monitoring network throughout the lagoon. Quarterly meetings with the network participants are being held and quality control information is being presented. Calculations of tributary loadings are being developed and enhanced synoptic water quality sampling is being conducted for the PLR Model.

Implementation Project MON-2(a): Citizens Volunteer Water Quality Monitoring Network

Continuation of the agreement with the Marine Resources Council, initiated in 1994, to collect water quality data through the use of its citizen's monitoring program. MRC maintains 78 monitoring stations on the IRL from Brevard County to Martin County and has continued to collect reliable long-term water quality data for trends analysis. Reports from the nation's 2nd largest volunteer water quality monitoring network have shown salinity trends, impacts of freshwater discharges, and other valuable results.

Status: Ongoing (September 2002)

Funding: \$60,000 Year 6; Total \$420,000

Implementation Project MON-2(b): CASTnet National Atmospheric Deposition Program Site

The establishment of a CASTnet site at Sebastian Inlet is significantly improving the IRL Program's quantification of nutrient loadings from airborne deposition. The data from this site is being combined with atmospheric deposition site data in the northern and central portions of the watershed to estimate the total loadings of nutrients to the watershed from airborne deposition. The EPA selected laboratory for this work is ESE Labs in Gainesville. The monitoring station has been operational since August 2001.

Status: Ongoing (August 2002)

Funding: \$68,500

Implementation Project MON-2(c): St. Lucie Fish Health as a Biological Indicator to Measure Project Performance

This project will continue a multi-year effort to develop, refine, and apply biological indicators to measure the effectiveness of water improvement projects. Abnormalities in fish assemblages reflect the quality of the water in which the fish live (Sindermann 1996<sup>1</sup>, Sanders et al. 1998<sup>2</sup>). This project will add five years of sampling to an existing time series of fish health data and will enhance its value for establishing baseline conditions, identifying the factors causing fish abnormalities, and evaluating the progress and effectiveness of implemented water management and water quality improvement projects. Results will be used to develop and refine performance measures for the SLE-IRL component of the Comprehensive Everglades Restoration Plan.

Status: Ongoing (2005)

Funding: Total \$590,000 (FY 1999-2000: \$90,000; FY 2000-2005: \$125,000 each FY)

## EPA SUPPLEMENTAL FUNDING ACTIVITIES

### Implementation Project DIMS: Centralized IRL Data Base

Support for development and implementation of a comprehensive and centralized electronic database for the IRL in cooperation with NASA. The first work order for this project includes the development of a seagrass transect database that complies with the SJRWMD's station header standards. This database will accommodate KSC long-term transect data, wetlands initiative seagrass data and SJRWMD seagrass transect data. The current KSC seagrass database contains of 98,000 measurements from over 600 surveys dating from 1983, the SJRWMD's database includes a similar volume of seagrass data

Status: Ongoing (April 2002)

Funding: \$20,000

### Implementation Project DIMS: IRL PLRG Data Base Management

The IRL PLR model is running on the Beowulf computer cluster at the District. While it is running well, the cluster software was updated to achieve better overall performance, and some training was provided for the users in the modeling section. The IRL PLRG assessment project will be using the Beowulf system extensively. This project includes upgrading the cluster operating system, provide training, and fine-tuning the system to peak operating condition. The benefit of this work to the Lagoon is to improve cluster operation and assure maximum availability and performance of the system to the modelers for running PLRG simulations for the foreseeable future.

Status: Complete

Funding: \$10,000

<sup>1</sup> Sindermann, C.J. 1996. Ocean Pollution. CRC Press. Boca Raton, FL.

<sup>2</sup> Sanders, R.E., R.J. Miltner, C.O. Yoder, and E.T. Rankin. 1999. The use of external deformities, erosion, lesions, and tumors (DELT anomalies) in fish assemblages for characterizing aquatic resources: A case study of seven Ohio streams. Pp. 203-224. In: T.P. Simon (ed.) Assessing the Sustainability and Biological Integrity of Water Resources Using Fish Communities. CRC Press. Boca Raton, FL.

## GRANTS PROVIDED FROM THE NEP TO LOCAL ENTITIES

| Local Government                          | Project Name   | End Date   | SJRWMD<br>Amount*                         | Local<br>Match     | Total Cost          |
|---|--|------------|---|--------------------|---------------------|
| <b><i>Fiscal Year 2000-01:</i></b>        |  |            |   |                    |                     |
| City of Satellite Beach                   | Jamaica Blvd. Stormwater Diversion   | Feb 2004   | \$100,000                                 | \$546,700          | \$646,700           |
| City of Fellsmere                         | Carter, Hall & James Subdivision<br>Stormwater/Pollution Control - Phase I | May 2002   | \$50,000                                  | \$80,000           | \$130,000           |
| Brevard County SWI                        | Chain of Lakes - Phase I   | Jun 2003   | \$130,000                                 | \$2,875,000        | \$3,005,000         |
| City of Melbourne/<br>Brevard County SWI  | Channel Stabilization  | Sep 2002   | \$50,000                                  | \$98,000           | \$148,000           |
| Indian River County                       | Vero Lakes Estates Stormwater<br>Improvement                               | Jul 2003   | \$50,000<br>addtn<br>(\$340,000<br>total) | \$892,180          | \$1,232,180         |
| Indian River County                       | Roseland Area East Stormwater<br>Improvement                               | Oct 2002   | \$235,000                                 | \$295,000          | \$530,000           |
| Town of Melbourne<br>Beach                | Melbourne Beach Stormwater Master<br>Plan                                  | Mar 2002   | \$25,000                                  | \$35,746           | \$60,746            |
| City of Cape<br>Canaveral                 | Cape Canaveral Stormwater Utility<br>Implementation                        | Oct 2002   | \$35,000                                  | \$38,500           | \$73,500            |
| County of Volusia                         | Silver Sands Stormwater<br>Improvements                                    | Jun 2002   | \$30,000                                  | \$31,000           | \$61,000            |
| City of Melbourne/<br>Brevard County SWI  | Melbourne Baffle Boxes   | Jun 2002   | \$40,000                                  | \$45,000           | \$85,000            |
| City of Rockledge                         | Knollwood Gardens Outfall Baffle Box                                       | Oct 2003   | \$26,000                                  | \$55,250           | \$81,250            |
| City of Cocoa Beach<br>Stormwater Utility | Second Street South Sediment/Oil &<br>Grease Trap                          | Sep 2002   | \$30,000                                  | \$41,200           | \$71,200            |
| Town of Melbourne<br>Beach                | Urban Stormwater Correction &<br>Improvements for Anchor & Pelican<br>Keys | Jul 2003   | \$25,000                                  | \$114,438          | \$139,438           |
| City of Cocoa                             | Florida Avenue Rockledge/Cocoa<br>Stormwater Facility                      | Mar 2002   | \$18,000                                  | \$18,170           | \$36,170            |
| <b>FY 2000-01 SUB TOTAL</b>               |  |            | <b>\$514,000</b>                          | <b>\$1,566,484</b> | <b>\$2,370,484</b>  |
| <b><i>Fiscal Year 2001-02:</i></b>        |  |            |   |                    |                     |
| City of New Smyrna<br>Beach               | East Circle Culvert Repair and Water<br>Quality Retrofit                   | Mar 2003   | \$20,000                                  | \$40,960           | \$60,960            |
| Indian River County                       | Roadway Paving and Drainage<br>Improvements                                | Nov 2003   | \$100,000                                 | \$3,349,980        | \$3,449,980         |
| Brevard County                            | Merritt Island Airport Pond  | Feb 2005   | \$100,000                                 | \$340,000          | \$440,000           |
| Fellsmere Water<br>Control District       | East Master Drainage Plan  | Mar 2003   | \$108,000                                 |                    | \$108,000           |
| Town of Melbourne<br>Village              | Melbourne Village Stormwater Master<br>Plan                                | Nov 2002   | \$29,100                                  | \$9,700            | \$38,800            |
| City of Satellite Beach                   | Modular Filtering Stormwater Inlets  | Mar 2003   | \$31,300                                  | \$30,000           | \$61,300            |
| City of Satellite Beach                   | Grant Avenue Baffle Box  | Mar 2003   | \$32,100                                  | \$20,000           | \$52,100            |
| City of Palm Bay                          | Perimeter Canal Rehabilitation, Phase<br>II                                | April 2003 | \$48,000                                  | \$49,000           | \$97,000            |
| City of Palm Bay                          | PMU 38/40 Stormwater Improvements  | Nov 2002   | \$23,000                                  | \$23,000           | \$46,000            |
| City of Palm Bay                          | Turkey Creek Subdivision Stormwater<br>Improvements                        | April 2003 | \$123,000                                 | \$175,000          | \$298,000           |
| <b>FY 2001-02 SUB TOTAL</b>               |  |            | <b>\$614,500</b>                          | <b>\$4,037,640</b> | <b>\$4,652,140</b>  |
| <b>FY 2000-01 &amp; 2001-02 TOTALS</b>    |  |            | <b>\$1,128,500</b>                        | <b>\$5,604,124</b> | <b>\$7,022,624</b>  |
| <b>GRAND TOTAL</b>                        |  |            |   |                    | <b>\$13,755,248</b> |

### **SECTION 3. IRL BASIN ADVISORY BOARD**

This section briefly describes additional projects and programs being completed by members of the IRL Basin Advisory Board (and other agencies), which are not included within the annual work plan as IRLNEP projects but do contribute toward overall CCMP implementation and restoration of the IRL. These projects demonstrate a strong commitment to CCMP implementation by members of the IRL Basin Advisory Board. Each of these projects, and those in Section 4, detail the future direction of CCMP implementation activities.

### **CCMP IMPLEMENTATION ACTIVITIES 2001-2002**

#### ***St. Johns River Water Management District***

FSD-13: Stormwater Management Cost-Share Program FY 2001-02 – The District entered into ten partnership agreements with the counties of Brevard and Indian River; the cities of Satellite Beach, Palm Bay, and New Smyrna Beach, the Town of Melbourne Village; and the Fellsmere Water Control District. These stormwater management projects target identified problem areas to improve water quality and flood protection within the IRL watershed. The District provided \$614,500 to fund these projects, amounting to a total of \$4.7 million (including local government match) in stormwater management implementation. (Eco Mgt TF \$466,000 / EPA/NEP \$18,500 / IRL License \$130,000)

FSD-13: IRL License Plate Funding FY 2001-02 – The District entered into three partnership agreements with the City of New Smyrna Beach and the counties of Brevard and Indian River. These stormwater management projects will improve water quality and flood protection within the IRL watershed through culvert repair and water quality retrofit, construction of a retention basin and Brazilian Pepper tree removal, and roadway paving and stormwater improvements. The District provided \$130,000 to supplement funds from the stormwater cost-share program for implementation of these projects.

FSD-1&3: The C-1 Re-Diversion internal design work has been accelerated. Land acquisition is complete with 3,964 acres acquired. The Sawgrass Lakes Water Management Area, which will treat stormwater before entering the St. Johns River, is under construction. SJRWMD and MTWCD are continuing to pursue additional federal and state support for the project.

FSD-1 & 13: The City of Sebastian sub-basin surface water management plan is ongoing with design work for the master plan and stormwater park and water quality monitoring. The Sebastian shoreline restoration project is complete; an expanded observation pier has been constructed. The Sebastian River water quality model has been delivered by FL Tech.

FSD-1: The Town of Malabar's surface water management plan is complete. Future efforts include installation and monitoring of BMPs to meet sub-basin PLR targets.

W-6: The Mangrove Planting project is ongoing throughout southern Brevard, Indian River, St. Lucie, and Martin counties with additional funding assistance from USFWS, FIND, and SFWMD.

SG-1: Seagrass aerial photos from 1996 have been photo-interpreted, draft historical land use and seagrass coverage maps are complete. Research project addressing light requirements for Johnson's seagrass continues.

DIM-2: Consultant working in-house to perform GIS database management and analytical tasks for seagrass and water quality projects in the IRL and to provide mapping services for the NCB project.

FSD-3 & SG-1: The IRL Bathymetric survey is complete. Water level and salinity measurements for FDEP are ongoing. Flow and salinity measurements for hydrologic monitoring also continue.

W-5 & 6: Rehabilitation of Impounded and Degraded Wetlands through dike removal, culvert installation and dragline ditch restoration are ongoing.

MON-1: Inter-agency IRL Water Quality Monitoring Network with Indian River and Volusia counties to calibrate the PLR model is ongoing. Brevard is currently not participating. The network is important in carrying out the resource assessment and diagnostic functions of the IRL restoration program.

DIM-2: Calibration of the PRL model was completed by the University of Florida (UF) and delivered to the SJRWMD for review (testing). The final technical report and manuals should be delivered by UF in June 2002.

FSD-3: Water Level, Salinity and Wind Data Collection, Inlet Tidal Cycle Flow Measurements, Tributary Flow Monitoring and Velocity Profile Measurements are being conducted in the ICWW.

### ***US EPA 319 Grant Projects***

FSD-13: Granted to Martin County's Stormwater Management Division in FY 2001 for Golden Gate Water Quality Improvements. Award \$440,000.

FSD-13: Granted to Indian River County Public Works Department in FY 2001 for East Gifford Area Stormwater Improvement. Award \$264,400.

FSD-13: Granted to the City of Satellite Beach in FY 2001 for Jamaica Boulevard Stormwater Diversion. Award \$385,000.

FSD-13: Granted to the SJRWMD in FY 2001 for the City of Sebastian Stormwater Park. Award \$575,000.

FSD-13: Granted to Brevard County Surface Water Improvement in FY 2001 for Indian Trail Water Quality Enhancement. Award \$264,000.

FSD-13: Granted to the City of Melbourne – Brevard County Surface Water Improvement in FY 2001 for Dove Street Water Quality Enhancement. Award \$102,000.

### ***South Florida Water Management District***

FSD-13, W-6 & BD-3: IRL License Plate Funding FY 2000-01 – The SFWMD provided \$133,280 for projects in partnership with local governments and organizations in St. Lucie, Martin, and Palm Beach counties. The projects funded address issues such as exotic plant removal and shoreline revegetation, mosquito impoundment enhancement, public access and awareness, and siltation removal.

FSD-12 and MON-1: St. Lucie River Issues Team 2000-01: C-44 STA, PC-38, and SLE Water Quality.

FSD-13: Ongoing SWIM Projects: Sewall's Point and Stuart III.

FSD-3: PLRG development and SAV distribution mapping is ongoing within the St. Lucie Estuary, plus circulation models and IRL bathymetry.

MON-1: Water quality monitoring and nutrient sediment loadings analysis in the IRL and St. Lucie Estuary at 41 stations are ongoing.

DIMS-3: Update of the IRLSIS is complete.

PIE-4, FSD-13 & SG-1: Habitat restoration projects, such as mangrove planting and education projects, have been funded through IRL License Plate revenue.

FSD-12 & 13: Indian River Estates, Fort Pierce, and Martin County stormwater retrofits.

PIE-1, 2 & 3: Environmental Education Programs such as Student Field Studies.

FSD-12 & BD-3: SFWMD is conducting the following projects in partnership with the US Army Corps of Engineers: Muck removal feasibility study in the St. Lucie Estuary, C&SF Indian River Lagoon Restoration Feasibility Study and public and government awareness program, and control or eradication of invasive non-native plant species in the North Fork of the St. Lucie Estuary.

W-6: IRL License Plate Funding FY 2000-01 – SFWMD has contracted the Environmental Learning Center and provided \$2,775 to execute a Red Mangrove Planting project in Martin County.

W-6: IRL License Plate Funding FY 2000-01 – SFWMD has contracted The Florida Oceanographic Society and provided \$2,850 to execute a Mangrove Marsh Impoundment Habitat Restoration Pilot project in Martin County.

W-6: IRL License Plate Funding FY 2000-01 – SFWMD has contracted The Nature Conservancy and provided \$26,714 to execute Non-Native Plant Removal and Habitat Restoration in Martin County. SWIM Plan Update in conjunction with SJRWMD/SWIM.

### ***Florida Dept. of Environmental Protection***

PS-3 & 4: Wastewater treatment and major sewer rehabilitation for the City of Cocoa Beach in 2001.

PS-3 & 4: Reclaimed water reuse facilities, Phase V Expansion, for the City of Rockledge in 2001.

MON-1: Water Quality Monitoring Station at the mouth of Turkey Creek.

MON-1: Water Quality and Biological monitoring in Turnbull basin.

PS-1: Monitoring Compliance with the IRL Act for wastewater discharges.

FI-1: EMAT implementation of CCMP.

SG-1: Seagrass and clammers working group.

PS-3: Biological monitoring of Reverse Osmosis discharge plants.

W-3 & 6: Continuing support for the Savanna's Ecosystem Restoration Team.

FSD-13: Administers the EPA Section 319 Program for state including over \$2 million to lagoon counties and cities in FY 2000-01 for water quality improvement projects.

### ***Volusia County***

FSD-13: Riverside Drive/Magnolia Avenue Stormwater System Retrofit project in the City of New Smyrna Beach, providing water quality retrofit of the drainage system along these roads serving over 52-acres of residential development.

FSD-13, W-5, and PIE-2: IRL License Plate – Stormwater, habitat improvement, and education projects, including impoundment reconnections and enhancements in Canaveral National Seashore and Mosquito Lagoon, restoration of marshes impacted by dragline ditches created for mosquito control.

SG-1: Seagrass Monitoring.

PS-3: City of Edgewater Reclaimed Water Augmentation project to reduce wastewater discharged to the Mosquito Lagoon through the construction of a storage tank to contain the excess reclaimed water during wet weather conditions and supply additional reuse capacity for customers during dry periods.

PS-1: New Smyrna Beach Waste Water Treatment Plant and extension of reuse lines to Bouchell Island.

FSD-14: Stormwater Utility fee in place for unincorporated Volusia.

FSD-13: Basin planning for stormwater problems.

MON 1 & 2: County and Citizen water quality monitoring.

PIE-2: Investment in Eco-tourism promotions

ETS-1: Manatee Protection Plan adoption.

### ***Brevard County***

FSD-13: Surface Water Improvement FY 2002-03: Stormwater projects will include: Indian Trail Pond (\$500,000), Chain of Lakes Phase II (\$3.0 million), and Pine Island North and South Borrow Pits Phase II (\$1.8 million).

FSD-13: Surface Water Improvement FY 2001-02: Florida Boulevard pond (\$250,000). Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Fay Lake Phase II District I project designed and constructed Port St. John outfall canals into Fay Lake, which will serve as a regional stormwater treatment pond. Total cost \$148,000. Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Indian Trail Pond [Fairglen] District I project constructed a regional stormwater pond adjacent to Fairglen Elementary School in conjunction with the new overpass at U.S. 1. Total cost \$420,000. Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Florida Boulevard Pond District II project constructed a regional stormwater pond at the site of the abandoned Carlton Groves Wastewater Treatment Plant. Total cost \$500,000. Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Oak Street/Gemini Elementary District III project designed and constructed retention ponds, pipes, and ditches to provide flood relief and water quality treatment along Oak Street and at Gemini Elementary School. Total \$300,000. Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Parkway Drive Phase II District IV project constructed a regional detention pond in Wickham Park to provide water quality treatment and provide passive recreation opportunity. Total cost \$750,000. Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Dove Street Pond project in Melbourne constructed an online treatment pond on approximately 1.5 acres on a canal flowing into the IRL. Total cost \$250,000. Complete.

FSD-13: Surface Water Improvement FY 2000-01: The Shannon Avenue project in West Melbourne piped an unstable ditch and installed a baffle box to reduce sediment to the IRL. Total cost \$120,000. Complete.

PS-1: Ensure compliance with IRL Act.

FSD-2: County-wide inventory of drainage systems and structural controls, GIS comprehensive county-wide stormwater master plan.

MB-2: Appointed a “live aboard task force” to address issues related to live aboard vessels.

MB-3 & ETS-1: Manatee Protection Plan approval still pending, including a section on boat facility siting.

MB-7: County submitted request through state legislative delegation for additional Marine Patrol officers in County.

BD-3: Coordinating “Pepper Buster” training and activities.

IM-1 & 2: Cooperating with SJRWMD to reconnect impounded marshes and initiated a marsh acquisition effort with Mosquito Control District.

LA-1, ETS-3, IM-2, W-4, BD-2 & 3: Established the EELs acquisition program in 1991, implemented numerous acquisition initiatives, developing and implementing management plans, protecting critical habitats, acquiring impoundments, essential wetlands, and lands to protect biodiversity and control exotic plants.

LA-2: County wetlands acquisitions ongoing.

W-3: Adopted a shoreline protection ordinance.

W-7: Contracting with Keep Brevard Beautiful to sponsor trash bashes, using county community service persons to clean beaches.

PIE-3 & 4: Public education on stormwater utility's scope of services, high school student stormwater sampling program, volunteer identification of illegal discharges into stormwater systems, implementation of Florida Yards & Neighborhoods Program.

### ***Indian River County***

FSD-13: Indian River County Stormwater Enhancement Project FY 2001-02: Kings Highway Improvements between 16<sup>th</sup> Street and Oslo Road - The County is constructing a major thoroughfare roadway, approximately 3 miles long, that will replace an existing road. The new four-lane highway will provide stormwater management tracts with storage and treatment of stormwater runoff before discharge into the Lateral B Canal. The project is under construction and is expected to be completed in early 2004.

FSD-13: Indian River County Stormwater Enhancement Project FY 2001-02: Initiated and Constructed Roadway Improvement projects - Several developer-initiated roadway improvement projects have been constructed. These projects have paved existing marl roads and retrofitted the roads' existing stormwater management systems to improve water quality in the IRL.

FSD-12: The East Indian River County's Master Stormwater Management Plan addresses the stormwater runoff from over 50,000 acres of land, which includes the urban center of Vero Beach. The Indian River Farms Water Control District discharges over 100 million gallons/day of untreated water into the IRL.

The first Phase of a Master Plan Study will reduce the pollution into the Lagoon, recharge the shallow aquifer, provide water for farmers and others, and ultimately, increase the overall economic health of the county. An integrated stormwater treatment, storage, and recharge/reuse system will be created. The stormwater facilities will also incorporate educational accommodations, wildlife habitat, and passive and active parks connected by greenways and bike paths along the canal right-of-ways, providing multi-use opportunities for the public. Draft interim report is complete.

W-4, 5 & 6: Mosquito Impoundment Reconnections.

FSD-7: Comprehensive Land Use Plan - stormwater element inclusion.

LA-1: \$26 million land acquisition bond approved enabling \$50 million worth of land bought through partnership with SJRWMD.

MON-1: Participation in IRL water quality monitoring network.

### ***St. Lucie County***

W-5 & 6, and PIE-4: IRL License Plate Funding - In FY 2000-01, License Plate funds provided \$38,753 to execute a Mosquito Impoundment Enhancement and Public Access/Awareness project. Work under that contract continues to be carried out during FY 2001-02: conversion of one dual pump station from 14,000 gpm to 21,000 gpm and purchase of one pump (IRL License \$20,699; SLCMCD \$5,000; Total \$25,699); installation of four 40-50' long, 30" diameter CAP of which two were in Impoundment 19A, one in Impoundment 3, and one in Impoundment 17A (IRL license \$15,200); removal of 69,035 linear-feet of exotic trees along shoreline of Indian River Lagoon (IRL License \$5,076, Federal \$56,770, State \$9,462, SLCMCD \$9,462, Total \$80,770); construction of two outlooks/fishing docks and one boardwalk, and installation of two bike racks (IRL License \$10,261).

FSD-13: Water Quality Improvement Projects FY 2001-02: The Hidden River Estates Stormwater Retrofit project will provide water quality treatment and flood protection for a residential neighborhood on the North Fork of the St. Lucie River. Presently, stormwater runoff from the 70-acre drainage basin discharges directly to the North Fork with no stormwater treatment other than the grassed swales that make up the conveyance system. Vacant lots in the neighborhood have been acquired for the construction of stormwater retention areas to provide water quality treatment. The project is currently in design and construction is expected to begin in FY 2001-02. Total cost \$308,420.

FSD-13: Water Quality Improvement Projects FY 2001-02: St. Lucie County has been working with the SFWMD and the IRLNEP, through the SJRWMD, in designing a stormwater management plan for the Indian River Estates subdivision. The intent of the Indian River Estates/Savannas Ecosystem Management project is to improve flood protection for the subdivision (approximately 1,200 acres) and to improve the quality of the stormwater runoff, which currently discharges from the subdivision directly into the Savannas State Reserve (the Savannas drainage basin outfalls to both the North Fork of the St. Lucie River and the IRL). The project is currently in design. Full construction funding has not yet been established. Total cost \$5,980,700.

### *Martin County*

As one of the six county governments participating in the implementation of the Indian River Lagoon (IRL) Comprehensive Conservation and Management Plan (the Plan), Martin County supports the improvement of water quality and enhancement of the habitat within and adjacent to the IRL. This support is evidenced by the development and implementation of the County's *Lands for Healthy Rivers and Natural Resources Protection Program*. The proposed purchases within this program are priority parcels identified within the Comprehensive Everglades Restoration Plan (CERP), the Florida Forever Program and other state and federal land acquisition programs. CERP is a joint project of the U.S. Army Corps of Engineers and the South Florida Water Management District which offers long-term solutions to restoring America's Everglades, along with the lakes and rivers of South Florida to a healthy condition.

On November 3, 1998, the voters of Martin County voted to add a one-cent sales tax for a period of three years for the purpose of land acquisition for river restoration, provide matching funds for conservation lands purchase and to fund capital projects for water quality improvement. It was estimated that the tax would provide \$38 million over those three years, however, almost \$46 million has been accumulated over those three years.

On Wednesday, February 13, 2001, the South Florida Water Management District adopted a resolution honoring the Martin County Board of County Commissioners for their leadership in establishing the Health Rivers program and their dedication to improving water quality in the IRL and its adjacent water bodies. In addition to land purchases for preservation and restoration, stormwater management projects are high on the County's list of priorities.

With the recent creation of the County's Office of Water Quality, there is a new and specific focus on improvement of water quality in the area. To that end, the County continues to dedicate increased fiscal and human resources to these projects. Listed below are capital and related project with identified funding for fiscal years 2001 and 2002.

W-6: IRL License Plate Funding FY 2001-02 - SFWMD has a continuing contract with the Environmental Learning Center and has provided an addition \$925 to execute a Red Mangrove Planting project in Martin County.

W-6: IRL License Plate Funding FY 2001-02 - SFWMD has entered into a contract with Martin County and provided \$86,000.00 to execute a Mosquito Impoundment Restoration Project by installing culverts and pumps, remove exotics and maintain dikes.

W-6: IRL License Plate Funding FY 2001-02 - SFWMD has partnered with the Florida Department of Environmental Protection and provided \$2,670 to execute removal of exotics and replanting of native species on spoil islands at the St. Lucie Inlet State Park.

W-6: IRL License Plate Funding FY 2001-02 - SFWMD has contracted with the Nature Conservancy and provided \$10,190 to execute removal of exotic vegetation at Blowing Rocks Preserve.

W-6: IRL License Plate Funding FY 2001-02 - SFWMD has contracted with the River Pine Home Owners' Association and provided \$14,000 to execute removal of exotics and replanting of native species.

FSD-14: Martin County's Lands for Healthy Rivers and Natural Resources Protection Program: On November 3, 1998, the voters of Martin County voted to add a one-cent sales tax for a period of three years and dedicate the revenues to the acquisition of land for river restoration, matching funds for conservation lands purchase, and to fund capital projects for water quality improvement. The proposed purchases are composed of priority parcels identified within the Florida Forever Program and the

Comprehensive Everglades Restoration Plan (CERP). As of December 31, 2001, the tax revenues collected and interest earned totaled \$45,876,386. To date (February 4, 2002) \$6,552,318 has been spent on Preservation Lands purchases and there is another approximately \$7,600,000 that will be spent on purchase of the Allapattah Ranch. Currently, there is approximately \$15.8 million available for Preservation Lands purchases and approximately \$23.4 million to be used to match federal dollars for designated CERP projects.

FSD-13 - Stormwater Capital Improvements 2001-2002: East Fork/Manatee Creek Project addresses water quality, flood attenuation and overdrainage. FY 2001 Ad Valorem \$43,000, FY 2002 Ad Valorem \$00.00, Total Cost \$990,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: Hibiscus Park Project addresses water quality and flood attenuation. FY 2001 Ad Valorem \$00.00, FY 2002 Ad Valorem \$00.00. FY 2002 Other Matchable Funds \$500,000 (State Revolving Fund). Total Cost \$675,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: Kitching Creek Project provides ecosystem restoration and overall surface water management system improvement. FY 2001 Ad Valorem \$00.00, FY 2002 Ad Valorem \$150,000. Total Cost \$3,000,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: Manatee Pocket - Salerno Creek Project provides regional stormwater facility development. FY 2001 Ad Valorem \$310,000, FY 2002 Ad Valorem \$00.00. FY 2002 Other Matchable Funds \$775,000 (State Revolving Fund), \$475,000 (319 Grant). Total Cost \$2,938,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: Old Palm City Retrofit Project addresses water quality and flood attenuation. FY 2001 Ad Valorem \$375,000, FY 2002 Ad Valorem \$00.00. FY 2002 Other Matchable Funds \$300,000 (State Revolving Fund), \$311,919 (319 Grant). Total Cost \$942,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: Palm Lake Park Project provides a stormwater management system. FY 2001 Ad Valorem \$200,000, FY 2002 Ad Valorem \$00.00. FY 2002 Other Matchable Funds \$1,300,000 (State Revolving Fund), \$280,000 (St. Lucie River Issues Team). Total Cost \$1,893,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: Poinciana Gardens Project provides ecosystem restoration and overall surface water management system improvement. FY 2001 Ad Valorem \$25,000, FY 2002 Ad Valorem \$00.00. FY 2002 Other Matchable Funds \$1,800,000 (State Revolving Fund), \$306,205 (St. Lucie River Issues Team). Total Cost \$2,338,000.

FSD-13 - Stormwater Capital Improvements 2001-2002: South County - Tropic Vista Project addresses water quality and flood attenuation. FY 2001 Ad Valorem \$307,000, FY 2002 Ad Valorem \$00.00. FY 2002 Other Matchable Funds \$1,300,000 (State Revolving Fund), \$241,000 (319 Grant). Total Cost \$2,703,000.

FSD-14 - MSTU approved at 0.5 mills for stormwater issues that raises \$3.4 million per year.

FSD-13: Gleason Street feasibility study. FY 2001 Ad Valorem \$50,000.

FSD-10: *Florida Yards & Neighborhoods Program* for environmental landscape education. Staff and other in-kind support equaling \$58,500 through September, 2002.

FSD-10: *Clean Marina* marine environment education program.

FSD-13: Stormwater Capital Improvements 2000-2001: The North County Water Quality Retrofit project addresses flood attenuation and water quality. FY 2000 Ad-Valorem \$500,000, FY 2001 No scheduled contribution. Total cost \$1,000,000.

FSD-13: Stormwater Capital Improvements 2000-2001: The Vista Solerno project provides for the construction of stormwater treatment facilities. FY 2000 No scheduled contribution, FY 2001 Ad-Valorem \$155,000. Total cost \$155,000.

FSD-13: St. Lucie River Issues Team Project 2000-01: Willoughby Creek.

FSD-13: Sandcastle Estates water quality treatment design complete, permit challenged.

FSD-13: East Hanson Grant Flow through Marsh ongoing maintenance.

FSD-13: Normand Street Weir design and permitting initiated.

FSD-13: Gleason St./Colby Ave. Stormwater feasibility study initiated.

FSD-13: Little Club Area Stormwater and Water Quality Improvements – design and permitting ongoing.

FSD-13: Yacht and Country outfall weir design and permitting initiated.

W-6: IRL License Plate Funding FY 2000-01 – SFWMD has entered into a contract with Martin County Parks and Recreation and provided \$13,662 to execute the Indian Riverside Park/Florida Institute of Technology Mangrove Lagoon Restoration project.

### ***US Army Corps of Engineers***

FSD-14: Indian River Lagoon North Feasibility Study initiation: public input workshops conducted, Project Management Plan under preparation, coordinated and established Project Delivery Team incorporating representatives from local and national government agencies and the public.

FSD-14: Indian River Lagoon South Feasibility Study: initiation of pilot projects.

FSD-6: Dredging at Canaveral Barge Channel (\$1.3 million). Planning for future dredging at Haulover Canal.

FSD-14: Pelican Island Sec. 1135 studies.

FSD-14: Ponce Inlet Sec. 1135 study ecosystem restoration.

FSD-14: C-1 Re-Diversion Project

### ***US Fish and Wildlife Service***

W-6: Merritt Island National Wildlife Refuge FY 2001-2002: The Refuge restored two impoundments, T-45 and V-5, containing 108 acres of coastal marsh by removing 3.01 miles of dike and placing the fill into the adjacent barrow ditch.

W-6: Merritt Island National Wildlife Refuge FY 2001-2002: The Gator Creek impoundment, encompassing 700 acres, was reconnected to the Indian River Lagoon by replacing three non-functioning water control structures. Bulkheads were also installed to reduce erosion and improve water quality.

W-5: Merritt Island National Wildlife Refuge FY 2001-2002: The Refuge will continue the Mosquito Lagoon project which will include the reconnection of 602 acres of habitat within two impoundments. Total cost \$87,000.

LA-2: Pelican Island National Wildlife Refuge FY 2001-02: The Refuge will acquire the remaining 42 acres of the Lier Tract for \$3.1 million and a portion of the Michaels Tract for \$2.8 million. The Refuge in conjunction with SJRWMD and FIND completed Phases I and II of the restoration of Pelican Island by airlifting shell material to the island and planting native plants.

W-1: Partner in MINWR Wetlands Management Initiative.

ETS-1: Development of a MINWR Comprehensive Conservation Plan.

### ***National Aeronautics and Space Administration***

DIM-2: Data Sharing Memorandum of Understanding with SJRWMD. Development of Centralized IRL Database.

### ***USDA Natural Resources Conservation Service***

FSD-4: St. Lucie River Issues Team 2001-02 Project: Citrus Irrigation.

FSD-4 & 10, W-4, ETS-3, and PIE-3: St. Lucie FY 2001 – The SWCD wrote conservation plans (Resource Management Systems) on 2,015 acres of agricultural land; applied conservation practices on 17,148 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 391 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; performed 140 urban mobile lab evaluations with a potential water savings of 22.5 million gallons and 52 agricultural mobile lab evaluations with potential water savings of 764.5 million gallons of water, amounting to 445.5 million gallons of actual water savings reported; provided technical and conservation education assistance to 2,174 customers.

FSD-4 & 10, W-4, ETS-3, and PIE-3: Martin County FY 2001 – The SWCD wrote conservation plans for 731 agricultural acres; applied conservation practices to 1,541 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 1,760 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; performed 164 urban mobile lab evaluations providing potential water savings of 57.5 million gallons and actual savings of 8.6 million gallons provided technical and conservation education assistance to 3,140 customers.

FSD-4 & 10, W-4, ETS-3, and PIE-3: Indian River FY 2001 – The SWCD wrote conservation plans for 4,008 acres of agricultural land; applied conservation practices on 28,974 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 63 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; performed 63

mobile lab evaluations on 1,460 acres of mainly citrus land, providing potential water savings of 5.1 million gallons and actual savings of 1.3 million gallons; provided technical and conservation education assistance to 2,429 customers.

FSD-4 & 10, W-4, ETS-3, and PIE-3: Brevard FY 2001 – The SWCD wrote conservation plans for 340 agricultural acres; applied conservation practices on 900 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 60 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; provided technical and conservation education assistance to 220 customers.

### ***Florida Inland Navigation District***

FSD-6 & 13: FY 2000-2001: FIND provided \$3,936,350 in assistance to local governments, which after local matching contributions amounted to \$9,200,969 for projects in Brevard, Martin and Indian River counties. Major projects included: Turkey Creek Channel Dredging – sponsored by SJRWMD; \$750,000 FIND assistance of \$2,200,000 total budget. Stuart Anchorage, Phase II – sponsored by the city of Stuart; \$312,750 FIND assistance of \$625,500. Lee Wenner Park Improvement, Phase II – sponsored by Brevard County; \$279,469 FIND assistance of \$566,436 total budget. Indian River Waterway Enhancement – sponsored by the City of Sebastian; \$170,000 FIND assistance of \$425,000 total budget. Ft. Pierce Inlet Boat Launch – sponsored by St. Lucie County; \$251,986 FIND assistance of \$825,900 total budget.

FSD-6: Funding Partner in Taylor Creek Environmental Dredging Project.

ICW Economic Studies Martin, St. Lucie & Indian River Counties Phase II.

W-3: Spoil Island Enhancement and Restoration.

FSD-6: ICW Dredging.

MON-2: MRC Citizens Water Quality Monitoring Program.

W-6: Ballard Park Shoreline Stabilization.

W-6: Wabasso Causeway Park Improvements.

MB-6: Marine Enforcement Program, Police Marine Patrol Boat.

FSD-13: Castaways Point Park Improvements.

PIE-2: Educational Nature Trail.

W-6: GIS Spoil Island Project.

### ***Florida Fish and Wildlife Conservation Commission***

LA-1 and MON-1: Update of GIS Landsat vegetation maps of the Indian River Lagoon for 2001.

### **Other Organizations' Activities**

#### ***Palm Beach County***

BD-3: IRL License Plate Funding FY 2000-01 – SFWMD contract with the Environmental Learning Center provided \$925 to execute a Red Mangrove Planting project in Palm Beach County.

FSD-6: IRL License Plate Funding FY 2000-01 – SFWMD contract with the Jupiter Inlet District provided \$25,000 to execute the Sims Creek Siltation Removal project.

BD-3: IRL License Plate Funding FY 2000-01 – SFWMD contract with Palm Beach County Parks and Recreation provided \$22,600 to execute the Coral Cove Park Exotic Plant Removal and Shoreline Revegetation Enhancement project.

#### ***US Geological Survey***

DIM-1, 2 & 4: Cooperative project between SJRWMD/USGS for Hydrologic Monitoring in the IRL.

#### ***National Ocean Service and National Oceanic and Atmospheric Administration***

MON-1: St. Lucie River Issues Team 2001-02 Project: Environmental Toxicity in SLE/IRL.

#### ***National Marine Fisheries Service and National Oceanic and Atmospheric Administration***

F-2 & ETS-4: St. Lucie River Issues Team 2001-02 Project: Fish Health Problems in the SLE.

***Institute of Food and Agricultural Sciences***

FSD-4: St. Lucie River Issues Team Project 2000-01: Golf, Urban, Past Water Quality; Citrus and Vegetable Water Quality; Citrus Pesticide BMP, and Water Table Management as a BMP.

FSD-4 & 6: St. Lucie River Issues Team 2001-02 Project: Water Table Management as a BMP, Phase 3; Golf, Urban, Past Water Quality; Citrus and Vegetable Water Quality; and Muck.

***St. Lucie County Cooperative Extension Unit***

FSD-13: St. Lucie River Issues Team Project 2000-01: Dupuis Restoration.

***North St. Lucie Water Control District***

FSD-4: St. Lucie River Issues Team Project 2000-01: NSLWCD BMP.

***City of Stuart***

FSD-13: St. Lucie River Issues Team Projects 2000-01: Haney Creek, Frazier Creek, Krueger Creek, and North Point CRA.

FSD-13: St. Lucie River Issues Team Projects 2001-02: Poppleton Creek, and-Frazier Creek.

***City of Ft. Pierce***

FSD-13: St. Lucie River Issues Team Project 2001-02: Moore's Creek Stormwater Retrofit.

***Town of Sewall's Point***

FSD-13: St. Lucie River Issues Team Projects 2001-02: Rio Vista Outfall Retention Area Retrofit.

FSD-13: Island Road Baffle Box, Complete \$47,000

**SECTION 4. DISCUSSION OF MAJOR GOALS/FOCUS FOR THE COMING YEAR AND ANY CHANGES IN PRIORITIES**

The program has been and continues to be very successful in forming partnerships with federal and state agencies and local governments to implement projects benefiting the IRL. Over \$30 million in federal, state and local dollars are committed along with SJRWMD and SFWMD dollars to current lagoon initiatives. Many of the current initiatives are continuing efforts, such as development of pollutant load reduction goals for impaired waters in the basin, reconnection of impounded salt marshes to the lagoon, and implementation of stormwater planning and retrofit projects with local governments. Others are new initiatives, such as construction of in-canal stormwater best management practices facilities in the Indian River Farms Water Control District, the construction of a stormwater park within the City of Sebastian, implementation of the C-1 Western Diversion Project which will reduce the volume and flow rate of freshwater discharges to the IRL, and the implementation of environmental muck sediment dredging in the lagoon's tributaries to prevent the re-suspension of sediments and the flushing of muck into the lagoon.

The primary goal of the Indian River Lagoon Program continues to be:  
To attain and maintain water and sediment quality needed to support a macrophyte-based system, endangered and threatened species, fisheries, and recreation in the Indian River Lagoon.

| Measures  |  | Baseline Data   |  |
|---|--|---|--|
| <ul style="list-style-type: none"> <li>• Designated use determinations in the DEP 305(b) Report for IRL watersheds in SJRWMD</li> <li>• Extent of seagrass coverage in SJRWMD</li> <li>• Acres of impounded wetlands reconnected under SWIM, and acres of dragline-impacted wetlands rehabilitated</li> </ul> |  | <ul style="list-style-type: none"> <li>• Watersheds with use determinations (20 of 59) in 1998: five fully meeting, 14 partially meeting, and one not meeting their designated use</li> <li>• 57,000 acres in 1996</li> <li>• Zero acres as of 1990, zero acres as of 1999</li> </ul> |  |
| Program Components  | FY 2002-2003 Tasks   |   |  |
| <b>Monitoring</b>   | <ol style="list-style-type: none"> <li>1. Continue monitoring of water quality and seagrass health and coverage in the IRL system.</li> <li>2. Incorporate all historic data, for future seagrass change analysis and targets by 2006.</li> <li>3. Collect and analyze data from the CASTnet atmospheric deposition site at Sebastian Inlet.</li> <li>4. Refine and evaluate bathymetric coverage to rectified 2001 imagery.</li> <li>5. Continue to evaluate the water quality / seagrass link to support PLRG development.</li> <li>6. Add one additional lagoon tidal station in segment 24.</li> <li>7. Implement a "State of the Watershed - 2004" conference, to serve as a benchmark for future evaluation of non-point source pollution abatement success, and identify unmet needs for the SIRL and the SLE.</li> </ol> |   |  |
| <b>Water quality goal development</b>   | <ol style="list-style-type: none"> <li>1. Propose seagrass depth coverage targets, light targets, and related water quality concentration targets</li> <li>2. Begin planning of stormwater retention and BMP facilities to meet the recommended freshwater discharge criteria for the Sebastian River estuary based on proposed salinity targets.</li> <li>3. Improve estimates of pollutant loadings in runoff to the IRL from un-gauged watersheds.</li> <li>4. Utilize the pollutant load reduction model in developing final PLRGs for impaired waters in the IRL.</li> </ol>  |   |  |

|   |   |
|---|---|
| <b>Wetland and shoreline rehabilitation</b> | <ol style="list-style-type: none"> <li>1. Reconnect additional impounded marshes in the MINWR and other impounded wetlands as they are acquired under public ownership.</li> <li>2. Continue to collect and analyze data on the effects of different management regimes on wetland functions in reconnected impoundments.</li> <li>3. Complete the rehabilitation of an additional 30 acres of dragline-impacted wetlands in the Mosquito Lagoon.</li> <li>4. Fully reconnect all mosquito impoundments in the southern IRL by 2006.</li> <li>5. Continue coordination with FDEP and others to develop habitat restoration plans for spoil islands.</li> <li>6. Continue to support exotic removal and habitat restoration projects.</li> <li>7. Continue to identify and evaluate potential mangrove planting sites, conduct a minimum of ten new plantings, monitor and evaluate previously planted sites, and assess alternative planting methods and technologies.</li> <li>8. Acquire identified priority parcels within the IRL Blueway CARL Project from willing sellers and through opportunity acquisitions when available.</li> </ol>   |
| <b>Pollution control</b>                    | <ol style="list-style-type: none"> <li>1. Complete construction of the spoil management site for the Sebastian River muck dredging project, and finalize plans to begin dredging operations.</li> <li>2. Provide cost-share funding for implementation of the first phases of the Crane Creek master surface water management plan, and complete construction of stormwater management projects in Fellsmere, and with Volusia, Brevard and Indian River Counties.</li> <li>3. Conduct annual local government stormwater cost-share program for IRL.</li> <li>4. Continue construction of stormwater management facilities in Palm Bay and Sebastian, and implementation of BMPs at Indian River Farms Water Control District.</li> <li>5. Finalize the design of the Sebastian River WCD stormwater treatment system and begin construction of recommended BMPs.</li> <li>6. Complete post-project BMP effectiveness monitoring and a post-dredge environmental assessment of Crane Creek, and begin the post-dredge assessment of Turkey Creek.</li> <li>7. Continue to support implementation of citrus agricultural BMPs to determine nutrient loadings from alternative citrus grove management scenarios.</li> <li>8. For the C-1 Western Re-Diversion Project, complete construction of the Sawgrass Lake Water Management Area treatment wetland, and complete contamination sampling in the SLWMA.</li> <li>9. Completion of Moore's Creek Retrofit Project, and full implementation of voluntary BMPs in the C-25/Ft. Pierce Farms Basin.</li> <li>10. Completion of Taylor Creek Sediment Removal Project by 2006.</li> <li>11. Replacement of Indian River Dr stormwater outfall pipes in St. Lucie County</li> <li>12. Continue installation of baffle boxes in Sewall's Point, and other sites that discharge stormwater directly to the lagoon.</li> <li>13. Initiation of the Manatee Creek Basin Retrofit Project in Martin County.</li> <li>14. Continue support for implementation of voluntary BMPs through the Indian River Citrus League, and the St. Lucie River Initiative</li> <li>15. Support implementation of the CCMP using IRL license tag and federal funds.</li> </ol> |
| <b>Coordination with Other Agency Plans</b> | <ol style="list-style-type: none"> <li>1. Continue implementation of the IRL-South Plan, and begin implementation of the IRL-North Plan in cooperation with the USACE.</li> <li>2. Continue to communicate and coordinate with FDEP, other agencies, and stakeholders in PLRG establishment, and any future TMDL activities.</li> <li>3. Continue support and coordination with the St. River Issues Team.</li> <li>4. Continue support and coordination with local governments and other partners.</li> </ol>  |
| <b>Public outreach and involvement</b>      | <ol style="list-style-type: none"> <li>1. Continue public outreach and involvement activities.</li> </ol>   |

## ***FY 2002-2003 IMPLEMENTATION PROJECTS***

These projects are recommended for funding to the IRL Advisory Board under this work plan with US EPA Section 320 funds and the non-federal matching dollars for the grant.

The following project descriptions are brief, conceptual summaries. Detailed scopes of work will be developed for each project for contract negotiations and implementation.

### **Implementation Project FSD-6 (d) Year 2: IRL Post-Dredge Assessment Project**

Among the several measures that are being taken to restore the Indian River Lagoon (IRL) is the removal of large deposits of muck where it is likely to contribute to water quality problems (especially with respect to high concentrations of suspended material, turbidity, and low dissolved oxygen concentrations). One such area where a significant quantity of muck was removed is Crane Creek, a tributary located in the central IRL basin. The creek receives stormwater runoff and concomitant suspended material from urban and residential land uses throughout the cities of Melbourne, West Melbourne, and Melbourne Village. Approximately 90,000 cubic yards of muck sediment were removed from Crane Creek in the winter of 1998. The amount of muck removed constituted a partial removal affecting primarily the navigational channels and basins of the Creek's lower reach. It is important to evaluate the effectiveness of the Crane Creek muck removal project to determine whether the environmental objectives (e.g., sediment trapping efficiency, improved sediment quality, increased dissolved oxygen in the creek's water column) were met by the partial removal of a muck deposit, and to assist the agency in the design of future muck removal projects to improve their effectiveness. The information generated from this project will not only have application to the IRL program but to other restoration programs.

Role of Partner: The SJRWMD will complete this assessment to determine the beneficial improvements from environmental muck dredging projects

Estimated Date of Completion: September 2003

Budget: \$69,000

Funding Sources: EPA/NEP

### **Implementation Project MON-2(a) Year 7: Citizens Volunteer Water Quality Monitoring Network**

Continuation of the ongoing volunteer water quality monitoring program administered by the Marine Resources Council (MRC). Data produced by this network is uploaded to STORET on a regular basis and is made available to agencies and local governments.

Role of Partner: The MRC maintains a network of 85 sites monitored by volunteers on a weekly basis, one of the largest citizens monitoring programs in the U.S.

Estimated Date of Completion: September 2003

Budget: \$60,000

Funding Sources: EPA/NEP

### **Implementation Project FI-1(a) Year 6: CCMP – Grants Writer/Facilitator**

Contracted grant writing support provided to local governments in the IRL basin. Through this project 32 proposals (primarily stormwater projects) have been submitted with 24 grants awarded providing \$11.3 million in assistance since 1997 totaling \$63.6 million in implementation projects benefiting the Lagoon.

Role of Partner: The grants writer assists local governments in preparing grant applications and responds to requests for additional information.

Estimated Date of Completion: June 2004

Budget: \$64,000 (\$43,820 base funding; \$20,180 incremental incentive bonus)

Funding Sources: EPA/NEP

### **Implementation Project FSD-6(c): Taylor Creek Restoration Dredging**

This dredging project will remove an estimated 200,000 cubic yards of sediment from Taylor Creek, in St. Lucie County, to improve water quality in the southern IRL. St. Lucie County has contracted a firm to complete the engineering, design, and permitting by November 2002. This funding will cover additional project costs incurred due to the unavailability of permanent upland sites in the area, which necessitated the costly separation and dewatering of sediments before transportation to final beneficial use sites.

Role of Partner: St. Lucie County as the project partner is responsible for the completion of the project.

Estimated Date of Completion: April 2004

Budget: \$50,000 additional (\$115,000 to date)

Funding Sources: EPA/NEP

Implementation Project PIE-2(c): Martin County Youth Education Camp Wet

Camp Wet is a turnkey project conducted by the Martin County School's Environmental Studies Center providing 156 children from diverse backgrounds with a two-week camp experience studying Florida's fragile environment and the Indian River Lagoon through a series of hands-on field investigations.

Students explore seagrass beds using seining nets to collect and identify species for further study, visit mangrove communities, learn about reefs and marine organisms, discover the sources of muck in the St. Lucie River, and complete other activities including games and puzzles to teach concepts and illustrate the fragile nature of the environment.

Role of Partner: Martin County Environmental Studies Center conducts the program, providing transportation, staff and materials for the camp.

Estimated Date of Completion: September 30, 2003

Budget: \$45,000 (\$20,000 NEP; \$25,000 Martin County and student registrations)

Funding Sources: EPA/NEP

Implementation Project: PIE-2(b) Year 4: IRL Information Library and Shoreline Restoration Project

Continuation of ongoing efforts with the MRC to develop and operate a centralized repository of IRL publications and other resource materials. This center provides assistance to students and citizens requesting additional information about the IRL. In addition, support is provided to MRC's exotic plant removal/ shoreline habitat restoration program.

Role of Partner: MRC as the project sponsor maintains the library, catalogues new materials, and responds to requests for information. They also conduct weekly Brazilian Pepper Tree "Busts" with volunteers.

Estimated Date of Completion: September 2003

Budget: \$25,000

Funding Sources: EPA/NEP

Implementation Project W-6(a) Year 7: Establishment of Fringing Mangrove Habitat

Support of ongoing shoreline restoration program undertaken by the Environmental Learning Center (ELC). To date, more than a mile of shoreline has been planted and monitored at sites ranging from Jupiter Inlet to Merritt Island. Project partners include SFWMD, USFWS, FIND and FDEP.

Role of Partners: ELC as project partner conducts weekly mangrove planting projects with volunteers and monitors previously planted sites.

Estimated Date of Completion: April 2004

Budget: \$25,000

Funding Sources: EPA/NEP: \$15,000; SFWMD: \$10,000 in-kind

Implementation Project PIE-2(a): Educate the Public and Governments about the Resources of the IRL

Provides funds for the development, publication and distribution of outreach materials (brochures, fact sheets, etc.) by the IRL Program and support of outreach programs.

Estimated Date of Completion: September 2003

Role of Partners: Project partners provide distribution of materials and information throughout the watershed.

Budget: \$33,600

Funding Sources: EPA/NEP

Implementation Project FSD-13: Stormwater Implementation Projects

Support for implementation of prioritized urban drainage system retrofits. These funds are often combined with SJRWMD ad valorem monies, state legislative appropriations, or with funds generated by the IRL license plate to support regional retrofit or upgrade projects.

Role of Partners: Project partners provide match to complete projects, monitor results, and maintain stormwater systems.

Estimated Date of Completion: February 2005

Budget: \$447,000

Funding Sources: EPA/NEP \$62,000; SJRWMD \$285,000; Local Government \$100,000 (cash).

Implementation Project FSD-4(b): BMP Implementation in the Citrus Industry

The IRL's citrus industry has an annual economic impact of over \$2.1 billion dollars in the lagoon's watershed. The implementation of Best Management Practices (BMPs) to achieve economic and environmental benefits will be continued in cooperation with SFWMD, University of Florida-IFAS, and the Indian River Citrus League. The goal of these BMPs is to reduce the harmful discharge of nutrients and suspended solids from citrus production to the lagoon. The performance of environmental assessments of crop management operations, reducing aquatic plants within canals and waterways, off-site transport of pesticides, metals, sediments and fertilizers, and the control of agricultural runoff as a source for irrigation are other BMPs being monitored for effectiveness and cost/benefit.

Estimated Date of Completion: January 2004

Role of Partner: UF-IFAS has installed monitoring equipment to determine the effectiveness of BMPs in citrus groves.

Budget: \$65,000

Funding Sources: EPA/NEP \$40,000; SFWMD \$25,000 (cash).

Implementation Project BD-1(a) Year 4: IRL Species Inventory & Relational Data Base (Smithsonian)

Development and inclusion of additional species reports in the existing on-line species inventory developed by the Smithsonian Marine Station at Fort Pierce (<http://www.sms.si.edu>). This information has proven quite valuable to students and educators throughout the IRL region.

Role of Partner: Smithsonian maintains and updates the relational data base and inventory on the web site.

Estimated Date of Completion: June 2004

Budget: \$35,000

Funding Sources: EPA/NEP

Implementation Project IM-1(a): Wetland Restoration (Impoundment Reconnection)

This project will implement wetland restoration and impoundment reconnection. Funds will be used to purchase culverts and pumps for the reconnection and management of impounded wetlands, to restore impoundment shorelines to near pre-impoundment condition, to restore wetlands damaged by dragline ditching for mosquito control, and other wetland restoration efforts.

Role of Partners: SJRWMD, USFWS, and the Volusia, Brevard, and Indian River County Mosquito Control Districts as project partners restore impounded wetlands and monitor their effectiveness.

Estimated Time for Completion: 2004

Budget: \$ 100,000

Funding Sources: SJRWMD

Implementation Project MON-2(b): CASTnet National Atmospheric Deposition Program Site

This project continues the support of the established CASTnet site at Sebastian Inlet being used to improve the IRL Program's quantification of nutrient loadings from airborne deposition. The data from this site, will be joined with atmospheric deposition site data in the northern and central portions of the watershed to estimate the total loadings of nutrients to the watershed from airborne deposition. The EPA selected laboratory for this work is ESE Labs in Gainesville.

Role of Partner: Indian River County as project partner collects samples from the site and records data collected, sending samples and data to the lab in Gainesville for analysis.

Estimated Date of Completion: March 2004

Budget: \$10,000

Funding Source: SJRWMD (match toward CASTnet Grant, not NEP grant)

ANS Species Grant Australian Spotted Jellyfish:

*Phyllorhiza punctata*, Australian spotted jellyfish are native to the waters of Australia, and is considered invasive in the U.S. *Phyllorhiza* first appeared in the IRL in June 2001, as their population was estimated to be between 300-500 during the summer of 2001. Spotted jellies are voracious eaters that consume small fish eggs, larvae and other microzooplankton. The appearance of hundreds-of-thousands of these jellies in Mobile Bay during 2000 caused concern among ecologists and the general public who feared that an established population would be damaging to fish and shrimp stocks. Based upon these findings the IRLNEP initiated a partnership with the Mobile Bay NEP and was awarded an NEP Aquatic Nuisance Species Grant to develop an NEP Action Plan for this invasive species. This collaborative, regional grant addresses the four challenges identified by the EPA-ANEP ANS Roundtable including the need to raise public awareness / understanding of the problem, the need to enhance information about the scope of the problem and determine pathways of introduction, develop a NEP regional assessment and monitoring plan and establish links with institutions to coordinate the ANS challenge.

Role of Partners: The IRLNEP and Mobile Bay NEP in cooperation with Dauphin Island Sea Lab, the Mississippi-Alabama Sea Grant and Florida Sea Grant, Smithsonian Marine Station, Harbor Branch Oceanographic, Florida Marine Research Institute and Barataria-Terrebonne Bay NEP in association with several local ngo's will produce viable public awareness and outreach programs with the expansion of the Dock Watch Program, conduct coordinated rapid assessment surveys, and develop a specific ANS Assessment Plan.

Estimated Date of Completion: September 2003

Budget: \$44,000

Funding Sources: US EPA Headquarters, IRLNEP and Mobile Bay NEP

***TOTAL FUNDS LEVERAGED 2001-2002***

| <b>Project Category</b>                  | <b>Management<br/>Conference CCMP<br/>Implementation<br/>Funding</b> | <b>Leveraged</b>  | <b>Total</b>      |
|--|--|-------------------|-------------------|
| Stormwater Management and Implementation | 8,270,272  | 32,647,002        | 40,917,274        |
| Habitat Enhancement and Restoration      | 2,785,779  | 991,979           | 3,777,758         |
| Public Information and Education         | 193,000  | 82,885            | 275,885           |
| Agricultural BMPs Implementation         | 2,112,507  | 2,112,507         | 4,225,014         |
| <b>Total</b>                             | <b>13,361,558</b>  | <b>35,834,373</b> | <b>49,195,931</b> |

**TABLE 1**  
*Annual Budget*

|   |                    |
|---|--------------------|
| US EPA Base Funds                         | 300,000            |
| Congressional Earmark                     | 200,000            |
| US EPA Outreach Grant                     | 10,000             |
| St. Johns River Water Management District | 365,000            |
| South Florida Water Management District   | 45,000             |
| County / Municipality (in-kind) match     | <u>100,000</u>     |
|   | <b>\$1,020,000</b> |
| <hr/>                                     |                    |
| ANS Species Grant                         | 40,000             |
| ANS Grant in-kind match                   | <u>4,000</u>       |
| Total                                     | <b>\$1,064,000</b> |

**Projected Expenses:**

**Travel**

|                      |            |
|----------------------|------------|
| Per Diem and Mileage | 10,000     |
| Air Travel           | 6,000      |
| Car Rental           | <u>500</u> |
| Total                | 16,500     |

**Equipment & Supplies**

|                            |              |
|----------------------------|--------------|
| Field Supplies & Equipment | 5,200        |
| Stationary & Office        | <u>2,000</u> |
| Total                      | 7,200        |

**Contractual/Consultant Services\***

|                                |            |
|--------------------------------|------------|
| CCMP Implementation Activities | \$983,600* |
|--------------------------------|------------|

**Other**

|                          |              |
|--------------------------|--------------|
| Advertisements           | 200          |
| Printing                 | 8,000        |
| Registration/Conferences | <u>4,500</u> |
| Total                    | 12,700       |

|                          |             |
|--------------------------|-------------|
| TOTAL PROJECTED EXPENSES | \$1,020,000 |
|--------------------------|-------------|

|                                   |               |
|-----------------------------------|---------------|
| ANS SPECIES GRANT & IN-KIND MATCH | <u>44,000</u> |
|-----------------------------------|---------------|

|                               |                    |
|-------------------------------|--------------------|
| <b>TOTAL FUNDING FY 02-03</b> | <b>\$1,064,000</b> |
|-------------------------------|--------------------|

\*Contractual/Consultant Services includes SJRWMD, SFWMD, & County Non-Federal Program Match of 50%.

**TABLE 2**  
*Work Plan Implementation Projects*

| <b>Project</b>                                    | <b>EPA/NEP</b> | <b>SJRWMD</b>  | <b>SFWMD</b>        | <b>LOCAL</b>   | <b>TOTAL</b>   |
|---|----------------|----------------|---------------------|----------------|----------------|
| <i>Action Plan</i>                                |                |                |                     |                |                |
| Post Dredge Assessment Project                    | 69,000         | 0              | 0                   | 0              | 69,000         |
| MON-2(a) CVWQMN                                   | 60,000         | 0              | 0                   | 0              | 60,000         |
| CCMP Grants Writer                                | 64,000         | 0              | 0                   | 0              | 64,000         |
| Taylor Creek Restoration Dredging                 | 50,000         | 0              | 0                   | 0              | 50,000         |
| Martin County Youth Education Project             | 20,000         | 0              | 0                   | 0              | 20,000         |
| IRL Library & Shoreline Project (MRC)             | 25,000         | 0              | 0                   | 0              | 25,000         |
| Shoreline Restoration (ELC)                       | 15,000         | 0              | 10,000 <sup>+</sup> | 0              | 25,000         |
| Public Information and Education                  | 33,600         | 0              | 0                   | 0              | 33,600         |
| Stormwater Implementation Projects                | 62,000         | 265,000*       | 0                   | 100,000*       | 427,000        |
| Citrus BMPs                                       | 40,000         | 0              | 25,000 <sup>+</sup> | 0              | 65,000         |
| IRL Species Inventory (Smithsonian)               | 35,000         | 0              | 0                   | 0              | 35,000         |
| Wetland Restoration<br>(Impoundment Reconnection) | 0              | 100,000*       | 0                   | 0              | 100,000        |
| SFWMD Cash Match                                  | 0              | 0              | 10,000*             | 0              | 10,000         |
| <b>TOTAL</b>                                      | <b>473,600</b> | <b>365,000</b> | <b>45,000</b>       | <b>100,000</b> | <b>983,600</b> |

\*Cash

<sup>+</sup>In-kind

|                                     |        |        |   |   |        |
|-------------------------------------|--------|--------|---|---|--------|
| CASTnet Atmospheric Deposition Site | 0      | 10,000 | 0 | 0 | 10,000 |
| ANS Species Grant                   | 44,000 | 0      | 0 | 0 | 44,000 |

## APPENDIX II

### Indian River Lagoon Program Staff

#### **Troy Rice, Program Director**

##### Principal Duties and Responsibilities:

- Directs the IRL Project Office and staff, and provides primary staff support to the IRL Advisory Board.
- Coordinates with other agency and local government representatives on lagoon restoration, stormwater, and habitat enhancement projects.
- Develops strategies to keep implementation activities on schedule and within budget.
- Manages information resources to public and private individuals and organizations interested in CCMP implementation.
- Facilitates partnerships between and among agencies, governments and organizations to accomplish restoration and implementation activities.
- Oversees and provides project management for IRL Program/SJRWMD projects and programs.

#### **Robert Day, Environmental Scientist IV**

##### Principal Duties and Responsibilities:

- Provides technical support for the IRL Advisory Board and other IRL Program staff.
- Provides presentations on IRL-related issues to the public, other agencies and the IRL Advisory Board.
- Participates in the development of projects and programs designed to support the implementation of the IRLCCMP.
- Provides project management for IRL Program/SJRWMD projects and programs.
- Participates in the development, refinement, coordination and implementation of environmental assessment and monitoring programs in the IRL Basin.

#### **Linda Goode, Public Communications Specialist II**

##### Principal Duties and Responsibilities:

- Provides project and contractual management in the administration of IRL marketing, public education and outreach contracts, including the IRL License Plate program.
- Coordinates and participates in public education events to present IRL outreach information and displays, including two Shallow Water Expo events.
- Coordinates with the NEP Citizens Action Committee Chair to reestablish a viable and active citizen's committee for the NEP Program.
- Prepares quarterly summaries of marketing and outreach activities.
- Provides support for development of annual work plans, reports and presentations.

#### **Kathy Recore, Business Resource Specialist IV**

##### Principal Duties and Responsibilities:

- Provide timely notices of funding sources to SJR project managers, local governments, state and Federal agencies and nonprofit organizations for implementation of the IRL Comprehensive Conservation and Management Plan and other water quality and water supply initiatives.
- Research and provide information on alternative funding sources for specific projects on request.
- Maintain electronic database of funding opportunities to be included on the SJR/IRL website.
- Provides administrative support for the Indian River Lagoon Advisory Board and Association of National Estuary Programs.
- Provides administrative support for the Indian River Lagoon Advisory Board and Association of National Estuary Programs.
- Monitors developments and changes to the Federal electronic grant management initiative.

#### **Ima Bujak, Project Administrator**

##### Principal Duties and Responsibilities:

- Performs project management and contract administration for the IRL Program.
- Assists in budget preparation and financial administration.
- Assists in development of Management Conference reports, including annual work plans.
- Provides support and coordinates with IRL Program staff, local government representatives, and IRL Advisory Board to develop and execute projects for implementation of the IRLCCMP.
- Assists in planning and participate in Management Conference activities, such as public workshops and committee meetings.

**APPENDIX II**

**ALLOCATION OF FY 2001-2002 EPA TRAVEL FUNDS**

In compliance with the requirement to document the use of EPA outreach/travel funds as specified in the NEP FY 2001 Funding Guidance and Requirements for Grants memo the following details these expenditures for the period October 2001 through March 2002.

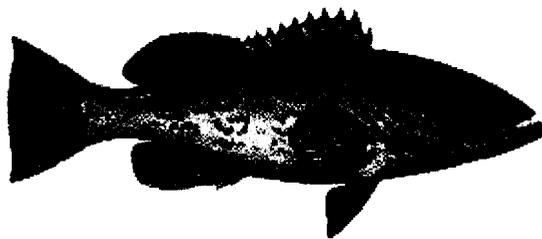
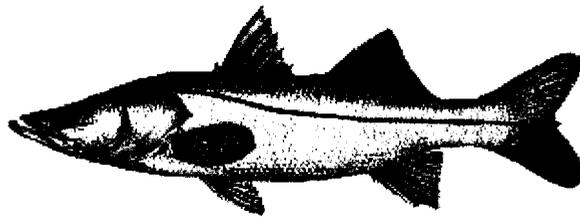
The Indian River Lagoon National Estuary Program expended 70 percent of the \$10,000 in EPA travel funds during the first six months of the fiscal year. The availability of these funds continues to be an important component of the Indian River Lagoon NEP's outreach and coordination efforts with other programs around the nation, the EPA Regional Office and Headquarters, and the Association of National Estuary Programs. The Indian River Lagoon NEP has utilized these funds to attend the US EPA/ANEP's Annual Meeting in Washington D.C. and the Fall Meeting in St. Petersburg, Florida.

| TRAVEL DATES   | LOCATION & PURPOSE   | COST            |
|----------------|--|-----------------|
| 11/07-11/01    | St. Petersburg, Florida –<br>US EPA/ANEP Fall Meeting<br>Troy Rice, Robert Day, Ed Garland, and Ima Bujak      | \$ 2,300        |
| 03/11-15/02    | Washington, D.C. – (Estimate)<br>NEP National Meeting US EPA/ANEP<br>Troy Rice, Robert Day, and Linda Burnette | \$ 3,500        |
| 04/30-05/01/02 | Atlanta, Georgia –<br>EPA Region IV Regional NEP Meeting<br>Troy Rice, Robert Day, and Ed Garland              | \$ 1,216        |
| Total          |  | <u>\$ 7,016</u> |

| 2002-2003<br>PROPOSED<br>TRAVEL DATES | LOCATION & PURPOSE   |
|---------------------------------------|--|
| 11/2002                               | Ocean City, Maryland –<br>ANEP Fall Meeting<br>Troy Rice, Robert Day, Linda Burnette, and Ima Bujak            |
| 03/2003                               | Washington, D.C. –<br>NEP National Meeting US EPA/ANEP<br>Troy Rice, Robert Day, Ima Bujak, and Linda Burnette |
| 09/14-18/2003                         | Seattle, Washington –<br>Estuarine Research Federation<br>Troy Rice, Robert Day, and Ima Bujak                 |



**EIGHTH YEAR WORK PLAN  
TO IMPLEMENT THE INDIAN RIVER LAGOON  
COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN  
FISCAL YEAR 2003 – 2004**



*Indian River Lagoon National Estuary Program  
525 Community College Parkway  
Palm Bay, FL 32909*

**APPROVED BY**

**THE INDIAN RIVER LAGOON BASIN ADVISORY BOARD**

**APRIL 23, 2003**

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## **SECTION 1. HIGHLIGHTS & INTRODUCTION**

The Indian River Lagoon Basin Advisory Board, as the National Estuary Program's Management Conference, is continuing to increase the momentum of implementation activities under the umbrella of the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP). During the seventh year of post-CCMP implementation, the Advisory Board has continued to implement water and sediment quality improvement projects, living resources and habitat enhancement efforts, and promote public and governmental support and involvement in CCMP implementation by effectively establishing partnerships and maintaining lines of communication and facilitation between the lagoon's management agencies, local governments and citizens.

The Advisory Board consists of representatives from the US Environmental Protection Agency (EPA); the Florida Department of Environmental Protection (FDEP); the St. Johns River Water Management District (SJRWMD); the South Florida Water Management District (SFWMD); the counties of Volusia, Brevard, Indian River, St. Lucie and Martin; the chairs of the Technical and Citizens Advisory Committees; the US Army Corps of Engineers (USACE); the National Aeronautics and Space Administration (NASA); the US Fish and Wildlife Service (USFWS); the US Department of Agriculture's Natural Resources Conservation Service (USDA/NRCS); the Florida Fish and Wildlife Conservation Commission (FFWCC); the Florida Inland Navigation District (FINN); and The Nature Conservancy (TNC).

Significant progress has been achieved in the Program's ongoing efforts to implement actions within the CCMP during 2002 and 2003:

Successful state legislative funding appropriations have provided over \$14 million to the SJRWMD in 2002-2003 for lagoon restoration and water quality improvement projects. This funding is being applied towards local government cost-share stormwater projects from Volusia through Indian River Counties, stormwater management master plan designs, the reconnection of salt marsh mosquito impoundments, and continuing project assessment research and data collection for use in developing PLRGs.

The SFWMD continues to lead lagoon restoration efforts and CCMP implementation in the southern lagoon region. Partnerships between the SFWMD and St. Lucie have restored impounded mosquito marshes and constructed stormwater treatment projects. In Martin County, the SFWMD is continuing the implementation of the Stuart SWIM project, has funded stormwater retrofits in cooperation with the county's stormwater utility program, and recently completed the acquisition of over 13,000 acres of isolated wetlands and pine flatwoods uplands known as the Allapattah Ranch in cooperation with Martin County and the USDA-NRCS. The SFWMD in partnership with USACE has completed the IRL South Feasibility Study Plan and is pursuing congressional funding under WRDA to implement the Plan's recommended priorities. The SFWMD is requesting an additional \$10 million in State assistance for implementation of priority projects identified by the St. Lucie River Issues Team for 2003-04, adding to the \$26.5 million already being used to implement 87 projects in Martin and St. Lucie Counties.

A portion of the SJRWMD's state funding, \$2 million is designated for the St. Sebastian River Dredging Project. This funding will be added to previous appropriations of \$3.8 million to construct a spoil management disposal site and initiate muck removal, now that the required engineering, diagnostic and characterization work for obtaining state and federal permits for the project are complete. This project will provide immediate improvements in water quality and habitat in the Sebastian River system and the IRL. This project will also contribute to the implementation of future total maximum daily loads (TMDLs) applied to the Sebastian River.

The SJRWMD & SFWMD are continuing to work in unison collecting and managing technical data to develop Pollutant Load Reduction Goals (PLRGs) as a precursor to the setting of Total Maximum Daily Load (TMDL) allocations by FDEP, estimated in the lagoon in 2004-05.

The water management districts in partnership with the USFWS and local mosquito control districts continue to monitor reconnected impounded wetlands for wildlife habitat and water quality improvements, while working to reconnect additional impoundments.

Local governments continue to actively pursue partnerships with the water management districts, FDEP and other agencies to implement stormwater retrofit and habitat restoration projects.

Intergovernmental coordination activities are reported to elected officials, agency managers and the public on basin-wide work being conducted by federal, state and local programs. The Marine Resources Council, under contract with the National Estuary Program, hosted numerous regional lagoon quarterly citizen workshops in each of the five lagoon counties, and two (one northern, one southern) lagoon conferences to inform the general public and elected officials about implementation activities and the status of the lagoon's water quality and habitat restoration initiatives. IRL Program staff continues to participate on local and lagoon-wide resource management committees and in quarterly county stormwater working group meetings.

The IRL NEP recently hosted the successful EPA sponsored "Emerging Technologies, Tools, and Techniques To Manage Our Coasts in the 21<sup>st</sup> Century" conference in January 2003 in Cocoa Beach. This conference in celebration of the 30<sup>th</sup> anniversary of the Clean Water Act, the Marine Protection, Research, and Sanctuaries Act, and the Coastal Zone Management Act focused on our vital coastal and ocean waters and the emerging tools, techniques and strategies needed to enhance our management and protection of coastal ecosystems over the next 25 years. The IRL NEP has also been involved in the planning and organization of a state-wide (Gainesville, FL – February 2003) and regional (Melbourne, FL – April 2003) citizens volunteer water quality monitoring conference, also being sponsored by EPA.

SJRWMD and SFWMD Environmental Sciences staff completed an update to the Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan, as the state-water management district's ecosystem restoration plan and sister document to the IRLCCMP. The updated 2002 SWIM Plan provides the most current, comprehensive information about the lagoon's seagrass and water quality, coastal wetlands and public involvement and education issues; and provides recommendations for action over the next 5 years.

As reported in the 2001-2002 Government Performance and Results Act (GPRA) Report, over 16,178 acres of habitat were rehabilitated, protected, or enhanced by IRL NEP management conference members last year. This impressive number of acres places the IRL second, only to the Barataria-Terrebonne Estuary Program in Louisiana, among the 28 NEP's around the country in habitat acreage protected during this time period.

Each member of the IRL NEP management conference continues to devote substantial resources and energy towards implementation. As reported in the 2002 GPRA Report, 100% of the CCMP's priority actions are being realized at some level (either: fully, substantially or moderately) according to their established timeline.

Over \$3 million dollars has been raised for implementation projects through the sale of the Florida Indian River Lagoon specialty license plate. This unique funding vehicle continues to provide project dollars for sediment traps, mangrove plantings, shoreline enhancements, muck dredging, impoundment reconnections and environmental education programs. The IRL License Plate ranks 11<sup>th</sup> in number of tags sold and 17<sup>th</sup> in revenue raised from among the 52 specialty plates offered in Florida.

Advocacy for lagoon restoration projects has increased through local, state and federal efforts. Public support for implementation of the CCMP continues to grow because of education and outreach activities. The use of informative outreach techniques including web based information (<http://irl.sjrwmd.com>), quarterly newsletters and other printed materials, and hands-on educational displays are informing and educating the public and elected officials about CCMP implementation successes. The production and distribution of the 2003 IRL photo contest/calendar has proven to be a very popular outreach and education tool, providing outstanding photos of the lagoon region and informative information about the lagoon for each month of the year.

The initiation of the ANS grant from US EPA Headquarters enabled the IRL NEP to partner with the Mobile Bay and Barataria-Terrebonne NEPs, Dauphin Island Sea Lab and others to expand the DockWatch volunteer monitoring program, conduct an assessment survey and develop an ANS assessment plan for the invasive Australian Spotted Jellyfish.

The IRL Basin Advisory Board continues to effectively implement the CCMP through enhanced partnership opportunities, communication and aggressive education and outreach activities. Continuing for the sixth year, is the budgeting of over 90 percent of the Federal EPA/NEP funds for implementation projects, with all salaries and benefits for staff being paid through the SJRWMD's Indian River Lagoon Program budget. This continuing

support is a reflection of the solid foundation of cooperation existing between the managing agencies, and of the desire for successful implementation of the CCMP. The momentum achieved during the first seven years of implementation is continuing to grow as additional funding sources are identified, more stormwater projects are completed, and as more stakeholders are educated on the ecological and economic importance of restoring North America's Most Diverse Estuary System.

The following summary lists the recommended projects to be funded under this work plan with US EPA Section 320 funds and the non-federal matching dollars for the grant. This Program budget estimate is based on level Congressional funding appropriations for EPA's National Estuaries Program from 2002-2003 appropriations.

**SUMMARY OF 2003 – 2004 WORK PLAN EPA FUNDING REQUEST**

|   |                    |
|---|--------------------|
| CCMP Implementation RFP .....                                   | \$ 135,000         |
| Citizens Volunteer Water Quality Monitoring Network (MRC) ..... | \$ 60,000          |
| CCMP Grants Writer.....   | \$ 60,000          |
| Martin County Youth Education Project.....                      | \$ 20,000          |
| IRL Library & Shoreline Project (MRC).....                      | \$ 25,000          |
| Shoreline Restoration Mangrove Plantings (ELC).....             | \$ 25,000          |
| Public Information and Education .....                          | \$ 30,600          |
| Stormwater Implementation Projects .....                        | \$ 80,000          |
| IRL Species Inventory (Smithsonian).....                        | \$ 38,000          |
| Operating, Travel Expenses, and Other .....                     | <u>\$ 33,085</u>   |
|   | <b>\$ 506,685</b>  |
| SJRWMD match.....   | \$ 271,685         |
| SFWMD match (Cash and In-kind).....                             | \$ 110,000         |
| Local Government match (In-kind).....                           | <u>\$ 125,000</u>  |
|   | <b>\$ 506,685</b>  |
| <b>Total</b>  | <b>\$1,013,370</b> |

## SECTION 2. PROGRAM ACCOMPLISHMENTS AND TRANSFERABLE SUCCESS STORIES

Sixty-four projects have been funded under the Program's seven implementation work plans since 1996. These projects range from the management of fresh/stormwater discharges, to wetlands protection; continuation of a grants writer consultant, water quality monitoring and improved biodiversity data management. The IRL Basin Advisory Board provides policy oversight and guidance for all projects. This section provides a brief update on the innovative, ongoing or recently completed projects included within the post-CCMP implementation work plans. Section 3, provides a listing of other actions conducted by members of the Advisory Board that are not specifically referenced in the work plans, but provide additional insight into overall lagoon management activities and CCMP implementation. All of these projects demonstrate a strong commitment by the members of the IRL Basin Advisory Board for implementation action and outline future direction for the Program.

