

SAVE THE MANATEE TRUST FUND
FISCAL YEAR 1997-1998
ANNUAL REPORT



Florida Department of Environmental Protection
Division of Marine Resources

December 1, 1998

EXECUTIVE SUMMARY

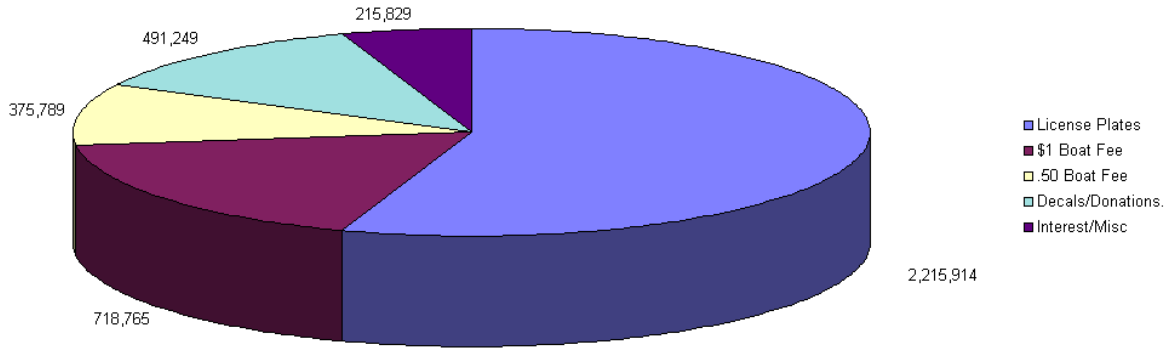
Manatees are marine mammals that can be found in Florida's coastal and riverine waters throughout the year. The Florida manatee is listed as an endangered species. Protection of manatees in Florida has been legislatively mandated since 1892. Current state efforts to recover the population are guided by the Florida Manatee Sanctuary Act of 1978 and the federally approved Florida Manatee Recovery Plan of 1995. The Florida Manatee Sanctuary Act declared the state to be a refuge and sanctuary for the manatee. The Act and subsequent amendments gives the Florida Department of Environmental Protection (FDEP) the authority to protect manatees from disturbance and harassment, injury, and intentional mortality. The Florida Manatee Recovery Plan lists 126 separate tasks that need to be accomplished to recover the Florida population of the West Indian manatee. Many of these tasks are addressed through a cooperative effort between federal, state, and local governments.

The largest manatees may reach thirteen feet in length and weigh over 3500 pounds, but most individuals are shorter (an average of 8 feet) and smaller (average of 1,000 pounds). Manatees are aquatic herbivores (plant eaters) and are most commonly seen eating, resting, or traveling. Female manatees are pregnant for 12-14 months and usually give birth to a single calf measuring about three to four feet in length. The calves remain with their mothers for up to two years. The recovery of the manatee population is impeded by mortalities from human-related causes (e.g., from collisions with watercraft, becoming trapped in water control gates and locks, and becoming entangled in fishing gear), as well as destruction and degradation of their habitat. Manatees have also died as a result of contact with harmful algal blooms, the effects of cold water, and natural disease.

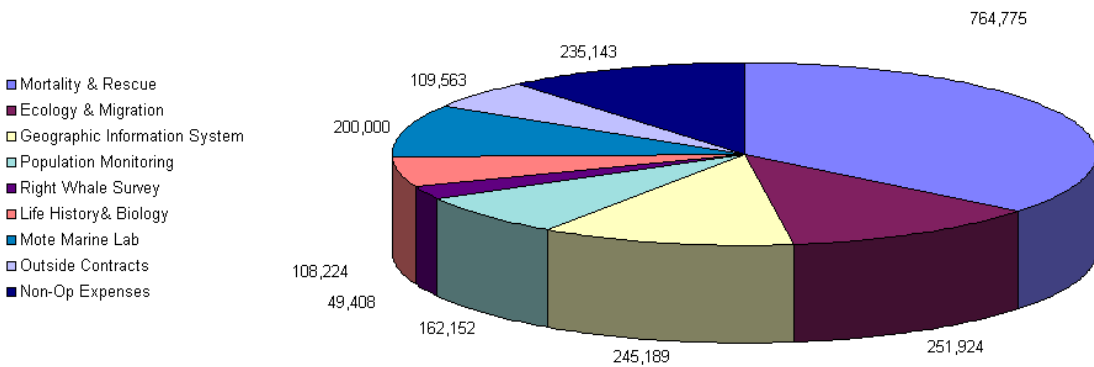
Funding for research and management activities in Florida is authorized through the Save the Manatee Trust Fund, which receives money from sales of a manatee license plate, boat registration fees, decal sales, voluntary contributions, and interest income. Revenues for the Save the Manatee Trust Fund for Fiscal Year 1997-98 totaled almost \$4,017,124, as shown in the accompanying pie chart. Environmental education programs were funded through an \$1,154,000 appropriation to the Florida Game and Fresh Water Fish Commission (FGFWFC). The legislative appropriation for manatee and marine mammal programs in 1997-98 was allocated to FDEP manatee and marine mammal research and management programs within the Division of Marine Resources, contracts to other research organizations, oceanaria participating in the rescue and rehabilitation of manatees, as well as private organizations. Research activities coordinated by the Division's Florida Marine Research Institute (FMRI) in St. Petersburg totaled \$2,126,378. Management activities conducted by the Division's Bureau of Protected Species Management (BPSM) totaled \$2,248,104. Budgetary breakdowns for individual program units for both the research and management efforts are depicted on the next page, followed by summaries of the work performed by personnel at the FMRI and the BPSM.

The human-related problems that manatees and their aquatic ecosystem face did not develop suddenly and they will not be solved quickly. The solutions are complex and time consuming, as documented in the Recovery Plan and as evidenced by the complexity of tasks undertaken by FDEP each year. Through the cooperation of local, federal, and state agencies, private organizations, and corporations, effective partnerships have been created to constructively address the recovery of the manatee population. FDEP persists in its efforts to heighten the environmental awareness of Florida's citizens and visitors, realizing that each person can make a significant contribution to the preservation of manatees and Florida's ecosystems by becoming aware of and complying with regulations that were designed both to protect this endangered species and to accommodate the growth of Florida's human population. FDEP will continue to coordinate its applied marine research programs with ecosystem management practices to ensure the habitat quality that sustains manatees can be improved and maintained within the State of Florida.

