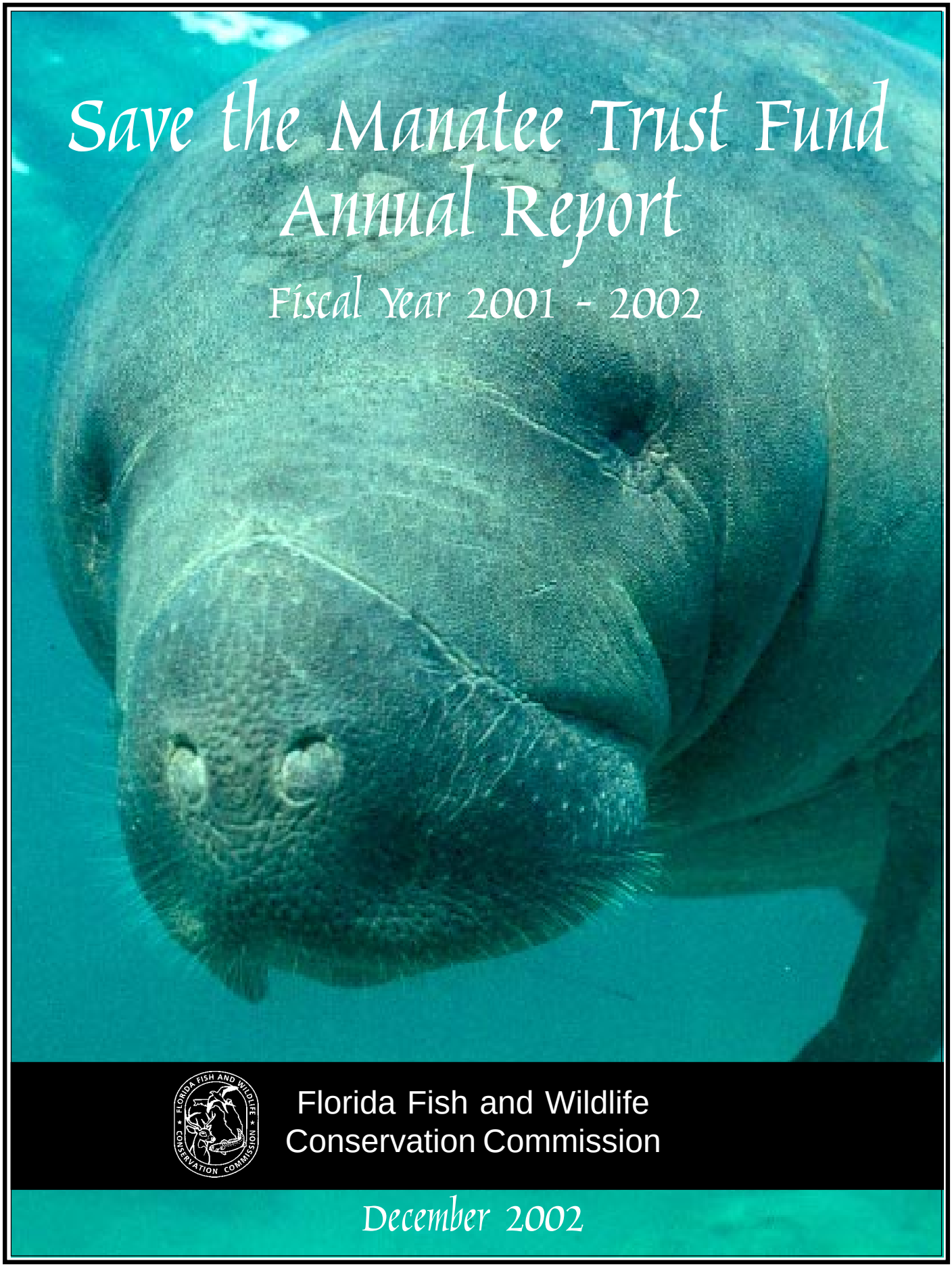

Save the Manatee Trust Fund Annual Report

Fiscal Year 2001 - 2002

Florida Fish and Wildlife Conservation Commission

December 2002

Save the Manatee Trust Fund

Annual Report
2001 - 2002

Florida Fish and Wildlife Conservation Commission
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Submitted by the:
Florida Fish and Wildlife Conservation Commission
Bureau of Protected Species Management
and the
Florida Marine Research Institute Manatee 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 management 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 FY 2001-2002 totaled $3,869,710.

Appropriations for the same fiscal year were approximately $4,377,922, which includes $371,000 provided to Division of Law Enforcement; and $272,701 to the Advisory Council on Environmental Education. Details are presented in the accompanying pie charts (page 7).

Expenditures from the STMTF were made for the Florida Fish and Wildlife Conservation Commission's (FWC) manatee program: $1,698,898 for research activities coordinated by the Florida Marine Research Institute in St. Petersburg; $1,139,167 for management activities within the Office of Environmental Services' Bureau of Protected Species Management. Budgetary breakdowns for individual program units under both the research and management 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. Florida has protected manatees 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 2001. In addition, the manatee is protected under the federal Marine Mammal Protection Act.

During the past year, increased attention was given to assessing the status of the manatee population. A workshop was convened in April that brought together experts from around the world to review the most recent manatee data. In addition, the FWC began a Biological Status Review, which included a Population Viability Analysis. Based on these most recent analyses, it appears that the total manatee population in Florida has increased over the past 30 years. In particular, strong population growth in sub-populations such as Florida's northwest coast (including Crystal River) and the upper St. Johns River, have been well documented. Population trends in other areas such as the Atlantic Coast and southwest Florida are less clear. While there is evidence that these areas have also experienced growth over the long-term, the most recent trends are cause for concern. In particular, survival rates in Southwest Florida suggest that the population may be stable or may have begun to decline in that region. Nevertheless, the FWC remains cautiously optimistic about the manatee's future in Florida. We believe that the focus of management over the past three decades--to reduce human-related injury and death, and to protect habitat--has been a major factor in realizing positive population growth. Provided that this basic approach is continued, the long-term survival of this species is promising. ❖

Acknowledgments and Credits:

FWC Executive Director - Kenneth Haddad
Office of Environmental Services Director - Brad Hartman/Brian Barnett
Florida Marine Research Institute Director - Gil McRae
Protected Species Management Bureau Chief - David Arnold
Manatee Research Administrator - Elsa Haubold

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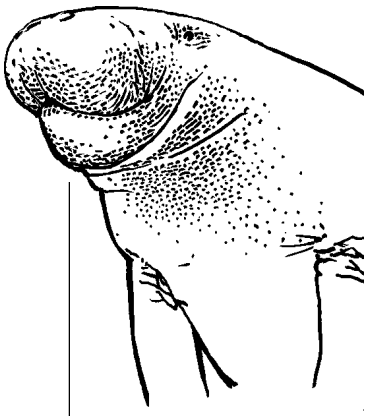

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Manatee Basics

Common name:	Florida manatee
Scientific name:	*Trichechus manatus latirostris*
Status:	Endangered (federal and state)
Range:	Throughout Florida, (the summer months into southeastern states)
Maximum census:	3,276 counted in 2001
History:	Native species found in fossil record and recorded by earliest explorers
Diet:	Freshwater and marine species of plants
Reproduction:	Breed year-round, most calves are born in the spring, a mature female can produce one calf approximately every three years
Life span:	Can live over 50 years but this is rare; most manatees die by the age of twelve
Unusual fact:	Manatee teeth are continuously replaced