### 2002-2003 WORK PLAN IMPLEMENTATION PROJECTS

| Project  | Funding Source |        |       |       |        | Completion Date | Deliverable   | Organization Responsible         |
|--|----------------|--------|-------|-------|--------|-----------------|---|----------------------------------|
|  | EPA/NEP        | SJRWMD | SFWMD | LOCAL | TOTAL  |                 |   |                                  |
| <i>Action Plan</i>   |                |        |       |       |        |                 |   |                                  |
| <u>MON-2(a) Year 7:</u><br>Citizens Volunteer<br>Water Quality<br>Monitoring Network     | 60,000         | 0      | 0     | 0     | 60,000 | Sep 2003        | IRL water quality<br>data uploaded to<br>STORET.  | Marine<br>Resources<br>Council   |
| <u>FI-1(c) Year 6:</u> CCMP<br>Grants<br>Writer/Facilitator                              | 48,320         | 0      | 0     | 0     | 48,320 | Mar 2004        | EPA 319 and<br>other grant<br>applications and<br>awards for local<br>governments   | Cape Canaveral<br>Scientific     |
| <u>PIE-2(c) Year 3:</u> IRL<br>Information Library &<br>Shoreline Restoration<br>Project | 25,000         | 0      | 0     | 0     | 25,000 | Sep 2003        | Centralized<br>repository of IRL<br>publications and<br>resource<br>materials. Exotic<br>plant removal/<br>shoreline habitat<br>restoration.                | Marine<br>Resources<br>Council   |
| <u>FSD-6 (d) Year 2:</u> Post<br>Dredge Assessment                                       | 69,000         | 0      | 0     | 0     | 25,000 | TBD             | Crane Creek water<br>quality and<br>sediment trapping<br>measures.  | SJRWMD                           |
| <u>W-6(b) Year 7:</u><br>Shoreline Restoration<br>with Mangrove Habitat                  | 15,000         | 10,000 | 1,500 | 0     | 26,500 | Mar 2004        | Establishment and<br>monitoring of<br>fringing mangrove<br>habitat (spanning<br>over a mile) along<br>shoreline from<br>Jupiter Inlet to<br>Merritt Island. | Environmental<br>Learning Center |
| <u>PIE-2(b):</u> Public<br>Information and<br>Education                                  | 33,600         | 0      | 0     | 0     | 33,600 | Sep 2003        | Development and<br>distribution of<br>IRL publications<br>and other outreach<br>materials.  | SJRWMD                           |

**2002-2003 WORK PLAN IMPLEMENTATION PROJECTS**

Continued

| Project  | Funding Source |         |        |           |           | Completion Date | Deliverable   | Organization Responsible   |
|--|----------------|---------|--------|-----------|-----------|-----------------|---|--|
|  | EPA/NEP        | SJRWMD  | SFWMD  | LOCAL     | TOTAL     |                 |   |  |
| <u>FSD-13</u> : Stormwater Implementation Projects                                       | 62,000         | 705,834 | 0      | 2,951,382 | 3,719,216 | Feb 2006        | Urban drainage system retrofits and stormwater master plans.  | Local governments within the IRL basin: County of Brevard; Town of Melbourne Village, and cities of Satellite Beach, Cocoa Beach, Cocoa, Edgewater, Palm Bay, New Smyrna Beach, and Rockledge. |
| <u>FSD-4</u> : Implementation of Best Management Practices (BMPs) in the Citrus Industry | 40,000         | 0       | 25,000 | 0         | 65,000    | Aug 2004        | Citrus BMP implementation to reduce nutrient and suspended solid discharges to the IRL.                         | Institute of Food and Agricultural Sciences - University of Florida  |
| <u>BD-1(a) Year 3</u> : IRL Species Inventory & Relational Data Base                     | 35,000         | 0       | 0      | 0         | 35,000    | Jun 2004        | Additional species reports included in the existing on-line IRL species inventory.                              | Smithsonian Marine Station at Fort Pierce  |
| <u>FSD-6(c)</u> : Taylor Creek Dredging  | 50,000         | 0       | 0      | 0         | 50,000    | TBD             | Final engineering and design of selected disposal option.   | St. Lucie County   |
| <u>PIE-2 (c)</u> : Martin County Youth Education Camp WET                                | 20,000         | 0       | 0      | 0         | 20,000    | Sep 2003        | Two-week eco camp experience for 156 students.  | Martin County School's   |
| <u>IM-1(b)</u> : Wetland Restoration (Impoundment Reconnection)                          | 0              | 100,000 | 0      | 0         | 100,000   | 2004            | Restored wetlands damaged by dragline ditching for mosquito control. Reconnected mosquito control impoundments. | SJRWMD, and Volusia, Brevard and Indian River counties.  |
| <u>AD-1</u> : CASTnet Atmospheric Deposition Program Site                                | 0              | 10,000  | 0      | 0         | 10,000    | 2004            | Site at SI to monitor airborne deposition. Not match for NEP.   | SJRWMD, Indian River county.   |
| <u>BD-3</u> : ANS Grant Australian Spotted Jellyfish                                     | 40,000         | 4,000   | 0      | 4,000     | 44,000    | Sep 2003        | Public awareness and information, monitoring via Dockwatch and species assessment                               | SJRWMD   |

## ADVISORY BOARD IMPLEMENTATION FUNCTIONS

### **a. Technical Program Management**

The SJRWMD and SFWMD are leading development of the Pollutant Load Reduction (PLR) Model for the lagoon in order to set PLRGs or numerical targets for the reduction of nitrogen, phosphorous, dissolved organic matter, and/or suspended matter loadings. These PLRGs will provide the basis for the setting of future Total Maximum Daily Load (TMDLs) allowances. The development and use of the model is based on the premise that sufficient water clarity is needed to restore seagrasses - a major goal of the CCMP and SWIM plan, and that good water clarity can be achieved by the measured reduction of the loadings on some or all of the constituents stated above.

The PLR Model's usefulness will lie in its predictive power. Once the model is calibrated and verified for a full range of expected meteorological and hydrological conditions in the lagoon, it will then be able to describe the lagoon's response to any realistic combination of hypothetical conditions, man-made influences or management criteria. More specifically, the PLR Model will predict changes in light attenuation (water clarity) resulting from actions that cause changes in tributary discharges, nutrient loadings, sediment characteristics or other conditions in the Indian River Lagoon. Therefore, the model will be a useful tool in determining PLRGs and in allocating pollutant load reductions among the major loading sources in the lagoon's watershed.

Interim PRLGs have been presented for the Crane Creek and Turkey Creek basins. These preliminary goals provide local governments within these basin's water quality improvement targets for all types of discharges including non-point discharges of stormwater. Many local governments have expressed a willingness to meet PLRGs once established, but fear making sizable investments in stormwater management infrastructure improvements until targets can be provided. Until PLRGs are translated into TMDLs and/or incorporated into rule, compliance in meeting PLRGs will be largely voluntary. Furthermore, as management strategies are enacted to achieve PLRGs, the corresponding monitoring network will help gauge their effectiveness in improving water quality in the lagoon.

Regional watershed planning activities for the St. Lucie Estuary and Indian River Lagoon include projects to document historical and existing seagrass coverages through a combination of photo interpretation, mapping and ground truthing. This information is being used to determine changes in the abundance and distribution of critical components of the ecosystem due to human activities in the watershed, develop PLRGs for freshwater, total suspended solids and nutrients, and to predict potential recovery with the implementation of stormwater and water quality management options. To document existing seagrass bed locations and to gain an understanding of temporal changes in seagrass distribution, aerial photography of the entire lagoon is needed on a regular basis. The SFWMD is currently producing a map of Indian River Lagoon seagrasses based upon aerial photographs taken in April 1999.

The listing of Johnson's seagrass under the Endangered Species Act has provided greater protection for 10 areas designated as critical habitat for this unique species found only in the Indian River Lagoon, south of the Sebastian Inlet, and in Biscayne Bay. Johnson's seagrass grows from the intertidal zone down to subtidal depths of 12 feet, shallower and deeper than most seagrasses in the lagoon, with a greater tolerance of temperature and salinity variations. Johnson's seagrass is the first seagrass species listed under the Act by the National Marine Fisheries Service.

Reconnection and monitoring of impounded estuarine wetlands continues to be a major cooperative effort between the SJRWMD, the US Fish and Wildlife Service, NASA, National Park Service and several Mosquito Control Districts. Since 1991, SJRWMD has partnered to reconnect over 18,750 acres of impoundments. When combined with reconnections made through mitigation and by other agencies, this represents 70% of the target of 33,000 acres. The SFWMD has assisted St. Lucie Mosquito Control District in reconnecting 4,800 acres of wetlands since 1987. The EPA grant award for the Merritt Island Wetlands Initiative will help to determine if the re-establishment of the hydrologic connection between impounded marshes and the lagoon can restore the ecological function of the impoundments to "native" marshes functionality.

**b. Project Management**

The SJRWMD has continued its outstanding support of the IRL Basin Advisory Board through continuing NEP Program sponsorship, contracts and procurement management, printing and computer services, administrative and operational support, and by providing significant annual non-federal program match. The SJRWMD incorporation of NEP staff positions into the District's budget has 'freed-up' federal dollars usually assigned for salaries for implementation activities. During FY 2002/03, the SJRWMD provided salary funding of approximately \$195,000, enabling the use of federal dollars for stormwater and habitat management projects in the lagoon.

The SFWMD has also continued its important financial and operational support for the Program. The invaluable assistance provided by the SFWMD's Martin/St. Lucie Service Center has benefited the outreach efforts of the IRL Program immensely by partnering in several educational events and exhibit displays. In 2001, the IRLNEP and SFWMD joined several local partners in supporting the construction of the Smithsonian Marine Ecosystems Exhibit at the St. Lucie County Marine Center in Fort Pierce. This exhibit provides public awareness and education about the diverse habitats and biological resources of the Indian River Lagoon to a wide audience of local citizens and Florida visitors attracted to the renowned facilities of the Smithsonian Institution. In addition, the SFWMD contributed funding towards the mangrove planting program being conducted by the ELC and towards the multi-spectral seagrass monitoring initiative.

IRL Basin Advisory Board oversight of the program during the past year has included the review and approval of the USACE/SJRWMD Project Management Plan for IRL North Feasibility Study, the IRL Legislative Funding Initiatives for FY 2003-04, and oversight of project office activities and ongoing work plan projects. Of particular importance this year was the success of the Advisory Board's local government membership passing resolutions of support in favor promoting the IRL Blueway land acquisition initiative to the state's A funding list to increase the likelihood of acquiring priority environmentally endangered lands along the lagoon.

**c. Intergovernmental Coordination**

The improved communication and cooperation established during the CCMP development process between agencies, local governments and other organizations involved in lagoon's management is continuing through the activities of the IRL Basin Advisory Board. This NEP facilitated process provides coordinated program budgets for lagoon activities, and the oversight and setting of funding priorities for the lagoon in future fiscal year budget cycles.

IRL Program staff and Advisory Board members continue to participate in national, state and regional intergovernmental coordination conferences, meeting and presentations. In March 2003, several staff and board member's participated in the annual NEP Directors' meeting and associated ANEP coordination meeting in Washington D.C. to discuss common issues of concern, the relationship between EPA and ANEP, and data and information sharing. In November 2002, staff attended ANEP's Fall Meeting held in Delaware. Common issues addressed included the development of a national advertising campaign for ANEP promoting estuarine protection, NEP funding guidance, Implementation Review feedback, and EPA oversight of NEP project activities.

**d. Facilitation, Conflict Resolution and Consistency Review**

Review of several Army Corps of Engineers dredge and fill projects have been conducted by staff for consistency with the goals and objectives of the CCMP. And local governments continue to request assistance in reviewing their Comprehensive Plan Evaluation and Appraisal Report (EAR) before they are submitted to the state for approval. Many local government's Comprehensive Growth Management Plans now include CCMP recommendations.

**e. Fund Raising**

The IRL Program has been very active in identifying and securing funding to support implementation of the CCMP. State funding in 2002 provided \$14.9 million to the SJRWMD for lagoon restoration and water quality improvement projects, and \$? million to SFWMD. This funding is being applied towards local government cost-share stormwater projects, stormwater management master plan designs, reconnection of salt marsh mosquito impoundments, and continuing project assessment, and data collection for use in developing PLRGs.

Over \$2.6 million has been raised for projects through the sale of the Florida Indian River Lagoon License Tag since 1995. This funding has been divided between the SJRWMD and SFWMD for restoration and education projects based upon the percentage of tag sales in each district's respective counties. Numerous stormwater retrofit projects, mosquito impoundment reconnections and environmental education outreach efforts have been supported through this innovative revenue source.

Implementation Project FI-1(a): CCMP - Grants Writer/Facilitator

The project has been supported by the IRL Program to assist local governments in meeting the challenges of financing CCMP implementation projects. The sixth year of work under this project has continued to demonstrate an ongoing desire by the lagoon area's municipalities, water control districts and counties to partner with state and federal agencies in implementation activities. Many local governments have utilized the services of this NEP consultant to identify new funding sources, prepare grant proposals and join with other partners to help implement CCMP recommendations. Through this project 39 grant proposals have been submitted since 1997, primarily for stormwater projects, with 29 grants awarded to date providing \$13.2 million in assistance for a total of \$73.8 million in project implementation. This service to local governments will continue through a contract ending March 2004.

Status: Ongoing (March 04)

Funding: \$224,670

**f. Advocacy**

In addition to the initiatives previously described, support for lagoon-related programs has also been generated through the Association of National Estuary Programs (ANEP). ANEP is the non-profit organization charged with coordinating and advocating for the 28 National Estuary Programs in their efforts to develop and implement CCMPs.

ANEP was instrumental in advocating for the reauthorization of Section 320 of the Clean Water Act granting authority for the National Estuary Program. Clarification on the use of Section 320 funds for implementation of CCMPs was granted and an increase in annual NEP appropriations through 2004 was authorized. ANEP is tracking congressional support for the appropriation of the increased NEP authorization in the U.S. Congress.

**g. Progress Reporting**

As reported in the 2002 GPRA Report, 100% of the CCMP's priority actions are being realized at some level (either: fully, substantially or moderately) according to their established timeline. Over 16,178 acres of habitat were protected, rehabilitated or enhanced by IRLNEP member's in 2002.

**h. Education and Outreach**

The hosting of general public workshops, regional conferences, and the establishment of a IRL Resource Library and Research Center in cooperation with the MRC have been projects implemented to promote lagoon education and information benefiting residents throughout the watershed. IRL Program staff continues to make numerous presentations to civic and community organizations, man display booths at environmental festivals and sport fishing shows, and deliver quality educational programs throughout the region.

IRL NEP funding from the USEPA contributed to the construction of the Smithsonian Marine Ecosystems Exhibit at the St. Lucie Marine Center in Fort Pierce, which was unveiled in August 2001. This project represents a collaborative effort between St. Lucie County, the City of Fort Pierce, SFWMD, and the IRL NEP Program. The goal of the Marine Ecosystems Exhibit is to build public awareness and education about the diverse living resources of the Indian River Lagoon. The exhibit will foster a better understanding of the fragile marine ecosystems of the Lagoon and adjacent offshore waters, instilling a sense of responsibility and protection for these invaluable marine resources.

During FY 2001-02, a portion of the revenue generated from the sale of the IRL License Plate has helped fund the Marine Discovery Center in New Smyrna Beach, and the newly built Marine Science Center near Ponce Inlet. In previous years, License Plate funds provided for the improvement of educational exhibits at the Wabasso Environmental Learning Center, provided start-up funds for a Nature Wetlands Walk at the Brevard Zoo, and provided needed funding for signs at lagoon-side parks, publications and educational materials for distribution.

The IRL Program Office also continues to produce a quarterly newsletter of lagoon information and project updates, which is forwarded to over 8,200 subscribers nation-wide with over 3,000 additional copies distributed through local government agencies, environmental organizations, and public education events. The newsletter is also made widely available to the general public through the IRL web site (<http://irl.sjrwmd.com>).

Implementation Project PIE-2(a): Inform the public and governments about the resources of the IRL, the value of these resources and threats to the continued viability of these resources.

The successful implementation of the CCMP depends upon public support for actions included within the plan. Development of this support relies on the public's understanding of the values of the resources, the threats to their continued viability and the specific actions proposed to protect and enhance these resources. Educating the public about the IRL generates public support for management activities. Developing and distributing printed materials such as the quarterly Indian River Lagoon Update Newsletter, flyers, brochures, fact sheets and booklets is a primary way to insure that needed support is developed and implementation success stories are relayed to the widest possible audience. Current information can also be accessed on-line through the SJRWMD website (<http://irl.sjrwmd.com>) and EPA's website through the Office of Water.

Status: Ongoing

Implementation Project PIE-2(b): Indian River Lagoon Resource Information Center and Shoreline Habitat Restoration Project.

This project is being performed under contract to the Marine Resources Council who has established an IRL Public Information Center as a multi-media information and research library to provide free and open access to research and education materials. This center is assisting students and citizens requesting information on the lagoon and includes the IRLSIS electronic database of lagoon publications. Additionally, volunteer education and outreach are being performed through the shoreline habitat restoration project where invasive, exotic nuisance plants are removed and replantings with native vegetation are conducted.

Status: Ongoing (September 2003)

Funding: \$24,900 Year 3; Total \$ \$74,700

Implementation Project PIE-3(c): Adopt a Drop – *be river friendly* Program

This program is continuing to be implemented by the St. Lucie River Initiative with funding support from the SFWMD. Adopt a Drop is an educational program informing homeowners and businesses how they can prevent pollution through stormwater runoff by using pesticides and fertilizers sparingly, avoid over-watering, and never pouring petroleum products into the ground or river.

Status: Ongoing

Implementation Project PIE-4(a): Increase public and government involvement in restoration activities.

The IRL Program worked with the Marine Resources Council to host a series of ongoing, quarterly public information workshops. These workshops are held throughout the lagoon to inform residents and elected officials about restoration projects, generate feedback from citizens, and improve the lines of communication between the residents and water managers. Two regional 'State of the Lagoon' conferences were held in the Fall/Winter of 2002.

Status: Complete (January 2003)

Funding: \$25,000 Year 2; Total \$47,226

## CCMP ACTION PLAN PROJECTS

### a. *Biological Diversity*

#### Implementation Project BD-1(a): IRL Species Inventory & Relational Data Base

The Indian River Lagoon Species Inventory has been developed by the Smithsonian Marine Station and is up and running at [www.sms.si.edu](http://www.sms.si.edu). Smithsonian has created a species master list with extensive cross-referencing, conducted an exhaustive literature search on selected species with bibliographic documentation and accumulated several valuable data bases for incorporation into the inventory including: marine fisheries recreational and commercial landings from five counties surrounding the lagoon over the past decade and commercial and fisheries regulations. The US Fish and Wildlife Service has also provided a current federal listing of threatened and endangered species for the five lagoon counties. Under the renewed contract to continue this project, Smithsonian is updating and expanding the inventory to accommodate a suite of ecological and taxonomic information, which will store, sort, retrieve, and format data quickly, efficiently and automatically. This project was initiated as a result of an identified lack of documentation available to lagoon managers in developing strategies for the protection of biodiversity and to assist in the broader scientific understanding of diversity, as well as increasing educational and public awareness of the biological value of the lagoon.

Status: Ongoing (June 2004)

Funding: \$35,000 Year 7; Total \$155,929

#### Implementation Project F-3: Oyster Restoration

By definition, an estuary is a place where fresh and salt water meet and mix. Historically, salt water entering the SLE varied due to the ephemeral nature of the inlets along the barrier island. There were periods of time when the SLE was predominantly fresh. As the area became settled, inlets were stabilized and major canals were constructed for drainage. This allowed an increase in population along the coast as well as in the western portion of the counties. The area, which originally drained slowly by overland flow into the SLE, increased in size, and subsequently drainage increased. As a result, the amount, quality and timing of fresh water entering the system was drastically altered. Certain estuarine species such as the American oyster, *Crassostrea virginica*, have been negatively impacted. Woodward-Clyde Consultants (1998) discussed historical and 1998 oyster distribution and suggested a loss of about 250 acres of oyster habitat since the 1940's. In order to undertake a restoration project in the SLE, basic biological information must be obtained for the local oyster population. This project will provide basic information needed to reestablish and enhance oyster beds in areas with the greatest potential for success. The American oyster, is considered an indicator of a healthy estuarine system by the SFWMD and a Valued Ecosystem Component. Evaluating this species is critical in determining water management practices.

Funding: \$1,148,000

### b. *Wetlands Protection*

The SJRWMD was awarded a grant by EPA Region IV in 1999, under the State Wetlands Protection Development Program for \$550,000 to fund an intensive study of wetland functions regarding nutrient cycling, sediment biogeochemistry, organic matter accumulation, and the value of wetlands in the regulation of water quality in the lagoon. The goal of this project is to determine if re-establishment of the hydrologic connection between impounded marshes and the lagoon can restore the ecological function of the impoundments to a state similar to that of "native" marshes, and to determine how continued hydrologic management will affect the restoration process. This project is being carried out with the assistance of the USFWS at Merritt Island National Wildlife Refuge, NASA at Kennedy Space Center, and local mosquito control districts in Brevard and Volusia Counties.

#### Implementation Project W-6(a): Restore Wetlands and Shorelines

The IRL mangrove planting program has continued to add new sites for the ninth year of operation, and maintain existing sites for the 'encased' mangrove planting method. The successful partnership forged between the SJRWMD, SFWMD, USFWS and the Environmental Learning Center and numerous civic organizations and volunteers, continues to enhance shoreline habitat throughout the southern lagoon region. Identification and ranking of future potential project sites to judge their probability of success is ongoing. Agencies, local governments, developers seeking mitigation sites, and groups seeking a public service project have participated in this successful habitat enhancement program.

Status: Ongoing (February 2004).

Funding: 26,400 Year 9; Total \$142,700

Implementation Project IM-1(a): Wetland Restoration (Impoundment Reconnection)

This project is implementing wetland restoration and impoundment reconnections. Funds are used to purchase culverts and pumps for the reconnection and management of impounded wetlands, to restore impoundment shorelines to near pre-impoundment condition, to restore wetlands damaged by dragline ditching for mosquito control, and other wetland restoration efforts.

Estimated Time for Completion: 2005

Budget: \$ 300,000 FY2002-03

Funding Sources: SJRWMD

**c. Land Acquisition**

The SJRWMD has acquired over 52,600 acres of environmentally sensitive lands within the lagoon watershed. Additional acreage has been acquired in northern Brevard County to assist with the Chain of Lakes Regional Stormwater Park near Titusville, land within the Sebastian River Buffer Preserve, and acquisition of 200 additional acres in Sebastian for the creation of stormwater detention systems.

The Nature Conservancy helped acquire the Inlet Groves Property under the Blueway Program, in partnership with Brevard County. This acquisition includes 290 acres in Snagg Point with 1.7 miles of lagoon shoreline and 50 acres of impounded marsh habitat to be reconnected to the lagoon. Martin County's one-cent sales tax referendum for land acquisition and capital projects was used to purchase 3,100 acres in the Atlantic Coastal Ridge Ecosystem, and assisted with the purchase of the Allapattah Ranch 13,186 acres in partnership with SFWMD and the USDA-NRCS. Indian River County in partnership with the cities of Vero Beach and Indian River Shores closed on the Lost Tree Islands in February 2003, the preservation of these important natural islands near Vero Beach has been a goal of the county's for more than two decades.

Additional acquisition opportunities will now be pursued under the IRL Blueway Program because of the state's ARC committee promoting the Blueway to the state's A funding list in December 2002.

**d. Fresh/Stormwater Discharges**

The IRL Program has been very active in partnering with numerous local governments during CCMP implementation to address freshwater and stormwater discharges to the lagoon. The SJRWMD's successful competitive local government cost-share program has been administered since 2000, awarding over \$2.3 million in district, license plate and NEP funding to thirty-one projects totaling over \$16.6 million in stormwater retrofit project work. These projects include constructing stormwater detention systems in Titusville, Merritt Island and northern Brevard County, and Melbourne in cooperation with Brevard County; stormwater detention and erosion control projects with the Cities of Palm Bay, Rockledge, Satellite Beach and Cape Canaveral, and Indian River County; stormwater master planning with the City of Sebastian, the Town of Melbourne Village, Indian River County, and the Fellsmere Water Control District; surface water treatment systems in Gifford and Roseland in partnership with Indian River County, and the cities of Edgewater and New Smyrna Beach; and various water quality improvement projects with other municipal and county stormwater utility programs.

Stormwater master planning in cooperation with SJRWMD, Brevard County and the City of Melbourne is complete for the 16,000 acre Crane Creek/Hickory Ditch sub-basin. The Cities of Satellite Beach and Palm Bay have also completed master planning efforts for their cities with the assistance of the IRL Program. FDEP has provided over \$27.2 million in low interest loans to municipalities within the lagoon watershed for construction of stormwater and wastewater facility improvements since 1996 (nearly \$50 million since 1994).

The environmental muck dredging of Turkey Creek, which started in 1999 and was completed in 2001, removed over 400,000 cubic yards of organic-rich muck sediment from the creek's bottom. This cooperative project between SJRWMD, FIND, and the City of Palm Bay will reduce the flushing of these muck deposits into the lagoon during storm events, thereby increasing water quality and promoting the reintroduction of seagrasses into the area. The SJRWMD also assisted the City of Palm Bay in implementing the related middle-reach sand delta navigation dredging project within the creek, which removed approximately 60,000 cubic yards of accumulated sand. And the SJRWMD has partnered with the Melbourne-Tillman Water Control District to remove accumulated sediments in the C-1 canal upstream of Turkey Creek to prevent this material from being flushed into the creek and lagoon during storm events while providing a sump basin to capture future sediments.

The SJRWMD has initiated the St. Sebastian River dredging project and will begin disposal site construction during the spring of 2003. The determination of muck volume and characterization of sediments for the St. Sebastian River indicated that an estimated 2.3 million cubic yards of sediments need to be dredged through this project based on available funding. In St. Lucie, the planning phase for Taylor Creek's dredging is near completion and construction is scheduled to begin during the summer of 2003.

Implementation Project FSD-3(a): Stormwater Utility Implementation for Cape Canaveral

In September 2000, the City completed and adopted its Stormwater Master Plan. This project was awarded funding under the local government cost-share program to create a Stormwater Utility for the City of Cape Canaveral. Stormwater Utility assessments will be used for the construction of BMPs identified in the City's Stormwater Master Plan. These BMPs include detention ponds with aeration fountains, stormwater reuse ponds, and baffle boxes.

Status: Complete Funding: \$73,500

Implementation Project FSD-3(b): Stormwater Master Plan Development for Melbourne Beach

At several locations in the Town of Melbourne Beach, streets and yards have been affected by flooding and homes have experienced property damage due to stormwater collecting at the end of cul-de-sac developments. Funded under the competitive local government cost-share program, this plan will address flood protection and remediation, as well as, retrofitting for water quality treatment of all the Town's outfalls. Projects will reduce stormwater pollution with target pollutant load reductions of 50%.

Status: Complete Funding: \$60,746

Implementation Project FSD-3(c): Stormwater Master Plan Development for Melbourne Village

Funded under the local government cost-share program, this stormwater master plan will assess the needs for stormwater improvements in the Town of Melbourne Village and identify specific drainage and water quality treatment opportunities within the Crane Creek basin. The project will reduce flooding at problem areas and provide water quality treatment. Stormwater management options and BMPs will be selected to decrease sediment and nutrient loadings and excessive freshwater discharges to Crane Creek and the IRL.

Status: Complete Funding: \$38,800

Implementation Project FSD-3(d): Stormwater Master Plan Development for Fellsmere Water Control District East, Master Drainage Plan

This project was selected under the local government cost-share program to develop a stormwater master plan for the eastern portion of the Fellsmere Water Control District. The Plan will include an inventory of major structures, cross sections of drainage canals, a hydrologic model (AdICPR) of the system, and will identify BMPs to improve water quality and reduce flooding within the District. It will identify practical stormwater treatment retrofit projects that can be constructed on presently vacant land, mostly under private ownership. Thus, the plan will prioritize acquisition of those parcels and provide a stormwater BMP implementation schedule.

Status: Ongoing Funding: \$160,800

Implementation Project FSD-3(e): Water Quality Model, Phase 3

The water quality model that was developed in Phase I & II will be extended south to include Jupiter Inlet/Loxahatchee River. In phase III, the model will be applied to pollution reduction target study and the establishment of minimum flows and levels and total maximum daily load. The project will be a multiple year contract and the \$80,000 in SFWMD FY2001 budget can fund the first stage of the project only. At the first stage the consultant will review the field data that SFWMD has collected and have a preliminary model calibrated. Tasks: (1) applications of the model that was calibrated in the first stage; (2) model improvements; (3) additional data collection if such needs are identified during data review; (4) extension of the model to Fort Pierce Inlet and Jupiter Inlet.

Funding: \$260,000

Implementation Project FSD-3 (f): Stormwater Master Plan Development for City of Edgewater

Preparation of an existing conditions analysis, recommending improvements analysis and engineering report and recommended capital improvements plan to identify treatment and conveyance needs and plan for implementation. This contract is pending adoption.

Funding: \$275,834

Implementation Project FSD-6(b): Reduce the impacts of muck in the IRL – St. Sebastian River Dredging Phase I

In 1999, the state legislature appropriated \$300,000 to FDEP for the SJRWMD to conduct a St. Sebastian River Muck Deposit Assessment and Management Project. This project assessed the present location, extent, depth, and volume of muck in the St. Sebastian River; characterized the physical and chemical components of this sediment; identified appropriate muck management (spoil) sites; and developed and analyzed alternative muck removal project designs with cost estimates with the final goal of receiving a noticed general permit to begin project construction. In 2000, the state legislature appropriated \$3.1 million for construction and dredging, and in 2003 the SJRWMD allocated an additional \$2 million. FIND has contributed \$680,000 towards this project to date for design, construction of the spoil site and initiation of the dredging.

Status: Ongoing Funding: \$6 million

Implementation Project FSD-6(c): Taylor Creek/C-25 Canal Restoration Project

The objective of this project is to evaluate and design for the removal and disposal of muck sediments that have accumulated in the navigation channel of Taylor Creek, Fort Pierce, Florida. This project includes the area east of the Florida East Coast (FEC) railroad up to the Intracoastal Waterway. Approximately 90,000 cubic yards of sediments are estimated for removal from this section (approximately 2,300 linear feet) of the navigation channel. The width of the channel is 140 feet at the Florida East Coast Railroad bridge for approximately 1,810 feet at which point the average width tapers to 100 feet for the remaining length up to the Intracoastal Waterway. The average depth of the sediment is estimated to be between six and seven feet throughout this channel. Also included in this project is the area west of the FEC railroad and extends up to the spillways at the C-25 Canal and North Canal (approximately 90,000 cubic yards at 2,850 linear feet).

The project is currently in design/planning permitting

|                |              |              |
|----------------|--------------|--------------|
| Project costs: | Design       | \$ 350,000   |
|                | Construction | \$ 3,500,000 |
|                | Total:       | \$ 3,850,000 |

Status: Ongoing

Funding: (EPA/NEP \$188,000 FY99 & \$50,000 FY02, FL Seaport Transportation & Economic Development Council \$1,400,000, SFWMD \$1,100,000, St. Lucie County \$650,000, FIND \$700,000)

Implementation Project FSD-10: Implementation of Surface Water Quality and Quantity BMPs for Indian River Citrus

Widespread concern about water quality in the St. Lucie Estuary has created considerable consensus about the need for improving water quality. Since citrus production is a major land use (120,000 acres) within the estuary drainage basin, Indian River (IR) citrus growers decided to develop proactive best management practices (BMPs) to reduce their contribution to water quality problems. IR growers worked in collaboration with the University of Florida, FDACS, SFWMD, FDEP, and other concerned citizens to develop a process for identifying appropriate practices and together have developed a manual describing these BMPs. The BMPs that have been developed should significantly decrease citrus industry contributions of pesticides, nutrients, water volume, sediments, and aquatic weeds into surface waters. A coordinated program of educational events to make growers aware of these BMPs has been designed and is ongoing, but widespread and rapid implementation is only likely if a team, committed solely to BMP implementation and quality assurance, is coupled with cost-sharing funds to help growers implement these often costly practices.

Funding: \$3,480,685

Implementation Project FSD-12(a): Ten Mile Creek

Ten Mile Creek is the first CERP-type project to be constructed in the Treasure Coast area. It is designated as a Critical Restoration Project, and is located west of the Florida Turnpike and south of SR 70 on Ten Mile Creek, the headwaters for the North Fork of the St. Lucie Estuary. This 900-acre stormwater retention and treatment area is a joint project between the SFWMD and USACE. The facility will allow flexibility in the basin relating to storing peak flows during the wet season, and providing a base flow during the dry season to the North Fork of the St.

Lucie River. Although it is on a quicker time schedule, Ten Mile Creek will be incorporated as an IRL Restoration Feasibility Study component.

Status: Ongoing (Implementation to begin Fall 2002)

Funding: \$30 million (SFWMD \$14,822,000, USACE \$15,178,000)

Implementation Project FSD-12(b): C-23 and C-28 Basin Retrofit

The North St. Lucie River Water Control District Canals 23 and 28 have interconnected drainage basins which discharge to the North Fork of the St. Lucie River. The drainage basins total 1,400 acres. The goal of this project is to provide water quality treatment for the entire interconnected drainage basin. In F.Y. 01-02, weir type spillways were constructed at the outfalls of both of these canals to provide a measure of water quality treatment for the drainage basin. The cost for the construction of these water control structures was \$346,000. The second phase of this project will be to build stormwater retention ponds to provide the full amount of water quality treatment. The pond design is currently in the preliminary design phase at a cost of \$51,700. Land acquisition for the proposed retention pond is in progress with the assistance of FDOT. No construction estimates have been determined.

Implementation Project FSD-12(c): C-24 Bank Stabilization

This project involves the stabilization of approximately 4,000 linear feet of the south bank of the C-24 canal, beginning at the canal's intersection with I-95 and extending westward. This section of the canal bank exhibits significant erosion and sloughing, thus increasing the sediment load within the canal and downstream to the St. Lucie River. This project proposes to stabilize the canal bank through standard engineering practices, by reshaping the canal bank, installing rip rap and or aquatic stabilizing vegetation at the toe of slope, then placing filter fabric or other such geotextile material and sodding the upper slopes to prevent continuous erosion and sloughing of the bank, thus reducing sediment load to the canal. Funding: \$576,489

Implementation Project FSD-12(d): North Fork Restoration

This project consists of feasibility planning for reconnecting wetlands and oxbows within the floodplain of the N. Fork St. Lucie River that are currently isolated (partially or completely) from the river's main branch because of historical dredging. These wetlands are crucial for water filtration, nutrient uptake, habitat for juvenile aquatic animals, and the survival of native oligohaline communities. Some areas (roughly 9 miles of shoreline) have been identified with dredge spoil deposition in need of breaching. Oxbows currently cut off from the river should be reconnected. Topographic surveys are needed to plan reconnection efforts. Also, surveys including coring must be conducted to elucidate the potential for additional shoreline spoil deposition in questionable areas.

Funding: \$420,270

Implementation Project FSD-13(a-1): Stormwater Treatment Implementation in Palm Bay

This project includes stormwater retrofits for two sub-basins within Palm Bay. Basin 1 incorporates BMP construction to improve water quality treatment, and reduce peak flows, flooding and loadings to the IRL. The construction of a 1.5-acre detention pond, sediment trap and culvert installation of an open ditch running through a auto salvage yard will provide a treatment train to substantially alter the current untreated conveyance system. Basin 13, will construct erosion control to stabilize and expand the conveyance canal for additional retention before release to Turkey Creek. Water quality monitoring will be performed for both retrofits to determine the levels of pollutant reduction achieved.

Status: Ongoing Funding: \$540,000

Implementation Project FSD-13(a-2): Stormwater Treatment Implementation in Palm Bay, Perimeter Canal Rehabilitation, Phases I and II

This project has received two grants under the competitive local government cost-share program to rehabilitate the Perimeter Canal, which provides stormwater drainage for 250 acres in the City of Palm Bay and additional 200 acres in the Town of Malabar. The Canal has been identified as the largest single non-treated source of sediments to lower Turkey Creek. Phase I of the project installed a baffle box at the outfall to Turkey Creek to reduce sediments in the stormwater outflow, and provided bank stabilization along a major section of the canal. Phase II will construct a treatment pond in the upstream section of the canal, install a weir to control flows, and conduct further bank stabilization.

Status: Phase I complete (May 2001). Phase II Ongoing

Funding: Phase I \$290,000. Phase II \$97,000. Total \$387,000.

Implementation Project FSD-13(a-3): Stormwater Treatment Implementation in Palm Bay PMU 38/40 Stormwater Improvements

This project has received two grants under the competitive local government cost-share program to correct flooding and water quality problems associated with stormwater flows from the PMU 38/40 subdivision. It will divert peak flows from the subdivision to C-78, and will modify this canal to accommodate the additional flows. Stormwater runoff treatment will be provided by a series of three ponds within the subdivision. The project is estimated to reduce annual pollutant loadings to Turkey Creek by up to 75,615 pounds of TSS, 969 pounds of TN, and 244 pounds of TP.

Status: Ongoing Funding: \$246,000

Implementation Project FSD-13(a-4): Stormwater Treatment Implementation in Palm Bay Turkey Creek Subdivision Stormwater Improvements

Funded under the competitive local government cost-share program, this project will improve the City's stormwater drainage system by providing treatment for outfalls from Turkey Creek subdivision, reducing flooding and erosion along Mandarin ditch, and obtaining field data on the suitability of various BMPs for future implementation in the City.

Status: Ongoing Funding: \$298,000

Implementation Project FSD-13(b-1): Cocoa Beach Brevard Ave. Bioretention System

This project was awarded funding under the local government cost-share program to construct a 1,350 feet linear landscape retention area to treat 2 acres of city road runoff.

Status: Complete Funding: \$48,592

Implementation Project FSD-13(b-2): Stormwater Treatment Implementation in Cocoa Beach Second Street South Sediment/Oil and Grease Trap

This project was awarded funding from IRL License Plate revenues to construct a baffle box with oil and grease removal at the intersection of Second Street South and Brevard Avenue in downtown Cocoa Beach. Due to adverse conditions and limited right-of-way for construction of this project the project has been terminated.

Status: Agreement Terminated.

Implementation Project FSD-13(b-3): Melbourne Beach Stormwater Improvements, Urban Storm water Correction and Improvements for Anchor and Pelican Keys

The project was awarded IRL License Plate funding to capture stormwater runoff from a 6.4-acre drainage basin in the Town of Melbourne Beach and route the water through baffle boxes and exfiltration systems, reducing the sediment load and untreated stormwater volume flowing from Pelican and Anchor Keys into the IRL. Presently, there are no stormwater treatment facilities in these drainage areas and no stormdrain pipes to convey water from the end of cul-de-sacs to the canal, so stormwater runoff reaches the canals by overland flow, causing considerable erosion and seawall collapse. Pollutants entering the canals will be reduced at both Anchor and Pelican Keys by creating a stormwater treatment train.

Status: Ongoing Funding: \$139,438

Implementation Project FSD-13(c): Stormwater Treatment Implementation City of New Smyrna Beach – East Circle Culvert Repair and Water Quality Retrofit

Funded under the competitive local government cost-share program, this project will replace an existing collapsed culvert and provide retrofits upstream of the culvert to improve water quality in the north Mosquito Lagoon.

Because of the severely restricted capacity of the culvert, there is periodic flooding of East Circle Street and an adjacent parking lot. Retrofits will add a retention swale with an overflow inlet and a short section of exfiltration trench connecting the overflow inlet to the existing street inlet.

Status: Ongoing Funding: \$60,960

Implementation Project FSD-13(d-1): Stormwater Treatment Implementation in Brevard County

This project was selected under the competitive local government cost-share program to construct a stormwater weir at Kennedy Point Marina, located just south of the City of Titusville. This weir will collect sediments from a 320-acre drainage basin, with regular maintenance and monitoring to be performed by the county.

Status: Ongoing Funding: \$110,000

Implementation Project FSD-13(d-2): Stormwater Treatment Implementation in Brevard County Channel Stabilization

This project was selected under the competitive local government cost-share program to stabilize the banks of Hickory Ditch along Crane Creek in the City of Melbourne. This section of channel extends from its confluence with Crane Creek south approximately 700 feet, discharging into Crane Creek approximately 5,000 feet upstream of the Indian River Lagoon. The channel section has severe side slope erosion and contributes large quantities of sediment to Crane Creek and the Lagoon. The project will demonstrate the use of geoweb confinement systems and erosion control mats as Best Management Practices.

Status: Ongoing Funding: \$148,000

Implementation Project FSD-13(d-3): Stormwater Treatment Implementation in Brevard County Chain of Lakes - Phase I

This project was selected under the competitive local government cost-share program to provide first flush treatment from an 850-acre watershed, reducing pollutant loadings to the Indian River Lagoon associated with untreated stormwater runoff from the upstream drainage area. Phase I of the project will construct three detention facilities totaling approximately 22 acres in surface area and provide additional crossdrains under U.S. Highway 1 and the Florida East Coast Railroad. Status: Ongoing Funding: \$3,005,000

Implementation Project FSD-13(d-4): Stormwater Treatment Implementation in Brevard County Merritt Island Airport Pond

This project was selected under the competitive local government cost-share program to construct a regional detention pond at Merritt Island Airport that will provide stormwater treatment for a 190-acre watershed. In addition, approximately 0.6 acres of highly distributed marsh on the west side of the pond will be enhanced by removing Brazilian peppers and re-establishing native species. This will be a cooperative effort with the Merritt Island Airport, which will donate an easement for the property. Status: Ongoing Funding: \$440,000

Implementation Project FSD-13(e-1): Stormwater Treatment Implementation in Indian River County

This project includes two water quality improvement cost-share agreements with Indian River County's Public Works Department. The first project is the Gifford area stormwater retrofit to construct a 4.5-acre detention pond and conveyance swale to provide flood protection, erosion control and water quality treatment in an area of low income homes north of Vero and just west of the Lagoon. The second project is for the construction of a wet detention pond and control structure in the Roseland area to reduce frequent and severe flooding within the natural slough which drains to the St. Sebastian River. Status: Ongoing Funding: \$580,000

Implementation Project FSD-13(e-2): Stormwater Treatment Implementation in Indian River County

This project also includes two water quality improvement cost-share agreements with Indian River County's Public Works Department. The first project is construction of the Vero Lakes Estates Stormwater System Retrofit to reduce loadings from a 1,461-acre subdivision draining into the South Fork of the St. Sebastian River. The second project is the Wabasso Causeway Park Improvement Project to reduce erosion and stabilize the shoreline along the causeway.

Status: Complete Funding: \$1,232,180

Implementation Project FSD-13(e-3): Erosion Control and Stormwater Treatment in Indian River County Roadway Paving and Drainage Improvements

This project will pave approximately 7.2 miles of roads that drain directly or indirectly into the IRL, amounting to nearly 21 acres of land area that will no longer contribute fine suspended solids to stormwater runoff entering the IRL. Another 40 acres will receive improved stormwater treatment through the construction of grass swales or other treatment systems. It is estimated suspended solid loadings to the lagoon may be reduced by up to 1,985 tons annually.

Status: Ongoing Funding: \$3,449,980

Implementation Project FSD-13(f): Stormwater Treatment Implementation in Titusville

This project will construct a treatment train throughout the Garden Street Basin including swale improvements, check dams, inlet skimmers, and a alum treatment detention pond in this highly urbanized basin.

Status: Ongoing Funding: \$1,116,360

Implementation Project FSD-13(g-1): Stormwater Treatment Implementation in Cocoa

The City of Cocoa was awarded a FY'99 Section 319 nonpoint EPA grant to construct an underground stormwater utility retrofit park, east of the historic Cocoa Village area. The IRL Program is participating with the City in this project to re-route runoff from the drainage system and capture it for treatment and subsequent reuse. The City has constructed three sediment traps within the system to provide treatment before the stormwater is collected in the underground system and then pumped to the wastewater treatment plant for additional treatment and reuse.

Status: Complete Funding: \$364,900

Implementation Project FSD-13(g-2): Stormwater Treatment Implementation in Cocoa Florida Avenue Rockledge/Cocoa Stormwater Facility

This project represents the City of Cocoa's part of a joint project with the City of Rockledge to collaboratively take control of a natural low point on their border. The two municipalities finalized the purchase of a parcel of land for a stormwater treatment facility in December 2000. Currently, untreated runoff from this watershed discharges to the Indian River Lagoon during any substantial rainfall event. Obtaining and designating this site as a future stormwater treatment facility provides a highly feasible retrofit for approximately 45.8 acres between both municipalities. This project was awarded IRL License Plate funding for the engineering design and construction of conveyance facilities from the City of Cocoa to the site of the new stormwater storage basin.

Status: Complete Funding: \$46,170

Implementation Project FSD-13(h-1): Stormwater Treatment Implementation in Satellite Beach

This project was funded under the local government competitive cost-share program to install stormwater inlet protectors for 30 of the city's inlets along its canal-front neighborhoods. Citizen volunteers will assist the city in maintaining and monitoring the debris collected in these protectors.

Status: Complete Funding: \$12,600

Implementation Project FSD-13(h-2): Stormwater Treatment Implementation in Satellite Beach Jamaica Boulevard Stormwater Diversion

Funded under the local government competitive cost-share program, this project will intercept and treat stormwater from 201 acres of the DeSoto Parkway watershed by creating three ponds (with associated connections and control structures) for wet detention and percolation of runoff. It will use BMPs to address stormwater quality problems and flooding in Jamaica Boulevard and DeSoto Parkway sub-basins.

Status: Ongoing Funding: \$646,700

Implementation Project FSD-13(h-3): Stormwater Treatment Implementation in Satellite Beach Modular Filtering Stormwater Inlets

This project will install modular stormwater inlet structures, incorporating skimmer baskets in paired inlet boxes under grates in curbing at ten intersections in the City. It will address chronic maintenance deficiencies and lack of stormwater treatment associated with existing stormwater inlets. The project will improve water quality by removing an estimated 1,800-3,600 pounds of suspended solids and debris annually from the City's stormwater runoff directly discharging into the Banana River.

Status: Ongoing Funding: \$61,300

Implementation Project FSD-13(h-4): Stormwater Treatment Implementation in Satellite Beach Grant Avenue Baffle Box

This project will install a baffle box to treat stormwater from 96 acres of the City's 139-acre Grant Avenue drainage sub-basin before discharging into the Banana River. Baffle box design improvements will facilitate removal of fine material and prevent water in the inlet and outlet pipes from flowing into the box during maintenance cleaning. This baffle box will remove approximately 14 tons of sediment annually from stormwater entering the River.

Status: Ongoing Funding: \$52,100

Implementation Project FSD-13(i): City of Cape Canaveral Stormwater Pilot Test

This project was selected under the local government competitive cost-share program to construct a stormwater control pilot system to pre-treat and divert runoff into the city's wastewater treatment plant to augment the production of reclaimed water.

Status: Complete Funding: \$41,800

Implementation Project FSD-13(j): City of Edgewater Stormwater Improvements & Reclamation

The City of Edgewater has proposed a project to construct a storage tank adjacent to their wastewater plant into a reclaimed water retention facility reducing stormwater and wet weather discharges to the Mosquito Lagoon.  
Status: Complete Funding: \$370,000

Implementation Project FSD-13(k): City of Fellsmere: Carter, Hall, and James Subdivision Storm Water/Pollution Control – Phase I

The project, selected under the local government competitive cost-share program, will provide surveying, engineering design, and permitting of a 5.5-acre retention pond in Fellsmere. After heavy rains, yards in the Carter, Hall, and James subdivision flood and trapped water becomes ponded, causing septic systems and drain fields to malfunction. The retention pond, a box culvert along State Street ditch with catch basins and drainage flow structures, will provide adequate right-of-way for paving of the street, helping to reduce erosion and sedimentation. The project will enable the management of stormwater discharges, and reduce sediment transport into the Sebastian River. Phase II is budgeted for construction in the summer/fall of 2002.  
Status: Ongoing Funding: \$130,000

Implementation Project FSD-13(l): County of Volusia Silver Sands Stormwater Improvements

The project received a local government cost-share grant to design and install a sediment, oil and grease collection structure on Hiles Boulevard outfall, one of the main stormwater outfalls in the Silver Sands community of southeast Volusia County. A Storm Ceptor sediment collection system will be installed to provide treatment of stormwater before discharge to Mosquito Lagoon. The Storm Ceptor implements an innovative technology that achieves 50-80% removal of suspended solids load from stormwater.  
Status: Complete Funding: \$61,000

Implementation Project FSD-13(m): City of Melbourne Baffle Boxes

The project was awarded funding from IRL License Plate revenues to install two baffle boxes at selected locations in the City of Melbourne.  
Status: Complete Funding: \$85,000

Implementation Project FSD-13(n): City of Rockledge Knollwood Gardens Outfall Baffle Box

The project was awarded funding from IRL License Plate revenues to install a CDS baffle box at the outfall of Knollwood Gardens subdivision in Rockledge.  
Status: Ongoing Funding: Estimated \$81,250

Implementation Project FSD-13(o): Moore's Creek Stormwater Retrofit

The project will install ten baffle boxes and four water control structures with associated sediment collection areas, and reshape slopes in the entire creek for increased storage. Public education was incorporated throughout all phases of construction. Runoff is discharged through Moore's Creek directly into the IRL near Ft. Pierce Inlet. The current drainage system provides little treatment prior to discharge. The project will provide detention and water quality treatment for a 10-year/3-day storm, thus reducing discharges, attenuating peak flows, reducing sediment loadings, and providing additional storage.  
Status: Phase I – Design and Permitting, Complete

Phases II, III, and IV – Construction, Ongoing (Phase II April 2003, Phases III & IV July 2004)  
Funding: Total \$2,788,118 (Phase I \$1,187,468; Phases II, III, and IV \$1,600,650)

Implementation Project FSD-13(p): Poppleton Creek Urban Water Quality Project

This project will provide increased groundwater storage upstream, add wet retention area and flow-through marsh, remove exotic vegetation and plant native vegetation, and remove muck sediments throughout Poppleton Creek which drains into the St. Lucie Estuary. Phase I will construct a weir, flow-through marsh and retention area below 5,000 lf of presently uncontrolled tidal ditch discharging into the Creek. Phase II will acquire adjacent native lands including rare and endangered uplands and the entire Creek floodplain, and will extend exotic plant and muck sediment removal within tidal Poppleton Creek. Phase I is on hold due to detection of environmental contamination.

Status: Ongoing (Phase I extended through July 2003; Phase II work will take one a year to complete).  
Funding: \$3,150,500

Implementation Project FSD-13(q): Platt's Creek Water Quality/Wetland Restoration

This project involves the purchase and decommissioning of approximately 102 acres of existing citrus groves adjacent to Platt's Creek and the North Fork of the St. Lucie River. The improvements will include construction of a 16 acre wet detention area adjacent to Platt's Creek which will provide water quality treatment for the approximate 1,000 acre drainage basin. Also, 86 acres of citrus groves will be removed and replaced by restored floodplain forest, marsh, and wet flatwood communities adjacent to Platt's Creek and the North Fork of the St. Lucie River. The stormwater detention area will have the capability of releasing treated runoff to the created wetlands for hydration and further water quality treatment. The restored floodplain will also provide additional water quality treatment for water flowing from Five and Ten Mile Creek. The project is currently in the permitting stage, and construction of the wet detention area is expected to begin in late F.Y. 03 and continue into F.Y. 04. Construction of the restoration area will be dependant upon the sale of credits in the Mitigation Bank.

|                |                              |                  |
|----------------|------------------------------|------------------|
| Project costs: | Land Acquisition (102 acres) | \$1,084,000      |
|                | Design/Permitting            | 320,360          |
|                | Construction                 |                  |
|                | Wetland Restoration          | 3,000,000        |
|                | Stormwater Facilities        | <u>2,200,000</u> |
|                | Total:                       | \$6,604,360      |

The County intends to recover the costs of the construction of the wetland restoration/creation through the establishment of a Mitigation Bank.

Implementation Project FSD-13(r): White City Canal F Project

This project is a surface water conveyance system for an approximately 102-acre drainage basin (primarily residential land use). Currently, the basin has no means of providing water quality treatment or discharge attenuation prior to direct discharge to the North Fork of the St. Lucie River. The project will include the construction of improvements along Canal F (low flow weirs) and online wet detention pond (approximately 0.7 acres) at the downstream end of Canal F. These improvements will provide water quality and quantity benefits for the drainage basin.

Status: Ongoing Funding: \$276,710.

Implementation Project FSD-13(s): Frazier Creek Restoration

Three phase project to provide increased groundwater storage upstream, additional wet retention area, remove exotic vegetation and plant native vegetation, and remove muck sediments, throughout the length of Frazier Creek. Phase 1 constructed in 1995 included muck removal, exotic removal, and construction of a weir and a sediment basin/retention area in 1400 lf of formerly uncontrolled tidal ditch at the upper reaches of the Creek east of Colorado Avenue. It also included stormwater retention improvements upstream in the tributary basin. Phase 2 consists of purchase of property adjacent to the existing weir, removal of that high-density septic tank land use, and expansion of the existing retention area above the Frazier Creek weir into the purchased lands. The resultant large and highly visible water quality treatment lake will become the centerpiece for community redevelopment on both sides of Martin Luther King Boulevard. The third phase of the project will be extension of exotic removal and muck sediments removal within tidal Frazier Creek from Colorado Avenue west to Sheppard Park at the mouth of the St. Lucie River. Improvement of this segment of Frazier Creek will enable canoe and kayak trails to extend from the St. Lucie River to the present weir and future improved retention lake and public park area, augmenting the City's blueways system and passive recreation opportunities. Completion of this third phase will present a restored tidal Creek and water quality retrofit within the Frazier Creek Basin, from its uppermost reaches to the River itself.

Funding: \$1,730,000

Implementation Project FSD-13(t): Golden Gate

Water Quality Retrofit is designed to improve water quality leaving area between Kensington and Jefferson streets between CRA1A (Dixie Highway) and Crooked Creek. The proposed 1.6-acre retention area will provide water quality for an existing discharge into the Crooked Creek. This outfall presently discharges sediment and nutrient loading in the St. Lucie Estuary. This project incorporates a stormwater treatment area (STA), which will include the purchase of vacant lots along the Barbershop Ditch right-of-way. Weir structures and this STA will be utilized to improve quality and reduce timing of fresh water going to Estuary. It will also reduce sediment and nutrients within the Estuary. Prior to connection, stormwater improvements will also include retrofitting of eight (8) baffle

boxes upstream of the retrofits providing further sediment and nutrient removal. The proposed area presently obtains no water quality treatment and entails 29.4 acres of land, which directly discharges into Crooked Creek. Water Quality Retrofit Improvements include: Design, Permitting, Property acquisition, Construction, Project Certification, Maintenance of Facility.

Funding: \$2,508,000

Implementation Project FSD-13(u): Palm Lake Drive

The Palm Lake Park Water Quality Retrofit is designed to improve water quality leaving the subdivision. The 292-lot development was first platted in 1958 and has little treatment with significant stormwater problems. The project will be to improve the roadside swale system in Palm Lake Park, improve system hydraulics throughout Palm Lake Park and enhance the Lake as an aquifer recharge and Retrofit Basin. Palm Lake Park Retrofit is located west of SR 5 (US Highway #1), north of SR 707, south of Britt Road and adjacent to Baker Road in Martin County, Florida. The Palm Lake Park Drainage System is comprised of the 292-lot Palm Lake Park Subdivision, which presently discharges to the North River Shore East/West ditch which is at the Palm Lake Parks southern boundary of the East/West ditch. North River Shores east/west ditch has two discharges: west into twin culverts under Spruce Ridge Drive to a canal (Half Mile Lake) directly connected to the St. Lucie River; and east into existing concrete box culverts under U.S. Highway No. 1 to Haney Creek which flows eventually to the St. Lucie River.

Funding: \$2,240,000

Implementation Project FSD-13(v): Fern Creek

The Fern Creek Basin Water Quality Retrofit (Phase II Construction) is a 10-acre retrofit to improve the quality of stormwater coming from areas developed previous to 1979 (estimated at 200 acres more or less) in the Fern Creek Basin (basin area approximately 1,360 acres). Design, surveying and modeling activities are under way. Fern Creek Retrofit project is located east of SR 76 (Kanner Highway) and adjacent to the Ronnie Mobile Home Park, St. Lucie Inlet Farms and Southwood Subdivision in Martin County, Florida. The project connects to the South Fork of the St. Lucie River and Southern Indian River Lagoon.

Funding: \$1,255,000

Implementation Project FSD-13(w): Rio Vista Outfall Retention Area

The Rio area is an older developed area in Martin County north of the St. Lucie River and east of the Roosevelt Bridge. There are several drainage basins in the area which discharge untreated stormwater runoff from developed areas directly to the St. Lucie River. The Sylvia Street outfall serves probably the easternmost of these drainage basins. The area of this basin is approximately 104 acres. Land uses are residential, commercial and roadway development which occur prior to stormwater runoff treatment requirements. The outlet for this drainage basin flows south along Sylvia Street, east along the north side of S.R. 707, across the highway to a 1.2-acre lake on the south side of S.R. 707 which is connected to an uncontrolled 48-inch concrete culvert discharging directly to the River. An opportunity exists to maximize the storage and water quality treatment provided by the lake through implementation of a weir on the upstream end of the pipe/outlet of the pond to meter discharges while maintaining flood protection provided by the existing facility.

Funding: \$150,000

Implementation Project FSD-13(x): River Park Water Quality Improvement

The proposed project consists of the installation of structural best management practices (BMPs) on two stormwater outfalls within the River Park development of St. Lucie County. These two outfalls have a combined contributing drainage area of 147± acres and consists of single family residential development. There is presently only a limited amount of stormwater treatment provided in the watershed through vegetated roadside swales. However these systems were initially constructed well before the evolution of stormwater treatment in the 1970s therefore the swales were constructed for the purpose of rapid surface water drainage conveyance offsite. Three baffle box BMPs and a sedimentation basin are proposed at the outfalls of the two drainage basins. The proposed BMPs will capture the majority of the total suspended solids load presently discharging to the North Fork. Funding: \$176,155

Implementation Project FSD-13(y): Island Road Baffle Boxes

The Island Road Subdivision of approximately 23 lots is completely surrounded by the Indian River Lagoon. The lots presently drain (approximately 50% of each lot) to the street and then discharge directly into the Indian River Lagoon. The proposed improvements include two baffle boxes and exfiltration pipe to prevent sediment from

discharging directly into the Indian River Lagoon. In addition, the exfiltration pipe will provide water quality retention. Approximately 300 linear feet of exfiltration is proposed.

Funding: \$45,000

Implementation Project FSD-13(z): Airport Ditch

The main airport ditch is the primary drainage conveyance for a developed basin. The lower reaches fall from the upstream control elevation of 3.3 feet NGVD to tidewater over a length of 4,759 feet. This section of ditch has no control structures above elevation -2.0 feet NGVD. It rapidly conveys largely untreated stormwater runoff directly to the Estuary. During dry periods, this segment of ditch bisects and bleeds groundwater from a 414-acre sub-basin to tide elevation. The uncontrolled southern tributary ditch drains another 100 acres to tide over a length of approximately 2,500 feet. There are three main components of this project: 1) installation of weirs in two ditches near existing outfalls to tidewater; 2) installation of a weir and bleeder at a secondary uncontrolled ditch; and 3) related elements of project construction.

Funding: \$832,169

Implementation Project FSD-13(aa): Krueger Creek

Krueger Creek is a channelized tributary to the St. Lucie Estuary that serves as the major drainage outfall for a large developed basin in the City of Stuart. It has not been maintained since its original construction in the 1950's, and has become choked with sand and fine muck sediments. The surrounding basin provides no formal stormwater treatment facilities except for roadside swales. This project consists of retrofit of an existing mixed use and fully developed urban drainage basin with baffle boxes at the three City controlled outfall points to the Creek; and removal of sand and fine muck sediments which have accumulated in the Creek over decades. This will restore the Creek to design depth and control future accumulations of sediments in the Creek. Restoration of design depth will prevent re-suspension of muck sediments due to boat traffic and wind shear, and prevent migration of these sediments into the

Estuary. It will also provide improved benthic habitat and improved tidal flushing.

Funding: \$363,000

Implementation Project FSD-13(bb): Hidden River Estates Stormwater Retrofit

The goal of this project is to provide water quality treatment and flood protection for a residential neighborhood on the North Fork of the St. Lucie River. Presently, stormwater runoff from the 70-acre drainage basin discharges directly to the North Fork with no stormwater treatment other than the grassed swales that make up the conveyance system. Vacant lots in the neighborhood have been acquired for the construction of stormwater retention areas to provide water quality treatment. The project is in construction and is expected to be completed in May 2003.

|                |                   |                |
|----------------|-------------------|----------------|
| Project costs: | Land Acquisition  | \$ 47,000      |
|                | Design/Permitting | 36,420         |
|                | Construction      | <u>294,095</u> |
|                | Total:            | \$377,515      |

Implementation Project FSD-13(cc): River Park Baffle Boxes

The goal of this project is to provide water quality treatment for stormwater runoff from the River Park subdivision. Presently, stormwater runoff from the 150 acre drainage basin discharges to the North Fork of the St. Lucie River with no stormwater treatment other than the grassed swales that make up the conveyance system. Baffle boxes will be constructed at the two main outfalls to the North Fork in order to trap sediment and other floating debris prior to the stormwater discharging to the North Fork. Final design plans are being completed, and construction is expected to begin in F. Y. 03.

|                |                   |                |
|----------------|-------------------|----------------|
| Project costs: | Design/Permitting | \$ 26,270      |
|                | Construction      | <u>111,337</u> |
|                | Total:            | \$137,607      |

Implementation Project FSD-13(dd): Indian River Estates/Savannas Ecosystem Management Project

St. Lucie County has been working with the South Florida Water Management District (SFWMD) and the Indian River Lagoon National Estuary Program, through the St. Johns River Water Management District (SJRWMD), in designing a stormwater management plan for the Indian River Estates subdivision. The intent of the project is to improve flood protection for the subdivision (approximately 1200 acres) and to improve the quality of the

stormwater runoff which currently discharges from the subdivision directly into the Savannas State Reserve (the Savannas drainage basin outfalls to both the North Fork of the St. Lucie River and the Indian River Lagoon). The project is currently in the permitting stage. Full construction funding has not yet been established.

|                |                  |             |
|----------------|------------------|-------------|
| Project costs: | Land Acquisition | \$ 35,000   |
|                | Design           |             |
|                | St. Lucie County | 250,700     |
|                | SFWMD            | 100,000     |
|                | SJRWMD           | 95,000      |
|                | Construction     | 5,500,000   |
|                | Total:           | \$5,980,700 |

Implementation Project FSD-13 (ee): Cocoa Beach Alum Enhanced Seminole Pond Park

This project will construct a .75-acre detention area using alum treatment technology within a passive recreation park to increase the pollutant removal effectiveness of the system treating an 83-acre urbanized sub-basin draining to the Banana River. The contract agreement is pending adoption.

Funding: \$1,591,470

Implementation Project FSD-13 (ff): Satellite Beach DeSoto Baffle Boxes

This project will install four baffle boxes near the stormwater outfall for a 296-acre urbanized sub-basin draining to the Banana River as a part of a Sec. 319 grant construction project implementing stormwater systems to treat 100% of the DeSoto Parkway basin. This contract is pending adoption.

Funding: \$120,000

Implementation Project FSD-13 (gg): Melbourne Village Platt Circle Stormwater & Sediment Project

This project will implement several sediment and erosion control measures and reduce localized flooding by regrading a drainage ditch, replacing a failed culvert pipe, installing a baffle box and piping an open ditch that is a source of sediment to the M-1 canal discharging to Crane Creek. This contract is pending adoption.

Funding: \$123,412

Implementation Project FSD-13 (hh): New Smyrna Beach Marina Stormwater and Sediment Project

Construction of a stormceptor sediment and pollution control device (baffle box) to capture runoff from three existing outfalls serving a 20-acre basin discharging to the Mosquito Lagoon in conjunction with other planned marina improvements. This contract is pending adoption.

Funding: \$62,000

Implementation Project FSD-13 (ii): Cocoa North Brevard Ave Stormwater Treatment System

Installation of a baffle box to serve a 15-acre downtown drainage basin. This contract is pending adoption.

Funding: \$42,500

Implementation Project FSD-13 (jj): Rockledge Ave Baffle Box

Installation of a sediment trap at the outfall located at Rockledge Ave & Rockledge Dr serving an 8+ acre basin. The City's goal is to install a minimum of at least one sediment trap at each outfall to the lagoon by 2010.

This contract is pending adoption.

Funding: \$52,000

Implementation Project FSD-13 (kk): Edgewater Gabordy Canal Bridge Baffle Box

Construction of a second generation baffle box capturing sediments and materials from two outfalls serving a 10-acre basin. This project is being implemented in conjunction with a pedestrian bridge installation over the canal with educational signage. This contract is pending adoption.

Funding: \$38,000

Implementation Project FSD-13 (ll): Brevard County Lake George Water Quality Improvements

This project will reroute existing pumped agricultural runoff from a 629-acre area into two stormwater treatment ponds via conveyance piping and a wetland treatment area. This project will help alleviate periodic residential flooding with the additional capacity in the expanded channels. This contract is pending adoption.

Funding: \$1,214,000

**e. Point Sources: CCMP Action Plan PS-1**

FDEP continues to monitor wastewater treatment plants throughout the lagoon watershed for compliance with the Indian River Lagoon Act. Efforts to encourage municipalities to include a reference to the Act during their Comp Plan updates, to ensure continued compliance, are ongoing. The State Revolving Loan Trust Fund, traditionally reserved for construction and upgrades to wastewater treatment plants, is continuing the 10 percent funding allowance for stormwater allocation low interest loans for local government non-point source projects.

**f. Marinas and Boats: CCMP Action Plan MB-6**

IRL Program staff participates in boater education programs and events to provide information on resource protection and practices boaters can perform to reduce their impacts on the lagoon. The IRL Boater's Guide remains a popular publication for boaters that includes information on the boating community and ways they may reduce their impacts on the water quality, habitats and endangered species in the IRL. The guide is posted in the IRL page of SJRWMD's web site.

**g. Monitoring and Data Management**

The SJRWMD and SFWMD continue to work with county governments to coordinate the ambient water quality monitoring network throughout the lagoon. Quarterly meetings with the network participants are being held and quality control information is being presented. Calculations of tributary loadings are being developed and enhanced synoptic water quality sampling is being conducted for the PLR Model.

**Implementation Project MON-2(a): Citizens Volunteer Water Quality Monitoring Network**

Continuation of the agreement with the Marine Resources Council, initiated in 1994, to collect water quality data through the use of its citizen's monitoring program. MRC maintains 78 monitoring stations on the IRL from Brevard County to Martin County and has continued to collect reliable long-term water quality data for trends analysis. Reports from the nation's 2nd largest volunteer water quality monitoring network have shown salinity trends, impacts of freshwater discharges, and other valuable results.

Status: Ongoing Funding: \$60,000 Year 7; Total \$480,000

**Implementation Project MON-2(b): CASTnet National Atmospheric Deposition Program Site**

The establishment of a CASTnet site at Sebastian Inlet is significantly improving the IRL Program's quantification of nutrient loadings from airborne deposition. The data from this site is being combined with atmospheric deposition site data in the northern and central portions of the watershed to estimate the total loadings of nutrients to the watershed from airborne deposition. The EPA selected laboratory for this work is ESE Labs in Gainesville. The monitoring station has been operational since August 2001.

Status: Ongoing Funding: \$78,500

**Implementation Project MON-2(c): St. Lucie Fish Health as a Biological Indicator to Measure Project Performance**

This project will continue a multi-year effort to develop, refine, and apply biological indicators to measure the effectiveness of water improvement projects. Abnormalities in fish assemblages reflect the quality of the water in which the fish live. This project will add five years of sampling to an existing time series of fish health data and will enhance its value for establishing baseline conditions, identifying the factors causing fish abnormalities, and evaluating the progress and effectiveness of implemented water management and water quality improvement projects. Results will be used to develop and refine performance measures for the SLE-IRL component of the Comprehensive Everglades Restoration Plan.

Status: Ongoing (2005)

Funding: Total \$590,000 (FY 1999-2000: \$90,000; FY 2000-2005: \$125,000 each FY)

## GRANTS PROVIDED FROM THE NEP TO LOCAL ENTITIES

| Local Government                         | Project Name   | End Date   | SJRWD<br>Amount*   | Local<br>Match     | Total Cost         |
|--|--|------------|--------------------|--------------------|--------------------|
| <b><i>Fiscal Year 2000-01:</i></b>       |  |            |                    |                    |                    |
| City of Satellite Beach                  | Jamaica Blvd. Stormwater Diversion   | Feb 2004   | \$100,000          | \$546,700          | \$646,700          |
| City of Fellsmere                        | Stormwater/Pollution Control - Phase I<br>Phase II                         | Complete   | \$50,000           | \$80,000           | \$130,000          |
| Brevard County SWI                       | Chain of Lakes - Phase I   | Jun 2003   | \$130,000          | \$2,875,000        | \$3,005,000        |
| City of Melbourne/<br>Brevard County SWI | Channel Stabilization  | Dec 2003   | \$50,000           | \$98,000           | \$148,000          |
| Indian River County                      | Vero Lakes Estates Stormwater<br>Improvement                               | Complete   | \$50,000           | \$892,180          | \$1,232,180        |
| Indian River County                      | Roseland Area East Stormwater<br>Improvement                               | Oct 2003   | \$235,000          | \$295,000          | \$530,000          |
| Town of Melbourne<br>Beach               | Melbourne Beach Stormwater Master<br>Plan                                  | Complete   | \$25,000           | \$35,746           | \$60,746           |
| City of Cape<br>Canaveral                | Cape Canaveral Stormwater Utility<br>Implementation                        | Complete   | \$35,000           | \$38,500           | \$73,500           |
| County of Volusia                        | Silver Sands Stormwater<br>Improvements                                    | Complete   | \$30,000           | \$31,000           | \$61,000           |
| City of Melbourne/<br>Brevard County SWI | Melbourne Baffle Boxes   | Complete   | \$40,000           | \$45,000           | \$85,000           |
| City of Rockledge                        | Knollwood Gardens Outfall Baffle Box                                       | Oct 2003   | \$26,000           | \$55,250           | \$81,250           |
| City of Cocoa Beach                      | Second Street South Sediment/Oil &<br>Grease Trap                          | Terminate  | \$30,000           | \$41,200           | \$71,200           |
| Town of Melbourne<br>Beach               | Urban Stormwater Correction &<br>Improvements for Anchor & Pelican<br>Keys | Jul 2003   | \$25,000           | \$114,438          | \$139,438          |
| City of Cocoa                            | Florida Avenue Rockledge/Cocoa<br>Stormwater Facility                      | Complete   | \$18,000           | \$18,170           | \$36,170           |
| <b>FY 2000-01 SUB TOTAL</b>              |  |            | <b>\$844,000</b>   | <b>\$5,166,184</b> | <b>\$6,010,184</b> |
| <b><i>Fiscal Year 2001-02:</i></b>       |  |            |                    |                    |                    |
| City of New Smyrna<br>Beach              | East Circle Culvert Repair and Water<br>Quality Retrofit                   | Mar 2003   | \$20,000           | \$40,960           | \$60,960           |
| Indian River County                      | Roadway Paving and Drainage<br>Improvements                                | Nov 2003   | \$100,000          | \$3,349,980        | \$3,449,980        |
| Indian River County                      | IRFWCD Sediment & Flow Reductions<br>& WQ Improvements                     | Jan 2004   | \$4,330,000        | \$0                | \$4,330,000        |
| Brevard County                           | Merritt Island Airport Pond  | Oct 2005   | \$100,000          | \$340,000          | \$440,000          |
| City of Fellsmere                        | Stormwater/Pollution Control Phase II                                      | Aug 2003   | \$660,000          | \$0                | \$660,000          |
| Fellsmere Water<br>Control District      | East Master Drainage Plan  | Aug 2003   | \$108,000          |                    | \$108,000          |
| Town of Melbourne<br>Village             | Melbourne Village Stormwater Master<br>Plan                                | Complete   | \$29,100           | \$9,700            | \$38,800           |
| City of Satellite Beach                  | Modular Filtering Stormwater Inlets  | Sep 2003   | \$31,300           | \$30,000           | \$61,300           |
| City of Satellite Beach                  | Grant Avenue Baffle Box  | Sep 2003   | \$32,100           | \$20,000           | \$52,100           |
| City of Palm Bay                         | Perimeter Canal Rehab Phase II   | Dec 2003   | \$48,000           | \$49,000           | \$97,000           |
| City of Palm Bay                         | PMU 38/40 Stormwater Improvements  | Nov 2003   | \$23,000           | \$23,000           | \$46,000           |
| City of Palm Bay                         | Turkey Creek Subdivision Stormwater<br>Improvements                        | April 2003 | \$123,000          | \$175,000          | \$298,000          |
| <b>FY 2001-02 SUB TOTAL</b>              |  |            | <b>\$5,604,500</b> | <b>\$4,037,640</b> | <b>\$9,642,140</b> |

**Fiscal Year 2002-03:  
(as of 2/03)**

| <b>Local Government</b>     | <b>Project Name</b>                | <b>End Date</b> | <b>SJRWMD<br/>Amount</b> | <b>Local<br/>Match</b> | <b>Total</b>        |
|-----------------------------|------------------------------------|-----------------|--------------------------|------------------------|---------------------|
| City of New Smyrna Beach    | City Marina Stormwater Retrofit    | TBD             | \$45,000                 | \$17,000               | \$62,000            |
| City of Cocoa Beach         | Alum Enhanced Seminole Pond        | TBD             | \$77,000                 | \$1,514,470            | \$1,591,470         |
| City of Satellite Beach     | DeSoto Baffle Boxes Project        | TBD             | \$60,000                 | \$60,000               | \$120,000           |
| Melbourne Village           | Platt Circle SW & Sediment Project | TBD             | \$92,500                 | \$30,912               | \$123,412           |
| City of Cocoa               | North Brevard Ave SW System        | TBD             | \$20,000                 | \$22,500               | \$42,500            |
| City of Rockledge           | Rockledge Ave Baffle Box           | TBD             | \$39,000                 | \$13,000               | \$52,000            |
| City of Edgewater           | Gabordy Canal Bridge Baffle Box    | TBD             | \$28,500                 | \$9,500                | \$38,000            |
| Brevard County              | Lake George WQ Enhancements        | TBD             | \$200,000                | \$1,014,000            | \$1,214,000         |
| Edgewater                   | Stormwater Master Plan             | TBD             | \$105,834                | \$170,000              | \$275,834           |
| City of Palm Bay            | PMU 38/40 SW Phase II              | TBD             | \$100,000                | \$100,000              | \$200,000           |
| <b>FY 2002-03 SUB TOTAL</b> |                                    |                 | <b>\$767,834</b>         | <b>\$2,951,382</b>     | <b>\$3,719,216</b>  |
| <b>FY 2000 – 2003 TOTAL</b> |                                    |                 | <b>\$7,216,334</b>       | <b>\$12,155,206</b>    | <b>\$19,371,540</b> |

### **SECTION 3. IRL BASIN ADVISORY BOARD**

This section briefly highlights additional projects and programs being completed by members of the IRL Basin Advisory Board (and other agencies), which are not included within the annual work plan as IRLNEP projects, but contribute significantly towards overall CCMP implementation and restoration of the IRL. These projects demonstrate the strong continuing commitment to CCMP implementation by members of the IRL Basin Advisory Board. Each of these projects, and those in Section 4, detail the future direction of CCMP implementation activities.

### **CCMP IMPLEMENTATION ACTIVITIES 2002-2003**

#### ***St. Johns River Water Management District***

FSD-13: Stormwater Management Cost-Share Program FY 2002-03 – The District approved ten new partnership agreements with the cities of Cocoa Beach, Cocoa, Rockledge, Edgewater, Satellite Beach, Palm Bay, and New Smyrna Beach, the Town of Melbourne Village; and Brevard County. These stormwater management projects target identified problem areas to improve water quality and flood protection within the IRL watershed. The District is providing \$767,834 to fund these projects, amounting to a total of \$3.7 million (including local government match) in stormwater management implementation. (Eco Mgt TF \$400,000 / EPA/NEP \$62,000 / IRL License \$305,834)

FSD-13: IRL License Plate Funding – The District partnered with Indian River County to assist 16 citrus growers in implementing BMPs, primarily installation of flashboard riser structures to reduce sediment and nutrient loadings to the lagoon, \$50,000.

FSD-13: IRL License Plate Funding – The District is partnering with the City of Rockledge to address flooding problems in the Fiske Blvd area through construction of a stormwater detention pond, \$50,000, the city will be expending an estimated \$800,000 on land acquisition and construction activities.

FSD-1&3: The C-1 Re-Diversion internal design work has been accelerated. Land acquisition is complete with 3,964 acres acquired. The Sawgrass Lakes Water Management Area, which will treat stormwater before entering the St. Johns River, is under construction. SJRWMD and MTWCD are continuing to pursue additional federal and state support for the project.

W-6: The District granted License Plate funding to the Marine Resources Council to complete a mature mangrove planting and shoreline stabilization project at AIS Point in Palm Bay, the future site for construction of the IRL House being funded by FIND and the City of Palm Bay, \$14,700.

PIE-2: The District provided License Plate funding to Brevard County Parks & Recreation to construct an educational kiosk at the Pepper Cove Impoundment, explaining restoration work and the value of enhancing/reconnecting impoundments, \$1,625.

F-2: The District provided License Plate funding to the University of Central Florida to complete a pilot project on restoration of eastern oysters in Mosquito Lagoon, \$1,000.

FSD-1 & 13: The City of Sebastian sub-basin surface water management plan is complete with design work for the master plan and stormwater park and water quality monitoring ongoing.

W-6: The Mangrove Planting project is ongoing throughout southern Brevard, Indian River, St. Lucie, and Martin counties with additional funding assistance from USFWS, FIND, and SFWMD.

SG-1: Seagrass aerial photos from 1996 have been photo-interpreted, historical land use and seagrass coverage maps are complete. Research projects addressing light requirements for Johnson's seagrass continues.

FSD-3 & SG-1: The IRL Bathymetric survey is complete. A shallow bathymetric survey of the causeways will be initiated under the IRL North Feasibility Study. Water level and salinity measurements for FDEP are ongoing. Flow and salinity measurements for hydrologic monitoring also continue.

