

# Save the Manatee Trust Fund



*Manatees resting in Salt Creek at Warm Mineral Springs*

## Annual Report 2002–2003

Submitted by  
Florida Fish and Wildlife Conservation Commission

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## To report fish and wildlife violations, including manatee injuries and mortalities

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## Annual Report

### 2002–2003



Florida Fish and Wildlife Conservation Commission  
620 South Meridian Street  
Tallahassee, Florida 32399

<http://myfwc.com>  
<http://floridamarine.org>

Submitted by  
**Florida Fish and Wildlife Conservation Commission**  
Division of Wildlife's Bureau of Protected Species Management  
Division of Law Enforcement  
Office of Informational Services  
and  
Florida Marine Research Institute's Endangered and Threatened Species Program

# EXECUTIVE SUMMARY

This is the annual status report on expenditures from the Save the Manatee Trust Fund (STMTF). This report is provided to the President of the Florida Senate and the Speaker of the Florida House of Representatives each year.

Funding for the state's manatee-related research and conservation activities is provided primarily from the STMTF, which receives money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. Revenues for fiscal year (FY) 2002–2003 totaled \$3,795,365.

Appropriations for the same FY were approximately \$3,992,736. Of that, \$3,534,652 was provided to the Florida Fish and Wildlife Conservation Commission (FWC) for research, conservation, and enforcement. Mote Marine Laboratory received \$325,000 for additional research, and the Advisory Council for Environmental Education received \$133,084. Details are presented in the pie charts at right.

Expenditures by the FWC from the STMTF included \$1,682,979 for research activities coordinated by the FWC Florida Marine Research Institute (FMRI) in St. Petersburg; \$1,155,999 for conservation activities within the FWC Office of Environmental Services' Bureau of Protected Species Management (BPSM); and \$372,875 to the FWC Division of Law Enforcement. Budgetary breakdowns for individual program elements under both the research and conservation efforts are included, followed by summaries of the work performed at the FMRI and the BPSM.

The Florida manatee is native to Florida's coastal and riverine waters and is listed by both the U.S. Fish and Wildlife Service and the FWC as an endangered species. Manatees have been protected in Florida since 1892. Federally, both the Marine Mammal Protection Act and the Endangered Species Act protect manatees. Current state efforts to recover the population are guided by the Florida Manatee Sanctuary Act [Section 370.12(2), Florida Statutes] and the federal Florida Manatee Recovery Plan of 2001. In FY 2002–2003, the FWC's manatee program focused on actions related to a settlement agreement from a lawsuit brought by Save the Manatee Club et al. in 2001. These activities involved (1) increasing the number of FWC law enforcement officers and the amount of time spent enforcing manatee zones in Florida's waterways, (2) completing a comprehensive report by FMRI analyzing manatee use of the Caloosahatchee River and surrounding areas, and (3) promulgating rules regulating boat speed and access in six counties to reduce risk to manatees.

The FWC staff members' also focused on completing a biological status review of the Florida manatee to assess its proper classification on the state of Florida's imperiled species list. The final report, available at [www.floridamarine.org](http://www.floridamarine.org), is the result of a complex scientific process that included compilation of the best available manatee data and development of a population viability analysis model to project the probability of a population decline and extinction in the next 45 and 100 years. The estimate of growth rate for the southwest subpopulation is slightly negative; although, there is statistical uncertainty surrounding the estimate. This means that researchers cannot determine with certainty whether the population is slowly increasing, roughly stable, or in definite decline. As reported in the final biological status review, of major concern is that model simulations indicate that the southwest subpopulation shows negative growth under conditions of constant carrying capacity and constant survival. Under this scenario, approximately half of the current estimated population in southwest Florida is projected to disappear within the next 45 years. Even assuming the most optimistic scenario of constant habitat conditions and no deaths caused by red tide or cold, the projected population trajectory is downward for the southwest region.

Although great strides have been made toward recovering the Florida manatee, there are still human-related and natural factors that could negatively affect the long-term survival of the species. With continuing conservation, law enforcement, outreach, and research, the FWC hopes to ensure that there will be a robust manatee population in Florida's future.

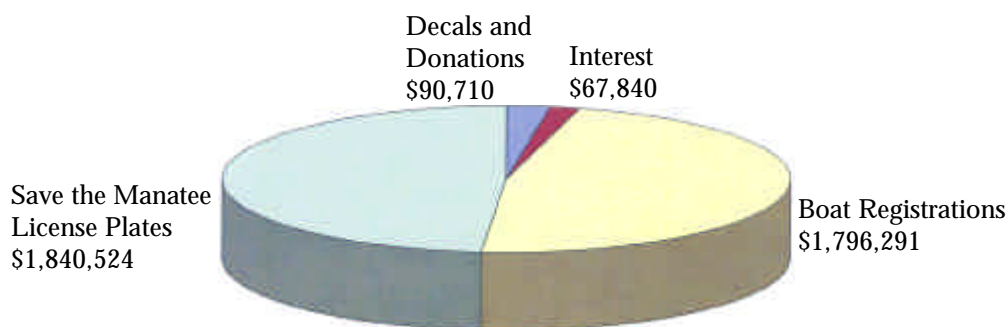
# Save the Manatee Trust Fund

## Revenues and Expenditures

**Figure 1: Revenues and Expenditures**

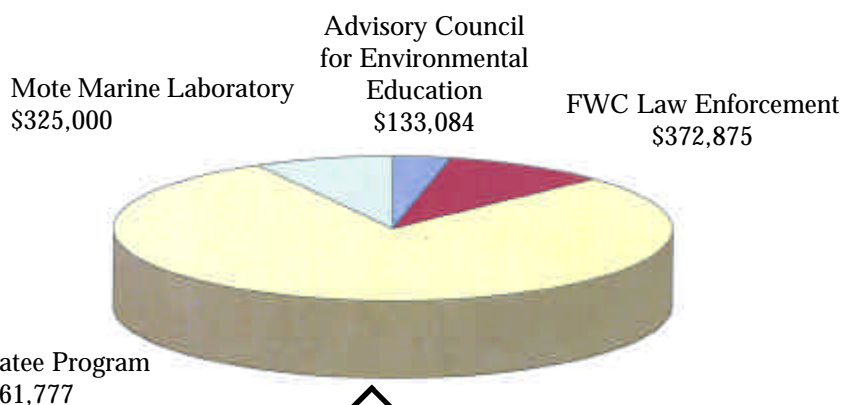
### REVENUE

**Total—\$3,795,365**

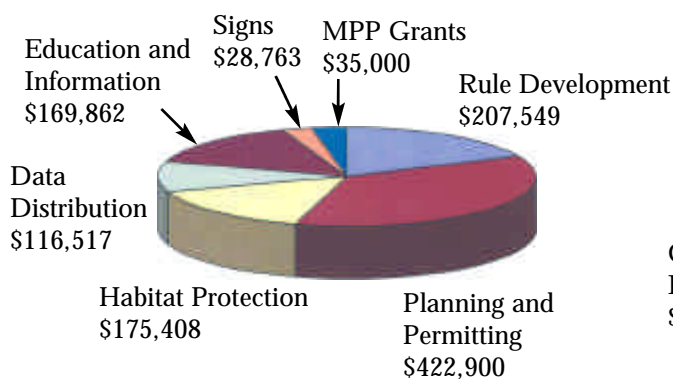


### APPROPRIATIONS

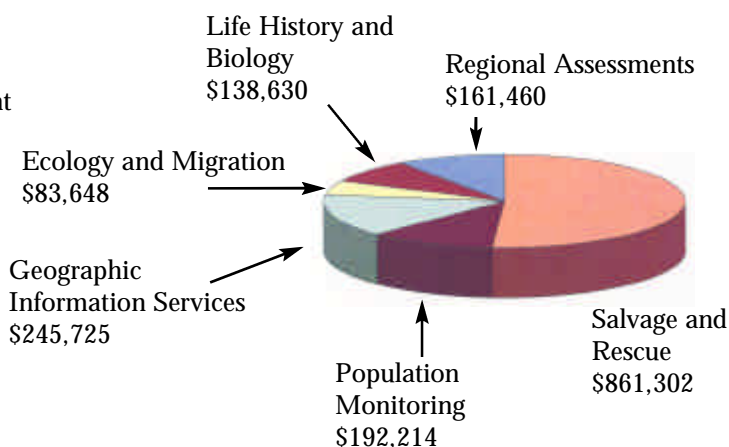
**Total—\$3,992,736**



**FWC Manatee Program  
Conservation Expenses  
Total—\$1,155,999**



**FWC Manatee Program  
Research Expenses  
Total—\$1,682,979\***



\*Includes \$15,327 in General Revenue to cover insufficient appropriation for FTE Salary

# MANATEE BASICS

<b>Common Name</b>	Florida manatee
<b>Scientific Name</b>	<i>Trichechus manatus latirostris</i>
<b>Status</b>	Endangered (federal and state)
<b>Range</b>	Throughout Florida (the summer months into southeastern states)
<b>Maximum Census</b>	3,276 counted in 2001
<b>History</b>	Native species found in fossil record and recorded by earliest explorers
<b>Diet</b>	Freshwater and marine species of plants
<b>Reproduction</b>	Breed year-round; most calves born in spring; a mature female can produce one calf approximately every three years
<b>Life Span</b>	Can live over 50 years, but this is rare
<b>Unusual Fact</b>	Age is determined by examining a thin cross section of the earbone of dead manatees, and counting growth layers, similar to counting rings in a tree



*The Florida Manatee, Trichechus manatus latirostris*

## A CLOSER LOOK

Adult manatees typically average 8–10 feet in length and weigh around 1,000 pounds. The largest manatees may reach 13 feet in length and weigh over 3,500 pounds. Adults are gray in color, with very sparse hairs distributed over much of the body. Stiff whiskers grow around the face and lips. Algae growing on the skin may make them appear green or brown. Manatees that live in saltwater may also have barnacles growing on their skin. Despite their large size, manatees can be difficult to see in the wild. Manatees eat a variety of aquatic plants and are often seen near natural or artificial fresh water sources.

