

GOAL I B

Manage Waterways to Safeguard Their Ecosystems

Brevard County, Florida lies within the convergence zone of tropical and temperate climates allowing for plants and animals of both climates to coexist in the same geographical area. The waterways and adjacent lands within Brevard County are among the most ecologically diverse in North America, supporting 2,100 plant species and 2,200 animal species (IRLNEP, 2008). The Indian River Lagoon (IRL), a major waterway in Brevard County, was designated an “estuary of national significance” by the United States Environmental Protection Agency (USEPA) in 1990 in recognition of the ecological diversity found in the IRL system (IRLNEP, 2008). The natural beauty of Brevard County’s waterways and adjacent lands make the county a desirable place to visit and live. Due to the attractiveness of the area, the numbers of residents and tourist continues to increase. This results in additional development that could threaten the environmental health and functionality of ecosystems throughout the county’s waterways and adjacent lands. The health of Brevard County’s waterways directly affects the economy and recreation potential of the county.

Brevard County’s economy relies heavily upon the ecological health of its extensive waterways. Marine related businesses in Brevard County produce almost \$754 million from sales annually (G.E.C., Inc., 2003). Many aspects of this robust economic component require fully functioning ecosystems, such as seagrass beds that have been calculated to contribute \$4,600 per acre per year to the productivity of the economy (Hazen and Sawyer, 2008). The waterways also increase residential property values in Brevard County by between \$1.18 billion and \$1.37 billion (G.E.C., Inc., 2003). Hazen and Sawyer found that as the water quality and diversity of wildlife improve, the revenue generated from waterway useage would increase by nearly \$80 million per year just from recreational and non-use values (2008). Multiple reports suggest that if the waterways were allowed to deteriorate, then property values, recreation, and revenue from marine related businesses would decline (G.E.C., Inc., 2003 and Hazen and Sawyer, 2008)

The waterways of Brevard County are home to approximately 50 endangered or threatened species. Many of these organisms are found in greater numbers throughout this county, such as the mangrove *rivulus* and Florida manatee, than any other area (Indian River Lagoon National Estuary Program, 2008). These creatures will continue to flourish as long as the habitats that they reside in are thriving and fully functional. As stewards of the land, it is our responsibility to protect its varied life.

Safeguarding the ecosystems of Brevard County waterways benefits not only the organisms that live within them, but also residents, tourist, and businesses. The continued population and economic growth of the county must be balanced with ecosystem preservation initiated through best management practices, smart development, and conservation.

Potential Funding Sources

Ad Valorem Taxes
General Sales Tax
Amusement Tax
Rental Car Tax
Watercraft Sales Tax
Real Estate Transfer Tax
Severance Taxes
Special Assessments Tax
Tax Increment Funding
Boater Registration Fees
Connection Fees
Disposal Fees
Emissions/Discharge-Based Fees
Facility Permit Fees/Monitoring Fees
Development Impact Fee
License Fees
Product Registration and Inspection Fees
Recreational Fees
Utility Charges
Wetland Permit Fees
General Obligation Bonds
Revenue Bonds
State Revolving Funds
Non-State Revolving Funds
Fines and Penalties
Land Trusts
Transferable Development Funds
Wetlands Mitigation Banking
Credit Card Insurance
Direct Donations
Stamp Fees
Water and Sewer Access Rights
FWS North American Wetlands Conservation Act Standard Grants
FWS North American Wetlands Conservation Act Small Grants
FWS Coastal Wetlands Planning, Protection, and Restoration Act Grants
FWS Coastal Program
FWS Partners for Fish & Wildlife
FWS Clean Vessel Act Pumpout Grant Program
FWS Endangered Species Conservation Grants
FWS Wildlife Restoration Grants
FWS Sport Fish Restoration Grants
NOAA Community Based Direct Solicitation
NOAA Fish America Foundation
NOAA Marine Debris and Technology Program
The Nature Conservancy
National Estuary Program CPR Grants
Coastal Counties Restoration Initiative

Potential Funding Sources (cont.)