A CLOSER LOOK

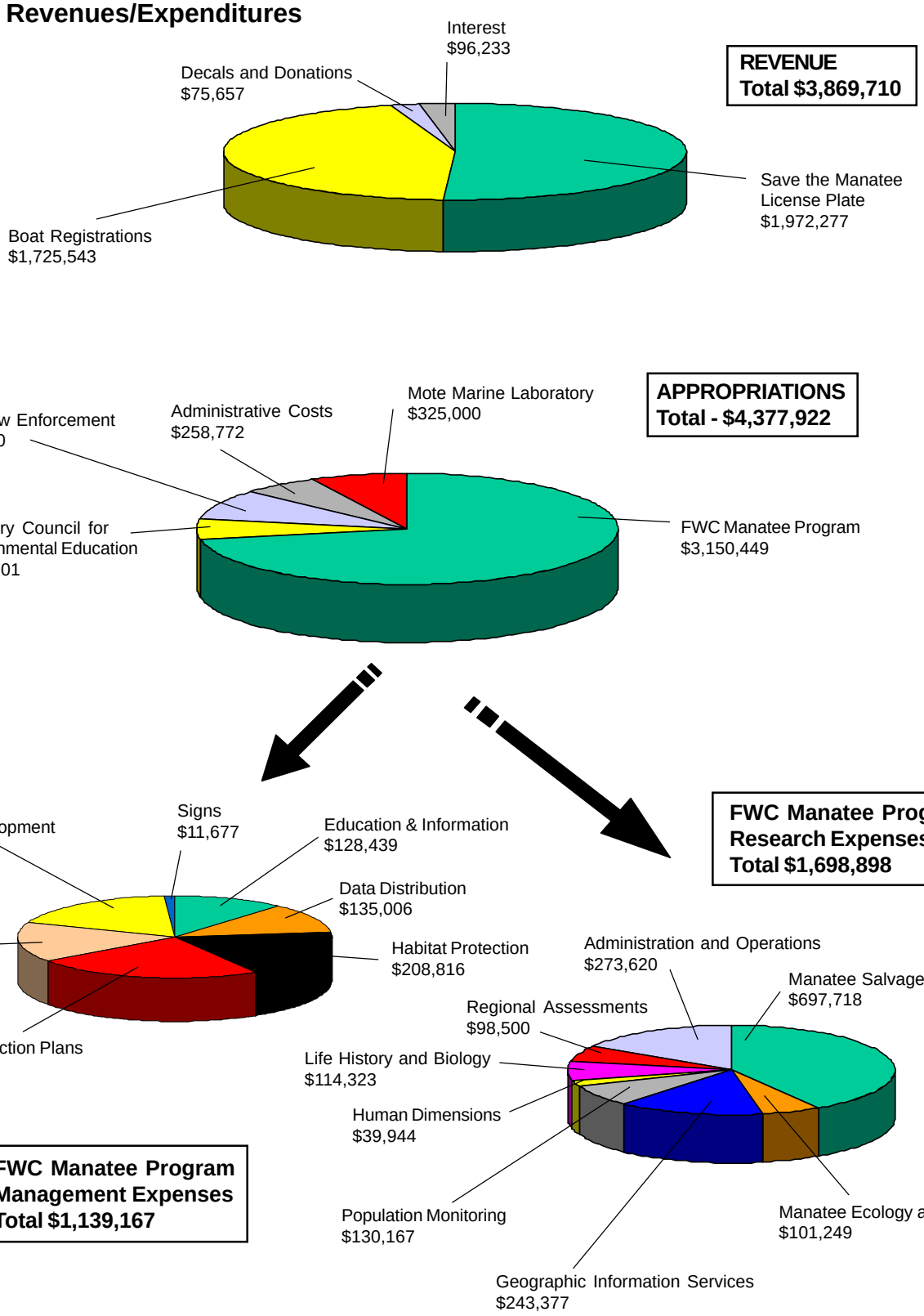
Adult manatees typically average 8-10 feet in length and weigh around 1,000 pounds. The largest manatees may reach 13 feet in length and weigh over 3,500 pounds. Adults are gray in color, with very sparse fine hairs distributed over much of the body. Stiff whiskers grow around the face and lips. Algae growing on the skin may make the animal 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. Gestation lasts approximately 13 months and results in the birth of a single 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 by a variety of human-related causes (*e.g.*, being struck by watercraft, being crushed in water control gates and boat locks, and becoming entangled in fishing gear). Manatees also die as a result of exposure to harmful algal blooms (red tide), the effects of cold water, and disease. Manatee habitat loss or degradation is also of concern, including future changes in artificial warm water refugia upon which many have become dependent.

Save the Manatee Trust Fund Revenues/Expenditures

Figure 1: Revenues/Expenditures



Intergovernmental Coordination

The recovery of the manatee requires coordination and cooperation between federal, state, and local branches of government. The State of Florida has a long history of working cooperatively with the U.S. Fish and Wildlife Service (USFWS) on manatee protection issues. In the last year, a number of circumstances have made inter-agency teamwork more challenging. As a result of settlement agreements, the state and federal agencies responsible for manatee protection have been engaged in significant actions related to rule-making. During 2001-2002, FWC continued to devote significant staff time and effort to review federal proposals and advise all parties of the various state actions.

Recovery Plan and Species Listing

The USFWS developed the initial recovery plan for the West Indian manatee in 1980. This initial plan focused primarily on manatees in Florida, but also included Antillean manatees in Puerto Rico and the U.S. Virgin Islands. This plan has been updated and revised three times since then, with the third revision being approved by the Regional Director of the USFWS on October 30, 2001. A number of FWC employees were instrumental in the completion of this update.

The goal of the recovery plan is to assure long-term viability of the Florida manatee in the wild. The plan sets forth the requirements for reclassification to threatened status and then the delisting of the Florida manatee. These requirements include using specific measurable biological criteria for assessing manatee recovery. The criteria are:

- Statistical confidence that the average annual rate of adult survival is 90% or greater;
- Statistical confidence that the average percentage of adult female manatees accompanied by a first or second year calf in the winter is at least 40%; and
- Statistical confidence that the average annual rate of population growth is equal to or greater than zero.

If these criteria are met over the most recent 10 year time period, then the FWS would consider downlisting from endangered to threatened, provided that threats to manatee habitat or range have also been addressed by the following:

- Identifying minimum spring flows;
- Protection of selected warm-water refuge sites;
- Identifying for protection foraging habitat associated with the warm-water refuge sites;
- Identifying for protection other important manatee areas; and
- Reducing unauthorized human caused “take.”

It is important to note that the above criteria are in the federal recovery plan but are not found in State statute or rule. The method used by the State to determine the status of manatee is found in Rule 68A-27, Florida Administrative Code and the criteria are different. Because the Federal and State processes and criteria for listing are markedly different, the resulting lists are not identical. As a result of receiving a petition requesting an evaluation of the status of the Florida manatee, FWC initiated a Biological Status Review. This is the first step in the state process and will determine what classification the Florida manatee should have at the State level. This will not have any effect on the Federal list.

Marine Mammal Protection Act

Another intergovernmental, coordinated activity that continued during FY 2001-2002 was cooperation as the USFWS prepared to publish federal rules to allow "take" under the Marine Mammal Protection Act. Currently, no level of "take" is authorized. This means that no action, which is determined to contribute to a "take," can be authorized. While this is a federal rule-promulgation process, state agencies including FWC, as well as activities in the private sector that require state or federal authorization (i.e. construction permits) may be impacted. ❖

Some of the Intergovernmental Partners for Manatee Protection

Florida Marine Research Institute
Marine Mammal Research

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 dedicated staff statewide and thoroughly examined (necropsied) in order to determine cause of death. Most necropsies occur at the Marine Mammal Pathobiology Laboratory (MMPL) in St. Petersburg, opened in 1993. Information gained through carcass salvage, rescue, and rehabilitation is crucial in providing wildlife managers with information about manatee health, life history, general and reproductive biology, and also provides data to help in developing population models.

2001-2002 Highlights

- During the 33-day period of March 15, 2002 to April 16, 2002 there was an increase in manatee deaths. FMRI collected 35 manatee carcasses from four southwest counties during this time. Brevetoxin from red tide was suspected based on recent locations of red tide blooms (Karenia brevis) found in Charlotte, Collier, Lee, and Sarasota counties where the carcasses were recovered, as well as physical evidence collected during necropsy and subsequent toxicology results. As a result a federally appointed advisory panel, The Working Group for Unusual Marine Mammal Mortality Events, declared this an unusual mortality event which means that federal assistance could be provided to study the event.
- Statewide there were 323 manatee carcasses documented in Florida during the fiscal year and all but two were recovered and examined.
- The MMPL was designed to process 150 carcasses per year. During the January to March quarter alone, 133 animals were transported to the Pathobiology Laboratory for necropsy. The large number of carcasses created a retrieval and processing challenge for staff. A total of twelve employees located at four field stations around the state and the MMPL responded to all carcass and rescue calls.
- In addition to determining cause of death, valuable data related to population and ecology studies as well as species health is gained from performing necropsies. The research currently being conducted includes: determining the age of manatees through ear bone sectioning, gross anatomy of reproductive system, thermoregulatory capabilities, and physiology and behavior of manatee buoyancy. During this past year, 353 ear bones were sectioned for aging. Work was presented at the 14th Biennial Conference on the Biology of Marine Mammals and the Manatee Population Ecology and Management Workshop.
- An e-mail notification system was launched to alert Law Enforcement and Management of weekly total and watercraft mortality updates.
- FMRI launched a data portal on their web site for monthly mortality totals. The totals are listed by cause of death and county locations. In addition an interactive, searchable database is now available at this site for use by the public. ❖