During the colder months, manatees in the southeastern United States must migrate to relatively warm water. This warm water may be in south Florida or may be the warm water of an artesian spring or industrial discharge. Manatees may mate year-round, however, most calves are born in the spring. Gestation lasts approximately 13 months and results in the birth of a calf (rarely twins) measuring 3–5 feet in length. The calves remain with their mothers for up to two years.

Manatees are killed or injured from a variety of causes. Manatees die as a result of exposure to harmful algal blooms (red tide), the effects of cold water, and disease. Human-related causes include watercraft, crushed in water control gates and boat locks, and entanglement in fishing gear. Manatee habitat loss or degradation, including future changes in artificial warm water refugia upon which many have become dependent, is also of concern.



# TABLE OF CONTENTS

<b>Executive Summary</b> .....	<b>4</b>
Save the Manatee Trust Fund Revenues and Expenditures .....	5
Figure 1: Revenues and Expenditures .....	5
Manatee Basics .....	6
 <b>Florida Marine Research Institute</b>	
Mortality and Rescue .....	8
Table 1: Manatee Mortality FY 2002–2003 .....	9
Table 2: Manatee Rescues FY 2002–2003 .....	9
Population Monitoring .....	10
Biological Status Review of the Florida Manatee .....	12
Measurable Biological Goals for the Recovery of the Manatee .....	13
Behavioral Ecology and Migration .....	14
Life History and Biology .....	15
Marine Mammals Geographic Information System .....	16
Human Dimensions .....	17
Regional Assessments .....	18
Publications Resulting From Work Funded by the Save the Manatee Trust Fund .....	19
Right Whales .....	20
 <b>Bureau of Protected Species Management</b>	
Law Enforcement Coordination .....	22
Plan and Permit Review .....	24
Rule Administration .....	24
Structure-Related Manatee Deaths .....	29
Figure 2: Structure-Related Deaths .....	29
Manatee Protection Plans .....	30
Habitat Characterization, Assessment, and Protection .....	32
Environmental Education and Information Dissemination .....	34
Data Distribution and Technical Support .....	36
Consensus Building and Stakeholder Cooperation .....	37
 <b>Advisory Council on Environmental Education</b> .....	<b>38</b>
 <b>Appendix A: Definition of Acronyms</b> .....	<b>40</b>

# MORTALITY AND RESCUE

A network of researchers and law enforcement agencies was established in 1974 to recover manatee carcasses and provide assistance to injured manatees. The mortality and rescue program now rests largely with the Florida Fish and Wildlife Conservation Commission.

All carcasses are retrieved by staff located at five field coastal stations. Most carcasses are examined (necropsied) at the Marine Mammal Pathobiology Laboratory (MMPL) in St. Petersburg in order to determine cause of death. The MMPL, designed to process 150 carcasses per year, now handles more than 300 carcasses per year.

Information gained through carcass salvage, rescue, and rehabilitation is crucial in providing wildlife managers with information about manatee health, mortality factors, life history, and general and reproductive biology. This program also provides data used in developing population models.



*FMRI staff members use a specially designed boat that allows for the animal to be pulled onto the back of the rescue boat*

## 2002–2003 Highlights

### Carcass Salvage

- Statewide, there were 361 manatee carcasses documented in Florida during the fiscal year, and all but 9 were recovered and examined.
- During the spring, a red tide event continued off the coast of southwest Florida. According to necropsy findings and toxicology results, a total of 84 manatees are suspected to have died as a result of the red tide bloom. As a result, a federally appointed advisory panel, The Working Group for Unusual Marine Mammal Mortality Events, declared this an unusual mortality event.
- For genetic analysis, tissue samples were collected from all 352 recovered carcasses. Other tissues were collected for toxicology and histopathology.
- Over 200 public records requests were filled for necropsy reports or necropsy-related data. Thousands of visits were logged on the FMRI manatee mortality Web pages containing interactive, searchable, mortality data.

### Rescue and Rehabilitation

- Forty-nine rescues were performed statewide during the 2002–2003 fiscal year.
- As of July 2003, 23 of these animals have been released back into the wild; 11 have died, and the remaining animals are still being rehabilitated in facilities around the state.



**Table 1. Manatee Mortality  
FY 2002–2003**

Human—watercraft-related	75
Human—other (entanglement, ingestion, etc.)	10
Human (flood gate or canal lock)	2
Natural	93
Perinatal (total body length less than 150 cm)	68
Cold Stress	39
Undetermined*	65
Carcasses not recovered	9

\* 'Undetermined' refers to all manatee deaths classified as 'Undetermined: Decomposed' or 'Undetermined: Other'



*MMPL staff perform a necropsy while three other carcasses await examination*



*Manatee rescued due to crabpot line entanglement*

**Table 2. Manatee Rescues  
FY 2002–2003**

Human—watercraft-related	8
Human—entanglement	9
Human—entrapment (flood gate or canal lock)	3
Human—other	1
Calf—alone	7
Natural—includes red tide	21

FMRI-MMPL received local, national, and international media attention:

Greenpeace Magazine—Germany  
Boat US Magazine  
New York Times  
Boston Globe  
Discovery Channel  
National Geographic  
Smithsonian Magazine  
Wall Street Journal

MMPL hosted visitors, faculty, and students from national and international institutions:

University of North Carolina	Brazil
Hubbs-Sea World	France
University of Florida	Belize
University of Illinois	England
Montana State University	Ireland
Texas A&M University	
University of Michigan	
Newcastle University (UK)	

# POPULATION MONITORING

Aerial surveys are important tools for acquiring information on manatee distribution, relative abundance, and use of habitat types. Statewide aerial and ground surveys of all known manatee wintering habitats in Florida and southeast Georgia are conducted after cold fronts, when animals aggregate at warm springs and thermal discharges from power plants and industries. Called “synoptic surveys,” these surveys are conducted in fulfillment of the Florida statute requiring an annual manatee census. Synoptic surveys yield minimum estimates of the manatee population. Other aerial surveys, called “distribution surveys,” are conducted twice monthly for two years to map seasonal distribution of manatees.

Aerial surveys are believed to underestimate manatee populations largely because some animals go undetected by observers. A model that uses a correction factor to integrate the effects of the environment on counts and the observer bias that occurs during surveys (number of animals undetected by the observer), is being developed to assist in calculating the most accurate, usable counts of Florida manatees. The calibration study was designed to provide better results from aerial surveys conducted at Tampa Electric Company’s (TECO) Big Bend power plant in Tampa Bay by using a calibration or correction factor that can adjust counts upward to correct for animals that were present but not counted during the survey. This study and similar studies should improve manatee counts at winter aggregation sites.

## 2002–2003 Highlights

### Synoptic Surveys

- To obtain minimum manatee-population counts, staff members from FWC and its partners conducted three synoptic surveys in January 2003. Weather conditions were excellent during all three surveys. The following are total counts for each of the synoptic surveys:

January 9 .....	2,861
January 21–22 .....	3,113
January 26–28 .....	3,029

- The survey conducted January 21–22 yielded the second highest statewide count since the survey began in 1991.

### Distribution Surveys

- In July 2002, FWC biologists began flying distribution surveys twice monthly in Indian River and Volusia counties. These surveys are designed to document the seasonal distribution of manatees in those counties and will continue until June 2004.

### Calibration Study

- The fourth year of the Tampa Bay Calibration Study was completed. Nineteen animals were captured, tagged, and monitored near the TECO Big Bend power plant.
- Fifteen of these animals were fitted with belts that had flags attached that could be seen from survey aircraft.
- Time-depth-temperature (TDR) recorders were also attached to the belts on five of nineteen captured manatees. The TDR data will be used to calculate the average dive time of each manatee.

- To regularly track manatee location and movement, Global Positioning System (GPS) satellite radio tags were attached to the belts on six of the animals.
- To record flag sightings, calibration flights were flown for 13 days in January. Ground crews also participated in documenting flags.
- To develop a correction factor for aerial surveys flown at Big Bend power plant, data from this fiscal year and the previous three years of the study are being analyzed.



*Flag and GPS tag used during 2002 Calibration Study*



*Tampa Electric Company's Big Bend power plant*



*Plane flying an aerial survey, similar to those flown by the FWC*

**Many agencies and institutions assisted with the synoptic surveys:**

U.S. Fish and Wildlife Service  
Mote Marine Laboratory  
Wildlife Trust  
Dade County  
National Park Service  
Dynamac  
Blue Spring State Park

Jacksonville University  
Lignum Via Key State Botanical Reserve  
Palm Beach County—Department of Environmental Resources  
Dade County—Department of Environmental Resources  
Broward County

**Several agencies and institutions assisted with the calibration study:**

University of Florida  
Mote Marine Laboratory  
Florida Aquarium

SeaWorld  
Wildlife Trust  
Ocean Conservancy

U.S. Geological Survey  
Sirenia Project



## Biological Status Review of the Florida Manatee

The Florida manatee is currently listed as endangered at both the state and federal levels. The FWC was petitioned by the Coastal Conservation Association to evaluate the status of the Florida manatee based on the state of Florida's criteria, which were adopted in 1999. The biological status review of a species is conducted around five measurable, objective criteria that are used to define a species as endangered, threatened, or a species of special concern. A species need only meet the requirements of one of the five criteria to be listed in a category. The report on the final biological status review of the Florida manatee is the result of a complex scientific process that included compiling the best available data on the manatee and developing a population viability analysis model to project the probability of a population decline and extinction in the next 45 and 100 years.