Coastal & Estuarine Land Conservation Program
Community Based Marine Debris Prevention and Removal Grants
Coastal Partnership Initiative (Fl Coastal Management Program)
Southeast Aquatic Restoration Partnership
Coastal Zone Management Administration Awards
Watershed Program Development Grant
Community Action for a Renewed Environment (CARE)
Beach Grants
Nutrients Benefits Valuation
Water Pollution Control
USACE Section 204
USACE Section 206
Estuary Habitat Restoration Act
Aquatic Plant Control
National Wildlife Refuge Cooperative Research Program
Water Resources Research Grant Program
NRCS Conservation Innovation Grants
National Fish and Wildlife Foundation Keystone Initiatives
Five-Star Restoration Grant Program
Shell Marine Habitat Program
Nature of Learning Program
Native Plant Conservation Initiative
Pulling Together Initiative
Fl FWC State Wildlife Grant
Boating Infrastructure Grant Program
Florida Boating Improvement Program
Florida Forever Program
Recreational Trails Program
Section 319 Grants
TMDL Water Quality Restoration Grants
Florida Recreation Development Assistance Program
Land and Water Conservation Fund
Indian River Lagoon License Plate Fund
Indian River Lagoon Workplan Projects
Community Education Grant Program
Water Management District Grants and Cost Sharing Programs
Florida Inland Navigation District Waterway Assistance Program
Conservation Fund
Cooperative Institute for Coastal and Estuarine Environmental
Technology (CICEET)
CICEET Mitigating Shoreline Erosion along Sheltered Coasts
Global Releaf
Wildlife Habitat Policy Research Program
Sea Grant Aquatic Invasive Species Research and Outreach Program
Tropical Subtropical Agricultural Research
Center for Environmental Excellence – American Association of State
Highway & Transportation Officials

Implement an Ecosystem-based Management Approach

Overview of Actions

- IB1-a* Identify keystone species and communities
- IB1-b* Remove muck from interior waterways
- IB1-c* Investigate the causes, effects and solutions of bio-toxins
- IB1-d* Investigate establishment of a mitigation value for mooring fields
- IB1-e* Investigate establishing standards (baseline) for sediment quality and benthic habitats
- IB1-f* Manage/eliminate invasive species
- IB1-g* Explore control of ballast and bilge water release
- IB1-h* Explore upland control along shoreline

OBJECTIVE IB1

Implement an ecosystem-based management approach.

RELATED IRL CCMP ACTIONS

- FSD-1*** Complete or continue the diagnostic, management or pilot projects related to stormwater or freshwater discharges being planned or undertaken by federal, state, regional, and local governments.
- FSD-2*** Continue implementation of the NPDES nonpoint source (stormwater) permitting program throughout the IRL region.
- FSD-3*** Develop, implement and update pollutant load reduction goals (PLRGs) for all areas of the IRL.
- FSD-4*** Develop and implement best management practices (BMPs) for the management of stormwater and agricultural and fresh water discharges.
- FSD-6*** Reduce the impacts of muck on the IRL.
- FSD-9*** Strengthen existing stormwater or fresh water discharge management programs.
- FSD-10*** Encourage the proper use of fertilizers, herbicides, pesticides, and reuse water.
- FSD-11*** Educate residents and property owners about the impacts of fresh water and stormwater discharges on the IRL and what they can do to reduce these impacts.
- MB-2*** Implement boat facility sitting plans and update these plans as new data and information are available.
- MB-3*** Prevent pollutant spills and discharges and protect the resources of the IRL from the impacts of any spills or discharges.
- MB-5*** Provide educational materials and programs, such as the Clean Boater Program and boater's guides, to owners and operators of boats and personal watercraft.
- TMDL-1*** Develop, implement, and update TMDLs for all areas of the IRL.

- BD-3** Create and maintain a species inventory for the IRL.
- W-3** Establish or enhance wetland or shoreline setback buffers.
- ETS-5** Identify endangered, threatened, and species of special concern distribution and critical habitats throughout the IRL.
- F-4** Identify, inventory, and assess finfish and shellfish habitats within the IRL and implement appropriate management and restoration strategies.
- IFF-1** Support the inventory and assessment of non-native invasive fauna and flora within the IRL basin.
- IFF-2** Support development and implementation of management plans for eradication or control of non-native invasive plants and animals found in the IRL region.
- IFF-3** Coordinate the formation of “Rapid Assessment” teams to assess the extent of recently discovered invasions and provide recommendations for management or eradication.
- IFF-4** Engage residents in management and eradication of exotic invasive species by providing standardized information to residents of the IRL region about non-native invasive plants and animals and their management and eradication.
- BAH-1** Implement a lagoon-wide, multi-species, multi-disciplinary approach to determine the status of emerging infectious diseases in the IRL, assess trends and identify underlying causes.
- BAH-2** Continue support of the Biotxin and Aquatic Animal Health Working Group and the goals of this working group.
- BAH-3** Complete or continue the projects identified in the preliminary *Strategic Plan for Algal Toxins and Aquatic Animal Health in the Indian River Lagoon*.

PRIORITY PROBLEM

The population of Brevard County was 398,978 in 1990 and grew to 556,213 in 2008 representing a total population increase of 39% (U.S Census, 2010). The increase in population led to rapid land development. The urban population in Brevard County represented 95.5% of the total county population in 2000 (EDIS, 2009). As more land has been developed, the amount of stormwater runoff containing pollutants has dramatically increased. The ever increasing areas of urbanization within Brevard County, coupled with the additional stormwater runoff, have created many potential problems for the waterways and adjacent lands throughout Brevard.