Table 1: Manatee Mortality FY 2001-2002

Human - Watercraft related	97
Natural	61
Perinatal (total body length less than 150cm)	53
Cold stress	15
Human - Other (entanglement, ingestion, etc.)	7
Human - Floodgate/Canal Lock	3
Number of carcasses not recovered	2
Undetermined/Decomposed	85
Total Number of Carcasses	**323**

Publications resulting from work funded by the Save the Manatee Trust Fund

- Flamm, R., L. Ward, and B. Weigle. 2001. Applying a variable-shape spatial filter to map relative abundance of manatees (Trichechus manatus latirostris) Landscape Ecology 16:279-288.
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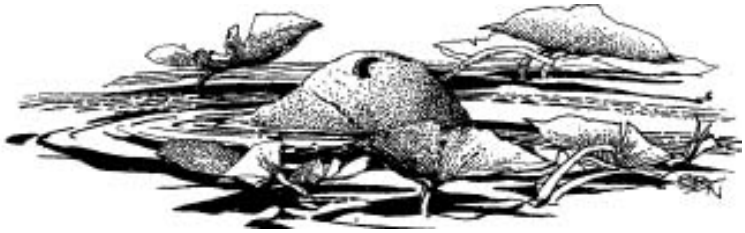
- Young, N.M. and S. Shapiro. 2001. U.S. Federal legislation governing marine mammals. Pages 741-766 in L. Dierauf and J.D. Gulland, editors. CRC Handbook of Marine Mammal Medicine, Second Edition. CRC Press, Boca Raton, Florida. ❖



Population Monitoring

Aerial surveys are important for acquiring information on manatee distribution, relative abundance, and use of habitat types. Statewide aerial surveys of all manatee wintering habitats in Florida and southeast Georgia are conducted after cold fronts, when the animals aggregate at warm springs and thermal discharges from power plants and industries. These surveys yield minimum estimates of the manatee population. Other aerial surveys are conducted year-round to map seasonal distribution of manatees.

Population models are being developed using data from aerial surveys and from mortality, life history, and ecology studies, to estimate trends in regional population sizes. While population models are preliminary, most point toward a slow increase in the population of manatees in two areas. The record number of deaths in recent years remains a concern in the recovery of the species. Continued high rates of mortality from watercraft collision as well as habitat loss and environmental degradation are serious, ongoing concerns.

2001-2002 Highlights

- Research on population modeling continues, incorporating 2001 mortality data and year 2002 synoptic survey counts. Information on population status was provided to the interagency Manatee Population Status Working Group, the Manatee Recovery Team, and the Manatee Technical Advisory Council.
- A total of 88 flights was made on 61 days, for manatee distribution, winter counts, calibration studies, and red tide reconnaissance.

(Continued on page 12)

Population - (continued from page 11)

◆ FMRI flew intensive aerial surveys this winter to assess the accuracy of aerial counts at the 3 Tampa Bay power plants, in cooperation with Mote Marine Laboratory. Scheduled aerial surveys were delayed due to the heightened security around power plants, following September 11th. The accuracy of counts was assessed using simultaneous aerial and ground counts. Time-depth recorders were used for the first time to document the percent of time manatees are at the surface to be counted. Results were presented at the international Marine Mammal Conference, December 2001, at the Population Workshop, and to the Manatee Technical Advisory Council.

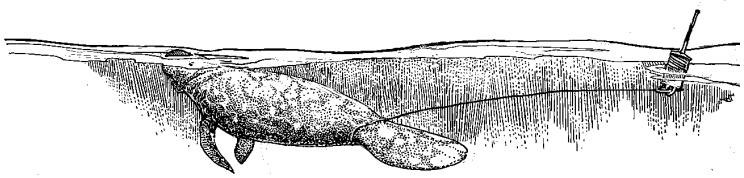
◆ One interagency, statewide "synoptic" aerial survey of manatees was conducted in 2002, funded by FMRI. The count of 1,796 manatees was low, due to sub-optimal weather conditions. Manatees were counted on 16 survey routes (12 aircraft, 4 ground), by 29 biologists from 11 state, federal, and county agencies, and from research labs and universities. The previous record count was 3,276 manatees on January 5-6, 2001. Counts vary depending on weather conditions and manatee response to cold weather.

◆ Sightings from aerial surveys were entered into the GIS system for assessment of manatee distribution for management decisions. These data are in high demand for management decisions, lawsuits, and hearings. The synoptic survey data were entered into GIS for the first time, from 17 surveys, 1991-2002.

◆ A biological status review of the Florida manatee was initiated. This process involved developing new population models to analyze the population against criteria developed by the State of Florida.

◆ Adult survival rates were estimated from winter photo-identification data collected by FWC and Mote Marine Laboratory in Tampa Bay and Southwest Florida. State-of-the-art "sight-resight" statistics were used to estimate survival rates, based on whether individuals are seen each winter. Survival rates were estimated for the southwest region for the first time.❖

Behavioral Ecology and Movements



Research on how manatees use the coastal habitats of Florida 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. 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 locational and other data are delivered to FMRI daily via the Internet. Staff use the satellite-derived locations to remotely track manatee movements over long time periods. They home in on the tag's unique VHF radio and ultrasonic signals to find and observe manatees in the field, in order to record data on behavior, group size, habitat, and movements.

This year FMRI conducted three major studies on manatee behavior, ecology, and movements, all of which relied heavily on satellite-based and field-monitored telemetry technology.

1) **Manatee Use of an Industrial Warm-water Refuge:** TECO Power Plant. The effluent canal of this power plant in Apollo Beach is the major winter aggregation site for manatees in Tampa Bay.

2) **Manatee Use of a Natural Warm-water Refuge:** Warm Mineral Springs. This natural warm-water spring and creek system off the Myakka River in Sarasota County is used by over 70 manatees as a thermal refuge during cold winter weather. These studies permit comparison of manatee use of contrasting warm-water refugia and nearby foraging habitats in relation to water temperature and other environmental factors.

3) **Evaluation of Rehabilitated Manatees in the Wild:** Manatees that are rescued as orphans or born in captivity grow up in an environment that is radically different from that experienced by free-ranging animals. Researchers tag and intensively monitor these "naive" manatees after their release in order to assess their behavioral adaptation, health, and, ultimately, survival in the wild.

2001-2002 Highlights

◆ Twenty manatees were captured over four days at the TECO power plant in northeastern Tampa Bay in December. These captures required extensive planning and coordination and involved 20-30 people per day. Fifteen animals were fitted with flags for a study designed to estimate the percentage of manatees missed during aerial surveys of power plant aggregations (see Population Monitoring). Five of these individuals were fitted with satellite-monitored radio-tags and time-depth recorders (TDRs) and were tracked through the winter to study their movements among and use of industrial warm-water refugia. Water temperature

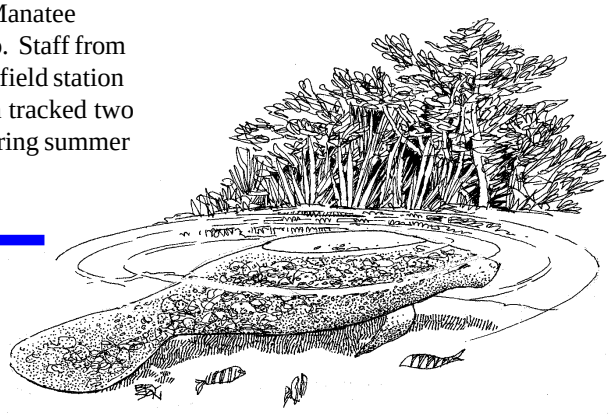
Behavioral - (continued from page 12)

and depth were recorded for these individuals every 30 seconds throughout the winter.

◆ Of the six manatees captured at Salt Creek, Warm Mineral Springs in January, four were radio-tagged to study their movements, habitat use, and behavior. Three of these individuals had been rehabilitated in oceanaria and released into the area in previous years. Another manatee that had remained tagged since the previous winter was also tracked in the region. An automated VHF receiver/datalogger station was set up at the manatee aggregation area between December and March to record attendance patterns of tagged manatees in relation to time of day, tidal state, and water temperature.