- Eighteen FMRI and other FWC staff members contributed to the 151-page report. Currently, it is the most comprehensive analysis of manatee population data.
- Two of the state's criteria for listing species are related to population decline. FWC's population viability analysis model indicated that, given future threats to the species, there is a probability of a 50% decline in the manatee population. This figure meets the definition of "threatened" under the state's population decline criteria.
- In Florida alone, area of occurrence of the Florida manatee was determined to be at least 7,500 square miles.
- The minimum number of mature manatees was estimated at 2,165 (based on the high count of 3,276 manatees recorded in January 2001).
- There was little evidence to suggest that the manatee could become extinct within the next 100 years. However, under certain scenarios, the population was reduced to very few animals (less than 200) over a 100-year period.
- Of major concern is the finding that the southwest subpopulation shows a negative growth rate. Even assuming the most optimistic and unrealistic case of constant conditions and no red tides or cold mortalities, the projected population trajectory is downward for the southwest subpopulation. This subpopulation, which includes Tampa Bay, south, through Collier County is thought to contain approximately 1400 individuals.
- The FWC has postponed making a decision on the listing status of the manatee. If the commission determined that down-listing is warranted, it will direct staff to complete a management plan for the Florida manatee by a specified date. The manatee would not be down-listed until the management plan was approved.
- It is important to note that the preliminary recommendation for down-listing should not be interpreted as confirmation that the species has been "recovered" or that it no longer requires protection. Also, the FWC staff recommendation does not affect the federal listing status of the manatee as endangered.
- FWC is currently working with other agencies to develop a model that is specific to the Florida manatee and can be used to assess the population and to assist in making decisions about future management actions.
- The final report on the Florida manatee biological status review is available on FMRI's Web site: [www.floridamarine.org](http://www.floridamarine.org).

# Measurable Biological Goals for the Recovery of the Florida Manatee

During the 2002 legislative session, section 372.072, Florida Statutes, was amended to include new requirements:

No later than February 15, 2003, the commission, working in conjunction with the United States Fish and Wildlife Service, shall develop measurable biological goals that define manatee recovery. These measurable biological goals shall be used by the commission in its development of management plans or work plans. In addition to other criteria, these measurable biological goals shall be used by the commission when evaluating existing and proposed protection rules and in determining progress in achieving manatee recovery.

- In January 2003, the FWC adopted the demographic benchmarks contained in the Third Revision of the Florida Manatee Recovery Plan as it felt that at the current time these benchmarks provide the best measurable biological goals presently available. The adopted benchmarks are as follows:
  - A. Statistical confidence that the average annual rate of adult manatee survival is 90% or greater
  - B. Statistical confidence that the average annual percentage of adult female manatees accompanied by first- or second-year calves in winter is 40% or greater
  - C. Statistical confidence that the average annual rate of population growth is greater than or equal to zero

The plan further indicates that these benchmarks should be achieved with a 95% level of confidence.

- As additional data are being collected and abilities to measure manatee population status are improving, it is proposed that the FWC and the U.S. Fish and Wildlife Service (USFWS) annually review these benchmarks. Goals may be altogether refined or changed in the future. In addition, it is noted that the statute required the establishment of measureable biological goals; however, there are many other goals and objectives in the Recovery Plan that are critical to the long-term survival of the species. In particular, the provision of viable habitat components, such as warm water springs, is of major importance. Perhaps in the future, some measurable goals for this and other habitat components can be jointly established.





# BEHAVIORAL ECOLOGY AND MIGRATION

Research on manatee use of Florida's coastal habitats is essential to understanding what resources are required to sustain a healthy population. By tracking the movements of individual manatees in fresh, brackish, and saltwater habitats, valuable information is obtained about their seasonal and daily movement patterns, migratory behavior, site fidelity, and habitat use.

To track manatees, researchers tether a floating radio-tag to a padded belt that fits around the base of the manatee's tail. Radio signals emitted by a satellite-linked transmitter within the tag are processed by the Argos system (a commercial satellite service), and location and other data are delivered to FMRI daily via the Internet. Staff use the satellite-derived locations to remotely track manatee movements over long periods.

To record data on behavior, group size, habitat, and movements, staff members home in on the tag's unique VHF radio and ultrasonic signals. During the past fiscal year, tremendous strides have been made in telemetry technology such that GPS are now available to track manatees. This allows researchers to obtain much more accurate locations of an animal on a more frequent basis (tags were set to obtain location information every 20 minutes this field season).

## 2002–2003 Highlights

- Six Argos-linked GPS tags were used in the December Calibration Study at TECO's Big Bend power plant.

- It was found that individual, tagged manatees leaving the warm water discharge of the power plant showed individual preferences for feeding sites.
- The final year of the Warm Mineral Springs (WMS) study began in January 2003. Four manatees, recognized from photo-identification as animals that regularly use this warm water site, were radio-tagged. The frequency of these four animal's use of the site was studied in relation to time, tidal state, and water temperature.
- Staff members monitored three animals that had been rehabilitated at oceanaria facilities and released into the wild (Spike, Mo, and Lowry).
- Spike was captured for a health assessment in July 2002. A month later his tag went off-line. Staff members have not seen him since that day.
- Lowry, born at Lowry Park Zoo after his mother was rescued, was tracked until December 19, 2002, when he died of natural causes.
- As a result of tracking, Mo was determined to be underweight, and a rescue was performed in Sulphur Springs on January 9, 2003. He is recovering, and plans are being made for another release.
- Based on data and recommendations provided by research efforts, the FWC approved a new seasonal no-entry zone in Salt Creek from the Route 41 bridge, north, to the weir at the WMS Community Center.

# LIFE HISTORY AND BIOLOGY

Information on manatee life histories is essential in assessing manatee population dynamics and recovery. Long-term data on growth and survival of individuals, reproductive performance of mature females, and health of wild manatees are important to the development of reliable population models. These data are gathered using a variety of research tools, including photo-identification of distinctly scarred individuals, passive integrated transponders (PIT tags) and non-invasive body condition indices such as ultrasound measurements of blubber thickness.

## Photo Identification

Many manatees can be recognized by their unique pattern of scars. Most scars are caused by collisions with watercraft, but they also result from entanglement in fishing gear and from fungal infections. The Manatee Individual Photo-Identification System (MIPS) is an image-based computerized database, initially developed by the U.S. Geological Survey's Sirenia Project. The MIPS allows researchers to easily match photographs of scarred manatees taken in the field to distinctively marked individuals that have been previously observed, documented with photographs, and cataloged in the database. FMRI collaborates closely with the Sirenia Project and Mote Marine Laboratory and coordinates and manages the portion of the catalog for west-central and southwestern Florida. In addition, FMRI field staff photo-document manatees statewide. Photo-identification data provide insights into manatee movements, site fidelity, survival rates, and reproductive parameters such as calving intervals.

## Passive Integrated Transponders

An important aspect of studying the manatee population is the ability to recognize individual animals over a long period of time. Currently, PIT tags are primarily effective for identifying

free-ranging manatees rescued due to injury, captured during research operations, or recovered dead. Similar to microchips implanted in domestic animals, PIT tags are inserted just under the skin near the shoulder blades of manatees handled by FMRI or other scientists. All animals that staff members come into contact with are scanned for PIT tags. A positive scan indicates that the animal has been used in a study or has been rescued in the past, adding to what is known about the particular animal's history.

## 2002–2003 Highlights

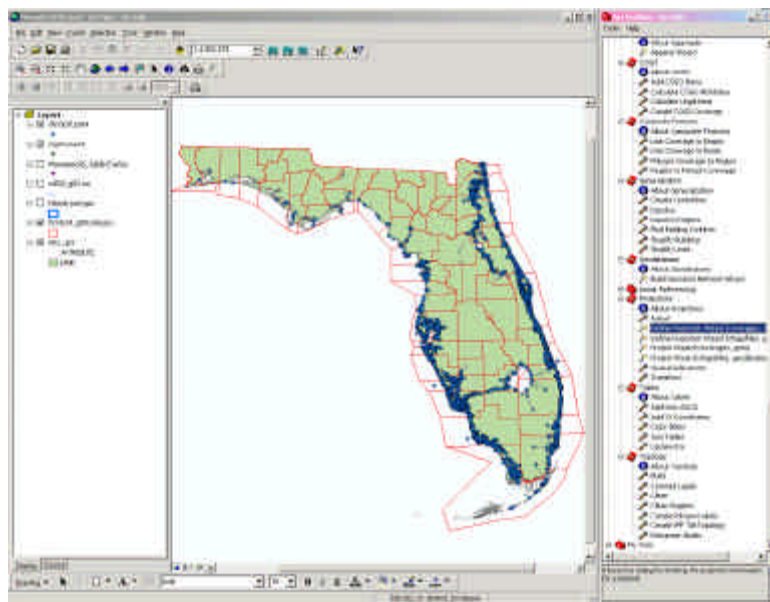
- Fifteen fully documented animals from southwest Florida were added to the photo-identification database this year.
- Staff members, interns, and volunteers spent 136 days conducting photo-identification research at land and boat sites around the Tampa Bay area and southwest Florida.
- Volunteers with the U.S. Army Corps of Engineers spent over 135 days photographing manatees at the Franklin and Ortona locks.
- Of the 19 animals captured at TECO, 3 were known MIPS animals; 4 were assigned new MIPS IDs; 6 were new, distinct unknowns, and 6 were indistinct.
- Eleven carcasses were identified through a positive PIT scan.

# MARINE MAMMALS GEOGRAPHIC INFORMATION SYSTEM

A geographic information system (GIS) is a computer-based mapping system designed to manipulate, analyze, and display large volumes of geographically-referenced data called “coverages.” Staff members working on the Marine Mammals GIS (MMGIS) have created numerous manatee data coverages, including carcass recovery sites, aerial survey locations, and locations of animals tracked by satellite. The MMGIS is a module of the comprehensive FMRI Marine Resources GIS (MRGIS), which facilitates access to a wide variety of data on the marine environment. The MRGIS is a primary tool for marine resource research and management. By allowing users to combine and query coverages representing different data themes relevant to the coastal environment, GIS applications facilitate an ecosystem approach to coastal resource management. The MMGIS staff works with research- and management-project teams to provide the public with manatee data in GIS format and to develop spatial analyses and modeling capabilities for manatee protection and ecosystem management.

## 2002–2003 Highlights

- All previous synoptic survey data were mapped in a GIS format.
- A CD-ROM containing Tampa Bay aerial survey, spatial filter, and shoreline data was created and delivered to BPSM for the Tampa Bay rule process.
- Maps illustrating the spatial locations of carcasses and rescues in Southwest Florida were prepared close to real time for the brevetoxin epizootic event (February–April 2003).
- GIS coverages were created for Volusia and Indian River distributional surveys for 2002–2003.
- Staff members successfully updated the programming to process manatee mortality data in Access and ArcGIS.