The urbanization of Brevard County has increased the threat of severe erosion along its shorelines. As more land is developed there is less vegetation and ground cover to absorb and slow the flow of stormwater runoff; leading to larger volumes of water sheet-flowing unimpeded over the land. These stormwater flows can rapidly erode the land, not only reducing the lot size, but also damage structures and other property on the uplands. An increased volume of stormwater entering saltwater waterways results in a reduction of the waterways salinity causing harm to saltwater and brackish water organisms. The influx of stormwater may initiate a series of chemical and physical processes that rapidly reduce dissolved oxygen levels, resulting in many aquatic animals either leaving the area or dying (Stevens et. al., 2006).

As the stormwater flows over streets, parking lots, and yards; pollutants such as oils, greases, fertilizer, and litter are transported to nearby waterways. Once in the waterways these pollutants are responsible for many conditions detrimental to the aquatic environment such as eutrophication and increased turbidity. Eutrophication leads to algae blooms that reduce sunlight penetration and reduced dissolved oxygen. Increased turbidity denies aquatic vegetation the sunlight needed for survival. Any one of the aforementioned conditions or a combination can create a dead zone, such as the ongoing one found at the mouth of the Mississippi River, if not mitigated (National Science and Technology Council, 2000). Upland controls along the shoreline, such as buffer zones consisting of native vegetation or stormwater retention systems, would reduce erosion and other negative environmental effects associated with stormwater runoff. The identification of publically identifiable species and communities would allow for the assessment of upland controls based on the population changes of keystone species and the health of the linked keystone communities.

When erosion is caused by pollutant laden stormwater, muck may be formed. Muck is a detriment and will settle to the bottom of the waterway, covering the natural benthic habitats. Since many of the waterways within Brevard County are relatively shallow, when the wind blows or the water is stirred the muck will be resuspended into the water column releasing pollutants and greatly increasing turbidity. As time progresses muck layers will grow, filling in the waterway becoming a boating and environmental hazard. The removal of muck from the waterways of Brevard County would not only aid in maintaining navigable waterways, but would also improve water quality and benthic habitat functionality.

Population growth in Brevard County and the region have led to an increase in the number of boats utilizing county waterways. Major county throughfares, such as Sebastian Inlet, connecting the IRL to the open ocean, and Port Canaveral have seen corresponding increases in sea going traffic. Brevard County alone had 38,366 registered boats in 2009 and the total registered boats for Brevard, Seminole, Orange, and Osceola Counties was 98,681 in 2009 (Florida Department of Highway Safety, 2010). During 2009 Port Canaveral completed construction of a 2.8 million barrel fuel storage terminal increasing the number of tanker ships coming to the port and also increased the cruise ship fleet from six to nine vessels (Port Canaveral, 2009). Due to these increases in boats and ships there is an elevated risk of contamination and the spread of non-native species through ballast and bilge releases into the waterways of Brevard County.

Task *IB1-a*

Identify keystone species and communities

BACKGROUND AND EXPECTED BENEFITS:

Identification of keystone species may make it possible to determine ecosystem and/or habitat health by monitoring one or two select species from each trophic level within that ecosystem or habitat. Currently, there are many individual species throughout the state and region being protected and monitored, among these are Wilson's plover, manatees, and Johnson's seagrass to name a few.

PRIORITY:

The working group recommends a priority rating of MEDIUM.

HOW:

Consult a panel of local and national experts and conduct a survey of residents to determine potential locally identifiable keystone species. Conduct studies using historical data to assess how keystone species may have changed over time. These studies may help corroborate the opinions expressed by the experts and residents. Conduct observational studies to verify that selected species are keystone species within trophic levels of selected habitats or ecosystems.

WHO:

Primary:

United States Fish and Wildlife Service
National Oceanic and Atmospheric Administration
Florida Department of Environmental Protection
Florida Fish and Wildlife Conservation Commission
Indian River Lagoon National Estuary Program
Brevard County
Educational Institutions
Sea Grant

Secondary:

United States Geological Survey
St Johns River Water Management District
Brevard Nature Alliance
The Nature Conservancy
Marine Resources Council
Marine/Agricultural Extension Service

WHERE:

Throughout Brevard County Waterways

MEASURE OF PROGRESS:

1. Approval of a plan on how to utilize a panel of experts, carry out a survey of residents, and conduct historical data searches as well as observational studies.
2. Secure funding.
3. Identification of keystone species and monitoring plan for the selected species to ensure that the species chosen are the best indicators for each tropic level that the organisms occupy.