◆ FMRI staff collaborated with Wildlife Trust to tag eight rehabilitated manatees in February, providing satellite-linked radio-tags for six. These individuals were released in various parts of the state, including Crystal River, Warm Mineral Springs, Blue Spring (upper St. Johns River), and Biscayne Bay. FMRI tracking efforts were concentrated in southwestern Florida but staff assisted in recaptures for regular health assessments in all areas. Digital GIS maps of up-to-date telemetry locations were distributed daily to members of the Manatee Rehabilitation Partnership. Staff from FMRI's Charlotte Harbor field station and Tequesta field station tracked two rehabilitated manatees during summer 2001 that had been released in Lake Okeechobee.

◆ A prototype Global Positioning System (GPS) datalogging tag was deployed on an adult female manatee tagged at the TECO captures during December. The tag was removed in March, providing hourly data on fine-scale movements in eastern Tampa Bay over a 2.5-month period in winter. The fine spatial and temporal resolution provided by GPS technology will provide us with detailed information on manatee habitat use and travel paths. ❖



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 ultrasonic measurements of blubber thickness.

Many manatees can be recognized by their unique pattern of scars. Most scars are caused by collisions with powerboats, but they also result from entanglement in fishing gear and 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 taken of scarred manatees 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 station staff photo-document manatees statewide. Photo-identification data provide insights into manatee movements and site fidelity, survival rates, and reproductive parameters such as calving intervals.

PIT tags are small, unpowered microchips that are placed under the skin of a captured manatee to provide long-term identification of individuals. All manatees handled for rescue, rehabilitation, or radio-tagging are marked with PIT tags. All dead manatees are scanned for PIT tags before necropsy to identify known individuals for life history information and to assess the survival of rehabilitated manatees that have been released back to the wild.

2001-2002 Highlights

◆ Currently, the west-central and southwest MIPS catalog consists of approximately 3300 images and 8000 sightings representing 600 manatees. FMRI staff added 15 fully documented animals to the catalog this fiscal year, and they worked intensively on database updates in anticipation of a major upgrade to the MIPS.

◆ FMRI photo-identification staff worked cooperatively with Mote Marine Laboratory, the U.S. Geological Survey's Sirenia Project, Lee County Parks, Florida Power and Light Cooperation, the U.S. Army Corps of Engineers, the National Park Service, and others to photo-identify manatees in southwestern Florida. Field staff had to adjust to the heightened security around power plants and lock chambers, as a result of September 11th.

◆ Tampa Electric Company funded photo-identification studies at the Big

(Continued on page 14)

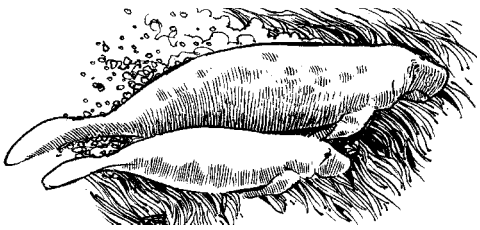
Life History (continued from page 13)

Bend power plant in Apollo Beach, Florida for the sixth consecutive winter (~$3,900). FMRI staff provided assistance to the Manatee Viewing Center staff in training of docents and in updating manatee-related public outreach information and displays; they also served on the Center's Environmental Education Advisory Board. As a result of the mild weather this winter, photo-identification efforts in Tampa Bay were conducted in both winter and warm-season aggregation sites.

- Because the FPL-Fort Myers power plant operated at less than full power this winter, manatees shifted their distribution to the Franklin Lock. Photo-identification effort was increased in this area to take advantage of the unusually large number of manatees present.
- Analysis of a video taken in the Warm Mineral Springs area in 1998 was completed. This facilitated the complete photo-documentation of several manatees that frequent Warm Mineral Springs in winter and added information on their sighting histories.
- Photographs of scarred manatees and accompanying data for the 2001-02 winter were processed for matches in an unprecedented short timeframe and provided to population assessment staff to estimate adult survival rates. These data were presented at the Manatee Population Ecology and Management Workshop in April.
- The FMRI photo-identification internship program continues to thrive. This fiscal year 15 interns participated in photo-identification, boater behavior studies, and other manatee-related activities. Staff also trained and processed the photographs of 8 volunteers collecting photo-identification data in the southwest. Volunteers working at the Franklin, Ortona, and St. Lucie locks provided data on manatee movements along the Okeechobee Waterway.
- Researchers marked over 50 manatees with PIT tags this year, including those captured at warm-water aggregation sites for radio-tracking studies and rehabilitated manatees that were released back into the wild. Of the 340 dead manatees salvaged in Florida this fiscal year, 8 were identified with PIT tags and 12 were matched to manatees cataloged in the MIPS.
- FMRI staff collaborated with wildlife veterinarians and university researchers to assess the health status of free-ranging manatees (both wild and rehabilitated) through analysis of blood chemistry, hematology, microbiology, immunology, and blubber thickness. ❖

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. The MMGIS staff work 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.

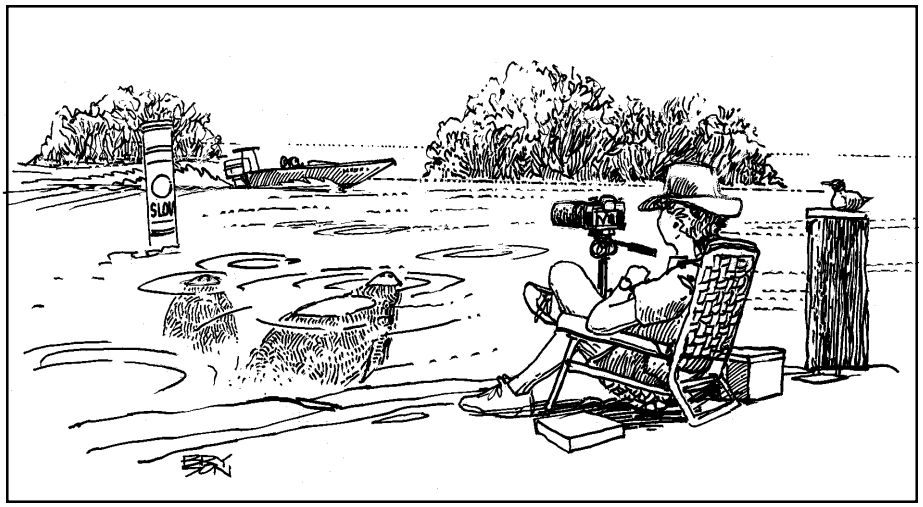


2001-2002 Highlights

- Approximately 150 CD Roms of the Version 1.3 Atlas of Marine Resources CD-ROMs were provided to scientists, managers, educators, and consultants. 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.
- Analysis for the biological status review of the manatee was been initiated using aerial survey and telemetry data to calculate Extent of Occurrence and Area of Occupancy using GIS methods.
- A final report that described statewide characterizations of manatee boat strike mortality was completed and delivered to USFWS. This work was also presented at the 14th Biennial Conference on the Biology of Marine Mammals.
- Staff prepared numerous maps and data files to assist in the evaluation of an unusual manatee mortality event caused by the red tide toxin during the 33-day period of March 15, 2002 to April 16, 2002.
- The MMGIS for manatee mortality was launched on FMRI's MRGIS website. Anyone with internet access can now create and access maps of carcass recovery from this site. ❖