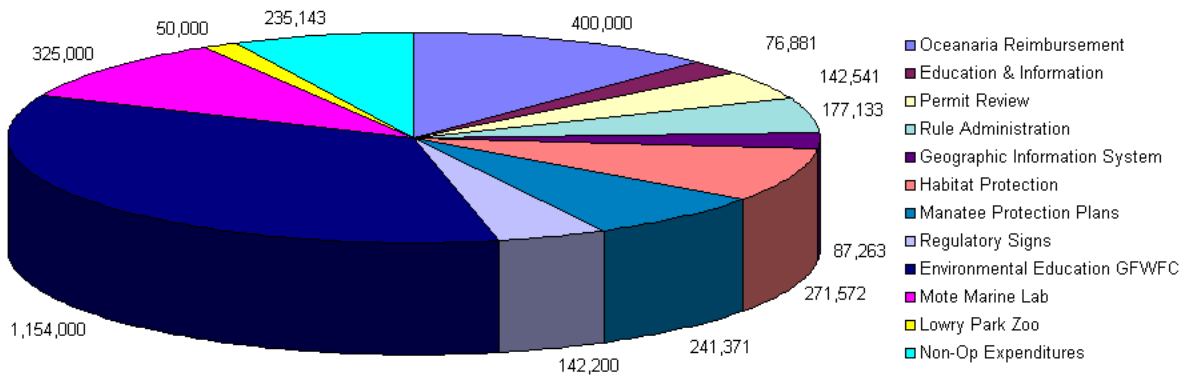
Save The Manatee Trust Fund Revenues
Fiscal Year 1997-1998
Total Revenues = \$4,017,124



Expenditures for Research
Fiscal Year 1997-1998
Total Expenditures = \$2,126,378



Expenditures for Management/Environmental Education
Fiscal Year 1997-1998
Total Expenditures = \$3,303,104



FMRI MARINE MAMMAL RESEARCH

The Marine Mammal Research Program is headquartered at the FMRI in downtown St. Petersburg. Additional staff are located at the FMRI Marine Mammal Pathobiology Laboratory (MMPL) in St. Petersburg and at field stations in Port Charlotte, Jacksonville, Melbourne, and Tequesta. Manatee research is organized into five projects: mortality and rescue; population monitoring; ecology and migration; life history and biology; and the marine mammal geographic information systems (GIS). Research on the endangered North Atlantic right whale is coordinated by program staff at the Jacksonville field station.

MORTALITY AND RESCUE



Marine Mammal Pathobiology Lab

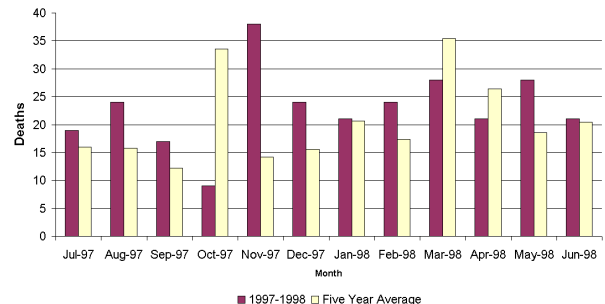
A network of researchers and law enforcement agencies was established in 1974 for the purpose of recovery of manatee carcasses and response to assist injured manatees. The US Fish and Wildlife Service (USFWS) and researchers at the University of Miami initiated the network. Over time, the program continued to expand and now rests largely with the FDEP. There is a dedicated staff statewide available for the collection of carcasses and to conduct research on statewide or regional issues involving manatees. A thorough examination (necropsy) is conducted on every carcass in order to determine the cause of death. Most necropsies occur at the state-of-the-art Marine Mammal Pathobiology Laboratory, opened in 1993 in St. Petersburg.

1997-1998 Highlights

- As a result of an evaluation by the US Marine Mammal Commission of the investigation of the 1996 manatee epizootic, several suggestions for improvements were presented. The most important was the development of a Contingency Plan to address large mortality events. This Plan

needed to be both specific in details and general in concepts in order to be the most useful overall. The Department contracted with Joseph Geraci and Valerie Lounsbury to write the Plan. The Department provided a great volume of information about personnel and material resources so that the contractors could incorporate this information into a workable plan of action. The Plan was completed and submitted to the Department in December 1997. This model document is extraordinary in its completeness and utility. Because these documents complement each other, the Plan is being printed in combination with the contingency plan generated by the USFWS and the national plan generated by the National Marine Fisheries Service (NMFS).

Florida Manatee Mortality
All Causes by Month
Fiscal Year 1997-1998



- MMPL collaborated with Eckerd College to determine age structure of the Florida manatees killed in the 1996 red tide epizootic in southwestern Florida. Further analysis of the epizootic specimens resulted in additional projects relating to manatee life history. Age-related data were collected and compared with the determined ages of these specimens. These data include; fusion of skull sutures, pelvic bone morphology, and flipper bone epiphyseal fusions. The age-related techniques could have forensic applications for analyzing recovered carcasses. Staff plan to develop an accurate technique for the age determination of live manatees.
- MMPL received a \$20,000 grant from the USFWS to hire staff to produce a report detailing manatee and fishery interactions. The major topics to be addressed are manatee injuries and deaths caused by

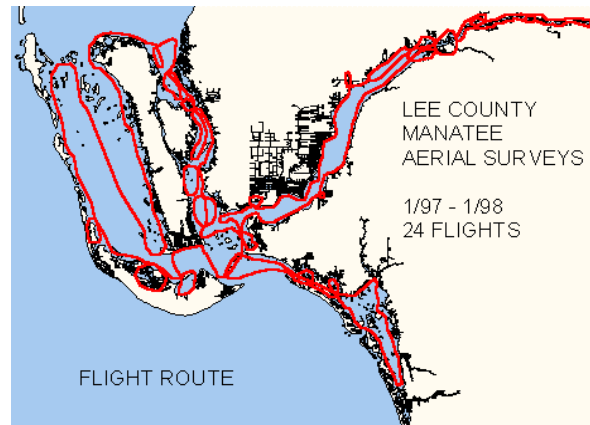
fishery interactions and a description of those fisheries. Staff compiled information from existing manatee mortality, manatee rescue and commercial fisheries databases. Protocols were implemented for the documentation of fishery interactions and the collection of gear.

- During November 1997, a small red tide event occurred in the waters of southwestern Florida. This was the same area affected by the 1996 manatee die-off that killed 149 manatees. Sixteen of the 20 carcasses found between 6 and 26 November showed signs of red tide toxicity. Tissue samples were collected and sent to collaborators who confirmed the presence of the toxin in manatee tissues. The red tide dissipated by the end of November and no carcasses affected by the toxins were found after 26 November.
- The National Marine Fisheries Service invited the MMPL to participate in the First Biennial Southeast Region Stranding Network Workshop held at Eckerd College. The workshop attracted approximately 100 stranding network members from the southeast US. Two bottlenose dolphin carcasses were used to demonstrate basic and advanced necropsy techniques to stranding network personnel.