RELATED CM3P ITEMS:

VIA Maritime management actions should be data driven

VIA3-a Partner with universities and the Cooperative Extension Service to obtain relevant data

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

Observational studies should ensure that the population of chosen species is large enough for long term monitoring.

Task *IB1-b*

Remove muck from interior waterways

BACKGROUND AND EXPECTED BENEFITS:

As the development of Brevard County has continued to increase, so too, has the quantity of stormwater discharges and incidental runoff into Brevard's waterways. The runoff and discharges associated with development have led to the accumulation of muck throughout Brevard's waterways, particularly affecting internal canal systems. The removal of these muck deposits will increase waterway navigability, as well as improve water and benthic habitat quality.

PRIORITY:

The working group recommends a priority rating of MEDIUM.

HOW:

The first step in successfully removing muck from county waterways is to identify the sources of muck and establish an outreach program to inform the public of its causes. Once existing muck deposits have been located, the removal of the accumulations should be prioritized by cost effectiveness, benefits to navigation, and improvements to ecosystems and benthic habitats. The identification of potential muck disposal sites and effective removal methods are essential to the successful reduction of muck from county waterways. Muck removal techniques will have to be analyzed to determine a cost effective method that produces little environmental damage. The final steps in removing muck from county waterways will be acquisition of all necessary permits and the funding necessary to conduct muck removal projects in prioritized locations.

WHO:

Primary:

United States Army Corps of Engineers
St Johns River Water Management District
Indian River Lagoon National Estuary Program
Florida Inland Navigation District
Canaveral Port Authority
Municipalities
Brevard County

Secondary:

United States Fish and Wildlife Service
Patrick Air Force Base
Canaveral Air Force Station
Florida Department of Environmental Protection
Florida Fish and Wildlife Conservation Commission
Seven Seas Cruising Association
Citizens for Florida Waterways
Marine/Agricultural Extension Service
Educational Institutions

Power Squadron
United States Coast Guard Auxiliary
Yacht Clubs

WHERE:

Throughout Brevard County Waterways

MEASURE OF PROGRESS:

1. Development of a plan that includes a public outreach program about causes/sources of muck and how to find locations, sources, and prevent accumulation of muck.
2. Completion of a prioritization matrix for areas for muck removal, identification of disposal sites and disposal methods, and identification of the most effective and least environmentally damaging techniques to remove muck.
3. Acquisition of permits and implementation of muck removal at designated locations.

RELATED CM3P ITEMS:

IIIA1-b Maintain waterway channels through dredging and by posting and maintenance of private aids to navigation

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

Task *IB1-c*

Investigate the causes, effects, and solutions of bio-toxins

BACKGROUND AND EXPECTED BENEFITS:

Algae blooms and diatom outbreaks have a devastating effect upon humans and aquatic organisms. Little is currently known about the environmental factors that trigger the blooms and outbreaks. Existing research points toward oceanic and meteorological events as the causes of some types of bio-toxin blooms, such as red tide, however, excess nutrients added to the water may affect the duration and intensity of a bloom (Fish and Wildlife Research Institute, 2007). Through continued research the exact causes of bio-toxin blooms and outbreaks can be better understood, thus leading to methods of prevention.

PRIORITY:

The working group recommends a priority rating of MEDIUM.

HOW:

Consult the Indian River Lagoon Program Bio-toxin Task Force and assign a county liaison to the task force. Conduct an economic impact study to quantify the effects of bio-toxin blooms and outbreaks on fisheries and tourism. Create a coordinated educational outreach program to inform the public on the causes, if known, and effects of bio-toxin blooms and outbreaks and what individuals can do to aid in the prevention of a bio-toxin bloom or outbreak.

WHO:

Primary:

National Oceanic and Atmospheric Administration
Florida Department of Agriculture
Florida Fish and Wildlife Conservation Commission
St Johns River Water Management District
Indian River Lagoon National Estuary Program
Brevard County
Educational Institutions
Sea Grant
Harbor Branch Oceanographic Institute at Florida Atlantic University

Secondary:

United States Environmental Protection Agency
Federal Emergency Management Agency
United States Geologic Survey
City of Melbourne
Marine Resources Council
Marine/Agricultural Extension Service
Surfrider Foundation

WHERE:

Throughout Brevard County Waterways

MEASURE OF PROGRESS:

1. Establish a county liaison with the Indian River Lagoon Program Bio-toxin Task Force.
2. Complete an economic impact study on the effects of bio-toxin blooms and outbreaks.
3. Create an education outreach program.

RELATED CM3P ITEMS:

VIA3-a Partner with universities and the Cooperative Extension Service to obtain relevant data

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

The Ecology and Oceanography of Harmful Algal Blooms (ECOHAB) Research Program is a multi-agency partnership between NOAA, the National Science Foundation, U.S. Environmental Protection Agency, National Aeronautics and Space Administration, and the Office of Naval Research. This program covers much of the preliminary work suggested by the working group including a broad economic analysis of HAB's of the US by region.