*Screen shot of ArcGIS software, used by GIS staff to analyze manatee deaths in the state of Florida*

# HUMAN DIMENSIONS

Traditionally, wildlife managers have relied on biological data to assess manatee status and set recovery goals. Managers use laws, regulations, and outreach as tools to achieve these goals. Consequently, wildlife management can be viewed as management of people, because human behavior ultimately determines the success of wildlife management actions. It is this human dimension of manatee protection that will lead to the recovery of the species. Human-dimension research concerns itself with how to apply research results, in terms of laws, regulations, law enforcement, and outreach, to achieve cost-effective manatee protection.

Several specific projects involve FWC manatee staff members:

1. Examining alternative approaches of education, outreach, and on-the-water signage to increase boater compliance in manatee speed zones in the absence of law enforcement
2. Assessing the effects of human activities (recreation, development, regulatory, etc.) on risks to manatees
3. Evaluating methods of implementation of laws, regulations, law enforcement, and outreach for their level of acceptance by and conflict with Florida's citizens

There are expected benefits to human-dimension research:

1. Relieving some of the burden on law enforcement through increased voluntary compliance
2. Identifying those outreach and educational

approaches that are most effective in generating compliance with regulation (direct spending on only those methods that work) and nurturing environmental stewardship

3. Working with citizens more effectively and decreasing the level of conflict between the agency and the public

## 2002–2003 Highlights

- Data analyses began on the final year of research and a telephone survey to assess the effectiveness of the educational program of Tampa BayWatch.
- FMRI staff members conducted a preliminary demonstration of a remote-sensing device that would be used to assess vessel compliance and vessel traffic.
- Staff members have initiated the statistical analysis of a manatee speed zone sign study. The purpose of this grant-funded study is to assess whether different signs influence boater compliance with speed zones.
- A manuscript titled “Boater Compliance with Manatee Speed Zones in Florida” was completed for publication.
- The first phase of the Florida Manatee Avoidance Technology Program's testing was completed when contractors working on technology related to voice recognition programs for manatee vocalizations met in St. Petersburg. The programs have had varied success depending on the methods employed to identify the signals and the level of background noise.



## REGIONAL ASSESSMENTS

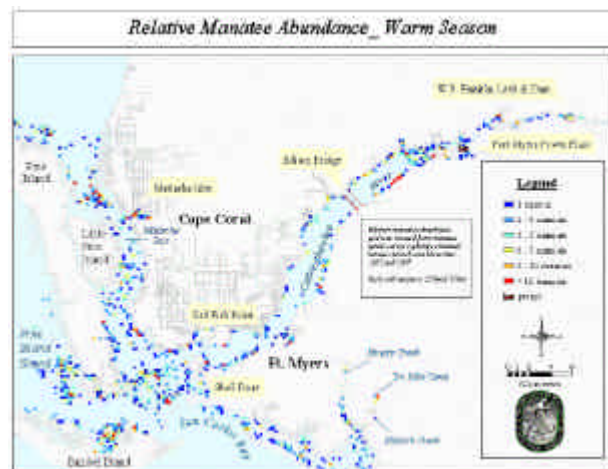
In partial fulfillment of the Settlement Agreement between various environmental groups and the FWC, researchers from the FWC examined manatee use of the Caloosahatchee River in Lee County, eastward, to the Edison Bridge and manatee use of Mullock Creek. Researchers examined human use of the river, habitat features, large and fine-scale manatee movements (from telemetry data), manatee distribution and relative abundance (from aerial surveys), and manatee deaths (from FWC carcass recovery data).

The Caloosahatchee River is an important place for large numbers of manatees in southwest Florida. Manatees use the mid-region, between Shell Point and the Edison Bridge, primarily as a travel corridor.

Requisites, such as warm water, are more abundant west of Shell Point (west region) and east of the Edison Bridge (east region).

Manatee distribution changes seasonally; reduced winter movements are concentrated upriver. In winter, fatally injured manatees may seek refuge in the east region.

The annual rate of increase of watercraft-related manatee deaths (1989–2001) suggests that there has been a change in boater abundance, boater behavior, or both. Data from this “weight-of-evidence” approach can be used in a simulation model to evaluate risk to manatees.



*This map displays relative manatee abundance for the Caloosahatchee River and surrounding areas during the warm season. The map was created from manatee aerial survey sightings obtained between March and November, 1995 and 1997.*



*This map displays relative manatee abundance for the Caloosahatchee River and surrounding areas during the winter season. The map was created from manatee aerial survey sightings obtained between December 1994 and February 1995, and January, February, and December 1997.*



## Publications Resulting From Work Funded by the Save the Manatee Trust Fund

Bossart, G.D., Meisner, R., Rommel, S.A., Ghim, S., and Jenson, A.B. 2003. Pathologic Features of the Florida Manatee Cold Stress Syndrome. *Aquatic Mammals*. 29. 1:9–17.

Deutsch, C.J., J.P. Reid, R.K. Bonde, D.E. Easton, H.I. Kochman, and T.J. O'Shea. 2003. Seasonal Movements, Migratory Behavior and Site Fidelity of West Indian Manatees Along the Atlantic Coast of U.S. *Wildlife Monographs* 67:1–77.

Kipps, E.K., W.A. McLellan, S.A. Rommel, and D.A. Pabst. 2002. Skin density and its influence on bouyancy in the manatee (*Trichechus manatus latirostris*), harbor porpoise (*Phocoena phocoena*), and bottlenose dolphin (*Tursiops truncatus*). *Marine Mammal Science* 18:765–778.

McLellan, W.A., H.N. Koopman, S.A. Rommel, A.J. Read, C.W. Potter, J.R. Nicolas, A.J. Westgate, and D.A. Pabst. 2002. Ontogenetic allometry and body composition of harbour porpoises (*Phocoena phocoena*) from the western North Atlantic. *Journal of Zoology*. 257:457–471.

Rommel, S.A. and H. Caplan. 2003. Vascular adaptations for heat conservation in the tail of Florida manatees (*Trichechus manatus latirostris*). *Journal of Anatomy* 202:343–353.

Silber, G.K., L.I. Ward, R. Clarke, K.L. Schumacher, and A.J. Smith. 2002. Ship Traffic Patterns in Right Whale Critical Habitat: Year 1 of the Mandatory Ship Reporting System. NOAA Technical Memo NMFS-OPR-20.

Sorice, M.G., C.S. Shafer, and D. Scott. 2003. Managing Endangered Species within the Use/Preservation Paradox: Understanding and Defining Harassment of the West Indian Manatee (*Trichechus manatus*). *Coastal Management* 31:319–338.

### **FMRI manages state funds allocated for manatee research at Mote Marine Laboratory. The following projects were funded during the 2002–2003 fiscal year:**

- Assessment of Thermal Biology and Potential for Thermal Stress
- Diagnostic Indicators of Manatee Immune Function
- Manatee Sensory Processes
- Studies in Matlacha Isles and other areas of southwestern Florida: Facilitating adult survival estimations in southwestern Florida, and documenting manatee habitat use patterns
- Developing numerical calibration indices at power plants
- Manatee rescue and verification

## RIGHT WHALES

In addition to manatee recovery efforts, the FWC is involved in recovery efforts for other endangered marine mammals, including the north Atlantic right whale, *Eubalaena glacialis*, the most endangered of the world's large whales. Most of this work is supported through grant funding provided by NOAA-NMFS; however, portions of some staff salaries are provided by the STMTE. Efforts have been heightened to prevent human-caused mortality in this species. Even one death per year has a significant impact on the population, which is estimated to number approximately 325 individuals. In 1994, NOAA Fisheries designated Florida and Georgia coastal waters as critical habitat for the right whale. This region is the only known calving ground of the northern right whale. The FWC is dedicated to assisting NOAA Fisheries in its efforts to protect the north Atlantic right whale as outlined in the 1991 Northern Right Whale Recovery Plan.

Federal efforts to protect right whales in the Florida-Georgia critical habitat have resulted in the formation of the Southeast Implementation Team for the Recovery of the North Atlantic Right Whale, a multi-agency and citizen advisory group. The Team develops management and research recommendations and assists in implementing the recovery plan. The FWC has been a member of the Implementation Team since its 1993 inception. A FWC staff member served as the chairperson of the team this year.

In an attempt to prevent ship strikes, which can kill or injure right whales, NOAA and the U.S. Coast Guard implemented the Mandatory Ship Reporting Systems (MSR) in July 1999. Under the systems, all commercial ships greater than 300 gross tons are required to report to the MSR when entering either of two areas surrounding

designated critical habitat: one in waters off the northeast U.S., the other off the southeast U.S. The northeast system operates year-round and encompasses critical habitats in Cape Cod Bay and the Great South Channel. The southeast system operates from 15 November to 15 April and encompasses right whale critical habitat off Georgia and Florida. Ships' captains are required to report vessel position, speed, and destination at their point of entry into the system. Once a report is received by the MSR server, a message providing information about recent right whale locations and advisories is sent back to the ship. FMRI coordinates a pager-alert network that notifies key agencies, ports, and mariners when right whales have been sighted.

Since 1987, FMRI staff members have conducted numerous aerial surveys to monitor seasonal presence of right whales, to determine the number of calves born, and to mitigate ship-whale collisions. Over the past several years, FMRI has worked closely with federal, state, and non-governmental-organization (NGO) partners to compile years of calving ground aerial-survey data into GIS format. Analyses of these spatial data will help researchers better define right whale distribution patterns in the southeast calving grounds in relation to environmental factors and human activities.

Researchers are currently studying sea surface temperatures and bathymetry relative to whale sightings to help them better understand whale habitats. Human activities, such as ship traffic, are also integrated into GIS to help characterize ship traffic patterns in right whale critical habitats. Ship traffic data are generated from MSR systems surrounding right whale critical habitats.