W-5 & 6: Rehabilitation of Impounded and Degraded Wetlands through dike removal, culvert installation and dragline ditch restoration are ongoing.

MON-1: Inter-agency IRL Water Quality Monitoring Network with Indian River and Volusia counties to calibrate the PLR model is ongoing. Brevard is currently not participating. The network is important in carrying out the resource assessment and diagnostic functions of the IRL restoration program.

DIM-2: Calibration of the PRL model was completed by the University of Florida (UF) and delivered to the SJRWMD for review (testing). The final technical report and manuals were delivered by UF in June 2002.

FSD-3: Water Level, Salinity and Wind Data Collection, Inlet Tidal Cycle Flow Measurements, Tributary Flow Monitoring and Velocity Profile Measurements are being conducted in the ICWW.

### ***US EPA 319 Grant Projects***

- FSD-13: Cocoa Beach Alum Enhanced Seminole Stormwater Treatment Pond/Park – to treat urban stormwater runoff with an alum injected pond and allow for a small recreation area. Award \$365,000
- FSD-13: New Smyrna Beach's 27<sup>th</sup> Ave Stormwater Retrofit – to treat urban stormwater runoff flowing into the Mosquito Lagoon with a trash collection screen, a sediment collection fore bay, and berm. Award \$90,000.
- FSD-13: Satellite Beach Desoto Baffle Box/Trunk Line- to treat urban stormwater runoff in the Desoto Parkway watershed with baffle boxes and swales. Award \$464,000
- FSD-13: Satellite Beach Exfiltration – installation of 4,800 feet of 24" exfiltration pipe to treat stormwater runoff. Award \$200,000
- FSD-13: Titusville Marina Basin Stormwater Retrofit – construction of a detention pond and manmade wetland to treat stormwater runoff. Award \$298,000
- FSD-13: Stuart Baffle Box Stormwater Retrofits – construction of a baffle box to treat stormwater runoff. Award \$132,771
- FSD-13: St. Lucie County Platt's Creek Stormwater Retrofit – construction of a alum treatment system in a 16 acre detention pond. Award \$150,000
- FSD-12: St. Lucie County Savannas State Reserve and Indian River Estates – construction of an alum treatment system in a large detention facility in the Savannas recreation area. Award \$200,000
- FSD-12: Martin County Kitching Creek Stormwater Improvements – construction of two wet detention ponds. Award \$366,348.

### ***South Florida Water Management District***

- FSD-13: The South Florida Water Management District completed almost \$160,000,000 of land acquisition in Martin and St. Lucie Counties to initiate the Indian River Lagoon Restoration Plan – a major component of the Comprehensive Everglades Restoration Plan. The final plan is awaiting federal approvals.
- FSD-13: W-6 & BD-3: IRL License Plate Funding FY 2002-03- The SFWMD provided \$133,280 for projects in partnership with local governments and organizations in St. Lucie, Martin, and Palm Beach counties. The projects funded address issues such as stormwater retrofits, exotic plant removal, shoreline stabilization and revegetation, mosquito impoundment enhancement, and public access and awareness.
- FSD-12 and MON-1: St. Lucie River Issues Team 2002-03: stormwater retrofits with City of Stuart, Sewall's Point, St. Lucie County, Martin County and two 298 districts, agricultural bmp projects with IFAS and USDA and additional agricultural bmp research.
- FSD-3: PLRG development and SAV distribution mapping is ongoing within the St. Lucie Estuary, plus circulation models, estuary and watershed models and IRL bathymetry.
- MON-1: Water quality monitoring and nutrient sediment loadings analysis in the IRL and St. Lucie Estuary at 41 stations are ongoing.
- Additionally, 38 tributary stations have been added in support of the urban bmp program
- DIMS-3: Update of the IRLSIS is complete.
- PIE-4, FSD-13 & SG-1: Habitat restoration projects, such as mangrove planting and environmental education projects, have been funded through IRL License Plate revenue.
- FSD-12 & 13: Indian River Estates, Fort Pierce, and Martin County stormwater retrofits. PIE-1, 2 & 3: Environmental Education Programs such as Student Field Studies.
- FSD-12 & BD-3: SFWMD is conducting the following projects in partnership with the US Army Corps of Engineers: Muck removal feasibility study in the St. Lucie Estuary, C&SF Indian River Lagoon Restoration Feasibility Study and public and government awareness program, and control or eradication of invasive non- native plant species in the North Fork of the St. Lucie Estuary..
- W-6: IRL License Plate Funding FY 2002-03 SFWMD has contracted with Palm Beach County - \$145,812, Martin County - \$104,340, and St. Lucie County - \$58,666 to conduct stormwater enhancement projects and habitat improvements such as exotic removal, shoreline stabilization and impoundment restoration. Contracting groups included Audubon, Mosquito Control, Nature Conservancy, FDEP and the Environmental Learning Center of Martin County.
- SWIM Plan Update in conjunction with SJRWMD/SWIM was adopted at the December 2002 Governing Board meetings of the both Water Management Districts.

### ***Florida Dept. of Environmental Protection***

PS-3 & 4:SRF Loan for wastewater treatment improvements and pump station rehabilitation for the City of Cocoa Beach.

PS-3& 4: SRF loan for wastewater collection, treatment and reuse system improvements for the City of Cocoa.

PS-3& 4: Legislative appropriation management for the St. Lucie Airport Industrial Park wastewater improvements.

PS-1 & OSDS-1: Legislative appropriation management for City of Palm Bay wastewater collection system to replace septic systems.

MON-1: Water Quality Monitoring in Turkey Creek and Crane Creek associated with the environmental muck dredging projects.

PS-1: Monitoring Compliance with the IRL Act for wastewater discharges through permit review and compliance inspections.

FI-1: EMAT implementation of CCMP.

SG-1: Seagrass and clammers working group.

PS-3: Biological monitoring of Reverse Osmosis discharge plants.

W-3 & 6: Continuing support for the Savanna's Ecosystem Restoration Team.

FSD-13: Administers the EPA Section 319 Program for state including over \$2.2 million to lagoon counties and cities in FY 2002-03 for water quality improvement projects.

MB-1: Implementation of the Clean Marina program in the Indian River Lagoon area.

MON-1: Southeast District is initiating a monitoring program for IRL tributaries and the IRL to determine impairment status and baseline WQ for CERP related projects. 30-40 stations estimated for quarterly sampling for Chlorophyll, nutrients, and physical parameters.

### ***Volusia County***

FSD-13: Riverside Drive/Magnolia Avenue Stormwater System Retrofit project in the City of New Smyrna Beach, providing water quality retrofit of the drainage system along these roads serving over 52-acres of residential development.

FSD-13, W-5, and PIE-2: IRL License Plate – Stormwater, habitat improvement, and education projects, including impoundment reconnections and enhancements in Canaveral National Seashore and Mosquito Lagoon, restoration of marshes impacted by dragline ditches created for mosquito control.

SG-1: Seagrass Monitoring.

PS-3: City of Edgewater Reclaimed Water Augmentation project to reduce wastewater discharged to the Mosquito Lagoon through the construction of a storage tank to contain the excess reclaimed water during wet weather conditions and supply additional reuse capacity for customers during dry periods.

PS-1: New Smyrna Beach Waste Water Treatment Plant and extension of reuse lines to Bouchell Island.

FSD-14: Stormwater Utility fee in place for unincorporated Volusia.

FSD-13: Basin planning for stormwater problems.

MON 1 & 2: County and Citizen water quality monitoring.

PIE-2: Investment in Eco-tourism promotions

ETS-1: Manatee Protection Plan adoption.

### ***Brevard County***

#### **Regional Stormwater Utility Department**

FSD-13: Regional Stormwater Utility Department FY 2001-02: The Florida Boulevard Pond project constructed a regional stormwater pond at the site of the abandoned Carlton Groves Wastewater Treatment Plant. Total cost \$250,000. Complete.

FSD-13: Regional Stormwater Utility Department FY 2001-02: The Shannon Avenue project in West Melbourne piped an unstable ditch and installed a baffle box to reduce sediment to the IRL. Total cost \$140,000. Complete.

FSD-13: Regional Stormwater Utility Department FY 2001-02: The Crane Creek/Hickory Ditch Stormwater Master Plan is a joint project between the City of Melbourne, the St. Johns River Water Management District and Brevard County. The Master Plan provides details of the Crane Creek and Hickory Ditch drainage system which discharges through Crane Creek into the Indian River Lagoon in the City of Melbourne. The Plan provides preliminary details for several alternate plans for construction projects that will improve conveyance and provide water quality improvements within the Crane Creek/Hickory Ditch system. The selected plan includes \$14,800,000

of improvements that will improve water quality. Brevard County and the Cities of Melbourne and West Melbourne have funds available for construction of the selected projects, however, additional funding will be necessary for implementation of this plan. Ongoing

FSD-13: Regional Stormwater Utility Department FY 2002-03: The Mulberry Lane District V project improves the water quality in the IRL by reducing the sediment loadings discharged into the upstream ditch system by installing a baffle box. Total cost \$75,000. Complete.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The City of Melbourne installed two baffle boxes to reduce sediment loading to the Eau Gallie River and Crane Creek. Installation of these baffle boxes was partially funded by the competitive local government cost-share program through the Indian River Lagoon program office. Total cost \$120,000. Complete.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The Oak Street/Gemini Elementary project designed and constructed retention ponds to provide water quality treatment along Oak Street and at Gemini Elementary School. The Gemini phase of the project was completed in 2001-02. The Oak Street phase will be completed in 2002-03. Total cost \$385,000.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The Indian Trail [Fairglen] project consists of constructing a regional stormwater treatment pond adjacent to Fairglen Elementary School. The project will be constructed in two phases: Phase I (piping improvements) was completed in 2002-03, Phase II (pond construction) is scheduled to be complete in 2002-03. Total cost \$450,000.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The City of Melbourne's Garfield Street project consists of the construction of two dry retention ponds to improve water quality in the Eau Gallie River by reducing the sediment and nutrient loading prior to discharge into a ditch which discharges into the Eau Gallie River and ultimately into the Lagoon. Total cost approximately \$150,000.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The Parkway project will construct regional detention ponds in the southeast corner of Wickham Park to provide water quality treatment and provide passive recreation opportunities. Total cost \$700,000.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The Dove Street Pond project in the City of Melbourne constructed an approximately 1.5 acre online treatment pond on a canal flowing into the IRL. Total cost \$150,000.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The Kelmore Baffle Box project improves the water quality in the IRL by reducing the sediment loadings discharged into the upstream ditch system. Total cost \$25,000.

FSD-13: Regional Stormwater Utility Department FY 2002-04: The Sarno Lakes Phase I project, FY 2002-03, will divert stormwater from a ditch system that currently discharges to the Lagoon and route it through three ponds totaling 14.5 acres that discharges into the St. Johns River. This project is partially funded with federal funds through an EPA 319H grant. Sarno Lakes Phase II, FY 2003-04, will improve upstream conveyance and divert additional flows to the ponds. Total cost \$820,000.

FSD-13: Regional Stormwater Utility Department FY 2003-04: The Pine Island project will convert existing borrow pits into stormwater treatment areas for a 15,000 acre drainage basin in North Merritt Island. This project is occurring on properties purchased by the County's EEL program and SJRWMD. Total cost \$3.4 million.

FSD-2: Regional Stormwater Utility Department FY 2002-03: County-wide GIS based inventory of drainage systems and will be complete in FY 2002-03. The GIS inventory currently contains 20,000 plus structures and will be an ongoing project to provide the most current data.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The City of Melbourne is currently developing a City wide stormwater master plan that provides details of the drainage system and problem areas throughout the City. A GIS based inventory of drainage systems and structural controls is being designed and the system is being mapped as a part of the overall project. The master plan will be complete in FY2002-03. The GIS inventory will be an ongoing project to provide the most current data. Total cost \$94,000.

FSD-13: Regional Stormwater Utility Department FY 2002-03: The City of West Melbourne is currently developing a City wide stormwater master plan that provides details of the drainage system and problem areas throughout the City. A GIS based inventory of drainage systems and structural controls is being designed and the system is being mapped as a part of the overall project. The master plan will be complete in FY2002-03. The GIS inventory will be an ongoing project to provide the most current data. Total cost \$80,000.

FSD-13: Regional Stormwater Utility Department FY 2003-04: The Tri-Party Project is a joint project between the City of Rockledge, the City of Cocoa and Brevard County. The 40 acre treatment pond is currently under construction and will treat runoff from a 940 acre watershed. Total cost \$325,000.

FSD-13: Regional Stormwater Utility Department FY 2005-06: The Chase Hammock Road and George Lake projects located on North Merritt Island will treat stormwater runoff by attenuation in constructed ponds followed by wetland treatment prior to discharge into the Lagoon.

### **Natural Resources Management Office**

MB-3 Complete and implement boat facility siting plans.

The Board approved the 2003 MPP on January 16, 2003 and directed staff to transmit the plan to the FWC. Subsequent communications with FWC indicates the State will approve the plan as submitted, which includes a Boat Facility Siting element (NRMO).

BD-3 Control or eradicate invasive exotic (non-native) plants and animals in the Indian River Lagoon region. NRMO- staff continues to participate with the Spoil Island Working Group to improve spoil island management and exotic species eradication.

Brevard County has amended its Landscaping/Land Clearing Ordinances to require the removal of invasive exotics at the time of development, and require that the property remain free of exotics thereafter.

ETS-1 Develop, update, or refine management of recovery plans for the endangered, threatened, or species of special concern found in the Indian River Lagoon region.

The Board approved a 2003 Manatee Protection Plan on January 16, 2003 and transmitted it to the FWC for approval. NRMO staff implemented two programs that impact manatees: 1. A Monofilament Recovery and Recycling Program, and, 2. A Kiosk (informational displays) design and installation program (NRMO).

The NRMO has completed (2002) an extensive inventory of all vegetative communities (> 1 ac mapping unit size) in Brevard County with the use of satellite imagery, aerial photographs and intensive ground truthing. The information is being used to develop a Significant Environmental Areas (SEAs) Ordinance that will include development criteria for sensitive areas. The initial area to be covered includes xeric habitats.

The NRMO completed updating the Florida Scrub-jay census through field verifications conducted by the NRMO staff and by using up-to-date information supplied by other Scrub-jay researchers.

DIM-2 Continue implementation of data and information management strategies.

Brevard County is continuing efforts to improve GIS capabilities, and make the GIS data available via the internet through the implementation of ArcIMS.

### **Environmental Endangered Lands Office**

Biodiversity (BD)

Policy 3.8 (Conservation Element) advocates conducting a spoil islands assessment by 2002 to identify valuable rookery areas.

Policy 3.13 (Conservation Element) supports the designation of the Indian River Lagoon from SR 405 to the north County Line as an aquatic preserve.

Policy 8.10 (Conservation Element) provides for the removal of invasive exotic species on public lands and native vegetation replacement program.

BD-3 Control or eradicate invasive exotic (non-native) plants and animals in the Indian River Lagoon region.

The EEL Program was awarded a \$12,000 grant through the National Fish and Wildlife Foundation for the reconnection of the Pepper Cove Impoundment adjacent to the Barrier Island Ecosystem Center. The EEL Program partnered with Florida Tech, the St Johns River Water Management District, Maple Street Natives, the Florida Bureau of Invasive Plant Management, and the Brevard County Mosquito Control District. A 15-minute documentary detailing the restoration is currently being shown on Space Coast Government TV. Copies are available upon request.

The EEL Program was awarded a \$30,000 grant through the Florida Inland Navigation District for the development of Digital Media Exhibits detailing the ecosystems of Brevard County. These digital exhibits are being developed in conjunction with the Harbor Branch Oceanographic Institution's Media Lab. The first phase of the exhibits is currently on display at the EEL Programs Enchanted Forest Sanctuary. The program will also be showcased at the Barrier Island Ecosystem Center scheduled to open in spring 2004.

The EEL Program received a \$25,000 grant from the U.S. Fish and Wildlife Service Partnership Program to eradicate Brazilian pepper and other non-native plants from private properties within the Archie Carr National Wildlife Refuge. Funds are being used to pay salaries for an EEL Program Intern and to purchase chemical. This

grant is an extension of a project previously funded through the Florida Department of Community Affairs. To date, over 250 private homes have been treated within the refuge.

The EEL Program has received a \$48,000 grant through the Florida Bureau of Invasive Plant Management for maintenance treatment on conservation lands within Brevard County, which have previously received funds from the State for initial treatment. Funds are being used to pay salaries for two EEL Program interns and for chemicals.

#### Land Acquisition (LA)

Policy 9.4 (Conservation Element) states the continued support for the EEL Program.

LA-1 Develop a coordinated strategy to identify, classify, acquire and manage environmentally sensitive lands throughout the Indian River Lagoon watershed.

Established EEL Program in 1990 (voter approved 0.25 mill ad valorem tax). (NOTE: Also implements BD-2 and W-4.)

NOTE: The County's EEL Program also implements ETS-3 (protect critical habitats), IM-2 (acquisition and restoration of impoundments), W-4 (acquire essential wetlands), BD-2 (land acquisition to protect biodiversity), BD-3 (control of exotic plants), and others.)

LA-2 Implement the process to acquire ownership or management of wetlands adjacent to the Indian River Lagoon.

Several County projects have acquired, or are in the process of acquiring, wetlands adjacent to the IRL.

The Blueways Florida Forever project was approved as a Group A project by the State's Acquisition & Restoration Council in December 2002. The Board of County Commissioners sent a resolution of support for this ranking.

This ranking allows the state to work on acquisitions within this project. The primary partner with the State is the SJRWMD with the EEL Program as a partner in selected areas such as the North Indian River Lagoon and Pine Island.

#### Endangered and Threatened Species (ETS)

The EEL Program continues to acquire lands within the Brevard Coastal Scrub Ecosystem project, which protects listed species such as the Florida scrub jay, indigo snake and gopher tortoise.

#### Public Involvement and Education (PIE)

PIE-3 Increase public and government awareness of programs which protect and restore the Indian River Lagoon.

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

The EEL Program is advancing with the development of the Barrier Island Ecosystem Center, located within the heart of the Archie Carr National Wildlife Refuge. The education programming and displays at the Center will focus on the barrier island ecosystem to include the lagoon and associated uplands.

#### Agriculture/Extension Services Office

##### MB-1 & MB-5: Marina and Boat Impacts (MB)

Participated in designation of Cape Marina, Port Canaveral, as the 1st Clean Marina/Clean Boatyard dual-designation in Brevard County (33rd Clean Marina in Florida, 5th Clean Boatyard in Florida).

Designation (with St. Lucie Co. Sea Grant Agent, Leroy Creswell) of Sebastian Inlet Marina and Trading Co. as the 1st Clean Marina in Indian River County.

Designation of Kennedy Point Marina and Yacht Club as a Clean Marina (44th in Florida), designation of Titusville Municipal Marina as a Clean Marina (45th in Florida).

Provided programmatic guidance for Manatee Cove Marina, Patrick Air Force Base, as they worked toward dual-designation as a Clean Marina/Clean Boatyard, to be accomplished in designation ceremonies scheduled for February 19, 2003 (will be 2nd military Clean Marina in Florida, 1st Air Force Clean Marina in Florida, 2nd dual-designation as Clean Marina/Clean Boatyard in Brevard County, and 1st military dual-designation as Clean Marina/Clean Boatyard in the United States).

Cooperated with Brevard County marinas and the Brevard Marine Industries Association, 15000 copies of the "Clean Boater" booklet were distributed in Brevard County.

#### BD-3 Biodiversity Action Plan (BD)

Conducted a canoe-trip for Brevard's senior citizens, into a mangrove ecosystem where the Marine Agent explained how invasive exotic Brazilian pepper invades, then dominates native mangrove mangrove communities, and how this may impact survival of juvenile species of fish, crustaceans, and other inhabitants of native mangrove communities.

Presentation to members of the Brevard Co. Oil Spillage Committee concerning mechanisms of transport of larvae of invasive exotic marine species in ballast water of ships. Emphasis was placed on the importance of not allowing ships in Port Canaveral to offload ballast water (which is not presently knowingly allowed), in order to prevent accidental introductions of invasive exotics, such as the Indonesian green mussel.

Cooperated with Florida Power & Light, Sharpes, to discover cause of cooling-intake system reduced efficiency. Fouling organisms were determined to be barnacles. Recommended removing PVC from system and replacing it with galvanized steel which is avoided by barnacle larvae.

160 clammers CERTIFIED as having attended annual environmental education seminars required by State Law.

#### W-7 Natural Communities Wetlands Action Plan

Instructed volunteers at annual "Beach Sweep" about the many ways trash can damage the environment, and endanger wildlife. Debris removed included plastic cups, straws, bottles, old polypropylene rope, driftwood, cigarette butts, plastic bags, dangerous medical waste, and paper products.

#### *Indian River County*

FSD-13: Indian River County Stormwater Enhancement Project: Kings Highway Improvements between 16th Street and Oslo Road - The County is constructing a major thoroughfare roadway, approximately 3 miles long, that will replace an existing road. The new four-lane highway will provide stormwater management tracts with storage and treatment of stormwater runoff before discharge into the Lateral B Canal. The project is under construction and is expected to be completed in early 2004.

FSD-13: Indian River County Stormwater Enhancement Project: Initiated and Constructed Roadway Improvement projects - Several developer-initiated roadway improvement projects may be constructed. These projects will paved existing marl roads and retrofit the roads' existing stormwater management systems to improve water quality in the Indian River Lagoon.

FSD-12: On December 17, 2002, the Indian River County Commission approved the East Indian River County Master Stormwater Management Plan. This stormwater plan addresses stormwater concerns within the Indian River Farms Water Control District (IRFWCD), a Florida Statutes Chapter 298 drainage district that encompasses over 50,000 acres in central eastern Indian River County. Several projects identified by the stormwater plan are proposed for design and beginning construction in 2003-2004: (1) Replacement of the middle radial arm gate at each of the IRFWCD's four existing radial gate water control structures, with a tilting weir gate. Tilting weir gates will allow better control of the upstream water level in the IRFWCD canals and reduce the amount of suspended solids that wash into the Lagoon. Additionally, a sedimentation basin and a floating debris boom will be constructed behind each water control structure. (2) Construction of a Stormwater Park in southwestern Indian River County. This facility will treat and store water from the IRFWCD's canals, removing suspended solids and nutrients. It will also provide cooling water for a proposed electric power plant and a source of irrigation water for farmers. (3) Installation of vortex-type treatment units in the IRFWCD's Main Relief Canal and South Relief Canal. These devices will help remove suspended solids and nutrients from the canal water before it reaches the Lagoon. A floating debris boom will be constructed upstream of each vortex facility.

FSD-7: Comprehensive Land Use Plan - stormwater element modification will be made when required by state law.

LA-1: The County expects to close on the Lost Tree Islands purchase in February. The County has a 60 percent Cost-Share grant to negotiate the purchase of the approximately 235-acre "Indian River Farms Coastal Preserve" (a.k.a. the Canty Property) north of Vero Shores Subdivision. Other Blueway projects on the LAAC acquisition site list include "Morgan's Impoundment" and "Winter Beach Marsh." The following table excerpt from the Indian

River County Comprehensive Plan (Table 6.22) summarizes projected expenditures on environmental land acquisitions by fiscal year.

| Project  | FY 2003-4          |
|--|--------------------|
| Jungle Trail Conservation Area - Beach Access Improvements | \$ 50,000          |
| Harmony Oaks – Access                                      | \$ 70,000          |
| Oyster Bar Salt Marsh                                      | \$ 45,000          |
| Hallstrom Farmstead  | \$ 126,150         |
| Environmental Land Acquisition                             | \$1,000,000        |
| Management/Access to Future Acquired Conservation Lands    | \$ 300,000         |
| <b>TOTAL</b>   | <b>\$1,591,150</b> |

MON-1: Participation in Indian River Lagoon water quality monitoring network will continue.

***St. Lucie County***

W-5 & 6, and PIE-4: IRL License Plate Funding – In FY 2001-02, License Plate funds provided \$56,816 to execute a Mosquito Impoundment Enhancement and Public Access/Awareness project. Work under that contract was completed during FY 2001-02: installation of a quad-pump station (28,000 gpm capacity) and purchase of two pumps (IRL License \$31,145.10; SLCMCD \$12,849.80; Total \$43,994.90); conversion of one 7,000 gpm pump station to a dual 14,000 gpm station, and construction of two outlooks, one fishing pier and one outdoor classroom with webcam are in-process in FY 2002-03 (IRL License \$25,672). Federal Funds from the NOAA CIAP program matched the License Plate grant to cover the quad pump station costs in FY 2001-02, and their contribution was \$63,273 towards the pump station construction and the purchase of three, 7,000 gpm pumps. The South Florida Water Management District also provided funding for a dual pump station at Queens Island, in the amount of \$20,000, in FY 2001-02.

W-5: St. Lucie County Mosquito Impoundment Reconnection: In FY 2002-03 the purchase of the Indrio Blueway 105 acre site is anticipated to close. Once closure is completed, restoration of historical tidal exchange between Impoundment 14 A (a 40 ac +/- coastal isolated wetland located at the site) and the Indian River Lagoon, is anticipated to occur. USDA, SLRIT and IRL License Plate grant funds are anticipated to complement local funds to complete the project. Funding: \$165,000

FSD-13: Water Quality Improvement Projects: St. Lucie County has been working with the SFWMD and the IRLNEP, through the SJRWMD, in designing a stormwater management plan for the Indian River Estates subdivision. The intent of the Indian River Estates/Savannas Ecosystem Management project is to improve flood protection for the subdivision (approximately 1,200 acres) and to improve the quality of the stormwater runoff, which currently discharges from the subdivision directly into the Savannas State Reserve (the Savannas drainage basin outfalls to both the North Fork of the St. Lucie River and the IRL). The project is currently in design. Full construction funding has not yet been established. Total cost \$5,980,700.

***Martin County***

As one of the six county governments participating in the implementation of the Indian River Lagoon (IRL) Comprehensive Conservation and Management Plan (the Plan), Martin County supports the improvement of water quality and enhancement of the habitat within and adjacent to the IRL. This support is evidenced by the development and implementation of the County's Lands for Healthy Rivers and Natural Resources Protection Program. The proposed purchases within this program are priority parcels identified within the Comprehensive Everglades Restoration Plan (CERP), the Florida Forever Program and other state and federal land acquisition programs. CERP is a joint project of the U.S. Army Corps of Engineers and the South Florida Water Management District which offers long-term solutions to restoring America's Everglades, along with the lakes and rivers of South Florida to a healthy condition.

On November 3, 1998, the voters of Martin County voted to add a one-cent sales tax for a period of three years for the purpose of land acquisition for river restoration, provide matching funds for conservation lands purchase and to fund capital projects for water quality improvement. It was estimated that the tax would provide \$38 million over those three years, however, \$50.4 million has been accumulated to date.

On Wednesday, February 13, 2001, the South Florida Water Management District adopted a resolution honoring the Martin County Board of County Commissioners for their leadership in establishing the Health Rivers program and their dedication to improving water quality in the IRL and its adjacent water bodies. In addition to land purchases for preservation and restoration, stormwater management projects are high on the County's list of priorities.

The County's Office of Water Quality focuses specifically on improvement of water quality in the area. To that end, the County continues to dedicate fiscal and human resources to these projects. Listed below are capital and related project with identified funding for fiscal years 2003 and 2004.

W-6: IRL License Plate Funding FY 2003 - SFWMD has a continuing contract with the Environmental Learning Center and has provided an addition \$1,850.00 to execute a Red Mangrove Planting project in Martin County.

W-6: IRL License Plate Funding FY 2003 - SFWMD is continuing a contract with Martin County and is providing Martin MCBCC/Engineering Department with \$29,760.26 for Mosquito Impoundment Restoration Project by removing exotic vegetation.

W-6: IRL License Plate Funding FY 2003 - SFWMD has entered into and completed a contract with the Florida Department of Environmental Protection and provided \$7,204.80 to execute removal of exotics and replanting of native species on spoil islands at the St. Lucie Inlet State Park.

W-6: IRL License Plate Funding FY 2003 - SFWMD has entered into a contract with Martin County Audubon Society and provided \$17,000.00 to execute a Habitat Enhancement Project that provides additional nesting areas, removes exotic vegetation and replants appropriate native vegetation.

W-6: IRL License Plate Funding FY 2003 - SFWMD has entered into a contract with the Nature Conservancy and provided \$29,760.27 to execute removal of exotic vegetation at Blowing Rocks Preserve.

W-6: IRL License Plate Funding FY 2003 - SFWMD has entered into and completed a contract with the River Pine Home Owners' Association and provided \$18,765.00 to execute removal of exotics and replanting of native species.

FSD - 3: Martin County Stormwater Master Plan: As part of the County's NPDES Initiative, application has been made to the Florida State Department of Community Affairs for funding in the amount of \$300,000 to be matched dollar for dollar by the County. This plan will provide the County with an inventory and baseline data to move forward with a comprehensive county-wide water management program and provide a vehicle for implementation of the Phase II National Pollution Discharge Elimination System.

FSD - 12: Kitching Creek Restoration Project: As part of the County's Loxahatchee River Restoration Initiative, application has been made to the U.S. Corps of Engineers to complete a "206" Continuing Authority Aquatic Ecosystem Restoration Project. The initial phase includes a Preliminary Restoration Plan which is in development and will determine the parameters for the project feasibility study. That study will determine the scope of work to be done and can bring up to \$5 Million federal dollars to the basin for redistribution and enhancement of flows through Kitching Creek southward to the "Wild and Scenic" Northfork of the Loxahatchee River.

FSD-14: Lands for Healthy Rivers and Natural Resources Protection Program: On November 3, 1998, the voters of Martin County voted to add a one-cent sales tax for a period of three years and dedicate the revenues to the acquisition of land for river restoration, matching funds for conservation lands purchase, and to

fund capital projects for water quality improvement. The proposed purchases are composed of priority parcels identified within the Florida Forever Program and the Comprehensive Everglades Restoration Plan (CERP). As of November 30, 2002, the tax revenues collected and interest earned totalled \$50,385,681. To date, \$17,753,118 has been spent on Preservation Lands purchases. There is approximately \$6.7 million available for Preservation Lands purchases and approximately \$25.9 million to be used to match federal dollars for designated CERP projects.

FSD-13 - Stormwater Capital Improvements 2003-2004: Coral Gardens Basin Improvements addresses water quality, flood attenuation and overdrainage. FY2003: Ad Valorem \$200,000. FY 2004: Ad Valorem \$240,000. Other Funds \$740,000 (St. Lucie River Issues Team), \$2,000,000. (SRF). Total Cost \$2,980,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Fern Creek Retrofit Project addresses water quality and flood attenuation. FY 2003: Ad Valorem \$344,000. Other Funds \$328,000. (St. Lucie River Issues Team). FY 2004: Ad Valorem \$300,000. Other Funds \$300,000. (St. Lucie River Issues Team). Total Cost \$1,279,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Golden Gate Water Quality Improvement Project addresses water quality and flood attenuation. FY 2003: Ad Valorem \$00. Other Funds \$657,000. (St. Lucie River Issues Team), \$990,000. (State Revolving Fund), \$440,000. (319 Grant). FY 2004: Other Funds \$325,000. (St. Lucie River Issues Team). Total Cost \$2,833,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Hibiscus Park Project addresses water quality and flood attenuation. FY 2003: Ad Valorem \$00. Other Funds \$550,000. (State Revolving Fund). Total Cost \$1,174,000. Project Completed 10/02.

FSD-13 - Stormwater Capital Improvements 2003-2004: Kitching Creek Project (Flora Avenue) provides ecosystem restoration and overall surface water management system improvement. FY 2003: Ad Valorem \$30,000. FY 2004: Ad Valorem \$118,000. Other Funds \$50,000. (FDEP Park Service), \$366,000. (319 Grant), \$366,000. (UNPSTA-Florida Forever). Total Cost \$782,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Little Club Improvement Project provides regional stormwater treatment facility development. FY 2003 Ad Valorem \$413,000. Other Funds \$430,000. (319 Grant). Total Cost \$1,273,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Manatee Creek Retrofit provides regional stormwater treatment facility development. FY 2003 Ad Valorem \$100,000. FY 2004 Ad Valorem \$00. Other Matchable Funds \$1,000,000 (St. Lucie River Issues Team), \$1,000,000 (State Revolving Fund). Total Cost \$3,972,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Old Palm City Retrofit Project addresses water quality and flood attenuation. FY 2003: Ad Valorem \$00. Other Funds \$391,000. (State Revolving Fund), \$312,000 (319 Grant). Total Cost \$3,475,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Palm Lake Park Project provides a stormwater management system. FY 2003 Ad Valorem \$210,000, Other Matchable Funds \$772,000. (State Revolving Fund), \$560,000 (St. Lucie River Issues Team). Total Cost \$1,893,000. Completed 1/03.

FSD-13 - Stormwater Capital Improvements 2003-2004: Poinciana Gardens Project provides ecosystem restoration and overall surface water management system improvement. FY 2003 Ad Valorem \$00. Other Matchable Funds \$2,097,000. (State Revolving Fund), \$306,205 (St. Lucie River Issues Team). Total Cost \$3,601,000. Phases I and II completed 12/02.

FSD-13 - Stormwater Capital Improvements 2003-2004: Rio-St. Lucie Surface Water

Management Improvements Project addresses water quality and flood attenuation. FY 2003: Ad Valorem \$60,000., Other Matchable Funds \$75,000. (St. Lucie River Issues Team). FY 2004: Ad Valorem \$188,000. Total Cost \$1,905,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: Salerno Creek Project provides regional stormwater facility development. FY 2003 Ad Valorem \$00.00., Other Matchable Funds \$360,000 (State Revolving Fund), \$360,000 (JPA-FDOT). Total Cost \$3,972,000.

FSD-13 - Stormwater Capital Improvements 2003-2004: South County - Tropic Vista Project addresses water quality and flood attenuation. FY 2003 Ad Valorem \$900,000. FY 2003 Other Matchable Funds \$2,500,000 (State Revolving Fund), \$241,000 (319 Grant). Total Cost \$3,578,000.

FSD-14 - MSTU approved at 0.468 mills for stormwater issues that raises \$4.1 million per year.

FSD-10: Florida Yards & Neighborhoods Program for environmental landscape education. Staff and other in-kind support equalling \$58,500 through September, 2003.

FSD-10: Clean Marina marine environment education program. Staff support.

#### ***US Army Corps of Engineers***

FSD-6: Dredging of Haulover Canal in Brevard County is complete - \$9.5 million.

FSD-14: Indian River Lagoon North Feasibility Study initiation: public input workshops conducted, Project Management Plan complete, continuing coordination with the established Project Delivery Team incorporating representatives from local and national government agencies and the public.

FSD-14: Indian River Lagoon South Feasibility Study: initiation of pilot projects.

W-6: Ponce Inlet North jetty extension underway; boat ramp channel study underway; feasibility study underway for exotic vegetation removal, bird nesting site restoration and shoal removal, \$10-15 million. FSD-14: Pelican Island Sec. 1135 study \$300,000.

FSD-14: C-1 Re-Diversion Project feasibility study underway \$400,000.

W-6: Canaveral Harbor O&M – sand bypass and sand tightening of north jetty; maintenance dredging of harbor; feasibility study of deepening of west turning basin - \$5 million.

FSD-6: Brevard County GRR, Reach 3 initiation in FY03.

#### ***US Fish and Wildlife Service***

W-5: Currently, Merritt Island National Wildlife Refuge is working with Federal Highway Administration on the restoration of a 12-mile section of Shiloh dike. The project will start on the north end of the Shiloh Road and proceeds south to the terminal end of the south Shiloh 1 North dike. Restoration of the spur dikes in Shiloh's 3 and 5 and the Shiloh 1 North dike would be accomplished by scraping down the dike to marsh elevation and removing the material, which will be deposited on the existing road surface of Shiloh's 5, 3, and 1, where the road repairs would take place. The Shiloh 1 North restoration would remove over 7,200 feet of dike, which additionally will be breached to the estuary about every 800 feet. In order to do this, it is necessary to construct 500 feet of new dike to bypass the restored wetlands (<0.25 acre).

The project will 1) restore 34-acres of marsh in the Shiloh 1 north impoundment, 2) restore 2 spur dikes (dead end dikes) in Shiloh 5 impoundment (about 4,400 feet), and 3) restore 1 spur dike in the Shiloh 3 impoundment (about 877 feet). Total proposed restoration is 38 acres.

The V-1 and V-2 impoundments were recently restored (198 acres). During February 2003, the V-3 and V-4 impoundments will be reconnected to the Mosquito Lagoon. Additionally, T-28-A (36 acres) impoundment will be reconnected to the Banana River.

LA-2: Pelican Island National Wildlife Refuge : The Refuge acquired the remaining 42 acres of the Lier Tract for \$3.1 million and a portion of the Michaels Tract for \$2.8 million.

W-1: Partner in MINWR Wetlands Management Initiative.

ETS-1: Development of a MINWR Comprehensive Conservation Plan.

ETS-1: Development of a Pelican Island Comprehensive Conservation Plan.

### ***National Aeronautics and Space Administration***

DIM-2: Data Sharing Memorandum of Understanding with SJRWMD. Development of Centralized IRL Database.

### ***USDA Natural Resources Conservation Service***

FSD-4: St. Lucie River Issues Team 2002-03 Project: Citrus Irrigation.

FSD-4 & 10, W-4, ETS-3, and PIE-3: St. Lucie FY 2001 – The SWCD wrote conservation plans (Resource Management Systems) on 1,450 acres of agricultural land; applied conservation practices on 18,479 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 354 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; performed 184 urban mobile lab evaluations with a potential water savings of 45.9 million gallons and 49 agricultural mobile lab evaluations with potential water savings of 1.8 Billion gallons of water, amounting to 1.5 Billion gallons of actual water savings reported; provided technical and conservation education assistance to 2,174 customers.

FSD-4 & 10, W-4, ETS-3, and PIE-3: Martin County FY 2002 – The SWCD wrote conservation plans for 731 agricultural acres; applied conservation practices to 1,541 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 1,760 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; performed 164 urban mobile lab evaluations providing potential water savings of 57.5 million gallons and actual savings of 8.6 million gallons provided technical and conservation education assistance to 3,140 customers.

FSD-4 & 10, W-4, ETS-3, and PIE-3: Indian River FY 2002 – The SWCD wrote conservation plans for 1,765 acres of agricultural land; applied conservation practices on 25,880 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 91 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; performed 47 mobile lab evaluations on 485 acres of mainly citrus land, providing potential water savings of 789 million gallons; provided 11,349 separate technical and conservation education assistances to customers.

FSD-4 & 10, W-4, ETS-3, and PIE-3: Brevard FY 2002 – The SWCD wrote conservation plans for 500 agricultural acres; applied conservation practices on 1,540 acres of citrus, pasture, and range land, wildlife, forest, and cropland; completed 50 natural resources conservation inventories and evaluations, which included providing soil surveys, flood zone maps, topographic maps, historical aerial maps information, wetland maps, and pond design, management and permit assistance; provided technical and conservation education assistance to 549 customers.

### ***Florida Inland Navigation District***

FSD-6: Intracoastal Waterway Maintenance Dredging

Completed maintenance dredging of 1.1 mcyds from reach I of Brevard County – north county line to Titusville marina. Partners ACOE & FIND. Costs- FIND \$7.2 m, ACOE \$2m.

Will initiate maintenance dredging of up to 1.4 mcyds from Reaches IV and V in Volusia County in the vicinity of Ponce Inlet, New Smyrna Beach and Edgewater. Partners ACOE and FIND. Costs FIND \$10m, ACOE \$2.5m.

Will initiate maintenance dredging of up to 60 kcyds from the Crossroads area in Martin County. Partners ACOE & FIND. Costs- FIND \$700k, ACOE \$250k.

Will initiate maintenance dredging of up to 100 kcyds from the Jupiter Inlet area in Palm Beach County. Partners ACOE & FIND. Costs- FIND \$750k, ACOE \$250k.

Completed construction of Dredged Material Management Area V-26 in Edgewater. Partners – FIND & City of Edgewater. Costs – FIND \$1.1m.

MB-5: Waterway Economic Studies

Will complete waterway economic studies of Brevard and Volusia counties. Partners FIND. Cost-\$200k.

W-6 & PIE-3: Assistance Program Projects

Kelly Park East Improvements. Partners - FIND & Brevard County. Costs - FIND \$80,000, County \$80,000  
AIS Lagoon House Shoreline Stabilization. Partners - FIND, Palm Bay, MRC. Costs - FIND \$70,000, Palm Bay/MRC \$70,000.

Shoreside Park Fishing Dock. Partners - FIND & Town of Palm Shores. Costs -FIND \$50,000, Palm Shores \$50,000.

Channel extension from Sebastian Inlet to the ICW. Partners - FIND, Sebastian Inlet District & SJRWMD. Costs - FIND \$63,121, SITD \$116,263.

Vitolo Park Public Access. Partners -FIND & St. Lucie County. Costs - FIND \$50,000, County \$63,716.

Pelican Island NWR Boardwalk & Observation Tower. Partners - FIND, SJRWMD, USFWS. Costs - FIND \$42,337, USFWS \$433,000.

St. Sebastian River Dredged Material Mgmt. Area Construction. Partners - FIND & SJRWMD. Costs -FIND \$250,000, SJRWMD \$1,734,000.

MB-8: Manatee Protection Signage

Brevard County signage for new manatee protection zones. Partners - FIND & USFWS. Costs - FIND \$400,000, USFWS \$100,000.

***Florida Fish and Wildlife Conservation Commission***

LA-1 and MON-1: Update of GIS Landsat vegetation maps of the Indian River Lagoon.

**SECTION 4. DISCUSSION OF MAJOR GOALS/FOCUS FOR THE COMING YEAR AND ANY CHANGES IN PRIORITIES**

The program has been and continues to be very successful in forming partnerships with federal and state agencies and local governments to implement projects benefiting the IRL. Over \$30 million in federal, state and local dollars are committed along with SJRWMD and SFWMD dollars to current lagoon initiatives. Many of the current initiatives are continuing efforts, such as development of pollutant load reduction goals for impaired waters in the basin, reconnection of impounded salt marshes to the lagoon, and implementation of stormwater planning and retrofit projects with local governments. Others are new initiatives, such as construction of in-canal stormwater best management practices facilities in the Indian River Farms Water Control District, the construction of a stormwater park within the City of Sebastian, implementation of the C-1 Western Diversion Project which will reduce the volume and flow rate of freshwater discharges to the IRL, and the implementation of environmental muck sediment dredging in the lagoon's tributaries to prevent the re-suspension of sediments and the flushing of muck into the lagoon.

The primary goal of the Indian River Lagoon Program continues to be:  
To attain and maintain water and sediment quality needed to support a macrophyte-based system, endangered and threatened species, fisheries, and recreation in the Indian River Lagoon.

| Measures  |   | Baseline Data   |  |
|---|---|---|--|
| <ul style="list-style-type: none"> <li>• Designated use determinations in the DEP 305(b) Report for IRL watersheds in SJRWMD</li> <li>• Extent of seagrass coverage in SJRWMD</li> <li>• Acres of impounded wetlands reconnected under SWIM, and acres of dragline-impacted wetlands rehabilitated</li> </ul> |   | <ul style="list-style-type: none"> <li>• Watersheds with use determinations (20 of 59) in 1998: five fully meeting, 14 partially meeting, and one not meeting their designated use</li> <li>• 57,000 acres in 1996</li> <li>• Zero acres as of 1990, zero acres as of 1999</li> </ul> |  |
| Program Components  | FY 2003-2004 Tasks  |   |  |
| <b>Monitoring</b>   | <ol style="list-style-type: none"> <li>1. Continue monitoring of water quality and seagrass health and coverage in the IRL system.</li> <li>2. Incorporate all historic data, for future seagrass change analysis and targets by 2006.</li> <li>3. Collect and analyze data from the CASTnet atmospheric deposition site at Sebastian Inlet.</li> <li>4. Refine and evaluate bathymetric coverage to rectified 2001 imagery.</li> <li>5. Continue to evaluate the water quality / seagrass link to support PLRG development.</li> <li>6. Implement a "State of the Watershed - 2004" conference, to serve as a benchmark for future evaluation of non-point source pollution abatement success, and identify unmet needs for the SIRL and the SLE.</li> </ol> |   |  |
| <b>Water quality goal development</b>   | <ol style="list-style-type: none"> <li>1. Propose seagrass depth coverage targets, light targets, and related water quality concentration targets</li> <li>2. Begin planning of stormwater retention and BMP facilities to meet the recommended freshwater discharge criteria for the Sebastian River estuary based on proposed salinity targets.</li> <li>3. Improve estimates of pollutant loadings in runoff to the IRL from un-gauged watersheds.</li> <li>4. Utilize the pollutant load reduction model in developing final PLRGs for impaired waters in the IRL.</li> </ol>   |   |  |

|   |  |
|---|--|
| <b>Wetland and shoreline rehabilitation</b> | <ol style="list-style-type: none"> <li>1. Reconnect additional impounded marshes in the MINWR and other impounded wetlands as they are acquired under public ownership.</li> <li>2. Continue to collect and analyze data on the effects of different management regimes on wetland functions in reconnected impoundments.</li> <li>3. Complete the rehabilitation of additional dragline-impacted wetlands in the Mosquito Lagoon.</li> <li>4. Fully reconnect all mosquito impoundments in the southern IRL by 2006.</li> <li>5. Continue coordination with FDEP and others to develop habitat restoration plans for spoil islands.</li> <li>6. Continue to support exotic removal and habitat restoration projects.</li> <li>7. Continue to identify and evaluate potential mangrove planting sites, conduct a minimum of ten new plantings, monitor and evaluate previously planted sites, and assess alternative planting methods and technologies.</li> <li>8. Acquire identified priority parcels within the IRL Blueway CARL Project from willing sellers and through opportunity acquisitions when available.</li> </ol>   |
| <b>Pollution control</b>                    | <ol style="list-style-type: none"> <li>1. Complete construction of the spoil management site for the Sebastian River muck dredging project, and finalize plans to begin dredging operations.</li> <li>2. Complete construction of stormwater management projects in Fellsmere, and with Volusia, Brevard and Indian River Counties.</li> <li>3. Conduct annual local government stormwater cost-share program for IRL.</li> <li>4. Continue construction of stormwater management facilities in Palm Bay and Sebastian, and implementation of BMPs at Indian River Farms Water Control District.</li> <li>5. Finalize the design of the Sebastian River WCD stormwater treatment system and begin construction of recommended BMPs.</li> <li>6. Complete post-project BMP effectiveness monitoring and a post-dredge environmental assessment of Crane Creek.</li> <li>7. Continue to support implementation of citrus agricultural BMPs to determine nutrient loadings from alternative citrus grove management scenarios.</li> <li>8. For the C-1 Western Re-Diversion Project, complete construction of the Sawgrass Lake Water Management Area treatment wetland, and complete contamination sampling in the SLWMA.</li> <li>9. Completion of Moore's Creek Retrofit Project, and full implementation of voluntary BMPs in the C-25/Ft. Pierce Farms Basin.</li> <li>10. Completion of Taylor Creek Sediment Removal Project by 2006.</li> <li>11. Replacement of Indian River Dr stormwater outfall pipes in St. Lucie County</li> <li>12. Continue installation of baffle boxes in Sewall's Point, and other sites that discharge stormwater directly to the lagoon.</li> <li>13. Initiation of the Manatee Creek Basin Retrofit Project in Martin County.</li> <li>14. Continue support for implementation of voluntary BMPs through the Indian River Citrus League, and the St. Lucie River Initiative</li> <li>15. Support implementation of the CCMP using IRL license tag and federal funds.</li> </ol> |
| <b>Coordination with Other Agency Plans</b> | <ol style="list-style-type: none"> <li>1. Continue implementation of the IRL-South Plan, and begin implementation of the IRL-North Plan in cooperation with the USACE.</li> <li>2. Continue to communicate and coordinate with FDEP, other agencies, and stakeholders in PLRG establishment, and any future TMDL activities.</li> <li>3. Continue support and coordination with the St. River Issues Team.</li> <li>4. Continue support and coordination with local governments and other partners.</li> </ol>   |
| <b>Public outreach and involvement</b>      | <ol style="list-style-type: none"> <li>1. Continue public outreach and involvement activities.</li> </ol>  |

## ***FY 2003-2004 IMPLEMENTATION PROJECTS***

These projects are recommended for funding to the IRL Advisory Board under this work plan with US EPA Section 320 funds and the non-federal matching dollars for the grant.

The following project descriptions are brief, conceptual summaries. Detailed scopes of work will be developed for each project for contract negotiations and implementation.

### **CCMP Implementation Project Proposals:**

This funding will be used to support selected project(s), reviewed and recommended by the IRL Technical Advisory Committee, to the IRL Advisory Board for their consideration under the Request for Proposals scheduled for release during the summer of 2003, with award(s) granted in November 2004. Selected projects will have a maximum of ten (10) months to complete their project and deliver required products to the NEP. Priority will be given to two categories of projects. First, proposals addressing the formation of a "task force" to assess recent wildlife disease occurrences such as fibropapillomas within the lagoon's sea turtle population, skin diseases and abnormalities in the dolphin population, toxic puffer fish containing saxitoxin, intense and long-lasting algal blooms, the introduction of the invasive *Caulerpa brachyura* algae, and the occurrence of changes in clams harvested in the lagoon. Second, proposals addressing new and innovative 'adult-targeted' public education and involvement products and activities targeted to generate understanding and support of lagoon implementation initiatives, increasing the sense of stewardship for the lagoon among the largest number of residents and visitors. Additionally, other proposals may be considered that address implementation of one or more of the IRL Program Goals as expressed in the IRLCCMP or the IRL SWIM Plan. Funding projects submitted in this category is a lower priority for the NEP than the previous two categories.

Estimated Date of Completion: September 2004

Budget: \$135,000

Funding Sources: EPA/NEP

### **Implementation Project MON-2(a) Year 8: Citizens Volunteer Water Quality Monitoring Network**

Continuation of the ongoing volunteer water quality monitoring program administered by the Marine Resources Council (MRC). Data produced by this network is uploaded to STORET on a regular basis and is made available to agencies and local governments.

Role of Partner: The MRC maintains a network of 85 sites monitored by volunteers on a weekly basis, one of the largest citizens monitoring programs in the U.S.

Estimated Date of Completion: September 2004

Budget: \$60,000

Funding Sources: EPA/NEP

### **Implementation Project FI-1(a) Year 7: CCMP – Grants Writer/Facilitator**

Contracted grant writing support provided to local governments in the IRL basin. The project has been supported by the IRL Program to assist local governments in meeting the challenges of financing CCMP implementation projects. The sixth year of work under this project has continued to demonstrate an ongoing desire by the lagoon area's municipalities, water control districts and counties to partner with state and federal agencies in implementation activities. Many local governments have utilized the services of this NEP consultant to identify new funding sources, prepare grant proposals and join with other partners to help implement CCMP recommendations. Through this project 39 grant proposals have been submitted since 1997, primarily for stormwater projects, with 29 grants awarded to date providing \$13.2 million in assistance for a total of \$73.8 million in project implementation.

Role of Partner: The grants writer assists local governments in preparing grant applications and responds to requests for additional information.

Estimated Date of Completion: June 2005

Budget: \$60,000

Funding Sources: EPA/NEP

Implementation Project PIE-2(c):Year 3 Martin County Youth Education Camp Wet

Camp Wet is a turnkey project conducted by the Martin County School's Environmental Studies Center providing 156 children from diverse backgrounds with a two-week camp experience studying Florida's fragile environment and the Indian River Lagoon through a series of hands-on field investigations. Students explore seagrass beds using seining nets to collect and identify species for further study, visit mangrove communities, learn about reefs and marine organisms, discover the sources of muck in the St. Lucie River, and complete other activities including games and puzzles to teach concepts and illustrate the fragile nature of the environment.

Role of Partner: Martin County Environmental Studies Center conducts the program, providing transportation, staff and materials for the camp.

Estimated Date of Completion: September 30, 2004

Budget: \$45,000 (\$20,000 NEP; \$25,000 Martin County and student registrations)

Funding Sources: EPA/NEP

Implementation Project: PIE-2(b) Year 4: IRL Information Library and Shoreline Restoration Project

Continuation of ongoing efforts with the MRC to develop and operate a centralized repository of IRL publications and other resource materials. This center provides assistance to students and citizens requesting additional information about the IRL. In addition, support is provided to MRC's exotic plant removal/ shoreline habitat restoration program.

Role of Partner: MRC as the project sponsor maintains the library, catalogues new materials, and responds to requests for information. They also conduct weekly Brazilian Pepper Tree "Busts" with volunteers.

Estimated Date of Completion: September 2004

Budget: \$25,000

Funding Sources: EPA/NEP

Implementation Project W-6(a) Year 8: Establishment of Fringing Mangrove Habitat

Support of ongoing shoreline restoration program undertaken by the Environmental Learning Center (ELC). To date, more than a mile of shoreline has been planted and monitored at sites ranging from Jupiter Inlet to Merritt Island. Project partners include SFWMD, USFWS, FIND and FDEP.

Role of Partners: ELC as project partner conducts weekly mangrove planting projects with volunteers and monitors previously planted sites.

Estimated Date of Completion: April 2005

Budget: \$35,000

Funding Sources: EPA/NEP: \$25,000; SFWMD: \$10,000

Implementation Project PIE-2(a): Educate the Public and Governments about the Resources of the IRL

Provides funds for the development, publication and distribution of outreach materials (brochures, fact sheets, etc.) by the IRL Program and support of outreach programs.

Estimated Date of Completion: September 2004

Role of Partners: Project partners provide distribution of materials and information throughout the watershed.

Budget: \$30,600

Funding Sources: EPA/NEP

Implementation Project FSD-13: Stormwater Implementation Projects

Support for implementation of prioritized urban drainage system retrofits. Funds of \$20,000 are available to each county and its municipalities involved in the management conference for local government assistance. Funds for Volusia, Brevard and Indian River counties may be combined with SJRWMD ad valorem monies, state legislative appropriations, or with funds generated by the IRL license plate to support regional retrofit or upgrade projects. Funds for St. Lucie and Martin counties may be combined with SFWMD ad valorem monies, state legislative appropriations, or with funds generated by the IRL license plate to support regional retrofit or upgrade projects. Role of Partners: Project partners provide match to complete projects, monitor results, and maintain stormwater systems.

Estimated Date of Completion: TBD

Budget: \$455,000

Funding Sources: EPA/NEP \$80,000; SJRWMD \$175,000; SFWMD \$100,000; Local Government \$100,000.

Implementation Project BD-1(a) Year 4: IRL Species Inventory & Relational Data Base (Smithsonian)

Development and inclusion of additional species reports in the existing on-line species inventory developed by the Smithsonian Marine Station at Fort Pierce (<http://www.sms.si.edu>). This information has proven quite valuable to students and educators throughout the IRL region. Role of Partner: Smithsonian maintains and updates the relational data base and inventory on the web site.

Estimated Date of Completion: June 2005

Budget: \$38,000

Funding Sources: EPA/NEP

Implementation Project IM-1(a): Wetland Restoration (Impoundment Reconnection)

This project will implement wetland restoration and impoundment reconnection. Funds will be used to purchase culverts and pumps for the reconnection and management of impounded wetlands, to restore impoundment shorelines to near pre-impoundment condition, to restore wetlands damaged by dragline ditching for mosquito control, and other wetland restoration efforts. Role of Partners: SJRWMD, USFWS, and the Volusia, Brevard, and Indian River County Mosquito Control Districts as project partners restore impounded wetlands and monitor their effectiveness.

Estimated Time for Completion: 2005

Budget: \$ 100,000

Funding Sources: SJRWMD

Implementation Project MON-2(b): CASTnet National Atmospheric Deposition Program Site

This project continues the support of the established CASTnet site at Sebastian Inlet being used to improve the IRL Program's quantification of nutrient loadings from airborne deposition. The data from this site, will be joined with atmospheric deposition site data in the northern and central portions of the watershed to estimate the total loadings of nutrients to the watershed from airborne deposition. The EPA selected laboratory for this work is ESE Labs in Gainesville. Role of Partner: Indian River County as project partner collects samples from the site and records data collected, sending samples and data to the lab in Gainesville for analysis.

Estimated Date of Completion: March 2004

Budget: \$10,000

Funding Source: SJRWMD (match toward CASTnet Grant, not NEP grant)

**IRLNEP Leveraged Resources Committed to NEP Operations and Projects from October 1, 2001-September 30, 2002**

| CCMP or Workplan Activity      | NEP Role (primary, significant, or support) | Total Leveraging    | Leveraged Federal |                 | Leveraged State    |                | Leveraged Local     |                 | Leveraged Private |                 |
|--------------------------------|---|---------------------|-------------------|-----------------|--------------------|----------------|---------------------|-----------------|-------------------|-----------------|
|                                |   |                     | Cash              | In-Kind         | Cash               | In-Kind        | Cash                | In-Kind         | Cash              | In-Kind         |
| 320 Match                      | Primary NEP requested                       | \$12,080,729        | \$1,320,471       | \$20,000        | \$611,700          | \$4,000        | \$10,043,410        | \$25,000        | \$1,500           | \$54,648        |
| Office Space & Personnel       | Significant - local sponsor SJRWMD          | \$337,500           |                   |                 | \$337,500          |                |                     |                 |                   |                 |
| Sebastian Stormwater Park      | Significant - NEP wrote grant proposals     | \$ 575,000          |                   |                 | \$575,000          |                |                     |                 |                   |                 |
| Sebastian River Dredging       | Significant - NEP wrote grant proposals     | \$ 250,000          |                   |                 | \$250,000          |                |                     |                 |                   |                 |
| Aquatic Nuisance Species Grant | Significant - NEP wrote grant proposal      | \$40,000            | \$40,000          |                 |                    |                |                     |                 |                   |                 |
| <b>Totals</b>                  |   | <b>\$13,283,229</b> | <b>\$40,000</b>   | <b>\$20,000</b> | <b>\$1,774,200</b> | <b>\$4,000</b> | <b>\$10,043,410</b> | <b>\$25,000</b> | <b>\$1,500</b>    | <b>\$54,648</b> |

**TABLE 1**  
*Annual Budget*

|   |                |
|---|----------------|
| US EPA Base Funds                                   | 300,000        |
| Congress Earmark                                    | 200,000        |
| US EPA Outreach Grant                               | <u>10,000</u>  |
| Subtotal Federal Funds                              | 510,000        |
| Congress Rescission 0.65% of EPA Appropriated Funds | <u>- 3,315</u> |
| Total Federal Funds                                 | 506,685        |
| <br>  |                |
| St. Johns River Water Management District           | 271,685        |
| South Florida Water Management District             | 110,000        |
| County / Municipality (in-kind) match               | <u>125,000</u> |
| Total Matching Funds                                | 506,685        |
| <br>  |                |
| Total   | \$1,013,370    |

**Projected Expenses:**

**Travel**

|                      |            |
|----------------------|------------|
| Per Diem and Mileage | 10,000     |
| Air Travel           | 6,000      |
| Car Rental           | <u>500</u> |
| Total                | 16,500     |

**Equipment & Supplies**

|                            |              |
|----------------------------|--------------|
| Field Supplies & Equipment | 2,200        |
| Stationary & Office        | <u>1,685</u> |
| Total                      | 3,885        |

**Contractual/Consultant Services\***

|                                |            |
|--------------------------------|------------|
| CCMP Implementation Activities | \$980,285* |
|--------------------------------|------------|

**Other**

|                          |              |
|--------------------------|--------------|
| Advertisements           | 200          |
| Printing                 | 8,000        |
| Registration/Conferences | <u>4,500</u> |
| Total                    | 12,700       |

**TOTAL PROJECTED EXPENSES** **\$1,013,370**

**TOTAL FUNDING FY 03-04** **\$1,013,370**

\*Contractual/Consultant Services includes SJRWMD, SFWMD, & County Non-Federal Program Match of 50%.

**TABLE 2**  
*Work Plan Implementation Projects*

| <b>Project</b>                                    | <b>EPA/NEP</b> | <b>SJRWMD</b>  | <b>SFWMD</b>   | <b>LOCAL</b>    | <b>TOTAL</b>   |
|---|----------------|----------------|----------------|-----------------|----------------|
| Action Plan                                       |                |                |                |                 |                |
| Project(s) TBD                                    | 135,000        | 0              | 0              | 0               | 135,000        |
| MON-2(a) CVWQMN                                   | 60,000         | 0              | 0              | 0               | 60,000         |
| CCMP Grants Writer                                | 60,000         | 0              | 0              | 0               | 60,000         |
| Martin County Youth Education Project             | 20,000         | 0              | 0              | 25,000*         | 45,000         |
| IRL Library & Shoreline Project (MRC)             | 25,000         | 0              | 0              | 0               | 25,000         |
| Shoreline Restoration (ELC)                       | 25,000         | 0              | 10,000         | 0               | 35,000         |
| Public Information and Education                  | 30,600         | 0              | 0              | 0               | 30,600         |
| Stormwater Implementation Projects                | 80,000         | 171,685        | 100,000*       | 100,000*        | 451,685        |
| IRL Species Inventory (Smithsonian)               | 38,000         | 0              | 0              | 0               | 38,000         |
| Wetland Restoration<br>(Impoundment Reconnection) | 0              | 100,000        | 0              | 0               | 100,000        |
| <b>TOTAL</b>                                      | <b>473,600</b> | <b>271,685</b> | <b>110,000</b> | <b>125,000*</b> | <b>980,285</b> |
| *In-kind  |                |                |                |                 |                |
| CASTnet Atmospheric Deposition Site               | 0              | 10,000*        | 0              | 0               | 10,000*        |

## APPENDIX II

### Indian River Lagoon Program Staff

#### **Troy Rice, Program Director**

##### Principal Duties and Responsibilities:

- Directs the IRL Project Office and staff, and provides primary staff support to the IRL Advisory Board.
- Coordinates with other agency and local government representatives on lagoon restoration, stormwater, and habitat enhancement projects.
- Develops strategies to keep implementation activities on schedule and within budget.
- Manages information resources to public and private individuals and organizations interested in CCMP implementation.
- Facilitates partnerships between and among agencies, governments and organizations to accomplish restoration and implementation activities.
- Oversees and provides project management for IRL Program/SJRWMD projects and programs.

#### **Robert Day, Environmental Scientist IV**

##### Principal Duties and Responsibilities:

- Provides technical support for the IRL Advisory Board and other IRL Program staff.
- Provides presentations on IRL-related issues to the public, other agencies and the IRL Advisory Board.
- Participates in the development of projects and programs designed to support the implementation of the IRLCCMP.
- Provides project management for IRL Program/SJRWMD projects and programs.
- Participates in the development, refinement, coordination and implementation of environmental assessment and monitoring programs in the IRL Basin.

#### **Linda Goode, Public Communications Specialist II**

##### Principal Duties and Responsibilities:

- Provides project and contractual management in the administration of IRL marketing, public education and outreach contracts, including the IRL License Plate program.
- Coordinates and participates in public education events to present IRL outreach information and displays, including two Shallow Water Expo events.
- Coordinates with the NEP Citizens Action Committee Chair to reestablish a viable and active citizen's committee for the NEP Program.
- Prepares quarterly summaries of marketing and outreach activities.
- Provides support for development of annual work plans, reports and presentations.

#### **Kathy Recore, Business Resource Specialist IV**

##### Principal Duties and Responsibilities:

- Provide timely notices of funding sources to SJR project managers, local governments, state and Federal agencies and nonprofit organizations for implementation of the IRL Comprehensive Conservation and Management Plan and other water quality and water supply initiatives.
- Research and provide information on alternative funding sources for specific projects on request.
- Maintain electronic database of funding opportunities to be included on the SJR/IRL website.
- Provides administrative support for the Indian River Lagoon Advisory Board and Association of National Estuary Programs.
- Provides administrative support for the Indian River Lagoon Advisory Board and Association of National Estuary Programs.
- Monitors developments and changes to the Federal electronic grant management initiative.

#### **Project Administrator, Position vacant as of 4/23/03**

##### Principal Duties and Responsibilities:

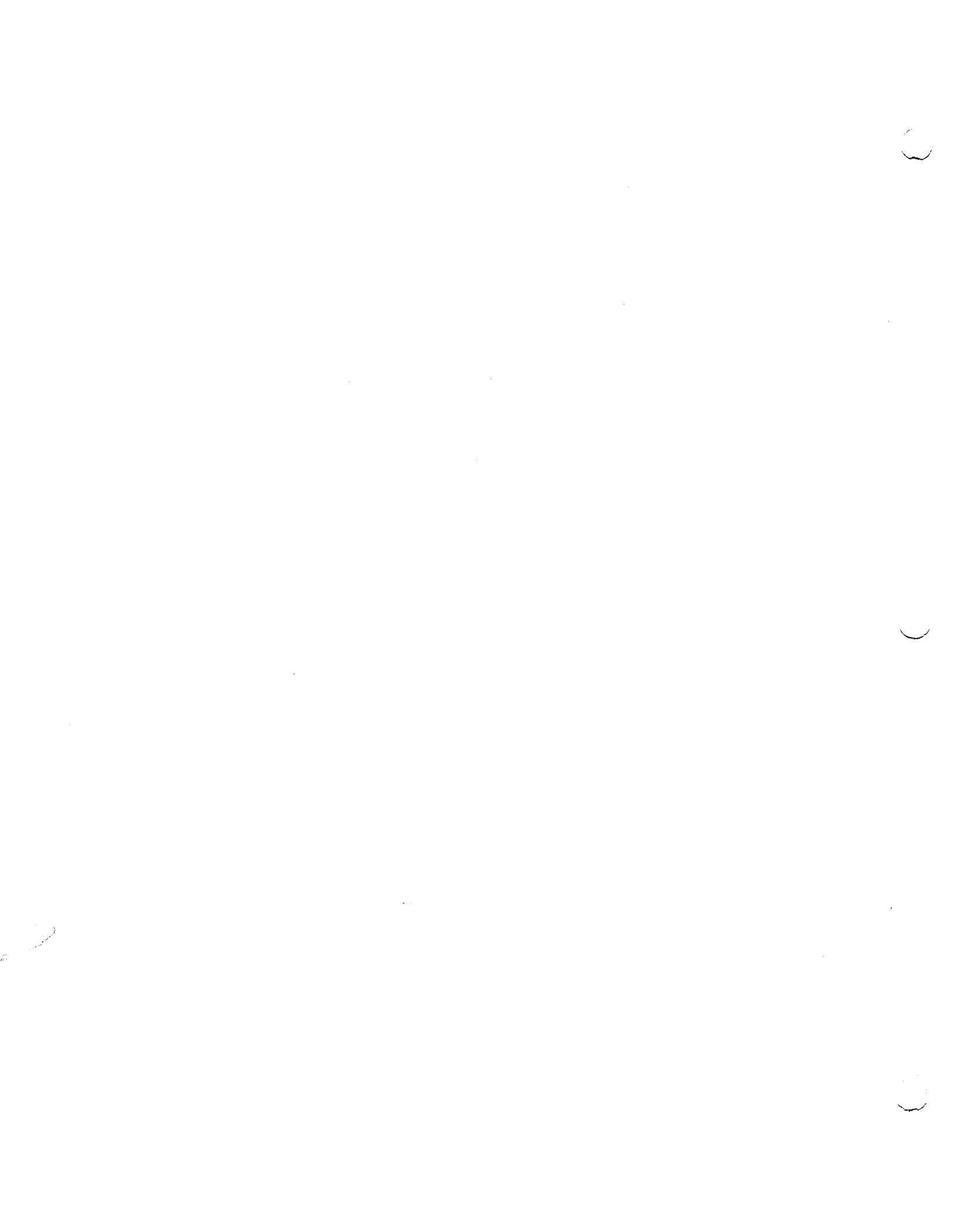
- Manages assigned contracts and local government assistance agreements
- Assists in development of Management Conference reports
- Prepares project budgets for submittal to Program Director, tracks expenditures, responds to audit and financial inquires.
- Supports implementing Management Conference agreements and the CCMP
- Assists in the planning and conduct of Management Conference meetings
- Meets with and participates in various advisory boards.

**APPENDIX II  
ALLOCATION OF FY 2002-2003 EPA TRAVEL FUNDS**

In compliance with the requirement to document the use of EPA outreach/travel funds as specified in the NEP FY 2003 Funding Guidance and Requirements for Grants memo the following details these expenditures for the period October 2002 through April 2003.