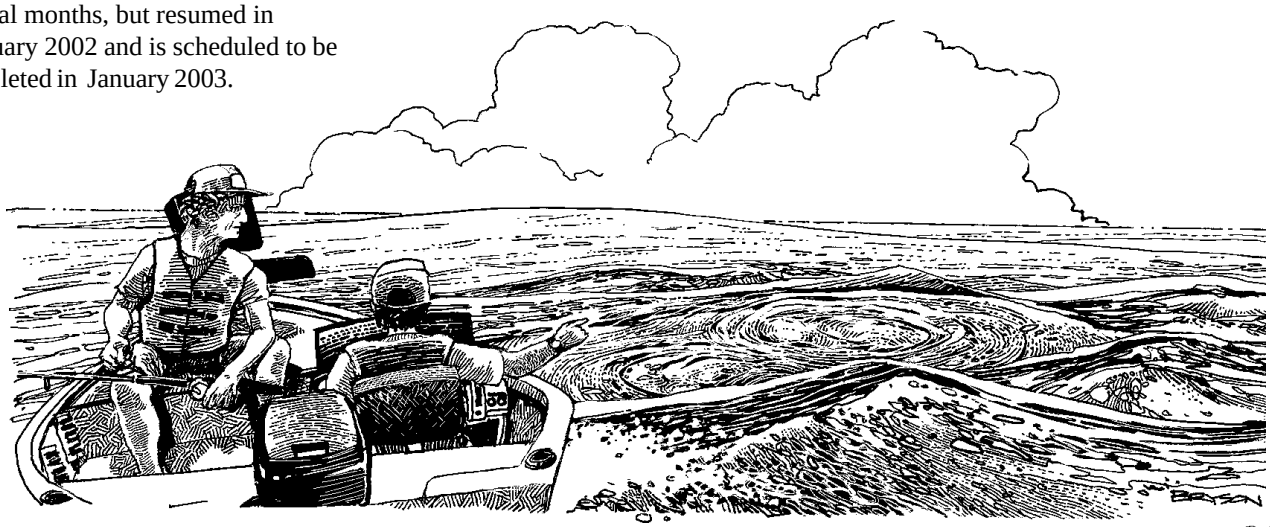
Human Dimensions

Understanding how humans affect the welfare of manatees is an important element in effective manatee protection. Factors such as pollution and mortality from boat strikes, and changes in habitat are all related to human activities. To make wise decisions with respect to habitat protection, boat speeds, refuge and sanctuary delineation, harassment, and compliance with speed zones, an understanding of human behaviors and motivations is necessary. Examples of human-dimension studies include gathering observation data on boat distribution and speed-zone compliance, assessing knowledge and attitudes via telephone or mail surveys, and evaluating the effectiveness of educational material in disseminating appropriate manatee-protection messages.

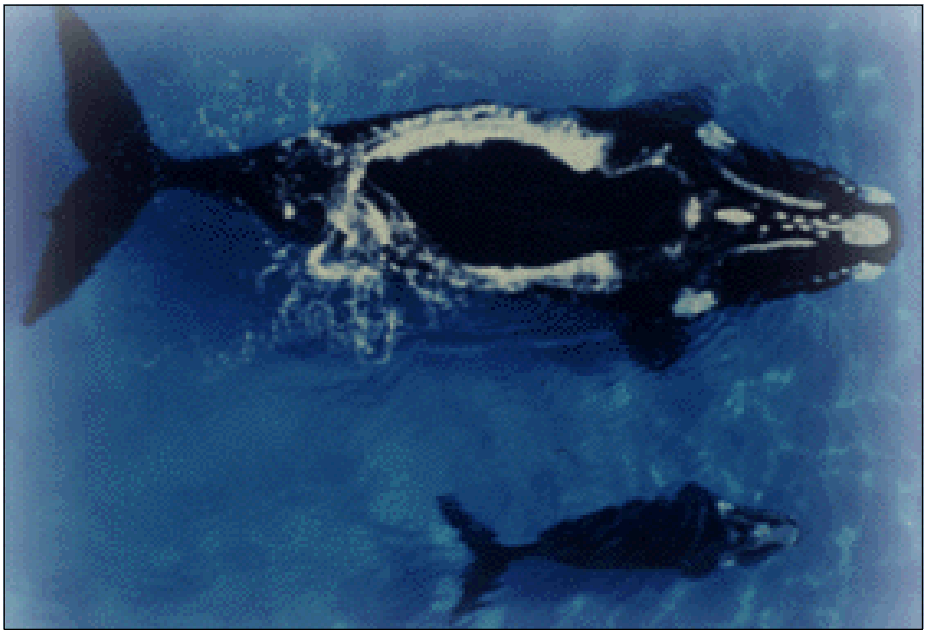


2001-2002 Highlights

- Staff participated in a meeting regarding an interagency statewide boater compliance plan with the Office of Executive Director, Bureau of Protected Species Management, Department of Law Enforcement, and Mote Marine Laboratory. As a result, FWC Law Enforcement Reservists were trained for a new boater compliance study. Unfortunately, due to September 11th this study was postponed for several months, but resumed in February 2002 and is scheduled to be completed in January 2003.
- A final grant report summarizing the 2000-2001 statewide manatee boater compliance study was completed and submitted to the USFWS. We recorded 13,936 observations in 864 hours of effort. Compliance with posted speed was highly variable between sites, but averaged 51%, with 14% of the observations recorded as blatant violations. This work was presented at the 14th Biennial Conference on the Biology of Marine Mammals and the Manatee Population Ecology and Management Workshop.
- Received money from USFWS CARA-lite grant to explore alternative methods to increase boater compliance within manatee speed zones (i.e., traffic calming alternatives).
- Received funding from FWC/BPSM and the Florida Inland Navigation District to conduct a study in Miami that explores the motivation behind compliance with manatee speed zones. Field sampling was completed and a telephone survey is being prepared.
- The final year of data collection comparing regulations passed in the Bartow area and educational efforts for fostering manatee stewardship have begun with the recruitment of five interns. ❖



Boaters observing a manatee "footprint" on the water



Publication:

A NOAA Technical Memo "Ship Traffic Patterns in Right Whale Critical Habitat: Year 1 of the Mandatory Ship Reporting System" is now available in print. For more information regarding the MSR systems and a report on the first year of MSR data please visit http://www.nmfs.noaa.gov/prot_res/PR2/Conservation_and_Recovery_Program/msr/msrhome.html

Right Whales

In addition to manatee recovery efforts, the FWC 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. Research conducted by FMRI on the right whale is federally funded. 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 that is estimated to number less than 300 individuals. NOAA Fisheries designated Florida and Georgia coastal waters as critical habitat for the right whale in 1994. This region is the only known calving ground of the northern right whale. FWC is dedicated to assisting NOAA Fisheries in its efforts to protect the northern 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 Southeastern U.S. Implementation Team for the Recovery of the North Atlantic Right Whale, a multi-agency/citizens 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 inception in 1993, and an FWC member will serve as chairperson of the Team next year.

Since 1987, FMRI staff 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 NGO partners to compile years of aerial survey data from the calving grounds into GIS format. Analyses of these spatial data will help us to better define right whale distribution patterns in the southeast calving grounds in relation to environmental factors and human activities. We are currently studying sea surface temperatures and bathymetry relative to whale sightings to help us better understand the habitats in which whales are found. 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 mandatory ship reporting (MSR) systems surrounding right whale critical habitats. These systems are federally implemented.

2001-2002 Highlights:

- FMRI distributed 28 alphanumeric pagers to facilitate the rapid dissemination of right whale sighting locations to all mariners in the southeastern United States in an effort to prevent ship collisions with right whales.
- GIS staff complied several years of aerial survey data and completed a preliminary analysis describing distribution and relative abundance of whales in the calving grounds.
- Staff met with various port authorities and military personnel to distribute Mandatory Ship Reporting documentation in coordination with NOAA Fisheries.
- FMRI conducted 29 winter aerial surveys resulting in a total of 18 sightings (5 mother/calf pairs, 3 mother/yearling pairs, one loan adult) of right whales. ❖

Office of Environmental Services
Bureau of Protected Species Management

Rule Administration

The Rule Administration Section focuses primarily on establishing comprehensive manatee protection boat speed and access 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 high priority for establishment of countywide speed zones: Brevard, Broward, Citrus, Collier, Dade, Duval, Indian River, Lee, Martin, Palm Beach, St. Lucie, Sarasota, and Volusia. As of 1999 countywide rules had been established in all of these counties. Much of this fiscal year's efforts were focused on the consideration of rules for numerous site-specific areas around Florida that were identified in a settlement agreement entered into by the Commission in April 2001 to resolve a lawsuit filed by a coalition of environmental groups. Some of the areas being considered for rule-making already had some level of protection in place, while others were completely unregulated.