## 2002–2003 Highlights

- From December 1, 2002, until January 26, 2003, FMRI staff members conducted 35 aerial surveys. This effort resulted in a total of 23 sightings of right whales. The individual breakdown of these sightings is 14 mother and calf pairs, 8 lone adults, and one entangled right whale. After a survey aircraft carrying Wildlife Trust personnel crashed off of Fernandina Beach, Florida, all right whale surveys were temporarily suspended pending analysis of safety protocols.
- Several FWC staff members obtained training and became certified to disentangle large whales from lines or other fishing gear when the animals are entangled at sea.
- Staff members responded to several requests for information from the National Marine Fisheries Service, including the preparation of maps showing U.S. Navy exercise sites in relation to whale sightings, aerial locations of entangled whales, and maps showing relative abundance and distribution of whales.
- Staff members filled numerous NOAA Fisheries requests for maps showing whale distribution and relative abundance in the southeast calving grounds.
- Staff members participated in a NOAA risk-assessment meeting aimed at developing potential strategies to reduce or eliminate right whale ship-strike fatalities.
- All data collected during offshore aerial surveys were entered, verified, and edited for inclusion in the Right Whale Consortium database.
- Staff members integrated identification information with the GIS aerial point data allowing for spatial queries of individual whales in the southeastern United States.



*FWC staff member assists with the disentanglement of a whale  
(photo provided by Center for Coastal Studies)*

### Right Whale Facts

Current population consists of approximately 325 animals

Most endangered of the large whales

Hunted as early as the eleventh century

Commercial harvest of right whales banned by the International Whaling Commission in 1949

# LAW ENFORCEMENT COORDINATION

The FWC Division of Law Enforcement was appropriated \$371,000 from the Save the Manatee Trust Fund (STMTF) for salaries and benefits within the 2002–2003 fiscal year. With the 2.5% pay increase, the appropriated funds were increased to \$372,875. The primary use of the funds was enhanced enforcement of the existing manatee protection speed zones.

The divisions' efforts are based on the premise that education and enforcement are inseparable. The division's enforcement efforts in this area include a strong educational component aimed at increasing community awareness of manatee issues. The goal is to gain an acceptable level of compliance to the manatee protection speed zones, which will hopefully result in a reduction of the watercraft-related manatee mortalities.

Enforcement efforts begin with educational and informational vessel stops and verbal warnings as each new protection zone is posted. The enforcement contact is escalated to written warnings and the issuance of Uniform Boating Citations (UBC) after a specific zone has been posted for a reasonable amount of time or for repeat offenders. Officer discretion, based on interviewing violators, is the guideline for the type of enforcement action applied in each contact.

Enforcement efforts have focused on areas of high watercraft-related manatee mortalities, areas of high vessel traffic in manatee protection zones, newly established protection zones, and times of the year when high manatee activity is expected (primarily winter months).

The Division of Law Enforcement continues to provide enhanced enforcement and closely track enforcement activities in the following counties of critical interest regarding manatee protection: Duval, Brevard, Indian River, Volusia, Dade, Broward, Palm Beach, Lee, Collier, Manatee, Sarasota, Citrus, and Levy.

## 2002–2003 Highlights

- To enhance manatee-protection efforts, twenty-five FWC law enforcement positions were provided by the 2001–2002 legislature. In October 2002, these new law enforcement officers graduated from the FWC Law Enforcement Academy, and after 13 weeks of an intense field-training program, they were functioning as fully qualified officers throughout the state.
- In excess of 33,000 patrol hours were conducted in critical areas as a response to increased watercraft-related manatee mortalities, reports of noncompliance, and sightings of high concentrations of manatees.
- Officers continued to provide first response and assistance in the recovery of manatee carcasses and in live rescues. One such rescue took place in the Ten Thousand Islands. Officers assisted in the effort and provided transportation to the area in a flats boat and an airboat.
- Throughout the state, the Division of Law Enforcement participated in more than 90 educational or outreach efforts targeting manatee awareness and compliance with manatee protection speed zones. In conjunction with the targeted educational and outreach efforts, officers made 31,474 educational

contacts regarding manatee protection during patrol hours.

- In an effort to prepare for enhanced patrols of manatee protection speed zones in Hillsborough County, all local officers have been attending speed radar school.
- State of the art speed-detection devices were purchased for officers in Volusia County.
- In an effort to provide improved understanding of the protection zones, the division undertook the monumental task of conducting an inventory of all speed zone markers in the state. Enforcement efforts regarding manatee protection are closely related to proper education of boaters. All the information was provided to FMRI GIS staff members for data entry.

### **Interagency Law Enforcement Cooperation**

- As the lead agency, FWC coordinated law enforcement officials in Lee County to begin the development of a Marine Law Enforcement Task Force to better organize the county's marine law enforcement activities. Though primarily created to address manatee protection in Lee County, it will also address other marine-related issues, such as boating safety and other resource regulation enforcement. The following law enforcement agencies have committed to participate in the Task Force: Lee County Sheriff's Office, Cape Coral Police Department, Fort Myers Police Department, Sanibel Police Department, and the U.S. Fish and Wildlife Service.

### **Homeland Security Initiative**

- The FWC Division of Law Enforcement continues to be an active participant in the nation's Homeland Security Initiative. The primary mission focus is providing port security in at least six different locations. These missions continue to require the division to direct some resources to protection patrols. This participation continues to be required in Broward and other areas when the alert is raised to orange.



*Informational poster advertising the Marine Law Enforcement Task Force in Lee County*



## PLAN AND PERMIT REVIEW

Activities permitted by state regulatory agencies (Department of Environmental Protection (DEP), water management districts, and the Department of Community Affairs) can adversely affect the endangered manatee. The BPSM reviews these projects and drafts agency opinions to reduce or eliminate potential negative effects. Staff members also provide technical support for the U.S. Fish and Wildlife Service during their consultation process.

### 2002–2003 Highlights

- Staff members provided expert testimony during administrative hearings concerning potential effects on manatees.
- Staff members attended numerous Cabinet Aides meetings to assist with agenda items regarding effects on manatees.
- The study for blasting conservation measures, initiated in the 2001–2002 fiscal year and funded by the Marine Mammal Commission and the U.S. Fish and Wildlife Service, continued this year. Draft documents outlining a literature search and guidelines for blasting conservation measures were developed and submitted to the FWC. The information is currently under review.
- Staff members provided input to the DEP regarding several proposed rule revisions for submerged lands.

#### Projects Reviewed During FY 2002-2003

Standard Conditions .....	231
Required Additional Questions.....	226
Critical Reviews that could significantly effect manatees or their habitat.....	37
Miscellaneous Correspondence.....	32

## RULE ADMINISTRATION

The Rule Administration Section focuses primarily on establishing comprehensive, manatee protection, boat-speed and boat-access zones. The section also administers activities related to these zones, such as sign-posting, permit issuance, and variance reviews. The first state-designated, boat-speed zones for manatee protection were established in 1979. In 1989, the Governor and the Cabinet identified 13 counties as high priority for the establishment of county-wide speed zones: Brevard, Broward, Citrus, Collier, Dade, Duval, Indian River, Lee, Martin, Palm Beach, St. Lucie, Sarasota, and Volusia. As of 1999, rules had been established in all of these counties. Much of this fiscal year's efforts were again focused on consideration of rules for numerous site-specific areas identified in an April 2001 settlement agreement the commission entered to resolve a lawsuit filed by a coalition of environmental groups. Some of the areas considered already had some level of protection in place, while others were completely unregulated.

### Operational Protection Under Settlement (OPUS)

- In September 2002, under Phase I of OPUS, the commission approved new or amended manatee protection rules for portions of Charlotte, DeSoto, Citrus, Hillsborough, Indian River, and Sarasota counties. The commission made changes to the proposed zones in Charlotte, Indian River, and Sarasota counties; all other proposed zones were approved without substantive changes.
- Language added to the proposed rules set the effective date of each rule as the date that regulatory signs are posted in each affected area.
- No administrative challenges were filed against any of the rules.

**Charlotte and DeSoto County** (68C-22.015, FAC)

Adopted in November 2002

- The rule change added zones in the Lemon Bay, Turtle Bay, and Peace River areas.
- Staff members developed draft sign plans for marking the zones and they continue working with Charlotte County staff to post regulatory markers.
- On-water work to post the markers has not begun.
- No posting work is needed in the Peace River system because the U.S. Fish and Wildlife Service adopted a federal manatee refuge that establishes identical or more restrictive regulations in all areas covered by the FWC rule.

**Citrus County** (68C-22.011, FAC)

Adopted in October 2002

- The rule change added two new winter season (November 15–March 31) safe-haven zones at the Blue Waters area of the Homosassa River.
- Staff members worked closely with employees from the Homosassa Springs State Wildlife Park and Citrus County to develop a sign plan for marking the zones. The areas were posted in time for the zones to be in effect for the entire 2002–2003 winter season.
- The U.S. Fish and Wildlife Service adopted federal manatee sanctuaries that are identical to the FWC zones. The posted markers display both state and federal regulations.

**Hillsborough County** (68C-22.013, FAC)

Adopted in November 2002

- The rule change removes the existing winter season slow speed and idle speed zones in the Hillsborough Bay channel leading to the Alafia River and in the lower portion of the river.

- The rule amendment created a year-round slow speed zone in the lower portion of the Alafia River with 25 mph boat operation allowed in the marked channel. In addition, a 25 mph shore-to-shore zone was established between US 41 and I-75.
- On the lower portion of the river, the new zones overlap Hillsborough County zones (enacted in 2002) that extend south along much of the eastern shoreline of Tampa Bay.
- Staff members worked closely with Hillsborough County to develop a sign plan for marking the zones. Posting of the areas was completed in May 2003.
- Old and unnecessary FWC signs were removed as a result of the U.S. Fish and Wildlife Service adopting more restrictive and slightly larger federal zones within the vicinity of the Tampa Electric Company Big Bend power plant area in Apollo Beach.

**Indian River County** (68C-22.007, FAC)

Adopted in November 2002

- The rule change added a new winter season safe-haven zone in the vicinity of the Vero Beach power plant and revised the existing zones in the Jungle Trail Narrows vicinity to expand the area regulated throughout the year.
- Staff members coordinated with the Florida Inland Navigation District to develop a sign plan for marking the zones.
- Posting of the areas was complete in June 2003.

**Manatee County** (68C-22.014, FAC)

Adopted in November 2002

- The rule added zones in the Terra Ceia Bay areas.
- Staff members developed a draft sign plan for

marking the zones and they continue working with Manatee County employees to post regulatory markers.