POPULATION MONITORING

Aerial surveys are invaluable in acquiring information on manatee distribution, relative abundance, and use of habitat types. State-wide winter aerial surveys of all manatee wintering habitats in Florida and southeast Georgia are conducted after cold front passages, when the animals aggregate at warm springs and thermal discharges from power plants and industries. These surveys are useful in determining minimum estimates of manatee populations. Data from aerial surveys and from mortality, life history, and ecology studies are being combined to create a population model that will estimate trends in regional population sizes. While population models are preliminary, most point toward a slowly increasing population of manatees. However, there is no reason to believe that manatees are any less endangered than before or that any ongoing manatee conservation strategies should be halted. The record number of deaths in recent years

remains a major impediment to the recovery of the species. Continued high rates of mortality from watercraft collisions, as well as habitat loss and environmental degradation are serious, ongoing concerns.



1997-98 Highlights:

- One interagency, comprehensive "synoptic" aerial survey of manatees was conducted in 1998: 2,022 manatees on January 29-30. Manatees were counted on 25 survey routes. A total of 31 biologists from 13 state, federal, county and private agencies participated, with a total of 19 flights made.
- Twice-monthly aerial surveys of manatee distribution were conducted by FDEP staff and contractors in Apalachicola Bay. A total of 110 aerial surveys were made in 1997-1998.
- Surveys in Lee County were completed in January 1998 as part of the follow-up assessment of the 1996 mortality event. Sightings from these surveys were entered into the GIS system for assessment of manatees at risk during the manatee epizootic. Maps of the aerial survey counts and the flight paths are now widely available on the FMRI Atlas of Marine Resources CD-ROM.
- Surveys in Brevard County were initiated in September 1997. These surveys take two days to cover the county, and will be conducted until September 1999. Brevard county contains a high proportion of all East coast manatees. The highest count was 684 manatees in December 1997. Data are being entered in GIS for use in management decisions.

- Surveys in Charlotte County were initiated in September 1997 by Mote Marine Laboratory, under contract to FDEP. They will continue until September 1999.
- Transect aerial surveys were conducted in the Banana River by FMRI in August 1997, as part of a long-term study to develop improved aerial survey techniques. These counts will be used as part of a long-term assessment of population trends
- Tests to determine the accuracy of using the Global Positioning System (GPS) for the rapid entry of aerial sighting locations were continued. GPS is used to document flight paths for aerial surveys.

ECOLOGY AND MIGRATION

Research on how manatees use the coastal habitats of Florida is essential to understanding what resources the population requires to expand and flourish. By following the movements of individual manatees in fresh, brackish, and saltwater habitats, valuable information is obtained about manatee behavior, migratory routes, and preferred habitats. Researchers place satellite and radio transmitters on manatees using a belt fastened around the narrow part of the tail stock and attach a floating transmitter housing to the belt. Signals from the satellite transmitters are processed by a commercial satellite service and delivered to FMRI daily via the Internet. Research teams working in the field use the satellite locations to determine general areas where manatees are located and then use the VHF radio signals to find the individual manatees. Staff can then observe the manatee and record its behavior and movements.

A pilot telemetry project, initiated in southwest Florida in February 1997, continued through January 1998. The study was conducted to better understand the dynamics of the southwest manatee population following a red tide event in 1996. Some of the goals of the project were to document daily and seasonal movement patterns and establish blood chemistry profiles on the tagged animals.

Rehabilitated manatees, including captive-born and orphaned manatees, were tagged and monitored in order to assess the success of their introduction or reintroduction into the wild. The

animals were captured by open-water capture on a set schedule in order to collect blood, measure blubber thickness and morphometrics, and take scar photographs and measurements.



1997-1998 Highlights:

- A draft of a technical report summarizing the 6-year (1991-1996) FDEP West Coast Telemetry project was prepared.
- Five manatees, of the original 8 manatees tagged in southwest Florida in February 1997, remained tagged at the end of the southwest Florida pilot project. One of the 5 manatees remained tagged after January 1998 in order to provide a transition between the pilot study and a larger study to be conducted in southwest Florida. This manatee is a female with a calf. They are one of several pairs being studied by a graduate student, from Texas A & M University, examining mother/calf vocalization.
- Valentine, a captive-born manatee, monitored for 2.5 years, was released into the wild without telemetry equipment on March 16, 1998. This is the first release by scientists of a captive-born manatee deemed to have successfully adapted to the wild. In June 1998, Englewood, a survivor of the 1996 red tide event, was retagged after her damaged radio transmitter, which had sunk in April 1997, was removed. Englewood has a calf and they are also subject animals of the mother/calf vocalization study. Jemp, a survivor of the

1995 red tide event, continued to be monitored through radiotelemetry.

- Lotek Marine Technologies Inc., in conjunction with the US Geological Service Sirenia project and FDEP developed a prototype GPS tag, for acquisition of more accurate animal locations. The tag will be tested on land prior to its deployment on a manatee.

LIFE HISTORY AND BIOLOGY

Information on aspects of manatee life history is essential in formulating an assessment of manatee population dynamics and recovery. Data on long-term growth and survival of individuals, reproductive capability of mature females, and health of wild manatees are essential to a population model and are gathered from a variety of research projects: the photo-identification catalog, use of passive integrated transponders (PIT tags), and non-invasive body condition indices.



Many individual manatees are recognized both by natural markings and scars inflicted mainly by interactions with powerboats. The USGS Sirenia Project developed the photo-identification protocols and the image-based computerized database, the Manatee Individual Photo-identification System (MIPS), currently used by the Sirenia Project, the FDEP, and Mote. Federal, state, and local organizations contribute data to a southeastern U.S. manatee photo-identification catalog. The FMRI coordinates and maintains a portion of the catalog for west-central and southwest Florida.

In addition, FMRI field station staff photo-document manatees statewide. The FDEP is collaborating with the Sirenia Project, Mote, and other cooperators to develop an Internet-accessible, image-based catalog that allows users to efficiently and easily share biological, geospatial, behavioral, and environmental data.

PIT tags are small, unpowered microchips that are placed under the skin of a manatee to provide long-term marking of individuals for identification purposes. All manatees handled for rescue, rehabilitation or radio tagging are marked with PIT tags. All dead manatees are scanned for PIT tags before necropsy in order to identify known individuals for life history and distribution data and to assess the success of the reintroduction of rehabilitated animals to the wild.

1997-98 Highlights:

- Currently, the west-central and southwest MIPS catalog consists of approximately 2400 images representing 500 manatees.
- FMRI photo-identification staff worked cooperatively with Mote, Lee County Parks, and the Florida Gulf Coast University to photo-document animals in Southwest Florida. In addition, volunteers continued to provide sighting information and photos of manatees observed statewide.
- Tampa Electric Company (TECO) funded an OPS research staff position for the 2nd consecutive winter (approximately \$3,800).
- FMRI staff conducted a study assessing the cost-effectiveness of aerial-assisted photo-identification studies in Terra Ceia Bay in Manatee County, Florida.
- FMRI photo-identification staff joined the salvage team to improve carcass photo-documentation protocols, identify more carcasses, and provide additional life history information.
- FMRI staff have compiled propeller scar data from the mortality database and are conducting a study assessing the occurrence of propeller scars on carcasses by sex, size, region, and age.
- PIT tags have been deployed in 155 manatees, 150 of those since June 1993.