<http://www.cop.noaa.gov/stressors/extremeevents/hab/current/fact-ecohab.html>

Task *IB1-d*

Investigate establishment of a mitigation value for mooring fields

BACKGROUND AND EXPECTED BENEFITS:

When a boat is anchored outside a managed mooring field, shifting winds and changing tides move the vessel at will, causing the chain and/or anchor to move. As the vessel shifts, the chain and/or anchor can cause severe damage to seagrass or other benthic resources. The establishment of managed mooring fields would greatly reduce the damage to seagrass beds and other benthic habitats caused by random, unmanaged anchoring. Managed mooring fields could possibly be used as an alternate form of mitigation for water-related construction projects due to the potential net environmental benefits that may result from the use of managed mooring fields. The managed mooring fields would also offer enhanced economic opportunities to communities along the IRL (i.e. encouraging visitors to pay to moor in the county and visit county attractions). The availability of pumpouts at managed mooring areas could reduce the likelihood that untreated sewage will be dumped into the water.

PRIORITY:

The working group recommends a priority rating of HIGH.

HOW:

Investigate the possibility of allowing a test site for studying the effects of a managed mooring field on different benthic habitats including seagrass and to attempt to quantify the net environmental benefits of mooring (vs. anchoring). Conduct a managed mooring field economic impact study to quantify the following: tourism opportunities created by managed mooring, missed economic opportunities due to the current absence of managed mooring fields, infrastructure security that would result from the reduced impact of derelict vessels, and economic impact of improving upland facilities near a managed mooring field. In addition to these easily quantifiable economic metrics, an attempt should also be made to measure the environmental costs and benefits of mooring to determine the suitability of using the creation of mooring fields as a form of environmental mitigation.

WHO:

Primary:

United States Army Corps of Engineers
Florida Fish and Wildlife Conservation Commission
City of Cocoa
City of Melbourne
City of Titusville
City of Palm Bay
Brevard County
Chambers of Commerce
Marine/Agricultural Extension Service
Educational Institutions
Sea Grant

Secondary:

Federal Emergency Management Agency
United States Fish and Wildlife Service
Florida Department of Community Affairs
Florida Department of Agriculture
St Johns River Water Management District
Indian River Lagoon National Estuary Program
Florida Inland Navigation District
Florida Regional Planning Councils
Brevard County Sheriffs Office
Other Municipalities

WHERE:

Throughout Brevard County Waterways

MEASURE OF PROGRESS:

1. Completion of Brevard County mooring field sighting analysis.
2. Completion of managed mooring field economic study.
3. Approval of test site to study the effects of a managed mooring field on various benthic habitats

RELATED CM3P ITEMS:

- IIB3** Pursue the establishment of several managed mooring fields throughout the county
- VIA3-a** Partner with universities and the Cooperative Extension Service to obtain relevant data

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

Additional values are derived from economic, access, and recreational uses.

Task *IB1-e*

Investigate establishing standards (baseline*) for sediment quality and benthic habitats

BACKGROUND AND EXPECTED BENEFITS:

There are currently no adopted standards for sediment quality in Florida and no comprehensive studies have been conducted to determine sediment quality and the condition of benthic habitats throughout Brevard County. Florida Department of Environmental Protection (1994) has created an atlas of coastal sediment contaminants by assessing nearly ten years of data collected through the Coastal Contaminants Survey, but has not used this data to create any state standards. A baseline study in Brevard County will assess sediment quality and benthic habitats in the County's waterways. The baseline study will be the first step towards establishing standards for sediment quality that would, at the very least, protect benthic habitats from further degradation, and could actually lead to improvements in sediment and benthic habitat quality.

PRIORITY:

The working group recommends a priority rating of MEDIUM.

HOW:

Partner with other agencies to conduct a baseline study, including historical data, to determine the present state of sediment quality and benthic habitats. Benthic habitat surveys may be necessary pending the outcome of the baseline study. Utilizing the data from the baseline study and any surveys conducted, sediment/benthic habitat goals will be identified and based on the goals standards will be created.

WHO:

Primary:

United States Fish and Wildlife Service
United States Geologic Survey
Florida Department of Environmental Protection
Florida Department of Agriculture
St Johns River Water Management District
Indian River Lagoon National Estuary Program
Educational Institutions
Sea Grant

Secondary:

National Oceanic and Atmospheric Administration
Florida Fish and Wildlife Conservation Commission
Brevard County
Florida Marine Contractors Association
Marine Resources Council
Marine/Agricultural Extension Service

WHERE:

Throughout Brevard County Waterways

MEASURE OF PROGRESS:

1. Development of a multi agency plan for a baseline study.
2. Secure Funding.
3. Implementation of the plan, benthic habitat surveys if necessary, and establishment of goals.