### **Sarasota County (68C-22.026, FAC)**

Adopted in November 2002

- The rule added a year-round slow speed zone in a previously unregulated area in the City Island vicinity and added a new winter season safe haven in the Warm Mineral Springs area off of the Myakka River.
- The commission will oversee the October 2003 scheduled posting of regulatory markers in the Warm Mineral Springs area.

### **Tampa Bay**

- Phase I OPUS rules were adopted in November 2002
- Staff members began working on Phase II, which includes developing a rule proposal for the Tampa Bay area.

### **Other Rule-Related Activities**

- As is now required by section 370.12(2)(f), Florida Statutes, staff members notified the counties of Hillsborough, Manatee, and Pinellas that the commission was considering a rule and requested that the counties designate a Local Rule Review Committee (LRRC).
- This will be the first time that the new LRCC process will be used. The committee will convene in July 2003.

### **Brevard County**

- Staff members worked with the Florida Inland Navigation District (FIND) to post regulatory markers for the amendments to the Brevard County rule (68C022.006, FAC) adopted in June 2002, following the state Division of

Administrative Hearings' (DOAH) dismissal of three rule challenges filed in 2001.

- Two separate appeals of the DOAH Final Order were filed with the Fifth District Court of Appeal.
- In March 2003, the district court affirmed the DOAH Final Order, and no appeal of the ruling was filed.
- Sign-posting work proceeded while the appeals were pending because the DOAH Final Order had affirmed the validity of the amendments.
- Contractors working for FIND began posting the new zones in November 2002 and completed the initial stages of work in February 2003; although, some fine-tuning and corrections were identified even before the posting work was completed.
- One complication was the vandalism with chain saws of several signs, mainly in the Eau Gallie area. The signs and upper pilings on a few of the vandalized installations were completely separated from the lower portion of the pilings, leaving only bare, unmarked pilings that were either submerged or only barely above the water's surface. Fortunately, no one ran into any of the vandalized installations before FIND was able to replace them.

### **Lee County**

- Staff members completed posting of the depth-dependent zone (slow speed or 25 mph, depending on depth) on Mullock Creek in November 2002. The zone was adopted in June 2001, but sign posting was delayed because of permit issues related to installation of the signs.
- In January 2003, a Lee County Court judge issued a written Final Judgement dismissing several citations that area boaters had received for intentionally violating some of the zones in Matlacha Pass, Pine Island Sound, and Estero Bay. The ruling invalidated the affected zones.

- After the commission requested but was denied a rehearing before the county court, the commission appealed the order to the circuit court.
- The invalidated zones will remain in effect while the appeal is pending.

### **Volusia County**

- In January 2003, the city of Oak Hill requested an extension of the southern boundary of the existing slow speed zone in its jurisdiction (68C-22.012, FAC). The city wants the new boundary extended to include the portion of the Intracoastal Waterway channel adjacent to several aquaculture leases in the Mosquito Lagoon. The city said that the extension was needed to protect people involved in shellfish harvesting.
- In March 2003, the commission sent a response stating that it would consider the rule change when it evaluates the entire rule (probably in 2004); however, the commission would not be able to use human safety as a reason for increasing the size of a manatee protection zone.

### **Variances and Waivers**

The BPSM received six requests for variances or waivers from manatee protection rules, as authorized by s. 120.542, Florida Statutes. Processing of these requests often requires a considerable amount of time because of notification requirements and the need for detailed coordination with the Division of Law Enforcement.

- In September 2002, the commission received an amended petition for a variance from the Brevard County Non-Motorized Water Sports Association for motorboat activities related to rowing and other non-motorized activities in portions of Brevard County. The petition was denied in December 2002, mainly for technical and procedural reasons. Staff members continued discussions with the

applicant regarding whether the scope of the variance request could be narrowed or otherwise refined, but as of the end of the fiscal year, the applicant had not reapplied.

- In December 2002, the commission received a request from a commercial crabber for a variance from the Brevard County rule to allow him to operate his vessel at speeds greater than Slow Speed while conducting commercial crabbing activities. Staff members requested additional information from the applicant in January 2003, but as of the end of the fiscal year, they had not received a response.
- In January 2003, the commission received a request from the Boca Raton Resort and Club for a variance from portions of the Palm Beach County and Broward County rules for activities associated with a Honda Marine dealer meeting in late 2003. Staff members requested additional information in February 2003 and received a response in March 2003. As of the end of the fiscal year, staff members were still in the process of reviewing the request.
- In February 2003, the commission received a petition from the Florida Institute of Technology (FIT) for a variance from portions of the Brevard County rule for activities associated with FIT's crew teams. Staff members requested additional information in February 2003 and received a response in April 2003. A Final Order granting a conditional variance was prepared in late June and signed by the Executive Director on July 1.
- In April 2003, the commission received a petition from a professional fishing guide for a variance from the Volusia County

rule to allow him to operate his vessel at speeds greater than slow speed while conducting guiding activities. Staff members requested additional information in May 2003, but as of the end of the fiscal year, they had not received a response.

- In April 2003, the commission received a petition from the Sarasota Ski-A-Rees organization for a variance from the Sarasota County rule to allow it to continue its traditional water skiing activities in the City Island area that was recently changed to a slow speed zone. As of the end of the fiscal year, staff members were still in the process of reviewing the request and coordinating with the applicant.

### **Permits**

Rule 68C-22.003, FAC, allows the commission to issue a number of different types of permits for activities that would otherwise be prohibited by the manatee protection rules. A total of 150–200 permits for commercial fishing and professional fishing guide activities are typically in effect at any given time. Each individual permit is in effect for two years from the date of issuance.

Staff members handled other permits this fiscal year:

- The Save the Manatee Club's challenge to the commission's notice of intent to issue a revised vessel-testing permit to Sea Ray Boats of Brevard County is still pending before the state Division of Administrative Hearings (DOAH Case No. -02- 1760). The case has been in abeyance since 2001, pending resolution of issues related to the federal manatee refuge that encompasses the areas affected by the proposed permit.
- In December 2002, the commission issued a permit to the FWC's FMRI to allow FMRI staff members to operate several research vessels at speeds greater than slow speed as

part of their efforts to capture and tag manatees in the discharge canal of TECO's Big Bend power plant in Hillsborough County.

- The commission issued a permit in March 2003 to allow a Brevard County resident to operate his vessel at speeds up to 25 mph when the water depth is not sufficient to allow access to his property at slow speed.
- Staff members proposed numerous resident access permits for the new winter season safe-haven zone that was adopted in November 2002 for a portion of the canal system adjacent to Vero Beach municipal power plant in Indian River County. The permits were not needed for the 2002–2003 winter season, since the regulatory markers for the zone were not installed until June 2003, but the permits will be needed to authorize access for the 2003–2004 winter season.

### **Other Activities**

Since October 2002, staff members have been working with FMRI to review and comment on GIS maps of all FWC manatee protection rules that FMRI staff members are creating for use on the Internet. The review process involves frequent communication between the BPSM and FMRI. As of the end of the fiscal year, final maps had been created for about half of the areas that have rules. Maps for the other areas are in varying stages of development or review.



## STRUCTURE-RELATED MANATEE DEATHS

After watercraft, more manatee deaths are attributed to navigational locks and water control gates than any other human cause. From 1974–2003, there were 174 structure-related manatee deaths in Florida.

The FWC has taken an active role in coordinating with the U.S. Army Corps of Engineers (USACE), the South Florida Water Management District, and the Florida Department of Environmental Protection to develop solutions to this serious problem. Intergovernmental coordination has been critical to addressing this issue. Save the Manatee Trust Fund expenditures to address structure-related manatee deaths have been key in supporting management and research activities, including review of new structures and proposed manatee technology, site visits to structures, organization of task force meetings, carcass recovery and rescues associated with structures, and maintenance of a database. Additional federal and state funds have been used to implement the technology needed to make structures safer for manatees.

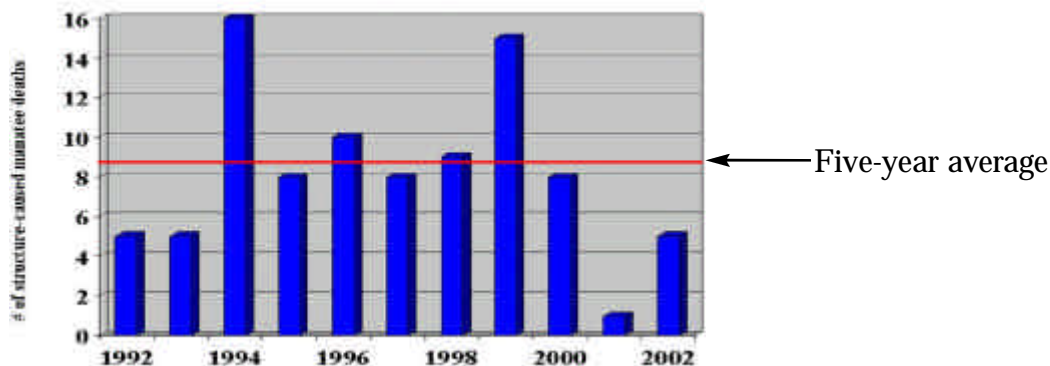
As shown in Figure 2, structure-caused manatee deaths during 2001 and 2002 were well below the 10-year average of 8.5 manatee deaths per year. There were no structure-related deaths in the first half of 2003.

There were five structure-related manatee deaths in calendar year 2002. Of the five deaths, four occurred in southeast Florida. Two of the structures responsible for these deaths were subsequently retrofitted with manatee protection devices. The third structure has never been associated with a manatee death. One manatee death occurred in southwest Florida. The lock likely responsible in that incident is scheduled to have a manatee-protection device installed in 2004.