Many carcasses have been identified with this technique. Tag scanners are available at all field stations so that staff can check badly decomposed carcasses not taken to the Marine Mammal Pathobiology Laboratory for necropsy. A research team is looking into new ways to implant PIT tags and monitor the tags without actually capturing the manatee. This would contribute to our ability to estimate manatee populations.

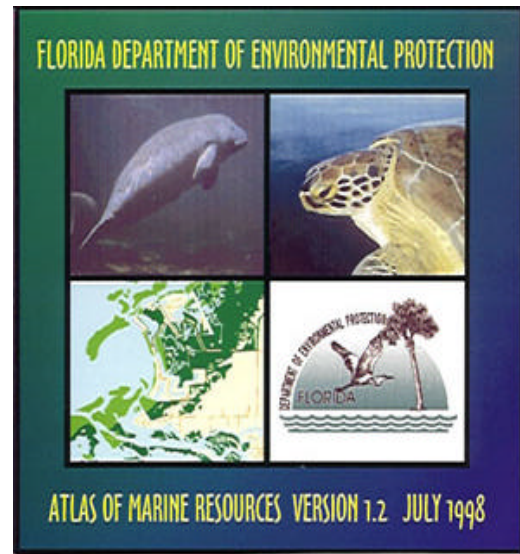
- Evaluation of body condition has been an important part of monitoring released manatees. Results of body condition evaluations were presented at the Captive Manatee Reintroduction/Release Workshop that was hosted by the FDEP FMRI on May 26-27, 1998. The workshop was a joint effort of the USFWS, the USGS Sirenia Project, FDEP, and SeaWorld of Florida. Attendance reached over one hundred for the two-day workshop which focused on the progress of captive manatee reintroduction efforts. The workshop was successful in providing a forum to plan and share information among a wide variety of agencies and organizations for which there is a large amount of interest and commitment to the reintroduction process.

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 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 Marine Resources GIS (MRGIS), which facilitates access by scientists and managers to a wide variety of data on the marine environment. The MRGIS is a primary tool for marine resource research and management. GIS applications facilitate an ecosystem approach to coastal resource management by allowing users to combine and query coverages representing different data themes relevant to the coastal environment. For example, GIS users can map and analyze manatee locations in relationship to habitat features such as depth

contours, seagrass, aids to navigation, and managed areas. The MMGIS facilitates the exchange of ideas and information by interfacing both management and research activities. The MMGIS staff works with both research and management project teams to provide manatee data in GIS format to the public and to develop spatial analyses and modeling capabilities for manatee protection and ecosystem management.

1997-98 Highlights:



- Over 250 Version 1.1 CD-ROM's were provided to scientists, managers, educators, and consultants. Version 1.2 of the FDEP Atlas of Marine Resources on CD-ROM was completed and is now available to GIS users at no charge. The new release includes new and updated coverages, graphics, and information designed to serve the needs of organizations interested in manatee research and management. Data are stored as ARCVIEW shapefiles for use in GIS. Data are provided on manatee mortality, results of aerial surveys, aerial survey flight paths, manatee density polygons, and protection zones. Base data include the Florida shoreline, depth contours, seagrass distribution, aids to navigation and other habitat-related features. The Marine Resources CD-ROM version 1.2 may be obtained by contacting Kathy Smith at (727) 896-8626 or e-mail SMITH_KD@EPIC7.DEP.STATE.FL.US.
- A computer model developed by FMRI MMGIS staff for estimating manatee travel

patterns from satellite and visual locations was used to map the travel paths of all tagged manatees from 1991-1996. Three telemetry-related presentations were given at a telemetry workshop during the annual conference of the National Wildlife Society held in Colorado, 21-27 September 1997. A presentation documenting the movements of a satellite-tagged manatee and associated biomedical information won first place for Most Unique Map Gallery Competition at the 1998 ESRI GIS Users Conference in San Diego.

RIGHT WHALES



In addition to manatee recovery efforts, the FDEP is involved in recovery efforts for other endangered marine mammals, including the northern right whale, *Eubalaena glacialis*, the most endangered of the world's large whales. Efforts have been heightened to prevent human-caused mortality in this species, where even one death per year has a significant impact on the population estimated to number less than 350 individuals. Northeast Florida and Georgia coastal waters were designated as critical habitat for the right whale in 1994 by the NMFS. This region is the only known calving ground of the northern right whale. FDEP is dedicated to assisting NMFS in its efforts to protect the northern right whale as outlined in the 1991 Northern Right Whale Recovery Plan.

Efforts to protect right whales in the Florida/Georgia critical habitat have resulted in the formation of the Southeastern U.S. Implementation Team for the Recovery of the Northern Right Whale, a multi-agency/citizens advisory group. The Team makes management and research recommendations and assists in implementing the Recovery Plan. The FDEP has been a member of the Implementation Team since its inception in 1993, and in 1997 the FDEP right whale principal investigator was appointed vice-chairperson of the Team. In addition, FMRI staff have conducted aerial surveys of right whales in Florida waters since 1987 to monitor seasonal presence of whales

and to determine the number of calves born during the season.

1997-98 Highlights:

- The 1997-98 winter season represented the most comprehensive aerial survey coverage to date of the right whale calving grounds and surrounding areas. This included over 70 coastal and offshore surveys flown by FDEP.
- FDEP/FMRI, the New England Aquarium, and the Georgia Department of Natural Resources documented 5 mother and calf pairs, and at least 38 other individual right whales, for a total of at least 48 different whales during the 1997-98 season. The number of calves was much lower than average this season.
- FMRI received a \$40,000 grant from NMFS to assist in right whale recovery efforts. Funding was used for nearshore aerial surveys, for confirming public sighting reports along Florida's East Coast, and to fund right whale GIS projects. FDEP continues work to establish an agreement with NMFS that will provide additional funding for right whale recovery efforts.
- A cooperative offshore survey effort between FMRI and Georgia DNR was also funded by NMFS, who provided \$43,000 to FMRI for observer salaries and \$104,000 directly to the National Oceanographic and Atmospheric Administration Air corps for aircraft services.
- A single mortality of a right whale calf was documented during the 1997-98 calving season. FMRI staff assisted in the confirmation, recovery and necropsy of the calf, which was determined to have died of natural causes.
- FDEP/FMRI initiated a complex communication network utilizing 25 alphanumeric pagers that facilitate the dissemination of right whale sighting locations to all mariners in the Southeast United States in an effort to prevent ship collisions.
- The MMGIS at FMRI continued to be an integral part of the right whale program, incorporating results of FMRI right whale aerial surveys, as well as ocean surface water temperatures and water depths.

SCIENTIFIC AND PUBLIC OUTREACH

During the year, four manuscripts were submitted for publication, five publications are currently in press and six have been published. Marine Mammal staff hosted 15 students, interns, externs and volunteers.