RELATED CM3P ITEMS:

- IA1-h*** Investigate the effects of emergency discharge by municipal sewage treatment plants into the Indian River Lagoon
- VIA2-a*** Incorporate bathymetry into conservation regulations
- VIA3-a*** Partner with universities and the Cooperative Extension Service to obtain relevant data
- VIB*** Encourage community based “peer review” of science-based rules and regulations

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

The sediment and benthic habitat quality will need to be monitored and the chosen standards should be re-evaluated as data becomes available.

*The Working Group recommends replacing “standards” with “baseline” in the Task.

Task *IB1-f*

Manage/eliminate invasive species

BACKGROUND AND EXPECTED BENEFITS:

Invasive flora and fauna continue to colonize East Central Florida and displace native species and habitat. Many non-native species such as the Australian white spotted jellyfish, striped barnacle, and parrot feather are already impacting the waterways of Brevard County. Controlling the establishment of new invasive species and the spread of established invasives is paramount in protecting the native biodiversity of East Central Florida.

PRIORITY:

The working group recommends a priority rating of HIGH.

HOW:

In order to manage/eliminate invasive species, established and emerging invasive flora and fauna need to be identified. The identified invasive species will then need to be prioritized based on the threat posed to native species and habitats and the effectiveness and costs of control. As newly found, emerging invasive species are identified, the sources of these introductions need to be discovered in order to prevent further exposures. Existing public outreach programs should be enhanced to include aids to identify invasive species, ways to control invasive species, and alternative native plants in lieu of potentially invasive plants for landscaping. Partnerships with non-profit organizations and other government agencies could aid in outreach programs, identification of established and emerging invasive species, and the control of invasive flora and fauna. Another factor that would aid in the management/elimination of invasive species is the establishment of stronger regulations on plants and animals sold/allowed in Florida.

WHO:

Primary:

United States Fish and Wildlife Service
National Oceanic and Atmospheric Administration
Florida Department of Environmental Protection
Florida Department of Agriculture
Florida Fish and Wildlife Conservation Commission
St Johns River Water Management District
Indian River Lagoon National Estuary Program
Brevard County
Marine Resources Council
Keep Brevard Beautiful
Native Plant Society

Secondary:

National Science Foundation
National Aeronautics and Space Administration
Municipalities
Brevard Nature Alliance

The Nature Conservancy
Marine/Agricultural Extension Service
Educational Institutions
Sea Grant
Boy/Girl Scouts
Garden Clubs
Home Owners Associations

WHERE:

Throughout Brevard County Waterways and Uplands

MEASURE OF PROGRESS:

1. Coordinate with non-profit organizations and other government agencies to identify established and emerging invasive species and improve public outreach programs.
2. Procure funding and prioritize established invasive species for control and emerging invasive species for elimination.
3. Develop stronger local and state regulations on plants and animals sold/allowed through the partnerships with non-profit organizations and other government agencies.

RELATED CM3P ITEMS:

- IDI-b** Implement marine science programs for kids
IDI-c Institutionalize education within County school system
IVA1-a Provide incentives to encourage education
IVA1-b Target educational programs to newcomers who may not be aware of local boating conditions
IVA1-c Work with boat dealers to promote educational opportunities for clients and the general boating public
IVA1-d Partner with the marine industry for the development of educational materials
IVA1-e Better advertisement of educational opportunities for boaters
VIA3-a Partner with universities and the Cooperative Extension Service to obtain relevant data
VIB Encourage community based “peer review” of science-based rules and regulations

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

The creation of a Brevard County amnesty program for owners of invasive species could aid in the control of established invasive species and possibly prevent the introduction of additional emerging invasive species. The Florida Fish and Wildlife Conservation Commission has developed and is implementing a similar plan for Southern Florida.

Task *IB1-g*

Explore control of ballast and bilge water release

BACKGROUND AND EXPECTED BENEFITS:

Ballast and bilge water releases are responsible for introducing pollutants including invasive species into coastal and inland waterways. Along with the oils and greases from within the ship, over 3,000 marine species ranging from microscopic to twelve inch fish have been identified in ballast water (Committee on Biological Diversity in Marine Systems, 1995). The control of these releases from ships and boats would aid in the control of invasive species as well as improve water quality.

PRIORITY:

The working group recommends a priority rating of MEDIUM.