### 2002–2003 Highlights

- Several structures were fitted with manatee protection devices in 2002–2003:
  - S-20G Military Canal
  - S-21 Black Creek
  - S-131 Lake Okeechobee (07/03)
  - S-135 Lake Okeechobee (07/03)

**Figure 2**  
**Structure Deaths**



# MANATEE PROTECTION PLANS

Manatee protection plans (MPP) are one tool that can assist in the long-term preservation of manatees and their habitat. The 1989 high priority designation by the Governor and Cabinet included development of MPPs in the 13 “key” counties. More recently, the 2002 Legislature amended Chapter 370.12(2) Florida Statutes, Florida Manatee Sanctuary Act, to incorporate the 1989 directive for the development of county MPPs. The statute provided deadlines for MPP development and required adoption of the boat facility element into county comprehensive plans. MPPs address boat-facility siting, habitat protection, local educational campaigns, and waterway-use regulations. County-specific boat-speed zones can be a component of these plans; however, a separate rule-making process is required for state rules. The plans can also address solutions for manatee mortality caused by locks, gates, large vessels, ships, and commercial fishing practices. Indirectly, MPPs may also increase the safety of boaters, facilitate recreational planning, and protect aquatic habitat critical to many other species. Plans can take several years to develop because of the complexity of issues a county must address in its plan and the range of information that must be collected. Staff members coordinate assistance with protection planning for counties and others as requested by local governments.

## 2002–2003 Highlights

- Staff members assisted in the review of draft Boat Facility Siting Plans for MPPs in Brevard, Broward, Citrus, Clay, Collier, Lee, Sarasota, and Volusia counties.
- The provisions of the Indian River County MPP directed the county to prepare a formal evaluation of the plan every two years. In anticipation of evaluation, the FWC staff is providing technical assistance to the county.
- In 2002, the BPSM funded a contract with Sarasota County. The contract to continue Sarasota County’s development of their MPP was completed June 30, 2003.
- FWC staff members worked throughout the year with Duval County to address the high number of watercraft-related manatee deaths in 2002. The Duval MPP requires limits on authorizing new docking facilities if there are five or more watercraft-related manatee deaths in a 12-month period. In 2002, Duval had 10 watercraft-related manatee deaths. In March 2003, FWC staff members reviewed the Duval County MPP Annual Update and provided comments. In June 2003, the FWC attended a meeting in Jacksonville to further discuss the recent manatee deaths and the potential effects of dredging. The meeting included representatives of Jacksonville University, the U.S. Army Corps of Engineers, the City of Jacksonville, the U.S. Fish and Wildlife Service, the Environmental Protection Agency (EPA), and JAXPORT.



## HABITAT CHARACTERIZATION, ASSESSMENT, AND PROTECTION

Like all wildlife, manatees require habitat. Manatee habitat consists of many components, including sufficient water depth, forage (marine and freshwater plants), freshwater for drinking, and warm water during periods of cold weather. Other, less definitive, important aspects may include “quiet places” where manatees can give birth successfully. Over time, the habitat in Florida has changed tremendously due to human influence. Dredging has created new waterways and canal systems that allow manatees to travel in many areas throughout the state. Some historic springs have been lost. Warm water from power plants has attracted manatees in great numbers and has undoubtedly altered the animals’ historical distribution and movement patterns. Exotic fresh water plants have provided new sources of forage, while overall there have been losses of significant quantities of marine seagrasses from decreases in water quality. The challenge today is to manage and conserve the manatee population in an already altered habitat that continues to change as the surrounding land is increasingly urbanized.

The habitat section of the BPSM focuses on issues such as seagrass protection, freshwater plant management, protection of natural warm-water springs, and reduction of risks to manatees from long-term habituation to artificial warm water sources. Understanding the manatee’s habitat needs and assessing habitat health and stability is a primary focus of these protection activities.

## 2002–2003 Highlights

- The FWC staff coordinated with intergovernmental agencies in working groups and task forces to effectively manage human activities in natural systems used by manatees.
- Staff members initiated a study at Manatee Springs to address concerns for managing the grazing effect during the cold season. Numerous manatees feed on the native aquatic plant communities in the springs. The study used cage enclosures around tapegrass patches to determine the relative effect of manatee grazing. The study also examined possible management strategies for allowing more rapid recovery of this resource after manatees move out of the system in the warm season.



*Staff member assesses the effect of manatee grazing at Manatee Springs*

- The FWC, USFWS, and USACE began evaluating changes to existing canal systems and the construction of new structures that are planned for the Comprehensive Everglades Restoration Plan (CERP). Twenty-eight CERP project plans were reviewed, and it was determined that 18 will directly affect manatees. The agencies will continue evaluation of manatee habitat in affected



systems and development of a focused manatee protection strategy throughout the CERP development and implementation process.

- All 15 Florida power plants discharging warm-water that is used by manatees as winter refuges have commission- and USFWS-approved Manatee Protection Plans as part of their NPDES permits.



*Power plants provide a warm water refugia for manatees during the winter months*

- Over the past year, the FWC participated in the Warm-Water Task Force, as recommended in the federal Manatee Protection Plan. The task force has been convened by the USFWS to address potential changes facing Florida's power-generating industry and, by default, warm-water refuge characteristics for the Florida manatee. The Task Force discussed changes that may include the retirement of older plants, deregulation of the Florida power industry, advances in technology, and new environmental regulations. Any of these changes will ultimately affect significant numbers of manatees that depend on the warm-water refugia created by these power plants.



*Mother (with tag) and calf feeding*



# ENVIRONMENTAL EDUCATION AND INFORMATION DISSEMINATION

The FWC recognizes that rules, regulations, and enforcement have limited effectiveness in achieving long-lasting healthy fish and wildlife populations in Florida. The agency desires movement toward public development of a strong conservation ethic that results in voluntary actions that enhance Florida's fish and wildlife resources. In simple terms, the FWC believes that it will never have all the resources for proper wildlife stewardship: instead the FWC needs a public that "wants" to do the right thing. Working toward this type of relationship with the public requires that the FWC provides accurate information and a consistent message promoting stewardship and conservation of Florida's resources.

The BPSM outreach section works to foster an understanding of the unique ecological and biological value of manatees, the problems they face, and the steps necessary to conserve the species. With a high profile species like the manatee, there is much misinformation. It is essential for the FWC to be diligent in providing accurate, science-based information and a consistent viewpoint that recognizes a balance between human use and conservation. While this information is provided to the public, the FWC also targets specific user groups that may effect manatees. Specific user groups include recreational boaters, large ship and tug operators, and divers. The FWC also works with youth, because it believes that the development of a life-long conservation ethic starts at an early age. The goal is to provide factual, timely information appropriate to the target user group.

## 2002–2003 Highlights

- A contract with the State of Florida Nature and Heritage Tourism Center continued this year. The BPSM provides manatee-related materials to the center for distribution to tourists. The center is located in White Springs, a short distance from I-75, near the Georgia-Florida border.
- This year, a large outreach mailing to chambers of commerce and public libraries around the state increased efforts to educate Florida's residents and visitors. After the initial contact, about 25 of the sites requested additional materials or staff members to offer presentations at their facilities.
- A total of 492 requests for information were mailed or e-mailed to the bureau for response. A portion of these requests (173) were for bulk orders of materials to be distributed throughout the requestor's organization.
- An assistant education video producer at the University of Florida contacted the BPSM about obtaining educational videos to use for producing a class instruction video. Staff members sent two videos that were produced through ACEE funds last year. After viewing the films, the producer suggested sending the videos to various cable stations around the state. Several cable companies were contacted about the videos, "A Closer Look at Manatees" and "The State of

Manatees.” Several companies responded to the offer:

Time Warner Cable  
Sunshine Network  
Lee County Public Resources  
Orange TV  
The Villages News Network

### **Panhandle Coast Guard Auxiliary Contacts**

As an auxiliary member and a FWC employee, a staff member is bridging the information gap in the Florida panhandle.

This forgotten coast” has been rediscovered as a growing, thriving community. Staff members are trying to educate auxiliary members in this area with information about various services available from the state.

The monofilament program is one of the first things introduced to the auxiliaries at a training conference held in Panama City. It is hoped that all of the auxiliaries from Pensacola to St. Marks will incorporate this program with their marina and bait shop visits and promote it in “boating safely” classes.

The St. Marks Flotilla 12 is pursuing this project and staff members are hopeful that others will join over the next few years. Other areas of the state have already introduced this recycling effort. For more information about this program, please visit [www.fishinglinerecycling.org](http://www.fishinglinerecycling.org)

Staff members are also working with a lieutenant in the Coast Guard to get top-down support for the authorized use of the manatee educational videos during all “boating safely” classes taught in the southeastern states. Videos were sent to auxiliaries in Florida a few years ago without this approval; staff members felt that more support would ensure use of the videos. The BPSM has a few hundred videos available to distribute as needed when the directive is approved.

The FWC Law Enforcement Web site has

a page set aside for auxiliaries to use for posting of “boating safely” classes. So far, Duval County is the only county listed on this page. The BPSM will pursue this resource as well by encouraging the auxiliaries to post their classes on this site.

### **Manatee Products Distributed**

Brochures:

*Miss Her Now* brochures  
*Commonly Asked Questions* brochure  
*Where are the Manatees?* brochure  
Brevard County Brochures

Other Items:

Manatee Coloring and Activity Book  
Manatee Middle/High School Activity Workbook  
Mini-posters  
Manatee News Quarterly newsletter

Web-based information is essential. Staff members worked to maintain and update three different FWC sites on manatees. Because of the high interest in manatees, a manatee link was created on the FWC home page. The link brings visitors to a manatee facts and information page ([myfwc.com/manatee](http://myfwc.com/manatee)). The BPSM posts the latest news and information on this page, including press releases, maps of new or proposed zones, and copies of commission positions on controversial manatee issues.

### **Economic Effect**

Florida attracts more out-of-state visitors to view wildlife than does any other state. In 2001, there were 1.5 million watchable wildlife recreationists participating in non-residential activities (any wildlife-watching activity that requires at least one mile of travel from home).

# DATA DISTRIBUTION AND TECHNICAL SUPPORT

Technology has become a vital tool in conservation decisions. Timely access to quality data can help managers make better-informed decisions. GIS use allows for spatial display and analysis of data. Data from FMRI and many other sources are collected for use by managers in their daily evaluations of rules, manatee protection plans, permits, habitat concerns and various other projects.