A photogrammetric study of remotely sensed and measured body lengths of a local population of manatees was completed. The study was a cooperative effort with Mote and incorporated video data from a tethered airship to document the number of calves, sub-adults and adults as well as manatee/human interactions at Homosassa Springs. An article describing the feasibility of the methods for documenting life-stage composition of manatee populations is in review. Video data were provided to management staff.

In August of 1997, the Department hosted the 46th International Conference of the Wildlife Disease Association. The Association consists of scientists dedicated to understanding diseases in wild animals and its effects on wild animal populations and cross over into agricultural interests and humans (zoonotic disease). The conference was one week long and was attended by 240 scientists representing 11 countries. Of particular interest was a symposium devoted to diseases caused by biotoxins that related directly to the recent manatee epizootic. In addition, several papers were presented relating to wildlife disease problems unique to Florida.

BUREAU OF PROTECTED SPECIES MANAGEMENT

The Bureau of Protected Species Management, based in Tallahassee, serves as the management component of the FDEP marine mammals program. It is responsible for the planning and implementation of management activities directed toward the protection and recovery of manatees, of other marine mammals such as the endangered right whale, and of marine turtles and their essential habitats. Marine turtle activities are funded from the Marine Resources Conservation Trust Fund and a grant from the FGFWFC. BPSM serves as the Department's primary liaison with appropriate federal, state, and local governments to facilitate strong comprehensive planning, including mandates of federal

endangered species recovery plans. Protection activities are principally implemented in three ways: state rules are developed, permit applications for resource development are reviewed and commented on, and manatee protection plans are developed and implemented, often with the assistance of local governments.

MANATEE PROTECTION PLANS

Manatee protection plans (MPPs) are essential to the long-term preservation of the species and its habitat and to the implementation of the FDEP's ecosystem approach to environmental protection. The Approved MPPs are designed to include boat-facility siting policies, habitat protection, local educational campaigns, and waterway-use regulations. County-specific boat speed zones are a primary component of these plans. The plans also address finding solutions to manatee mortality caused by locks, gates, large vessels and ships, while reducing any adverse affects that commercial fishing practices have upon manatees. In setting policies to safeguard manatees and their habitats, the MPPs also have the effect of increasing the safety of boaters, facilitating recreational planning, and protecting aquatic habitat critical to many species that depend on the associated ecosystems. Because of the complexity of issues a county must address in its plan and the range of information that must be collected, plans take several years to develop and implement. The preferred mechanism to put a MPP into effect is for each local government to append the plan into its comprehensive plan. In 1989, the Governor and Cabinet set priority in developing these plans in 13 counties where manatee mortality rates and essential habitat protection needs were the greatest. MPP staff coordinate assistance with protection planning for these counties and others as requested by local government.

1997-1998 Highlights

- The Citrus County MPP-related comprehensive plan amendment was successfully passed by the County Commission in December 1997 and submitted to Department of Community Affairs. This makes Citrus the first county to have gone through a complete 5-year review of the MPP.

- Volusia County submitted a revised MPP that included only minor modifications to FDEP after a series of county-sponsored public workshops and Ad-Hoc Committee meetings facilitated by the Conflict Resolution Consortium. Representatives from Volusia County met with BPSM staff and FDEP Secretary Virginia Wetherell to present the plan's recommendations. Comments on that draft were sent back to the County.
- MPP staff met with Martin County's Environmental Division staff in June 1998 to discuss initiation of the MPP. A new planner has been hired to coordinate the task. Staff provided comment on the second draft of the Indian River County MPP and have continued work with the County on the draft plan's boat facility siting element. Staff continued communication with Brevard County staff to discuss the future of the plan's boat facility siting recommendations and other plan revisions.
- Two independent manatee and seagrass protection task forces began meeting in Southwest Florida with MPP staff participation. The Charlotte County Manatee and Seagrass Task Force was initiated by the County Commission in order to assess the development of both manatee and seagrass protection zones within the county. MPP staff also served on the committee for the Tampa Bay Regional Planning Council's Agency on Bay Management (ABM) Manatee Protection Strategies Task Force. The results of this consensus process are described in the paper, *Position Paper: Summary of Issues and Recommendations Concerning Protection of the West Indian Manatee (Trichechus manatus) in Tampa Bay* (ABM, 1998). The recommendations include the designation of four main manatee aggregation sites for regulatory protection as well as a large portion of the Tampa Bay shoreline for an innovative stewardship based voluntary compliance slow-speed zone. MPP staff has been instrumental in developing the creative mechanisms by which these voluntary zones will be explained to the public, implemented, and monitored for effectiveness.

- Staff reviewed approximately 57 planning documents for their potential effects on manatees. These include city and county Evaluation and Appraisal Reports, state park management plans, aquatic preserve plans, and grant application proposals.

LAW ENFORCEMENT COORDINATION

BPSM and FMRI staff continues to increase involvement and coordination with federal, state and local law enforcement agencies. This has been done by providing training to law enforcement recruits, distributing maps and education materials to on-water officers, and holding coordination meetings with applicable law enforcement agencies. Specific examples of this work include:



- Development of information packages, which include general manatee information materials, laminated speed zone maps with citations, and speed zone reference wall maps.
- Hosting the USFWS, FGFWFC, Save the Manatee Club (STMC), and State Department of Law Enforcement (DLE) meeting in Tallahassee.
- Coordinating law enforcement training activities, including organization of BPSM and FMRI presentations at the Florida Marine Patrol academy in 1998. This was the first year to include cadets from the FGFWFC. A total of 50 information packages were made available for the new officers.
- Development, printing and distribution of waterproof speed zone citation maps and other education information to officers of the FMP Districts 2 (Broward and Dade), 2-B

(St. Lucie), 3-B (Lee) and District 4 (Tampa Bay and Sarasota).

- Meetings with USFWS and state park officers regarding enforcement of the speed zones in Port of the Islands and Faka Union Canal in Collier County.

SPECIAL PROJECTS

The Palm Beach Seagrasses and Boat Facility Working Group, a multi-agency effort coordinated by BPSM MPP staff, was nominated and awarded a FDEP Team Award in 1998. This major study of seagrasses was undertaken as a part of the effort to effectively plan for new boat facilities within Palm Beach County. The group, involving six agencies and over 20 scientists, worked to review and map 110 individual sites through 58 field surveys. Field data collection was completed and mapping begun in preparation for updating the boat facility-siting guide with the survey results. Though mapping efforts have been switched from the USFWS to the FDEP, MPP staff took the lead in developing the specific methodology needed to revise this important report.

Through contracts managed by the BPSM, Mote has continued to perform and complete sections of boating activity, speed zone compliance, and manatee behavioral studies in Lee County waters. Quarterly progress reports have been reviewed by BPSM, and ultimately these studies will be incorporated into the developing Lee County MPP. To complement these studies, MPP staff has continued field review and computer database collection for a BPSM initiated shoreline parcel and boat facility inventory within Lee County.