HOW:

Public education through Coast Guard approved boating courses may be one of the most effective ways to control ballast and bilge water release. A coordinated, multi agency approach should be used to get more of the public, especially young adults and teens, to attend the Coast Guard approved boating courses that include ballast and bilge water regulations and best practices. The creation of a boaters licensing system with a written test would ensure not only that people attending the boating course, but also retained the information. The control of ballast and bilge water release would also be aided by increased infrastructure such as signage and rinse-out stations. Presently the Coast Guard tracks ballast water release and other ship discharges in the Canaveral Port so Brevard County should continue to support the Coast Guard in any possible way.

WHO:

Primary:

United States Environmental Protection Agency
United States Coast Guard
Florida Fish and Wildlife Conservation Commission
Canaveral Port Authority

Secondary:

United States Fish and Wildlife Service
National Oceanic and Atmospheric Administration
Department of Homeland Security
Florida Department of Environmental Protection
St Johns River Water Management District
Brevard County Sheriffs Office
Brevard County
Seven Seas Cruising Association
Citizens for Florida Waterways
Marine/Agricultural Extensions Service
Educational Institutions
Sea Grant

Power Squadron
United States Coast Guard Auxiliary
Yacht Clubs
Surfrider Foundation
Boat U.S.

WHERE:

Throughout Brevard County Waterways

MEASURE OF PROGRESS:

1. Public outreach coordinated with agencies that already have Cost Guard approved boating courses in order to increase awareness within Brevard County.
2. Identify and evaluate locations for additional signage and rinse-out stations.
3. Acquire funding for 1 and 2.

RELATED CM3P ITEMS:

- IDI-c** Institutionalize education within County school system
- IDI-f** Educate boaters on their impacts to water quality and other environmental factors
- IDI-h** Improve enforcement of existing regulations regarding check pump-outs/bilges

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

The Working Group recommends conducting a survey about the public's awareness of rules and regulations concerning ballast and bilge water release prior to any change in current boater outreach programs. A second survey could be conducted after enhancements created due to this project. The first survey would be a baseline study while the second survey would indicate the success of coordinated outreach programs.

Task *IB1-h*

Explore upland control along shoreline

BACKGROUND AND EXPECTED BENEFITS:

One of the largest contributors to water quality degradation and the formation of muck is stormwater runoff. The large amount of development that occurred throughout Brevard County has reduced the natural absorption of water and nutrients that vegetated areas provide. Upland control along shorelines such as retention, redirection of flow, or creating a buffer of native vegetation can reduce the direct effects of stormwater runoff.

PRIORITY:

The working group recommends a priority rating of HIGH.

HOW:

A public outreach program designed to inform the public about the effects of stormwater runoff and outline ways landowners could reduce stormwater runoff would contribute to upland control along shorelines. Another way to increase upland control along shorelines is clearly defined county regulations presented in an easily accessible, user friendly format. Strictly enforcing uniform standards that do not allow variances for new or expanded construction would also support the shoreline management objectives of this section.

WHO:

Primary:

United States Environmental Protection Agency
Florida Department of Environmental Protection
St Johns River Water Management District
Indian River Lagoon National Estuary Program
Brevard County

Secondary:

United States Army Corps of Engineers
Florida Department of Community Affairs
Florida Department of Transportation
Florida Department of Agriculture
Canaveral Port Authority
Florida Regional Planning Councils
Municipalities
Marine Resources Council
Citizens for Florida Waterways
Marine/Agricultural Extensions Service
Educational Institutions
Sea Grant
Home Owners Associations

WHERE:

Throughout Brevard County Waterways and Uplands

MEASURE OF PROGRESS:

1. Creation of new or enhancement of existing public outreach program in order to inform the public of ways to reduce stormwater runoff, including native vegetation planting suggestions, from their property.
2. Creation of clearly outlined regulations and runoff management methods in an easily accessible, user friendly format.

RELATED CM3P ITEMS:

- IC1-b** Investigate options for incentive-based voluntary retrofit programs for properties not meeting current storm water and septic requirements
- IC1-c** Investigate establishment of a grant program to upgrade failed septic systems
- IC1-d** Conserve upland buffers to waterways
- IC1-e** Explore the benefits and current regulations concerning shoreline setbacks for driveways and concrete
- IC1-h** Investigate Best Management Practices for lawn care and fertilizer application including the effectiveness of programs such as the University of Florida's Florida Yards and Neighborhoods program
- ID1-c** Institutionalize education within County school system
- ID1-e** Promote awareness of problems associated with fertilizers and benefits of Best Management Practices
- VIA3-a** Partner with universities and the Cooperative Extension Service to obtain relevant data
- VIB** Encourage community based "peer review" of science-based rules and regulations