Technical support for staff members is also an integral component of this section. The use of available technology helps staff members make informed decisions and appropriate recommendations. The technical support section also maintains the peripheral devices essential to job function and serve as the liaison with the help desk when staff members have network problems.

## 2002–2003 Highlights

- Staff distributed approximately 120 GIS maps, 200 AutoCAD maps, and 175 digital data sets to external customers. Manatee-protection zones are kept current on the Web site, and many customers are now able to download and print their own maps online.
- Phase I and II of OPUS rule making accounted for a significant portion of staff time. As technology has improved and the BPSM capabilities have increased, customer expectations and demands have also risen. For example, presentations for commission meetings are now expected to include full briefing packages that show existing rules, rule proposals, and associated data in color. In addition, these visual aides are also adapted for PowerPoint presentations that allow for an examination of existing zones, proposed zones, and the supportive data. Local rule-review committees and

stakeholder groups also expect similar, high quality, graphic displays when reviewing commission proposals.

- Staff members integrated digital covers of proposed federal manatee zones with existing state rule covers to accommodate a review of the federal zones. Once comparison maps were created, they were provided to stakeholders.
- GIS staff members received instruction and on-the-job training in ArcGIS 8.2, making them more proficient with GIS software. Staff members can now complete more analyses at their desktop computers.
- ArcGIS 8.2 has proven to be a robust tool. The powerful software has made it easier to make standard maps, and it also made it possible to create more custom maps for internal and external customers.
- Hardware upgrades for older computers continue this year. Pentium II machines have been upgraded to Dell Premium IV machines. Bigger hard drives and better GIS and graphic capabilities have been installed. A new, large-format plotter was acquired this year. It allows printing of higher quality maps and posters and produces a professional product.

# CONSENSUS BUILDING AND STAKEHOLDER COOPERATION

In the past year, polarization and discord among stakeholders involved in manatee conservation reached an all-time high. In an effort to bring parties together, FWC staff members explored the possibility of initiating a facilitated conflict resolution process. The FWC believes that a conflict resolution process could accomplish many goals:

1. Reduce the polarization of stakeholders and citizens
2. Establish common ground and acknowledge areas and issues on which stakeholders agree
3. Clearly articulate areas of disagreement or conflict
4. Identify steps that can be agreed on that are preferable to litigation
5. Foster an improved level of trust among stakeholders in order to facilitate successful resolution of future disagreements
6. Identify specific measures that can be collectively undertaken to advance the common goal of protecting and conserving manatees for their long-term well being and for the benefit of people

The first exploratory meeting was held in Tallahassee in February 2003. Twenty-one stakeholders and staff members from the U.S. Fish and Wildlife Service and the Department of Community Affairs participated. A follow-up meeting was held in March in Orlando; it was facilitated by the Florida Conflict Resolution Consortium. Unfortunately, a few

stakeholders had concerns that ultimately prevented the group from moving forward. For example, the planned federal rule-making process for consideration of additional boat speed zones (scheduled for completion by July 31, 2003) was a major obstacle for some stakeholders. Other stakeholders found the FWC's plans to consider a change of the listing status for the manatee problematic.

The two meetings held produced some positive results. For example, as a result of these meetings and subsequent discussions, the USFWS agreed to rescind the Director's Order of January 22, 2003. The decision to rescind this order benefited the marine construction industry and provided potential relief from bureaucratic red tape to many single-family homeowners.

While no commitment to enter into a formalized conflict resolution process was reached at these exploratory meetings, there was considerable interest in the concept from all parties. The FWC is planning to continue the process later in 2003.

# ADVISORY COUNCIL ON ENVIRONMENTAL EDUCATION

Since 1989, the Advisory Council on Environmental Education (ACEE) has recommended funding for over 170 environmental education projects. The council adheres to a rigorous selection process to ensure funding of the most qualified projects. Before 1999, funding for environmental education projects was appropriated from both the Florida Panther Research and Management Trust Fund and the Save the Manatee Trust Fund. Effective July 1, 1999, projects supported by the Save the Manatee Trust Fund were required to focus solely on manatees and manatee-related environmental education topics. In 2001, the Florida Panther Research and Management Trust Fund was no longer available to fund ACEE environmental education projects. The funding for manatee-related environmental education projects was significantly reduced in 2002. As a result, ACEE selected only four projects for the 2002–2003 grant cycle, totaling \$133,084 in requested grant money.

## **“Manatee Education for Lee and Charlotte Counties”**

Grant Amount: \$14,069

Total Project Cost: \$15,158

Charlotte Harbor Environmental Center (CHEC) conducted “Manatee Education for Lee and Charlotte Counties” for third grade classes. This effort was designed with manatees as the focus for integrated education. The project included an interactive press-conference skit using a manatee puppet. Based on what they learned, students created manatee brochures for distribution through local libraries, park and information kiosks, bait and tackle shops, and U.S. mail as part of CHEC’s new residents’ packages. The project also included a professional development component for teachers.

Ninety-five school programs, involving 2,540 participants from Lee and Charlotte counties, were provided. Educator surveys indicated that the

program was successful in increasing student awareness and appreciation for manatees; improving understanding of water quality, habitat, and watercraft mortality as factors in sustaining manatee survival; and empowering students to take direct, personal action to solve problems by educating others in the community.



*Students in Martin County School District*

## **“The Manatee: Florida’s Endangered Marine Mammal”**

Grant Amount: \$37,081

Total Project Cost: \$68,746

The Environmental Studies Center, as part of the Martin County School District, designed and conducted “The Manatee: Florida’s Endangered Marine Mammal.” At the Environmental Studies Center, 643 first-grade students and 69 teachers and parent volunteers in Martin County public and private schools experienced a day of hands-on programs about manatees, and 151 parents and children participated in two family-oriented “Fun Days” to learn about manatees. Activities included a PowerPoint presentation, wet lab, art projects, an interactive computer game, and a quiz on manatees. Using information similar to that created for the first-grade program, a lecture series focused on manatee education was presented to 66 parents and children and 76 retirees. Based on results of pre- and post-tests administered to all of the above groups, the children improved their knowledge



about manatees by at least 16 percent, and classes showed as much as 41 percent improvement on post-test scores. Adults tested improved by 17 percent after the lecture and 20 percent after the “Fun Day” activities. Children tested after the “Fun Day” improved their scores by 29 percent—over 8 points more than the median results from the school group activities.

#### **“Live From Sarasota: Manatee”**

Grant Amount: \$45,945\*

Total Project Cost: \$69,725

Mote Marine Laboratory developed “Live From Sarasota: Manatee!” in partnership with Booker High School in Sarasota. Students in the Environmental Science Academy magnet program trained to develop a videoconference unit and an online component to teach elementary students about manatees and the animals’ relationship to a healthy coastal ecosystem. Students translated “real-world” scientific experiences with biologists in the field into a series of activities for a high-school-level videoconference on manatees. Mote staff members observed as high-school students presented their videoconference to local elementary school classes. According to pre-test and post-test results from these presentations, elementary students’ knowledge increased by an average of 27 percent, and their attitudes about manatees improved by an average of 19.3 percent.

\*Note: Total amount was not distributed due to 2003–2004 budget cuts; grantee stopped work on project, awaiting approval of funds certified forward to the extended date of December 2003. As of the last progress report, \$25,846.50 had been distributed.

#### **“Manatee Issue Survey: Comparing the Opinions of the Public, Environmentalists, and the Marine Industry on Florida’s West Coast”**

Grant Amount: \$35,989\*

Total Project Cost: \$74,339

The University of Florida, Department of Wildlife Ecology and Conservation, developed and

conducted “Manatee Issue Survey: Comparing the Opinions of the Public, Environmentalists, and the Marine Industry on Florida’s West Coast.” The survey was designed to describe and compare each audience’s opinions on the following issues:

- Manatee conservation and management
- Compromises people may be willing to make
- Willingness to pay for regulatory and outreach programs
- Knowledge of specific aspects of manatee management, such as downlisting (from endangered status to threatened status)
- Attitudes toward waterway use and boating rights
- Sources of information about manatees
- Related manatee issues

The University of Florida proposed numerous grant components:

- A logic model for the expected relationships between outcomes and predictor variables
- Questionnaires tailored for each audience
- A PowerPoint presentation of results and findings
- A workshop to present and discuss results
- Extension fact sheets and Web page
- A peer-reviewed publication and presentation at professional meetings

Results were to be disseminated to the public via the Extension Service.

\*Note: Total amount not distributed due to 2003–2004 budget cuts; grantee stopped work on project. As of last progress report, \$11,742 had been distributed.

## APPENDIX A—DEFINITION OF ACRONYMS

ACEE—Advisory Council on Environmental Education  
BPSM—Bureau of Protected Species Management  
CERP—Comprehensive Everglades Restoration Plan  
CHEC—Charlotte Harbor Environmental Center  
DCA—Department of Community Affairs  
DEP—Department of Environmental Protection  
DOAH—Division of Administrative Hearing  
FAC—Florida Administrative Code  
FMRI—Florida Marine Research Institute  
FIND—Florida Inland Navigational District  
FWC—Florida Fish and Wildlife Conservation Commission  
FY—Fiscal Year  
EPA—Environmental Protection Agency  
GIS—Geographic Information System  
GPS—Global Positioning System  
LRCC—Local Rule Review Committee  
MIPS—Manatee Individual Photo-Identification System  
MMGIS—Marine Mammals Geographic Information System  
MMPL—Marine Mammal Pathobiology Laboratory  
MPP—Manatee Protection Plan  
MRGIS—Marine Resources Geographic Information System  
MSR—Mandatory Ship Reporting Systems  
NGO—Non-Governmental Organization  
NMFS—National Marine Fisheries Service  
NOAA—National Oceanic and Atmospheric Administration  
NPDES—National Pollutant Discharge Elimination System  
OPUS—Operational Plan Under Settlement  
PIT—Passive Integrated Transponders  
STMTF—Save the Manatee Trust Fund  
TDR—Time-depth-temperature recorders  
TECO—Tampa Electric Company  
UBC—Uniform Boating Citations  
USACE—U.S. Army Corps of Engineers  
USFWS—U.S. Fish and Wildlife Service  
WMS—Warm Mineral Springs