The Indian River Lagoon National Estuary Program expended 86% percent of the \$10,000 in EPA travel funds during the first seven months of the fiscal year. The availability of these funds continues to be an important component of the Indian River Lagoon NEP's outreach and coordination efforts with other programs around the nation, the EPA Regional Office and Headquarters, and the Association of National Estuary Programs. The Indian River Lagoon NEP has utilized these funds to attend the US EPA/ANEP's Annual Meeting in Washington D.C., the Fall Meeting in Ocean City Maryland, and several workshops and meetings throughout Florida.

| TRAVEL DATES           | LOCATION & PURPOSE  | COST           |
|------------------------|---|----------------|
| 10/15-18/02            | <b>Ocean City Maryland –</b><br>ANEP Fall Meeting<br>Troy Rice, Bob Day, William Kerr, Ed Garland                               | \$2,500        |
| 11/5-6/02              | <b>Tampa Florida –</b><br>Invasive Species Workshop<br>Troy Rice, Bob Day   | \$ 360         |
| 12/3-7/02              | <b>Tallahassee Florida –</b><br>Acquisition Restoration Council Meeting &<br>Meeting with Mobile Bay NEP DockWatch<br>Troy Rice | \$ 406         |
| 1/27-31/03             | <b>Cocoa Beach Florida –</b><br>EPA Tech Transfer Conference<br>Troy Rice, Bob Day  | \$ 475         |
| 3/10-13/03             | <b>Sarasota Florida –</b><br>Submerged Aquatic Habitat Estuaries Workshop<br>Bob Day  | \$ 300         |
| 3/15-21/03             | <b>Washington DC –</b><br>EPA/NEP National Meeting<br>Troy Rice, Bob Day, Linda Burnette  | \$3,500        |
| 4/13-16/03             | <b>Baltimore Maryland –</b><br>Restore America's Estuaries Conference<br>Troy Rice  | \$1,100        |
|                        |   | <hr/>          |
| <b>Total</b>           |   | <b>\$8,641</b> |
| <b>Future Proposed</b> |   |                |
| <b>Travel</b>          |   |                |
| <b>DATES</b>           | <b>LOCATION &amp; PURPOSE</b>   |                |
| 9/02                   | Seattle Washington<br>ANEP Fall Meeting Troy Rice, Bob Day  | \$1,359        |



**IRLNEP Leveraged Resources Committed to NEP Operations and Projects 2003**

| CCMP or Workplan Activity      | NEP Role (primary, significant, or support) | Total Leveraging    | Leveraged Federal |          | Leveraged State |         | Leveraged Local |          | Leveraged Private |          |
|--------------------------------|---|---------------------|-------------------|----------|-----------------|---------|-----------------|----------|-------------------|----------|
|                                |   |                     | Cash              | In-Kind  | Cash            | In-Kind | Cash            | In-Kind  | Cash              | In-Kind  |
| 320 Match                      | Primary NEP requested                       | \$12,080,729        | \$1,320,471       | \$20,000 | \$611,700       | \$4,000 | \$10,043,410    | \$25,000 | \$1,500           | \$54,648 |
| Office Space & Personnel       | Significant – local sponsor SJRWMD          | \$337,500           |                   |          | \$337,500       |         |                 |          |                   |          |
| Sebastian Stormwater Park      | Significant – NEP wrote grant proposals     | \$ 575,000          |                   |          | \$575,000       |         |                 |          |                   |          |
| Sebastian River Dredging       | Significant – NEP wrote grant proposals     | \$ 250,000          |                   |          | \$250,000       |         |                 |          |                   |          |
| Aquatic Nuisance Species Grant | Significant – NEP wrote grant proposal      | \$40,000            | \$40,000          |          |                 |         |                 |          |                   |          |
| <b>Totals</b>                  |   | <b>\$13,283,229</b> | \$40,000          | \$20,000 | \$1,774,200     | \$4,000 | \$10,043,410    | \$25,000 | \$1,500           | \$54,648 |

TABLE 2

TABLE 3

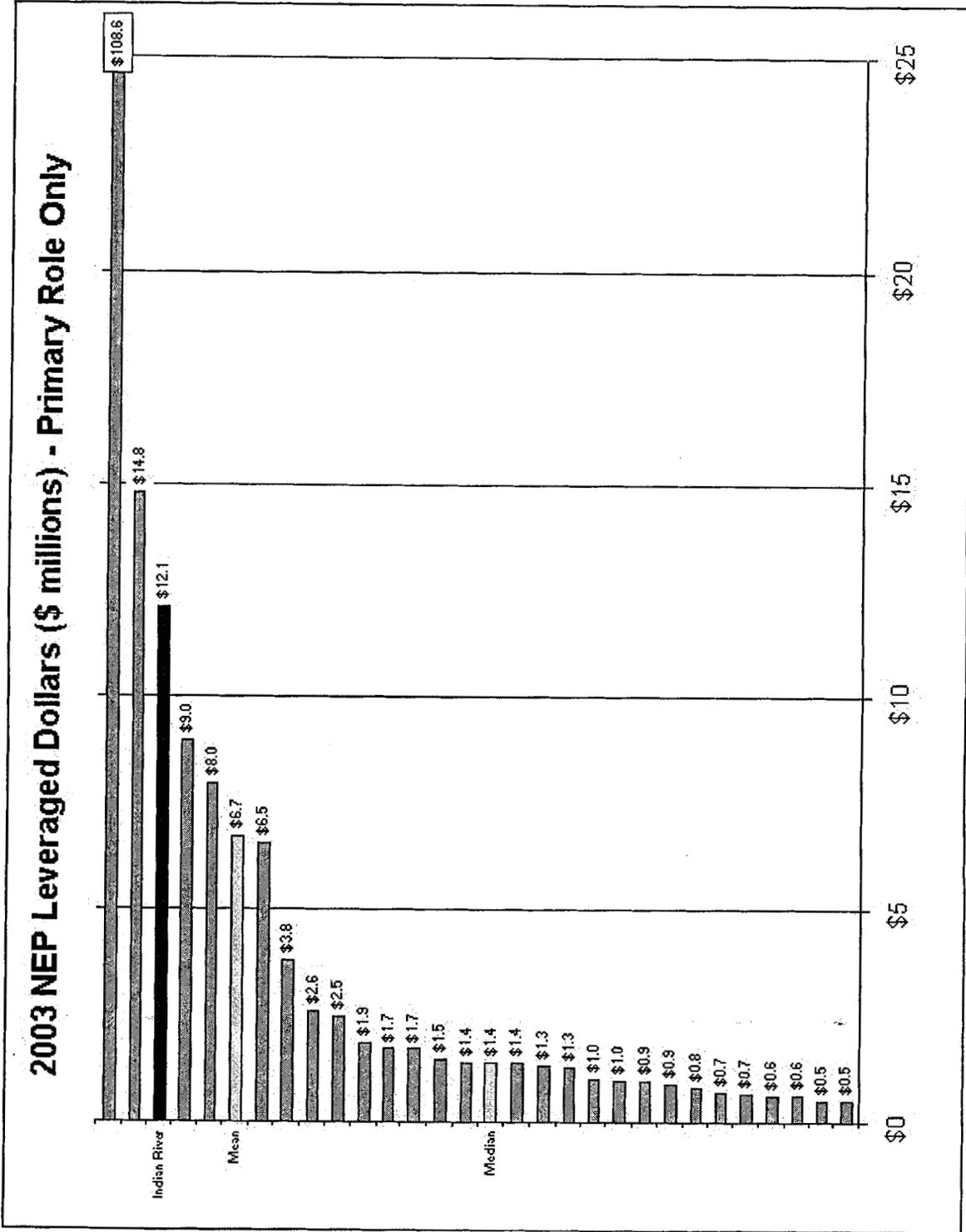
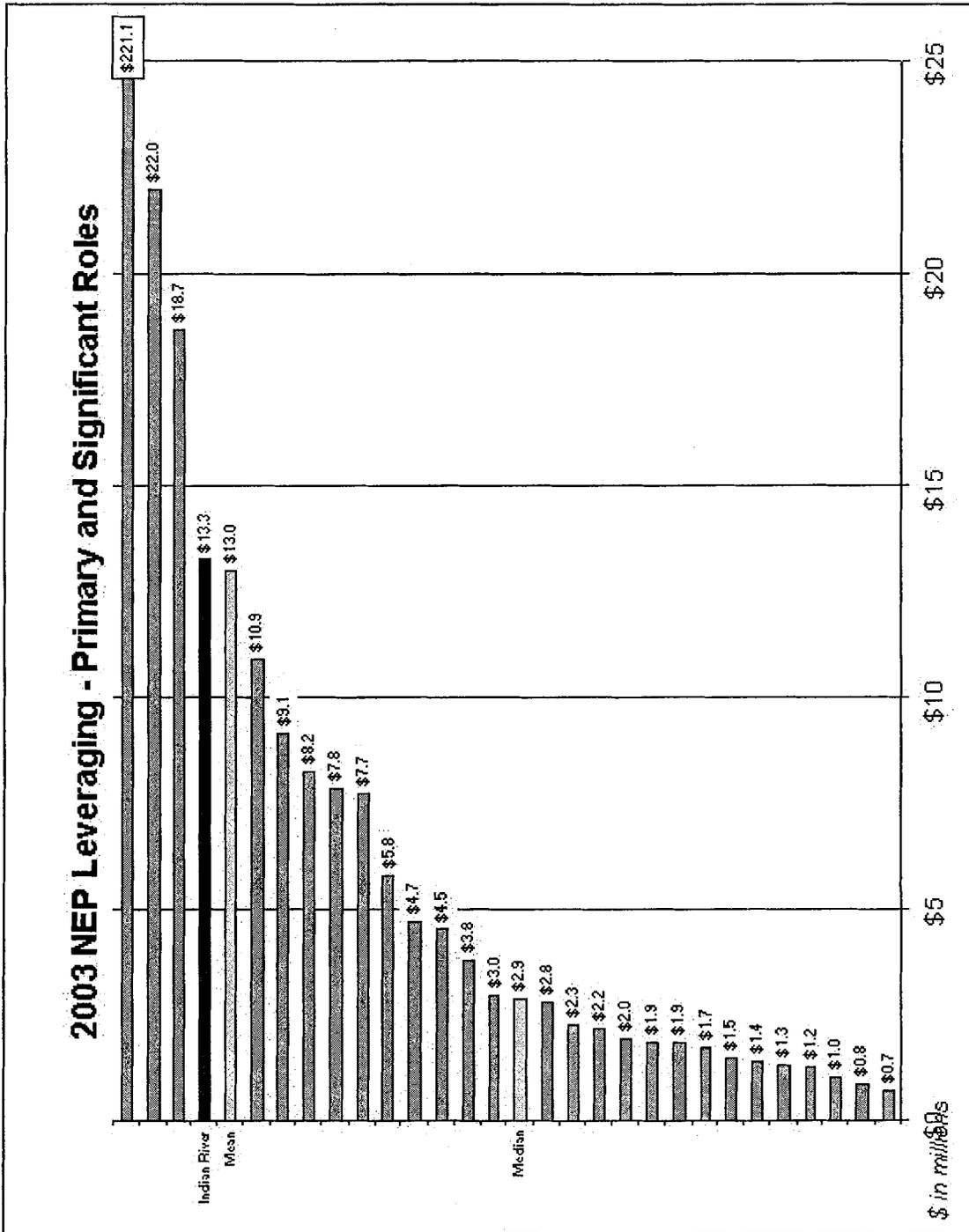
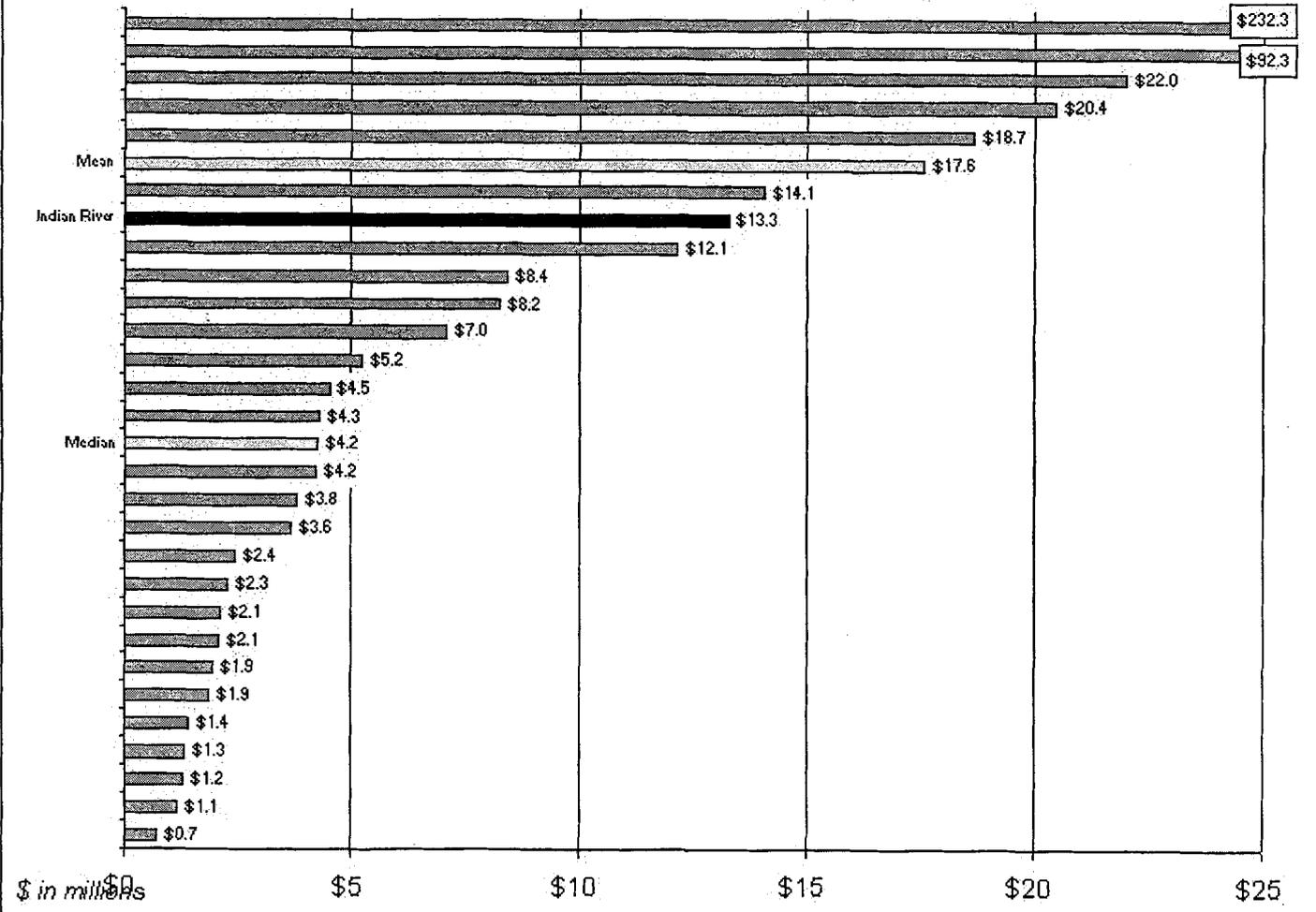


TABLE 4



### 2003 NEP Leveraging - All Roles



# EPA Government Performance and Results Act

## CCMP PRIORITY ACTIONS REPORTS

### Indian River Lagoon National Estuary Program CCMP Priority Actions Initiated FY 2000- 2001

| Total Priority Actions in CCMP | Priority Actions Initiated Baseline (2000) | CCMP Priority Actions Initiated This Year (Number and Title) | Total Priority Actions Initiated This Year (Since last GPRA report) | Target of Priority Actions Initiated by 9/2002 | Number of Ongoing Actions This Year (Since initial GPRA Report) | Number of Total Priority Actions Completed This Year (Since last GPRA report) | Cumulative Number of Priority Actions Completed To Date |
|--------------------------------|--|--|---|--|---|---|---|
| 46                             | 45   | 45<br>Continuing Priority implementation Actions             | 0   | 46<br>Continuing implementation activities     | 67  | 7   | 7   |

### Indian River Lagoon National Estuary Program CCMP Priority Actions Initiated FY 2001- 2002

| Total Priority Actions in CCMP. | Actions Initiated Baseline (1999) | CCMP Actions Initiated This Year  | Total Actions Initiated This Year (2001)   | Cumulative Total Initiated | Target of Actions Initiated by 9/2002 |
|---------------------------------|-----------------------------------|---|--|----------------------------|---------------------------------------|
| 46                              | 67                                | 67<br>All but one CCMP action have at least minimal implementation progress | 67<br>Continuing implementation activities | 67                         | 68                                    |

### Indian River Lagoon National Estuary Program CCMP Priority Actions Initiated FY 2002- 2003

| Total Priority Actions in CCMP | Number and Title of CCMP Priority Actions Initiated This Year | Total Priority Actions Initiated This Year* (Since last GPRA | Total Percentage of all CCMP Priority Actions Initiated This Year | Target of Priority Actions Initiated by 9/2003 | Number of Ongoing Priority Actions This Year* (Since initial GPRA Report) | Number of Total Priority Actions Completed This Year* (Since last | Cumulative Number of Priority Actions Completed To Date |
|--------------------------------|---|--|---|--|---|---|---|
| 46                             | 0   | N/A  | 100%  | 46   | 46  | 0   | 9   |

## Indian River Lagoon Habitat Restoration FY 2000-2001

| CCMP ACTION      | Project Name  | Habitat Types   | Description of Project   | Action/ Activity | Partners   | Acreage Protected or Restored this Reporting Year | Total Project Costs (NEP Portion) | Project Duration and/or Completion Date |
|------------------|---|---|--|------------------|--|---|-----------------------------------|---|
| W-5              | Wetland and Impoundment reconnection / restoration                    | Coastal Wetlands (Impounded salt marshes & mangrove swamps) | Reconnection, breaching and restoring isolated wetlands impounded for mosquito control | Reestablishment  | SJRWMD<br>SFWMD<br>USFWS<br>NASA<br>Brevard Co.<br>Mosquito Cntr.<br>Volusia Co.<br>Mosquito Cntr.                     | 274 acres   | \$120,000 (2001)                  | 2000 - ongoing                          |
| W-6<br>&<br>BD-3 | Restore Wetlands & Shorlines<br><br>Eradicate invasive exotic species | Wetlands & shorlines  | Exotic species removal of Brazilian Pepper and plantings of native red mangroves       | Rehabilitation   | SJRWMD<br>SFWMD<br>USFWS<br>NPOs<br>Volunteers   | 11 acres  | \$51,000 (2001)                   | 2000 - ongoing                          |
| BD-2             | Acquisition of environmental endangered lands                         | Uplands Wetlands<br>Shoreline                               | Fee simple purchases<br>Conservation easements   | Protection       | SJRWMD<br>SFWMD<br>Florida CARL<br>USFWS<br>Volusia Co.<br>Brevard Co.<br>Indian R. Co.<br>St. Lucie Co.<br>Martin Co. | 288 acres   | \$5 million (2001)                | 1999 - ongoing                          |

Government Performance and Results Act (GPRA) Reporting

Reporting Period: October 1, 2001 - September 30, 2002

INDIAN RIVER LAGOON

| NEP | CCMP ACTION    | PROJECT NAME  | HABITAT DESCRIPTION   | HABITAT CATEGORY                                       | PROJECT DESCRIPTION  | ACTIVITY                         |
|-----|----------------|---|---|--|--|----------------------------------|
| IRL | W-6            | Dragline ditch restoration  | Dragline ditch and spoil impacted salt marsh  | Wetlands - Coastal salt marshes and mangrove swamps    | Complete leveling of spoil mounds to marsh elevation and partial filling of dragline ditches to maximize area returned to adjacent salt marsh elevation.                                     | Re-establishment of salt marshes |
| IRL | W-5            | Wetland and impoundment reconnection/ restoration                     | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps    | Reconnection of isolated wetlands impounded for mosquito control   | Rehabilitation                   |
| IRL | W-5            | Wetland and impoundment reconnection/ restoration                     | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps    | Water quality Improvement of wetlands impounded for mosquito control   | Rehabilitation                   |
| IRL | W-5            | Wetland Acquisition - Pepper Park Addition                            | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps    | Acquisition of wetlands Impounded for Mosquito Control   | Protection                       |
| IRL | W-4, W-5, BD-2 | Allapattah Ranch  | Pine flatwood uplands, impacted wetlands, and dry prairies currently in use as improved pasture | Dry prairies, mosaic wetlands, Upland - pine flatwoods | Restoration of isolated wetlands(51%) and pine flatwoods uplands (49%)   | Rehabilitation                   |
| IRL | FSD-4          | C-23/C-24 North Reservoir   | Uplands   | Uplands  | Construction of reservoir for stormwater quality/quantity treatment and timing   | Enhancement                      |
| IRL | W-6            | Establishment of fringing mangrove habitat in the Indian River Lagoon | Mangrove fringe along high energy shorelines  | Mangroves  | Planting mangroves using Riley Encased Method along high energy shorelines   | Re-establishment                 |
| IRL | W-6            | Shoreline Natural Habitat Restoration Program                         | Shoreline of coastal salt marshes and mangrove swamps   | Wetlands - coastal salt marshes and mangrove swamps    | Eradication of exotic invasive vegetation and planting of native estuarine shoreline vegetation  | Re-establishment                 |
| IRL | W-5            | RIM plan at Indian River Impoundment #30 (Vickers)                    | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps    | Implementing Rotational Impoundment Management (RIM) by the installation of culverts to reconnect the impoundment to the IRL and a pump station for improved water level management control. | Rehabilitation                   |
| IRL | W-5            | RIM plan at Indian River Impoundment #19 (North ORCA)                 | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps    | Implementing Rotational Impoundment Management (RIM) by the installation of culverts to reconnect the impoundment to the IRL and a pump station for improved water level management control. | Rehabilitation                   |

| NEP | CCMP ACTION      | PROJECT NAME   | HABITAT DESCRIPTION   | HABITAT CATEGORY   | PROJECT DESCRIPTION  | ACTIVITY                   | PARTNERS   | ACREAGE                                     | PROJECT COST |
|-----|------------------|--|---|--|--|----------------------------|--|---|--------------|
| IRL | W-4              | Wetland Acquisition - Indrio Blueway Buffer - S. IRL           | Impounded mangrove swamp, Facultative Wetlands and Pine Flatwoods                 | Wetlands - Coastal mangrove swamp, Facultative Wetlands and Pine Flatwoods                         | Acquisition of wetlands Impounded for Mosquito Control and Preservation of native uplands  | Protection                 | FCT, Saint Lucie County ESL Program and Mosquito Control District, TPL, USFWS              | 105 Total (80 +/- wetland)                  | \$1,377,700  |
| IRL | W-4, LA-2, ETS-3 | Lost Tree Islands and McCuller's Point Acquisition Central IRL | Impounded salt marsh, mangrove fringe, submerged aquatic vegetation, spoil island | Wetlands - Coastal salt marshes and mangrove swamps, estuarine grass beds, Uplands - spoil islands | Acquisition of Lagoon islands, coastal wetlands and submerged bottomlands for protection & passive recreation  | Protection                 | Indian River County, City of Vero Beach, Town of Indian River Shores, FL Communities Trust | 508 Total (249 acres above mean high water) | \$15,324,000 |
| IRL | BD-2             | Environmentally sensitive land - Acquisition - Pine Island     | Uplands, Pine Flatwoods   | Uplands - Unimproved dense mature scrub, pine flatwoods  | Construction of stormwater treatment ponds and restoration of isolated wetlands and pine flatwood uplands  | Protection and Enhancement | SJRWMD   | 39  | \$207,526    |
| IRL | BD-2             | Acquisition C-23 South Reservoir - St. Lucie -CERP             | Uplands   | Uplands  | Construction of reservoir for stormwater quality/quantity treatment timing   | Protection and Enhancement | SFWMD  | 1,265.62                                    | \$6,297,762  |
| IRL | BD-2             | Acquisition C-23/24 STA - St. Lucie -CERP                      | Uplands   | Uplands  | Construction of stormwater treatment area for stormwater quality/quantity treatment timing   | Protection and Enhancement | SFWMD  | 996.38                                      | \$6,305,000  |
| IRL | BD-2             | Acquisition - Palmar   | Uplands, Pine Flatwoods   | Uplands - Pine flatwoods, impacted wetlands and dry prairie currently in use as improved pasture   | Restoration of isolated wetlands and pine flatwood uplands   | Protection and Enhancement | SFWMD, Martin County   | 2,500.17                                    | \$7,822,750  |
| IRL | BD-2             | Acquisition - Allapattah                                       | Uplands, Pine Flatwoods   | Uplands - Pine flatwoods, impacted wetlands and dry prairie currently in use as improved pasture   | Restoration of isolated wetlands and pine flatwood uplands   | Protection and Enhancement | SFWMD, Martin County   | 7,259.97                                    | \$30,527,300 |
| IRL | W-5              | Wetland and impoundment reconnection/ restoration - S. IRL     | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps  | Water quality Improvement of wetlands impounded for mosquito control   | Restoration                | SFWMD/IRL License Plate, Saint Lucie County Mosquito Control                               | 325   | \$14,337     |
| IRL | W-5              | Wetland and impoundment reconnection/ restoration - MINWR      | Impounded salt marshes and mangrove swamps  | Wetlands - Coastal salt marshes and mangrove swamps  | Water quality Improvement of wetlands impounded for mosquito control   | Restoration                | USFWS, SJRWMD, East Volusia Mosquito Control District                                      | 602   | \$71,000     |
| IRL | W-6              | Dragline ditch restoration - Mosquito Lagoon                   | Dragline ditch and spoil impacted salt marsh                                      | Wetlands - Coastal salt marshes and mangrove swamps  | Complete leveling of spoil mounds to marsh elevation and partial filling of dragline ditches to maximize area returned to adjacent salt marsh elevation. | Restoration                | SJRWMD, NPS CNS, East Volusia Mosquito Control District                                    | 25.763                                      | \$138,220    |

Performance and results Act (GPRA) Reporting

Reporting Period: October 1, 2002 - September 30, 2003

INDIAN RIVER LAGOON - Continued Page 2

| NEP | CCMP ACTION | PROJECT NAME  | HABITAT DESCRIPTION                         | HABITAT CATEGORY  | PROJECT DESCRIPTION   | ACTIVITY  | PARTNERS                                       | ACREAGE    | PROJE COST |
|-----|-------------|---|---|---|---|---|--|------------|------------|
| IRL | W-6         | Wetland restoration - Pine Island                             | Impacted salt marsh                         | Wetlands - Coastal salt marshes and mangrove swamps             | Removal of dredge spoil deposition to restore saltmarsh habitat                           | Restoration   | Brevard County, SJRWMD, FDOT mitigation        | 10         | \$140,800  |
| IRL | W-6         | Establishment of fringing mangrove habitat in the IRL         | Mangrove fringe along high energy shoreline | Mangrove - Planting mangroves along high wave energy shorelines | Re-establishment of mangrove fringing plants  | Rehabilitation                                      | ELC, NEP, SJRWMD, SFWMD, USFWS FDEP, FIND,     | 1.35       | \$61,200   |
| IRL | BD-3        | Dike restoration - MINWR                                      | Uplands                                     | Uplands - spoil dikes containing impounded wetlands             | Restoration of dikes that were created through the coastal salt marshes                   | Rehabilitation - Removal of exotic invasive species | USFWS, FDEP                                    | 48.5 Miles | \$102,000  |
| IRL | BD-3        | Dike restoration - Mosquito Lagoon                            | Uplands                                     | Uplands - spoil dikes containing impounded wetlands             | Restoration of dikes in the coastal salt marshes  | Rehabilitation - Removal of exotic invasive species | SJRWMD, East Volusia Mosquito Control District | 2 Miles    | \$87,388   |
| IRL | BD-3        | Invasive Species Management - MINWR                           | Uplands                                     | Uplands - Pine flatwoods, impacted wetlands, native scrub       | Control of Australian Pine, Cogangrass, Bamboo and Eucalyptus                             | Rehabilitation - Removal of exotic invasive species | USFWS, FDEP                                    | 110        | \$44,000   |
| IRL | BD-3        | Invasive Species Management - MINWR                           | Transitional Wetlands                       | Wetlands  | Control of Melaleuca  | Rehabilitation - Removal of exotic invasive species | USFWS, FDEP                                    | 2,400      | \$96,000   |
| IRL | BD-3        | Invasive Species Management - Pine Island                     | Uplands                                     | Uplands - Pine flatwoods  | Control of Brazilian pepper   | Rehabilitation - Removal of exotic invasive species | Brevard County                                 | 3          | \$4,500    |
| IRL | BD-3        | Invasive Species Management - Pine Island                     | Uplands                                     | Uplands - Pine flatwoods  | Control of Brazilian pepper   | Rehabilitation - Removal of exotic invasive species | Brevard County, SJRWMD, FDOT mitigation        | 50         | \$51,300   |
| IRL | BD-3        | Invasive Species Management - Barrier Island Ecosystem Center | Barrier Island upland, scrub, coastal dune  | Barrier Island  | Control of Brazilian pepper   | Rehabilitation - Removal of exotic invasive species | Brevard County                                 | 6          | \$6,374    |
| IRL | BD-3        | Invasive Species Management - Kabboord Nature Sanctuary       | Uplands                                     | Pine flatwood uplands, impacted wetlands                        | Control of Brazilian pepper   | Rehabilitation - Removal of exotic invasive species | Brevard County                                 | 12         | \$12,000   |
| IRL | BD-3        | Invasive Species Management                                   | Wetlands                                    | Wetlands - Coastal salt marshes and mangrove swamps             | Control of Brazilian pepper and re-establishment of native estuarine shoreline vegetation | Rehabilitation                                      | MRC, NEP,                                      | 137        | \$34,800   |



## INDIAN RIVER LAGOON PROGRAM

525 Community College Parkway, S.E. • Palm Bay, FL 32909

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Internet: <http://sjr.state.fl.us>



## Indian River Lagoon National Estuary Program 2004 Implementation Tracking System

### File Access Instructions

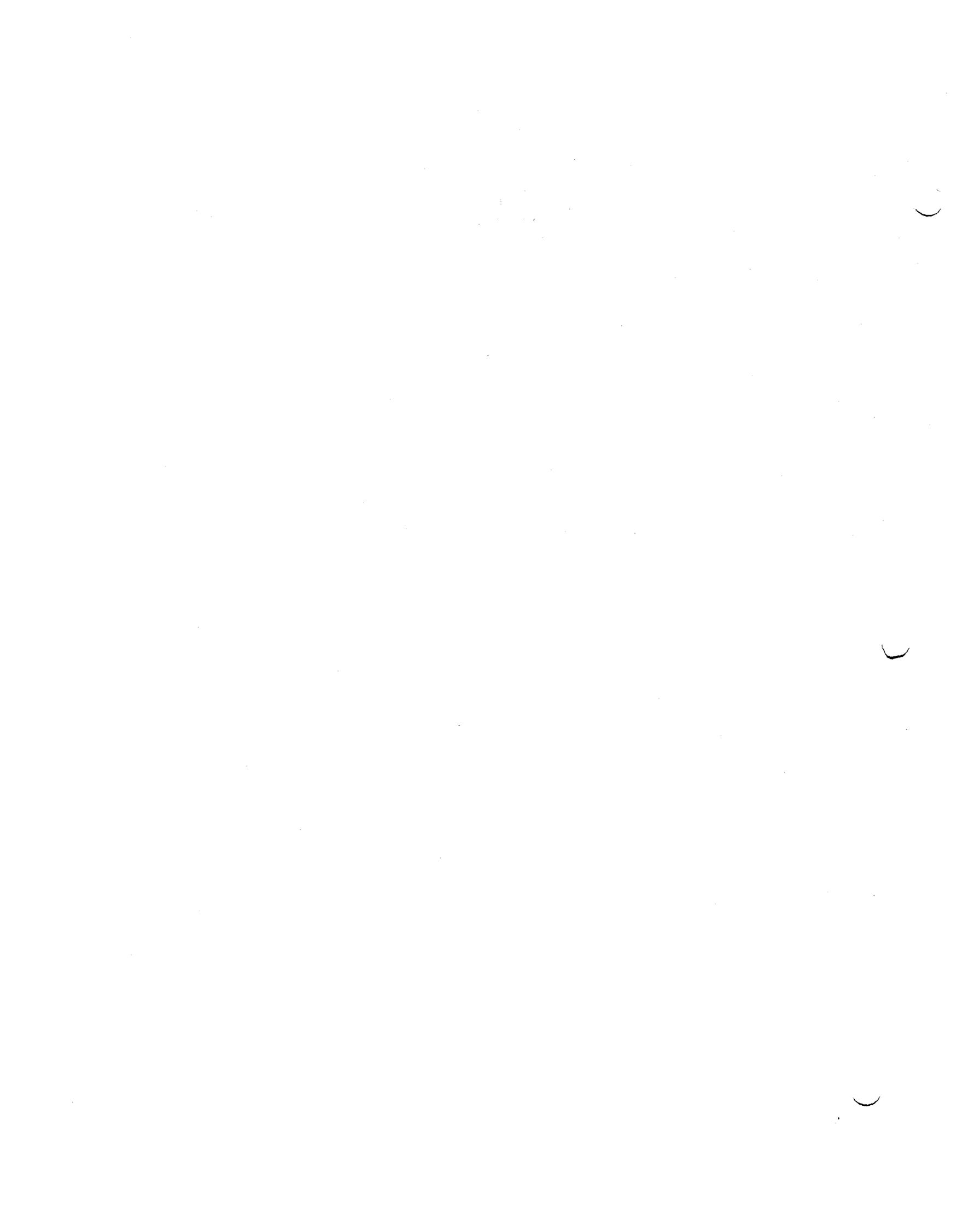
The enclosed compact disc contains several files representative of individual project and summary project files. The majority of the files were created in Microsoft Project 2002 and require that software for access. Two of the files have been exported to Microsoft Excel.

The MS Project files contain all of the data categories suggested by the Environmental Protection Agency 2004 Implementation Review guidelines. The files are organized into a hierarchy that illustrates the flexibility of MS Project. Files with names such as COCOA BEACH ALUM INJECTION are individual project files with associated tasks, time lines and funding source information for that specific project. File IMPLEMENTATION REVIEW EXPANDED is a master file with all sampled projects linked. This file is a digital representation of the project tables in Attachment 4 of the Implementation Review. File IMPLEMENTATION REVIEW COMPLETE is also a master file with sampled projects linked. In addition, this file contains the complete database structure to illustrate all project data elements captured by Indian River Lagoon Program staff. File IMPLEMENTATION REVIEW SUMMARY is a compilation of tasks, time frames, lead entities, project status and funding sources of the sampled projects. However, all of the data rows in the files with the prefix of IMPLEMENTATION REVIEW may be expanded or collapsed by the reviewer as needed. Expansion will provide all of the individual project details while collapsing the data will compress those details and will show only the project summary task. In the Project/Task Name data field, simply click on the minus or plus sign in the far left side of the field to expand or collapse the database structure.

The MS Excel files demonstrate the exporting functionality of MS Project mapping. File EXPORT PROJECT FILE is an example of all the data that is being captured in MS Project for the sampled projects. EXPORT PROJECT FILE FILTERED NEP is an example of the funding given to the Indian River Lagoon Program through the National Estuary Program and the relationship of that funding to funds provided by state and local governments.

IRL staff feel that utilization of MS Project will allow for the tracking of individual projects, preparation of management reports, capture of funding sources and CCMP implementation status.





| Project/Task Name  | Project Description  | CCMP Action Plan | Priority | Project Start Date           | Project Finish Date         |
|--|--|------------------|----------|------------------------------|-----------------------------|
| <b>Kennedy Point</b><br>Brevard County Kennedy Point Marina                            | This project will construct a stormwater weir at Kennedy Point Marina, located just south of the City of Titusville. This weir will collect sediments from a 320-acre drainage basin, with regular monitoring and maintenance. | FSD 13           | High     | Tue 10/10/00<br>Tue 10/10/00 | Sun 9/19/04<br>Sun 9/19/04  |
| <b>Lake George</b><br>Brevard County Lake George Water Quality Improvements            | This project will reroute existing pumped agricultural runoff from a 629-acre area into two stormwater treatment ponds via conveyance piping and a wetland treatment area prior to discharge into the Indian River Lagoon.     | FSD 13           | High     | Wed 10/1/03<br>Wed 10/1/03   | Sat 9/30/06<br>Sat 9/30/06  |
| <b>Cape Canaveral BB</b><br>Cape Canaveral International Drive Baffle Box              | Installation of a baffle box at the end of International Drive. Project will treat stormwater from a 195 acre urbanized basin.   | FSD 13           | High     | Wed 8/14/02<br>Wed 8/14/02   | Fri 3/4/05<br>Fri 3/4/05    |
| <b>Cocoa Beach Alum</b><br>Cocoa Beach Alum Injection for Seminole Pond                | This project will construct a .75-acre detention area using alum treatment technology to increase the pollutant removal effectiveness of the system treating an 83-acre urbanized sub-basin draining to the Banana River.      | FSD 13           | High     | Mon 7/21/03<br>Mon 7/21/03   | Tue 1/11/05<br>Tue 1/11/05  |
| <b>Indian River Citrus BMP</b><br>Indian River County Citrus Best Management Practices | Citrus grove owners will apply for assistance to develop and implement BMP's applicable to their particular grove.   | FSD 4            | High     | Mon 9/29/03<br>Mon 9/29/03   | Tue 3/22/05<br>Tue 3/22/05  |
| <b>Perimeter Canal</b><br>Palm Bay Perimeter Canal Project Phase II                    | Bank stabilization and construction of wet retention structures for the Perimeter Canal. The Canal has been identified as the largest single non-treated source of sediments to lower Turkey Creek.                            | FSD 13           | High     | Wed 7/24/02<br>Wed 7/24/02   | Tue 12/14/0<br>Tue 12/14/04 |
| <b>Edgewater Stormwater Master Pla</b><br>Edgewater Stormwater Plan                    | Preparation of existing conditions, recommended improvements and CIP for implementation.   | FSD 3            | High     | Thu 5/8/03<br>Thu 5/8/03     | Fri 10/29/0<br>Fri 10/29/04 |
| <b>Melbourne Village Flood and Sedi</b>  |  |                  |          | Mon 6/2/03                   | Tue 11/23/0                 |

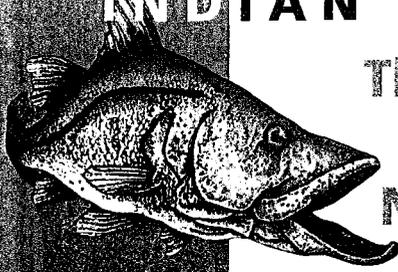
| Percent Complete | Federal Partner(s) | Federal Funding | Federal Funding Sources | Non Federal Funding | Non Federal Sources  | Total Project Cost | Latitude/Longitude | Habitat Protected/Restored |
|------------------|--------------------|-----------------|-------------------------|---------------------|--|--------------------|--------------------|----------------------------|
| 0%               |                    | 0               |                         | 0                   |  | \$110,000.00       |                    |                            |
| 0%               | NA                 | 0               |                         | 110000              | Brevard County (\$66,000)/ SJRWMD (\$44,000)                                 | \$110,000.00       | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$1,214,000.00     |                    |                            |
| 0%               | NA                 | 0               |                         | 1214000             | Brevard County (\$1,015,000)/ SJRWMD (\$200,000)                             | \$1,214,000.00     | TBD                | NA                         |
| 67%              |                    | 0               |                         | 0                   |  | \$112,778.00       |                    |                            |
| 67%              | NA                 | 0               |                         | 112778              | Cape Canaveral (\$56,389)/ SJRWMD (\$56,389)                                 | \$112,778.00       | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$1,591,470.00     |                    |                            |
| 0%               | NA                 | 0               |                         | 1591470             | Cocoa Beach (\$298,617)/ SJRWMD (\$77,000)/ FCT (\$850,853)/ FEDP (\$15,000) | \$1,591,470.00     | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$50,000.00        |                    |                            |
| 0%               | EPA                | 40000           | NEP                     | 10000               | Indian River County (In Kind)  | \$50,000.00        | TBD                | NA                         |
| 27%              |                    | 0               |                         | 0                   |  | \$97,000.00        |                    |                            |
| 27%              | NA                 | 0               |                         | 97000               | Palm Bay/ SJRWMD   | \$97,000.00        | TBD                | NA                         |
| 25%              |                    | 0               |                         | 0                   |  | \$345,000.00       |                    |                            |
| 25%              | NA                 | 0               |                         | 345000              | Edgewater (\$239,166)/ SJRWMD (\$105,834)                                    | \$345,000.00       | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$123,648.00       |                    |                            |

| Project/Task Name  | Project Description   | CCMP Action Plan | Priority | Project Start Date           | Project Finish Date          |
|--|---|------------------|----------|------------------------------|------------------------------|
| Melbourne Village Flood and Sediment Control   | This project will implement several sediment and erosion control measures by regarding a drainage ditch , installing a baffle box and piping an open ditch that is a source of sediment to the M-1 canal discharging to Crane Creek.                        | FSD 13           | High     | Mon 6/2/03                   | Tue 11/23/04                 |
| Satellite Beach DeSoto Pkwy<br>DeSoto Baffle Box   | This project will install four baffle boxes near the stormwater outfall for a 296-acre sub-basin draining to the Banana River as a part of a Sec. 319 grant construction project implementing stormwater systems to treat 100% of the DeSoto Parkway basin. | FSD 13           | High     | Tue 6/3/03<br>Tue 6/3/03     | Wed 11/24/04<br>Wed 11/24/04 |
| Satellite Beach Jamaica Blvd<br>Satellite Beach Jamaica Boulevard Stormwater Improvement project | This project will intercept and treat stormwater from 201 acres of the DeSoto Parkway watershed by creating three ponds (with associated connections and control structures) for wet detention and percolation of run-off.                                  | FSD 13           | High     | Tue 8/14/01<br>Tue 8/14/01   | Sun 2/1/04<br>Sun 2/1/04     |
| Rockledge Fiske Blvd<br>Rockledge Fiske Boulevard  | The District is partnering with the City of Rockledge to address flooding problems in the Fiske Blvd area through construction of a stormwater detention pond.  | FSD 13           | High     | Tue 10/10/00<br>Tue 10/10/00 | Mon 10/31/04<br>Mon 10/31/05 |
| Rockledge Avenue<br>Rockledge Avenue Baffle Box  | Installation of a sediment trap at the outfall located at Rockledge Ave & Rockledge Dr serving an 8+ acre basin. The City's goal is to install a minimum of at least one sediment trap at each outfall to the lagoon by 2010.                               | FSD 13           | High     | Fri 5/2/03<br>Fri 5/2/03     | Sat 10/23/04<br>Sat 10/23/04 |
| Palm Bay Units 38 and 40<br>Palm Bay PMU 38/40 Stormwater Improvements                           | Stormwater runoff treatment will be provided by a series of three ponds within the subdivision. The project is estimated to reduce annual pollutant loadings to Turkey Creek by up to 75,615 pounds of TSS, 969 pounds of TN, and 244 pounds of TP.         | FSD 13           | High     | Tue 7/2/02<br>Tue 7/2/02     | Tue 11/16/04<br>Tue 11/16/04 |
| New Smyrna Beach Marina<br>New Smyrna Beach City Marina Stormwater Retrofit                      | Construction of a stormceptor sediment and pollution control device (baffle box) to capture runoff from three existing outfalls serving a 20-acre basin discharging to the Mosquito Lagoon in conjunction with other planned marina improvements.           | FSD 13           | High     | Fri 6/6/03<br>Fri 6/6/03     | Sun 8/29/04<br>Sun 8/29/04   |

| Percent Complete | Federal Partner(s) | Federal Funding | Federal Funding Sources | Non Federal Funding | Non Federal Sources  | Total Project Cost | Latitude/Longitude | Habitat Protected/Restored |
|------------------|--------------------|-----------------|-------------------------|---------------------|--|--------------------|--------------------|----------------------------|
| 0%               | EPA                | 2000            | NEP                     | 121648              | Melbourne Village (\$31,148)/ SJRWMD (\$90,500)                  | \$123,648.00       | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$120,000.00       |                    |                            |
| 0%               | EPA                | 60000           | NEP                     | 60000               | Satellite Beach (\$60,000)                                       | \$120,000.00       | TBD                | NA                         |
| 22%              |                    | 0               |                         | 0                   |  | \$646,700.00       |                    |                            |
| 22%              | NA                 | 0               |                         | 646700              | Satellite Beach (\$161,700)/ FDEP (\$385,000)/ SJRWMD (\$100,00) | \$646,700.00       | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$95,000.00        |                    |                            |
| 0%               | NA                 | 0               |                         | 95000               | Rockledge (\$45,000)/ SJRWMD (\$50,000)                          | \$95,000.00        | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$52,000.00        |                    |                            |
| 0%               | NA                 | 0               |                         | 52000               | Rockledge (\$13,000) / SJRWMD (\$39,000)                         | \$52,000.00        | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$246,000.00       |                    |                            |
| 0%               | NA                 | 0               |                         | 246000              | Palm Bay (\$123,000)/ SJRWMD (\$123,000)                         | \$246,000.00       | TBD                | NA                         |
| 0%               |                    | 0               |                         | 0                   |  | \$62,000.00        |                    |                            |
| 0%               | NA                 | 0               |                         | 62000               | New Smyrna Beach (\$17,000)/ SJRWMD (\$45,000)                   | \$62,000.00        | TBD                | NA                         |

# INDIAN RIVER LAGOON

## The health and future of this Estuary of National Significance



### Inside

**Page 2**  
**Water quality assessment**  
 A breakdown of the indicators of a waterway's health.

**Page 3**  
**Comprehensive Conservation and Management Plan**  
 An update on issues and challenges, and how they are being addressed.

**Page 4**  
**Exotic challenges**  
 Nonnative species threaten lagoon's habitat, other wildlife.

*"In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught."*  
 — Baba Dioum



Above: Mangroves offer a variety of food and shelter for many lagoon wildlife. Right: Birds guard the lagoon's habitat from intruders.



Net O'Malley/IRL/INWIS

## Lagoon is more than a shimmering backdrop in coastal region

It is our weekend playground, an ever-changing tableau of water and light, a solace to the soul. On any day along the Indian River Lagoon, you'll find people fishing from causeways, plying the waters in pleasure boats, observing wildlife or simply relaxing at one of many waterfront parks. While the aesthetics and recreational amenities offered by this waterway are readily apparent, the lagoon has many values that may not be obvious to the casual observer.

The Indian River Lagoon is a misnomer; the lagoon is not a river at all, but a special place called an estuary. Here, in this mingling of fresh and salt water, are more than 4,300 species of plants and animals, including 35 that are listed as threatened or endangered — more than any other estuary in North America.

More than just a shimmering backdrop, this productive and diverse waterway is an important element in the economy of the region and the nation. Commercial and recreational fishermen harvest thousands of pounds of fish and shellfish in the lagoon each year while water-related businesses, services and activities all contribute substantially to the economy. All of these factors contribute an estimated \$750 million to the region's and nation's economies annually.

Stretching approximately 156 miles along the east coast of Florida, the lagoon region encompasses portions of Volusia, Brevard, Indian River, Martin, St. Lucie and Palm Beach counties. The lagoon system actually encompasses a series of shallow, interconnected lagoons — the Indian River, the Mosquito Lagoon and the Banana River. Six small and widely spaced inlets connect the lagoon to the Atlantic Ocean. The size of these inlets and the shallow nature of the lagoon allow for a limited exchange of waters between the lagoon and the ocean. One of these inlets, Fort Canaveral, is separated from the lagoon by locks, further reducing tidal exchange with the ocean.

Within this same stretch of coastline, tropical and temperate climatic zones and biological provinces meet and overlap. This convergence has resulted in a unique and extremely diverse collection of habitats and species that occur nowhere else.

The mild climate and the bounty of natural resources found in the region support a vigorous local economy and attract numerous visitors and new residents each year.

### Lagoon Under Stress

This valuable resource is showing signs of stress, however. Like much of Florida, the lagoon region has seen a substantial population increase since the 1940s. Census data since that era show population growth approaching 50 percent during each decade. Much of the development and infrastructure constructed to serve this rapidly growing population did not consider the sensitivity of the lagoon. Causeways across the lagoon were built and channels were dredged. Wetlands were filled for development or impounded for mosquito control. Storm water and wastewater were discharged to the lagoon with little or no treatment.

While many of these activities are no longer allowed or are strictly regulated, the cumulative impacts of past activities have degraded water and sediment quality in the lagoon. Water quality in many areas is no longer sufficient to support healthy seagrass beds or to allow the unrestricted harvest of shellfish. The abundance of many important fish and wildlife species has declined.

Significant amounts of time and effort have been expended in efforts by federal and state agencies, local governments, interested groups and concerned individuals to protect and restore the resources of the lagoon. As a result, the discharges from most domestic wastewater treatment plants have been eliminated. The few wastewater plants that continue to discharge to the lagoon have limits on the volume of their discharge and must meet strict standards for the quality of those discharges.

### State of the Indian River Lagoon — 2003

The following overview of the current conditions in the lagoon is largely drawn from the recent update of the Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan. The lagoon SWIM Plan update was developed and produced by SWIM staff from the St. Johns River and South Florida water management districts in conjunction with Indian River Lagoon National Estuary Program (NEP) staff. A copy of the complete plan update is available from the lagoon NEP or may be found online at [http://www.sfnwd.gov/irfwmp/irwp\\_csl/projects/irf\\_swim.html](http://www.sfnwd.gov/irfwmp/irwp_csl/projects/irf_swim.html).

Sea grass is the proverbial measuring stick for determining the health of the lagoon. One of the fundamental objectives of the lagoon program is the recovery and maintenance of a healthy and productive seagrass community in the lagoon. Preliminary analysis of lagoon data indicates that inadequate light is the primary factor limiting seagrass growth in the lagoon. Other factors, such as salinity, sediment quality, hydrology and physical disturbance may also affect seagrass growth and health.

The same analysis also found that turbidity, chlorophyll *a* and color are the principal factors affecting water clarity in the lagoon. Turbidity is influenced by the amount of total suspended solids in the water, while chlorophyll *a* is influenced by nitrogen and phosphorous concentrations. Given that the lagoon is 156 miles long, water clarity can vary throughout its reaches; however, the identified pollutants and factors that influence them are involved to some degree in reducing light penetration of the water column in all segments of the lagoon.

### Seagrass Resource Assessment

Scientists look to the sea grass to measure the health of the lagoon. When sea grass thrives, so does the lagoon; when water quality diminishes, so does sea grass.

Evaluation of seagrass resources in the lagoon is based on three measurements:

- Changes in the acreage of seagrass coverage over time (gain or loss)
- Maximum depth of the edge of seagrass beds
- Percent of surface sunlight reaching seagrass restoration depth targets

See Lagoon on Page 2

## Lagoon Continued from Page One

General seagrass coverage distribution and trends in the lagoon can be summarized as follows:

- Segments containing the largest acreage of seagrass coverage are found around north Merritt Island, within and adjacent to the federally protected NASA/Kennedy Space Center/Merritt Island National Wildlife Refuge complex (north Indian River Lagoon and northern Banana River) and Canaveral National Seashore (southern Mosquito Lagoon). These segments have shown little change in seagrass coverage since the 1940s.
- The largest area of poor seagrass coverage extends from the Cocoa area to the Palm Bay area. This area has experienced the greatest loss of seagrass coverage since the early 1940s (70 percent).
- Within the Mosquito Lagoon, Banana River and north/central Indian River Lagoon areas, the most recent data available (1996) show 57,179 acres of sea grass is 56 percent of the potential 101,997 acres of sea grass. The 1940s seagrass coverage was 63,238, or 62 percent of the potential seagrass acreage.
- Within the south Indian River Lagoon, the current (1999) seagrass cover is 7,808 acres, or 39 percent of the potential 19,799 acres. The 1940s acreage is similar (7,688 acres) and also 39 percent of the potential acreage.
- For the entire lagoon, the potential seagrass acreage is 113,073 acres. Present seagrass acreage is 69,692 (1999), or 62 percent of the potential acreage.

### Water Quality Assessment

#### Salinity

The lagoon is an estuary, a water body where the freshwater of its tributaries mixes with the salt water of the Atlantic Ocean. During the 1990s, average salinities throughout the lagoon (with the exception of the tributaries) were well above 20 parts per thousand (ppt), the optimum range for seagrass growth. With the exception of widgeongrass, *Ruppia maritima*, salinity of 20 ppt appears to be a minimum growth threshold for lagoon seagrass species. Sea grasses may survive if the average annual or seasonal salinity is less than 20 ppt; however, growth may be impaired even if other environmental conditions are optimal. Maintaining salinities of 20 ppt or greater appears to be particularly important during the growing season.

The highest average salinities were found in the Mosquito Lagoon and the south Indian River Lagoon, followed closely by the north Indian River Lagoon (north of Titusville). The lowest average salinities during the 1990s were found in the southernmost reach of the Banana River and in the Melbourne area of the central area of the lagoon. These areas are distant from oceanic influence and receive large volumes of freshwater discharges from tributaries and associated drainage systems. In these segments, salinities can drop below 20 ppt for extended periods of time.

#### Color

Water color is another indicator of water quality in the lagoon. Color generally tracks salinity trends in the Banana River and the central and south Indian River Lagoon. Tributaries and canals in these areas discharge large volumes of freshwater that, in addition to reducing salinity, have relatively high color.

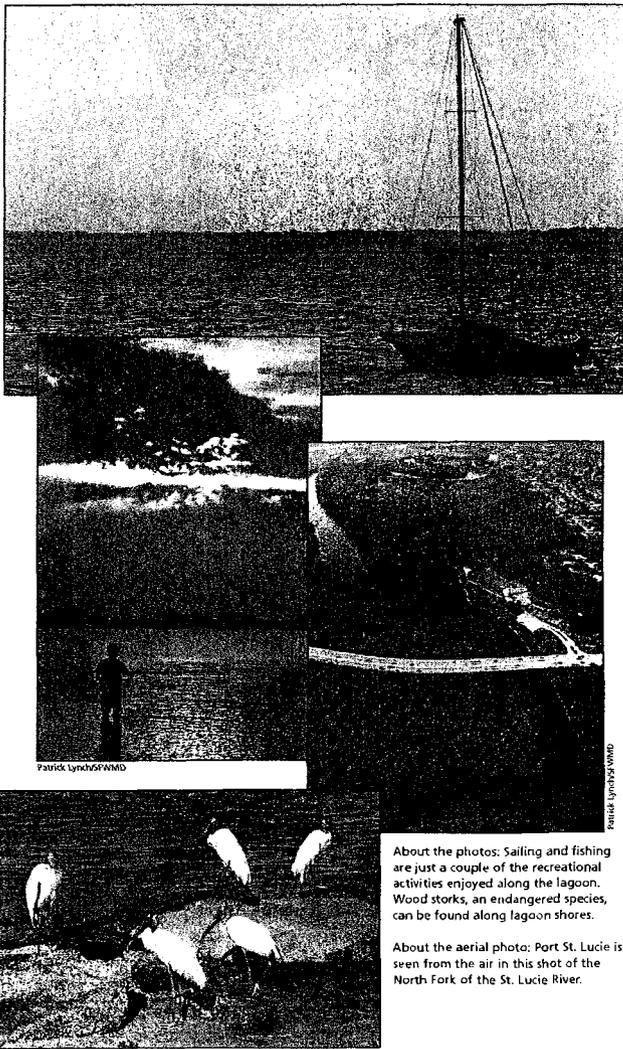
Scientists measure the color of water in platinum cobalt units (pcu). Relatively clear water will generally measure about 10 pcu. Climb higher on the pcu scale, and the water darkens to a tea-colored hue. With the exception of the central lagoon region, the 10-year average for color ranges between 15 and 20 pcu; in the central lagoon, 20 and 30. The highest 10-year average color was found in the Newfound Harbor area of the Banana River, with the highest individual measurements found in the Vero Beach area.

#### Turbidity/Total Suspended Solids

Turbidity is a word often bandied about when the lagoon's water quality is discussed. In simplest terms, turbidity describes the cloudiness of the water. The more turbid the water, the less light reaches the sea grass.

Water clarity is measured in nephelometric turbidity units (NTU), with lower numbers representing clearer water. Average turbidity levels in the Banana River and the north and central Indian River Lagoon generally do not exceed six NTU, and are typically half that level. In contrast, the Mosquito Lagoon and the south Indian River Lagoon frequently average above six NTU. Both the highest 10-year average and the highest variability in monthly turbidity were found south of Fort Pierce Inlet.

These turbidity trends are likely explained by the presence of total suspended solids (TSS), the organic and inorganic particles found floating in the waterway. Further analysis indicates that these suspended solids contribute significantly to turbidity levels in several segments, especially in



About the photos: Sailing and fishing are just a couple of the recreational activities enjoyed along the lagoon. Wood storks, an endangered species, can be found along lagoon shores.

About the aerial photo: Port St. Lucie is seen from the air in this shot of the North Fork of the St. Lucie River.

the Mosquito Lagoon, Banana River and north Indian River Lagoon.

Average TSS levels throughout the lagoon system range from 18 to 34 milligrams per liter (mg/L). The lowest 10-year average TSS (18 mg/L) was found in the Cocoa-Melbourne area, a pleasant surprise, considering the area's booming development, associated drainage and the relatively small area of open water in that reach.

#### Nitrogen/Phosphorus

Heavy concentrations of nitrogen and phosphorus can fuel algal blooms in the lagoon.

Studies have shown that there is a general north-south decrease in total nitrogen (TN) concentrations from the north Banana River and the northern lagoon through the southern lagoon. Exceptions to this trend are upward spikes in Palm Bay and Vero Beach, areas compounded by a lack of tidal flushing and situated near the discharges of major drainage systems. The higher concentrations of TN in the northern lagoon area may be due to:

- Large standing pools of organic nitrogen and plant material that may remain for months to more than a year
- Distance from oceanic influence
- Small drainage basins

A similar trend is seen in the Mosquito Lagoon, but TN decreases from the southern Mosquito Lagoon to the north. Once again, distance from oceanic influences, a small drainage basin and few tributaries affect the amount of time nitrogen stays in one place and flushing in this area. Vero Beach, another hot spot, receives discharges from three large drainage systems which, when combined, constitute about 25 tons of phosphorus per year, the largest loading in the lagoon basin. The lowest phosphorous concentrations are found in Hobe Sound.

#### Chlorophyll a

In recent years, algal blooms in the lagoon have been a concern to scientists. These blooms, fueled by

an overabundance of nutrients, can rob the water of oxygen and lead to fish kills.

Elevated levels of Chlorophyll a, the green photosynthetic pigment in phytoplankton (algae), is usually a warning sign that nutrient concentrations may be excessive. Elevated concentrations have been found in the southern Banana River and the Cocoa-Melbourne area where the 10-year chlorophyll a average concentration is greater than 8 micrograms per liter. Levels are lower in the Vero Beach area, most likely due to increased flushing (2-3 weeks versus 3-6 months) and higher average color. A similar reduced algal response is seen in the Fort Pierce and St. Lucie River area, where shorter residence times and increased flushing may also play a role.

#### Water Quality and Seagrass Respones Summary

The lagoon areas with the poorest water quality are Cocoa to Palm Bay, the southern Banana River, Vero Beach, Fort Pierce, and the St. Lucie River area. Low salinities, elevated color, nutrients and chlorophyll a contribute to the poor conditions in the Cocoa-Palm Bay segments. The southern Banana River is also impacted by low salinities, elevated color, nutrients and chlorophyll a. The Vero Beach segments are affected by elevated color, turbidity and nutrients. The southern lagoon segments near Fort Pierce and the St. Lucie River are impacted by elevated turbidity, TSS, nutrients and chlorophyll a. Areas adjacent to larger tributaries and major drainage also experience higher than typical levels of TSS, color and nutrients.

In general, seagrass coverage tracks water quality trends. Areas with good seagrass coverage are located adjacent to relatively undeveloped watersheds or in close proximity to inlets, while areas of extensive losses and sparse sea grass are adjacent to highly developed watersheds and shorelines.

## Progress report on implementation of the Indian River Lagoon's Comprehensive Conservation and Management Plan

**B**y the 1990s, it was apparent that the Indian River Lagoon, the very thing that lured thousands to the east-central Florida coastline, was in dire straits. In response, more than 100 agencies and local governments with management responsibilities for the Indian River Lagoon developed a united strategy to restore and preserve this idyllic, yet fragile, water body.

The finished product, the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP), was approved in 1996 by the U.S. Environmental Protection Agency (EPA) and Florida's governor. The Indian River Lagoon National Estuary Program (IRLNEP) has addressed many challenges by implementing projects in the plan and has achieved many successes in partnership with federal, state and local governments and private nonprofit organizations.

- Recent CCMP implementation achievements include:
- Funding the nation's second-largest citizen's volunteer water quality monitoring network
  - Implementing the Lagoon Biotoxin and Aquatic Animal Health Working Group to address wildlife diseases and mortality events
  - Expansion of the DockWatch volunteer jellyfish reporting network through an EPA aquatic nuisance species grant
  - Supporting ongoing wetlands and shoreline restoration and enhancement through mosquito control impoundment reconnection and the restoration of mangrove shorelines lagoonwide
  - Promoting the Lagoon Blueway land acquisition initiative to the state's "A" funding list, increasing the state's participation in the acquisition of priority environmentally endangered lands along the lagoon
  - Funding for a local government grants writer to assist county and municipal governments in receiving more than \$15 million in state and federal grants for stormwater retrofits and localized flood control projects. This leveraged more than \$75 million in water quality implementation projects.

### Emerging Challenges

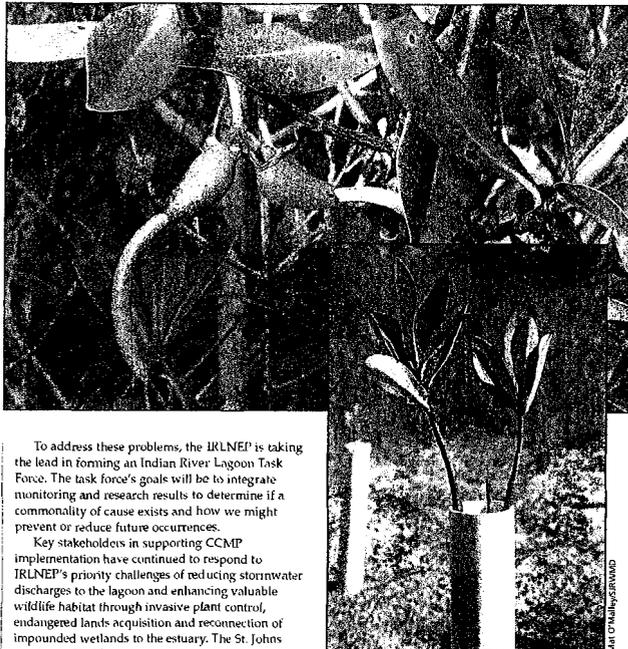
Many new and ongoing projects and programs have helped the IRLNEP to increase public involvement in CCMP implementation activities. These include:

- Periodic lagoonwide and regional forums providing information on lagoon projects and programs, offering individuals an opportunity to discuss these projects and provide feedback
- Regular "State of the Lagoon" conferences, offering information on the current state of the lagoon's natural resources
- Citizens volunteer water quality monitoring network
- DockWatch volunteer jellyfish monitoring and survey project
- Regular "Pepperbush" or workdays, where volunteers participate in the removal of Brazilian pepper and other exotic or nuisance vegetation
- Shoreline plantings
- Shoreline and spoil island "trash-bashes" or cleanups
- Production of new and ongoing outreach and education materials, such as the "Ethical Angler" wallet cards, the annual photo contest/lagoon calendar and the quarterly Lagoon Update newsletter

The CCMP is not a static document, as evident by the new challenges and priorities being met. The IRLNEP has identified invasive, exotic species and aquatic animal health as emerging challenges to the lagoon's ecosystem, while stormwater management and enhancing seagrass production remain the highest priorities.

Over the past several years, there has been increasing concern over the number of wildlife-related disease and mortality events in the lagoon, possibly a symptom of a wider-scale problem regarding the overall "health" of the lagoon system. Despite considerable progress and success in rehabilitating impounded wetlands as habitat and improving water quality conditions in the lagoon during the past two decades, a number of fairly recent, possibly interconnected wildlife-related mysteries remain unsolved. They include:

- The skin disease *Leishmaniasis* occurring on much of the lagoon's resident dolphin population
- Fibropapillomas on many of the green turtles found in the lagoon
- Increased incidence of tumors in hard clams
- Decreases in the population of horseshoe crabs
- The recent appearance of saxitoxin in puffer fish in the northern lagoon, resulting in a ban on catching puffers throughout the lagoon and health advisories regarding human consumption of these fish
- Sporadic occurrence of "spicy" tasting clams
- The appearance of invasive species such as the Australian spotted jellyfish (*Phyllorhiza punctata*) in the central lagoon and the exotic macroalgae *Codium bursa* in the southern portion of the estuary



To address these problems, the IRLNEP is taking the lead in forming an Indian River Lagoon Task Force. The task force's goals will be to integrate monitoring and research results to determine if a commonality of cause exists and how we might prevent or reduce future occurrences.

Key stakeholders in supporting CCMP implementation have continued to respond to IRLNEP's priority challenges of reducing stormwater discharges to the lagoon and enhancing valuable wildlife habitat through invasive plant control, endangered lands acquisition and reconnection of impounded wetlands to the estuary. The St. Johns and South Florida water management districts continue to work in unison, collecting and managing technical data to develop pollutant load reduction goals (PLRGs) as a precursor to the setting of total maximum daily load (TMDL) allocations by the Florida Department of Environmental Protection (FDEP). The water management districts, the U.S. Fish and Wildlife Service, mosquito control districts and others continue to reconnect marshes previously impounded for mosquito control purposes, restoring the wildlife and water quality benefits of these wetlands.

Local governments continue to pursue partnerships with the water management districts and FDEP and funding from EPA to implement stormwater retrofit, sediment source reduction and habitat restoration projects valued at over \$30 million annually. Citizen volunteers continue to monitor water quality and collect valuable data for lagoon managers on a weekly basis. School children are learning about lagoon ecology issues through the Martin County Environmental Studies Center Camp WET program, the St. Lucie County Marine Center, the Environmental Learning Center in Indian River County, the Brevard Zoo, Volusia's new Marine Science Center at Ponce Inlet, and the Marine Discovery Center in New Smyrna Beach. Other residents are educated about the lagoon's diversity and value at numerous festivals, sportfishing venues and local environmental events.

Knowledge of the lagoon's unique and varied biodiversity continues to grow through the success of the Indian River Lagoon online Species Inventory directed by the Smithsonian Marine Station at Fort Pierce at <http://www.serc.si.edu/sims/irlspec/index.htm>. NASA is enhancing the quality of diagnostic research into seagrass and water quality conditions through multi-spectral imagery and mapping. Citrus growers are implementing agricultural best management practices (BMPs) to reduce nutrient and suspended solids discharges to the lagoon under the direction of the U.S. Department of Agriculture's Natural Resources Conservation Service and the state's Institute of Food and Agricultural Science's Cooperative Extension Service and local soil and water control districts.

Following the successful environmental muck dredging projects in Crane and Turkey creeks in southern Brevard County, the St. Johns River Water Management District prepared plans for the dredging of the St. Sebastian River, targeting the removal of more than 2 million cubic yards of sediment, with funding

Mangroves are important to many of the lagoon's resident wildlife for food and habitat.

Young mangroves are held in place and protected along the lagoon's shoreline by plastic pipe that allows the trees to become established.

assistance from the Florida Inland Navigation District. The South Florida Water Management District, working in cooperation with various partners, is targeting 300,000 cubic yards of muck for removal in Taylor Creek, and will soon begin working on a muck removal plan for the St. Lucie Estuary

### Restore a Florida Treasure

Hook up now at your local tag office

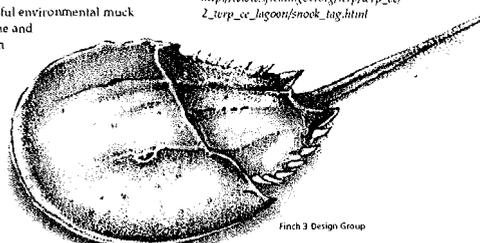


under the South Indian River Lagoon Restoration Project in conjunction with the U.S. Army Corps of Engineers.

Since 1995, motorists have been pitching in by buying Indian River Lagoon specialty license plates. So far, the "snook tag" has raised more than \$3 million dollars for projects that include sediment traps, mangrove plantings, shoreline enhancements, Brazilian pepper tree "busts," and environmental education programs and centers throughout the estuary. Every dollar raised is returned to the county where it was generated. What's more, license plate funds are used to leverage millions in matching project dollars.

To learn more about the Indian River Lagoon and the many projects being implemented throughout the estuary, please visit the following Web sites:

- <http://irl.sprawl.com>
- <http://141.232.1.11/arg/evc/mals/irl/index.html>
- <http://www.epa.gov/owow/ocens/lagoon/>
- [http://www.fcnml.gov/org/irwp/irwp\\_cel\\_2\\_terp\\_sc\\_lagoon/snook\\_tag.html](http://www.fcnml.gov/org/irwp/irwp_cel_2_terp_sc_lagoon/snook_tag.html)



Finch 3 Design Group

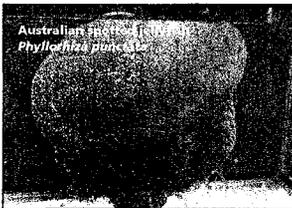
## Indian River Lagoon challenges/emerging issues

### Australian spotted jellyfish (*Phylloriza punctata*)

The Australian spotted jellyfish, a native of the Indo-Pacific, was first found in the Indian River Lagoon in the Melbourne area in the summer of 2001. Spotted jellyfish were also seen in the summer of 2002, but none were sighted in 2003.

Spotted jellies devour huge numbers of fish eggs, larvae and other microzooplankton. It is believed that this species reached the lagoon as polyps attached to the hulls of ships passing through the Panama Canal.

You can help by joining DockWatch, a program that allows the public to monitor spotted jellyfish and other invasives and share their sightings with scientists. For more information, visit DockWatch online at <http://dockwatch.dsi.org>.



Harbor Branch Oceanographic Institution



Harbor Branch Oceanographic Institution

### *Caulerpa brachypus*

The marine algae *Caulerpa brachypus* is a nonnative species originating in the Pacific Ocean. It may either have arrived in the lagoon region in ship bilges or have been discarded by aquarium hobbyists. This algae has no known natural controls in Florida waters and can spread rapidly, blanketing valuable natural submersed aquatic vegetation communities such as sea grass or coral reefs. In recent years, scientists have observed this species encroaching over large areas of coral reef in the ocean offshore of Palm Beach County.

In the spring of 2003, several small patches of *Caulerpa brachypus* were observed in the lagoon near the St. Lucie Inlet and Fort Pierce Inlet. By summer, these patches had disappeared. The potential still exists for this species to become established in the lagoon and displace the native submersed aquatic vegetation community.

Several agencies, including the Florida Department of Environmental Protection, the Florida Marine Research Institute, the Indian River Lagoon National Estuary Program, the St. Johns River Water Management District, the South Florida Water Management District, Florida Sea Grant and Harbor Branch Oceanographic Institute, have joined together in an effort to educate the public about this potentially invasive species and have coordinated monitoring programs to detect the presence and possible spread of this species.



Harbor Branch Oceanographic Institution

### Toxic puffer fish

Between January and June 2002, 19 cases of puffer fish poisoning were reported to state and federal health officials. In all of these incidents, the affected individuals reported consuming puffer fish caught in the lagoon. Nearly all of the puffers involved in these incidents were caught in the Titusville area, with two separate cases occurring in the Cocoa and Pineda Causeway areas.

Puffer fish poisoning is usually caused by the ingestion of tetrodotoxin, which is found in the internal organs of some species of puffer fish. The recent poisoning cases in the lagoon are unusual. Analysis of the fish tissue found that the toxin involved was saxitoxin, not tetrodotoxin. Saxitoxin is usually found in shellfish, which can cause paralytic shellfish poisoning when affected shellfish are consumed.

None of the numerous algal species found in the lagoon are known to produce saxitoxin. After extensive investigation by the Florida Marine Research Institute (FMRI), it was determined that a common algal species in the lagoon was producing saxitoxin.

Finding that an algal species native to the lagoon is now known to produce saxitoxin is a public health concern, an environmental concern and an economic concern. Public health may be threatened should significant concentrations of saxitoxin be found in clams, oysters or other lagoon species that are commonly caught and eaten. The presence of saxitoxin in the food chain may have contributed to several unusual events that recently occurred in the lagoon (for example, fish kills, horse-shoe crab mortalities and dolphin mortalities). Should saxitoxin be detected in shellfish in concentrations greater than allowed by the Food and Drug Administration, this fishery may be closed and its economic benefits to the region lost.

The Florida Fish and Wildlife Conservation Commission has prohibited the harvest of puffer fish from the entire lagoon. FMRI, along with the Florida Department of Agriculture and Consumer Services - Division of Aquaculture, continues to monitor shellfish and several other species for saxitoxin.

### Who to call to volunteer

If you would like to join the efforts to help protect the Indian River Lagoon, you can call:

#### Volusia County

- Marine Discovery Center (866) 257-4828
- Marine Science Center (386) 304-5545
- Environmental Management (386) 423-3303
- Keep Volusia Beautiful (386) 943-4905

#### Brevard County

- Marine Resources Council (321) 504-4500
- Environmentally Endangered Lands Program (321) 633-2016
- Merritt Island National Wildlife Refuge (321) 861-0667
- Turkey Creek Sanctuary (321) 952-3433
- Keep Brevard Beautiful (321) 631-0501
- Natural Resources Management Office (321) 633-2016
- Environmentally Endangered Lands Program (321) 255-4466

#### Indian River County

- Environmental Learning Center (772) 589-5050
- Keep Indian River Beautiful (772) 978-0722

#### St. Lucie County

- Harbor Branch Oceanographic Institute (772) 465-2400

#### Martin County

- Florida Oceanographic Society (772) 225-0505
- Hobe Sound National Wildlife Refuge (721) 546-6141
- Keep Martin Beautiful (561) 781-1222

### Learn about the lagoon

Many free sources are available with news about the Indian River Lagoon.

The Indian River Lagoon Update, an eight-page newsletter, is published quarterly by the St. Johns River Water Management District and the lagoon National Estuary Program, in cooperation with the South Florida Water Management District. To be placed on the mailing list to receive a paper copy, call (800) 725-5922 or visit [www.sjrwmd.com](http://www.sjrwmd.com). The newsletter is also available online.



The two water management districts and various organizations maintain lagoon information on Web sites, including the following:

- <http://irl.sjrwmd.com>
- [www.sfwmd.gov/org/estuarines/programs/irl.html](http://www.sfwmd.gov/org/estuarines/programs/irl.html)
- [www.epa.gov/owow/estuaries/programs/irl.htm](http://www.epa.gov/owow/estuaries/programs/irl.htm)

### Tag sales benefit lagoon



Let others know you support Indian River Lagoon restoration efforts by purchasing a lagoon license plate.

Fifteen dollars from the sale of each lagoon license plate is combined with funding from other sources and used in a variety of ways to restore and protect the most diverse estuary in North America. At least 80 percent of the plate proceeds go to habitat restoration and up to 20 percent to environmental education focusing on the lagoon. No administrative salaries or studies are paid for from license plate revenue.

Proceeds from the sale of the plate are used to protect and restore lagoon habitat and water quality through reconnection of impounded salt marshes, shoreline stabilization, spoil island and mangrove restoration, stormwater treatment and environmental education projects. The tag, sporting a lagoon snook, has raised more than \$3 million, with annual revenues of about \$400,000. With local funding matching tag grants, money for lagoon projects is usually double!

Lagoon license plates are available at all Florida tag offices.

### For more information



St. Johns River  
Water Management District  
4049 Reid Street • P.O. Box 1429  
Palatka, FL 32178-1429  
(386) 329-4500  
(800) 451-7106  
[www.sjrwmd.com](http://www.sjrwmd.com)



South Florida  
Water Management District  
Martin/St. Lucie Service Center  
210 Atlanta Ave.  
Suwanee, FL 34594  
(772) 223-2600  
(800) 250-4100  
[www.sfwmd.gov](http://www.sfwmd.gov)



Indian River Lagoon  
National Estuary Program  
St. Johns River  
Water Management District  
Palm Bay Service Center  
515 Community College Parkway S.E.  
Palm Bay, FL 32909  
(321) 984-4950 • (800) 226-3747  
<http://irl.sjrwmd.com>



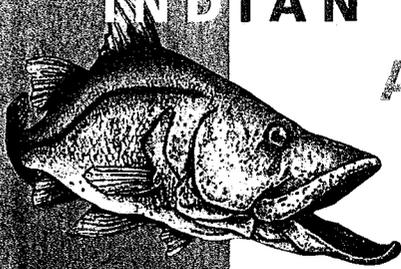
U.S. Environmental Protection Agency  
Region 4, Office of Water Management  
61 Forsyth Street, SW  
Atlanta, GA 30303-3194  
(800) 241-1754  
(404) 562-9345  
[www.epa.gov/owow/estuaries/lagoon/](http://www.epa.gov/owow/estuaries/lagoon/)



U.S. Army Corps of Engineers  
Jacksonville District  
701 San Marco Blvd.  
Jacksonville, FL 32207-8175  
(800) 381-9435  
(904) 337-3235  
[www.sj.usace.army.mil](http://www.sj.usace.army.mil)

# INDIAN RIVER LAGOON

## An overview of the North Feasibility Study



### Studies could increase lagoon funding

**Top:** Dawn greets an early morning stroller on one of the many public docks on the Lagoon.

**Bird:** The wood stork (*Mycteria americana*) is one of the listed species that makes its home in the lagoon.

**Bottom:** Representatives of local, state and federal government agencies, various groups and interested persons regularly meet to discuss challenges to the lagoon and develop possible solutions.

**A**s part of the Comprehensive Everglades Restoration Program (CERP), the U.S. Army Corps of Engineers has initiated feasibility studies to design and evaluate restoration projects for the northern and southern portions of the Indian River Lagoon.

The Indian River Lagoon South Restoration Project, which targets the portion of the lagoon in St. Lucie and Martin counties, was initiated in 1998 by the Corps and the South Florida Water Management District, the local sponsor for this project. The recommended project developed through this study includes construction of extensive water storage and stormwater treatment areas, acquisition and restoration of natural storage and treatment areas, "muck" removal and habitat creation. The South Project Implementation Report was completed in April 2004 and is under congressional consideration for authorization and funding.

The Indian River Lagoon North Feasibility Study was initiated in 2002. This study targets the portion of the lagoon in Volusia, Brevard and Indian River counties, with the St. Johns River Water Management District as the local sponsor. Similar to the South Feasibility Study, the North Feasibility Study could incorporate both natural and constructed water storage and stormwater treatment areas as key elements of the recommended project developed by this study. The study should wrap up in 2007, with submission to Congress for consideration for authorization and funding anticipated in 2008.

Both the north and south studies have incorporated the goals and objectives of the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP) and the Indian River Lagoon Surface Water Improvement and Management (SWIM) plan into their studies. Both studies could be considered implementation of the SWIM Plan and CCMP as they use information and direction provided by these documents to develop specific projects designed to address problems identified in the plans. Many of the projects are regional in scale, with associated costs that would be difficult for local or state agencies to assume without federal assistance.

More information about these studies may be found at the Comprehensive Everglades Restoration Plan Web site at [www.evergladesplan.org](http://www.evergladesplan.org).

#### Where is the study area?

The Indian River Lagoon North Feasibility Study area includes portions of Volusia, Brevard and Indian River counties. The study area stretches for approximately 128 miles from Ponce de Leon Inlet to Fort Pierce Inlet and includes the Indian River Lagoon, tributaries to the lagoon and the lagoon's watershed. The northern portion of the Indian River and all of the Mosquito Lagoon and the Banana River are included in the study area. The Atlantic Ocean, ocean beaches and the St. Johns River and its watershed are not included in the study area.

The remaining portion of the lagoon in St. Lucie and Martin counties has been addressed in the Indian River Lagoon South Restoration Study.

#### Why is the U.S. Army Corps of Engineers involved?

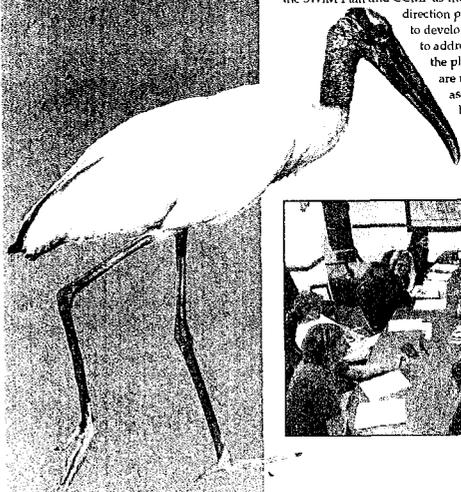
Both the Indian River Lagoon north and south studies are elements of the Comprehensive Everglades Restoration Plan. The restoration plan, in turn, is linked to the Central and Southern Florida (C&SF) Project. The C&SF Project is a multipurpose project first authorized by Congress in 1948 to provide flood control and services to enhance water quality and water supply to much of Florida, south of Orlando. While the C&SF Project accomplished many of its original goals, there were significant impacts to the integrity, health and productivity of many important ecosystems in central and south Florida. A recent study of the C&SF Project and its impacts to these ecosystems by the Corps and other agencies resulted in the development of CERP. CERP was authorized by Congress in 2000.

The primary links between the lagoon and the C&SF Project are the various canals draining to the lagoon, constructed as part of the C&SF Project. These canals include C-23, C-24, C-25 and C-44 in the lagoon's south study area and C-54 in the lagoon's north study area.

Other non-C&SF federal projects in the lagoon basin include the Intracoastal Waterway and several port, inlet and navigation projects. These projects may be evaluated as part of the lagoon's North Feasibility Study.

#### How do various lagoon restoration plans relate to the new study?

Significant amounts of time and effort have gone into the development of the lagoon SWIM Plan and the lagoon National Estuary Program (NEP) CCMP. The goals and objectives of these plans are reflected in the goals and objectives developed for this study and will continue to provide primary guidance for the study as it progresses. Similarly, the data collected during the development of these plans will be essential in assessing various alternatives developed during the study.

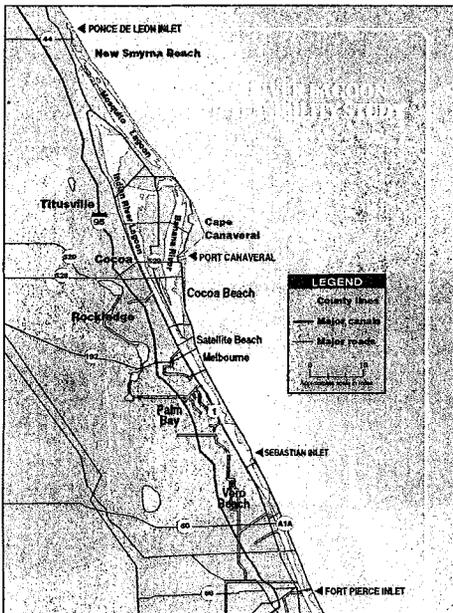
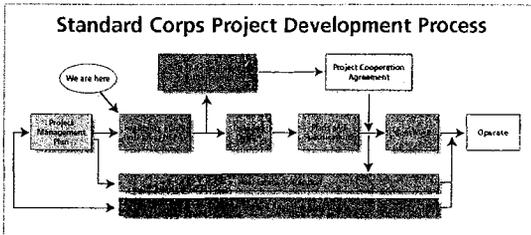


Indian River Lagoon • An overview of the North Feasibility Study

How does the process work?

Any project seeking federal funding through the Corps must follow a standard project development process (as illustrated in the accompanying chart). Presently, the Indian River Lagoon North Project has completed a Project Management Plan and is initiating a feasibility study. The lagoon North Feasibility Study is scheduled to be complete in 2007. Congressional authority for projects identified in the feasibility study will be sought through the Water Resources Development Act of 2008. Funding will be provided through subsequent legislation.

In addition, as required by the National Environmental Protection Act, development of the lagoon north feasibility study is being coordinated with state and federal resource management agencies. These agencies have been contacted to seek their comments and recommendations as restoration alternatives and performance measures are developed.



What is the present status of the lagoon North Feasibility Study?

The lagoon north feasibility study was initiated in August 2002. Presently, performance measures are being developed to evaluate the effectiveness of restoration activities. These measures will be primarily based on the health and extent of important natural resources in the lagoon, such as sea grass. Projects are also under way to model the response of the lagoon and its resources to various restoration alternatives in order to compare the effectiveness of these alternatives. Coordination with various state and federal resource management agencies, as required by the National Environmental Protection Act, has been initiated as well.

Several presentations about the study have been given to various civic groups. Public comment on the study has been taken at meetings of the lagoon north project delivery team, and public information materials have been developed and distributed. Additional presentations, opportunities for public review and comment, and informational materials are anticipated as the study moves forward. To learn more about study progress and upcoming meetings, check the CERP Web site at [www.cerpfuturesplan.org](http://www.cerpfuturesplan.org).

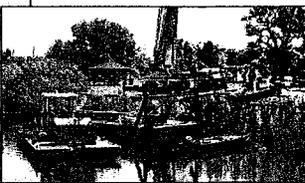
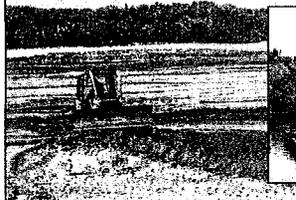
What is the schedule for the study?

|  |      |
|--|------|
| Identification of problems and opportunities                                       | 2003 |
| Development of performance measures  | 2003 |
| Identification and development of evaluation models                                | 2003 |
| Formulation of alternative plans   | 2004 |
| Evaluation of effects and comparison of alternative plans                          | 2005 |
| Alternative formulation public meeting   | 2006 |
| Selection of recommended plan  | 2006 |
| Draft feasibility report/public review   | 2006 |
| Draft feasibility report public meeting  | 2006 |
| Final feasibility report   | 2007 |
| Final feasibility report public meeting  | 2007 |
| Water Resources Development Act of 2008 (Congressional authorization to construct) | 2008 |

Projects would be varied under the feasibility study



Some of the ongoing efforts to protect the lagoon and that could be expanded through the feasibility study include the dredging of "muck" from area waterways, building of regional stormwater ponds, monitoring of habitat and wildlife, and opening of mosquito impoundments.



For more information



St. Johns River Water Management District  
4049 Reid Street • P.O. Box 1429  
Palatka, FL 32178-1429  
(386) 379-4500 • (800) 451-7106  
[www.sjrwmd.com](http://www.sjrwmd.com)



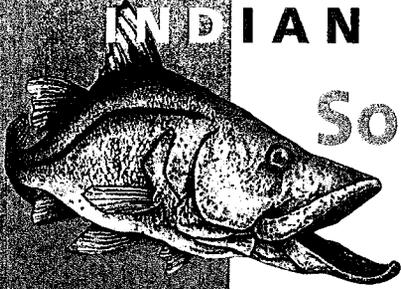
Indian River Lagoon National Estuary Program  
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525 Community College Parkway S.E.  
Palm Bay, FL 32909  
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<http://irl.sjrwmd.com>



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Jacksonville District  
701 San Marco Blvd.  
Jacksonville, FL 32207-8175  
(800) 291-9475 • (904) 232-2235  
[www.saj.usace.army.mil](http://www.saj.usace.army.mil)

# INDIAN RIVER LAGOON

## South Restoration Project



Spring 2004

The Indian River Lagoon is the most biologically diverse estuary system in North America.

Restoration efforts will protect the health of this unique ecosystem, as well as revitalize fish and oyster habitats.

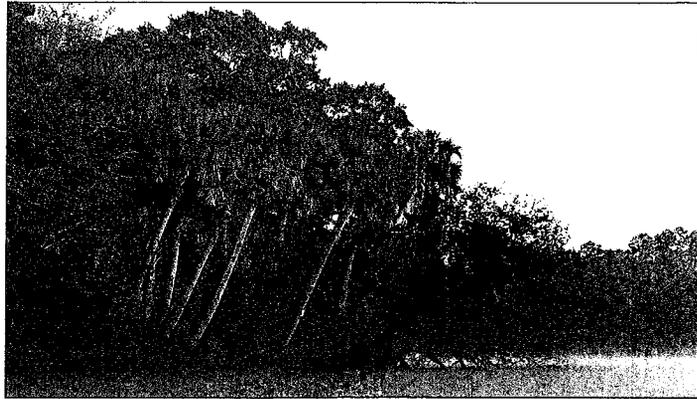
### What is WRDA?