2001-2002 Highlights:

- The changes to the Brevard County rule (68C-22.006, FAC) that were approved by the Commission on May 23, 2001, were finally adopted on June 4, 2002. Adoption had been delayed by three rule challenges (Case Nos. 01-2114RP, 01-2197RP, and 01-2198RP) pending before the state Division of Administrative Hearings (DOAH). A hearing on the challenges began in September 2001 and concluded at the end of October. DOAH issued a Final Order on April 17, 2002, dismissing all of the challenges. Two separate appeals of the Final Order were filed in May with the Fifth District Court of Appeals (Case Nos. 5D02-1424 and 5D02-1440). It is unlikely that the appeals will be resolved before late 2002 or early 2003; however the appeals will not delay the rule from going into effect. As of the end of the fiscal year, FWC staff continued to coordinate with the Florida Inland Navigation District and others to finalize a sign plan to post the new zones.
- In July 2001, FWC staff completed the last of five meetings with various stakeholder groups as part of the process to develop a rule proposal for the Lemon Bay, Turtle Bay, and Peace River portions of Charlotte County. A Notice of Rule Development was published in the FAW in early February 2002. Later in February, FWC staff met with a local rule review committee (LRRC) that Charlotte County had formed at the FWC's request and also conducted a Rule Development Workshop in Punta Gorda. A formal rule proposal was approved by the Commission at its May 2002 meeting after reviewing staff recommendations, the report submitted by the LRRC, and additional public comment provided at the May meeting. A Notice of Proposed Rulemaking for a Charlotte County rule (68C-22.015, FAC) was published in the FAW in June 2002. The proposed rule also included a section of the Peace River in DeSoto County.
- In July 2001, FWC staff completed the last of three meetings with various stakeholder groups as part of the process to develop a rule proposal for the Warm Mineral Springs and City Island areas of Sarasota County. A Notice of Rule Development was published in the FAW in February 2002. Later in February FWC staff conducted Rule Development Workshops in North Port and in Sarasota. A Notice of Proposed Rulemaking for amendments to the Sarasota County rule (68C-22.026, FAC) was published in the FAW in June 2002.
- In August 2001, FWC staff completed the last of three meetings with various stakeholder groups as part of the process to develop a rule proposal for the Blue Waters area of the Homosassa River in Citrus County. A Notice of Rule Development was published in the FAW in February 2002. In March FWC staff conducted a Rule Development Workshop in Lecanto. A Notice of Proposed Rulemaking for amendments to the Citrus County rule (68C-22.011, FAC) was published in the FAW in June 2002. In the fall of 2001

(Continued on page 18)

Blue Waters near Homosassa Springs State Wildlife Park

Rules - (continued from page 17)

FWC staff had worked with the Homosassa Springs State Wildlife Park to mark a voluntary "safe haven" area where manatees could rest without being disturbed by human activities. These signs were posted for the 2001-02 winter season since no new regulatory zone could be established before the end of the winter season.

- In August 2001, FWC staff completed the second of two meetings with various stakeholder groups as part of the process to develop a rule proposal for the Jungle Trail Narrows and Vero Beach Power Plant areas of Indian River County. A Notice of Rule Development was published in the FAW in February 2002. Later in February FWC staff conducted a Rule Development Workshop in Vero Beach. A Notice of Proposed Rulemaking for amendments to the Indian River County rule (68C-22.007, FAC) was published in the FAW in June 2002.

- In August 2001, FWC staff completed the last two of five meetings with various stakeholder groups as part of the process to develop rule proposals for the DeLeon Springs and Lower Halifax River areas of Volusia County. A Notice of Rule Development was published in the FAW in February 2002. Later in February FWC staff conducted a Rule Development Workshop in Port Orange. The Commission decided at its May 2002 meeting not to propose any amendments to the existing zones. Instead, staff was directed to reassess the entire countywide rule after new aerial survey data are collected. Surveys were set to begin in July 2002 and continue through June 2004.

- In July and August 2001, FWC staff conducted five meetings with various stakeholder groups as part of the process to develop rule proposals for the Sky Lakes and Blue Lagoon areas of Miami-Dade County. After reviewing the available data and considering the input provided at the stakeholder meetings, staff recommended that no changes be proposed to the existing zones and that instead efforts be made to improve compliance with the existing regulations. At its meeting in May 2002, the Commission concurred with the staff recommendations so no rule amendments were proposed.

Manatee cow nursing her calf and juvenile.

- In August 2001, FWC staff completed the last three of six meetings with various stakeholder groups as part of the process to develop a rule proposal for the Crossroads area of Martin County. A Notice of Rule Development was published in the FAW in February 2002. In March FWC staff conducted a Rule Development Workshop in Hobe Sound. The Commission decided at its May 2002 meeting not to propose any amendments to the existing zones.

- In September 2001, FWC staff completed the last three of eight meetings with various stakeholder groups as part of the process to develop a rule proposal for the North Fork of the Loxahatchee River in Palm Beach County. A Notice of Rule Development was published in the FAW in February 2002. Later in February FWC staff conducted a Rule Development Workshop in Jupiter. The Commission decided at its May 2002 meeting not to propose any amendments to the existing zones.

- In September 2001, FWC staff completed the last five of six meetings with various stakeholder groups as part of the process to develop rule proposals for the Alafia River in Hillsborough County and Terra Ceia Bay in Manatee County. Separate Notices of Rule Development were published in the FAW in February 2002. Later in February FWC staff conducted Rule Development Workshops in Riverview and in Bradenton. Notices of Proposed Rulemaking for amendments to the Hillsborough County rule (68C-22.013, FAC) and establishment of a Manatee County rule (68C-22.014, FAC) were published in the FAW in June 2002.

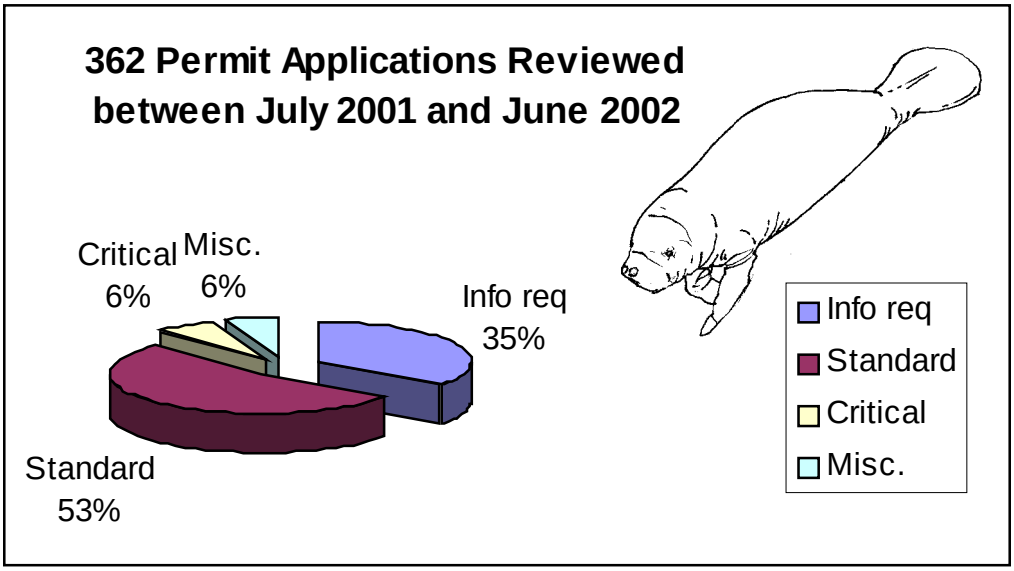
- In February 2002, pursuant to §370.12(2)(o), FS, the Commission formally approved the local manatee protection ordinance that had been adopted by Hillsborough County in December 2001. The ordinance expanded the protection zones that the County had adopted in 2000 such that zones were established for most County waters inside of the six-foot depth contour between the Alafia River and the Little Manatee River.