The legislature transferred \$499,500 from the Save the Manatee Trust Fund to support the environmental education programs of the Game and Fresh Water Fish Commission. These funds were used, in part, to support the operations of the Advisory Council on Environmental Education (ACEE). Since 1996, the ACEE has served as a forum for the discussion and study of problems that affect the environment, which could be improved with environmental education. The Council is directed to solicit and select proposals for environmental education projects. The projects are supported through legislative appropriations. As a result of legislative action in 1998, future appropriations

from the Save the Manatee Trust Fund for education projects must be used for "manatee related" education projects only. A separate report to the legislature details activities of the Commission and ACEE. For more information regarding the report and the Environmental Education Grant Program, contact Ms. Madeline Strong at (850) 487-0123.

STRUCTURE-RELATED MANATEE DEATHS

More manatee deaths are attributed to structures (navigation locks and water control gates) than any other human cause except for watercraft. From 1974-1997, 136 manatees were crushed or drowned by navigation locks or water control structures. Structure-caused manatee deaths were down slightly in calendar year 1997 to eight. FDEP staff has taken an active role in coordinating with the US Army Corps of Engineers (Corps) and the South Florida Water Management District (SFWMD) to develop solutions to this serious problem. The Task Force recognizes that a number of actions will be needed, the most important of which is the development of technology that would make locks and water control structures "manatee-safe."

1997-98 Highlights:

- The SFWMD in conjunction with Harbor Branch Oceanographic Institute (HBOI) designed a manatee protection system device for vertical lift gates. The system uses strips of piezo electric film embedded in blocks of polyurethane and placed on either side of the lift gate. The device can sense when force is applied, but does not have any moving parts that can foul or corrode. The prototype was installed at structure S-26 (two gates) in Dade County in November 1996. SFWMD installed the protection devices on four gates of S-29 in November 1997.
- Work began on removing the old version of manatee protection devices on the two gates at S-27. They will be replaced by the piezo strips by the fall of 1998.
- The Corps contracted with HBOI to install piezo strips on S-25 B which should be completed in the fall of 1998.

- The Corps contracted with HBOI to develop a prototype acoustic manatee protection device for navigation locks. This device uses a series of paired transmitters and receivers that will be attached to the leading edge of navigation lock gates. When a manatee breaks the beam of sound, the gates will stop, then begin to open. The prototype will be installed at the St. Lucie lock in the fall of 1998.
- The FDEP provided data and review to the Corps for their proposal to use Environmental Restoration Money from Section 1135 to apply acoustic manatee protection to the Canaveral lock.

GEOGRAPHIC INFORMATION SYSTEM, STATISTICS, AND GRAPHICS

The BPSM-GIS section provides management staff with the most recent marine mammal research data with the cooperation of the FMRI staff in St. Petersburg. Most data layer updates are acquired from FMRI, although some are created in the BPSM-GIS section or obtained from other governmental sources. All data layers created within the BPSM are forwarded to FMRI-GIS staff for inclusion in the Marine Resources GIS. Graphic materials for presentation are developed and produced utilizing various software, printers, plotters, and other resources.

1997-98 Highlights:

- Manatee GIS data were updated for use in rule making, protection planning, permitting, and public information response activities of the BPSM.
- The statewide geospatial coverage of manatee protection speed zones was updated to reflect current changes in rules.
- BPSM level network support was integrated into section responsibilities to improve efficiency and facilitate continual technological resource development.
- Additional GIS software licenses for desktop computers were purchased to extend GIS functionality to more BPSM staff.
- The section distributed 211 GIS maps and 102 Autocad maps to external customers;,

95 digital data sets (outside requests), 84 GIS maps and 640 Autocad maps (some as map series) were done for staff in the BPSM.

HABITAT CHARACTERIZATION, ASSESSMENT AND PROTECTION

A viable population of manatees will not persist without suitable habitat. Florida's increasing human population, and particularly the associated coastal development, is a long-term threat to the manatee's habitat. Historically, coastal development has resulted in degradation of water quality and destruction of seagrasses - the manatee's primary food. Ways to minimize negative effects of coastal development are being explored. The first step is to better understand the manatee's habitat needs and to monitor and assess habitat health and stability.



The health of any habitat is important as an indicator of that habitat's ability to sustain a viable population of manatees and other marine species. During the past five years, 50 acres of seagrass have returned to Hillsborough Bay after point source nutrient loads were reduced through regulatory means. This represents a significant turnaround: since 1950 coastal development and decreased water quality have resulted in an estimated 81 percent loss of the seagrasses historically found in Tampa Bay, an area heavily used by manatees and other marine mammals on Florida's west coast. Improvements such as this are more the exception rather than the norm, however. Water quality continues to decline in areas of critical importance to the manatee as industrial effluent contamination, non-point source runoff from

agricultural and civic lands, and disturbance-related sediment loads in the water column continue to increase in most areas. Seagrass in areas of Florida Bay, which contain over half of the seagrass acreage in Florida waters, and the Indian River Lagoon continue to decline or show signs of diminished health due to human activities. Continued loss of aquatic habitat despite existing protection measures in important manatee habitat areas indicates that addressing manatee habitat protection needs is an enduring focus of the manatee recovery effort.

1997-1998 Highlights:

- BPSM staff continued to serve on the Crystal River Interagency Working Group to establish plans for using aquatic herbicides in Kings Bay and the Homosassa River. Each winter since 1994 exotic vegetation has declined due to a combination of higher salinities, alga blooms, and increased consumption by wintering manatees. The

higher salinities and algal blooms are thought to be the result of decreased fresh water flow and increases in the nutrient loading of the groundwater. Manatees using this natural warm-water refuge are subject to increased stress and threat of injury relative to past years due to this loss of foraging habitat. Monitoring of manatee numbers and aquatic vegetation abundance has led to the decision to continue the October 1 through April 1 moratorium on all aquatic plant management activity in Kings Bay and the Homosassa River. Harvesting of floating mats of the blue-green alga *Lyngbya* sp. will continue in an effort to encourage the growth of preferred manatee forage plant species.