Approximately every two years, members of Congress write and pass into law a Water Resources Development Act, or "WRDA." Typically, each WRDA provides federal authorization for construction of facilities and systems used to manage water resources.

Projects such as those constructed by the U.S. Army Corps of Engineers are approved in the WRDA legislation. The Indian River Lagoon South Restoration Project recommended plan may be among many considered for authorization in the next WRDA, which is expected in late summer or early fall (2004).

Once WRDA authorization is secured, separate congressional funding will still have to be sought for the project's engineering and construction activities. Approximately \$1.2 billion — split equally between the state and federal government — is needed to implement the Indian River Lagoon South Restoration Project.

**Where are we now?**  
The U.S. Army Corps of Engineers and its state partner, the South Florida Water Management District, are making final preparations to submit the Indian River Lagoon South Restoration Project Implementation Report (recommended plan) to the assistant secretary of the Army (Civil Works) for final review within the Army, other agencies, and the public. Once finalized, the report will be submitted to Congress for WRDA authorization. For a copy of the Project Implementation Report, visit [www.evergladesplan.org](http://www.evergladesplan.org).



## Getting the water right

Restoration of estuarine treasure nears congressional authorization

**A**ptly named, Florida's "Treasure Coast" encompasses some of the state's most productive and most threatened estuarine treasures — the Indian River Lagoon and St. Lucie Estuary. Home to more than 4,300 species of plants and animals, and supporting an annual economic impact of more than \$730 million lagoonwide, Martin and St. Lucie counties will benefit from careful and deliberate protection and restoration of these water bodies.

The lagoon and estuary have suffered from altered water flow patterns and degraded water quality. In the past few years, excessive rains required additional flood water releases to the estuary from Lake Okechobee. These freshwater releases, combined with excess stormwater runoff arriving in the estuary through drainage canals, altered the salinity balance, stressing the estuary's unique ecosystem. In addition, neighborhoods and farms were popping up all around the estuary's 827-square mile watershed. Outdated stormwater management systems and runoff from fertilized areas caused an increase in the volume of fresh water and pollution levels entering the estuary and lagoon.

### Fixing the problem

A huge effort, called the Indian River Lagoon South Restoration Project, is under way to reverse the damaging effects of pollution and unnaturally large freshwater discharges into these ecologically vital water bodies. The delicate balance of fresh and salt water in the lagoon and estuary will be restored, polluted water will be treated and depleted habitats will be revitalized.

The Indian River Lagoon South Restoration Project is part of an even bigger, system-wide plan to restore, protect, and preserve the water resources of central and southern Florida. This plan is known as the Comprehensive Everglades Restoration Plan, which includes several projects

throughout the vast Kissimmee-Lake Okechobee-Everglades connected watershed, including the Indian River Lagoon. When all of these projects are in place, the natural environment will be dramatically improved.

From 1996 to 2003, the South Florida Water Management District and U.S. Army Corps of Engineers conducted a study — the Indian River Lagoon South Feasibility Study — during which comments were provided by the public to help shape the final recommended project plan to address the issues facing this region. Called the Indian River Lagoon South Project Implementation Report, the plan is expected to go to Congress for review and authorization under the Water Resources Development Act (WRDA) in late summer or early fall — making it the first Everglades restoration project to be submitted for congressional authorization.

### Other restoration efforts

While the Indian River Lagoon South Restoration project works to achieve more comprehensive, long-term ecosystem restoration goals, local restoration and water quality improvement efforts have an effect on the health of the estuary and lagoon. These efforts complement other short-term solutions such as the projects conducted through the Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan and the National Estuary Program.

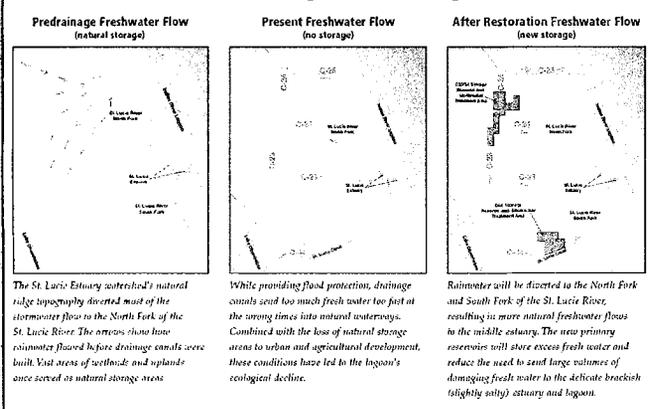
In 1998, the interagency South Florida Ecosystem Restoration Task Force formed a St. Lucie River Issues Team made up of federal, state and local governments as well as agricultural and environmental interests. The team was tasked with documenting the existing condition of the estuary, describing the impacts of the 1998 releases from Lake Okechobee and developing an interim action plan made up of specific short-term projects that can be implemented within five years to improve the estuary's water quality.

Funding through the Issues Team allows local governments to take the necessary steps to improve the quality of water discharges. To date, the Issues Team has funded 96 projects throughout Martin and St. Lucie counties, totaling more than \$57 million including local sponsors' 50 percent cost match. Stormwater retrofits comprise almost half of the projects funded by the team. Agricultural and urban best management practices, habitat restoration, and research and education are the other main categories.

Many of the turn-dirt projects have been successfully completed. Funding has been through the Florida Legislature and, most recently, \$2 million from the South Florida Water Management District for projects starting in 2004.

The Indian River Lagoon South Restoration Project, as well as all related efforts, are moving forward because of a dedicated partnership between federal, state and county governments, and because of invaluable contributions from the local community.

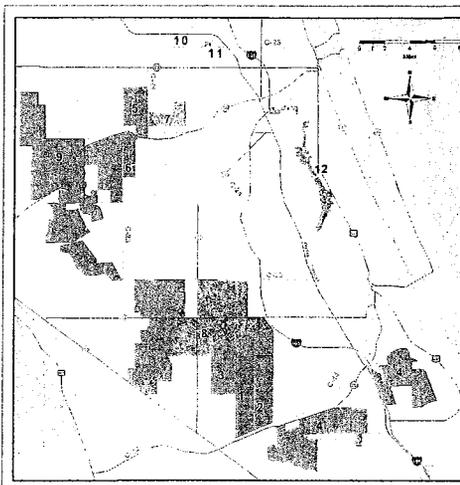
### South Indian River Lagoon - Restoring the Flow



## Features, benefits of the South Restoration Project

The Indian River Lagoon South Restoration Project recommended plan lays out a regional approach to the problems of the Martin and St. Lucie County portion of the lagoon, and identifies five features that work together to restore and protect the lagoon.

- Reservoirs.** Four aboveground reservoirs on approximately 12,000 acres of land are planned in Martin and St. Lucie counties to capture water from the C-23, C-24, C-25 and C-44 canals. Collectively, these reservoirs will provide storage for 135,000 acre-feet or approximately 44 billion gallons of water. The stored water should greatly reduce the need to send large volumes of fresh water caused by stormwater runoff in Martin and St. Lucie counties to the lagoon through the C-23, 24, 25 and 44 canals. The C-44 (St. Lucie Canal) reservoir is one of the three Comprehensive Everglades Restoration Plan reservoirs identified for accelerated construction. The large releases of fresh water from Lake Okeechobee will also be significantly reduced when other features of the Comprehensive Everglades Restoration Plan are constructed, such as the Everglades Agricultural Area storage south of the lake, C-43 storage west of the lake and aquifer storage and recovery wells north of the lake.
- Stormwater Treatment Areas.** Four constructed wetlands will be built on 9,000 acres of land, which will treat stormwater runoff captured by the project prior to discharge to the lagoon. The "STAs," as they are known, will reduce phosphorus volume entering the lagoon by up to 41 percent and nitrogen by up to 26 percent. These constructed wetlands will also provide water supply benefits, storing up to 35,000 acre-feet or approximately 11 billion gallons of water with an average depth of 6 to 18 inches.
- Restored Natural Areas.** Another 90,000 acres of existing uplands and wetlands in Martin, St. Lucie and Okeechobee counties will be used for multiple purposes including water storage and natural area restoration. These areas will hold 30,000 acre-feet or about 10 billion gallons of water, and will provide increased wetland and upland habitat for wildlife. In addition, approximately 3,100 acres of the floodplain along the North Fork of the St. Lucie River will be restored, benefiting the wildlife and ecology of the area. With the Indian River Lagoon South Restoration Project, these areas will receive a natural flow of fresh water similar to that received prior to human alterations.
- Diversion of Water.** Existing water flow within the basins will be diverted to reduce the damaging



Indian River Lagoon South Recommended Plan

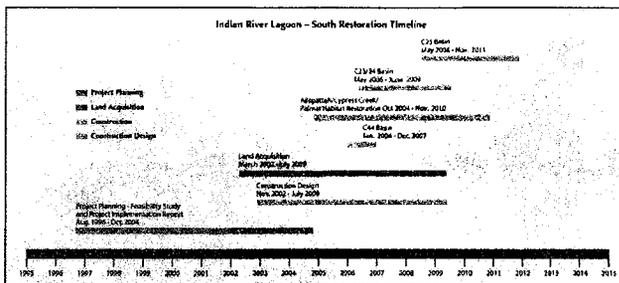
- C-44 Basin Components**
- C-44 - Reservoir
  - C-44 - Stormwater Treatment Area
  - C-23/C-44 - Stormwater Treatment Area
  - Palmar Complex - Natural Storage and Water Quality Area
- C-23/24 Basin Components**
- C-23/C-24 - Stormwater Treatment Area
  - C-23/C-24 - North Reservoir
  - C-23/C-24 - South Reservoir
  - C-23/C-24 - Stormwater Treatment Area
  - Allspatch - Complex Natural Storage and Water Quality Area
  - Cypress Creek/Trail Ridge Complex - Natural Storage and Water Quality Area
- C-25, Northfork and Southfork Basin Components**
- C-25 - Reservoir
  - C-25 - Stormwater Treatment Area
  - Northfork Natural Floodplain Restoration
  - Muck Remediation and Artificial Habitat

- Legend**
- Natural Floodplain Restoration
  - Natural Storage and Water Quality Area
  - Reservoir
  - Stormwater Treatment Area

impacts associated with large, rainy season, freshwater discharges to the middle estuary and improve ecology in the North Fork of the St. Lucie River. Water will be diverted to the North or South Forks of the St. Lucie River, to the C-44 canal, resulting in more natural freshwater flows to the middle estuary.

- Removing Muck and Adding Artificial Habitat.** Some 7.9 million cubic yards of muck will be removed from four "dead zones" located in the

North Fork, South Fork, and middle estuary of the St. Lucie River. Muck removal will establish clean river and estuary bottom suitable for re-colonization of bottom-dwelling organisms including oysters. Oyster shell, artificial reef balls and artificial submerged aquatic vegetation will be deposited near the muck removal sites, creating another 90 acres of habitat and accelerating the colonization process.



## New reservoir on fast-track

Accelerates implementation of the South Restoration Project

C-44 basin components of the Indian River Lagoon South Restoration Project include a 3,315-acre, 10-foot-deep above-ground reservoir and two 3,000-acre stormwater treatment areas. The new reservoir will provide relief to the delicate health of the estuary and lagoon. The project is one of the three Comprehensive Everglades Restoration Plan reservoirs identified for accelerated construction. The two other reservoirs will be located on the Caloosahatchee River (C-43) west of Lake Okeechobee and in the Everglades Agricultural Area south of the lake. Together, these reservoirs will significantly increase water storage availability and significantly reduce the need for damaging flood control releases from Lake Okeechobee to the Caloosahatchee and St. Lucie estuaries.

To accelerate the C-44 components, the South Florida Water Management District has implemented

a public-private partnership for the first phase. The agreement is to produce a conceptual plan for the project on the identified site and complete approximately 15 percent of the detailed design. This phase will last through the end of July 2004, when the construction schedule will be finalized. Overall, the project has been accelerated by almost two years with completion scheduled by 2007.

The C-44 components will capture runoff from the area watershed, clean some or all of it, and then return it to the basin when there is a need. The Indian River Lagoon and the St. Lucie Estuary will benefit from improved timing of releases and water quality, which will help maintain desirable salinity levels. In addition to improving water quality, the reservoir and treatment areas will increase available water supplies for the environment, people and farms.

## Who to call to volunteer

If you would like to join the local efforts to help protect the Indian River Lagoon, you can call:

**St. Lucie County**

- Harbor Branch Oceanographic Institute (772) 465-2400

**Martin County**

- Florida Oceanographic Society (772) 225-0505
- Hobe Sound National Wildlife Refuge (772) 546-6141
- St. Lucie River Issues Team, (772) 223-2600, Ext. 3603

Or you can visit these Web sites for information on upcoming meetings, plan changes and recent activity:

- Upper East Coast Water Supply Plan - [www.sfwmd.gov](http://www.sfwmd.gov)  
Go to Major Projects then Water Supply Plans

- Indian River Lagoon Restoration (North and South) [www.evergladesplan.org](http://www.evergladesplan.org)  
Go to Projects then Feasibility Studies

- Official Web page of Martin County - [www.martin.fl.us](http://www.martin.fl.us)  
Go to Hot Topics

Finally, you can attend the Rivers Coalition Meetings, which are held on the last Friday of each month at the Realtor Association of Martin County.

**For more information**

To learn more about the Indian River Lagoon South Restoration Project and the Comprehensive Everglades Restoration Plan, visit [www.evergladesplan.org](http://www.evergladesplan.org). Or, contact the two Indian River Lagoon South Restoration Project Managers:

|   |  |
|---|--|
| <p><b>David Unsell</b><br/>South Florida Water Management District<br/>3301 Gun Club Road<br/>West Palm Beach, FL 33406<br/>(561) 682-6889<br/><a href="mailto:dunsell@sfwmd.gov">dunsell@sfwmd.gov</a></p> | <p><b>Michael Rogalski</b><br/>U.S. Army Corps of Engineers • Jacksonville District<br/>Prudential Building • 701 San Marco Blvd.<br/>Jacksonville, FL 32207<br/>(904) 232-1450<br/><a href="mailto:michael.b.rogalski@aj02.usace.army.mil">michael.b.rogalski@aj02.usace.army.mil</a></p> |
|---|--|

## The Journey to Restore America's Everglades

A partnership of the U.S. Army Corps of Engineers, South Florida Water Management District and many other federal, state, local and tribal partners.



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**IR23**

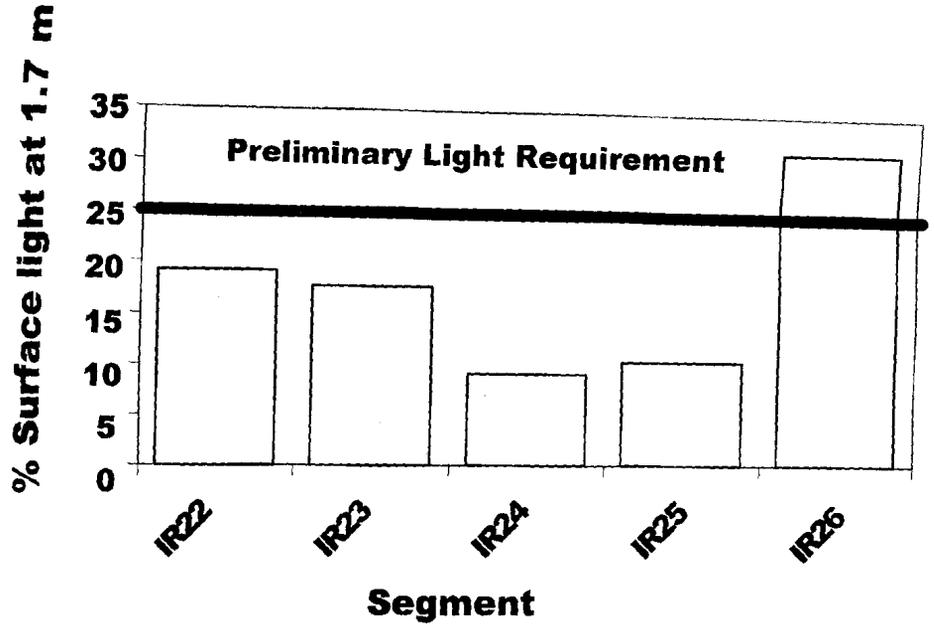
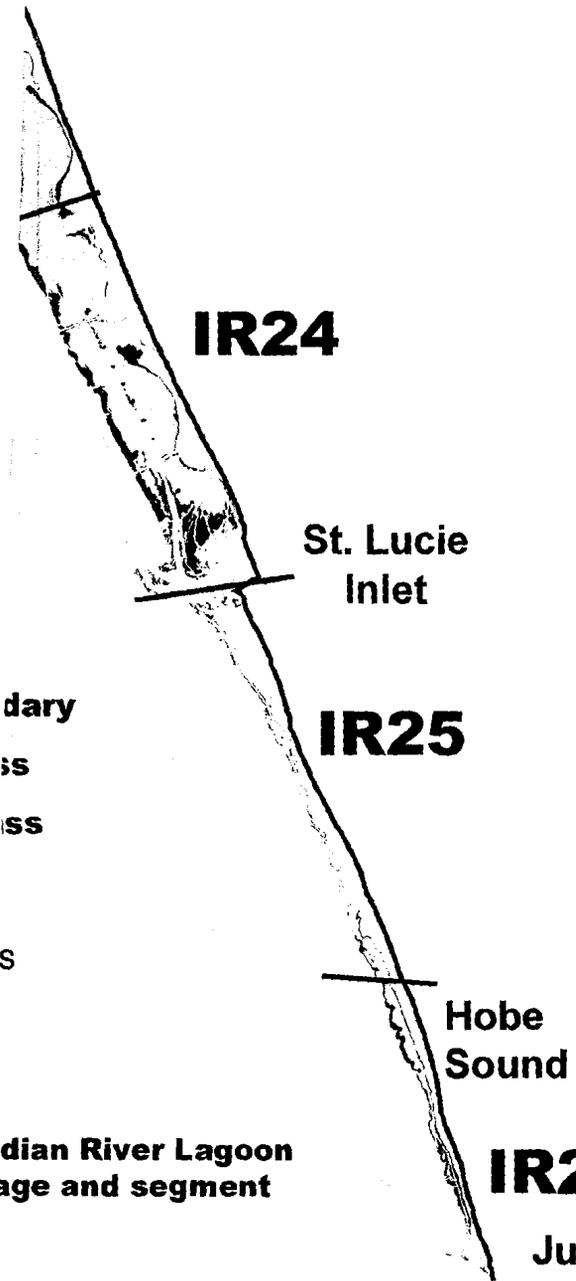


Figure 6-1c. Median percent surface light at the 1.7 m target depth for each segment, north to south (see map at left for location of segments). Based on monthly measurements from 1990 to 1999.



**IR24**

St. Lucie Inlet

**IR25**

Hobe Sound

**IR26**

Jupiter Inlet

dary

ss

ss

S

Indian River Lagoon  
age and segment

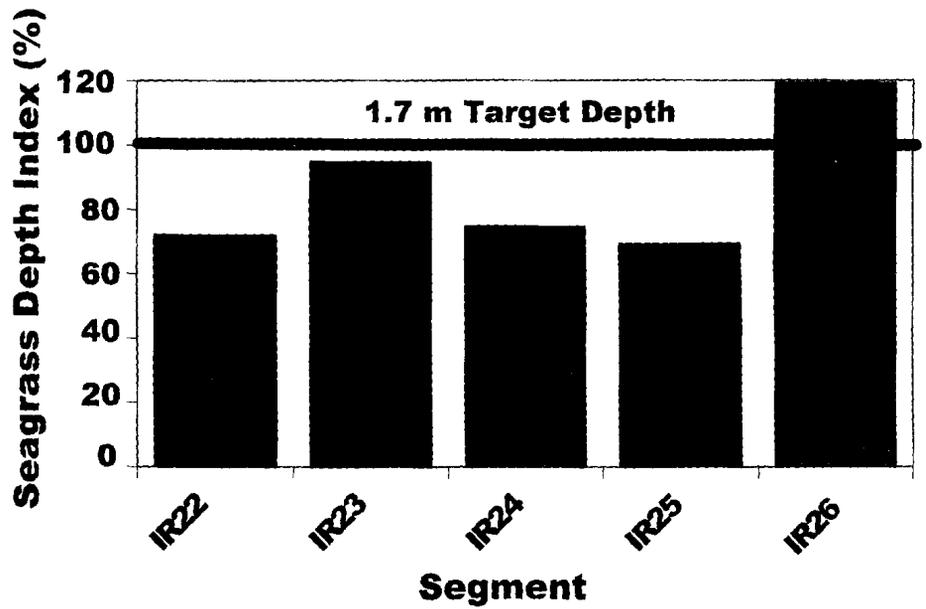


Figure 6-1d. Seagrass Depth Index = depth of edge of bed as a percent of the 1.7 m target depth\*. Based on average seagrass deep edges mapped in 1992, 1994, and 1996.

\* The Seagrass Depth Index (SDI) is based on potential coverage to 1.7 m referenced to the NGVD29 vertical datum. The SDI would be slightly less if potential coverage were referenced to mean water level (MWL).

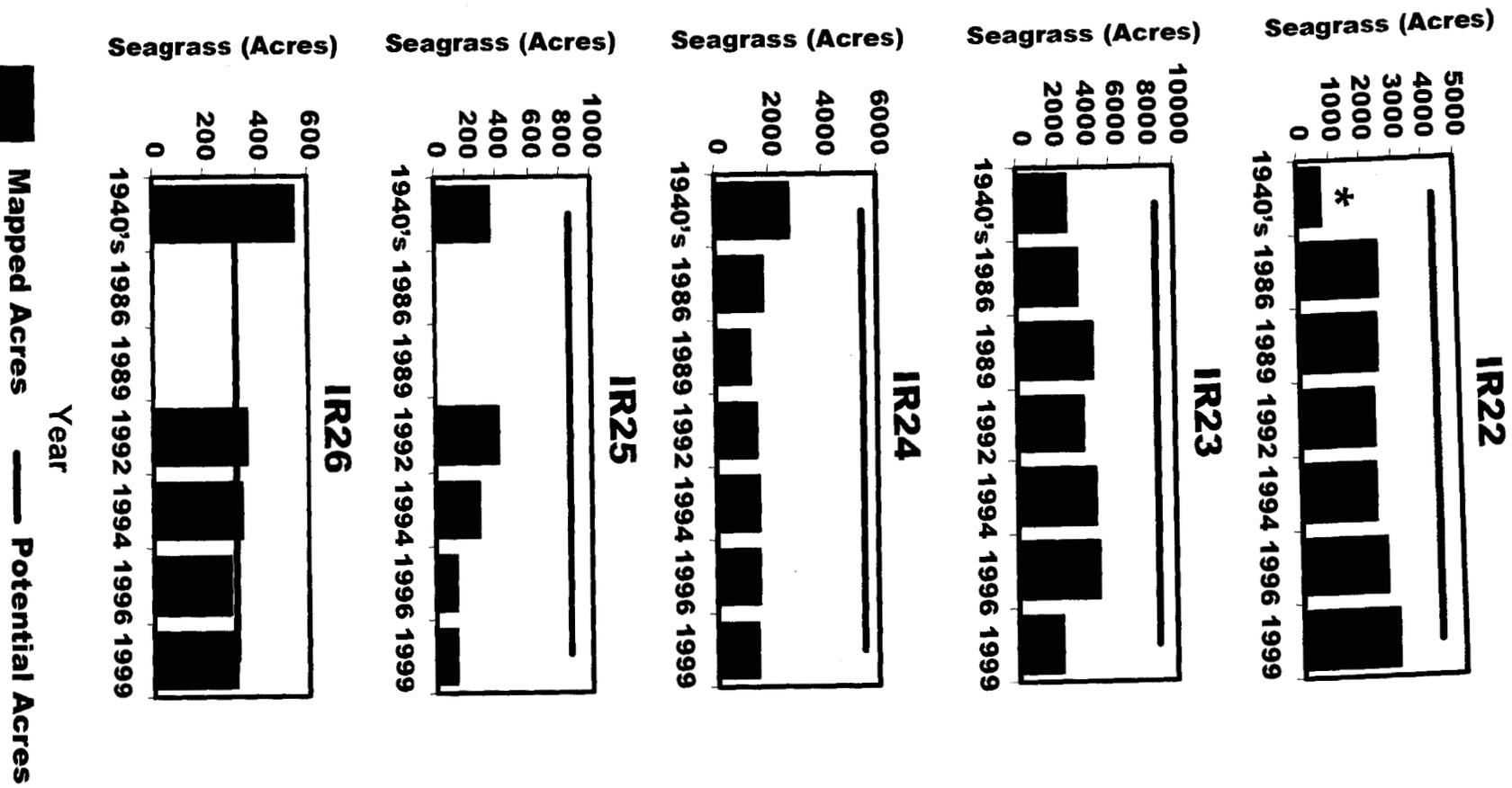


Figure 6-1 b. Acres of seagrass, by segment, in each year mapped. Note differing scales. Potential seagrass acres (the area < 1.7 m deep) are shown as a blue line.

\* In IR22 seagrass acreage was 2,336 in 1958

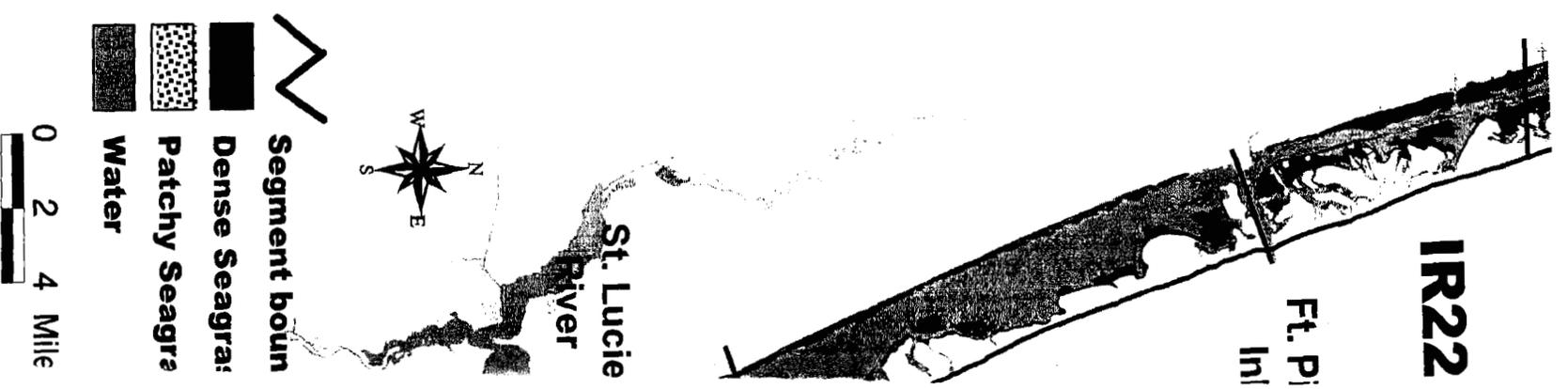


Figure 6-1a. South Inlet 1999 seagrass cover boundaries

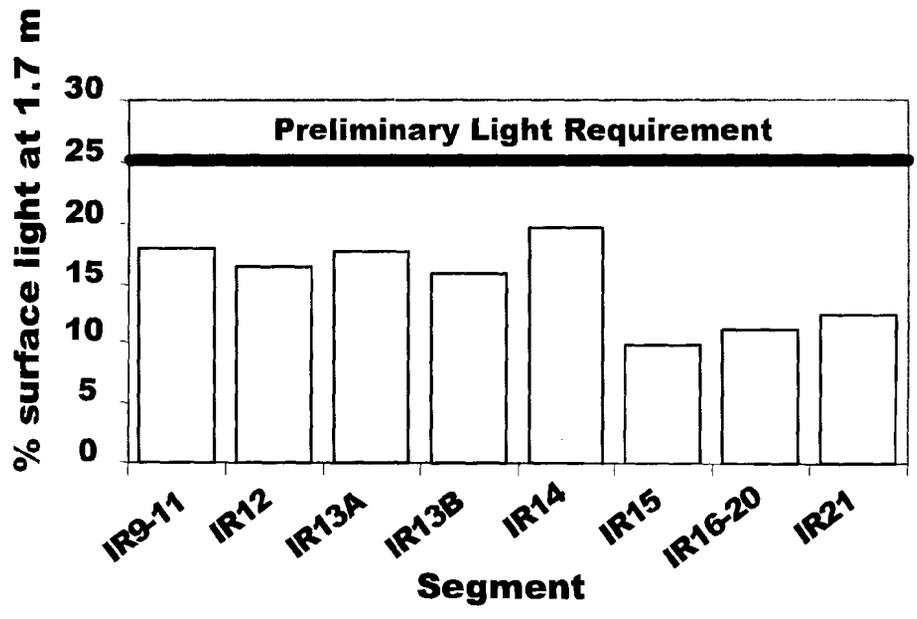
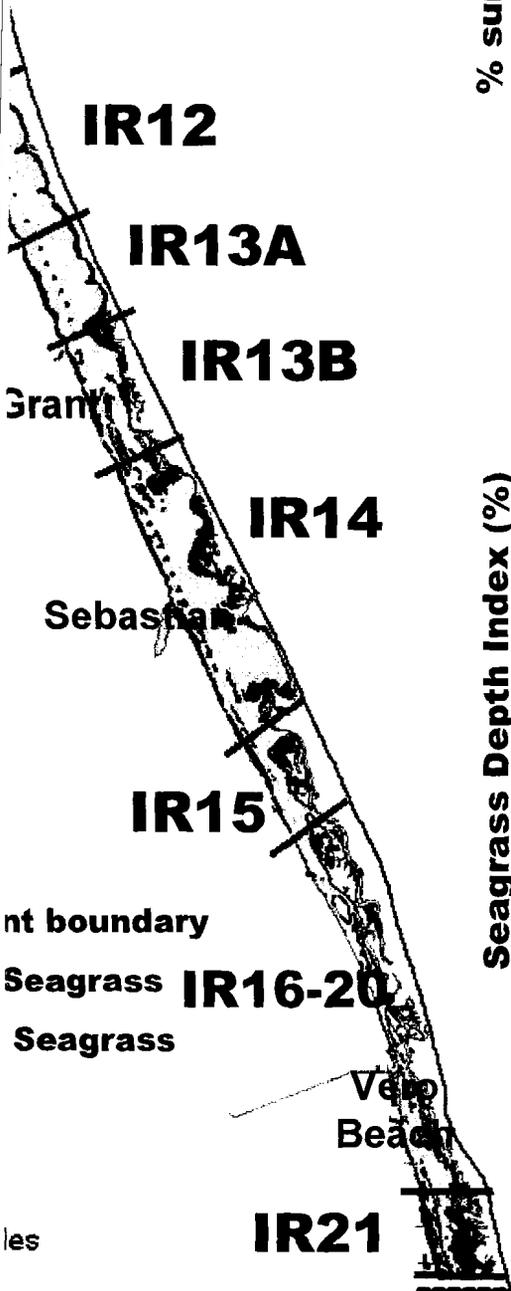


Figure 5-2 c. Median percent surface light at the 1.7-m target depth for each segment, north to south (see map at left for location of segments). Based on monthly measurements from 1990 to 1999.

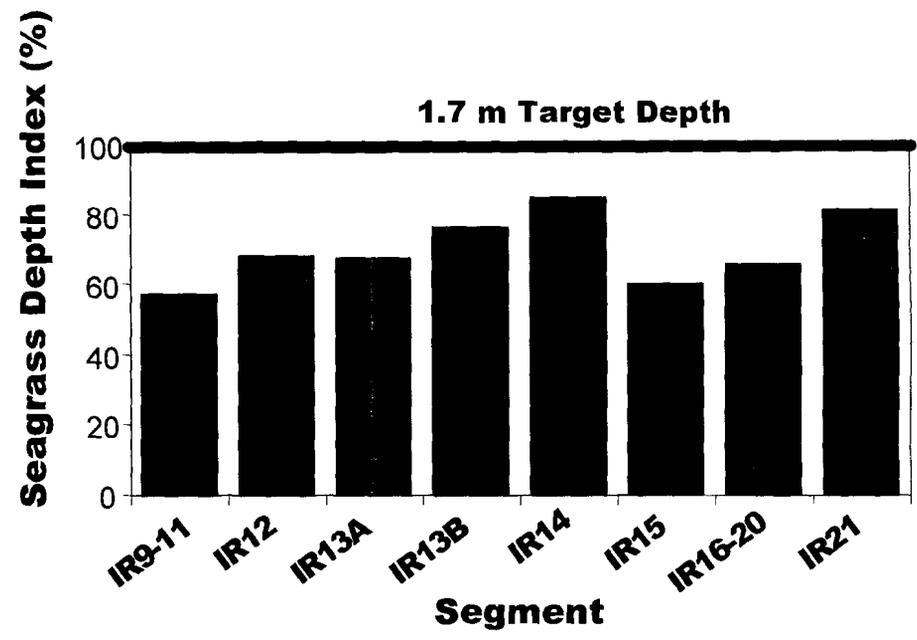
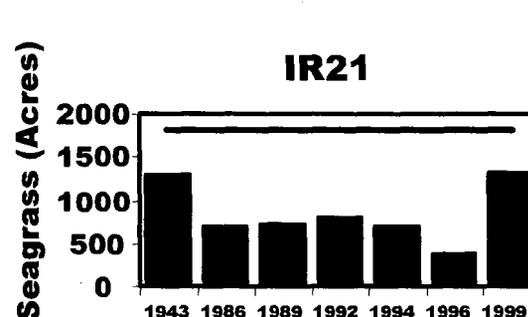
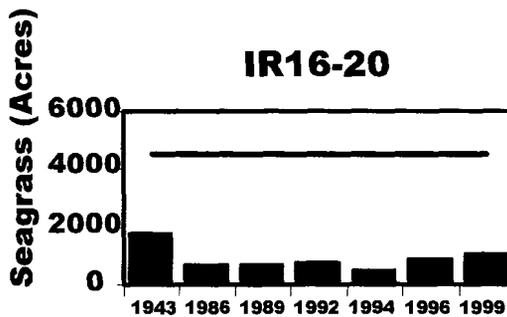
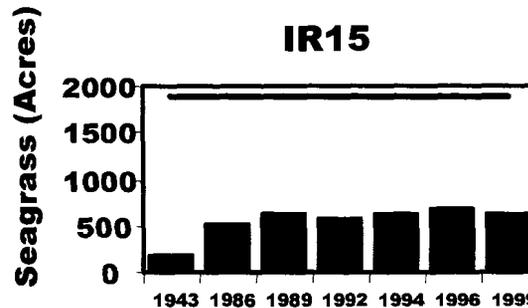
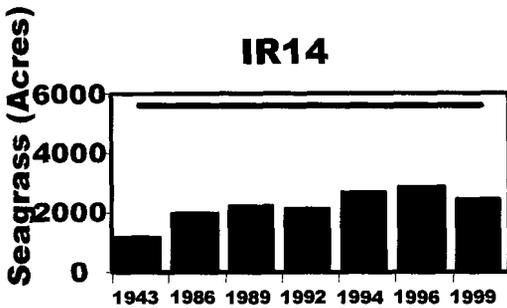
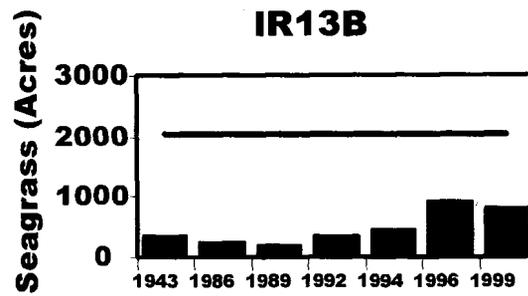
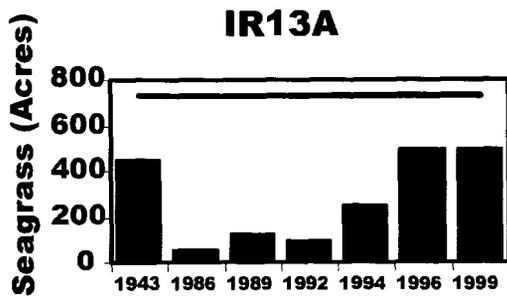
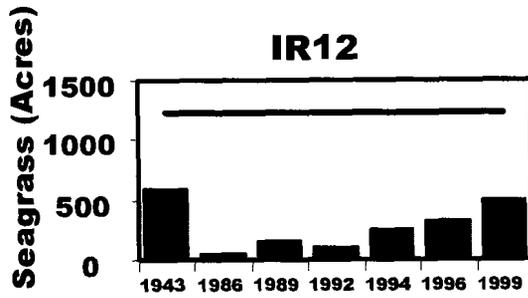
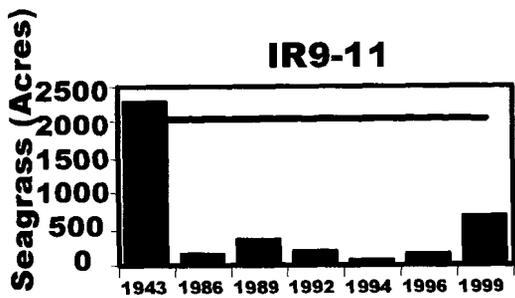


Figure 5-2 d. Average Seagrass Depth Index = depth of edge of bed as a percent of the 1.7-m target depth\*. Based on average seagrass deep edges mapped in 1992, 1994, and 1996.

\* The Seagrass Depth Index (SDI) is based on potential coverage to 1.7 m referenced to the NAVD88 vertical datum. The SDI would be slightly less if potential coverage were referenced to mean water level (MWL).



Mapped Acres
  Potential Acres

Figure 5-2 b. Acres of seagrass, by segment, in each year mapped. Note differing scales. Potential seagrass acres (the area < 1.7 m deep) are shown as a blue line. Note large historical loss in segments IR9-11, 12, and 13A and recent recovery to near historical levels. Segments IR13B through IR16-20 were never near potential acres. Segments 13B through 15 have more seagrass now than in 1943 - Sebastian Inlet was not permanently opened until 1948.

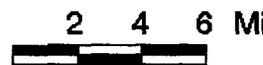
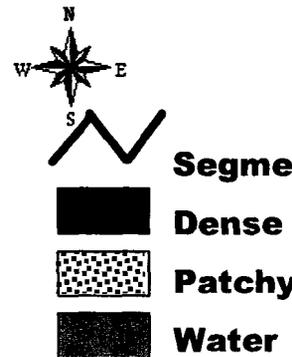


Figure 5-2a. Central 1999 seagrass cover and segment boundaries.

haulover Canal

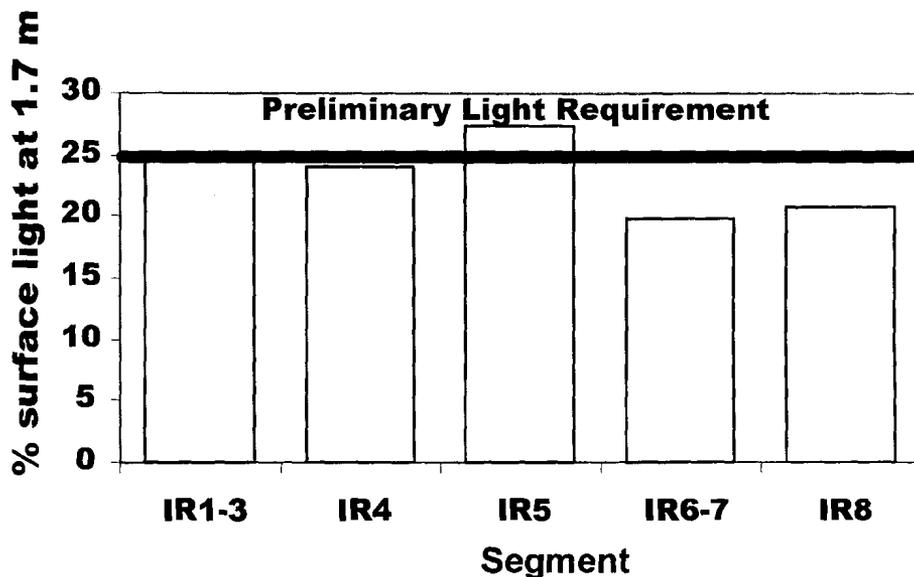


Figure 5-1 c. Median percent surface light at the 1.7-m target depth for each segment, north to south (see map at left for location of segments). Based on monthly measurements from 1990 to 1999. Note how closely the northern three segments meet the target.

NASA Cswy.

Pine Island

IR6-7

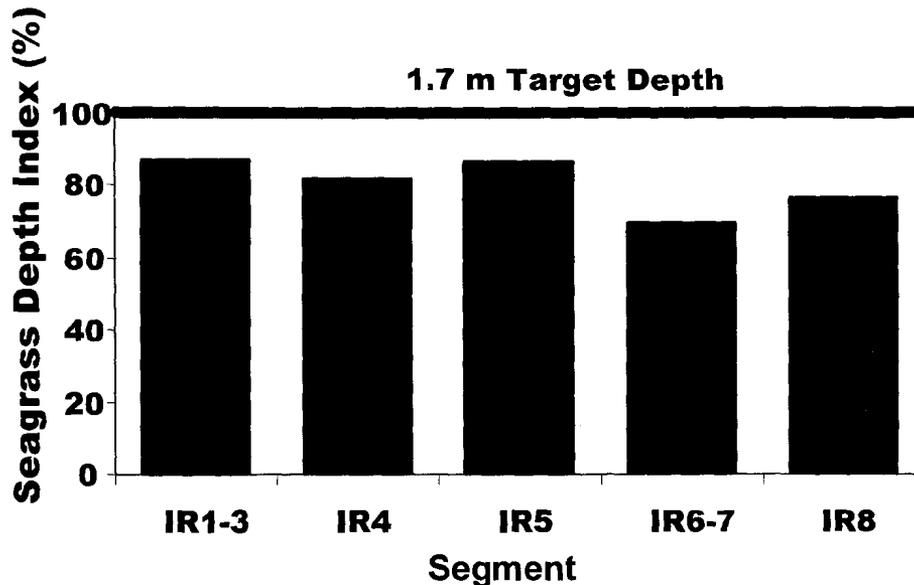


Figure 5-1 d. Average Seagrass Depth Index = depth of edge of bed as a percent of the 1.7-m target depth\*. Based on average seagrass deep edges mapped in 1992, 1994, and 1996.

Cocoa

IR8

Honeymoon Lake

\* The Seagrass Depth Index (SDI) is based on potential coverage to 1.7 m referenced to the NAVD88 vertical datum. The SDI would be slightly less if potential coverage were referenced to mean water level (MWL).

Indian River Lagoon 1999  
segment boundaries

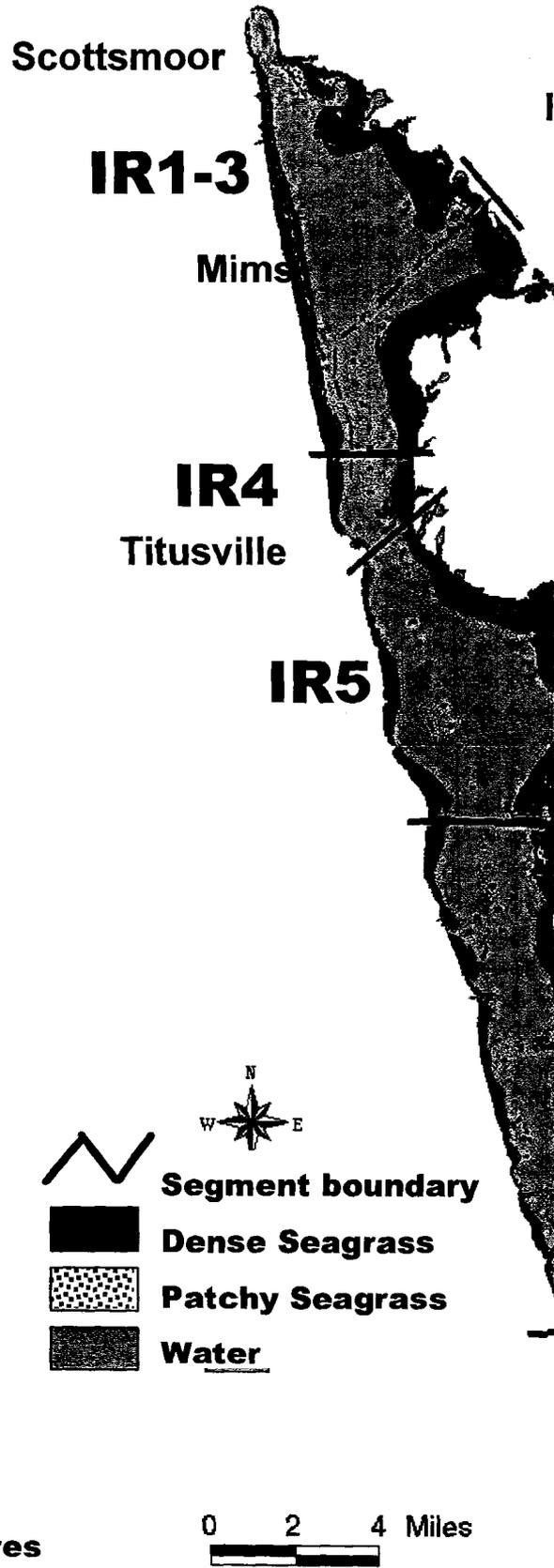
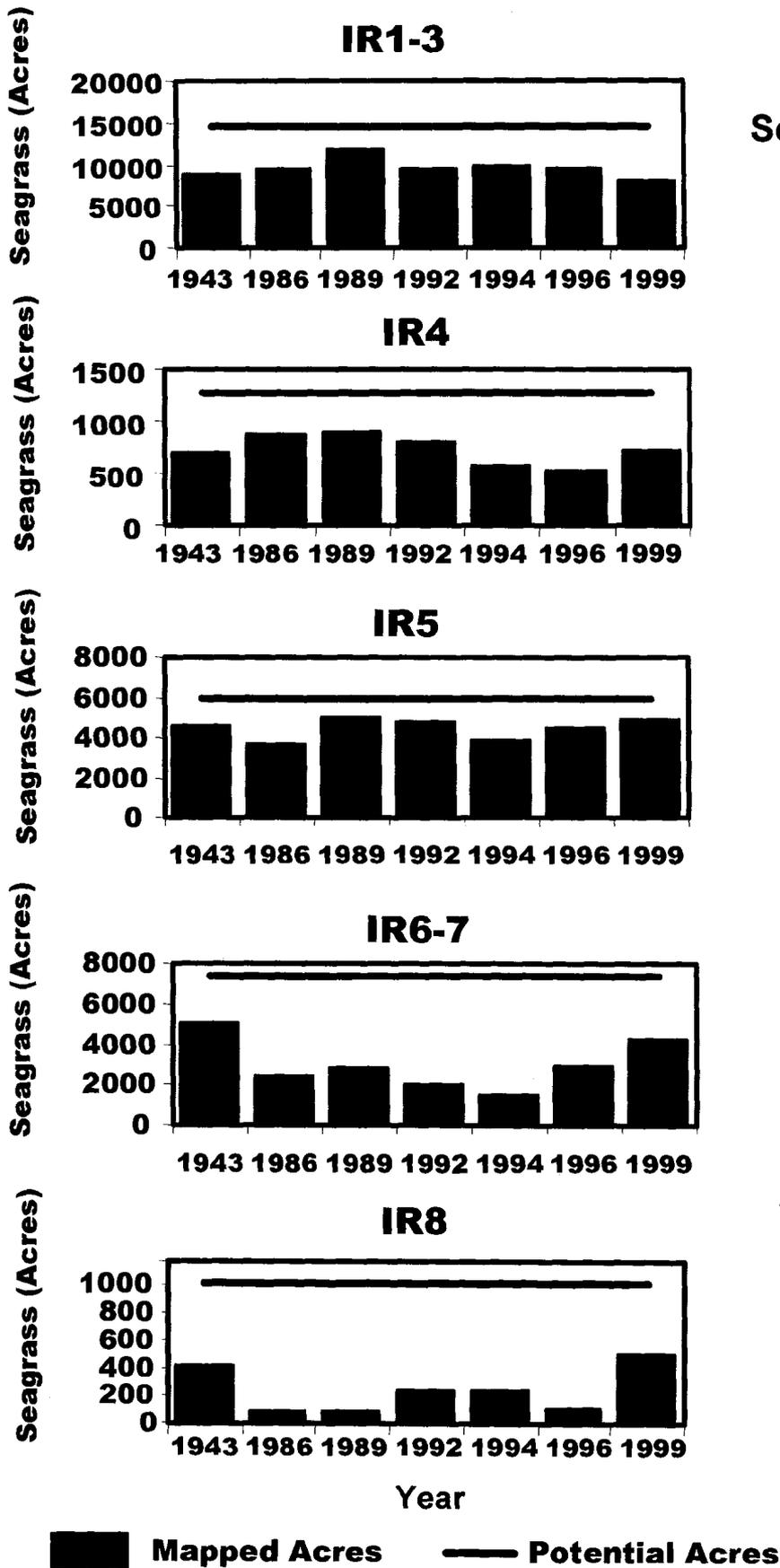


Figure 5-1 b. Acres of seagrass, by segment, in each year mapped. Note differing scales. Potential seagrass acres (the area < 1.7 m deep) are shown as a blue line.

Figure 5-1a. North Indian Rive seagrass coverage and segme

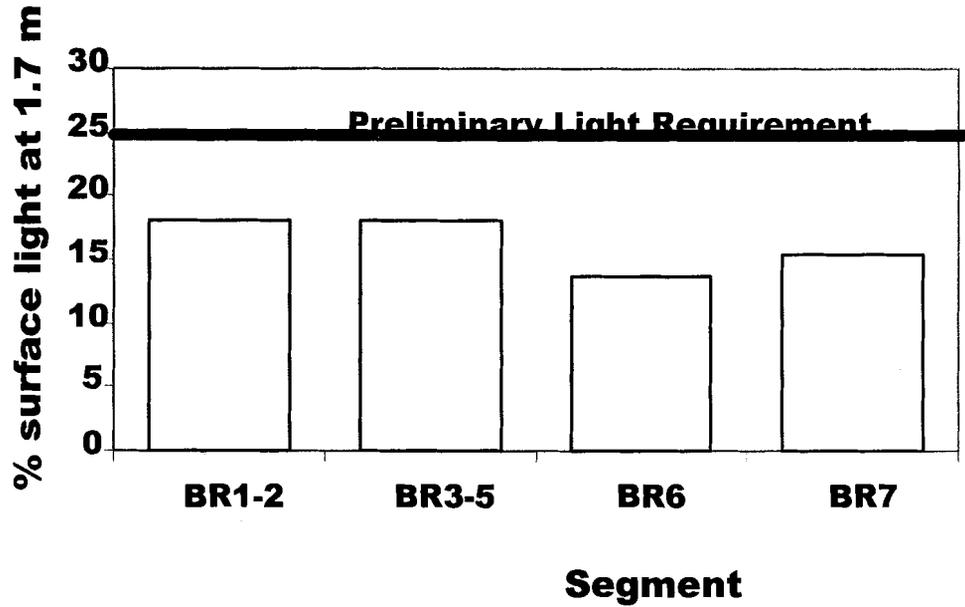
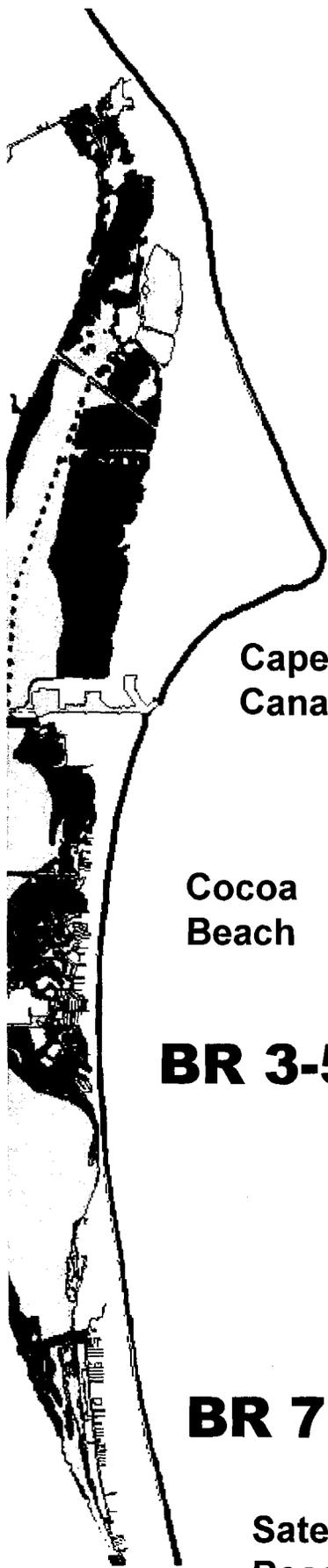


Figure 4-1 c. Median percent surface light at the 1.7-m target depth for each segment, north to south (see map at left for location of segments). Based on monthly measurements from 1990 to 1999.

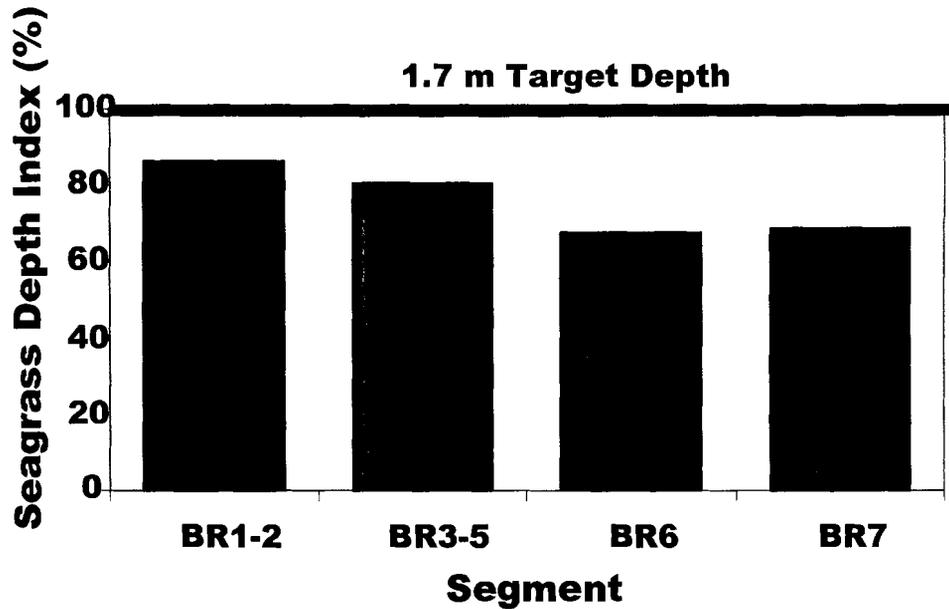


Figure 4-1 d. Average Seagrass Depth Index = depth of edge of bed as a percent of the 1.7-m target depth\*. Based on average seagrass deep edges mapped in 1992, 1994, and 1996.

\* The Seagrass Depth Index (SDI) is based on potential coverage to 1.7 m referenced to the NAVD88 vertical datum. The SDI would be slightly less if potential coverage were referenced to mean water level (MWL).

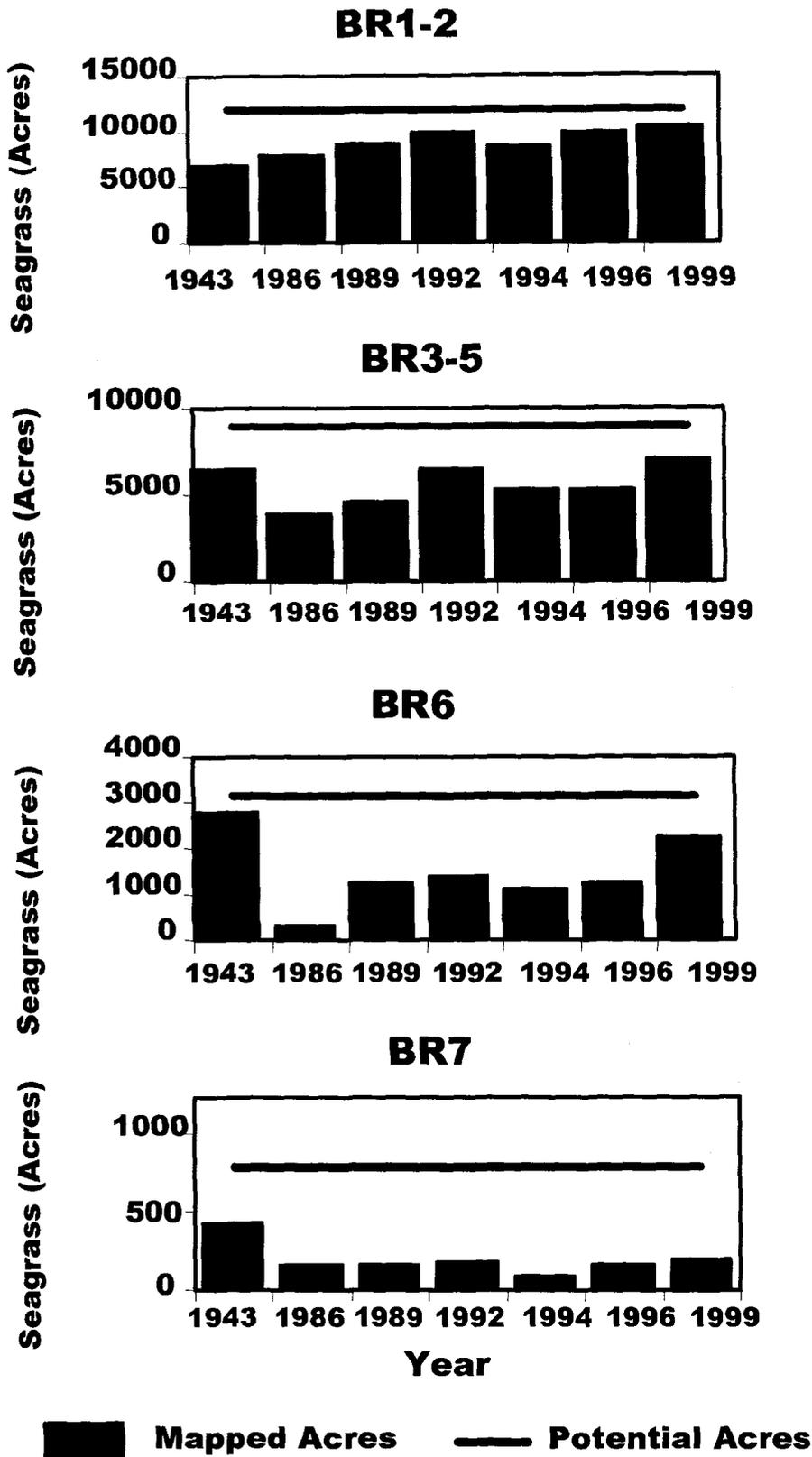


Figure 4-1 b. Acres of seagrass, by segment, in each year mapped. Note differing scales. Potential seagrass acres (the area < 1.7 m deep) are shown as a blue line. Note general long-term stability in segments BR1-2 and BR3-5 and a pattern of recovery from 1994 to 1999 in all segments.

**BR1-2**

Merritt  
Island

Newfound  
Harbor

**BR 6**

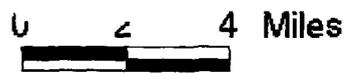


Figure 4-1a. Banana River Lag seagrass coverage and segme

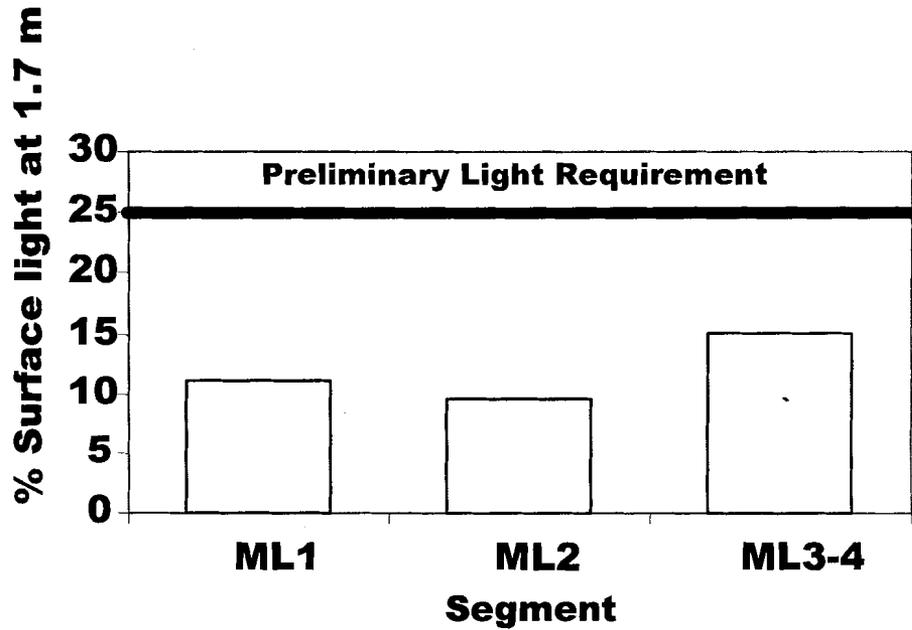


Figure 3-1c. Median percent surface light at the 1.7-m target depth for each segment, north to south (see map at left for location of segments). Based on monthly measurements from 1990 to 1999. Note that even segment ML3-4 is far below the target.

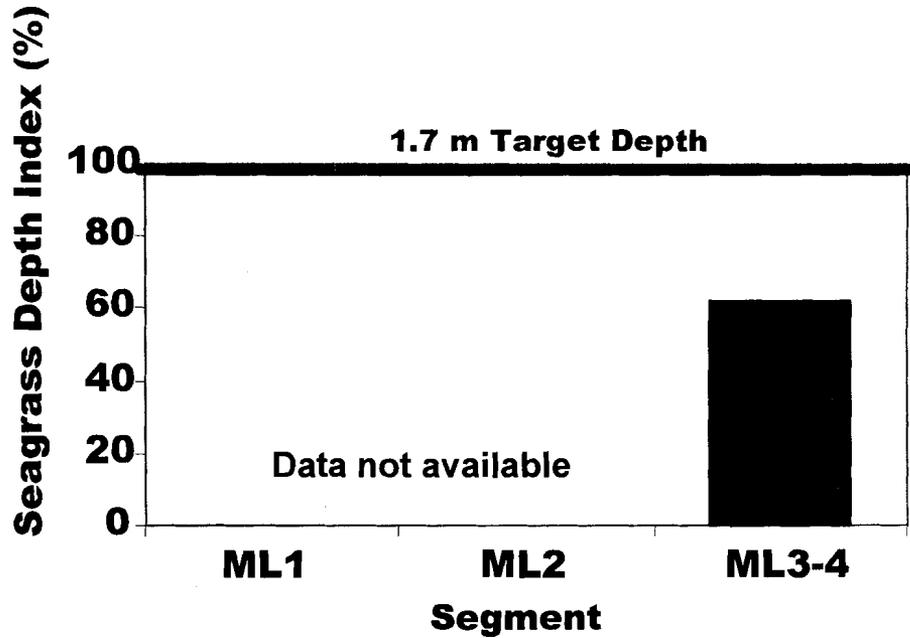
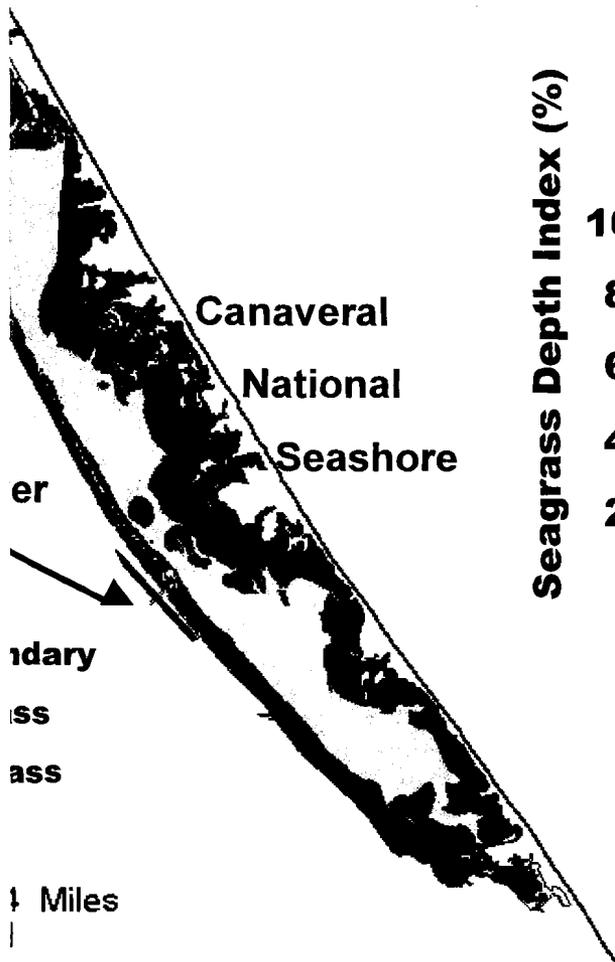


Figure 3-1d. Average Seagrass Depth Index = depth of edge of bed as a percent of 1.7-m target depth\*. Based on average seagrass deep edges mapped in 1992, 1994, and 1996.

\* The Seagrass Depth Index (SDI) is based on potential coverage to 1.7 m referenced to the NAVD88 vertical datum. The SDI would be slightly less if potential coverage were referenced to mean water level (MWL).

nlet

L2



Lagoon 1999 seagrass boundaries

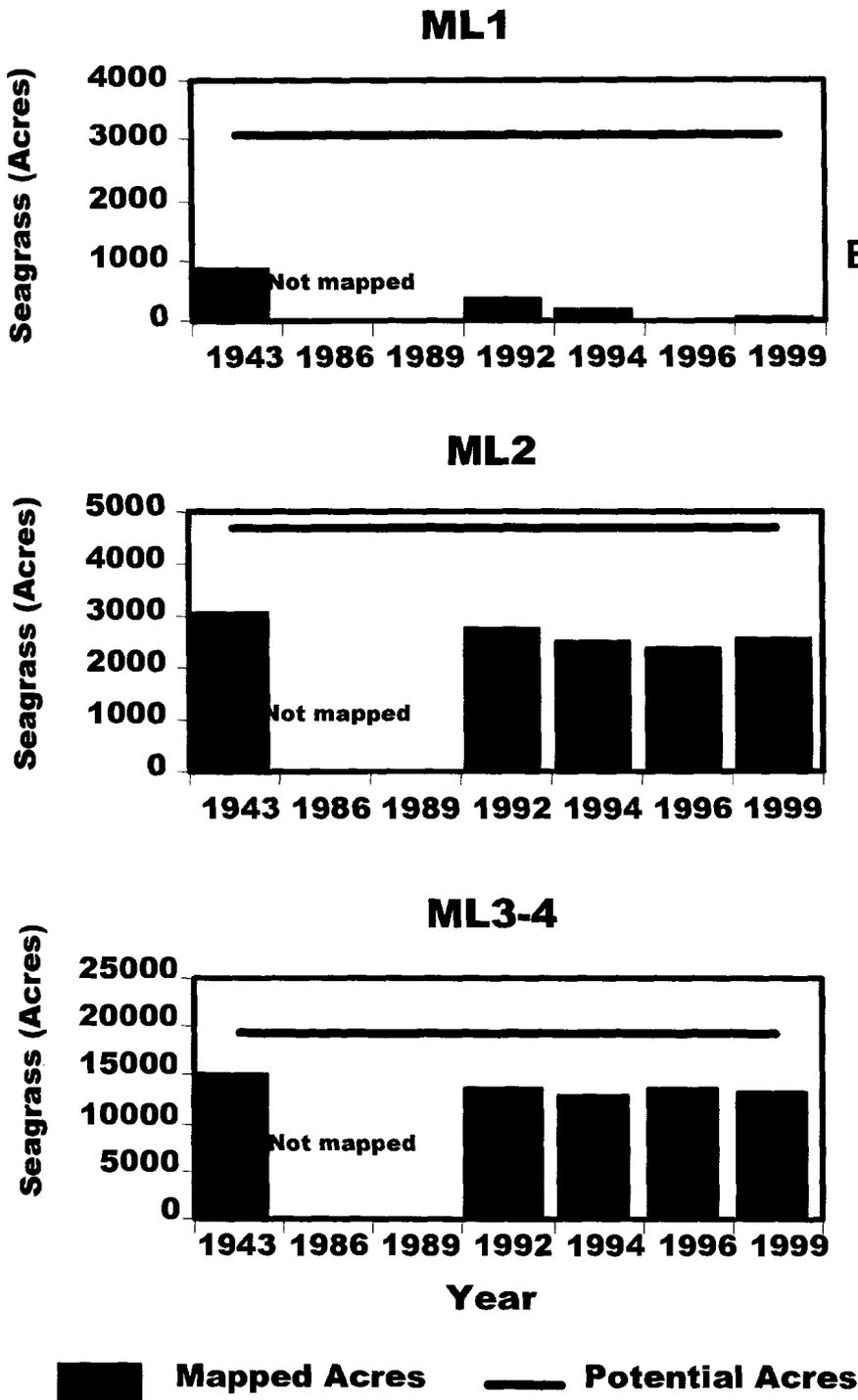


Figure 3-1b. Acres of seagrass, by segment, in each year mapped. Note differing scales. Potential seagrass acres (the area < 1.7 m deep) are shown as a blue line. Note loss in segment ML1 and long-term stability in ML2 and especially ML3-4.

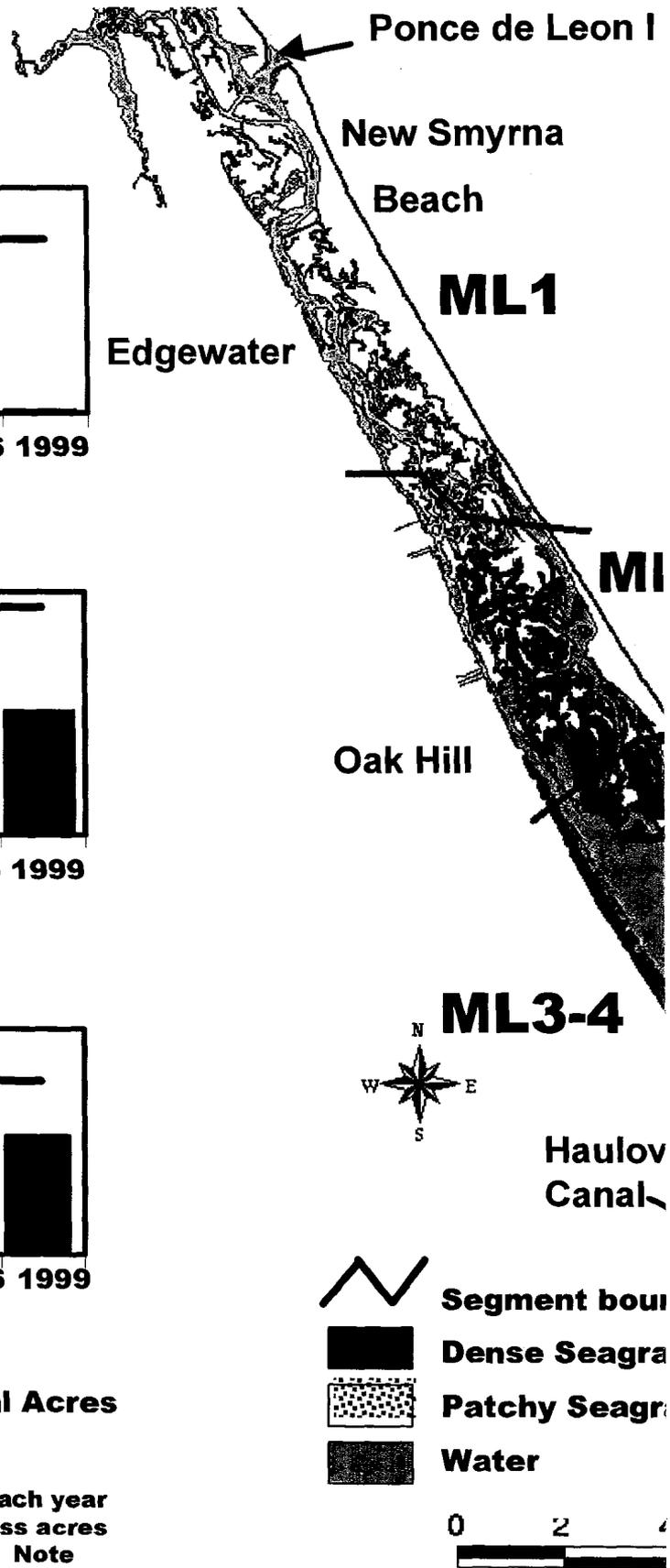


Figure 3-1a. Mosquito coverage and segments

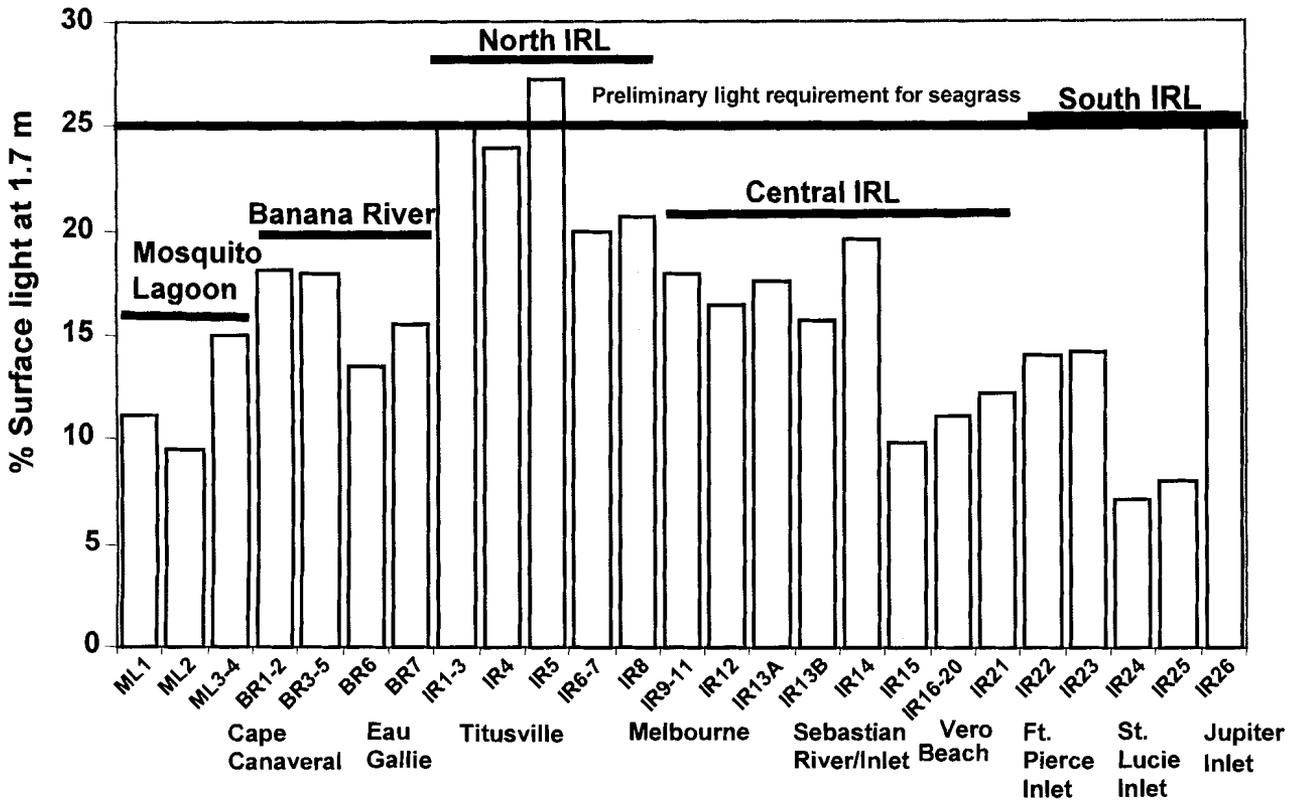


Figure 2-3b. Median percent surface light at the 1.7 m target depth for each segment, north to south (see map at left for location of segments). Based on monthly measurements from 1990 to 1999.