(Continued on page 19)

Plan and Permit Section Review

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

Figure 2: Permit Applications



2001-2002 Highlights:

- Staff reviewed a total of 362 projects during the year and offered biological opinions and recommendations to reduce or eliminate potential negative effects of the proposed activities. Of the applications received from regulatory agencies that had potential impacts to manatees, BPSM was able to review approximately 80% of the requests for agency comments. Fifty-three percent (53%) of the projects reviewed required standard conditions, and six percent (6%) were critical reviews that could significantly impacts manatees or their habitat. Thirty-five percent (35%) were information requests and six percent (6%) was miscellaneous correspondence.
- Staff attended numerous Cabinet Aides meetings to assist with agenda items regarding impacts to manatees.
- Coordination meetings with various agencies were held, as well as meetings with consultants and applicants. Multiple site visits were also performed.
- A study for blasting conservation measures was initiated, with funds secured from the Marine Mammal Commission as well as the U.S. Fish and Wildlife Service.
- Staff assisted in the review of draft Boat Facility Siting Plans for Manatee Protection Plans in Martin, Indian River, Brevard, Volusia, Sarasota and St. Lucie.
- Staff continued rulemaking efforts required by the settlement agreement for their designated areas of proposed rulemaking.
- Staff provided Bureau support by maintaining and updating the mortality database with MS Access, and by updating and revising Bureau web pages.
- Staff regularly coordinated with the USFWS on review of projects.
- Provided input to DEP on several proposed rule revisions for submerged lands. ❖

Rules - (continued from page 18)

- Considerable time was once again spent this year on sign posting issues. BPSM staff coordinated closely with the Commission's Division of Law Enforcement, navigation districts, staff from various counties and cities, and others. Staff also conducted numerous field inspections to assess the adequacy of existing sign plans and the condition of previously posted signs. Staff was directly involved in hiring contractors and overseeing sign work in Clay County to repair several damaged signs and to relocate several others in the Doctors Lake area covered by the Duval County rule; in Putnam County to replace signs and add several new installations in the portion of Lake George covered by the Volusia County rule; and, in Collier County to repair several signs that had been vandalized.
- Staff continued to issue permits (in accordance with 68C-22.003, FAC) for commercial fishing and professional fishing guide activities in Volusia, Brevard, Indian River, St. Lucie, Lee, and Collier counties. In April 2002, one professional fishing guide permit in Lee County was revoked because the permit holder had been issued multiple citations for violating the Lee County

(Continued on page 20)

Manatee Protection Plans

Manatee Protection Plans (MPPs) 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 counties listed in the Rule Section above. 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. Because of the complexity of issues a county must address in its plan and the range of information that must be collected, plans can take several years to develop. MPP staff coordinates assistance with protection planning for the following counties and others as requested by local governments.

2001-2002 Highlights

- **Broward County** completed their MPP grant "Broward County Innovative Manatee Protection Plan Education Element" early in the fiscal year (July 2001). One of the components, the Boater 101 Education Course is available to students in the Broward County area and the approach is being presented to other schools throughout Florida for possible use. Two meetings were held with Broward County planning staff to talk about continuing work on developing the remaining portions of the comprehensive manatee protection plan. County staff continues to collect data on boat facility siting and habitat.
- **Clay County** has initiated a contract with JU to develop a county MPP. They funded the effort through a federal grant.
- **Volusia County** provided FWC Phase II of the Volusia County Manatee Protection Plan. FWC reviewed the plan and met with the county to discuss how they should continue to develop the MPP.
- The FWC approved a revision to the **Indian River County** MPP February 6, 2002.
- BPSM funded contracts in 2001 with Sarasota, **St. Lucie** and **Martin** counties to continue development of their Manatee Protection Plans (MPP). St. Lucie and Martin Counties finalized their MPPs and both were approved by the FWC. **Sarasota County** applied to receive additional funding in early 2002 to complete the remaining portions of the plan. This contract begins in July 2002.
- Rookery Bay Aquatic Preserve held a Coastal Management Workshop entitled "A Law Enforcement Workshop on Manatee Protection" in **Collier County** on July 27, 2001. BPSM staff presented an overview of the State's manatee protection efforts. Improvements in public education were recommended.
- **Collier County** - in conjunction with FMRI, continues to develop their countywide comprehensive boaters guide. BPSM staff provides the County technical support on this project.
- **Lee County** - See the Advisory Council for Environmental Education (ACEE) section for information about various grant projects funded this fiscal year through ACEE grants or contracts.❖

Rules - (continued from page 19)

rule as well as his permit. In July 2001, FWC transferred to Bombardier Motor Corporation the vessel testing permit that Outboard Marine Corporation (OMC) had held for St. Lucie, Martin, and Palm Beach counties. (Earlier in 2001 Bombardier had acquired the test facility that had been owned by OMC.) In April 2002, FWC issued a permit to allow a consulting company to access the Pansy Bayou No Entry zone in Sarasota County to map fisheries habitat. Another permit was issued in May 2002 to allow Mote Marine Laboratory to continue research on manatees and seagrasses in Pansy Bayou. Several permits also were issued to allow residents to access waterfront property within various limited-entry areas around the state. Three variances were also issued during the fiscal year pursuant to §120.542, Florida Statutes. Two of the three variances were issued by default in October and December 2001 because no final agency action was taken within the time limit imposed by the statute. Both of these variances involved activities in Brevard County; however, both variances will cease to be valid when the June 2002 amendments to the Brevard County take effect. The third variance was granted in December 2001 to an airboat tour company in Collier County that requested renewal of its variance to operate at higher speeds in areas where professional fishing guide permits are currently being issued.❖

Law Enforcement Coordination

BPSM and FMRI staff continued to increase involvement and coordination with federal, state, and local law enforcement agencies. This was done by training law enforcement recruits, distributing maps and educational materials to officers, and holding coordination meetings with law enforcement agencies, especially the FWC.

2001-2002 Highlights

- In a continuing effort to increase boater compliance with the newly posted manatee speed zones in Lee County, BPSM created several different site-specific speed zone brochures for law enforcement officers to distribute to first time offenders.
- In an effort dubbed the Ramp Ranger program, local, state and federal law enforcement officers, DEP staff, along with volunteers from local environmental organizations, Power Squadrons and U.S. Coast Guard Auxiliaries helped distribute a variety of manatee information to the public at boat ramps. The Ramp Ranger program was initiated in Brevard, Volusia, and Clay Counties.
- The Division of Law Enforcement was appropriated $371,000 from the Save the Manatee Trust Fund (STMTF) for salaries and benefits within the 2001/ 2002 fiscal year. The primary use of the funds was to enhance enforcement of the existing manatee protection speed zones. This appropriation was in conjunction with the 25 additional law enforcement officer FTE's.
- The Division's efforts are based on premise that education and enforcement are inseparable. The Division's enforcement efforts in this area include a strong educational component aimed at bringing a 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/informational vessel stops and verbal warnings as each new protection zone is posted. The enforcement contact is escalated to written warnings and issuing Uniform Boating Citations (UBC's) after a specific zone has been posted for a reasonable amount of time or for repeat offenders. Officer discretion based upon 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 during the times of the year when high manatee activity is expected (primarily winter months).
- The Division of Law Enforcement provided enhanced enforcement and closely tracked 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.
- In response to increased watercraft related manatee mortalities and reports of noncompliance as well as sights of high concentrations of manatees, patrol hours were increased by a total of 25% in the following counties: Duval; Volusia; Lee; Collier; Manatee and Sarasota.
- Throughout the state, the Division of Law Enforcement participated in excess of 50 educational and/or outreach efforts targeting manatee awareness and compliance with manatee protection speed zones.
- Law enforcement officers continued to provide first response and assistance in the recovery of manatee carcasses.
- Working in conjunction with City of Port Orange there was an interactive sign placed at a very active boat ramp to inform boaters of manatee zones and FWC's commitment to manatee protection and boating safety.
- Law enforcement patrols on the Calosahatchee River, Franklin locks, Orange River and Matlacha Pass (Lee county) were assigned in response to Manatee Alerts provided by the Bureau of Protected Species Management in January, February and March of 2002.
- In Lee county alone law enforcement personnel distributed over 100,000 Boaters Guides which provide detailed information regarding manatee protection zones as well as general boating information.
- Coordination with local law enforcement agencies is best exemplified by the relationship with the Lee county Sheriff's Office Marine Unit. Though their data was not available by fiscal year, the calendar year data for 2001 indicated they had contact with more than 400 vessels which were not in compliance with manatee protection speed zones. The 2002 calendar year data clearly shows an upward trend in contacts with vessels in manatee protection zones.
- Due to significant issues such as high watercraft related mortalities or new protection zones in the counties of Duval, Volusia, Brevard, Lee and Collier, there were additional educational efforts in combination with law enforcement patrols. The targeted efforts provided a combined increase of 28% in educational contacts, resulting in 18,178 people personally receiving information regarding manatee protection efforts in these counties. In the counties of critical interest law enforcement officers provided a total of 28,758 face to face educational contacts.
- Due to the tragic events of 9-11-01, the FWC Division of Law Enforcement became an active participant in the Homeland Security initiative of the President. These missions forced the Division to redirect some resource protection patrols. ❖