- BPSM staff coordinated the Blue Spring Interagency Working Group to ensure that manatee habitat in this area will be sustained and monitored on a regular basis. The group continued a ban from October to April on aquatic plant management activities in the vicinity of Blue Spring from Lake Beresford to channel marker 85 on the St. Johns River. Recent surveys of aquifer discharge at Blue Spring have indicated that a reduction of 7-10% of the water flow has occurred at the spring due largely to water withdrawals by regional residents. This places at question the long-term status of Blue Spring as an important natural warm-

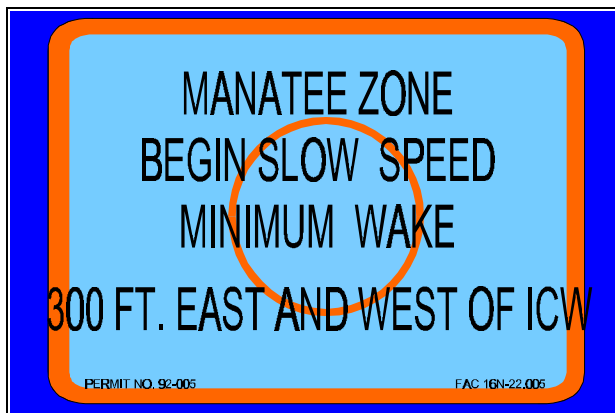
water refuge for the St. Johns River manatee population. BPSM staff is working with the St. Johns Water Management District to establish minimum spring flow levels needed to maintain this natural warm-water refuge for manatees.

- BPSM staff provided reviewed permits under the FDEP's National Pollution Discharge Elimination System (NPDES) program to address short and long-term concerns with the permitting of artificial manatee warm-water refuges such as power plants and industrial plants. BPSM has also coordinated with USFWS, USGS Sirenia Project, and industry to plan future research into the continued use of these sites by manatees in an effort to focus on addressing the long-term effect of such artificial habitat on manatee populations. The formal review process involves development of manatee protection plans for each plant that will address (a) disruption to warm-water outflows during winter, (b) inadequate discharge temperatures to sustain manatees during extreme cold events, (c) precautions to minimize hazards to manatees at intake and outfall areas, and (d) timely communication to manatee recovery program personnel of any long-term changes in the availability of warm-water discharges and/or unanticipated problems that may effect manatees in plant outfall areas. These plans are provided to the FDEP and reviewed by BPSM.
- A two-year study was continued by the BPSM in conjunction with the FDEP Bureau of Coastal and Aquatic Managed Areas (BCAMA) to address the effect of structures (docks, piers) on seagrass community health in the lower Indian River Lagoon. Experimental docks have been developed over existing seagrasses, which are regularly monitored to assess the effect that dock height and construction material use have on light levels reaching these aquatic plants. Preliminary data indicate that higher docks permit greater light transmittance, which relates to improved seagrass growth under these structures. It is hoped that this research may result in innovative designs or development of construction criteria that will allow seagrasses to persist below such over water structures.
- The efficacy of inboard motor propeller

guard use for the protection of manatees and their habitat was addressed through a propeller guard assessment study funded by the Save the Manatee Trust Fund. The study suggests that currently available propeller guards for inboard engines provide only limited protection for manatees and effect vessel performance. The BPSM is working with FMRI staff to address follow-up studies designed to further assess propeller guards for manatee protection using the information gathered from this study.

- Staff developed a report summarizing the establishment of seagrass protection zones around the state that address damage from motorboats. This summary provides an historical background of “no combustion engine operation zones” as a management tool for the protection of seagrass systems from the adverse effects of propeller scars. The report is available upon request from the BPSM.

RULE ADMINISTRATION



The Rule Administration Section focuses primarily on establishing comprehensive manatee protection boat speed zones and administering 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. There were 13 counties identified in 1989 by the Governor and Cabinet as those needing to be put first in priority for establishment of county-wide speed zones: Brevard, Broward, Citrus, Collier, Dade, Duval, Indian River, Lee, Martin, Palm Beach, Sarasota, St. Lucie, and Volusia. At the close of the fiscal year, efforts on that charge had resulted in implementation of zones in 12

counties and publication of the zone proposal for the 13th county nearing.

1997-98 Highlights:

- Development of amendments to the Lee County rule (62N-22.005, Florida Administrative Code (FAC)) was almost completed. Much of the work centered on development of the Statement of Estimated Regulatory Costs (SERC). Extra emphasis was placed on this SERC because it would be the first prepared for a manatee protection rule and because of the controversy surrounding past rule-making efforts in Lee County. Staff spent a considerable amount of time reviewing the responses to the thousands of surveys that were distributed to registered boat owners, marinas, other water-related businesses, professional fishing guides, commercial fishing and charter businesses, and to real estate companies in early 1997. The draft SERC was nearly complete by the end of June 1998, and the formal rule proposal was to be published in the Florida Administrative Weekly by late summer.
- Staff worked to coordinate posting of the signs needed to mark the amendments to the Collier County rule (62N-22.023, FAC) that were adopted in May 1997. The sign plan was finalized in late 1997 after coordinating with staff from the FDEP's Division of Law Enforcement, Collier County and the Rookery Bay National Estuarine Research Reserve. Staff performed an on-water inspection of the proposed sign locations in April 1998 with the contractor, before posting was started, to ensure that everyone understood what was needed. Posting of the signs was delayed several times by the contractor and had not started by the end of the fiscal year.
- Staff began evaluating the need to amend the Brevard County rule (62N-22.006, FAC) in response to recommendations made by Brevard County in its Manatee Protection Plan (MPP). This evaluation is being conducted as part of the review of the entire MPP, which was submitted in August 1997. Staff also responded to a petition filed by Save the Manatee Club in December 1997 that requested more restrictive zones in the Canaveral Barge Canal area. After

reviewing all available information, the Department denied the petition.

- Staff continued to coordinate with Volusia County staff in development and review of a draft MPP. Staff is now evaluating the need to amend the Volusia County rule (62N-22.012, FAC) in response to recommendations contained in the MPP.
- The need to amend the Citrus County rule (62N-22.011, FAC) to increase manatee protection in the Blue Waters area of the Homosassa River was considered. Increasing numbers of manatees using the area in winter and the increasing popularity of the area as a place to see and swim with manatees had resulted in reports of manatees being harmed. Staff attended several meetings with other state and federal officials to discuss options. A Notice of Rule Development was published in June 1998 and a workshop was held in Citrus County that month. Instead of proposing a new zone to be in place for the 1998-99 winter season, a decision was made to increase enforcement and public education in the area and collect more information. Depending on what happens during the next winter, rule making could be pursued next year.
- Changes to the Indian River County rule (62N-22.007, FAC) are being considered in conjunction with the County's development of its MPP. Palm Beach County staff requested the Department consider changes to the Palm Beach County rule (62N-22.009, FAC) in the area around the North Fork of the Loxahatchee River because of confusion over whether the main channel should be included or excluded from the existing regulations. Due to other priorities, no changes were recommended until the entire rule can be reassessed. As an alternative, staff suggested that the County consider adoption of a local boating safety zone.
- Although staff did not begin a formal review of the Sarasota County rule (62N-22.026, FAC), the need to revise the zone on the Myakka River is likely to become an issue soon. The County is in the process of trying to obtain permits to mark a channel in the southern portion of the river in the hopes of

having the rule amended to allow higher speeds in the channel. MPP and Rules staff began looking at the issue and provided comments regarding the proposal to place channel markers.