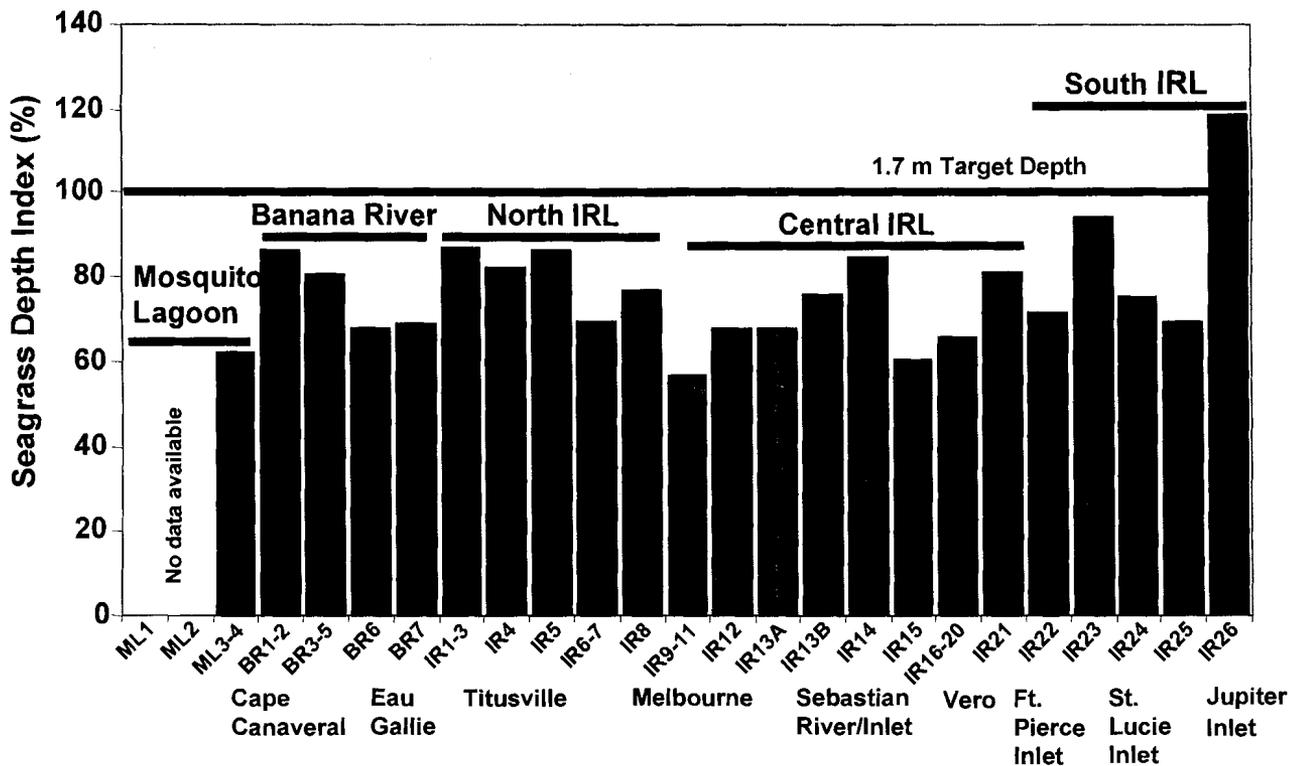
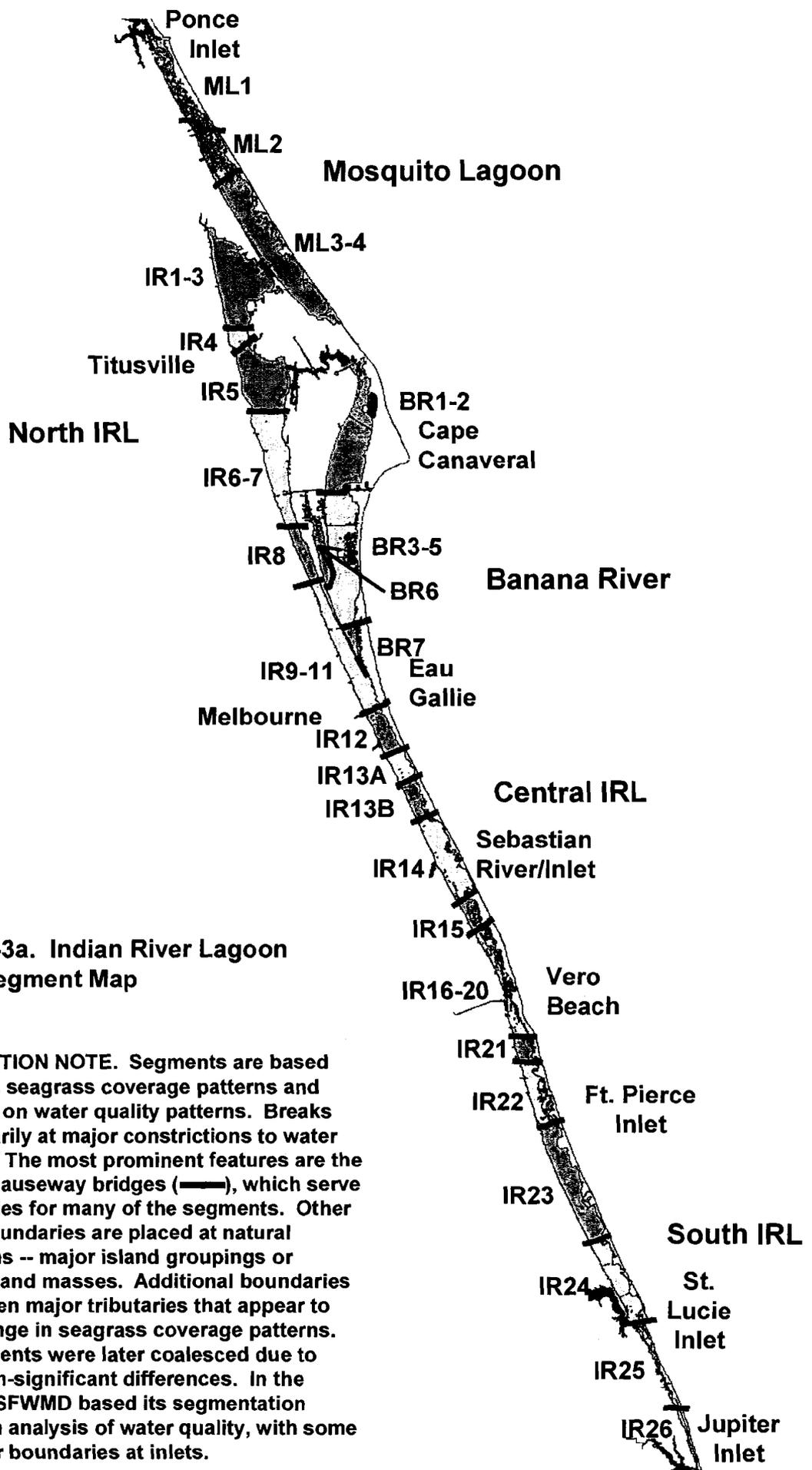


Figure 2-3c. Average Seagrass Depth Index -- depth of edge of bed as a percent of 1.7 m target depth\*. Based on seagrass deep edges mapped in 1992, 1994, and 1996. (See map at left for location of segments.)

\* The Seagrass Depth Index (SDI) is based on potential coverage to 1.7 m referenced to the NAVD88 vertical datum, except in South IRL where depths were referenced to NGVD29. The SDI would be slightly less if potential coverage were referenced to mean water level (MWL).



**Figure 2-3a. Indian River Lagoon System Segment Map**

**SEGMENTATION NOTE.** Segments are based primarily on seagrass coverage patterns and secondarily on water quality patterns. Breaks occur primarily at major constrictions to water circulation. The most prominent features are the numerous causeway bridges (—), which serve as boundaries for many of the segments. Other segment boundaries are placed at natural constrictions -- major island groupings or peninsular land masses. Additional boundaries were between major tributaries that appear to induce change in seagrass coverage patterns. Some segments were later coalesced due to small or non-significant differences. In the South IRL, SFWMD based its segmentation primarily on analysis of water quality, with some of the major boundaries at inlets.

# WORKSHOP SUMMARY

## Gulf, Caribbean, and Florida East Coast Fisheries Workshop

September 4-5, 2003  
Clemente Center  
Florida Institute of Technology  
Melbourne, Florida



Photo by Robert Day.

Hosted by:  
Indian River Lagoon Estuary Program

Sponsored by:  
U.S. Environmental Protection Agency  
Association of National Estuary Programs  
Florida Institute of Technology

Conference Coordinators  
The Southeastern National Estuary Programs:  
Barataria-Terrebonne  
Charlotte Harbor  
Coastal Bend Bays and Estuaries  
Galveston Bay  
Mobile Bay  
San Juan Bay  
Sarasota Bay  
Tampa Bay

Thursday, September 4, 2003

8:15 Welcome and Workshop Objectives  
Host: Troy Rice, Indian River Lagoon Estuary Program

Troy Rice, Director of the Indian River Lagoon Estuary Program, welcomed everyone to the workshop and made announcements about the facility and the workshop schedule.

8:30 Fisheries Regulation Panel  
Moderator: Mark Alderson, Sarasota Bay National Estuary Program

***Roy Crabtree, National Marine Fisheries Service***

Dr. Roy Crabtree outlined the regulatory tools that the National Marine Fisheries Service uses to manage fisheries. He described legislation such as the Marine Mammal Protection Act, the Endangered Species Act, as well as the role of the Fisheries Management Councils. He outlined the major actions that the Gulf, South Atlantic, and Caribbean Fisheries Management Councils are currently taking. Dr. Crabtree also described management tools such as limiting areas to fisherman and setting gear restrictions.

***Corky Perret, Mississippi Department of Marine Resources***

Corky Perret described the organization of the State of Mississippi fisheries management agencies. He described the major issues facing the State of Mississippi, their role on the Gulf Fisheries Council, and some of the management actions they have taken to protect and maintain fisheries. Mr. Perret mentioned that he has been active first in Louisiana and now in Mississippi fisheries management along the Gulf and serves on the Gulf Fisheries Management Council.

***Richard Paperno, Fish & Wildlife Conservation Commission, Florida Marine Research Institute***

Dr. Rich Paperno described the role of the State of Florida and the Fish and Wildlife Conservation Commission (FWC) in managing fisheries. Dr. Paperno gave a brief summary of how the Division of Marine Fisheries sets rules and the types of data that are included in the process. He described the fisheries dependent information collected from commercial and recreational fisherman and the fisheries independent data collected by the FWC. He described the process of holding Commission meetings to present proposed changes in regulations and collect input from stakeholders and the concerned public.

***Questions and Discussion***

Q: Why is there such a lack of data for stock assessments? Is this a funding issue?

A (Dr. Crabtree): Most stock assessment programs are run by the states. The NMFS works with the states on stock assessment; we work closely with our state partners. More fisheries independent monitoring (FIM) programs are needed. We don't have a comparable program in the Gulf for reef fish. We also need more observers. All those needs are in the Gulf. The Atlantic and Caribbean needs are even greater.

Q: Is enforcement performed on a national or state level? How can enforcement be enhanced?

A (Corky Perret): The National Marine Fisheries Service and the National Oceanic and Atmospheric Administration joined with five gulf and three Eastern states to enhance

enforcement. State officers are now deputized to enforce federal regulations. Federal funding is still needed at the federal level. Better enforcement is needed. We have great fisheries in the Southeast but we don't get our fair share of the federal funding for fisheries. Our proportion of federal funding has been slowly changing, but it still has a long way to go.

A (Roy Crabtree): The feds hear these concerns everywhere we go. Now, with national security issues at the forefront, the U.S. Coast Guard is being tasked with a lot of additional duties and it takes time away from their ability to provide assistance with fisheries enforcement.

Q: It is my understanding that stock assessments are usually conducted three times per year. This year, only one time is planned. Why has this changed and why isn't the same level of effort being applied to stock assessments now?

A (Roy Crabtree): I would have to look to see how many stock assessments were done last year. Our plans are to do more than one per year. We do have to figure out how to manage those species that we don't have assessments for. But we do have assessments for most species. Sometimes, we use indicator species to assess the status of several species in multi-species groups. We need to make more progress but it is unrealistic to think we will eventually do stock assessments for all species.

Q: Dr. Crabtree mentioned Secretarial Amendment 2 on Red Grouper. Could you expand on that?

A (Roy Crabtree): That amendment is under preparation right now. We expect to publish a notice of availability in the next month. A reduction on the order of ten percent is needed.

Q: Fish regulations seem to be derived from terrestrial methods of control. In some cases it seems like area management may be more appropriate than individual species management approaches. Are there trends within your agencies to move toward area management approaches?

A (Corky Perret): No!

A (Roy Crabtree): There is gradual movement toward multiple species approaches.

A (Corky Perret): Let's be clear that the lawyers do all the managing now. It is very difficult to meet legal muster with management actions. We propose actions and then the lawyers tell us what we really can do.

Q: Fisheries seem over-regulated and under-enforced. Are the existing regulations adequate or do we really need more regulations?

A (Corky Perret): We can always use more enforcement but if we really want to catch someone, we can.

10:00            Break

10:15            Estuarine Management Programs Supporting Fisheries Panel Moderator:  
Mark Alderson, Sarasota Bay National Estuary Program

### ***Kerry St. Pé, Barataria-Terrebonne National Estuary Program***

Kerry St. Pé presented a summary of selected fisheries-related projects implemented by the Gulf, Caribbean, and Florida East Coast National Estuary Programs. He explained that all 28 National Estuary Programs (NEPs) are community-driven groups using a partnership approach to develop and then implement a comprehensive management plan to solve complex environmental problems affecting an estuary. Each of the NEPs is designated as nationally significant under Section 320 of the Clean Water Act. The partnerships represented by the Gulf Region NEPs have implemented a broad range projects related to fisheries issues. These projects include fisheries habitat creation and

enhancements as well as evaluations of nursery habitat value. The structure of NEPs offers an excellent forum for considering future fisheries issues and needs of the Gulf region in a unified manner.

***Jenna Wanat, Apalachicola National Estuarine Research Reserve***

Jenna Wanat explained that habitat alteration and degradation are priority issues for the National Estuarine Research Reserve system (NERRs). The System-wide Monitoring Program (SWMP) is an effort to characterize various estuarine systems throughout the nation and provide accurate baseline data to monitor potential changes within these systems. Continuous water and weather monitoring protocols have been established, as well as monthly water nutrient sampling, to provide information about the abiotic components of these estuaries. As the NERR system has evolved, so has the monitoring program, toward characterizing the biological components of these systems. Consideration is being made for pilot studies such as assessing the composition and extent of marshlands and submerged aquatic vegetation. Other projects within these Reserves address the changes in various faunal communities. Fish monitoring is common throughout the NERRs, however no nation-wide protocols have been established. Ms. Wanat's talk described the issues faced by the three Research Reserves in Florida and their efforts to establish fish monitoring programs.

***Byron Griffith, U.S. EPA-Gulf of Mexico Program***

Byron Griffith was delayed by travel difficulties, and was unable to participate in this session. He gave his presentation during the following session.

***LeRoy Creswell, Florida Sea Grant***

LeRoy Creswell described the role of Florida Sea Grant with fisheries monitoring. He also described the national Sea Grant program as well as examples of collaboration among the state Sea Grant programs and the individual National Estuary Programs.

***James A. Bohnsack (NOAA), Florida Keys National Marine Sanctuary***

Jim Bohnsack described the National Marine Sanctuary Program and identified the two marine sanctuaries in the region—Flower Garden Banks National Marine Sanctuary and the Florida Keys National Marine Sanctuary. Grays Reef, off the coast of Georgia, is also designated a National Marine Sanctuary. He described the role of the marine sanctuaries in terms of fisheries protection and management. He also described the concerns and issues that arose during the Florida Keys Marine Sanctuary designation, how those concerns were addressed, and some of the public feedback now that the sanctuary is in place.

***Questions and Discussion***

Q: Are there opportunities for the National Estuary Programs to join forces with fisheries folks to improve resources?

A (Kerry St. Pé): Yes, this was one of our objectives by hosting this workshop. A first step was bringing the Gulf of Mexico Program, NOAA, and these other organizations together to talk about what we all can do. The opportunity is there. We would like to look for pilot projects common to the whole Gulf region to pursue.

Q: Do the National Estuary Program (NEP) personnel have the authority to regulate?

A (Kerry St. Pé): The NEPs are non-regulatory, but we have some influence with the research and regulatory folks. The NEPs are frequently used as a sounding

board to express concerns, particularly by those folks working in the field and observing problems.

Q: This is really a comment for the National Estuarine Research Reserves—it would be really helpful to put on training for law enforcement staff. Teach the law enforcement how to recognize issues. Provide some in-service training for them on species recognition. This is something the NEPs and the NERRs could really help with.

Q: I have a question about receiving comments about development within the estuaries. We never see anything from the NEPs on development and permitting issues. Why is that?

A (Kerry St. Pé): It is not routine for us to comment on permits in the Barataria-Terrebonne program. If there is an issue we have had core partners ask us to come and comment on a particular permit. NEPs also have good contacts with stakeholder groups and can urge them to comment.

Q: I am curious about the involvement of NERRs with fish monitoring. Are you going to become more involved in stock assessment? It would be great if you would get involved in the fisheries assessment review process.

A (Jenna Wanat): We are certainly involved in stock assessment. However, our assessment is focused on a limited geographic area.

Q: Is the NERR gearing up to have a major fisheries program?

A (Jenna Wanat): The reserves are not really gearing up for major fisheries assessment work. These are little projects that I talked about.

Q: This question is for Dr. Bohnsack--many environmental factors influence sites. The National Marine Sanctuaries don't have complete control over their sites. There was considerable controversy about different groups' activities with the sanctuary. How do groups feel now that the sanctuary is in place?

A (Jim Bohnsack): There is a control issue. Are the changes we see due to fishing, weather, or other factors? When you control fishing and you see a response, it is pretty clear that fishing has a major effect. As far as the groups go, there has been a big change in attitude about the Sanctuary among many groups. Some thought we were giving too much protection, others thought it was not enough. Since then, we have had the Tortugas effort in 2000 and fishermen supported those closures. So the Sanctuary effort seems to have convinced many people that it works.

Q: What about the recreational (fishermen) guys?

A (Jim Bohnsack): The one vote against was from the recreational group. You have to ask yourself why that is. Part of the reason may be that the people that represent them have a vested interest in having more fishermen. Individually, some recreational anglers are supportive of these protection efforts. With others, I really believe it is an education issue.

Q: Based on your technology and management experience, what would be the number one thing that each of you would do to balance or maintain fisheries?

A (Jenna Wanat): Provide good data to those making decisions.

A (LeRoy Crestwell): Impacts are from historical use of the land—and the flushing of those pollutants into the water. Florida's interior ends up in the estuary. I would focus on watershed management for better water quality.

A (Kerry St. Pé): I would also focus on watershed management. Within that I would work on the restoration of natural hydrology. We are losing our fish nurseries in Louisiana.

A (Jim Bohnsack): I think a big problem is shifting baselines. We need to restore our knowledge of what systems can do. People seem to think that the best condition

of the environment was when they arrived, whether that is five, ten, or forty years ago. We need to establish a national network of no-take reserves.

12:15 Lunch Buffet

1:30 Essential Fish Habitat (Moderator: Dick Eckenrod, Tampa Bay Estuary Program)

***David Dale, NOAA***

Mr. David Dale provided background information regarding the Essential Fish Habitat (EFH) provisions contained in the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act and subsequent EFH regulations. He described NOAA Fisheries' responsibilities to identify and conserve EFH and to minimize the adverse affects of fishing on EFH. He identified what has been designated as EFH and Habitat Areas of Particular Concern (HAPC) in the southeast United States, what roles Federal agencies have in protecting EFH and HAPCs, and he summarized the current status of the NOAA Fisheries EFH program. Mr. Dale also identified potential roles that estuary management programs could have in protecting and conserving EFH.

***Terri Jordan, U.S. Army Corps of Engineers, Jacksonville District***

Ms. Terri Jordan explained that under the Magnuson-Stevens Fisheries Act, the Army Corps of Engineers is legally required to consult with the National Marine Fisheries Service. The Corps and NMFS have agreements on how this consultation is conducted. Ms. Jordan's presentation reviewed the Corps process and requirements, as well as a review of a few projects that have been directly effected and modified by Essential Fish Habitat (EFH) reviews.

***Questions and Discussion***

Q: Why not convince the sand not to go where it doesn't need to be?

A (Terri Jordan): It's a lot easier to approach it the way we do.

Comment: Sallie Davis noted that a 90-day comment period started in August and should run through October. The Gulf Restoration Network has a display with information set up at the workshop.

Q: How do you avoid damaging habitat areas of particular concern?

A (Terri Jordan): We rely heavily on Council documents that the National Marine Fisheries Service advises us to follow.

Q: You mentioned lack of data on the locations of habitats as a significant issue. What would you want to see at a particular website in terms of data?

A (Terri Jordan): A GIS map that can zoom down to a specific area. The National Ocean Service has a map finder that is a wonderful technology. You can then get a list of habitat areas of particular concern (HAPCs) in that area. Geographically orientated data is very helpful. Metadata is not as important.

Q: For on-going Army Corps projects, do we have impacts on essential fish habitat (EFH)?

A (Terri Jordan): Yes, sometimes--sometimes the initial consultations stands. Sometimes a new consultation is needed. It largely depends on the length of time between dredging activities and what habitats may have come in or developed in the meantime.

2:30 Break

***Paul Choucair, Texas Parks and Wildlife Department, "An Overview of the Texas Spotted Seatrout Fishery with an Example of Regulatory Changes Based on Sociological Issues"***

Mr. Paul Choucair noted that twenty years of management and conservation measures by Texas Parks and Wildlife Department (TPWD) resulted in a spotted seatrout population that is over 50% greater than levels observed in 1980s. TPWD fishery independent data indicated that the overall spotted seatrout numbers were in an upward trend, but catches of larger fish were low. Angler groups and guide associations voiced concerns over the decrease in catches of larger spotted seatrout and encouraged TPWD to develop management measures which would allow anglers a better opportunity to catch quality and trophy spotted seatrout. This presented Coastal Fisheries with a unique situation - the chance to improve the spotted seatrout stock by fine tuning existing regulations, based on sociological issues, rather than a biological problem.

TPWD embarked on a full review of all available spotted seatrout data, extensive public education, and review of constituent comments. Texas Parks and Wildlife Commission approved the formation of a Spotted Seatrout Workgroup which was comprised of anglers, biologists, and other interested parties from all regions of the Texas coast. Their function was to study the issue and assist the TPWD in determining if regulatory changes were needed, educate anglers about spotted seatrout management, and facilitate reaching a consensus amongst Texas anglers. This was the first time Texas fishery management has involved constituents, to this extent, in the decision making process of fishery regulations. The process took one year from the creation of the Spotted Seatrout Workgroup to the adoption of new regulations.

***Michael D. Murphy, Florida Marine Research Institute, Florida Fish and Wildlife Commission, "An Assessment of the Condition of the Common Snook Population on the Atlantic Coast of Florida"***

Mr. Mike Murphy reported that this assessment integrates information from snook life history studies, population monitoring programs, and fisheries data into an age-based assessment of Florida's Atlantic coast snook population. Snook are protandric hermaphrodites, i.e., they begin life as males and then switch from mature males to females. They are able to spawn as females beginning the first spawning season following transition. Understanding this reproductive strategy is important for accurate estimation of the population's spawning potential, the primary biological benchmark used to measure the status of the snook population. Fishery-independent indices of abundance of snook, implemented in 1997 on the Atlantic coast, have shown declines since 1997.

In contrast, angler total-catch rates, which include the number of snook harvested and the number released, have remained relatively steady since 1996. The total annual harvest of snook has been steady since 1998 at about 40,000 fish. About 10,000 fish in this total harvest are the result of deaths that occurred subsequent to snook being released alive. Results of the assessment analysis indicate that spawning biomass of snook has declined since 1997 and recruitment has been at low levels in recent years. The transitional spawning potential ratio for the Atlantic snook population was 30

percent in 2001, lower than the Florida Fish and Wildlife Commission's management objective of 40 percent.

***Edward Chesney, Louisiana Universities Marine Consortium, "Fishery Independent Data as a Resource for Evaluating Environmental Problems: Perspectives on Fisheries and Fisheries Habitat in the Fertile-Crescent"***

The northern Gulf of Mexico (nGOM) is among the most productive ecosystems in the world, yet a number of environmental problems threaten sustainability of fisheries yields. Fishery-independent trawl data (SEAMAP and other) are being analyzed to evaluate long-term changes in community structure of the nGOM in an attempt to link observed changes to environmental effects such as eutrophication and hypoxia. The large fishery-independent trawl dataset that covers inshore and offshore waters from Texas, Louisiana and Mississippi was incorporated into a geographical information system (GIS) to facilitate analyses. Non-parametric tests are being used to evaluate long-term changes in community structure among depth zones and areas of the coastal zone. Habitat suitability and preferences of key demersal nekton is being evaluated and used as an indicator of the relative vulnerability of each species to hypoxia. A Principal Component Analysis (PCA) of habitat preferences for various life stages shows that not all demersal species are equally likely to be vulnerable to hypoxia. A comparison of eutrophic ecosystems from around the world shows that the expression of eutrophication is also likely to differ among ecosystem and depend upon the physical and biological characteristics of the ecosystem and how the fauna use the habitat within a particular ecosystem. The effects of eutrophication in the northern Gulf of Mexico will be contrasted with other eutrophic systems from around the world and a hypothetical framework offered to explain some of the observed difference in the expression of eutrophication among ecosystems and likely consequences for fish and fish habitat.

**Questions and Discussion**

Q: Did you survey the public as to their reaction to the management options?

A (Paul Choucair): No, we didn't ask that in the management options.

Q: There was a slide on the relative abundance of snook, there are large error bars on the 1992 to 1997 data. Why is that?

A (Mike Murphy): The larger error bars are indicative that the model did not pick up on the trend of the relative index as well in those years.

Q: How do you come up with a two percent release mortality estimate?

A (Mike Murphy): We believe that is the lowest possible release mortality rate. We have done some experiments in tanks. It's pretty hard on them--the catch and release. We estimate that 90 percent of the total catch is released.

Q: Has anything happened to snook populations since the net ban in 1995?

A (Mike Murphy): We haven't seen that.

Q: Ken Leiber has had good success in raising snook. Are snook good candidates for restocking?

A (Mike Murphy): Spawning biomass indicates that fish are not replacing themselves or there is some environmental condition that is a bottleneck for their reproduction.

4:30           Adjourn Workshop for the Day

5:00           Evening Reception and Poster Session  
Hors d'oeuvres were served in the Clemente Center.

Friday, September 5, 2003

8:30 Case Studies in Estuarine Management  
Moderator: Kerry St. Pé, Barataria-Terrebonne National Estuary Program

***Sava Varazo, Florida Department of Environmental Protection & Robin Finkel, ERSO, Inc., "Project GreenShores, Habitat Restoration in Pensacola Bay"***

Due to a family emergency, these speakers were unable to attend the workshop.

***Peter R. Hoar, NOAA National Coastal Data Development Center, "Data access and management pertaining to fisheries and protected species habitat delineation"***

Peter Hoar reported that the goal of the National Coastal Data Development Center (NCDDC) coastal ecosystem program is to promote Internet access to data on coastal and marine organisms, their relationship to the environment, and their responses to natural and human impacts. Improved access to the coastal biological and ecological data record enhances our ability to use existing data for research and monitoring programs. Efficient data management, metadata, and data query also assists efforts to target new studies where comparatively little information exists, while helping to avoid duplication of past research. Since the coastal ecological data record is enormous, we chose to begin our efforts in the Gulf of Mexico region with national expansion to follow. Our current focus is on developing GIS for habitat mapping, both for managed fishery species and endangered species in the Gulf of Mexico and South Atlantic regions. In addition, we are working with scientists in the Gulf of Mexico region to develop Internet access focusing on data sets that are most likely to be used for on-going research and monitoring programs.

***R. LeRoy Creswell, Florida Sea Grant/ St. Lucie County, "The Gulf and Caribbean Fisheries Institute: A Regional Forum Dedicated to Fisheries and Marine Resource Management in the Caribbean and Gulf of Mexico"***

LeRoy Crestwell described the Gulf and Caribbean Fisheries Institute (GCFI). The GCFI was founded in 1947 to promote the exchange of current information on the use and management of marine resources in the Gulf and Caribbean region. From its beginning, GCFI has endeavored to involve scientific, governmental, and commercial sectors to provide a broad perspective on relevant issues, and to encourage dialogue among groups that often operate in relative isolation from one another. For 37 years, GCFI operated as an informal association under the sponsorship of the University of Miami. In 1985, with encouragement from the University, GCFI became an independent not-for-profit corporation formally dedicated to its original purposes. GCFI is governed by a Board of Directors elected by and from its membership. Because its program includes the entire Gulf of Mexico and Caribbean region, particular effort is made to ensure balanced representation from throughout the region in its annual programming and decision-making processes.

The primary activity of GCFI is its annual meeting devoted to technical presentations and workshops on current issues relevant to the use and management of marine resources in the Gulf and Caribbean region. These activities are documented in the annual Proceedings of the Gulf and Caribbean Fisheries Institute, which is received in more than 80 countries. Annual meetings are hosted by government, academic, or private sector sponsors in countries throughout the region. This presentation will review

recent topics presented at the annual GCFI Institutes and describe the program for the 56th GCFI to be held in Tortola, British Virgin Islands in November 2003.

***Gary E. Raulerson, Sarasota Bay National Estuary Program, "Fish Utilization of Several Natural and Restored Intertidal Habitats In Sarasota Bay, Florida, with A Comparison to Nearby Systems"***

The Sarasota Bay region lost approximately thirty-nine percent (39%) of its intertidal habitat to various activities during the 20<sup>th</sup> century. During the 1990's, the completion of over twenty (20) intertidal habitat restoration projects within the watershed began the attempt to regain some of the lost natural functions of the bay. However, no attempt to comprehensively assess the value of the created or restored habitat has occurred. Different estuarine habitat types within Sarasota Bay may differ in terms of utilization by fishery species considered commercially, recreationally or ecologically important. This project investigated the fish utilization of several restoration sites within the Sarasota Bay watershed and compared them with nearby natural sites. Sampling occurred at approximately forty (40) sites (restored and natural) within Sarasota Bay during Winter 2002 and Summer 2002.

During the three year period 1999 through 2001 of FIM-FMRI monitoring, Tampa Bay annual catch and effort varied from 404,637 to 429,891 animals collected in 564 seine hauls each year using a 21.3-m seine in shore-fringing habitats. In Charlotte Harbor, annual catch and effort varied from 106,974 to 393,924 animals collected in 384 seine hauls each year using a 21.3-m seine in shore-fringing habitats. For Sarasota Bay during 2002, a total catch of 310,208 animals was collected with less than half the effort (i.e., just 160 samples) than in adjacent estuaries and using equal or smaller sample areas over all gear deployment techniques in shore-fringing habitats. The species richness (i.e., total number of taxa collected) for all 21.3-m seine hauls during 1999 through 2001 FIM-FMRI monitoring varied from 110 to 119 taxa in Tampa Bay, and from 100 to 121 taxa in Charlotte Harbor. For Sarasota Bay during 2002, the total catch over all gear deployment techniques included 80 taxa in two sample seasons, winter and summer.

The comparison of natural and restored sites allows an estimation of the relative value of critical habitat types by reference to abundance and diversity of key guild species. The information acquired will be used in concert with newly created GIS data layers to help identify selected critical habitat types in terms of priority for protection and restoration. This long-term restoration plan will be partly based on considerations of fish community abundance supported by each critical habitat type and the proportion of historic and differential losses of each habitat type revealed through regional studies.

***Questions and Discussion***

Q: What does the PVC reef ball look like?

A (Gary Raulerson): Mr. Raulerson explained what the reef balls look like.

Q: Is the seagrass mapping up and available?

A (Peter Hoar): No, but the process is underway. The project file will be sent to the protected resources division by the end of the month. It may be up on the web by the end of the year.

Q: Regarding the Sarasota Bay reef balls—what habitat were you able to mimic?

A (Gary Raulerson): The reef balls do not mimic any specific habitat. They create new habitat that wasn't there before. Since it's impossible to replace mangrove

habitat that has been replaced by residential development, that habitat is permanently lost. The reef balls may support a different life stage of the fish that the mangroves did.

Q: Are you doing to incorporate other datasets from the National Estuary Programs (NEPs)? Are you linking only by metadata?

A (Peter Hoar): We are putting together a metadata catalog. The level of information will vary by program. What is in there will be determined on an organizational basis. Florida Marine Research Institute (FMRI) is well positioned, so we will probably have a link to them. Other organizations are less well prepared to have their data linked.

Q: Tampa Bay has a program for reef balls in front of hardened residential areas. Do you have similar plans for Sarasota Bay?

A (Gary Raulerson): Yes.

Q: Who obtains the permits for those reef balls?

A (Mark Alderson): We are considering applying for a blanket permit from the Army Corps.

Q: To LeRoy Creswell--who administers your scholarship fund for students? Where can contributions be made?

A (LeRoy Creswell): The main scholarship contact is Bill Dipp at Texas A&M. Or you can e-mail me for his contact information ([lcreswell@mail.ifas.ufl.edu](mailto:lcreswell@mail.ifas.ufl.edu)).

Q: Are you linking coastal mapping functions with National Ocean Service photography?

A (Peter Hoar): Yes, we are considering that. We are closely affiliated with the Naval Oceanographic Office as well as other institutions that are doing some very cutting edge stuff.

Q: What are the research funding sources for the non-U.S. territories in the Caribbean and Gulf?

A (LeRoy Creswell): There are a variety of sources. Mostly the funding comes from government, academic, or regional organizations.

10:00 Break

10:15 Marine Protected Areas and Habitats Areas of Particular Concern  
Moderator: Kerry St. Pé, Barataria-Terrebonne National Estuary Program)

***James A. Bohnsack, NOAA Fisheries , "Responses by Florida's coral reef and estuarine fish populations to no-take marine reserves"***

Several Florida studies have examined impacts of no-take zones on estuarine fishes at Cape Canaveral, and on reef fishes in the Florida Keys National Marine Sanctuary (FKNMS). After first five (5) years of no-take zone protection in the FKNMS, biologically and statistically significant ( $p < 0.05$ ) increases occurred in density of adult (exploitable phased) fishes, but not for two common, non-exploited, reference species, striped parrotfish (*Scarus iserti*) and stoplight parrotfish (*Scarus viride*). Yellowtail snapper (*Ocyurus crysurus*) increased four fold, black grouper (*Mycteroperca bonaci*) 28 fold, and gray snapper (*Lutjanus griseus*) eight fold in no-take zones compared to the pre-reserve baseline conditions. Significant region-wide recruitment events following 1998 and 1999 hurricanes that resulted in significant increases in adult black grouper and gray snapper outside reserves. However, the rate of change within reserves were still significantly higher than outside reserves. Likewise, studies at Cape Canaveral zones closed since 1962 show significant increases in fish diversity, abundance, and mean size within closed areas for exploited species. Following closure, the number of world record gamefishes landed in nearby areas increased significantly and currently include

half of the Florida IGFA records for spotted seatrout, and more than half of records for red and black drum. In conclusion, exploited fish stocks have been shown to benefit from no-take marine reserves.

***R. Grant Gilmore, Jr., Dynamac Corporation, "Cape Canaveral and Oculina Bank Marine Protected Areas: Impacts to Fisheries and Technologies for Assessment and Management"***

Historical and recent environmental assessment and research of Marine Protected Areas (MPA) at the Oculina Habitat Area of Particular Concern and the Kennedy Space Center (KSC), Merritt Island National Wildlife Refuge, and Canaveral National Seashore has produced a variety of positive and negative results on MPA management as it relates to regional fisheries resources. New technologies are needed to adequately address remote MPA management concerns. Integrated systems for physical and biological parameter monitoring and study include deploying innovative prototype technologies developed for space applications such as sensor webs from NASA's Jet Propulsion Laboratory, as well as new underwater acoustic tools developed by Navy and NASA KSC in collaboration with NOAA/OE/NURP/NMFS to assess aquatic biological activity in association with real time oceanographic and climatic data streams. The KSC environment offers a secure, protected technology development site, as well as high native biodiversity and unique oceanographic conditions. Environmental assessment systems developed at KSC, therefore, not only present potential model systems for deployment elsewhere, but also for the study of natural settings, ecosystems, and biological behavior at the Cape Canaveral-Merritt Island complex, Indian River Lagoon system, and adjacent reef formations of the Atlantic Ocean.

***Jonathan M. Shenker, Florida Institute of Technology, "Utilization of the Indian River Lagoon as an Essential Nursery Habitat by Tarpon (*Megalops atlanticus*)"***

The Indian River Lagoon (IRL) is an Essential Nursery Habitat for many fishes, including one of the most important sport fishes in the southeast United States: Tarpon (*Megalops atlanticus*). Tarpon spawn in offshore waters, and their larvae migrate through inlets into the IRL. Metamorphosing juveniles move into the stagnant upper marsh habitats surrounding the IRL. Identifying mechanisms that influence larval movement into and around the estuary, and natural and human influences on juvenile survival and growth, are critical for development of habitat and species management strategies.

We conducted extensive sampling of larval movement from the Atlantic Ocean into the IRL. We moored large plankton nets in Sebastian Inlet to collect daily samples of recruiting larvae for 100 consecutive days during two summers. Dramatic variability was observed in the magnitude and timing of recruitment. The greatest recruitment was associated with Hurricane Erin, a Category 1 storm that passed directly over Sebastian Inlet in 1995. Although sampling was not possible for 72 hours during and immediately after the storm, more larvae were captured during the next 5 days than were taken in the rest of the 2-summer study.

A simultaneous experiment was performed in 1995 on a 100 ha mosquito control impoundment adjacent to Sebastian Inlet. We periodically opened the culverts connecting the marsh to the lagoon, and successfully induced movement of metamorphic tarpon into their nursery habitat. These results show how managed

habitats can be manipulated to enhance larval utilization of these valuable nursery regions.

### ***Questions and Discussion***

Q: Have any of you ever made these presentations to the Florida Fish and Wildlife Conservation Commission? I think this information needs to be right in their face.

A (Jon Shenker): The Fish and Wildlife Conservation Commission has been very supportive. They funded the larval tarpon work we did. I have presented this information to them and they are aware of the results.

A (Grant Gilmore): They have also supported my work in the early 1990s. I would like to verbally present my recent results to them.

A (Jim Bohnsack): I would be happy to present this information to them.

Q: I have a question about the IGFA fishing records. Were there records from before the closure of the area? Have the total number of fishermen changed?

A (Jim Bohnsack): We have records since 1938, so they go fairly far back. All the species have been on record of a long period of time. Are there trends in fishing? Yes, there has been an increase in fishermen.

Q: A comment first--in Charlotte Harbor, Florida, concerning tarpon, we have a very cooperative arrangement for management among various agencies. This question is for Jim--if you have Marine Protected Areas, is it better to have large MPAs or more, smaller ones? How do you maximize their effectiveness?

A (Jim Bohnsack): That is a really good question that is difficult to answer. A bunch is probably better than one large one. You hedge your bets that way. That way, if there is a spill or a problem in an area, that isn't your only protected area.

A (Grant Gilmore): For certain species, like grouper, which have a large range for their life cycles you need more areas. It really depends on what species you are trying to protect.

Q: Has there been any work on closures on re-opened systems? Should the closed areas be rotated?

A (Jim Bohnsack): When we opened one area, eighty percent of the population was removed within one month--there was a "derby effect." For the long-lived species, opening an area puts them at risk.

Q: Are the recreational anglers the last group to resist Marine Protected Areas (MPAs)? Is there an effort to change that?

A (Jim Bohnsack): I do go and talk to them. The industry may have a different opinion than the individual anglers. I'm a recreational angler myself so I identify a lot with that group. We just have a lot more anglers now that we did in the 1950s.

Q: What were the factors considered in deciding the size and location of the no-take zones?

A (Jim Bohnsack): We originally recommended a fifteen to twenty percent of the total sanctuary area to be closed. That amount went down to one-half of one percent, based on public comment. It was a social/political process. As far as the size--all the areas were combined as a stratum.

A (Grant Gilmore): One thing I found in addressing angler groups is that you can't protect everything. You need to know a lot about the fish's life cycles to be able to set your protection priorities. Spawning areas are critical, for example.

A (Jim Bohnsack): Should you design an MPA for a specific species? I would say, "No." I disagree with Grant on this point. You have to manage for habitat and then, in theory, everything will be better. Protect your ecosystem.

A (Grant Gilmore): I agree with Jim totally—the ecosystem needs to be protected. But we need to protect those parts of the ecosystem that are critical for the life cycle of the fish.

12:00 Break for Lunch

12:30 Field Trip to the Indian River Lagoon Mangrove Marsh  
Host: Jon Shenker, FIT

Management of the interface between land and estuarine habitats can have dramatic impacts roles of those habitats. Those who joined us got a quick tour of one such interface – the mangrove marshes that line much of the Indian River Lagoon. Many of these marshes are managed to inhibit breeding of the salt marsh mosquito and to maintain their role as vital fish nurseries.

We went on a quick walking tour around the access road of a marsh, showing the natural and managed components of the marsh. We linked up with a fishery research program for demonstration of the unusual sampling techniques that can be employed to sample in this complex environment. Conference participants could hike or even join the fisheries sampling program.



Field trip photos by Robert Day.

## Posters

"Characterization of Water Quality, Oyster Reproduction and Health in the St. Lucie Estuary: A One-Year Monitoring Study," C. Wilson<sup>1</sup>, L. Scotto<sup>2</sup>, A. Volety<sup>3</sup>, J. Scarpa<sup>4</sup>, S. Laramore<sup>4</sup>, and D. Haurert<sup>5</sup>. <sup>1</sup>University of Florida/IFAS Indian River Research and Education Center, Fort Pierce, FL, 34945. <sup>2</sup>U.S. Fish and Wildlife Service, Vero Beach, FL, 32960. <sup>3</sup>Florida Gulf Coast University, 10501 FGCU Blvd, Fort Myers, FL 33965. <sup>4</sup>Harbor Branch Oceanographic Institution, Fort Pierce, FL, 34946. <sup>5</sup>South Florida Water Management District, West Palm Beach, FL, 33406.

"Downstream Effects of Altered Freshwater Inflow on Fish, Shrimp and Crabs of the 10,000 Islands Estuary of Southwest Florida," O'Donnell, P., Rookery Bay National Estuarine Research Reserve, Naples, Florida.

"Downstream Effects of Altered Freshwater Inflow on Shark Nurseries of the 10,000 Islands Estuary of Southwest Florida," O'Donnell, P., Rookery Bay National Estuarine Research Reserve, Naples, Florida.

"Fisheries-Independent Monitoring in the Gulf of Mexico and along Florida's East Coast," Ehlinger, G.<sup>1</sup>, Brodie, R.B.<sup>1</sup>, Leffler, D.<sup>2</sup>, Tremain, D.M.<sup>3</sup>, and Paperno, R.<sup>3</sup> Florida Fish & Wildlife Conservation Commission, <sup>1</sup>Florida Marine Research Institute, Jacksonville Field Laboratory, Jacksonville, Florida; <sup>2</sup> Florida Marine Research Institute, St. Petersburg, Florida; <sup>3</sup>Florida Marine Research Institute, Indian River Field Laboratory, Melbourne, Florida.

"Gray snapper, *Lutjanus griseus*: assessment of recruitment and growth in an east coast Florida estuary," Paperno, R.<sup>1</sup> and Colvocoresses, J.A.<sup>2</sup>, Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, <sup>1</sup>Indian River Field Laboratory, Melbourne, Florida and <sup>2</sup>South Florida Regional Laboratory, Marathon, Florida.

"Ichthyoplankton Community Structure of the Northern Indian River Lagoon Complex, Florida with Emphasis as to the Importance of an Estuarine No-Take Fisheries Reserve," Reyier, E.A., Dynamac Corporation, Kennedy Space Center, Florida. Shenker, J.M. Florida Institute of Technology, Melbourne, Florida.

"NOAA Restoration Center--Restoring Coastal and Marine Habitats," Macfarlan, D., NOAA Restoration Center, St. Petersburg, Florida.

"Sustainable Fisheries Campaign—Gulf Restoration Network," Davis, Sallie E., Gulf Restoration Network, New Orleans, Louisiana.

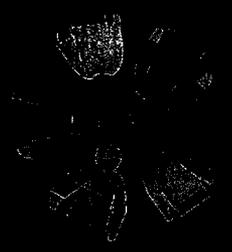
***Regional Fisheries Workshop-Speakers (22) and Registrants (60)***  
***Melbourne, Florida***

| <b><i>Last Name</i></b> | <b><i>First Name</i></b> | <b><i>Organization.</i></b>            | <b><i>City</i></b> | <b><i>State</i></b> | <b><i>ZIP</i></b> | <b><i>Phone Number</i></b> | <b><i>Notes &amp; E-Mail</i></b>                  |
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# **Community Culture and the Environment: A Guide to Understanding a Sense of Place**



**Theresa Trainor  
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*Community Culture and the Environment: Understanding a Sense of Place*



# Outcomes

- Community Definition
- Community Targeting
- Communication
- Coalition/Consensus Building:  
Partnerships
- Environmental Education  
Environmental Planning
- Public Participation
- Community Service  
Projects/Volunteers
- Resource Identification
- Sustainable Economic  
Development Strategies
- Goal Setting/Visioning
- Comprehensive Planning
- Information Gap Identification
- Indicators

# The Process

**Step 1: Pre-Project Planning**



**Step 2: Define Goals and Community**



**Step 3: Identify Community Characteristics**

**Assessment Questions**



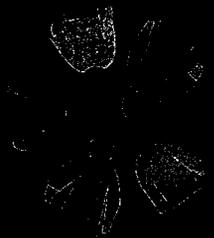
**Step 4: Identify Assessment Methods**



**Step 5: Analyze Results**

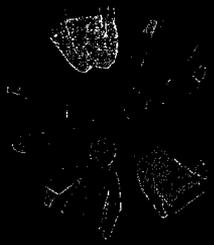


**Step 6: Select and Implement Best Strategies**



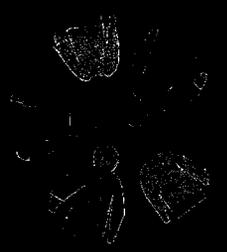
# Community Characteristics

- Community Boundaries
- Community Capacity and Activism
- Community Interaction and Information Flow
- Demographic Information
- Economic Conditions and Employment
- Education
- Environmental Awareness and Values
- Governance
- Infrastructure and Public Services
- Local Identity
- Local Leisure and Recreation
- Natural Resources and Landscape
- Property Ownership, Management and Planning
- Public Safety and Health
- Religious and Spiritual Practices



# Methods

- Background Research
- Census Data Research
- Content Analysis
- Environmental Values
- Typology
- Focus Groups
- Interviewing
- Maps and Geographic Data
- Meetings
- Observation
- Regional Economic Data Research
- Social Mapping
  - Asset
  - Cognitive
  - Concept
  - Social Network
- Surveys and Polls
- Visual Methods



# Indian River Lagoon NEP

## Goals for IRL:

- Enhance communication
- Build partnerships
- Consensus building
- Id of community perceptions and values

## Audience:

- Advisory Board members, staff, non-profits within IRL
- 25 participants



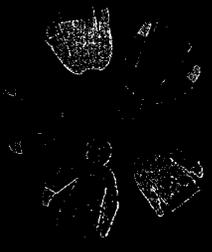
# Workshop Impact

- o Better understand resident's feelings about land acquisition issues.
- o Determine reasons for conflict between organization and community.
- o Develop new outreach programs.
- o Develop surveys regarding recycling.
- o Fine tune approach to problem resolution.



## Workshop Impact cont.

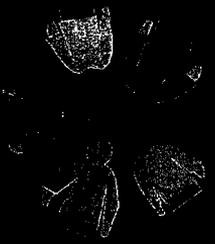
- o Further develop the WAV program.
- o Design NERRS training program.
- o Revise and re-issue surveys on vision for City of Satellite Beach.
- o Train-the-trainer program in IRL



# Indian River Lagoon NEP



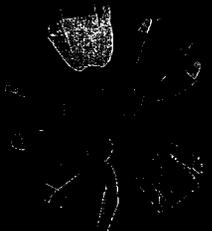
*Community Culture and the Environment: Understanding a Sense of Place*



# Indian River Lagoon NEP



*Community Culture and the Environment: Understanding a Sense of Place*



# Indian River Lagoon NEP



*Community Culture and the Environment: Understanding a Sense of Place*

# INDIAN RIVER LAGOON Update

Quarterly newsletter of the  
Indian River Lagoon National Estuary Program

Winter 2004  
Volume XII  
No. 1

## Inside this issue

- 1 **Lagoon House**  
Building to showcase lagoon history, beauty.
- 2 **A different kind of camp**  
Elected officials hit the water to learn about lagoon.
- 3 **Guest column**  
Group studies effect of causeways on waterway.
- 4 **Estuary Day**  
Event promotes estuary awareness.
- 5 **St. Lucie Estuary**  
Projects ranked for funding.
- 6 **Marine Discovery Center**  
Education facility to expand.
- 7 **Stormwater park**  
New ponds to treat storm water.
- 8 **Partnership directs program**  
What the lagoon program is all about.

### About the photo:

Construction workers put the finishing touches on the Lagoon House prior to its opening in early 2004.



Ed Garland

## Lagoon House to showcase estuary

Four centuries ago, Ais Indians patrolled this ragged escarpment to watch for approaching Spanish ships in the Indian River Lagoon.

It is a fitting site for the Lagoon House, a new landmark off of U.S. Highway 1 in Palm Bay designed to serve a multitude of roles in the lagoon region.

Exhibits showcased within the 6,400-square-foot building will highlight the historical, archeological, cultural, natural, scenic and recreational resources available throughout the lagoon area. The \$1.1 million building will also function as a welcome center to the Indian River Lagoon Scenic Highway.

Visitors can learn about the Ais Indians, who met Ponce de Leon when he discovered Florida, and see an actual example of a historic Indian midden — a refuse pile of ancient artifacts left behind by indigenous people in the region. There will be information about

the biodiversity of the lagoon — the most diverse estuary in North America — and the steps being taken to preserve it. The development of the Lagoon House exhibits may be partially funded through a donation from the Tomlinson family, former owners of the property where the Lagoon House is located.

In its role as a Scenic Highway Welcome Center, the facility will offer information on dozens of destinations dotting the lagoon corridor, and how to best experience them. One of Florida's nine designated scenic highways, the highway links natural areas along the lagoon — three national wildlife refuges, a national park, a state park and numerous county and city recreational facilities.

City officials are anxious for the grand opening, slated for early 2004.

“The Lagoon House has been a model for interagency cooperation,”

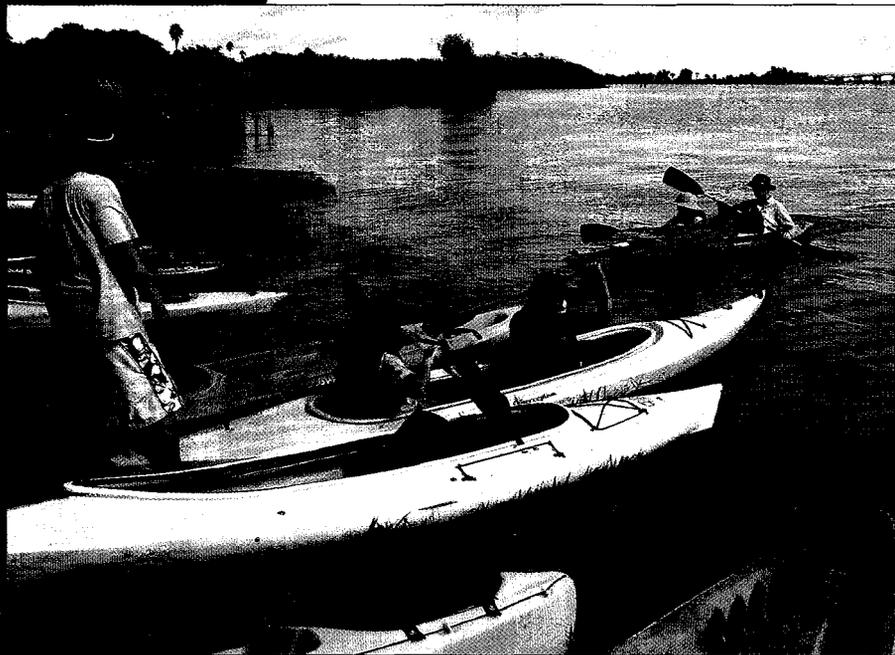
*See Lagoon House on Page 5*

# Hundreds attend inaugural National Estuary Day event

A concrete canoe? It may sound like an oxymoron or the name of a rock band, but sure enough, the Florida Institute of Technology displayed a glossy black model at the first-ever National Estuary Day Festival on Sept. 27 at Riverview Park in Melbourne.

Every fall, the National Estuarine Research Reserve System (NERRS) and the National Estuary Program (NEP) host a variety of recreational and educational activities in local communities across the country. This year, the Indian River Lagoon program joined forces with the Brevard County Regional Stormwater Utility Department and several other agencies to host a bash of its own.

Part of the day's events at the National Estuary Day Festival included a tour of the lagoon by canoe.



Ed Garland

Tens of millions of dollars in the local economy can be traced to the lagoon in the form of commercial and recreational fishing, property taxes and eco-tourism. Yet many people are unaware that the lagoon is not, as the name suggests, a river at all. This brackish water body is, in fact, the most diverse estuary in North America and home to 32 threatened or endangered species, some found nowhere else on the planet.

"We were thrilled with the turnout for this first-time event," says Gayle Hoffman, lead organizer and public education and outreach coordinator for the county's regional stormwater utility department. "Our goal was to provide educational and hands-on activities that illustrated how to enjoy the lagoon without negatively impacting it."

The array of activities included kayaking and kiteboarding demonstrations, water sampling and casting demonstrations, environmental exhibits and ecological tours. Activities for children included face painting by Brevard Zoo teen volunteers, nature scavenger hunts and a touch-tank brimming with horseshoe crabs and other creatures native to the lagoon.

The event also provided a venue to launch the "What's An Estuary? Now You Know" National Education and Outreach Campaign. This ambitious program aims to make "estuary" an everyday household word, like "river" and "ocean," by the year 2005. Want to learn more? Visit the campaign's Web site at [www.whatsanestuary.com](http://www.whatsanestuary.com).

## Lagoon license plate funding available in 2004

The St. Johns River Water Management District announces the availability of funds from the Indian River Lagoon License Plate Program for competitive proposals implementing "turn dirt" habitat and water quality improvement projects in Volusia, Brevard and Indian River counties.

The application, program guidelines and policies are accessible on the District's Web site at <http://irl.sjrwmd.com>. The deadline for submitting an application is March 5, 2004.

For more information, contact the lagoon program office at (800) 226-3747.

**Restore a Florida Treasure**

**Hook up now at your local tag office**



To learn more about the Indian River Lagoon, please visit the following Web sites:

<http://irl.sjrwmd.com>

[www.sfwmd.gov/org/exo/mlsc/irl/index.html](http://www.sfwmd.gov/org/exo/mlsc/irl/index.html)

<http://www.epa.gov/owow/estuaries/programs/irl.htm>

# Issues Team selects 10 projects to help St. Lucie Estuary

The South Florida Water Management District has budgeted \$2 million this year to enable the St. Lucie River Issues Team to identify short-term projects to improve water quality in the St. Lucie Estuary.

The South Florida Ecosystem Restoration Task Force created the St. Lucie River Issues Team after severe ecological impacts to the St. Lucie Estuary occurred in 1998 due to El Niño rains and necessary freshwater releases into the estuary. The team's 18 members include scientists, engineers and water quality experts from government and agriculture, and environmental interests and private individuals.

Each project funded requires a 50 percent match from the local sponsor. The projects are ranked by the team based on three basic criteria: dollar value, readiness and local commitment.

In order of their ranking, the current fiscal year projects are:

- Environmental enhancement program, city of Port St. Lucie
- Citywide "baffle box" (sediment trap) retrofit program, city of Stuart
- St. Lucie Estuary tributary monitoring, located in Martin and St. Lucie counties
- Water quality enhancement best management practices, Troup Indiantown Drainage District
- Manatee Creek Basin water quality retrofit, Martin County
- Coral Gardens Basin water quality retrofit, Martin County
- Town of Ocean Breeze sediment traps, Martin County

- Upper East Coast Watershed Symposium, to be held Jan. 7–9, Marriott Resort, Hutchinson Island
- Phase two of Florida Oceanographic Society's mosquito impoundment restoration

The Issues Team is currently reviewing 24 additional water quality enhancement projects for fiscal year 2004–2005.

These projects, likewise, are designed to improve the quality of water flowing into the St. Lucie Estuary and the Indian River Lagoon and improve the health of the waterways.

To date, the Issues Team has funded more than 87 projects totaling \$57 million — which includes local sponsors' matches — in Martin and St. Lucie counties and their municipalities.

"Creating partnerships has been integral to the success of our mission," says Kathy LaMartina, the team's project manager with the South Florida District. "Many of these projects are moving forward quicker than they would without this funding."

To find out more about the Issues Team, contact LaMartina at [klamart@sfwmd.gov](mailto:klamart@sfwmd.gov) or call (772) 223-2600, ext. 3603.



South Florida Water Management District

The Salerno Creek retrofit — located a quarter mile from Manatee Pocket (an area of special concern in the lagoon) in Martin County and east of U.S. Highway 1 and west of State Road A1A — is proposed to improve water quality in the lagoon by capturing runoff from the 780-acre drainage basin and routing the water to a detention facility for treatment prior to possible wet-weather discharge.

## Lagoon House *Continued from Page One*

says Sue Hann, Palm Bay's deputy city manager. "The idea was conceived by Ted Moorhead, chairman of the Indian River Lagoon Scenic Highway Coalition. Not only did Ted initiate the Scenic Highway Coalition, which would allow the city to obtain federal scenic byway funding for the project, he also served on the Florida Inland Navigation District (FIND) Board, which provided additional financial support." Ted Moorhead was the recipient of the annual National Estuary Program's Indian River Lagoon Leadership Award in 2003 due, in part, to his vision for the Lagoon House and the scenic highway.

The Florida Department of Transportation's Scenic Highway Program, the Florida Department of Environmental Protection, the Indian River Lagoon National Estuary Program and the city of Palm Bay also participated in funding the project. The St. Johns River Water Management District and the Florida Department of Community Affairs' Florida Communities Trust Fund Program participated in the initial purchase of the properties where the Lagoon House is sited, as well as the preservation areas to the north and south of the building.

## Marine Discovery Center to expand

At first look, a former wastewater treatment plant may seem an unorthodox structure for an environmental education facility, but consider the location: a waterfront parcel surrounded by acres of pristine mangrove habitat in the Indian River Lagoon.

For two years, the Marine Discovery Center in New Smyrna Beach has introduced people of all ages to the wonders of the lagoon by immersing them in its estuarine environment.

Bruce Jailldagian, founder of the center, espouses a philosophy of hands-on learning as a means of connecting people to their surroundings. "Rather than capturing, containing and feeding marine specimens for display, we'd rather bring students out to the lagoon and let them get their hands wet," he says. "The emphasis is really on the kids. If kids see how it all fits together and how fragile the lagoon is, they'll carry that with them forever."

The heart of the educational program is a 40-passenger pontoon boat offering wildlife, history and sunset cruises. In the past two years, Jailldagian estimates his crew has led between 400 and 500 tours. It is a true grassroots project, supported by a staff of three and many volunteers.

Greater things are on the horizon, however. In October, the center broke ground for a new \$500,000 pavilion that will feature a conference

center and a wet lab for marine studies. The new addition should be completed by December 2004. Meanwhile, the bird rehabilitation center, which has already treated more than 400 birds, will also undergo an expansion.

"I'd say that 75 percent of the birds we treat suffered problems with entanglement with fishing lines," Jailldagian says. "Pelicans, especially, get mixed up with fishermen and their lines."

The center's staff has a gift for making the most out of what they have. For now, the old wastewater treatment plant buildings serve as an office, a lab and classrooms. An old concrete chlorine tank has been converted into a touch-tank replete with about 25 species of crab, fish and stingrays. The exterior walls of the building are covered with murals of fish and mangroves, fashioned by Jailldagian's boat crew.

"We do everything on the cheap," he says proudly. "Everything you see is a grassroots effort. We're truly fortunate to have so many wonderful volunteers."

The center has received support from the Florida Inland Navigation District (FIND), the Ponce Inlet Port Authority, the Indian River Lagoon License Plate Program, and local businesses.

Jailldagian is excited about the center's growth. He has watched the summer camp program

flourish from a single camp of nine children to five camps totaling 72 children last summer. The winter hiring of a teacher will allow the center to double the number of students reached.

"Camp can be the highlight of their lives," he says. "It can influence their career choices. About one third of the kids I talk to want to be marine biologists. That's encouraging!"

For more information about the Marine Discovery Center, call (386) 428-4828 or visit [www.marinediscoverycenter.org](http://www.marinediscoverycenter.org).

Bruce Jailldagian, Marine Discovery Center founder, introduces students to the lagoon through educational experiences on this pontoon boat.



Ed Garland

## This park will be hard at work — cleaning storm water

Just south of Collier Creek Estates in Sebastian, the largest remaining undeveloped site in Sebastian is undergoing a transformation.

Earth-moving equipment is reshaping the land into a 166-acre regional stormwater park, a joint effort between Sebastian and the St. Johns River Water Management District. The \$2 million project is designed to pump storm water to treatment ponds before it reaches the Indian River Lagoon.

“The chief goal is to reduce the amount of pollutants and freshwater being discharged to the Sebastian River and the lagoon,” says Ralph Brown, a District engineer. “The park will capture 1,400 acres of urban stormwater runoff that currently receives no treatment.”

Runoff from the Sebastian watershed will flow through a series of four treatment ponds of varying sizes constructed at the park. Sediments and suspended solids will settle out to the bottom of the ponds, the largest and final pond in the chain being a 60-acre historical wetland surrounded by a berm. The treated water will then return to Collier Creek and, ultimately, to the lagoon.

Stormwater treatment is just half of the story. The site will also provide passive recreation through nature trails and picnic areas and include educational displays about the harm stormwater runoff causes to water bodies and the mechanics of treating polluted water.



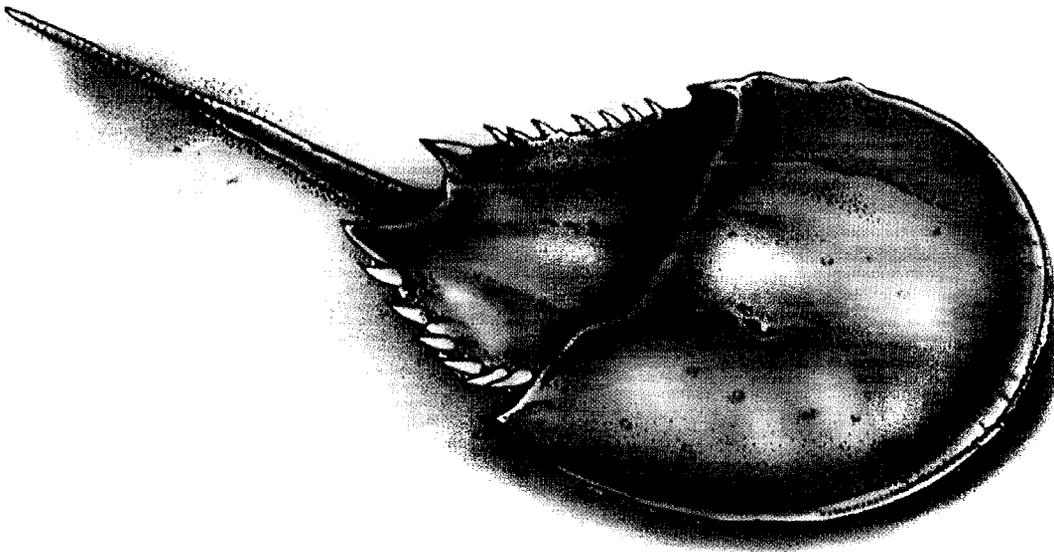
Ed Garland

A sign posted at the construction site highlights the protected species that call the park home. These include the gopher tortoise, scrub jay and indigo snake.

“You’ll be able to walk along the berms surrounding the larger ponds and along trails through the oak hammock,” Brown says. “It’s a beautiful piece of property.”

Most of the project will be finished in May, but the largest pond will require additional time due to the amount of dirt to be excavated. An outside contractor will pay the District \$95,000 to remove the dirt within two years, although Brown estimates that the excavation work will be done in about half that time.

Work is progressing at this 166-acre site in Sebastian where storm water will be treated to remove pollutants before the water reaches the Indian River Lagoon.



## Indian River Lagoon Update

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For additional information about the Indian River Lagoon Update or the lagoon program, please call Ed Garland, regional communications coordinator, at (321) 676-6612.

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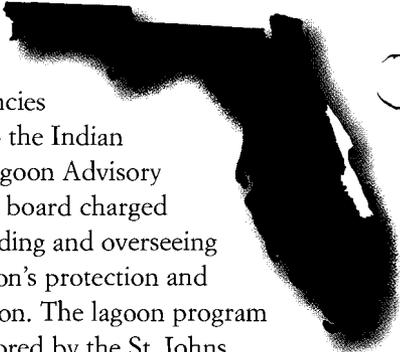


## Partnership directs program

The Indian River Lagoon National Estuary Program is a partnership whose members work to improve the water quality and ecological integrity of the 156-mile-long estuary on Florida's east coast.

The U.S. Environmental Protection Agency (EPA) designated the lagoon as "an estuary of national significance" in April 1990 and included the lagoon in the National Estuary Program.

The lagoon program began in April 1991, with oversight and funding from EPA. The St. Johns River and South Florida water management districts, the five counties that border the lagoon — Brevard, Indian River, Martin, St. Lucie and Volusia — and representatives of state, federal and regional governments



and agencies make up the Indian River Lagoon Advisory Board, a board charged with guiding and overseeing the lagoon's protection and restoration. The lagoon program is sponsored by the St. Johns District and is housed at the District's Palm Bay Service Center.

The St. Johns District oversees lagoon work in Brevard, Indian River and Volusia counties. The South Florida District oversees lagoon work in Martin, Okeechobee and St. Lucie counties.

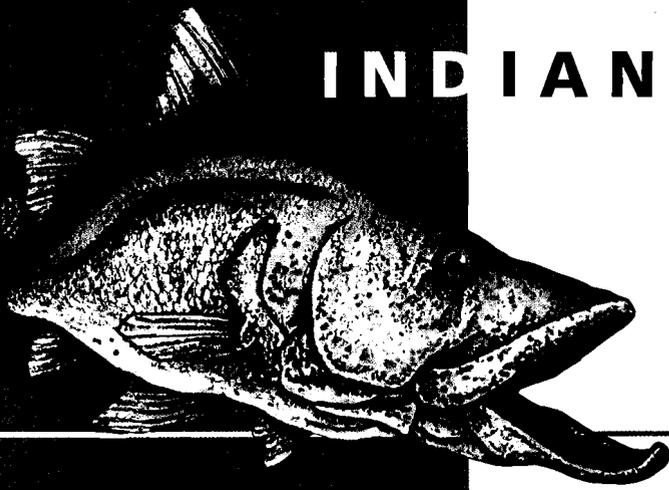


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# Update

Quarterly newsletter of the  
Indian River Lagoon National Estuary Program



Fall 2003  
Volume XI  
No. 4

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## National campaign launched to raise estuary awareness

What's an estuary?

It's one of those ten-dollar words that isn't usually bandied about during the course of everyday conversation. No, it's not a type of French cuisine or a member of the woodwind family.

Here's a hint: An estuary is that rare and special place where freshwater meets salt water. This protected body of water, often partially enclosed by reefs, barrier islands or fingers of land, is distinct from all other places on Earth. In fact, it is irreplaceable. Estuaries are the most productive ecosystems on Earth, containing more life per square inch than the richest farmland or deepest forest.

There are more than 100 estuaries in the United States that are home to tens of thousands of fish, birds, mammals, unique plant communities and more than 110 million people. Seventy

percent of the entire United States' population visits an estuary every year.

People and wildlife love estuaries for their many beautiful and diverse habitats, including sandy beaches, freshwater and saltwater marshes, rocky shores, shellfish beds, mangrove forests, river deltas, seagrass meadows and wooded swamps.

What's an estuary? Now you know.

National Estuary Day (Sept. 27) marked the launch of a nationwide campaign to make "estuary" an everyday household word, like "river" and "ocean," by the year 2005. The Association of National Estuary Programs (ANEP), which includes the Indian River Lagoon program, and the National Estuarine Research Reserves System are partners in this ambitious project.

The "What's An Estuary? Now You Know" National Education and Outreach Campaign is being designed to be seen by millions across the country and to involve a critical mass of individuals, organizations and businesses to create public awareness about what an estuary is and why it's important to protect.

Join the lagoon program, ANEP and others to help spread the "estuary" word. For more information, access the campaign's Web site at [www.whatsanestuary.com](http://www.whatsanestuary.com).

**WHAT'S AN ESTUARY? NOW YOU KNOW.**

*When you mix the fresh water of a river with the salt water of the sea, something wonderful happens...*

*As if by magic, a life-supporting habitat is created for thousands of species of fish, birds, and mammals.*

*It's called an estuary.*

*This protected body of water, often partially enclosed by reefs, barrier islands or fingers of land, is distinct from all other places on earth. In fact, it is irreplaceable.*

*Not only estuaries are the most productive ecosystems on earth, containing more life per square inch than the richest farmland or deepest forest.*

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**CAMPAIGN OUTREACH TOOLS**  
The nationwide "What's An Estuary? Now You Know" campaign is seeking individuals, organizations and businesses to help spread the word. Contact the Campaign Outreach Director at [outreach@whatsanestuary.com](mailto:outreach@whatsanestuary.com) for more information.

Home | Contact Us | 800.933.6363 | Ecosystem Inc.

## DockWatch needs volunteers to watch for jellyfish

A new volunteer program will enable the public to help report sightings of an exotic invader in the Indian River Lagoon.

DockWatch is transforming lagoon users into watchdogs for science. The program, funded through a \$40,000 U.S. Environmental Protection Agency grant, will help scientists improve their understanding of the seasonality and distribution of spotted "jellies" in the lagoon. DockWatch was founded by Dauphin Island Sea Lab in Alabama.

Volunteers receive monitoring kits that enable them to submit vital information such as water temperature and salinity during a sighting to the DockWatch Web site.

"This Web site will help the public serve as a second set of eyes for scientists studying jellies in the lagoon," says Troy Rice, Lagoon Program director. "In addition, the program will explain how nuisance species like spotted jellyfish impact both the ecology and economy of coastal estuaries." So far, more than a dozen people have signed up to become volunteers. Rice is hopeful that others will join the ranks as word of the fledgling program spreads throughout the lagoon's 156-mile-long watershed.

In addition, the St. Johns River Water Management District is distributing thousands of jellyfish identification cards to the public. The wallet-size cards include a color photo of an Australian jelly, a synopsis of its arrival and resulting harm in Florida's waters, and contact information.



During the past two summers, the Australian spotted jellyfish has made brief appearances in the lagoon, raising concerns among scientists that this voracious eater could permanently adapt to the lagoon's marine environment. So far, no jellies have been sighted in the lagoon this year.

The spotted jellies, *Phyllorhiza punctata*, made headlines several years ago when they appeared in the Gulf of Mexico, causing problems in the nets of shrimp boats and consuming huge numbers of fish eggs, larvae and other microzooplankton.

Concern about the predatory nature of the jellies turned to the lagoon when a handful were spotted there during the summer of 2001. Another was found the following summer.

For more information, visit DockWatch online at <http://dockwatch.disl.org>.



A newly developed card gives visitors to the lagoon region a credit card-sized reference sheet to help locate the exotic Australian jellyfish.

## Director's column

### Task Force to tackle wildlife health issues

Over the past several years, there has been increasing concern over the number of wildlife-related disease and mortality events in the Indian River Lagoon, and speculation that these events are a symptom of a wider-scale problem regarding the overall "health" of the lagoon system.

Despite considerable progress and success during the past two decades in rehabilitating impounded wetlands as habitat and improving water quality conditions in the lagoon, a number of fairly recent, possibly interconnected wildlife-related mysteries remain unsolved.

These mysteries include the skin disease fibropapillomas on lagoon dolphin and a high occurrence in 2001 of dolphin mortalities, increased incidents of clam tumors coupled with low levels of hard clam recruitment and an occurrence of odd "spicy" tasting clams in 2000, increasing reports of lesions on fish and fish kills, the disappearance of large numbers of horseshoe crabs, tumors on sea turtles, saxitoxins in puffer fish and related illnesses in 2002, and the appearance of invasive species such as the Australian spotted jellyfish, *Phyllorhiza punctata*, in the central lagoon and the exotic *Caluerpa brachypus* macroalga in the southern portion of the estuary. All of these occurrences dictate our need to understand these complex problems and determine if a commonality of cause exists and how we might prevent or reduce future occurrences.

The Indian River Lagoon Program, under the direction of the lagoon Advisory Board, in cooperation with the Florida Fish and Wildlife Conservation Commission's (FWC) Florida Marine Research Institute and the St. Johns River and South Florida water management districts, is forming an Indian River Lagoon Task Force.

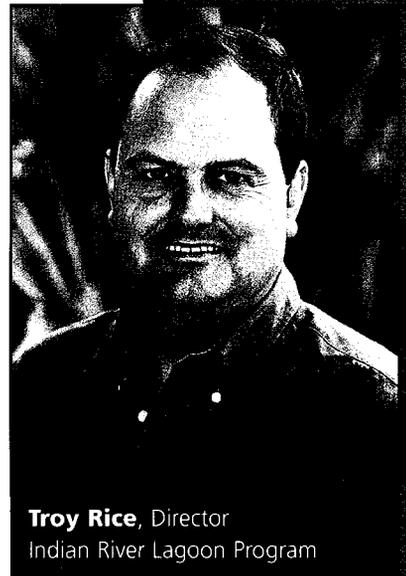
The task force's goals will be to integrate monitoring and research results, prioritize issues for additional investigation, determine if a common connection exists between these health-related issues and recommend comprehensive management actions to address these problems through the establishment of a multitasked academic and agency group of researchers and scientists.

FWC has already successfully used this approach with the establishment of the Harmful

Algal Bloom Task Force that has been investigating the occurrences of algal blooms and red tide throughout Florida's coastal waters. In fact, this task force has named an advisory panel that is already investigating *Caluerpa brachypus* in the lagoon. This effort will provide a foundation for the establishment of the lagoon task force and will be coordinated with numerous ongoing research projects being conducted by federal, state and local environmental agencies and nonprofit organizations, with funding from the U.S. Environmental Protection Agency (EPA) through the National Estuary Program.

The formation of a task force was first called for in February 2003 during the "Indian River Lagoon: An Estuary In Transition" conference hosted by The Nature Conservancy and the Marine Resources Council. Emphasizing that scientists working with limited budgets from various agencies and organizations have been investigating what appeared to be unrelated incidents of animal diseases and deaths in the lagoon for a number of years, and in most cases haven't been able to establish definite answers to these incidents, the conference's participants concluded the importance of looking at all of these things together in the big picture.

The first meeting of the Indian River Lagoon Task Force is planned for this fall and will begin the process of taking a holistic look at past events to help us all begin to understand the complexity of these problems and if a linkage can, in fact, be established among these mysterious maladies.



**Troy Rice**, Director  
Indian River Lagoon Program



## Symposium addresses a 'watershed in transition'

Who is responsible for protecting and restoring the St. Lucie Estuary and the Indian River Lagoon? The roster includes everyone from elected officials and scientists to government agencies and concerned citizens.

The "Watershed in Transition 2004" Symposium, Jan. 7-9, 2004, will bring together representatives and participants from each of the governmental and private entities conducting programs on watersheds and receiving water bodies in Martin and St. Lucie counties. The symposium will be a report by the various entities on their activities and status of efforts to protect and preserve the watershed — the St. Lucie Estuary and the lagoon.

The collection of symposium information will be used to:

- Benchmark the status of the knowledge, understanding, programs, projects and activities as they relate to watershed resource protection and enhancement
- Reinforce the link between land use and activity impacts and the ultimate achievement of long-term public goals for the estuary and the lagoon
- Inform stakeholders of progress toward preservation and restoration objectives and future outlook

The symposium will be held at the Marriott Resort on Hutchinson Island near Stuart, Fla. Symposium topics include Environmental Education/Outreach, Watershed Best Management Practices, Watershed Assessment, Comprehensive Everglades Restoration Plan (CERP), and Economics and Environmental Enhancement.

Tentative plans include an "environmental education" social gathering on the evening of Jan. 7, 2004, to showcase the different environmental education programs available to local teachers. The second day will offer a plenary session devoted to the overall status of the six symposium topics. The third day will include concurrent sessions devoted to specific focus break-out sessions relating to each of the six symposium topics. Invited speakers for both the



South Florida Water Management District

plenary and concurrent sessions will include governmental and private stakeholders.

The St. Lucie Estuary and southern Indian River Lagoon provide aesthetic values, economic incentives and recreational opportunities for Martin and St. Lucie counties which directly affect the counties and their residents. A major issue for both of these water bodies is how to develop an integrated management process that avoids conflicting rules. The list of environmental decision-making bodies is lengthy, with participation by nearly every federal, state and local agency with responsibilities in water management, coastal zone management, endangered species regulation, fisheries regulation and environmental protection.

For more information or for a complete format of the symposium, please contact Boyd Gunsalu of the South Florida Water Management District's Martin/St. Lucie Service Center at (772) 223-2600, Ext. 3606, or e-mail at [bgunsalu@sfwmd.gov](mailto:bgunsalu@sfwmd.gov).



The St. Lucie Inlet  
from a bird's eye view.

To learn more  
about the Indian River  
Lagoon, please visit the  
following Web sites.

<http://irl.sjrwmd.com>

[www.sfwmd.gov/org/  
exo/mslsc](http://www.sfwmd.gov/org/exo/mslsc)

[http://www.epa.gov/  
owow/oceans/lagoon](http://www.epa.gov/owow/oceans/lagoon)

## Lagoon Blueway expands by two parcels

Two more jewels have joined the chain of protected waterfront lands known as the Indian River Lagoon Blueway.

The St. Johns River Water Management District's Governing Board this summer approved the purchase of slightly more than 30 acres of impounded tidal marsh and uplands in Indian River County.

Situated near Wabasso and Winter Beach, the land consists of two noncontiguous parcels about one-half mile south of Wabasso Road, on the western shore of the lagoon.

The two parcels are environmentally valuable lands and include four acres of impounded (blocked off) wetlands that will be reconnected to the lagoon. Culverts will be installed to recreate the connection between the marsh and the open water estuary, thereby maximizing the use of the marsh by fish species requiring access to wetlands during a portion of their life. In addition, the water levels in the impoundments can be manipulated to benefit wading birds during nesting season.

"Decades ago, thousands of acres of wetlands along the lagoon's shoreline were impounded and flooded to help control the mosquito population," says Troy Rice, Indian River Lagoon Program

director. "The reconnection or restoration of more than 27,000 acres of impacted wetlands has helped to enhance the lagoon's diversity in plants, fish and wildlife. Estuarine ecologists have documented that an isolated impoundment may harbor six to 10 species of fish, but as many as 90 different species often can be found in a reconnected or restored impoundment."

The District purchased the 30 acres in Indian River County from The Nature Conservancy for \$72,971 — a bargain when one considers that the appraised value was \$633,000 in 2001. The purchase amount was to cover The Nature Conservancy's costs incurred for appraisals and other fees.

This newest acquisition comes in the wake of a legislative mandate to bolster efforts to buy and preserve environmentally endangered lands along the lagoon. Last winter, the Acquisition and Restoration Council of the Florida Department of Environmental Protection (FDEP) promoted the Indian River Lagoon Blueway Project to the Florida Forever Group "A" funding list. The designation makes millions of dollars in state funds available to help acquire land along the lagoon or "blueway" corridor from willing sellers.

Looking south from the Wabasso Causeway, one can see the undeveloped shoreline of the Indian River Lagoon Blueway. Two parcels were recently added in this region.



Ed Garland

## Rockledge takes a lead in stewardship

As Ken Poole sees it, improving water quality in the Indian River Lagoon goes hand in hand with improving flood protection in his city. Poole is the assistant director of Public Works for the city of Rockledge, Brevard County's oldest city, located on the western shore of the lagoon.