ESTIMATED COSTS AND IMPLEMENTATION TIMELINE FOR TASK

To be determined

NOTES

REFERENCES

- Committee on Biological Diversity in Marine Systems, National Research Council. 1995. Understanding Marine Biodiversity A Research Agenda for the Nation. National Academy Press, Washington, D.C.
- Economic Development Intelligence System. August 2009. Brevard County Profile.
- Florida Department of Environmental Protection. 1994. Florida Coastal Sediment Contaminants Atlas Technical Volume.
- Florida Department of Highway Safety and Motor Vehicles. 2010.
<http://www3.hsmv.state.fl.us/Intranet/dmv/TaxCollDocs/vesselstats2009.pdf>.
- Florida Fish and Wildlife Conservation Commission. June 2007. Florida's Red Tide.
- G.E.C., Inc. Feb 2003. An Economic Analysis of the District's Waterways in Brevard County Final Report.
- IRLNEP (Indian River Lagoon National Estuary Program). Indian River Lagoon Comprehensive Conservation and Management Plan Update 2008.
- Hazen and Sawyer. August 2008. Indian River Lagoon Economic Assessment and Analysis Update.
- National Science and Technology Council. May 2000. An Integrated Assessment, Hypoxia in the Northern Gulf of Mexico.
- Port Canaveral. 2009. Cruising Into the Future 2009 Report.
- Sidman, Charles *et.al.* 2007. A Recreational Boating Characterization of Brevard County. University of Florida Sea Grant Program.
- Stevens, Philip W., Blewett, David A., and Casey, Patrick J. Dec 2006. Short-term Effects of a Low Dissolved Oxygen Event on Estuarine Fish Assemblages Following the Passage of Hurricane Charley. *Estuaries and Coasts*, Vol. 29, No. 6A, p. 997-1003.
- U.S. Census Bureau. 2010. State and County QuickFacts. Brevard County FL.
<http://quickfacts.census.gov/qfd/states/12/120091k.html>.
<http://quickfacts.census.gov/qfd/states/12/12009.html>.

GOAL II A

Engage All Relevant Planning and Regulatory Agencies to Find Solutions to Access Issues in a Regional Perspective

As Brevard County and the surrounding region's populations continue to grow, the existing waterway access points will become overwhelmed. The number of people trying to utilize them and there will be less land available that could potentially be used for waterway access. Although it is important that the county strives to find local solutions, access issues are a regional problem as the waterways and people are not bound by county borders. Brevard County is surrounded by major water way thoroughfares that encompass large geographic areas, including: St. John's River, IRL, Banana River, Mosquito Lagoon, and Atlantic Ocean. The St. John's River flows directly through nine counties and passes many towns. The Indian River Lagoon is found in six counties and has a large number of towns and cities along its shores. Illustrated throughout A Recreational Boating Characterization of Brevard County is the fact that a large percent of the current waterway access points are used by citizens who do not reside within the county. In light of these facts, Brevard County's focus for solutions to waterway access issues could be maximized by a coordinated effort with neighboring counties, municipalities directly on the waterways, local and regional planning agencies, and local and regional regulatory agencies.

Recommended approaches to identifying solutions to access issues in a regional perspective include having a representative of agencies within the region to meet at a reoccurring scheduled interval. The goals of these meetings would be to identify access issues, assess potential solutions to access issues, and ensure that validated solutions are acted upon.

Recommended Planning and Regulatory Agencies to be Engaged

St. Johns River Water Management District	Indian River City
East Central Florida Regional Planning Council	City of Rockledge
Treasure Coast Regional Planning Council	City of Melbourne
Brevard County	City of Palm Bay
Indian River County	Town of Malabar
Martin County	City of Sebastian
St. Lucie County	City of Vero Beach
Volusia County	City of Fort Pierce
City of New Smyrna Beach	City of Port St. Lucie
City of Edgewater	City of Stuart
City of Titusville	Palm City
City of Cocoa	

Potential Funding Sources

Ad Valorem Taxes
Corporate Gross Receipts Tax
Corporate Income Tax
General Sales Tax
Rental Car Tax
Boat Rental Tax
Tourist Development Tax
Watercraft Sales Tax
Special Assessments Tax
Boater Registration Fees
Facility Permit Fees/ Monitoring Fees
Inspection Certification Fees
License Fees
Recreational Fees
Wetland Permit Fees
Fines and Penalties
Coastal Zone Management Administration Awards
Endangered Species Conservation Grants
Florida Boating Improvement Program
NOAA Marine Debris and Technology Program
Coastal Partnership Initiative (Fl Coastal Management Program)
NRCS Conservation Innovation Grants
Indian River Lagoon License Plate Fund
Indian River Lagoon Workplan Projects
Florida Inland Navigation District Waterway Assistance Program

REFERENCES

IRLNEP (Indian River Lagoon National Estuary Program). Indian River Lagoon Comprehensive Conservation and Management Plan Update 2008.

Sidman, Charles *et.al.* 2007. A Recreational Boating Characterization of Brevard County. University of Florida Sea Grant Program.

DRAFT