- Amendments to the General Provisions of Chapter 62N-22 (62N-22.001 through 62N-22.003, FAC) were initiated based on recommendations submitted to the Department by the Boating Advisory Council. These rules describe the processes the Department uses to establish zones and issue authorizations to conduct activities, which are otherwise prohibited by manatee protection rules. The amendments were adopted in April 1998.
- The Section issued permits (in accordance with 62N-22.003, FAC) for commercial fishing and professional guiding activities in several counties (predominately Volusia, Brevard, and Indian River). In late June 1998, the Department began to receive many requests for permits in Collier County in association with the recently adopted rule. At the end of the fiscal year, approximately 67 permits (to 46 individuals) had been issued for these purposes statewide. In addition a few permits were issued to allow vessel testing in specific zones and to allow access to limited-entry areas by researchers and residents. A variance was issued to allow a one-day barefoot water skiing exhibition in Lee County and another variance (to allow airboat tours in Collier County) was being considered.
- Staff responded to numerous requests for rule-related information. Most requests concerned why a particular area did or did not have boat speed restrictions. The most frequent response was a letter providing information on manatee use of the area and describing the process the Department uses to establish zones. Individuals requesting more restrictive regulation were urged to contact their local government first to determine if adoption of a local ordinance was possible.
- Staff provided information to the USFWS to assist their efforts in passing a federal emergency rule establishing a sanctuary at Three Sisters Springs in Citrus County.

PERMIT REVIEW

Coastal development and activities such as dredge-and-fill projects, marina and boat ramp construction, movie production and marine events can have significant negative effects on manatees and their habitat. Reviewing these projects allows FDEP to reduce or eliminate negative effects by recommending special permit conditions or, in rare cases, permit denials. Staff work with applicants, the USFWS, FDEP and Water Management District Environmental Resource Permitting staff, the U.S. Coast Guard, the Army Corps of Engineers, Port Authorities, Regional Planning Councils, local governments and the Department of Community Affairs.

1997-1998 Highlights:

- Staff performed 210 manatee impact reviews, as requested by various agencies. Of these reviews, 35 were considered "critical" because of their complexity or potential to significantly impact manatees or their habitat and two were denials. In addition, 75 miscellaneous correspondence letters were prepared, including approvals for manatee educational signs required by permits.
- Quarterly coordination meetings between permit review staff and Dade County staff were held in order to implement the approved Dade County MPP.
- A letter was sent to almost 200 city and county authorities asking for voluntary installation of grates on existing culverts that may pose a risk of entrapment to manatees. To date, a few municipalities are proactively installing grates on existing culvert discharges in order to reduce the probability of death by drowning or starvation from entrapment in storm-water drains and culverts.
- Staff prepared comments on several projects that proposed the destruction of seagrass beds important to manatees. One of these projects went through the administrative hearing process and the FDEP position for protecting these seagrasses was upheld. Two other projects are in the beginning stages of the hearing process.

- Through coordination with the Florida Department of Transportation, adequate manatee protection measures were implemented for the explosive demolition of a bridge over the Halifax River, an important manatee habitat. Another blasting project was coordinated with the East Volusia Mosquito Control. This project attempted to improve water quality and flushing by opening up existing mosquito control ditches using explosives. An extensive manatee watch was performed, and manatees and dolphins were observed in the vicinity, but no wildlife-related incidences occurred during blasting.
- Staff provided technical expertise to the FDEP Division of Water Facilities in rulemaking activities to amend 18-21 F.A.C. This revision to the sovereign submerged lands rule is in response to a request by the Governor and Cabinet to address leases for Special Events, such as boat shows.

PUBLIC EDUCATION AND INFORMATION (E&I)

An integral component of the Florida Manatee Recovery Plan involves educating the public. In addition to Florida's citizens, the FDEP also targets the state's 40.5 million annual visitors to increase public awareness of manatees. BPSM participates in the development of public service announcements, television messages, brochures, teacher's guides, posters, pamphlets and information and marketing displays for public education purposes.

While not the primary focus of this section, education and information distribution is often linked to fund-raising efforts. Manatee program funding is dependent on voluntary donations or selective purchases by Florida citizens. A special effort during this fiscal year was a postcard campaign to owners of the Save the Manatee specialty license plate. The postcards were sent to those individuals whose license plates were up for replacement or renewal. The postcard informed the license plate holders about how the money raised from the manatee license plate is used to help this endangered species. Approximately 4,000 postcards are sent each month. This effort will last for one year and then a decision will be made on the effectiveness and need for continuing this effort.

Another means of providing information that coincides with fundraising is through the Voluntary Contribution Campaign, which occurs each year in June during the state's vessel registration period. County tax collection offices provide a manatee decal to each person who donates \$5 or more to the Save the Manatee Trust Fund. Fourteen of the 67 counties participated in the campaign in June. The winning counties (those who raised the most funds per vessels registered in June 1998) were Flagler, Sarasota, Manatee, Charlotte and Seminole. A portion of the funds collected from decal donations (the third and fourth dollar of each donation) goes to the oceanaria facilities (Lowry Park Zoo, Miami Seaquarium, and Sea World) engaged in the rescue, rehabilitation and release of wild manatees.

1997-1998 Highlights

- E&I staff coordinated with a group from St. Petersburg, FL to provide information about Florida at the Winter Olympics in Japan. Manatee film footage and information was made available for inclusion in a kiosk display, which was visited by numerous attendees at the Olympics.
- E&I staff contracted with Theme Park Productions, Inc. for use of manatee footage at the "Rafiki's Planet Watch" exhibit at Disney's Animal Kingdom in Florida.
- New signs were designed for placement at boat ramps around the state. The new sign replaces the two signs currently distributed.
- E&I staff targeted educators this year and set up displays at two conferences: the Florida Science Teacher's Conference and the League of Environmental Educators in Florida Conference. Staff also met with Save the Manatee Club, attended the Interagency Oceanaria Meeting, assisted at the State Fair and visited several of the oceanaria facilities around the state.
- E&I staff responded to more than 1,000 manatee information requests from individuals, teachers and other educational staff.
- The technical/research newsletter, the *Manatee News Quarterly* was printed four

times this year. This newsletter has grown to over 250 recipients from its original distribution of 10-20 recipients.

- MPP staff worked to further public manatee education and awareness through developing the second version of the Lee County Boater's Guide and initiating work on the Collier County Boater's Guide. Staff also worked with individual counties to enhance manatee awareness and implement educational activities for Manatee Awareness Month. Staff and other members of the Dade Manatee Awareness Group met and drafted an annual work-plan; designed and identified funding sources for an imaginative multi-use education kiosk; developed Public Service Announcements (PSA), and designed children's education programs. In addition manatee awareness month activities were implemented including news releases, education initiatives at Miami Seaquarium, and a manatee poster contest for children.



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Florida residents can buy manatee license plates for their vehicles. Receipts from tag sales are available for marine mammal research and management efforts through the Save the Manatee Trust Fund.



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