"The city of Rockledge has two major stormwater treatment facilities under construction," Poole says. "We're not only improving flood protection in our older sections of town, but we're effectively treating storm water before it reaches the St. Johns River and the Indian River Lagoon."

In the city's northwest, Public Works is creating a 60-acre stormwater treatment facility, where future plans call for providing recreational opportunities for the public. The facility was named Robert A. Anderson Park and is a tri-party agreement with Brevard County, Cocoa and Rockledge. All three governmental agencies will benefit from the stormwater treatment park.

"The city of Cocoa is finalizing plans to put a pump station at the facility," Poole says. "Cocoa will be able to use the treated storm water as a source of irrigation."

A similar project is unfolding in the city's northeast section at Barton Park, where a lake will treat the storm water flowing from an 800-acre urbanized area.

"Most of the older neighborhoods predate the regulations that are now in place to protect the

lagoon from untreated storm water," Poole explains. "This project will remedy the problem of storm water flowing from these neighborhoods directly into the lagoon."

Because the Barton Park project required the use of wetlands, the city partnered with Brevard County to buy 115 acres for wetland mitigation. The project is called the Faulk Canal project and will include the removal of invasive plant species. The stormwater treatment facility will have a conservation easement that will ensure the perpetual protection of pristine wetlands on the property.

Plans for the Levitt Stormwater Park are in the engineering/design phase. The city purchased this property just east of Fiske Boulevard and south of the Levitt Park entrance that will serve as a recreational area, as well as provide stormwater treatment and reduce the amount of flooding for the upstream residents. This project will take freshwater out of the lagoon and redirect storm water to the St. Johns River Basin.

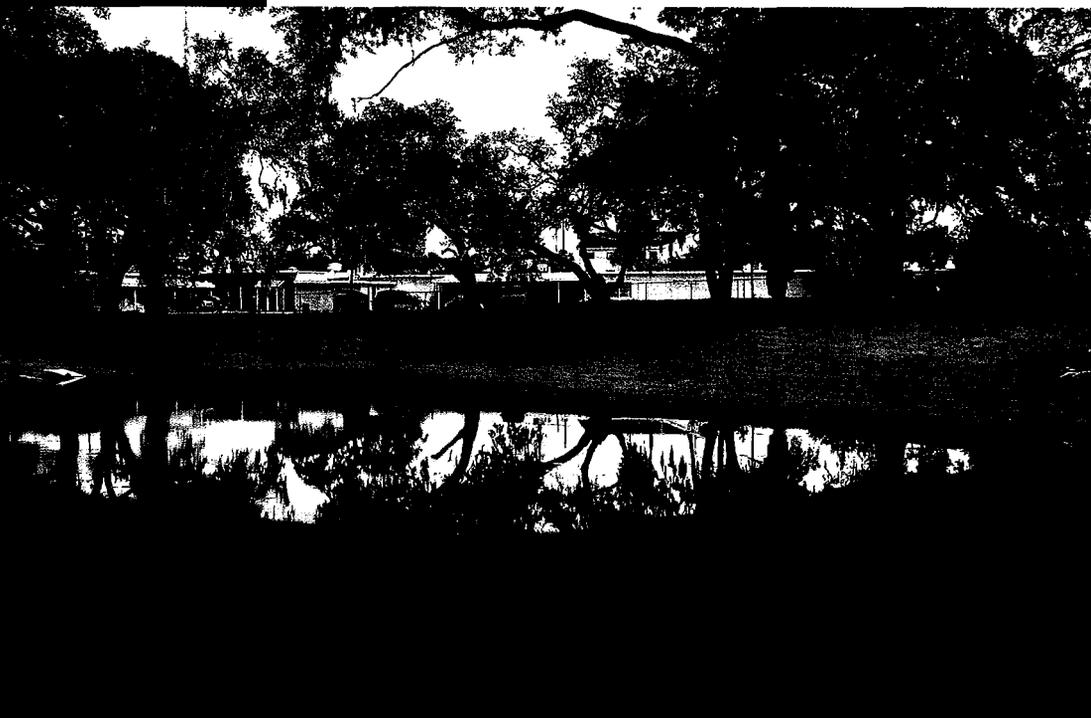
On the east side of U.S. Highway 1, the city has entered a partnership with the city of Cocoa and established the Morris Stormwater Park. This park is completed and treats storm water from approximately 40 acres from both cities.

Rockledge hasn't overlooked smaller improvements either. The city has already installed three sediment traps to catch pollutants before they reach the lagoon and a fourth is in the planning stages.

The city's Public Works Department serves as a model for environmental stewardship. The Public Works heavy equipment breakdown area is fitted with a state-of-the-art filtration system that absorbs oils and other chemicals that might otherwise wind up as surface water pollutants.

"We were the first city in Brevard County to install the filter baskets, according to the manufacturer, Eco Sense," Poole says. "We are doing our best to operate the city's facilities without harming the environment."

The Morris Stormwater Park is one of several stormwater treatment facilities in the city of Rockledge. The parks improve water quality in the Indian River Lagoon.



Ed Garland

# Resurrecting the marshes of Pine Island

In the 1960s, Kennedy Space Center and its support industries fueled a population boom on Merritt Island. At that time, even environmentally sensitive lands were fair game for what was then considered urban “improvement.”

One such spot was a 50-plus acre salt marsh on the western fringes of north Merritt Island. A canal was dug to provide boat access to the Indian River Lagoon, and the excavated spoil material was pumped onto the adjacent marsh to provide high, dry land for the planned suburban enclave.

The grand plans were never realized, and the land eventually became part of the St. Johns River Water Management District’s 850-acre Pine Island Conservation Area.

Now, the District is partnering with the Brevard County Parks and Recreation Environmentally Endangered Lands (EEL) Program to restore the salt marshes in what may be the largest restoration project of its kind in the lagoon’s 156-mile-long watershed.

“At one time, this land had been a pristine salt marsh,” says D. Scott Taylor, EEL central regional land manager. “One of our first restoration goals was to remove the fill and grade the land to salt marsh elevation.”

The first phase of the project encompasses 10 acres and required the removal of thick clots of invasive Brazilian pepper trees that dominated the landscape. Then came the temporary storage and removal of roughly 50,000 cubic yards — nearly 3,000 dump truck loads — of spoil material.

“It took a month and a half to clear 50 acres of pepper trees,” Taylor says. “It was just solid pepper. They had really gained a foothold, forcing out native plants.”

Crews were also saddled with the task of scraping down spoil mounds — nine feet high in some instances — to the level of nearby salt marshes.

The real test will come this fall, when tides rise and cover the land in water for the first time in more than 35 years, Taylor says.

“Thriving salt marshes adjacent to the project will serve as our benchmark to measure success,” he says. “Hopefully, we’ll see marsh plants sprouting by spring.”

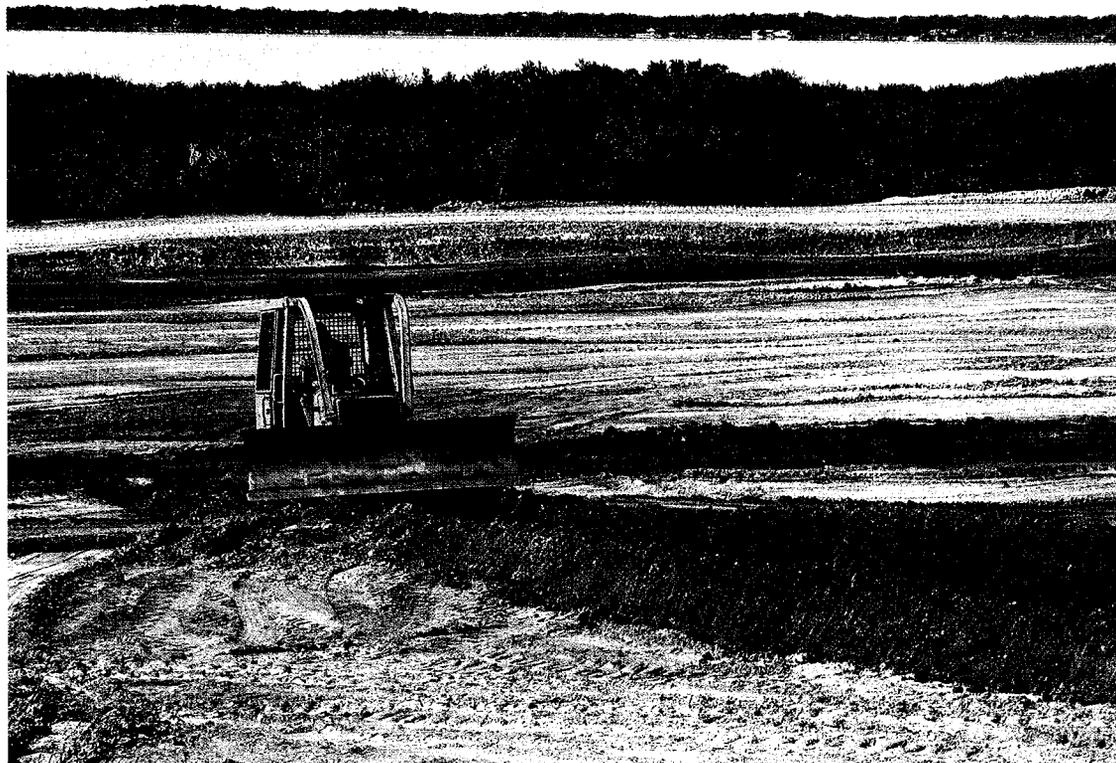
Long-term plans call for construction of a boardwalk with interpretive educational materials to explain the restoration process to the public.

Funding for this phase of the restoration totaled \$194,196 and came from a combination of the District’s Money-For-Mitigation Program (\$57,346) and from a Florida Department of Transportation (FDOT) mitigation project (\$136,850). The total project cost is estimated at \$1.2 million.

“This is probably one of the largest salt marsh re-creation projects in the lagoon,” Taylor says. “Here, we had a virtual desert of no ecological value. To return 50 or 60 acres to the lagoon system is remarkable.”



Heavy equipment is used to restore a salt marsh at the Pine Island Conservation Area.



Ed Garland

## Indian River Lagoon Update

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## Partnership directs program

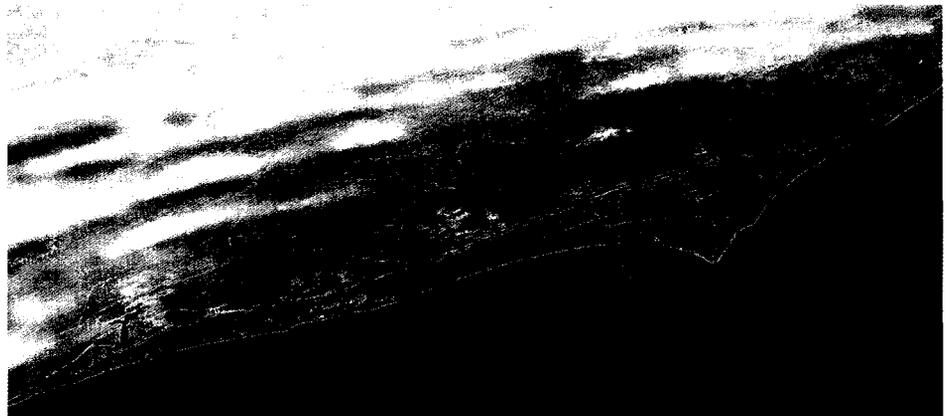
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# INDIAN RIVER LAGOON Update

Quarterly newsletter of the  
Indian River Lagoon National Estuary Program

**Spring 2003**  
**Volume XI**  
**No. 2**

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Property such as this at the Oslo Riverfront Conservation Area would be protected under the Blueway Project.



Mat O'Malley

## Blueway back on top of funding list

An effort to buy and preserve waterfront land along the Indian River Lagoon is a top priority of the state once again.

Dormant for more than four years, an initiative known as the Indian River Lagoon Blueway Project recently received a much-needed boost by state officials, thanks to the grassroots support of stakeholders and public officials along the 156-mile-long waterway.

In December, the Acquisition and Restoration Council of the Florida Department of Environmental Protection (FDEP) promoted the Blueway to the Florida Forever Group "A" funding list. This designation makes millions of dollars in state funds available to help acquire environmentally endangered lands to help restore and preserve the lagoon.

The council, chaired by FDEP Secretary David Struhs, has taken a major step toward helping to preserve one of the most biologically diverse estuaries in North America, says Troy Rice, lagoon program director.

"Acquisition of properties identified in the Indian River Lagoon Blueway will help to provide a natural linkage between the estuarine community and the upland area," Rice adds.

Priority Blueway parcels total more than 8,800 acres in five counties: 30 properties in Martin County covering 460 acres, 291 properties covering 793 acres in St. Lucie County, 81 properties covering 1,603 acres in Indian River County, 148 properties in Brevard County covering 4,256 acres, and 84 properties in Volusia County covering 1,743 acres.

*See Blueway on Page 5*

## New zoo classrooms bring science books to life

Imagine studying geology where your classroom is a cave. Or meandering through wetlands instead of just reading about them in a textbook.

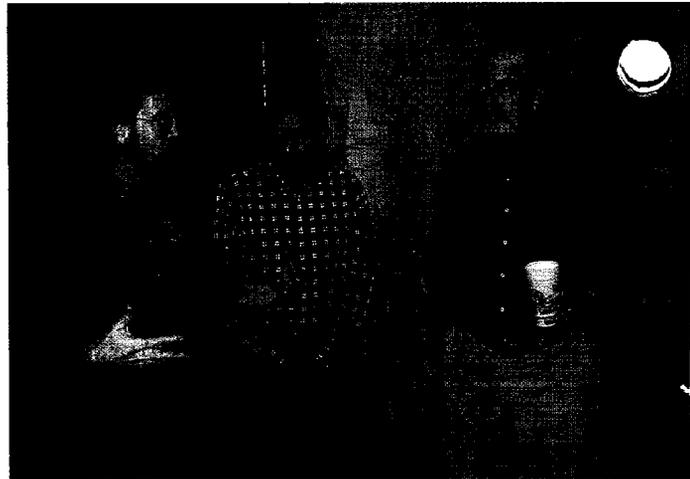
Since opening its doors a decade ago, the Brevard Zoo has offered cutting-edge educational programs that have served as models for other zoos throughout the country.

On Jan. 17, the zoo unveiled three new on-site classrooms that have set a new benchmark in environmental education. The newest additions, reminiscent of theme park props, resemble an underground cavern, a towering treehouse and a backwoods swamp shack.

The classrooms will allow the zoo to expand on a six-year-old program that has resulted in improved attendance and Scholastic Aptitude Test (SAT) scores among Brevard County's "at risk" students.

"With this program, we've seen kids change their behavior patterns, because nobody wants to miss school," says Chris DeLorey, the zoo's education director. "This is nothing like these kids have ever had."

In the swamp house, for example, the classroom's walls and ceilings are festooned with curios that speak to its primordial surroundings: old fishing rods and wading boots, an airboat propeller and a manatee skeleton. Here, instructors like Daniel Hayes, an educator with the



Ed Garland

St. Johns River Water Management District, will teach students the science of water sampling and plant and animal identification.

"The students will not only study wetlands, but have them right outside their back door," DeLorey says. "They will be able to work in small groups and then educate younger students and the public on what they've learned."

It's a far cry from the program's formative years, when classes were taught from a trailer on the zoo grounds.

The success of the program — which includes a testimonial from a former truant now seeking a college degree — earned the zoo a \$500,000 grant from the Eckerd Family Foundation for construction of the whimsical buildings.

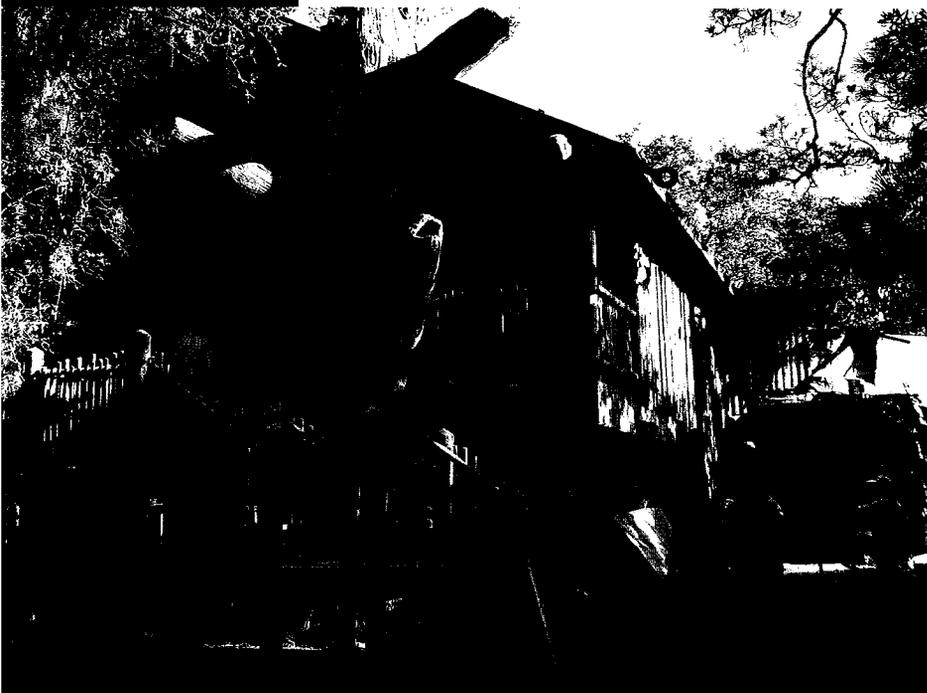
Perhaps the most impressive aspect of each classroom is in the architectural details. Embedded in the walls of the cave classroom (replete with jagged stalactites and stalagmites) are ancient dinosaur jawbones and other fossils. The massive oak tree supporting the floor of the treehouse classroom is actually a man-made monolith cleverly designed to fool the eye.

These are classrooms that engage the students by combining traditional instruction in a real-world environment, says DeLorey.

"At the elementary school level, kids build patterns for attendance," DeLorey says. "This type of learning environment has an impact on kids. The teachers are just as excited about this."

Chris DeLorey of the Brevard Zoo, left, talks with George Smith and Skip Harris, members of the Space Coast Sportfishing Foundation, during a tour of the zoo's new themed classrooms.

Classrooms with an appealing facade keep minds alert at the zoo's education facility.



Ed Garland

## Sportfishing club donates money, items for lagoon exhibit

Nearly a decade ago, a group of Brevard County residents banded together to support educational programs focusing on the diverse marine life of east-central Florida.

Over the years, the Space Coast Sportfishing Foundation hosted a variety of events, including its annual Kids' Fishing Clinic, where swarms of children learn basic angling techniques, boating and fishing safety, and conservation principles.

The Foundation's ultimate goal, however, was to raise money for an Indian River Lagoon exhibit at the Brevard Zoo in Melbourne.

It was with mixed emotions that the Foundation's board members met with zoo officials to see that goal realized. The organization donated \$18,000 to be used toward a marine-themed Indian River Lagoon exhibit in the zoo's Africa exhibit, but the Foundation's president, Skip Harris, also announced that the Foundation was disbanding.

"When we started out, we chose to direct our fundraising toward educational programs and exhibits at the zoo," Harris says. "We've met that goal."

The zoo also received the Foundation's Fishing Simulator, which features a realistic tug-of-war battle with a mighty marlin that jumps and runs on a television screen.

Zoo officials say they're excited about the prospect of adding the new lagoon exhibit to the zoo's already diverse collection.

"We're looking at tying in the sea turtles found on our beaches to Africa," says Chris DeLorey, the zoo's education director. "Sea turtles have been tracked all over the Atlantic from the lagoon region. We're trying to show the visitor that the things we have in the lagoon affect areas all over."



Ed Garland

Roseate spoonbills, which are common around Merritt Island National Wildlife Refuge, are part of the Brevard Zoo's Indian River Lagoon exhibit, an exhibit showcasing some of the nearly 4,000 species found in the lagoon.

## Blueway

*Continued from Page One*

The lagoon serves as a natural water corridor, or "blueway," which combines the proposed acquisition areas into a functional archipelago (chain of many islands) of natural areas. These stepping stones of land serve as buffers from development pressure as well as wildlife travel corridors along the lagoon.

"The blueway concept is envisioned as an ecosystem project that acquires new sites to complement existing natural areas," Rice says. "This integration of natural areas includes federal, state, county and city lands."

Renewed interest by the St. Johns and South Florida water management districts, individual

counties, and individuals helped push the project into a competitive position.

The governor and the Cabinet must approve the project as a priority before water managers and county planners can seek out willing sellers, get appraisals and begin negotiations.

"My hope is that, through partnerships with the state, we'll be able to acquire a significant number of parcels," Rice says. "Through a coordinated, consensus-driven establishment of this multi-agency acquisition and management partnership, the Indian River Lagoon Program can help to ensure the long-term stewardship of our lagoon."

## St. Johns District awards cost-share funds for variety of lagoon projects

Ten local governments along the Indian River Lagoon will share \$767,834 that the St. Johns River Water Management District's Governing Board approved in February for a diverse array of stormwater projects.

The projects will help improve water quality in the 156-mile-long estuary by reducing its intake of trash, suspended solids, phosphorus and nitrogen. Improved water clarity will benefit the lagoon's shellfish beds and sea grasses, which are vital to fish and other marine life.

"The cost-share program enables the District to develop financial partnerships with local governments that might otherwise not be able to take on these projects," says Troy Rice, director of the District's Indian River Lagoon Program.

Projects to be undertaken this year include:

- Using state-of-the-art technology to increase the pollutant removal effectiveness of a stormwater park in Cocoa Beach
- Installing four sediment traps in Satellite Beach to capture pollutants that would otherwise reach the Banana River Lagoon
- Renovating ditches in Melbourne Village that will control erosion, improve flood control and reduce sediment discharging into Crane Creek
- Installing a pollution control device at New Smyrna's city marina in conjunction with other planned marina improvements
- Installing a sediment trap to capture stormwater pollution in downtown Cocoa, Rockledge and Edgewater

- Removing agricultural stormwater pollution from Lake George in Brevard County by using channels, pipes and a wetland treatment area
- Developing a stormwater master plan for Edgewater
- Reducing flooding and stormwater pollution in a Palm Bay neighborhood

The \$767,834 will come from the District, the U.S. Environmental Protection Agency and lagoon license plate sales, and will be combined with funds from the local governments to complete \$3.7 million in projects.

Money is awarded annually through the cost-share program as part of the Governing Board's work to restore and protect the lagoon.

"Keeping the lagoon clean is more than just an ecological issue," says Board member Bill Kerr of Melbourne Beach. "It's an economic issue. The lagoon accounts for more than \$300 million in fishery revenues annually and a similar dollar figure in marine and boat sales. The lagoon is a vital part of our economy."

The District received 18 applications with a total request of \$1.4 million in cost-share assistance. This year, neither Indian River County nor its municipalities submitted funding proposals.

## Calendar photos are online

If a picture is worth a thousand words, then the online photo gallery of the Indian River Lagoon is worth many thousands of words.

Featuring the entries of past submissions to the Indian River Lagoon calendar contest, the gallery shows scenes of all aspects of life along the lagoon.

The online photo gallery was prepared and is maintained by the Smithsonian Marine Station at Fort Pierce and can be viewed at the Web site <http://www.sms.si.edu/irlspec/GalleryMain.htm>.

For information about the 2004 calendar contest, visit the Web site <http://irl.sjrwmd.com>.

Applications can be obtained at the St. Johns River Water Management District's Palm Bay Service Center, 525 Community College Parkway, S.E., or at the South Florida Water Management District's Martin/St. Lucie Service Center in Stuart, at 210 Atlanta Ave. The deadline for the 2004 calendar contest is June 1, 2003.

Information is also available by calling the St. Johns District at (800) 226-3747 or the South Florida District at (800) 250-4100, Ext. 3605.



To learn more about the Indian River Lagoon, please visit the following Web sites.

<http://irl.sjrwmd.com>

[www.sfwmd.gov/org/exo/mlsc](http://www.sfwmd.gov/org/exo/mlsc)

<http://www.epa.gov/owow/oceans/lagoon>

# Marsh reconnection improves lagoon conditions

Maligned as mosquito factories in the 1950s, many of Florida's marshes were tamed into submission with tractors and draglines. The bloodsucking swarms dwindled, but so did the rich marine life that depended on marshes for survival.

The Florida Oceanographic Society (FOS) in Martin County recently completed an environmental and educational project designed to revive a coastal marsh by re-establishing its original, natural flows to the Indian River Lagoon.

Funded in part by the Indian River Lagoon license plate program, this pilot project tests the effectiveness of removing a section of man-made berm and reconnecting the impounded mangrove marsh, says Mark Perry, FOS director.

"We're testing methods for breaking down man-made berms so that the marsh is more of a whole," Perry says. "We'd like to see the whole marsh system reconnected at one elevation."

Dozens of volunteers have helped to remove exotic vegetation — primarily Australian pines and Brazilian pepper trees — and knock down an old ditch berm. This relatively simple strategy resulted in the desired outcome: the mangrove marsh was re-connected with the lagoon, allowing tidal exchanges and maintaining water levels for mosquito control.

Water quality sampling confirmed a general improvement in water quality such as increased oxygen levels and a lower sulfide level, compared to the sampling prior to the restoration effort. In addition, fish populations and bird species are more diverse.

Staff and volunteers of FOS will continue to monitor the progress of this project in the future by measuring the water quality and bio-diversity of species in the area.



Mark Perry

This successful habitat restoration project opened up approximately 20 acres of habitat for juvenile snook, tarpon, snapper and other species to thrive in the lagoon.

"Approximately 46,000 visitors each year visit our facility on Hutchinson Island," Perry says. "Explanatory signs will help visitors enjoy an educational experience while they meander along the nature trail and learn about this environmental effort."

FOS is a nonprofit organization founded in 1964 to protect, preserve and restore Florida's ocean and coastal ecosystems through education, research and personal stewardship.

Philip Baldwin frequently monitors the progress of mangroves as part of the FOS study.

A boardwalk winds through a mangrove forest on the property of the Florida Oceanographic Society in Stuart, Fla.

FOS is located at 890 N.E. Ocean Boulevard in Stuart, Fla. (34996). Additional information is available by calling (772) 225-0505 or visiting the Web site, [www.fosusa.org](http://www.fosusa.org).



Mark Perry

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## Partnership directs program

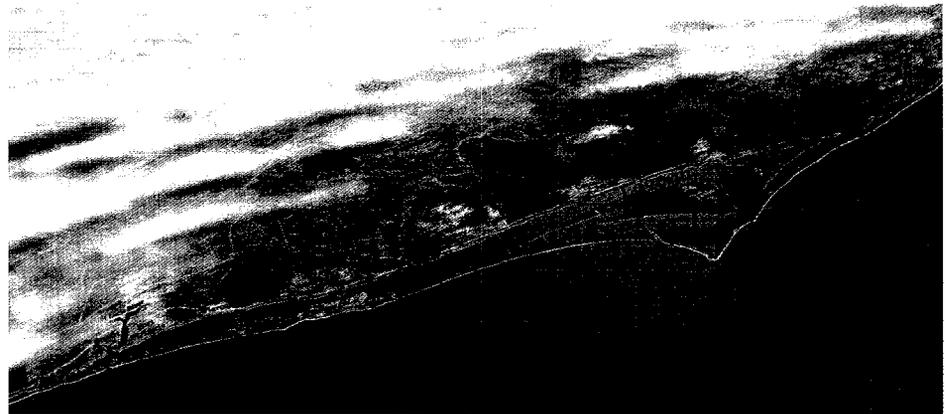
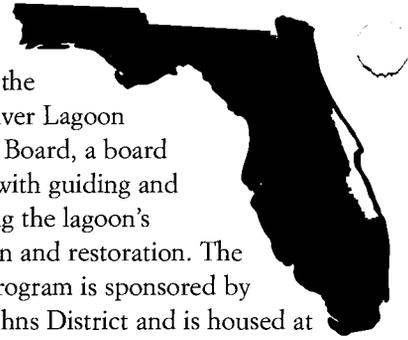
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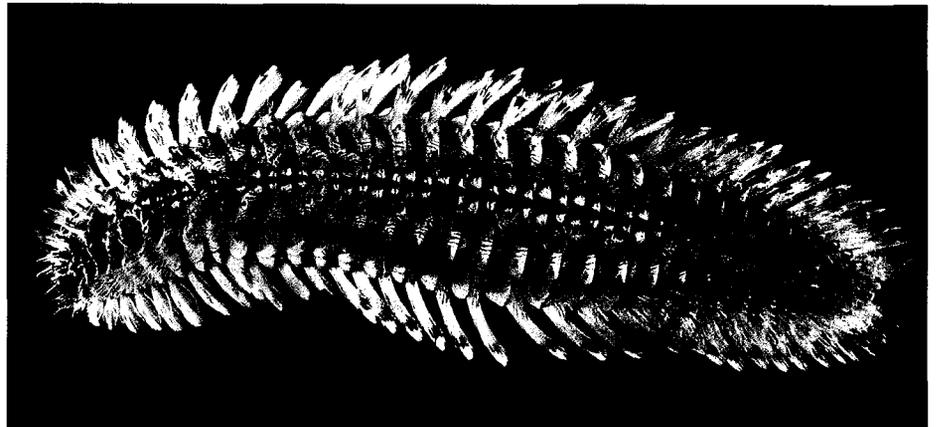
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No. 3

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**About the photo:**  
A bristle worm close up



Provided by the Smithsonian Marine Station at Fort Pierce

## Bristle worms are a mysterious denizen of the lagoon, pack a powerful punch

Some of the largest and most familiar creatures found in the Indian River Lagoon are also considered the most gentle. Consider, if you will, the docile manatee or the frolicsome dolphin. They're the visual equivalent of polka music: you can't help smiling when you see them.

At the other end of the spectrum is the reclusive red-tipped bristle worm (*Chloëia viridis*), a voracious little creature whose beauty is matched by its ability to inflict pain to unsuspecting potential predators and prey alike.

Never seen a bristle worm? Not surprising, says Woody Lee, a research assistant for visiting scientists at the Smithsonian Marine Station at Fort Pierce.

"Very little is known about them," Lee says. "We suspect that there are several different species of bristle worm in the lagoon, but they're very secretive and they haven't been studied in detail."

Bristle worms generally burrow in the sediment of the lagoon, out of sight

of humans. Undulating along the sandy lagoon floor, these aggressive carnivores will eat whatever they come across, be it another worm, a sea whip or even a small crab.

For the unlucky victim, an attacking bristle worm must seem like a horror movie monster. The worm's reversible lower lip expands wider and larger than its body while the rasp-like mouth cavity grinds and crushes its meal before it is passed down to the worm's stomach. A bristle worm can devour prey nearly as wide and thick as it is, but not as long.

Bristle worms attain a length of about four or five inches and their iridescent bodies can vary from green to red.

"You might be tempted to touch them, but that would be a painful mistake," Lee says. "Their flamboyant color is actually a warning sign for you to back off."

See Bristle worms on Page 7

## Advisory Board submits 2003–04 work plan to EPA

Laying the groundwork for the next fiscal year, the Indian River Lagoon Advisory Board has approved the submission of a work plan to the U.S. Environmental Protection Agency (EPA) totaling nearly \$1 million in new and ongoing projects aimed at restoring and protecting the lagoon.

Each year, the Advisory Board submits a work plan detailing how it will carry out the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP) using EPA section 320 funds and nonfederal matching dollars. The CCMP serves as a blueprint for ensuring a balance between people and nature in this fast-growing region.

Among the projects recommended for funding in fiscal year 2003–04:

- Continuing the Marine Resources Council's citizens volunteer water quality monitoring program, a network of 85 sites along the lagoon monitored by volunteers on a weekly basis
- Supporting an ongoing shoreline restoration mangrove planting program undertaken by the Environmental Learning Center in Vero Beach
- Retrofitting stormwater drainage systems in urban areas to reduce the amount of pollutants flowing into the lagoon

- Restoring impounded wetlands by reconnecting them to the lagoon and rehabilitating drag-line ditch impacted wetlands
- Continuing with efforts to educate the public and governments about the resources of the lagoon

Next year's work plan is different from previous work plans in that the Advisory Board agreed to set aside funding for innovative projects that would increase knowledge and understanding of problems in the lagoon. These projects are intended to address concerns about a variety of maladies occurring in the lagoon in the recent past such as skin diseases on dolphins and turtles, formerly benign puffer fish becoming toxic, and increases in algal blooms and fish kills.

"A task force, for example, could coordinate a variety of monitoring and research projects in an effort to better define the cause or causes of these maladies," says Troy Rice, lagoon program director. "The data gathered could help identify possible management actions to address the causes."

An afternoon storm brings rain to mangroves at Merritt Island National Wildlife Refuge.



## Guest column

# District, Corps partner on study, work to improve lagoon's health

Minimizing the impact of development pressures on the Indian River Lagoon is no mean feat.

Where do the problems lie? In the disappearance of natural habitats in the 156-mile-long estuary? In stormwater discharges from heavily urbanized areas? In harmful freshwater discharges into a water body requiring a balance of fresh and salt water?

The U.S. Army Corps of Engineers (USACE) has partnered with two water management districts to find long-term solutions for restoring and protecting the lagoon.

The Indian River Lagoon Feasibility Study, a component of the Comprehensive Everglades Restoration Plan (CERP), is authorized by the Water Resources Development Act of 1996. The study has been divided into two separate feasibility studies — lagoon north and lagoon south — to accommodate different natural resource restoration targets and nonfederal sponsors. Both studies focus on salinity levels, “muck” quantity, water quality, and wetlands and water supply problems within the lagoon.

The lagoon south study was completed in August 2002 and was sponsored by the South Florida Water Management District and USACE. The south study area encompasses the lagoon's watershed in Martin and St. Lucie counties.

Based on the south study, plans to improve lagoon conditions include building reservoirs and stormwater treatment areas, enhancing natural storage and treatment areas, restoring floodplains, diverting water, removing muck and creating artificial habitat. Additional information on the south study can be found online at <http://www.evergladesplan.org>.

The lagoon north study began in August 2002 and is sponsored by the St. Johns River Water Management District and USACE. The lagoon north study area includes the lagoon's watershed in Volusia, Brevard and Indian River counties. The federally constructed project, tying the lagoon north study into the CERP, is Canal 54, which was originally constructed as a component of the Central and South Florida Flood Control Project.

In addition, the federally constructed Intracoastal Waterway runs the north-south length of the study area.

Among the goals of the lagoon north study are:

- Reducing excessive amounts of freshwater and pollutants flowing into the lagoon, thereby improving water quality and lagoon habitats (with an emphasis on sea grass)
- Maintaining and improving water supply and flood protection
- Improving opportunities for tourism, recreation and environmental education
- Improving fisheries and associated industries

The lagoon north study will build upon and incorporate previous and ongoing projects, including the Surface Water Improvement and Management Plan, the Comprehensive Conservation and Management Plan (CCMP), stormwater projects, muck removal from Crane and Turkey creeks in Brevard County, reconnection of impounded wetlands, removal of harmful exotic vegetation, mangrove plantings and the Canal 1 redirection.

An interagency project delivery team has been formed to assist and coordinate the study. Potential alternatives for restoration in the north include reservoirs, stormwater treatment areas, natural storage and treatment areas, water diversions and muck removal.

The north study is scheduled for completion in August 2007 in order to be included for consideration for congressional authorization in the 2008 Water Resources Development Act.

The current status and calendar of upcoming meetings can be found on the CERP Web site at <http://www.evergladesplan.org>.



**Debbie Peterson**  
USACE planning technical leader



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## Ranch being restored to wetland

In north-central Martin County, the typical landscape has been defined by uniform rows of orange groves or cattle ranches teeming with grazing beef cattle or dairy cows.

This year, however, approximately 20,000 acres of land known as the Allapattah Ranch — used for decades to pasture beef cattle — will be set on the road to restoration through a partnership among local, state and federal governments.

The goal is to restore and enhance wetlands for wildlife, improve water quality and decrease stormwater flows into the St. Lucie River and the Indian River Lagoon. These enhancements will improve habitat for many threatened and endangered animals and accelerate some of the expected benefits of a larger state-federal plan to restore the Everglades.

Less than a century ago, this land was very different. The area's natural pine forests, wet prairies and interconnected shallow rivers and streams were probably a very comfortable home for alligators and other native wildlife, and prime hunting and fishing grounds for Native Americans and the state's first explorers. (The word Allapattah is very close to words in the Creek, Seminole and Miccosukee tribes' languages for "alligator.")

In 1912, the Allapattah Ranch was part of Palm Beach County. During that boom period, land sold for \$50 per acre in advertisements distributed throughout the nation, Canada and Europe.

Florida's pioneers saw very little value in swamps or "unimproved" land. The collective mindset was locked in on draining wetlands and converting them to various agricultural uses — productive endeavors such as citrus farming and cattle ranching. Since then, Floridians have learned that these natural systems play a vital part in storing and cleaning water resources, which is why the water management districts and various agencies or local governments are working to acquire and restore natural systems.

The purchase and restoration of the ranch will be financed through a unique partnership that includes the South Florida Water Management District, Martin County, the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service and the U.S. Army Corps of Engineers. The total acquisition cost was approximately \$50 million, with the South Florida District contributing about \$40 million and Martin County contributing \$10 million.



Patrick Lynch

A contribution of approximately \$30 million from USDA's Wetlands Reserve Program helped to accelerate the acquisition and restoration of the Allapattah property. The authorization and funding for the Wetlands Reserve Program are included in the 2002 Farm Bill. Members of Florida's congressional delegation helped to ensure that the Farm Bill included adequate funding for conservation programs such as the Wetlands Reserve Program, and that the authorization would apply to agricultural and environmental conditions in Florida.

"This land acquisition represents just how successful partnerships among local, state and federal governments can be," says South Florida District Governing Board member Lennart Lindahl.

Work has already begun to treat exotic pest plants on the property, such as Brazilian pepper and melaleuca. Sections of the property will continue to be leased for restricted cattle grazing even while restoration activities are under way — primarily to prevent additional infestations of exotic plants from overrunning the large acreage.

Approximately 2,300 acres of the western part of Allapattah is proposed for use as a stormwater treatment area. For the remainder of the property, filling drainage ditches and modifying current drainage practices will encourage the native plants, trees and wildlife — which once thrived in the pine flatwoods, marshes and prairies of this landscape — to reclaim it.

Martin County Commission's past Chairperson Elmira Gaaney, left, presents an Allapattah partnership funding check to South Florida Water Management District Governing Board members Lennart Lindahl and Trudi Williams, and the District Executive Director, Henry Dean.

# New Smyrna Beach projects ensure cleaner lagoon

Once a source of water pollution in the Mosquito Lagoon, a New Smyrna Beach neighborhood now serves as a model for stormwater treatment.

The city of New Smyrna Beach is wrapping up the second of two neighborhood projects designed to remove trash, oil, sediments and other pollutants from storm water before they're carried to the lagoon.

"There was a need to do something on Magnolia Avenue," says Robert Bennett, a project engineer with Environmental Consulting and Technology, which designed the new stormwater system for the city. "The stormwater system was very old and deteriorating."

In the Magnolia Avenue area, there were seven untreated outfalls to the lagoon. When it rained, storm water would carry pollutants directly to the lagoon. Leaves were a particular problem, because Magnolia Avenue is an older tree-lined street, Bennett says.

The solution was to install what is known as "exfiltration trench systems" along the street. This treatment system consists of a perforated or slotted pipe surrounded by rock and filter fabric. Storm water seeps out of the pipe and through the rock and finally infiltrates the surrounding soil. Sediment and leaves are collected in sumps in the bottom of the catch basin inlets, while floating trash and debris are contained by skimmers located in the inlets.

Following the success of the Magnolia Avenue project, the city set its sights a block away on Riverside Drive. On that street, each intersection had a series of catch basins leading to a single pipe that discharged directly to the lagoon.

To remedy the pollution problem, the city installed a combination of exfiltration trench systems and continuous deflective separation (CDS) units that capture fine sands and solids through a screening process.

"The CDS system can catch 80 to 90 percent of the pollutants present in the storm water," Bennett says.

The \$2 million total cost of the projects was funded in part with a \$490,000 U.S. Environmental Protection Agency (EPA) grant through the St. Johns River Water Management District and a \$1.3 million State Revolving Fund loan, used to match the grant.

To ensure that the new stormwater systems are working efficiently in removing pollution, water



City of New Smyrna Beach

quality testing will follow 10 storms. The city is happy to have received the grant money, according to Khalid Resheidat, the city engineer.

"These treatment systems will go a long way toward cleaning up our part of the lagoon," he says. "It is especially important with the new NPDES (National Pollutant Discharge Elimination System) rules taking effect. We are getting a head start with these projects."

Workers install a section of pipe for a stormwater system on Magnolia Avenue in New Smyrna. The project was designed to prevent harmful untreated stormwater runoff from polluting the Mosquito Lagoon.



# Thousands celebrate Pelican Island's 100th birthday

A boardwalk built as part of the Pelican Island centennial allows refuge visitors to wander above saltmarsh grasses.

The statue of Paul Kroegel, who led efforts to convince President Theodore Roosevelt to declare Pelican Island a refuge for wildlife, looks over the Indian River Lagoon. In the background are visitors to the 100th anniversary celebrating the Pelican Island National Wildlife Refuge this spring.

It was a birthday like no other.

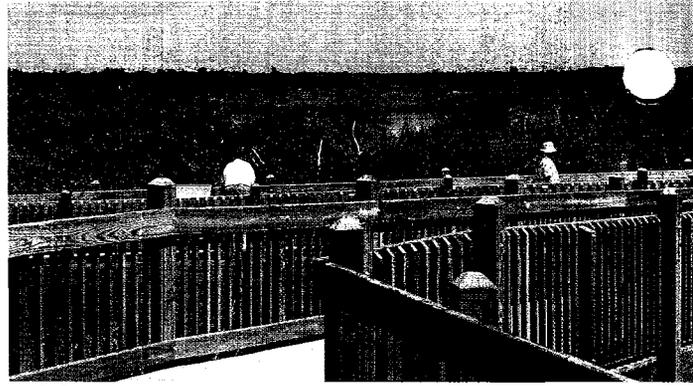
In March, 35,000 celebrants flocked to Sebastian to mark the 100th anniversary of Pelican Island National Wildlife Refuge, the cornerstone of a national wildlife refuge system that today encompasses 540 national wildlife refuges across America.

Launched March 12, the four-day celebration offered a seemingly endless succession of activities throughout Indian River County. Organizers included the U.S. Fish and Wildlife Service (USFWS), The Pelican Island Preservation Society, dozens of other partners and sponsors, and more than 200 volunteers.

"We're tickled pink," says Joanna Taylor, USFWS refuge ranger. "It was the most successful event we've ever had. It exceeded our expectations."

At Riverview Park in downtown Sebastian, events included a celebration of American wildlife conservation hosted by TV personality Jack Hanna, an evening concert by folk singer and part-time Sebastian resident Arlo Guthrie, a fireworks show, live animal exhibits, booths representing more than 50 national wildlife refuges from across the country, and hourly educational seminars.

During a closed media event at the refuge's new public facilities, U.S. Secretary of the Interior Gale Norton and U.S. Congressman Dave Weldon



Ed Garland

of Melbourne dedicated the Centennial Trail by attaching the final plank to a boardwalk leading to a new observation tower that boasts the only land-based opportunity to view the two-and-a-half acre island.

Norton was also on hand March 14 to help the U.S. Postal Service unveil a Pelican Island National Wildlife Refuge commemorative stamp. The stamp features a photograph of a brown pelican by Dr. James Brandt.

"This centennial event has helped us educate so many people about the history of Pelican Island and the fact that it is America's first national wildlife refuge," Taylor says. "You could feel a real sense of pride throughout the community at the event."

Taylor says the story of Pelican Island is also the story of Paul Kroegel, the German immigrant who, in the 1800s, was the first person to take an interest in protecting the birds of Pelican Island.

Kroegel, who kept a watchful eye on the birds from his hilltop home, worked with noted conservationists of the day to help convince President Theodore Roosevelt to establish Pelican Island as America's first federal bird reservation. Roosevelt issued the executive order on March 14, 1903, and Kroegel served as the country's first wildlife refuge manager. Kroegel remained at his post, wielding a shotgun to ward off poachers, until 1926.

Taylor spent some time at the festival with Kroegel's descendants, who she felt were "really proud" over the recognition he received.

"They were so proud for (Kroegel's) legacy," Taylor says. "It's all about how one person can make such a big difference. He's the person who really started it all."



Ed Garland

## Lagoon leader honored with award

Ted Moorhead has been recognized for his tenacious efforts to help restore and protect the Indian River Lagoon.

Moorhead, a Palm Bay resident, received the Lagoon Leadership Award during a meeting of the Indian River Lagoon Advisory Board in March. The award recognizes those who provide a shining example of stewardship for the lagoon through advocacy, education and implementation of the Indian River Lagoon Comprehensive Conservation and Management Plan.

Moorhead served for 12 years as an administrative assistant to U.S. Representative (now Senator) Bill Nelson. He is a founding member of the Marine Resources Council and served two terms as a board member for the Florida Inland Navigation District.

Also, Moorhead was instrumental in the designation of the Indian River Lagoon Scenic Highway in Brevard and Indian River counties. He wrote grant proposals that led to \$1 million in assistance funding for the development of the Lagoon House in Palm Bay. The facility will provide a central hub along the scenic highway for information, environmental education and public meetings.

The award is organized by the Indian River Lagoon National Estuary Program of the St. Johns River Water Management District, with the support



Ed Garland

of the U.S. Environmental Protection Agency, the South Florida Water Management District, and the 13 other federal, state and regional agencies and local governments that make up the Indian River Lagoon Advisory Board.

Indian River Lagoon Program Director Troy Rice, right, presents an appreciation award to Ted Moorhead during a gathering last spring.

## Bristle worms

*Continued from Page One*

The worm's body is fringed with hollow, toxic spines designed to snap off and embed themselves in your skin if you touch them.

"Your hand will swell up if you touch them," Lee says. "A fish that eats a bristle worm will usually spit it right back out. The bristles and the bright colors are a perfect defensive system."

Lee doesn't recommend that you add bristle worms to your aquarium menagerie, given the creature's carnivorous nature and toxic tendencies.

But those who insist on seeing these elusive worms can see one up close at the Smithsonian Marine Ecosystems Exhibit along the Fort Pierce Inlet. The facility features a 3,000-gallon live display of a coral reef ecosystem and several smaller displays depicting the remarkable biodiversity of the lagoon, as well as offshore and near-shore habitats.

For more information about the Smithsonian exhibit and Web site, visit <http://irl.sjrwmd.com>.

## Indian River Lagoon Update

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## Partnership directs program

The Indian River Lagoon National Estuary Program is a partnership whose members work to improve the water quality and ecological integrity of the 156-mile-long estuary on Florida's east coast.

The U.S. Environmental Protection Agency (EPA) designated the lagoon as "an estuary of national significance" in April 1990 and included the lagoon in the National Estuary Program.

The lagoon program began in April 1991, with oversight and funding from EPA. The St. Johns River and South Florida water management districts, the five counties that border the lagoon — Brevard, Indian River, Martin, St. Lucie and Volusia — and representatives of state, federal and regional governments

and agencies make up the Indian River Lagoon Advisory Board, a board charged with guiding and overseeing the lagoon's protection and restoration. The lagoon program is sponsored by the St. Johns District and is housed at the District's Palm Bay Service Center.

The St. Johns District oversees lagoon work in Brevard, Indian River and Volusia counties. The South Florida District oversees lagoon work in Martin, Okeechobee and St. Lucie counties.



**St. Johns River**  
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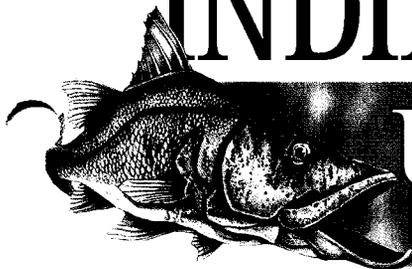
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# INDIAN RIVER LAGOON

## UPDATE

Volume 2, No. 4 • Fall



## EPA funding for lagoon to increase in 2003

Ongoing efforts to protect and restore the Indian River Lagoon will receive a boost from the U.S. Environmental Protection Agency (EPA) in fiscal year 2002–03, which begins Oct. 1.

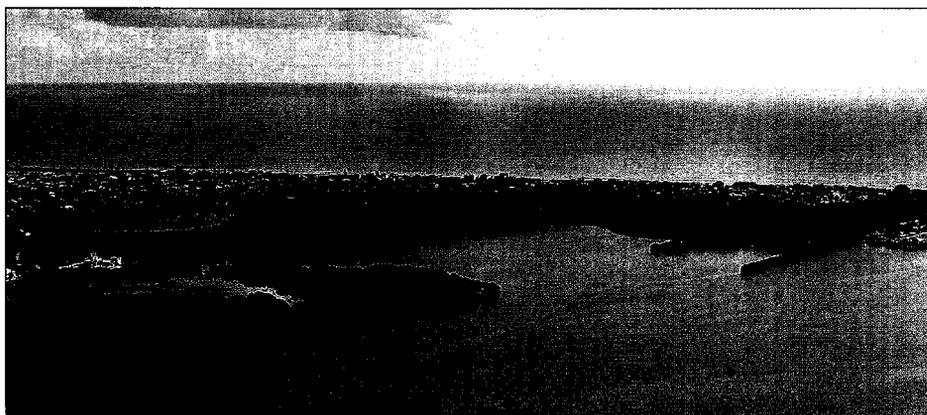
The Indian River Lagoon Advisory Board has set aside \$510,000 for 13 lagoon projects, ranging from stormwater system improvements and environmental “muck” dredging projects to education and grant-writing programs using the annual assistance funding from EPA under the National Estuary Program (NEP).

This federal funding infusion represents a \$200,000 increase over the previous year that will leverage a 50 percent match in nonfederal dollars, or a total of \$1.02 million for chosen projects.

“The increase in EPA funding is a result of the work between the Association of National Estuary Programs and Congress,” says Troy Rice, lagoon program director.

The targeted projects in the approved 2002–03 NEP work plan include:

- Continuing assessment of water quality and benthic (underwater, bottom) habitat improvements resulting from the Crane Creek muck dredging in 1998
- Continuing support for the Marine Resources Council’s (MRC) 85-site volunteer water quality monitoring program
- Funding for grant writing support to local governments in the lagoon region. This project has resulted in



Troy Rice

*Water quality and habitat enhancements will be funded in 2003 to protect the lagoon’s fragile balance between people and nature in North America’s most biodiverse estuary.*

- \$11.3 million in federal and state grants since 1997, providing \$63.6 million in projects benefiting the lagoon
- Initiating an environmental muck dredging project that will remove 200,000 cubic yards of sediment from Taylor Creek in St. Lucie County
- Funding a second year of “Camp Wet,” which provides 156 children from diverse backgrounds with two weeks of hands-on education about Florida’s fragile ecosystems
- Continuing support of MRC to develop and operate a centralized library of lagoon publications and resource materials
- Funding continuation of a shoreline restoration program to plant red mangroves in the estuary by the Environmental Learning Center in Wabasso
- Supporting high-priority water quality urban drainage system improvements. Project partners

- provide a match to complete projects, monitor results, and maintain stormwater systems
- Reducing stormwater pollution in the citrus industry by implementing best management practices. The goal is to reduce harmful discharges of nutrients and other pollutants from citrus production areas to the lagoon
- Continuing development of the Smithsonian Marine Station’s online species inventory (<http://www.sms.si.edu>)
- Restoring habitat of lagoon wetlands damaged by dragline ditching for mosquito control
- Continuing support of the CASTnet National Atmospheric Deposition Program site at Sebastian Inlet being used to study the effects of airborne pollution in the lagoon

# District, Army Corps partner in lagoon study

An oft-heard maxim in government is that partnerships wield more clout — and generate more money for programs — than do solo efforts.

Taking this philosophy to heart, the St. Johns River Water Management District and the U.S. Army Corps of Engineers are embarking on a five-year study designed to improve marine habitats and water quality in the Indian River Lagoon.

The Indian River Lagoon North Restoration Feasibility Study will build on previous and ongoing restoration efforts and adopt the same goals and objectives included in the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP) and the Surface Water Improvement and Management (SWIM) Plan.

"By working with the Corps, the District will receive credit for work we've already planned to carry out," says Troy Rice, the District's Indian River Lagoon Program director. "This will allow us to target a portion of the \$7.8 billion in Everglades Restoration funding for future lagoon projects."

The study will identify possible improvements to the lagoon in Indian River, Brevard and Volusia counties. Under an agreement approved in July, the District will contribute in-kind and consultant services equal to half of the estimated \$7.8 million cost of the study.

Issues to be addressed include improving habitat, water circulation and water quality; environmental dredging; developing a sediment control strategy; better control of stormwater runoff; removal of harmful exotic vegetation; water supply and flood protection; and increasing recreational opportunities. This study will complement a similar program at the southern end of the lagoon led by



Robert Day

*Joel Stewart, Whit Green, Vince Singleton, Marvin Carter and Troy Rice, from left, survey the Sebastian River Water Control District to determine what improvements may be needed in the area. Some improvements could be funded with money received through the Indian River Lagoon North Feasibility Study.*

the South Florida Water Management District and the Corps.

Some of the potential projects are reminiscent of past endeavors, such as removing gooey "muck" from the Intracoastal Waterway or rerouting water westward to District-owned lands to reduce harmful freshwater discharges into the lagoon.

All 14 causeways in the study area will also be evaluated to determine their impact on rates at which the lagoon is able to circulate around these man-made barriers in the waterway. Poor circulation causes sediment buildup and vegetation decay, resulting in poor water quality. Replacing causeway fill with low-profile bridges or installing concrete box culverts could help reverse the situation and provide additional protection by strengthening these important hurricane evacuation routes.

If Congress approves the study in 2008, large-scale projects will require about seven years from conception to completion, while smaller projects

can be turned around in about half that time.

"We may never be able to return the lagoon to its once-pristine condition," Rice says. "However, this study will help further our knowledge of the lagoon system and the source of its problems, and aid us in recommending viable, cost-efficient, long-term solutions."

While the District and the Corps are the two principal agencies responsible for the development of the study, an interagency project development team comprising other federal, state and local agencies will participate in the overall effort, Rice says.

For more information, or to follow the progress of the study, visit [www.evergladesplan.org/projects](http://www.evergladesplan.org/projects) and click on the Indian River Lagoon North Feasibility Study link, or contact Rice at (321) 984-4950, Pete Milam, Corps, at (386) 329-4302, or call toll-free, (800) 291-9405, and select extension "0" from the switchboard.

## Concerns for lagoon have been heard

In 1995, we, the residents of the south end of the Indian River Lagoon, brought together environmental, economic, agricultural and community leaders along with local and regional elected officials and we asked the question, "What are the problems that face the St. Lucie Estuary and the Indian River Lagoon?"

The boaters pointed at the agriculturalists (those folks who live west of town and use lots of fertilizers and pesticides) and said, "They are!"

The agriculturalists pointed at the urbanites (those folks who live directly adjacent to the shoreline and use lots of fertilizers and pesticides) and said, "They are!"

And the urbanites pointed to the boaters (those folks who churn up seagrass beds, and directly dump petroleum products, human waste and used fishing line into the estuary) and said, "They are!"

The only thing in common the group had was that they all blamed government agencies for the dilemma and their local elected officials for not doing enough to hold the agencies accountable.

Then came the devastation in the spring of 1998. As a result of El Nino rainfall, Lake Okeechobee was the highest it had ever been during the dry season. Faced with the real possibility of dike failure, the U.S. Army Corps of Engineers and the South Florida Water Management District (SFWMD) made the decision to bring the lake down — and bring it down quickly. The impact on the St. Lucie Estuary was devastating. Anyone that tells you it wasn't, wasn't there.

Local conditions deteriorated quickly. Salinity plummeted, sea grasses and oysters suffered, or died, and lesioned fish became the norm. Local folks got concerned, then they got mad ... very mad. If there was one

positive thing that happened as a result of the discharges of 1998, it was the galvanization of a community. A community, often divided, became united in its anger and its resolve to appeal to the agencies and elected officials for help.

In the last four years, several things have happened:

1. The Indian River Lagoon South Feasibility Study — The Martin/St. Lucie part of the Comprehensive Everglades Restoration Project, this study has received wide local support and has been sent to Congress for authorization. SFWMD is so confident that it is the right plan, it has budgeted \$150 million for fiscal year 2002-03 for implementation even before the plan has been approved by Congress.
2. The St. Lucie Issues Team has solicited, ranked and received \$26.5 million of state funding for 77 local stormwater projects that have at least 50 percent local cost match and are designed to complement the lagoon feasibility study with local, turn-dirt, stormwater and habitat restoration projects.
3. The agricultural and urban interests have developed, and are starting to implement, a proactive best management practices program that focuses on the impact of agricultural and urban runoff and focuses on structural and management strategies that reduce potential for adverse impacts downstream.
4. Lots of folks quit pointing at others and starting pointing at themselves.

Additionally, local governments formed stormwater utility programs. Agencies accepted more responsibility

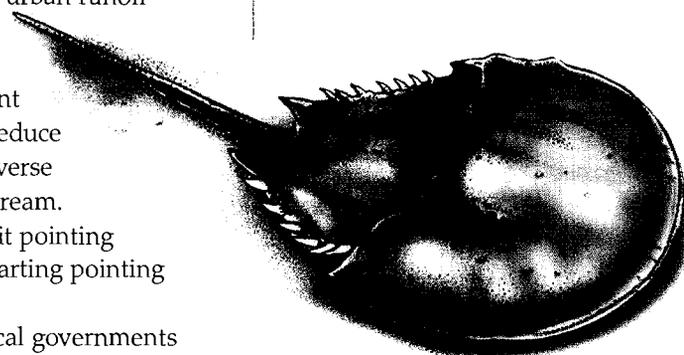
### Guest column Indian River Lagoon Program



**Paul Millar**

Director, Martin/St. Lucie Service Center,  
South Florida Water Management District

and are now working more cooperatively. Individuals are paying more attention to their yards and neighborhoods. Agriculture took a hard look in the mirror and agreed to help solve the problems. Working together, we will restore our rivers to good health. We have a lot to do, but I do believe we have turned the corner toward that future.



# Turkey Creek Sanctuary — oasis in the city

Exploring the serpentine boardwalks of Turkey Creek Sanctuary, it's easy to imagine you're miles from the asphalt grids of civilization.

The creek's tea-colored waters twist through a dense canopy of ancient sabal palms and regal oaks festooned with butterfly orchids. Here, not even an unrelenting afternoon sun can penetrate the unruly groundcover below. It is a primordial place, rife with shadows and noises and things that skitter unseen.

At 122 acres, the sanctuary is a postage stamp-sized patch of wilderness compared to many public lands in east-central Florida, concedes Oli Johnson, the sanctuary's park ranger.

"Basically, it's a coastal stream that feeds into the Indian River Lagoon," Johnson says. "Here, at least, it's still intact. You walk on the boardwalk and it seems like you're out there.

In actuality, you're in downtown Palm Bay."

Every year, roughly 30,000 people visit the sanctuary, but Johnson figures that the number is higher because many folks don't sign the registry at the boardwalk's entrance.

Scanning his records, Johnson traces his finger along entries that include visitors from France, Sweden, Holland, Finland, the Virgin Islands, and 35 states.

"We get visitors from all over the world," Johnson says. "The Europeans go nuts when they see a raccoon, an armadillo or even a squirrel. Many visitors are from urbanized areas where wildlife is almost nonexistent."

Throughout the year, Johnson and his staff offer tours of the sanctuary, as well as slideshows, summer camp programs, puppet shows and hands-on exhibits at the Margaret Hames Nature Center, an educational center

nestled in the pines just a few yards away from the boardwalks and hiking trails.

There's also the day-to-day challenges that come with managing a fragile environment that contains a mosaic of habitats: sand pines, floodplains, hardwood hammocks and the creek itself.

A typical day may involve hacking away at invasive Brazilian pepper trees, removing fallen trees from canoe routes, or taking water samples.

Although the creek is buffered by this pristine area, it is also the receiving body of a 100-square-mile network of canals. In the past, the creek and its basin at the Indian River Lagoon have been strangled by sediment from stormwater runoff. The ragged, sandy cliffs bordering the creek have also been blamed for sediment buildups along the creek bed.

Relief arrived in May 2001 with the completion of a muck-dredging project at the mouth of Turkey Creek. The two-phase project resulted in the removal of nearly 400,000 cubic yards — or about 22,000 dump-truck loads — of muck from the creek, which carries the sediment to the lagoon.

A more recent milestone was the acquisition of 16 additional acres adjacent to the sanctuary. The city was awarded a grant from the Office of Greenways and Trails for the purchase of the land, which is being incorporated into a fledgling trail system in south Brevard County.

"This is a wonderful addition to the sanctuary," Johnson says. "This land will be open to hikers and bicyclists for generations to come."



Ef Corfiant

Turkey Creek Sanctuary is a 122-acre natural oasis in the middle of Palm Bay.

## SeaWorld campers explore lagoon

The silence of a sultry afternoon on the Mosquito Lagoon is shattered by the din of distant laughter. Sure enough, an armada of canoes appears on the horizon — the teenage paddlers jockeying for position as they approach the shore.

The 44 campers plying the pristine waters near Oak Hill were to spend the afternoon exploring North America's most diverse estuary, the Indian River Lagoon system. By day's end, they had examined mangrove islands, old mosquito impoundments and underwater denizens: scuttling crabs, schools of fish, and maybe a manatee or two.

SeaWorld Adventure Camp offers youths a chance to experience Florida's diverse natural environments, as well as to meet its scientists and stewards. During their 11-day sojourn, the students reef snorkel in the Florida Keys, visit the Astronauts Hall of Fame, spend a day at Cape Canaveral

National Seashore, canoe the lagoon, and sleep overnight next to dolphins, manatees or possibly polar bears at SeaWorld Orlando.

"The goal is to teach campers about the natural environment and have fun in the process," says Ngaire Heriford, SeaWorld Orlando's senior manager of education marketing.

"We explore everything from marine animal anatomy and classification to identifying habitats and caring for the environment as a whole," Heriford says. "The kids walk away with a sense of purpose and understanding of the world they live in."

At Oak Hill, Bruce Beckwith of Pack and Paddle Outdoor Adventure Tours led the campers on two canoe trips. The group meandered around islands brimming with birds and plant life as Beckwith narrated their journey.

After lunch, Brevard County Watershed Action Volunteer (WAV) Coordinator Chris Koeppel gave an

outdoor slideshow presentation on the lagoon. The Brevard WAV program is administered through the St. Johns River Water Management District and Brevard County.

For many of the youths — who hail from such diverse locales as Colorado, Arizona, New York, and even overseas — the program is an eye-opener.

"It's so much different than home," beamed Shannon Zeman, who lives near Seattle. "It's not this hot in Washington."

And it's not every day that a group of youths from such far-ranging geographies will see mangrove or a manatee.

"The kids learn how and why we've become the leaders in environmental education," Heriford says. "They meet professionals both at SeaWorld and in the field and see how things work behind the scenes at SeaWorld Orlando."



Summer days at SeaWorld Orlando's Adventure Camp include canoe tours of the Indian River Lagoon.



## Beneficial uses of muck being explored

If you've spent time on the Indian River Lagoon estuary system, you've probably encountered "muck" — that black, gooey substance blanketing some areas of the lagoon floor.

What is muck? Muck is a combination of fine-grained sediments containing large amounts of clay and silt and about 10 percent "organic matter." Most of the muck is carried in storm water to receiving water bodies, finally settling as a loose, unconsolidated black mud.

When stirred up by wind or boat traffic, muck can wreak environmental havoc on a waterway by blocking significant amounts of sunlight from reaching seagrass beds. Lack of light prevents photosynthesis needed by sea grasses and other native aquatic

bottom vegetation to survive. Covering up the natural sand and shell bottom also has a detrimental effect on many bottom-dwelling estuarine creatures and sea grasses.

The muck remediation component of the Indian River Lagoon South Feasibility Study (part of the Comprehensive Everglades Restoration Project) includes removal of 5.5 million cubic yards of muck from four "hot spots" located in the North Fork, South Fork and Middle Estuary of the St. Lucie River. Approximately \$55 million of an \$850 million budget has been allocated for muck remediation.

What will be done with all this muck? To meet acceptable standards, it

must be recycled, fill unmet needs and benefit the environment.

Past research led to the theory that there might be beneficial agricultural uses for muck. However, new data indicate that due to the high sodium content and low organic content, agricultural uses for muck would not be the best choice.

Alternate beneficial uses being explored as part of a pilot study include using muck as a sealant to retard seepage within reservoirs, as a substrate in stormwater treatment areas, and as a pasture grass herbicide and soil additive for conversion of unplanted pastures to native habitats.

## Lagoon photo contest winners announced

More than 100 people showed off their artistic talents by participating in the first Indian River Lagoon photo contest.

"The response and enthusiasm for the contest were tremendous," says

Linda Goode, public communications specialist for the lagoon program. "We received submissions from residents throughout the lagoon region, as well as from out-of-state visitors to the area."

The sole requirement was that submissions were to be related to the lagoon and lagoon activities. Typical genres included boating, fishing, and other forms of outdoor recreation; wildlife; scenic vistas and landscapes; and familiar landmarks.

The top three winning entries were "Indian River at Dawn" by Teresa Fiorillo of Titusville, "Morning at Ponce Inlet Harbor" by Joe Schofield of Winter Park, and "Tricolor Heron Close-up" by Pam Winegar of Malabar.

Environmental Consulting and Technology Inc. sponsored the prize categories.

Have an idea for a lagoon photo? It's not too early to begin snapping your best frames for the next lagoon photo contest, which will feature winning images in a 2004 calendar. Entry form information will be available in the winter edition of the *Update*.



Teresa L. Fiorillo

Teresa L. Fiorillo of Titusville submitted this photograph, "The Indian River Lagoon at Dawn," for the lagoon program's calendar contest.

# Volunteers sought to watch for exotic jellyfish

A federal grant will help stewards of the Indian River Lagoon monitor the estuary's waters for exotic jellyfish and other invasive species.

The Indian River Lagoon National Estuary Program, in partnership with the Mobile Bay National Estuary, has been awarded \$40,000 from the U.S. Environmental Protection Agency for a collaborative aquatic nuisance species grant.

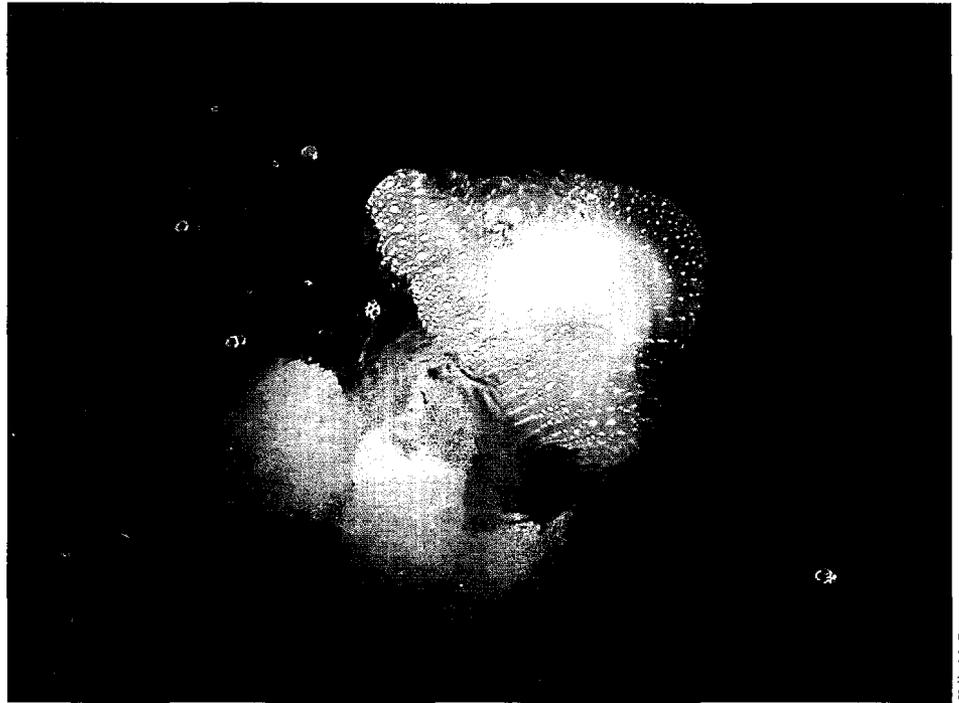
This grant will be used to increase the public's understanding and awareness of the problems associated with these jellyfish and to develop a monitoring plan and determine the pathways taken by the "jellies" into the lagoon and several Gulf Coast estuaries.

To monitor the jellyfish, the lagoon program will be expanding the volunteer-based DockWatch Program from Mobile Bay to the lagoon.

Lagoon program officials are asking boaters and residents along the lagoon to report any sightings of the Australian spotted jellyfish by calling (800) 226-3747 and to become members of the DockWatch Program.

"The data collected by the volunteers in DockWatch are available on a project-dedicated Web site, allowing volunteers immediate reward for their effort," says Troy Rice, Indian River Lagoon Program director. "This Web site helps explain how nuisance species like spotted jellyfish impact both the ecology and the economy of coastal estuaries and helps educate volunteers about the many different species of jellyfish and their roles in the estuary."

The DockWatch Web address is <http://dockwatch.disl.org>. Until the program is established in the lagoon, boaters and residents can go to the data page on the Web site and submit a one-time sighting online by clicking



Kelly McCoy

Scientists spotted this Australian jellyfish in the Indian River Lagoon this summer. The lagoon program recently received a grant to monitor the exotic jellyfish in the lagoon region.

on the east Florida coastline portion of the map outlining the lagoon.

The Australian spotted jellyfish, which made its first appearance in the lagoon's waters in 2001, returned for an encore this summer. The spotted jellies, *Phyllorhiza punctata*, are known to consume huge numbers of fish eggs and larvae and other microzooplankton, with the potential to harm estuarine systems.

In July, Dr. Rich Paperno, a biologist with the Florida Marine Research Institute's Indian River Field Laboratory, collected the year's first spotted jelly between the Pineda and Eau Gallie causeways. The basketball-sized animal was frozen for transport and tissue analysis at Harbor Branch Oceanographic Institution in Fort Pierce.

Only a few Australian spotted jellies have been found in the lagoon so far, but a large seasonal population explosion is possible in the years to

come if the jellies find the lagoon a suitable habitat for the establishment of a resident population.

"We live in a day and an age where we're seeing more exotics where they shouldn't be," says Dr. Jim Masterson, an ecologist at Harbor Branch Oceanographic Institution who is studying the spotted jellies. "It is a question of having informed eyes on the water so we know what's happening out there."

**Restore a Florida Treasure**

**Hook Up  
Now!**



## INDIAN RIVER LAGOON UPDATE

Produced by staff in the Office of Communications and Governmental Affairs, St. Johns River Water Management District.

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Visit us on the Internet at [sjrwm.com](http://sjrwm.com).

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## Partnership directs program

The Indian River Lagoon National Estuary Program is a partnership whose members work to improve the water quality and ecological integrity of the 156-mile-long estuary on Florida's east coast.

The U.S. Environmental Protection Agency (EPA) designated the lagoon as "an estuary of national significance" in April 1990 and included the lagoon in the National Estuary Program.

The lagoon program began in April 1991, with oversight and funding from EPA. The St. Johns River and South Florida water management districts, the five counties that border the lagoon —

Brevard, Indian River, Martin, St. Lucie and Volusia — and representatives of state, federal and regional governments and agencies make up the Indian River Lagoon Advisory Board, a board charged with guiding and overseeing the lagoon's protection and restoration. The lagoon program is sponsored by the St. Johns District and is housed at the District's Palm Bay Service Center.

The St. Johns District oversees lagoon work in Brevard, Indian River and Volusia counties. The South Florida District oversees lagoon work in Martin, Okeechobee and St. Lucie counties.



Mat O'Malley



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# INDIAN RIVER LAGOON

## UPDATE

### Congress boosts funding for estuaries

The National Estuary Program (NEP) will reap a \$4 million funding increase in fiscal year 2002-03, thanks to unilateral support from Congress.

The Veterans Affairs and Housing and Urban Development and Independent Agencies Appropriations bill that provides funds for the U.S. Environmental Protection Agency (EPA) set the NEP budget at \$22.5 million, exceeding both the House and Senate recommendations and surpassing the current budget by more than \$4 million.

Locally, this windfall translates to an approximately \$180,000 funding increase to the Indian River Lagoon National Estuary Program next year, or a total of approximately \$520,000 in available federal funds.

This infusion of dollars means that the lagoon program will have more federal money available for stormwater cost-share and habitat restoration projects throughout the lagoon region.

"Congress has shown that it understands the critical importance of protecting our estuaries," says Troy Rice, lagoon program director at the St. Johns River Water Management District.

"The economy of many coastal areas is directly related to the health of the estuaries they encompass, and the value of our nation's estuary-related natural resources directly impacts our nation's economy. When those natural resources are imperiled, so are the livelihoods of those who live and work there."

The Congressional budget report contains a directive to the EPA that at least 65 percent of the funds appropriated for the NEP must be distributed to programs for implementation of the Comprehensive Conservation and Management Plans (CCMPs).

The lagoon program's CCMP contains a roster of 68 goals, objectives and priority actions ranging from improving water quality to protecting wildlife resources. This plan serves as a blueprint for ensuring a balance between people and nature in a region that lures thousands of newcomers each year.

In addition, Congress funded the EPA's Section 319 nonpoint source pollution grants at a higher level than recommended by the Senate — \$237 million, or \$37 million above fiscal year 2001 level. Nonpoint source pollution grants are used to help communities reduce or eliminate nonpoint sources of pollution — those that can't be traced to a particular point of origin — such as stormwater runoff.

# Brevard Zoo works to promote lagoon

Monkeys, kangaroos and flamingos are among the menagerie of animals inhabiting the Brevard Zoo in Viera.

Yet one of the most popular educational attractions isn't found within the zoo's exotic confines, says Chris DeLorey, the zoo's educational director.

A few miles to the east, the Indian River Lagoon brims with more than 4,300 species of plants and animals. The estuary is perhaps the best hands-on teaching tool for enlightening children and adults alike about an environment without parallel.

Each year, DeLorey and his staff introduce some 6,000 students to the lagoon by taking them on field trips. During these excursions, students drag seine nets across the lagoon floor in search of marine life. The reward might be horseshoe crabs, jellyfish, blue crabs or even a tiny spotted seahorse.

"During one trip, the kids found 119 species of animals in one day," DeLorey says. "Every time we go out, we find things that we've never seen before."

Students not only experience firsthand the lagoon's diversity, but the threat of human impacts.

An afternoon scavenger hunt sends youngsters in search of discarded trash that can threaten marine and animal life.

"We get the kids to understand that the little actions they do can have a big impact on wildlife," DeLorey says. "The kids are enthusiastic. We have a hard time getting them to stop picking up garbage when the scavenger hunt ends."

In addition, the zoo's educational staff uses replicas of manatee skulls and other props, known as "biofacts," to engage the students. Because the props are replicas, children can handle them without fear of breaking them, DeLorey explains.

DeLorey attributes the success of the program, in part, to the zoo's partnership with the St. Johns River Water Management District's Indian River Lagoon Program.

Funds generated through the District's lagoon license plate program

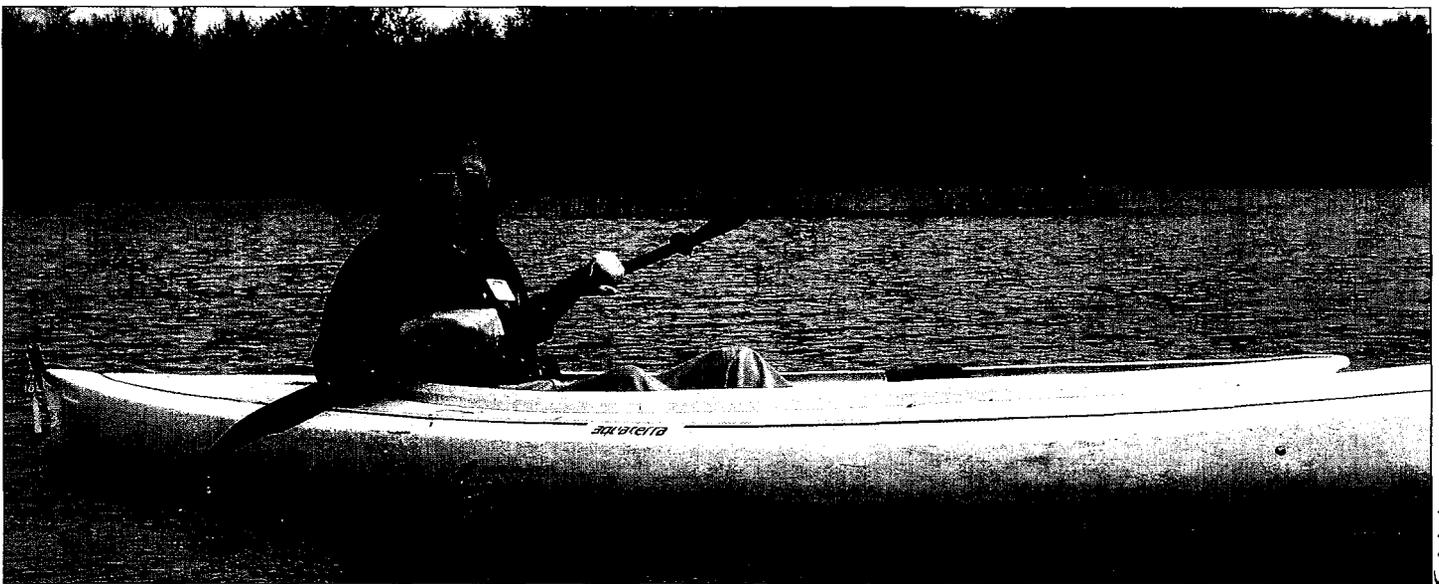
have paid for bus transportation for lagoon field trips, biofacts, a mobile lagoon display board circulated at area festivals and other public events, and portable teaching kits that provide teachers with two weeks' worth of videos, posters, puppets, books and other activities.

"It's a great partnership," DeLorey says. "We carry out the program and the District provides many of the materials for the kids."

The Brevard Zoo already boasts the distinction of being the only zoo in the nation featuring guided kayak trips on an on-site wetland marsh.

Now, the concept is being expanded to include 3.5-hour guided kayak trips along the lagoon. In January, tours will be available on Saturdays and holidays.

"It's a great way to get people into the lagoon," DeLorey says. "The message is that the lagoon has many uses, but we must maintain the health of the lagoon if we are to continue using it."



Chris DeLorey of the Brevard Zoo explores the restored wetlands area of the zoo.

# Successful year builds path to healthier lagoon

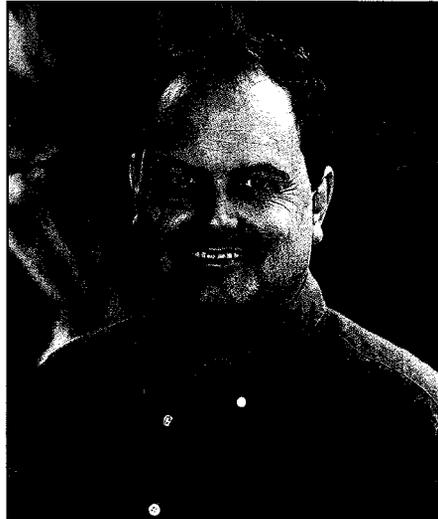
2001 was a very productive, successful year for the Indian River Lagoon. State and federal funding enabled implementation of new stormwater retrofit and habitat enhancement projects, and the continuation of outreach activities.

The past year witnessed the completion of the Turkey Creek environmental "muck" dredging project, with nearly 400,000 cubic yards of muck removed. The Taylor Creek project in St. Lucie, targeting 200,000 yards of muck removal, and the St. Sebastian River dredging project, targeting removal of up to 2 million cubic yards of sediments over the next several years, were begun.

Habitat restoration highlighted many of the accomplishments in 2001.

- In Operation Save Pelican Island, the U.S. Fish and Wildlife Service airlifted 250 tons of fossilized oyster shell to the island to serve as a natural wave break to halt severe erosion at our nation's first national wildlife refuge, in Indian River County.
- Reconnection of impounded wetlands has increased diversity in plants, fish and wildlife. Scientists have documented that an isolated impoundment may harbor six to 10 species of fish, but as many as 90 species often occur in a reconnected impoundment.
- Removal of invasive Brazilian pepper trees and the planting of mangroves by hundreds of volunteers have rehabilitated thousands of feet of lagoon shoreline.
- Aggressive land acquisition initiatives are preserving important properties needed for lagoon restoration. Martin County's one-cent sales tax referendum for land acquisition and municipal capital

## Director's Comments, Indian River Lagoon National Estuary Program



**Troy Rice**

projects was used to purchase 3,100 acres in the Atlantic Coastal Ridge Ecosystem. Construction of new stormwater treatment systems has also been actively pursued.

- Cocoa completed its lagoon-front stormwater park, which employs a unique underground storage system to catch the "first flush" of runoff for future reuse.
- Satellite Beach has continued to implement stormwater treatment projects such as the Jackson Avenue exfiltration project and the Jamaica Boulevard detention ponds system.
- Stuart is continuing projects in Haney, Frazier, Poppleton and Krueger creeks subbasins, and the town of Sewall's Point completed construction of several retention areas, including Quail Run Park.
- The St. Johns River Water Management District designed a 100-acre regional stormwater treatment system in Sebastian, is partnering with Indian River County to implement new

stormwater facilities throughout the county, and is working with the U.S. Army Corps of Engineers to construct the C-1 Rediversion Project and initiate the Indian River Lagoon North Restoration Feasibility Study.

- The South Florida Water Management District, working with the St. Lucie River Issues Team, is implementing 24 projects, including agricultural irrigation retrofits, sediment trap construction and the Florida Yards and Neighborhoods program. The South Florida District also completed drafting the Indian River Lagoon South Feasibility Study in partnership with the Corps.

Cumulative sales of the lagoon license plate exceeded \$2 million in 2001, providing funding for stormwater, habitat and education projects throughout the watershed.

The Smithsonian Marine Station, in cooperation with St. Lucie County and other groups, opened the St. Lucie County Marine Center. The center displays a live coral reef ecosystem and several aquariums modeling living marine ecosystems in the lagoon.

Volunteers and public works employees placed more than 11,000 storm drain markers throughout Brevard, Martin and St. Lucie counties to remind residents about stormwater impacts by saying "Dump no waste — Drains to lagoon."

Overall, these efforts and many others to protect the Indian River Lagoon in 2001 have continued to make progress along the path to restoring a healthier estuarine ecosystem that provides vital economic and natural resource benefits to Florida and to our nation.

# Public input vital to improving lagoon

In its zeal to undertake massive environmental projects, big government can sometimes overlook the targeted beneficiaries — the public.

State and federal environmental managers are taking strides to ensure that they don't make that mistake in planning marine habitat and water quality improvements for the Indian River Lagoon.

The U.S. Army Corps of Engineers and the St. Johns River Water Management District have initiated a feasibility study to identify possible improvements to a stretch of the lagoon in Indian River, Brevard and Volusia counties.

In September, the two agencies held three consecutive workshops in Vero Beach, Viera and Edgewater to solicit public comment and to provide information about the Indian River Lagoon North Restoration Feasibility Study. "The strong attendance at the

workshops illustrates that people care about the lagoon's future," says Troy Rice, the District's Indian River Lagoon program director. "We're taking all suggestions and comments to heart. It's their tax dollars destined to pay for potential projects."

Issues under consideration for this study include improving habitat, water circulation and quality; environmental dredging; developing a sediment strategy; better control of stormwater runoff; removal of exotic vegetation; water supply and flood protection; and increasing recreational opportunities.

Officials aren't trying to reinvent the wheel. This study will build upon previous and ongoing projects, such as the nearly completed Upper St. Johns River Basin Project in Brevard and Indian River counties, the Intracoastal Waterway and the C-1 Rediversion Project in Brevard County.

Additionally, the feasibility study will adopt the same goals and

objectives included in the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP) and Surface Water Improvement and Management (SWIM) Plan.

Many of the potential projects are typical of past endeavors over the years, such as "muck" removal in the lagoon and its tributaries, exotic vegetation removal and wetland restoration. Other possible scenarios — such as providing improved water flow in areas adjacent to causeways by providing relief bridges or concrete box culverts — could enhance water quality and seagrass habitat in the lagoon.

Although large projects generally require about seven years from conception to completion, smaller projects can be turned around in about half that time, says Corps spokesman David Schmidt.

Construction projects ultimately chosen will be funded jointly between the federal government and the District. In addition, the District will provide necessary lands, easements and rights-of-way, and operate and maintain completed projects.

"Our goal is to make the environment better and help the community," Schmidt says.

For more information, contact Rice at (321) 984-4950, Steven Robinson, Corps, at (904) 232-2585, or call toll-free, (800) 291-9405, and select extension "0" from the switchboard.



To help improve water flow in the lagoon, replacing earthen causeways with bridges such as this one at U.S. 1/92 in Melbourne, has been proposed.



# Profile gives snapshot of lagoon region

It's no secret that the Indian River Lagoon is critical to east-central Florida's regional economy in terms of tourism, recreation, commercial fishing and the citrus industry.

So, you may wonder, which industries fuel the lagoon region's economic machine? A new federal study offers some answers.

The U.S. Environmental Protection Agency's National Center for Environmental Economics recently completed an economic profile of the lagoon region, measuring everything from tourism dollars to average annual household incomes in the 2,330-square-mile study area.

The profile serves as a resource for characterizing the regional economy of the lagoon's National Estuary Program (NEP) area, a region that includes portions of Brevard, Indian River, Martin, Okeechobee, St. Lucie and Volusia counties.

Similar profiles were completed for each NEP study area using data at the zip code level and an economic modeling system maintained by the Center. The 1998 data is the most recent year available.

Among the findings of the study:

- The average household income in the lagoon region is \$59,509, while the national average is \$69,409.
- Real estate was the top industry in terms of output in 1998, with more than \$1.9 billion in sales.
- The category of "eating and drinking" employed the most workers in 1998, with 23,744 people earning a total of \$300 million.
- Tourism industries together make up \$540 million in output and employs nearly 12,000 in the lagoon region.

"This profile provides a snapshot of the economic character of the lagoon region," says Troy Rice, director of the St. Johns River Water Management District's lagoon program. "While the importance of the citrus industry is missing from these indicators, the tourism-related service industries that are dependent upon a healthy lagoon ecosystem and clean beaches are shown to represent a significant portion of the region's gross domestic product."

For more information about the study, call Gregg Serenbetz at (202) 260-5359.



Matt O'Malley

*Hotel rooms, such as this one overlooking Sebastian Inlet, are temporary homes to tourists, who contribute to the economy of the lagoon region.*

*Below: With more than 190,000 registered anglers in the lagoon region, marinas stay busy.*



Ed Gerland



# Groups work to enhance lagoon's spoil islands

Who among us hasn't fantasized about shedding our daily responsibilities and escaping to a sun-blached tropical island?

The spoil islands dotting the Indian River Lagoon may not be remote by any stretch of the imagination — most are situated a few hundred yards from shore — but they're an enticement nonetheless.

On any given weekend, the islands teem with boaters. Revelers transform the islands into makeshift Club Meds, lugging with them everything from lawn chairs and tents to propane barbecue grills.

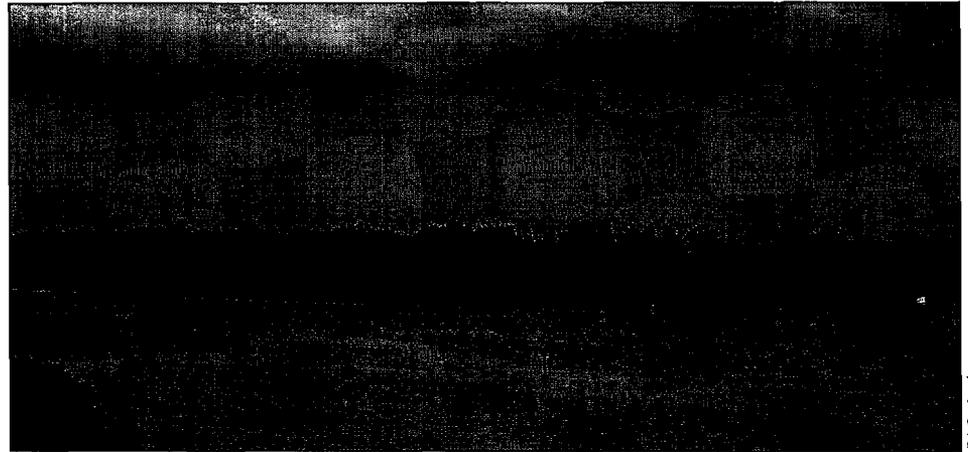
It's no surprise that islands prone to human traffic have become overrun with trash and debris. Worse, some islands designated for conservation and education are being used for recreation.

On many islands, exotic plants have displaced most of the native species. Australian pine and Brazilian pepper are two of the main culprits. This subtle invasion of exotic species eventually limits plant and animal diversity on the islands.

"Exotic infestation is our biggest concern," says Jeff Beal, aquatic preserve manager of the Florida Department of Environmental Protection's (FDEP) Office of Coastal and Aquatic Managed Areas. "Some, like the Australian pines, were probably planted to stabilize the islands."

Fortunately, says Beal, several groups who use the islands have teamed up with a network of government agencies to enhance and police them.

Stewards of these fragile isles run the gamut — boaters, fishing clubs, the Boy Scouts, Stewards for the Southeast Florida Aquatic Preserves,



Ed Garland

*This spoil island at Wabasso South is just one which various groups seek to preserve.*

the Marine Resources Council and Keep Indian River Beautiful.

"When Keep Florida Beautiful holds events, hundreds show up for coastal cleanups that include 10 spoil islands," Beal says. "All in all, there are probably 1,000 people involved in various spoil island projects."

The irony is that few of the islands in the lagoon are the work of nature. The term "spoil islands" is rooted in their origin. From 1953 to 1961, the federal government created the Atlantic Intracoastal Waterway by dredging a 12-foot-deep channel in the lagoon. The "spoil" from the dredging created 137 islands throughout the 156 miles and four counties of the lagoon.

Over the years, the islands have become an indelible part of the lagoon's most scenic vistas and a magnet for both recreation and ecotourism.

The public-private effort to protect and restore the islands is known as the Spoil Island Enhancement Project. The Florida Inland Navigation District (FIND) provides funding for many island restoration projects.

Even with funding in hand, enhancing an island is an evolutionary process.

First, volunteers remove trash and debris. A kiosk is constructed to inform the public about the restoration efforts taking place. The kiosk also offers information about exotic plants, preferred access points, a history of the lagoon and its spoil islands, and contact information for those interested in volunteering or learning more about the project.

Next, targeted exotics are killed. If campsites are desired, the exotics are cut down and stacked for firewood.

Finally, open areas are converted into camping and picnicking areas by the addition of firepits, picnic tables and benches. In some cases, native plants might be introduced to the site.

"Those who want to get involved at a grassroots level can attend one of our Spoil Island Work Group meetings," Beal says. "The group comprises local environmental professionals, group leaders and representatives of the associated government agencies."

For more information on upcoming spoil island enhancement projects, call Beal at (561) 873-6590 or Bill Frega at (561) 332-0841, or visit the Web site [Spoilislandproject.org](http://Spoilislandproject.org).

## St. Lucie River Issues Team ranks projects

A group of government officials and river advocates who make up the St. Lucie River Issues Team met in the fall to review and rank proposals for a variety of projects needing funding from the Florida Legislature. All projects are aimed at enhancing the Indian River Lagoon.

The Issues Team has requested \$7.5 million to fund the projects, but the legislative delegations of the Treasure Coast ultimately will determine funding for fiscal year 2003 during upcoming legislative sessions.

Of the proposed projects, one would reduce urban runoff into the Savannas ecosystem in St. Lucie County; another seeks to use experimental technology to improve

water quality within mosquito impoundments along the lagoon.

In all, 25 local, state and federal projects aimed at improving storm-water quality in the lagoon and the St. Lucie estuary are vying for a chunk of state funds. To date, the Issues Team has distributed \$21.5 million to local, state and federal agencies for such projects. Participants are required to match the funding dollar-for-dollar. In some cases, the local match has exceeded the required 50 percent.

The legislative appropriations have enabled agencies to carry out research, stormwater retrofits and habitat improvements which are needed prior to the implementation of the Southern Indian River Lagoon Feasibility Study

and which would not otherwise have been possible.

"The Issues Team is hopeful that its track record for selecting and successfully completing projects will lead to a high level of support during the next budget session," says Patricia Goodman, a contract manager for the South Florida Water Management District.

"This support will further improve the quality of storm water entering the St. Lucie Estuary and, in turn, lead to improved environmental conditions and habitats within the Indian River Lagoon."

## Envirothon fosters love, study of nature

Each year, thousands of high school students across Florida and many more around the nation compete in varying levels of a problem-solving, natural resource education program called Envirothon.

In the field, teams of students are challenged to use critical thinking skills and work as a team to answer written questions and conduct hands-on investigations of environmental issues in five categories — water, soils, forestry, wildlife and a current issue dealing with the environment.

Students in the Indian River Lagoon region within the South Florida Water Management District — Indian River, Martin, Okeechobee and St. Lucie counties — have a sixth topic, the Indian River Lagoon. The lagoon is a major part of the region's economy and requires protection by every individual. The Envirothon's lagoon section supplies students with

the fundamental knowledge necessary to make important decisions to protect the lagoon.

Envirothon stimulates, reinforces and enhances students' interest in the environment and our natural resources. It presents an opportunity to match wits with peers to realize and accept responsibility as stewards of the land.

The concept was created by the Pennsylvania Association of Conservation Districts as an outdoor hands-on competition. From "Environmental Olympics," the concept expanded to other states and when the national competition was added in 1988, the name was changed to Canon Envirothon. In 1999, 48 states and provinces participated. Envirothon affords a unique approach to environmental education, and it's fun!

Envirothon offers educators a ready-made program that fosters a well-rounded approach to environmental education, and the Envirothon training and competition contributes to achieving several benchmarks of Florida's Sunshine State Standards.

To find out more about Envirothon, visit the Web site <http://gnv.ifas.ufl.edu/~veroweb/envirothon> or call Kathy LaMartina at the South Florida Water Management District at (561) 223-2600, Ext. 3603.



## INDIAN RIVER LAGOON UPDATE

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Ed Garland, Patricia Goodman and Troy Rice

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## Landscaping seminar slated

Free landscaping seminars will be held in Cocoa on Feb. 9 and Melbourne on Feb. 23, from 8 a.m. to 12:30 p.m.

The "Florida Friendly" landscape seminars will feature Janice Broda, of Florida Natives for the Space Coast, and Sally Scalera, a Brevard County horticultural extension agent and *Florida Today* columnist.

The seminars, designed to teach homeowners how to create an attractive, water-efficient, low-maintenance yard, will be held at the Solar Energy Center in Cocoa and Florida Tech's Gleason Auditorium in

Melbourne. Seminars include a free continental breakfast, rain gauges, hose nozzles, and other surprises.

Preregistration is mandatory, as space is limited. To attend the Cocoa seminar, call (321) 639-7655; for Melbourne, call (321) 674-5761.

Sponsors are the cities of Cocoa, Melbourne, Palm Bay and Titusville, the St. Johns River Water Management District and Brevard County Water Resources. Contributors are the Florida Native Plant Society and the University of Florida's Brevard County and Indian River County extension services.



File photo

*A coastal upland plant community thrives along the coast.*



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# INDIAN RIVER LAGOON

## UPDATE

### Pelican Island gears up for a celebration

Ninety-nine years ago, President Theodore Roosevelt set aside a tiny island on Florida's east coast for the protection of brown pelicans and other birds from market hunters.

Pelican Island, America's first national wildlife refuge, became the first of a National Wildlife Refuge System that now encompasses 538 refuges on more than 94 million acres.

If all goes as planned, President George W. Bush will help usher in the 100th anniversary of Pelican Island and the National Wildlife Refuge System on March 14, 2003, with the ceremonial swing of a hammer and the establishment of a new wildlife refuge somewhere in the United States.

"President Bush would sign an executive order creating a new refuge," says U.S. Fish and Wildlife Service Refuge Ranger Joanna Taylor. "It would be fitting to celebrate Pelican Island's 100th birthday with an event mirroring President Roosevelt's actions."

The U.S. Fish and Wildlife Service and the Pelican Island Wildlife Refuge Centennial Steering Committee are constructing a celebration focused around the weekend of March 14, 15 and 16, 2003. The roster of events includes a presidential ceremony, the grand opening of the refuge's public facilities, a National Wildlife Refuge System time capsule display, and a two-day Wildlife Festival.

Other events may include fireworks, a concert by famed musician and part-time Sebastian resident Arlo Guthrie, a performance by the U.S.

Marine Corps Band, a community parade and exhibits from the Smithsonian Institute.

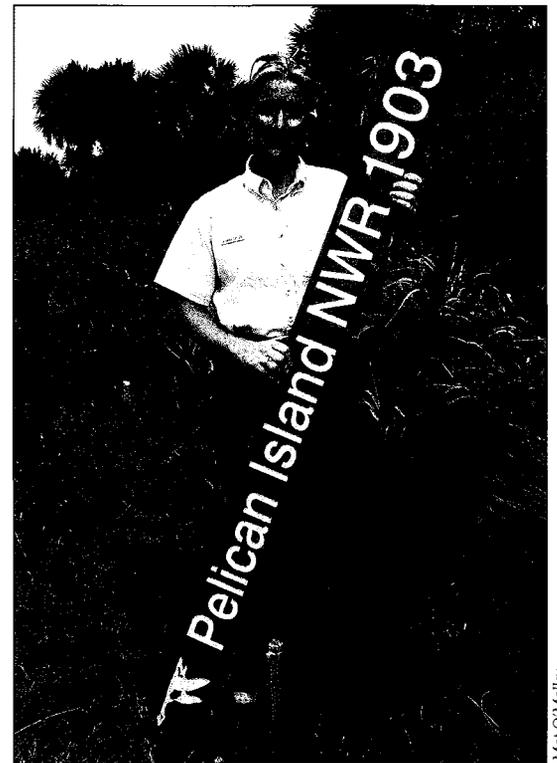
If the president participates, he will nail down the final plank in the Centennial Trail Boardwalk, which will meander through restored tidal mangrove swamp and hammock habitats to an 18-foot-tall observation tower, providing the only land-based public viewing point of Pelican Island.

The boardwalk will be lined with individually engraved planks naming each of the nation's refuges, their state and the year of establishment.

The final plank will denote the yet-to-be named refuge. Suggestions have included, President Roosevelt and Paul Kroegel, who was instrumental in getting the attention of President Roosevelt to protect Pelican Island and served as the nation's first refuge manager.

A National Wildlife Refuge System Centennial Commission has been created to draw sponsors and conduct fund-raising. The 10 members are national celebrities and include Jack Hannah, best known for his popular syndicated television show, "Jack Hannah's Animal Adventures."

"The Centennial Commission's first task is to secure funding for a national wildlife refuge system exhibit to be displayed at the Smithsonian's



Joanna Taylor, a ranger at Pelican Island National Wildlife Refuge, holds the first plank in what will be a boardwalk built to celebrate the refuge's 100th anniversary.

American Museum of Natural History in Washington, D.C.," Taylor says.

Event organizers are encouraging volunteers and donors to contribute time and money for the slew of planned events. For more information, contact the Pelican Island National Wildlife Refuge Centennial Celebration public relations hotline at (772) 571-2003 or the Pelican Island National Wildlife Refuge at (772) 562-3909.

# Are horseshoe crabs living fossils in peril?

Gretchen Ehlinger has heard the descriptions from fishermen and old-timers residing along the Indian River Lagoon: clumps of horseshoe crabs so thick they resembled one immense, shape-shifting organism scuttling along the lagoon floor.

"People tell me there used to be thousands of horseshoe crabs in the lagoon," Ehlinger says. "We're not seeing that anymore."

Very little is known about the Indian River Lagoon horseshoe crab population, but there has been a noticeable decline in their numbers over the past 20 years. And that worries Ehlinger, a doctoral candidate at Florida Tech who is wrapping up a five-year study of these enigmatic creatures.

"Horseshoe crabs have been around for millions of years without having to change much at all," Ehlinger says. "All of a sudden, they're having problems. This is worrisome because they're a good indicator of the health of the lagoon."

Despite its name, the horseshoe crab, *Limulus polyphemus*, belongs to the phylum Arthropoda and is more closely related to spiders and scorpions than it is to true crabs and crustaceans.

Horseshoe crabs are key players in the lagoon's complex food chain because their eggs provide a major food source for juvenile sea turtles, migrating shorebirds, and many species of fish.

Along the Atlantic coast, reproduction patterns of horseshoe crabs are predictable in that the females generally spawn on gently sloping shorelines at high tide on the new and full moon in the spring.

Ehlinger's research has revealed that the horseshoe crab population in the lagoon, by contrast, does not follow the



*Gretchen Ehlinger is getting hands-on experience with horseshoe crabs while working on her graduate studies.*

same pattern of spawning and larval hatching as seen elsewhere, most likely due to the lack of tidal influences.

"Something is causing the horseshoe crabs in the lagoon to spawn, but it's sporadic," Ehlinger says. "This peculiarity makes it more difficult to determine why the horseshoe crab population is declining."

A number of factors may be contributing to the decrease of horseshoe crabs in the lagoon: loss of habitat, an increase in muck and sediment, and human takings.

A few years ago, fishermen were seen loading truck beds full of horseshoe crabs for use as eel bait. This unchecked ravaging of horseshoe crabs likely impacted their populations, especially given the fact that it takes nine to 12 years for them to reach maturity.

"The problem we're seeing now isn't just something that is happening now," Ehlinger says. "It's something that happened 10–20 years ago. There's a time lag between the cause and the effects upon the population."

Meanwhile, Ehlinger is raising and studying horseshoe crabs in a lab at Florida Tech and sharing information with specialists in South Carolina. Canaveral National Seashore, which helped fund her research, will use the fruits of her labor to better protect and manage horseshoe crabs in the Mosquito Lagoon.

"People don't realize how critical they are to the environment," Ehlinger says. "The more we learn about them, the better our chances of ensuring their survival in the lagoon."

For more information, contact Ehlinger at (321) 674-7983.

# A look at the lagoon's dolphin dilemma

Recent local media attention has focused on the health of dolphins in the Indian River Lagoon. The number of dolphin strandings has apparently increased over the last few years as have the number of lesions on individual animals and other dolphin maladies.

Some of the media articles and editorials have speculated that there is a direct link between water quality in the lagoon and the health of the lagoon's dolphin population.

Scientists may not agree with the media on a direct cause and effect, but scientists would agree that poor water quality does impact a variety of lagoon species.

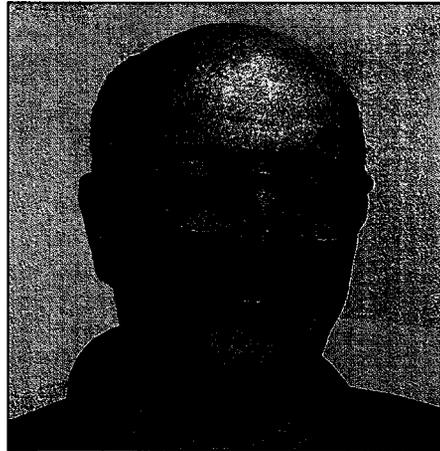
Many of us may be familiar with the impacts that stormwater discharges can have on water quality and, subsequently, on the lagoon. Discharges of storm water can change the salt levels in lagoon water. Sediments often associated with stormwater discharges can increase water cloudiness or form sandbars.

Both of these are primary factors that adversely impact the lagoon's seagrass community. Similarly, the larvae or juveniles of many lagoon species only tolerate a limited range of salt level changes and are often intolerant of even minute amounts of many of the pollutants commonly found in storm water.

Does this mean that the lagoon is some sort of toxic bouillabaisse that kills or causes diseases or gross mutations in every life form it contacts? Not really. While storm events can result in discharges of a variety of pollutants going in to the lagoon, on the whole, water quality in the lagoon is "fair," generally meeting state and federal water quality standards.

Much of the lagoon is classified as shellfish harvesting waters where

## Guest column Indian River Lagoon Program



**Robert Day**  
Project scientist, lagoon program,  
Palm Bay office

direct harvest and consumption of shellfish is permitted. When water quality violations occur, the standard that is most often violated is for dissolved oxygen content. Low dissolved oxygen levels can result in fish kills. Violations of the dissolved oxygen standard occur most often during the warmer months when high water temperature and increased runoff from summer storms combine to result in algal blooms and decreased oxygen levels.

A common thread throughout all assessments of the lagoon's water quality is the impact of stormwater discharges. As point sources of pollution (primarily domestic wastewater treatment plants) have largely been eliminated as the result of the Indian River Lagoon Act, nonpoint sources of pollution (primarily storm water) are the remaining source of pollutants flowing into the lagoon.

The Indian River Lagoon Program, along with many agencies and local governments, is working to address the pollutants from storm water and

other nonpoint sources of pollution. While many projects have been completed, other projects are pending and still others are in the design and development stage.

One of the key elements in reducing pollutants from nonpoint sources is the assistance of the residents of the lagoon region. Efforts by individuals to reduce their impact on the environment by activities such as proper use of fertilizers and pesticides are critical to the lagoon's protection and restoration.

One can participate in these efforts through the St. Johns River Water Management District's Watershed Action Volunteer (WAV) program, implemented in cooperation with Brevard and Indian River counties, or by obtaining information through the Florida Yards and Neighborhoods program offered by the Agricultural Extension Service.

Reducing the amount of pollutants flowing into the lagoon and its watershed will do much to protect and improve water quality. Reducing nonpoint source pollution will, in turn, reduce the impacts to seagrasses and larvae and juvenile animals. If certain aspects of water quality are found to be related to dolphin health problems, these projects and programs will also help address this problem.



# Public to keep an eye out for exotic jellyfish

A fledgling volunteer program in the Gulf of Mexico will soon be expanded to the Indian River Lagoon to help scientists learn about an exotic invader that has infiltrated both water bodies — the Australian spotted jellyfish.

The spotted “jellies,” *Phyllorhiza punctata*, made headlines two years ago when they appeared in the Gulf of Mexico, clogging shrimp nets and devouring untold numbers of fish eggs, larvae, and other microzooplankton. Their appearance in Mobile Bay caused concern among ecologists and the general public, who feared that an established population could be potentially damaging to fish and shrimp stocks.

To learn more about these gelatinous newcomers, Dr. Monty Graham and Lisa Young of Dauphin Island Sea Lab in Alabama established DockWatch, a program that enlists volunteers to serve as the eyes and ears for early warning of jellyfish blooms.

DockWatch has helped Graham learn about the salinity, temperature and other related data associated with jellyfish sightings.

Now, a collaborative effort is under way to expand the Dauphin Island Sea Lab’s DockWatch into the Indian River Lagoon region, where a handful of spotted jellies was discovered in June 2001. An aerial survey last year estimated the Australian jellyfish population in the lagoon to be between 300 and 500, last year.

“The beauty of the DockWatch approach is in its adaptability,” says Troy Rice, Indian River Lagoon Program director. “It is a technique that can be used to address any invasive species that can be recognized by the lay public with a little education. Having trained

observers provides us with valuable information about the early stages of a future invasion.”

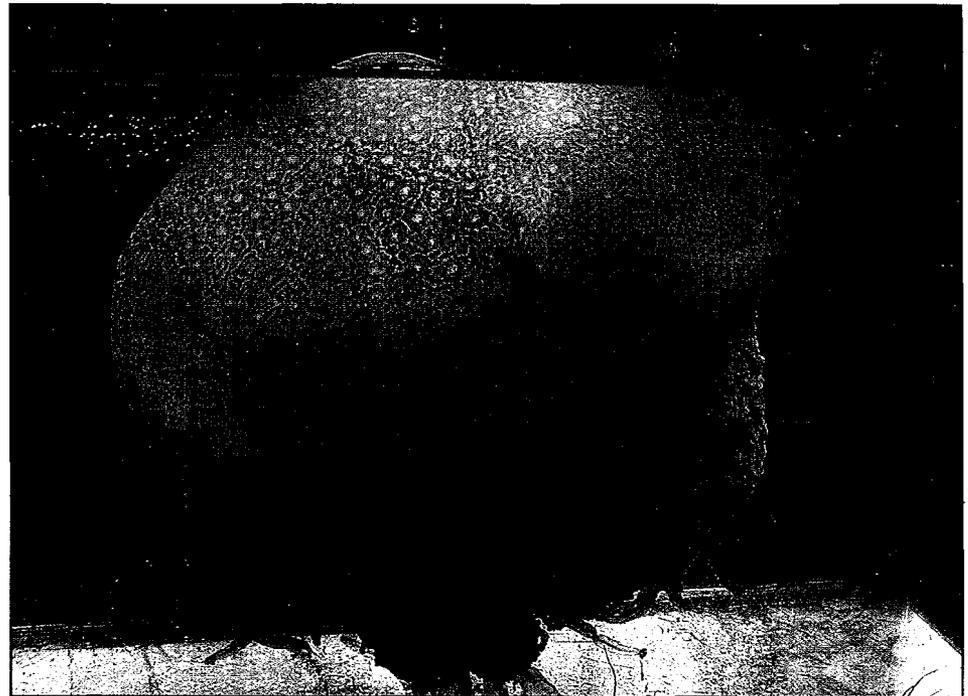
DockWatch volunteers in the lagoon region will be recruited through newspaper articles, pamphlets and educational posters.

Collected data will be available on a project-dedicated Web site, allowing volunteers immediate reward for their efforts. The Web site will help explain why nuisance species like jellyfish are negative influences to both the ecology and the economy. Upon completion of the study, the results will be made available to the general public.

How did a native of the Indo-Pacific arrive in the waters of America’s southeast? It is generally believed the jellyfish were originally transported in the bilge water of a ship traveling through the Panama Canal.

Although few jellies have been found in the lagoon, a seasonal population explosion is possible in the years to come. Specimens collected in the Gulf of Mexico in 2000 were not found to have zooxanthellae, a type of symbiotic algae in their tissues that gives them a brownish appearance. But specimens collected from the lagoon did. This may indicate that the lagoon could be a suitable habitat for the establishment of a resident population.

“For the public at large, jellyfish are often a nuisance that is not well understood,” Rice says. “DockWatch unites scientists and the public in a joint effort to meet the demands of this type of study and to provide answers to the public.”



DockWatch volunteers will be looking out for Australian jellyfish such as this one found in the Indian River Lagoon last year.

Harbor Branch Oceanographic Institution

# Tag funds bolster new marine science centers

A seashell roughly the size of an economy car is an impressive sight. But what about the four-foot-tall mosquito? You'd be more tempted to saddle up this gargantuan bloodsucker than to dare swat it.

Since opening its doors in June, the new Marine Science Center at Lighthouse Point Park has proven that learning about Florida's native critters can be fun as well as enlightening.

"There really has not been anything like this to educate people of all ages about our fragile marine environment," says Sheri Robbins, the Center's manager. "We're surrounded by water, so this type of facility is a natural."

The Center features a 3,100-square-foot exhibit and display gallery, a 5,000-gallon artificial reef, lifelike habitat dioramas, a classroom and a wet lab, and educational programs and activities for all ages.

Inside, the focus is on traditional education through lab sessions and exhibits. Outside, a sea turtle rehabilitation facility allows visitors to view injured turtles on the mend, a sight that has a lasting impact on visitors.

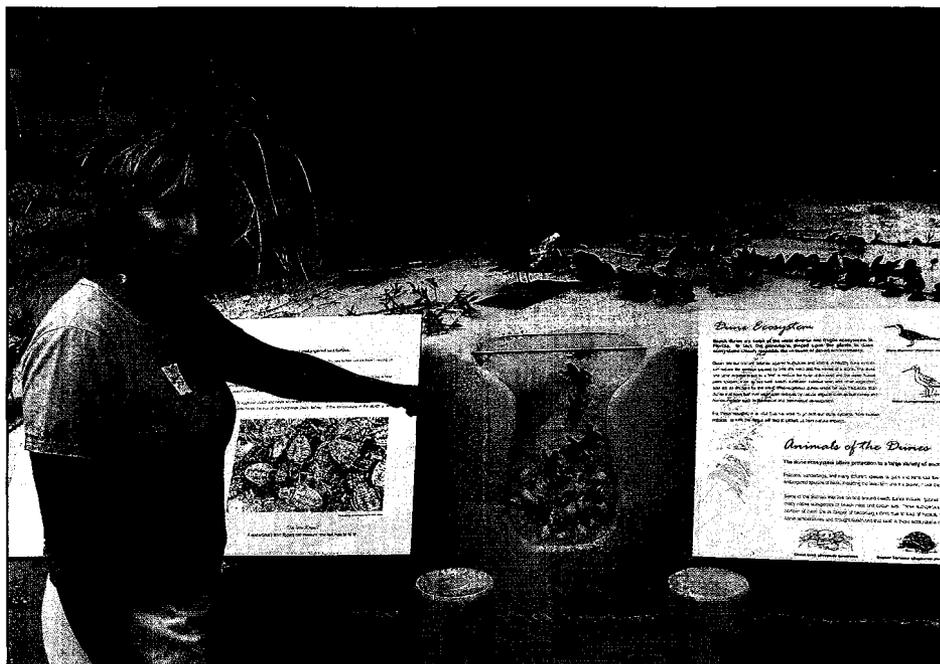
The Indian River Lagoon Program donated \$20,000 from its lagoon license plate revenues to help pay for the Center's wet-dry lab, which will be a vital part of the education programs being developed.

Another \$20,000 in license plate money is helping fund development of the Marine Discovery Center in New Smyrna. This project, still in the embryonic stage, will be housed in the city's old waste treatment plant on the city's north causeway. The Discovery Center is a grassroots, volunteer-based initiative founded in 1994 with the aim of promoting the preservation of the local environment.

"These funds are from the sale of 'snook' tags to drivers in Volusia County and throughout the state," says Troy Rice, Indian River Lagoon Program director. "The funds are being returned to this community to support environmental education and raise awareness of the economic and ecological importance of the Indian River and Mosquito Lagoon estuary system."

To carry out the Science Center's mission, Robbins and her staff are tooling up for a variety of programs aimed at drawing children and adults — local residents and visitors alike. The educational curricula will expand with time and will include lab work and field trips for schoolchildren, three one-week summer camp stints coordinated with the Museum of Arts and Science, sleepovers, story time with the New Smyrna Beach Regional Library, and rotational displays of children's artwork coordinated through the Arthaus Foundation, Inc.

"We're also developing a program called Seasonal Saturdays," Robbins says. "Activities will coincide with particular seasons in Florida, such as sea turtle nesting season or hurricane season. We hope to offer hands-on lab experiments as part of these Saturday programs."



A life-sized display showing how turtle hatchlings emerge from a nest is just part of the exhibit that Lori Becker has to show visitors to the new Marine Science Center.

The Science Center is located next door to the historic Ponce Inlet lighthouse at 100 Lighthouse Drive in Ponce Inlet. Admission is \$3 for ages 13 and up, and \$1 for ages five to 12. Children under five are admitted free. For more information, call (386) 304-5545 or visit [www.echotourism.com](http://www.echotourism.com).

Ed Garland



## Program fosters cleaner citrus discharges

It's no wonder the Spanish chose the Indian River Lagoon region when they introduced citrus to Florida in the late 1500s.

The region's proximity to the warm Gulf Stream offers a degree of built-in freeze protection for groves. The flat land and high water table afford trees with enough moisture to obtain high-quality color, texture and flavor.

Today, the lagoon region supports a \$2.1 billion citrus industry that, in turn, is trying to minimize negative impacts on the 156-mile-long estuary. A new program funded through sales of Indian River Lagoon license plates is helping citrus growers accomplish that goal.

Using a \$50,000 grant, the Indian River County Cooperative Extension Service and the Indian River Soil and Water Control District initiated a cost-share program that helps growers replace or upgrade water control structures that manage the release of water entering into the lagoon.

In citrus groves, water control structures known as screw gates are commonly used to manage water flow. With this type of structure, excess water is released through the bottom, water which has an initial high potential for transporting sediment downstream. Upon reaching the lagoon, these harmful sediments reduce water quality and block

sunlight necessary for the survival of vital sea grasses.

Under the Indian River County cost-share program, license plate money covers 75 percent of the cost of replacing screw gates with riser board structures, which allow sediments to settle out before drainage water reaches the lagoon. Growers pay the remaining 25 percent of the cost for the upgrades.

"This program is important because we need all land use categories to participate in improving water quality in the lagoon," says Liberta Scotto, program coordinator for the Extension Service. "This program is one way the agricultural industry is participating in this issue. They're being extremely proactive."

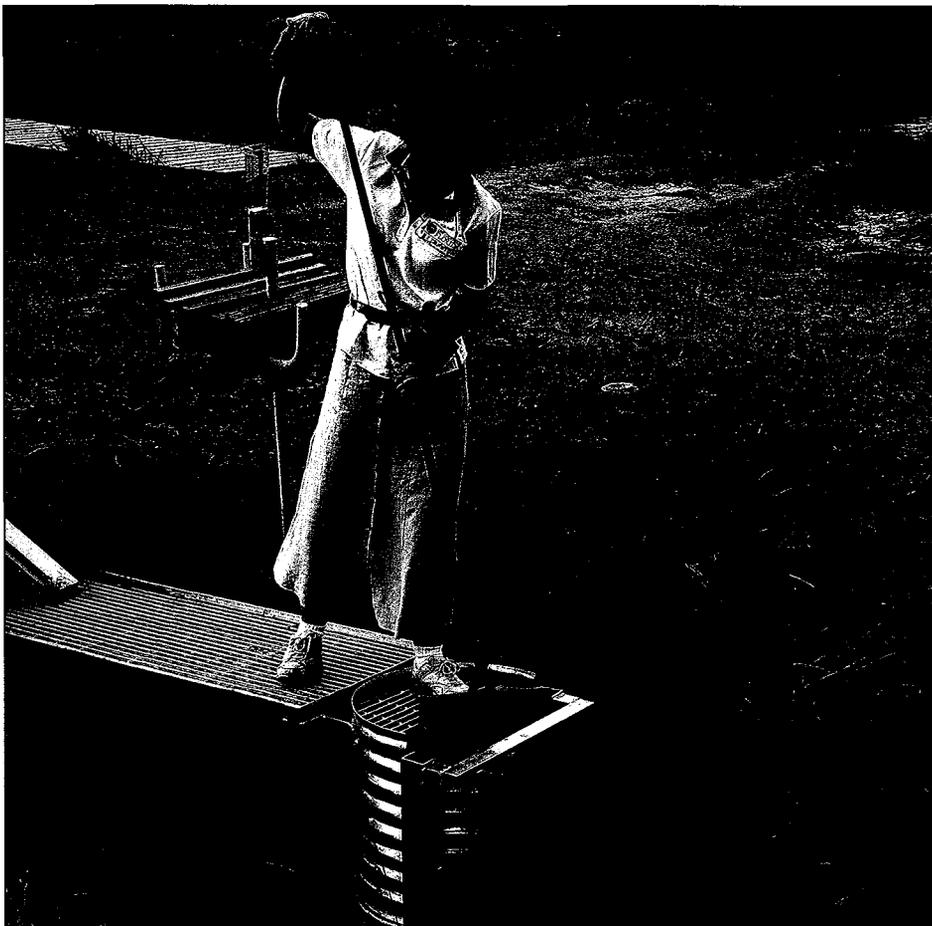
Growers were required to provide professional cost estimates for proposed improvements and to attend educational presentations on improving their management practices in ways that help the environment. Of those applications received, 12 growers were awarded grants.

All told, 19 water control structures at groves in Indian River County will be improved, reducing the flow of sediments, nutrients and organic debris from 758 acres, says James Karl, a conservation technician with the Indian River County Soil and Water Conservation District who worked closely with the applicants.

"The program is as much about education as anything else," Karl says. "We had upwards of 200 people show up at one of our presentations."

Scotto says the citrus industry's enthusiastic response to the program wasn't surprising.

She says, "Many citrus growers realize that they must be good stewards of the land, for it is their lifeline."



*Liberta Scotto demonstrates how riser boards are used in citrus groves to allow sediments to settle out of drainage water.*

## Volunteer group helps restore lagoon habitat

The Orlando Chapter of the Coastal Conservation Association (CCA) Florida is leading a community-based habitat enhancement and restoration effort to re-establish red mangrove (*Rhizophora mangle*) and salt marsh (*Spartina alterniflora*) ecosystems in the Indian River Lagoon.

In the last two years, volunteers from this CCA chapter, the Back Country Fly Fishing Association, Rockledge High School science students and members of the local community planted more than 5,000 red mangrove propagules (seedlings).

This year, the goal is to plant more than 20,000 red mangrove propagules and 1,000 salt marsh plugs. The expanded program initiated this year has been made possible with financial grants from the FishAmerica Foundation, the United States National Oceanic and Atmospheric Administration Community-based Restoration Program and the Canaveral Port Authority.

In April, volunteers planted 6,937 red mangrove propagules on a site being restored by the Canaveral Port Authority. The next planting is scheduled for July 27 in Cocoa Beach, with additional plantings scheduled for Sept. 28 and Nov. 16.

"There's plenty of room for more volunteers," says Doug Blanton, conservation chair of the Orlando CCA chapter. "It's fun, educational and family-oriented, and it only takes half a day."

Red mangroves are one of the lagoon's most important aquatic plants. The roots provide shelter for large and small organisms and the branches provide roosting and nesting sites for countless year-round and migratory birds.

"Marine biologists have estimated that a single red mangrove will be the home to over 10,000 fish during its lifetime and a mangrove may live to be over 20 years old," says Blanton. "When you multiply that times the thousands of trees we're planting, it's



Mark Carter, a member of the Orlando chapter of the Coastal Conservation Association and vice president of CCA Florida, checks a row of newly planted mangrove seedlings.

easy to see the positive impact our efforts can have on the entire lagoon." For information on how to participate in the next planting, e-mail either Mark Carter at [oarlocki@aol.com](mailto:oarlocki@aol.com) or Doug Blanton at [mangrove@indianriver.cc](mailto:mangrove@indianriver.cc), or go to [www.indianriver.cc/cc/events.htm](http://www.indianriver.cc/cc/events.htm).

## Grant sends students to educational summer camp

This summer, 156 Martin County children from diverse backgrounds will experience a two-week camping adventure that they might not otherwise be able to afford, thanks, in part, to a \$20,000 grant from the National Estuary Program (NEP).

Camp WET — which stands for water, environment and technology — is hosted each year at the Environmental Studies Center in Jensen Beach. The program offers students entering the fifth and sixth grades an opportunity to study local and global environmental issues in depth.

The program is composed of three two-week sessions that accommodate 52 students per session. Campers, selected by their school teachers based on interest and student need, will enjoy hands-on, field-based learning techniques that have been proven effective with students of this age.

Planned activities include snorkeling at Bathtub Reef, seining in the Indian River Lagoon, touring the Loxahatchee River and visiting the Martin County Water Treatment Plant. The goal is to teach children about the area's unique environment without making it too much like school.

"The program opens the door of opportunity to children that might otherwise not have a chance to attend," says Martin County Commissioner Doug Smith. "The teachers do a fantastic job. It's an amazing thing to see."

The Center attempts to instill youngsters with an environmental conscience, reaching the parents indirectly. Students share what they've learned at the dinner table, making what is taught at camp go much further than the campers themselves.

## INDIAN RIVER LAGOON UPDATE

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For additional information about the Indian River Lagoon Update or the lagoon program, please call Ed Garland, regional communications coordinator, at (321) 676-6612.

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## Partnership directs program

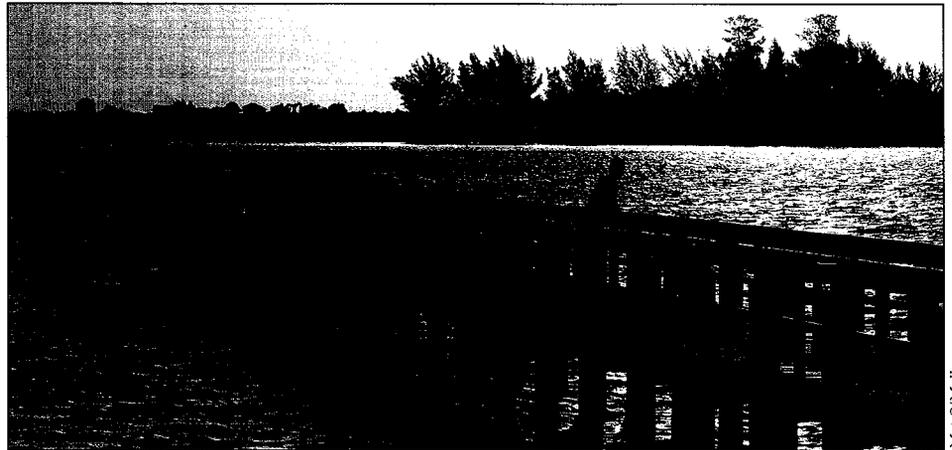
The Indian River Lagoon National Estuary Program is a partnership whose members work to improve the water quality and ecological integrity of the 156-mile-long estuary on Florida's east coast.

The U.S. Environmental Protection Agency (EPA) designated the lagoon as "an estuary of national significance" in April 1990 and included the lagoon in the National Estuary Program.

The lagoon program began in April 1991, with oversight and funding from EPA. The St. Johns River and South Florida water management districts, the five counties that border the lagoon —

Brevard, Indian River, Martin, St. Lucie and Volusia — and representatives of state, federal and regional governments and agencies make up the Indian River Lagoon Advisory Board, a board charged with guiding and overseeing the lagoon's protection and restoration. The lagoon program is sponsored by the St. Johns District and is housed at the District's Palm Bay Service Center.

The St. Johns District oversees lagoon work in Brevard, Indian River and Volusia counties. The South Florida District oversees lagoon work in Martin, Okeechobee and St. Lucie counties.



Mar O'Malley



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<http://www.epa.gov/owow/oceans/lagoon>

For more information, contact the  
**Indian River Lagoon Program**  
525 Community College Parkway SE  
Palm Bay, FL 32909  
(321) 984-4950 or (800) 226-3747  
Fax: (321) 984-4937



# the Indian River Lagoon license plate



HELPING RESTORE  
A FLORIDA TREASURE



## Indian River Lagoon System



## What the Lagoon Means to the Region

With an annual economic impact of \$753 million, the Indian River Lagoon is certainly worth protecting. Just take a look at some of the numbers.

The waterway provides 19,000 jobs for lagoon area residents, with a combined annual income of \$250 million. Residences and other properties along the lagoon are valued at \$825 million.

Lagoon fishing grounds are valued at \$140 million, and shellfish are worth \$15 million annually. The lagoon provides half of east Florida's annual clam harvest and 15 percent of the nation's clam harvest. The world-renowned citrus industry, supported by the lagoon's watershed, is valued at \$2.1 billion.

Recreational activities such as boating, water sports, hunting, shellfish harvesting, fishing and nature observation bring in more than \$465 million annually.



# The Indian River Lagoon

a special place

A brilliant blue ribbon of water wanders through the backyard of growing urban areas along Florida's Atlantic Coast, meandering through the heart of North America's most diverse estuary. Along its way, this water body passes by pre-colonial Indian mounds, ancient salt marshes, and the more modern world of America's spice port at Kennedy Space Center.

This underwater "rain forest," known as the Indian River Lagoon, is home to a rich array of plants and animals — more than 4,000 species — including manatees, dolphins, sea turtles and seahorses. Numerous seagrass beds offer hiding places for young sea cucumbers — oysters, clam shells, crabs and fish — whose very survival depend on the willingness, collectively and individually, of people to protect and restore the lagoon, a fragile and special place.

This fragile foundation was created thousands of years ago when the Atlantic Ocean deposited a massive sandbar along Florida's east coast, cutting off a long narrow strip of ocean — it became the lagoon, spanning 150 miles from Ponce de Leon Inlet at New Smyrna Beach, south to Jupiter Inlet, near Stuart, the lagoon's location gives it a climate that ranges from temperate (or moderate) to subtropical (very hot).

Under these idyllic waters, the lagoon and its natural system, the ocean, threatened by the sandy beaches, the lagoon would have an important message: the whole is far better than the sum of its parts.

Along the shores and in the marshlands, brackish mangrove trees hold the soil in place. Many of the trees grow through the water, forming a thicket whose small, flat and rigid, stiff, woody, brown leaves provide shade. These mangrove trees are home to a wide variety of birds, fish and other animals. They also provide a natural barrier against waves from the ocean and prevent the salt water from entering the lagoon.

In the marshes, mangrove trees provide food for the manatee and turtle, and shelter the crab, shrimp and fish. Like the trees and mangroves, the water manatee, the oyster, the seagrass and the fish, all depend on the water from above, looking for their next meal. All are tied together in the food chain.

The delicate balance of life is seriously threatened. The effects of human activities are disturbing the water and disturbing the delicate chain. Pressure from increasing residential and commercial development, pollution and other human impacts have forced a new way of thinking about the lagoon. We cannot afford to lose this unique, irreplaceable.

## The lagoon needs our help

Between Volusia and Martin counties, Florida's Atlantic Coast is known alternately as the Space Coast and as the Treasure Coast. It should, however, be known as "nature's coast" for it is the natural environment of the lagoon that attracts so many to it. Three major water bodies — the Mosquito Lagoon, the Banana River and the Indian River Lagoon — make up the area, a popular recreation area and habitat for abundant wildlife.

Though the word "river" appears in its name, the Indian River Lagoon is not a river. It is actually an estuary. An estuary is any water body where freshwater (in this case draining from the land or a river) and salt water (from the ocean) meet and mix. The Indian River Lagoon is also a special type of estuary called a lagoon, because it does not rely on rivers as a source of freshwater.

More than 1.35 million people live and work in the lagoon region, which includes some of the fastest growing areas in the United States.

## Protecting the lagoon

In an effort to protect the unique diversity of this environmental gem, the U.S. Environmental Protection Agency designated the Indian River Lagoon as an estuary of national significance in April 1994 and included the lagoon in the "Area and Estuary Program." Established under the Water Quality Act of 1987, the program administers a permit system for activities that may affect pollution, development or erosion, and assists local organizations in the development of long-range plans to protect and manage the waters.

The Indian River Lagoon program began in April 1994, with oversight from the U.S. Environmental Protection Agency. Other program participants are the St. Johns River and South Florida water management districts and the five counties that border the lagoon — Brevard, Indian River, Martin, St. Lucie and Volusia. The lagoon program has been incorporated into the St. Johns River Water Management District, with input from the original participants and the Indian River Lagoon Advisory Board, a board made up of individuals and representatives of state, federal and local governments and agencies.

## Program goals

The collaborative effort to protect and restore the lagoon are to:

- Improve and protect the environmental integrity of the Indian River Lagoon.
- Attain and maintain a functioning, healthy ecosystem that supports endangered and threatened species.
- Provide a forum for the coordination of efforts related to the restoration and enhancement of the estuary and the enforcement of rules provided for its protection.
- Develop and implement a strategy for public participation and education.
- Develop and implement a formal management plan, with accountability and goals clearly established.
- Identification and development of long-term funding sources for lagoon protection and restoration programs.

## A few facts about the lagoon

- Length — 156 miles long
- Bordering counties — five
- Local authorities — 32 cities, two port authorities, two inlet commissions, six soil and water conservation districts
- Width — varies from one-half mile to 5 miles
- Depth — averages 3 feet
- Water type — a mixture of freshwater and salt water
- Water sources — rainfall, the ocean and drainage from the land
- Watershed — 2,264 square miles
- Surface water — 353 square miles
- Number of fish species — 603
- Number of bird species — 310
- Number of plant species — 1,350
- Number of animal species — 2,765
- Number of annual anglers — 190,000

## Solutions to the lagoon's problems

**Problem:** Many and increasing quality degradation.

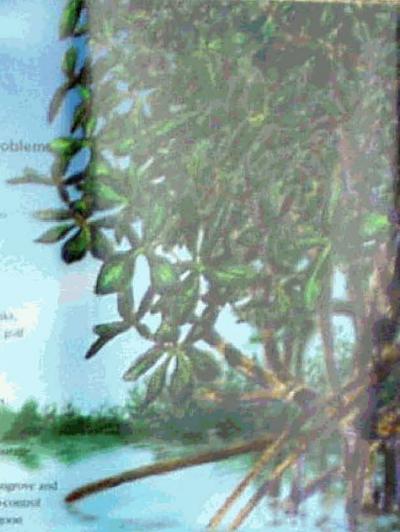
- Solutions:**
- Restore water quality by reducing discharges into the lagoon.
  - Reduce soil erosion.
  - Reduce the amount of nutrients going into the lagoon from sewage plants, septic tanks, industry, towns, gardens, golf courses and farms.
  - Reduce the disposal of pollutants into the lagoon and its tributaries.

**Problem:** Habitat loss and degradation.

- Solutions:**
- Protect, restore and encourage new seagrass beds.
  - Restore or reconstruct mangrove and salt marshes in mosquito-control impoundments to the lagoon.

**Problem:** No long-term commitment to problem solving.

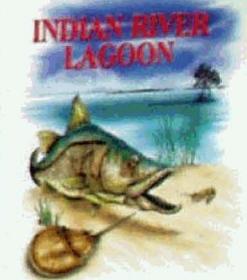
- Solutions:**
- Coordinate local, state and federal efforts to clean up the lagoon.
  - Ensure adequate enforcement and compliance of laws created to protect the lagoon.
  - Create an action-oriented partnership to protect the lagoon, that includes businesses, scientists, government representatives and individuals throughout the lagoon region.
  - Obtain definite, long-term commitments to restoration plans and activities.
  - Monitor, continually, the success of cleanup efforts.



A look at North America's most diverse estuary system

# A fragile balance

THE INDIAN RIVER LAGOON



St. Johns River Water Management District  
Indian River Lagoon Program  
123 Commonsense College Parkway S.E.  
Palm Bay, FL 32909  
(321) 964-4200  
(800) 226-5747 or (800) 204-5264  
Use the Internet: www.irlm.com

Hook up now!

FLORIDA YES24

EPA

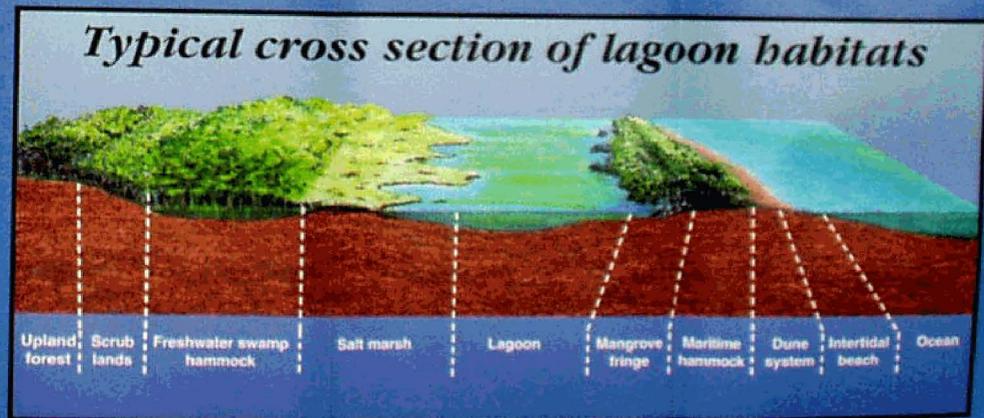
St. Johns River Water Management District



THE INDIAN RIVER LAGOON

# A fragile balance

A look at North America's most diverse estuary system

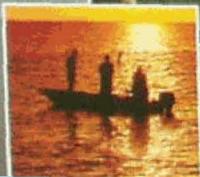
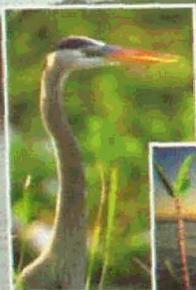


## About the Lagoon

The Indian River Lagoon supports a wide variety of wildlife. The lagoon contains 2,965 species of animals — including 700 species of fish and 310 species of birds — and 1,350 plant species. One-third of the country's manatees make the lagoon their home. It is also home to 32 other threatened or endangered species.

The lagoon extends from Ponce de Leon Inlet in Volusia County to Jupiter Inlet in Palm Beach County.

Ranging in width from one-half mile to 5 miles wide, the lagoon averages 3 feet in depth. The Intracoastal Waterway, which is the federal navigation channel running the length of the lagoon, averages 12 feet in depth.



## Lagoon Projects – How Funds Are Used

Proceeds from the sale of the Indian River Lagoon plate are used to protect and restore lagoon habitat and water quality through *reconnection of impounded salt marshes, shoreline stabilization, spoil island and mangrove restoration, stormwater treatment and environmental education projects.* During its first five years, the license plate raised more than \$2 million, with annual revenues of about \$400,000. Local cost-share partnership funding for the lagoon projects is usually double!

Lagoon projects completed or planned include:



### Volusia

Stormwater retrofit and sediment trap installation were completed in New Smyrna Beach. Restoration of coastal marshes was

implemented at Tomoka GeoPark.

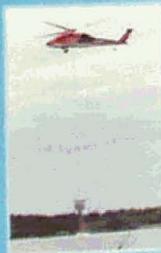
### Brevard

Over 400,000 cubic yards of muck have been removed from Crane and Turkey creeks. Shoreline stabilization is completed at Ais Park. Impounded salt marshes have been reconnected, mangroves planted and sediment traps have been installed.



### Indian River

Sediment trap installation, coquina rock installation at Sebastian Riverview Park for shoreline stabilization, Wabasso Causeway stormwater systems improvements, 250 tons of oyster shells airlifted to Pelican Island to create natural wave break to halt erosion.



### Palm Beach

Shoreline restoration was implemented at Coral Cove Park. Jupiter Inlet and spoil islands have been



revegetated with native plants. Boy Scouts installed stormwater curb inlet markers at Loxahatchee River. Brazilian Peppers were removed in J.W. Corbett Wildlife

Management Area. Restoring the function of two culverts enhanced Jones Creek flow. Fisheries are now benefiting from restoration of native wetland habitat in Frenchman's Forest.

### St. Lucie

Mosquito impoundments have been reconnected and enhanced. Exotic plant species have been removed. 75 acres of coastal wetlands have been restored with improved public access. Moore's Creek has undergone cleanup and enhancement.



### Martin



Blowing Rocks Preserve historical habitat has been restored. Sediment traps have been installed. Mangrove restoration

has taken place in Jensen Beach at Indian Riverside Park. A pilot project involving mangrove marsh impoundment habitat restoration is in place. State land at Seaborch has been revegetated with native plants.

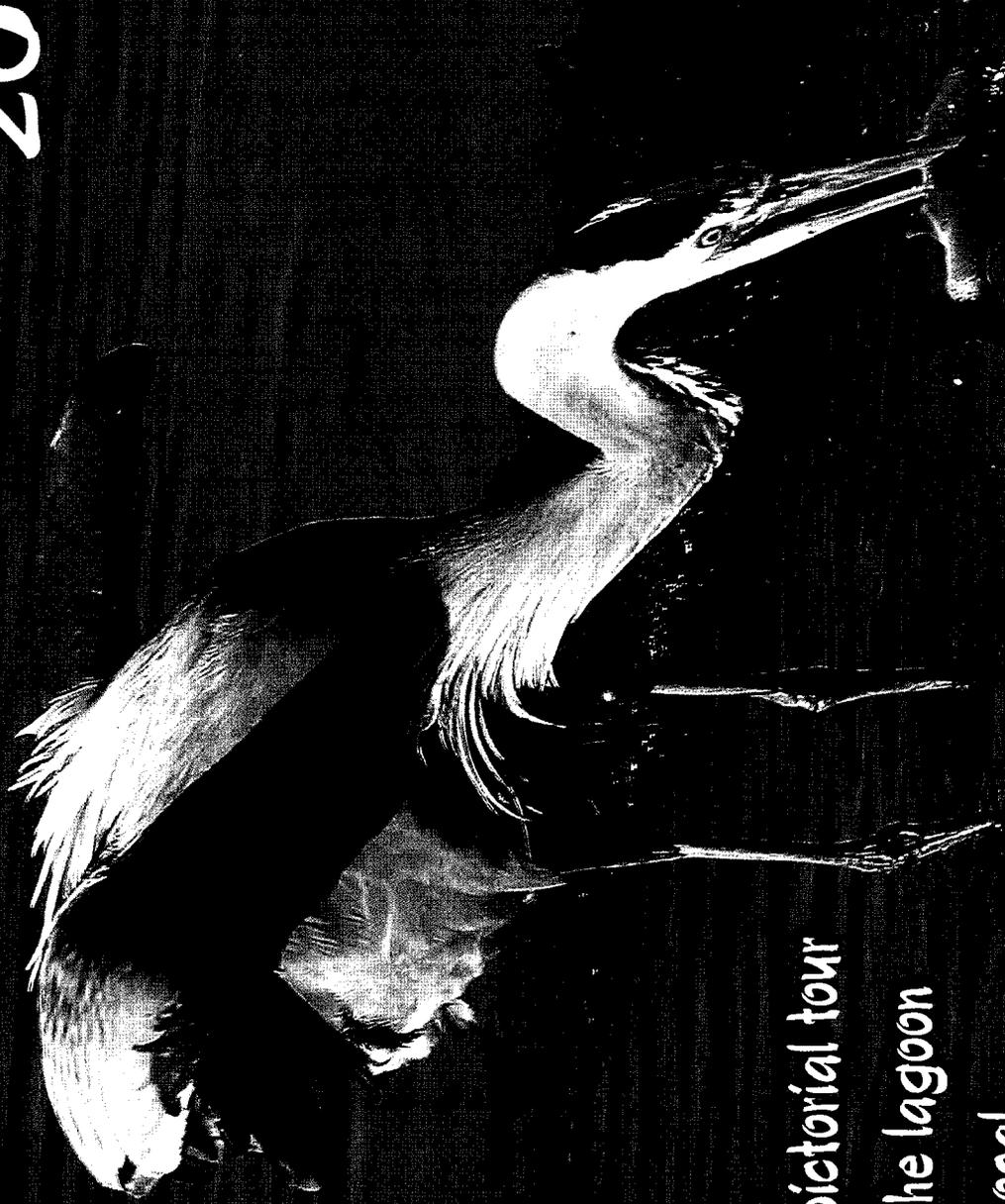


## What Your Purchase Means

When Florida residents purchase an Indian River Lagoon specialty license plate for their vehicle, they are doing much more than paying a registration fee. They are helping to restore a 350-mile-long waterway.

Fifteen dollars from the sale of each lagoon license plate is combined with funding from other sources and used in a variety of ways to restore and protect the most diverse estuary in North America. At least 80 percent of the plate proceeds go to habitat restoration and up to 20 percent to environmental education (focusing on the lagoon). No administrative salaries or studies are paid from license plate revenue.

# Indian River Lagoon 2004 Calendar



A pictorial tour  
of the lagoon  
by local  
photographers...

Restore a  
Florida Treasure



Hook Up Now!  
At Your Local  
Tag Office

Learn more about the  
Indian River Lagoon,  
please visit the following web sites:

<http://irl.sjrwmd.com>

<http://www.sfwmd.gov/org/lexo/mslsc>

<http://www.epa.gov/owow/estuaries/programs/irl.htm>

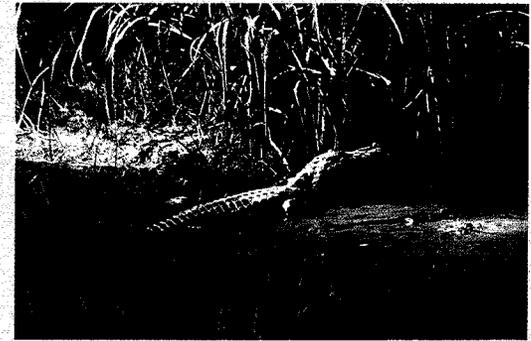
# The Indian River Lagoon



## Parasailing Over the Indian River Lagoon

Photographer: Lila Dizefalo  
Location: South of Sebastian Inlet

The system is comprised of three  
water bodies, including the  
Mosquito Lagoon, Banana River,  
and the Indian River Lagoon  
proper.



## My Mom's Bigger Than Your Mom

Photographer: Ann Spellman  
Location: Kennedy Space Center

It's sometimes mistaken for a river,  
but the Indian River Lagoon system  
is really a brackish water estuary  
stretching 156 miles from Ponce de  
Leon Inlet in Volusia County to  
Jupiter Inlet in Palm Beach County.



## Horseshoe Crab

Photographer: Jim Angy  
Location: Near Melbourne Causeway

It crosses the temperate and sub-tropical zones and serves as a nursery and spawning ground for lagoon and ocean species.



## A Dang, Darn Darner

Photographer: Jeffrey Berger  
Location: Melbourne Beach

The lagoon is the most biodiverse estuary in North America and is home to more than 4,000 species of plants and animals.



## Checked Pufferfish

Photographer: Tom Norwood  
Location: Merritt Island

Unlike a river, the lagoon is driven by wind and wave.



## Sunrise Over Melbourne Causeway

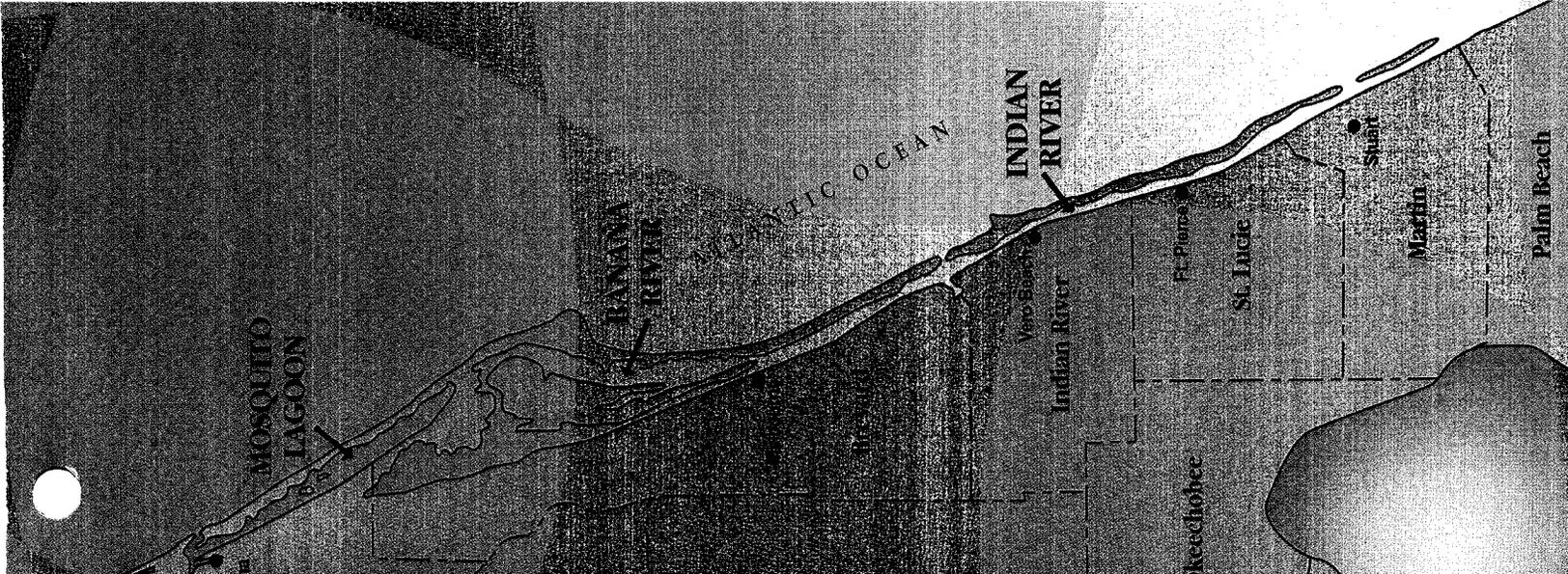
Photographer: Richard Ennis  
Location: Melbourne



Environmental Consulting & Technology, Inc.  
in cooperation with the Florida Department of Environmental Protection



Environmental Consulting & Technology, Inc.









romantic Jupiter Inlet

photographer: Joe Crawford from Jupiter, Florida



## Snowy Egret Show

Photographer: Charles Corbeil  
 Location: Merritt Island NWR

The Indian River Lagoon is strategically located on the Atlantic Flyway making it a key biological highway™ for many migratory bird species.

To learn more about the Lagoon visit:  
<http://www.sfwmd.gov/org/exo/mslsc>

# FEBRUARY 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--------|---------|-----------|----------|--------|----------|
|        |        |         |           |          |        |          |
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| 22     | 23     | 24      | 25        | 26       | 27     | 28       |
| 29     |        |         |           |          |        |          |





# MARCH 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
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| 21     | 22     | 23      | 24        | 25       | 26     | 27       |
| 28     | 29     | 30      | 31        |          |        |          |



## Walking Roots

Photographer: Barbara Zarrella  
 Location: Round Island Park - Vero Beach

Starting in the 1940s, more than 10,000 acres of wetlands in the Indian River Lagoon were impounded for mosquito control. Reconnecting these impounded wetlands to the lagoon restores habitat to fish and wildlife and benefits water quality.

To learn more about the Lagoon visit:  
<http://iri.sjrwmd.com>



RIVERSIDE  
CAFE

Little Nobe II

Little Nobe II

Riverside Cafe

Photographer: Patricia R. Holm Location: Vero Beach, Florida

# APRIL 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
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| 18     | 19     | 20      | 21        | 22       | 23     | 24       |
| 25     | 26     | 27      | 28        | 29       | 30     |          |



## Casting for Bait

Photographer: Robert Murray  
 Location: Titusville, Florida

The Indian River Lagoon brings in more than \$730 million dollars annually to the region's economy.

To learn more about the Lagoon visit:  
<http://irl.sjrwmd.com>

| MARCH |    |    |    |    |    |    | APRIL |    |    |    |    |    |    |
|-------|----|----|----|----|----|----|-------|----|----|----|----|----|----|
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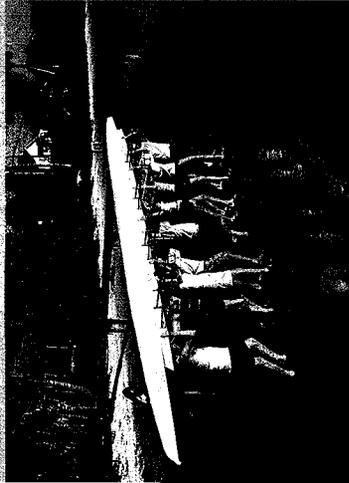






# JUNE 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
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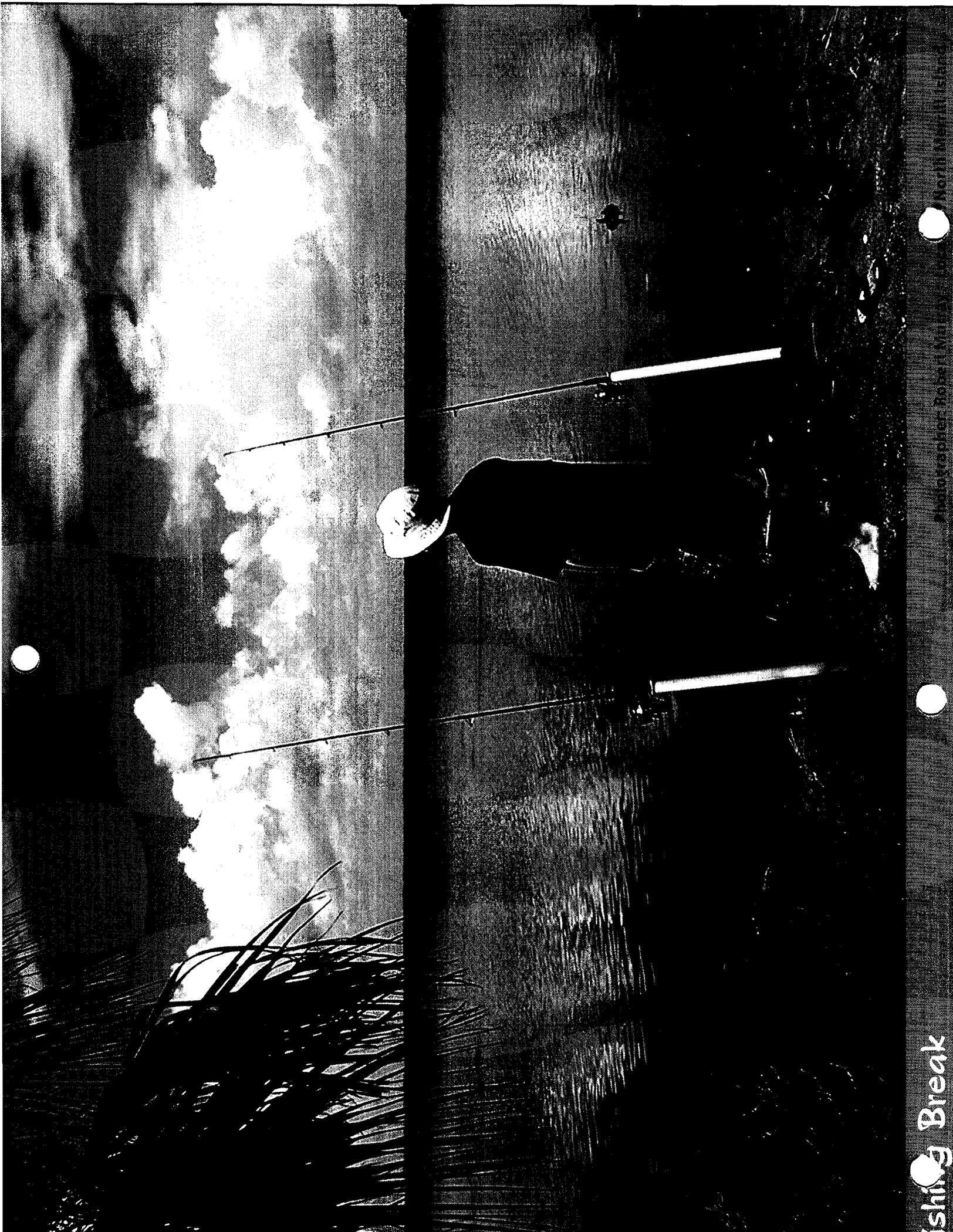


## Crivisa River

Photographer: Scott Kuhns  
 Location: North of Jensen Causeway -  
 Martin County

The Indian River Lagoon is one  
 of the most popular destinations  
 for recreational anglers in the  
 State of Florida.

For more information on lagoon  
 species visit:  
<http://irl.sjrwmd.com>



# JULY 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
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|        |        |         |           | 25       | 26     | 27       |
|        |        |         |           | 28       | 29     | 30       |
|        |        |         |           | 31       |        |          |



## Manatee Pocket Community

Owner: Brooks Conrad  
 Location: Manatee Pocket, Stuart

Cost: \$1000 to spread 1 pound of fertilizer on a lawn, but it costs less to make that nitrogen out of the air.

For more information about the Lagoon visit:  
[www.epa.gov/owow/watersheds/indian\\_river\\_lagoon/programs/irt.htm](http://www.epa.gov/owow/watersheds/indian_river_lagoon/programs/irt.htm)





le, Mud Flat, Tube Worms & Sotgrass Foothold

© 1981

# AUGUST 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--------|---------|-----------|----------|--------|----------|
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| 22     | 23     | 24      | 25        | 26       | 27     | 28       |
|        |        |         |           |          |        |          |
| 29     | 30     | 31      |           |          |        |          |



## Butterfly Garden

Photographer: Pat Poston

Location: Banana River - Merritt Island

The biodiversity of the crabs and shrimp that live in burrows the sediments is higher in the Indian River Lagoon than any other temperate estuary on earth."

The late Raymond Manning  
Smithsonian National Museum of Natural History



# SEPTEMBER 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|--------|--------|---------|-----------|----------|--------|----------|--------|
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| 5      | 6      | 7       | 14        | 15       | 16     | 17       | 18     |
| 12     | 13     | 14      | 21        | 22       | 23     | 24       | 25     |
| 19     | 20     | 21      | 28        | 29       | 30     |          |        |
| 26     | 27     | 28      |           |          |        |          |        |





Photographer: Bill Engard Station: St. Lucie In

# OCTOBER 2004

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
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|        |        |         |           |          | 14     | 13       |
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# NOVEMBER 2004

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one  
by the  
ion



Photographer: Robin Sheinwald Location: New Smyrna Beach, Florida

# DECEMBER 2004

|  | SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
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|  |        |        |         | 29        | 30       | 31     |          |        |



# Restore a Florida



At Your E

To learn more about the In  
please visit the fo