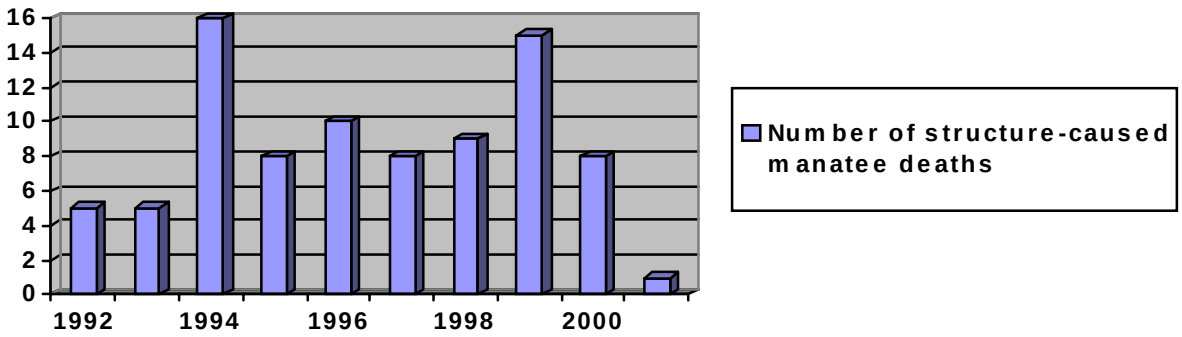
Habitat Characterization, Assessment and Protection

The recovery of the manatee population in Florida cannot occur without suitable habitat. Human population in Florida, and associated extensive 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. Reductions in the flow of warm spring waters, due to consumptive human uses, threaten significant natural warm water refuges in the northern half of the state. An uncertain future for the power industry, with looming deregulation and existing power plant senescence, also poses possible threats to established artificial warm water refuges. Understanding the manatee's habitat needs and assessing habitat health and stability is a primary focus of habitat protection programs.

(Continued on page 23)

Structure-related Manatee Deaths

Figure 3: 1992 - 2001 Structure Deaths



Second to watercraft, more manatee deaths are attributed to structures (navigation locks and water control gates) than any other human cause. From 1974-2001, 167 manatees were crushed or drowned by navigation locks or water control structures in Florida. There was only one structure-caused manatee death in calendar year 2001. That manatee was killed at S-77, the Moore Haven Lock and Dam operated by the U.S. Army Corp of Engineers (USACE) in Glades County.

The FWC has taken an active role in coordinating with the USACE and the South Florida Water Management District and the Florida Department of Environmental Protection (DEP) to develop solutions to this serious problem. Intergovernmental coordination has been critical to addressing this problem. Save the Manatee Trust Fund expenditures to address this problem have been primary in support of 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 data base. Additional Federal and State Funds have been used to implement the technology needed to make structures safer for manatees.

2001- 2002 Highlights:

Structures fitted with manatee protection devices in 2001-02 included:

G-36 Hendry Creek
S-22 Snapper Creek
S-28 Miami Shores

DEP made progress in equipping Rodman Dam and Buckman Lock with manatee protection and should be completed early in 2002/03.

The Interagency Task force held one meeting in September 2001, in Jacksonville, Florida. ❖

Habitat - (continued from page 22)

2001- 2002 Highlights:

- FWC manatee habitat staff coordinated with intergovernmental agencies in working groups and task forces to effectively manage human activities in natural systems used by manatees.
- The FWC manatee program developed two signs that have been placed around the state at warm water refuge and fishing access locations. A total of 70 of the warm water refuge signs and 170 of the entanglement signs were posted in over 20 coastal counties.
- All of the warm water facilities that are important to manatees, except the TECO Big Bend power plant, have Commission approved manatee protection plans as part of the NPDES permitting process. ❖

Fort Myers Power Plant - The plant was recently re-powered extending its life at least 30 years. A manatee protection plan assured that manatees were not harmed during the transition.

Data Distribution and Technical Support

Timely, accurate distribution of data is essential to make management decisions. Data from FMRI and many other sources is acquired by BPSM and used by managers in the promulgation of rules, the development of MPPs, and the review of permits. Use of a Geographic Information System (GIS) allows for spatial display and analysis of the databases. GIS staff currently uses Windows 2000, ArcGis 8.2, and AutoCAD Map 2000 to meet the data needs of our customers.

Technical support for staff is also an integral component of this section. The use of all available technology helps staff make good decisions. Our staff uses Windows 98 and 2000, and ArcView 3.2 or ArcGis 8.2 to facilitate permit review, rule development and other necessary functions. The technical support section also maintains the network and peripheral devices used by staff in their management decisions.

In addition to internal use, BPSM responds to many requests for data from the public each year. These requests are filled either electronically or through the production of paper maps.

2001-2002 Highlights

- BPSM GIS staff distributed approximately 82 GIS maps, 353 AutoCAD maps and 100 digital data sets to external customers.
- Staff spent significant time preparing maps and data analyses related to rule development. Data was collected from FMRI and other sources in order for BPSM staff to make management decisions regarding the 16 areas under consideration. Mortality, aerial survey, seagrass, telemetry, and bathymetry data were collected, reprojected if necessary, and then either made into maps or redistributed to staff for their projects.
- In-house staff training in ArcView 3.2 made it easier for staff to utilize the data in order to customize their projects.
- Hardware upgrades were a crucial component in our overall production output as a bureau this year. Most of the BPSM computers were upgraded from Pentium II machines to Dell Pentium IV machines with 20GB hard drives. Upgrades for the rest of staff will occur this year.
- GIS software was upgraded from ArcView 3.2 to the more powerful ArcGis 8.2. This switch solved several longstanding problems. With new capabilities staff was able to spend more time solving problems and advancing the needs of bureau staff. ❖

Environmental Education and Information Dissemination

Public support of government conservation programs is vital to their success. In order to engender support, the public must be well informed. We hope to foster an understanding of the problems facing manatees, as well as the steps that need to be taken to recover the species. In addition, it is important to target specific user groups that have impacts on manatees. Knowledge of manatee habitat requirements, behavior, and general biology can contribute towards the reduction of manatee disturbance, harassment, injury and death. The Bureau of Protected Species distributes a wide array of information to a variety of audiences. Our goal is to provide factual, timely information appropriate to the target user group.

2001-2002 Highlights

◆ The introduction of the "Way of the Manatee" education kits (PreK-5th grade) was one of our highlights this year. The kits were presented to Leon County Science teachers at the beginning of the school year and were scheduled at 25 sites. Education staff assisted with the distribution and presentation of programs to about 2500 students this year. In addition to Leon County, two other counties—Franklin and Wakulla—were able to use some of the kits as well. Overall, 37 teachers received hands on training and were able to teach their students about manatees, habitat protection, environmental awareness and personal safety (e.g. swimming, boating). E&I staff continue to evaluate the contents and add or delete materials to improve the kits. (Note – Requests about the kits and some of the backup materials have already been sent to other areas of the state—Broward and Lee Counties). E&I staff plan to introduce the kits on a more statewide level when the initial 2-year trial period is over.) E&I staff nominated the program for the annual Davis Productivity Awards.

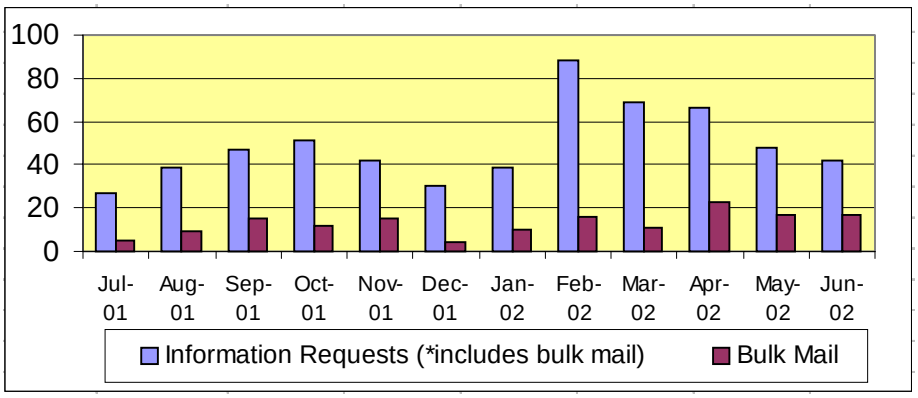
◆ A new manatee time line was created for the bureau web pages. Staff researched various publications and files to gather information for this site. The overall result is several pages that showcase decades of manatee protection efforts in Florida.

◆ The decal contest this year was offered to Middle School students around the state. The design selected was a watercolor image painted by Stephanie Lemos from Jose Marti Middle School in Hialeah. Additionally, Maricela Davila, a middle school student from Everitt Middle School in Panama City, suggested the slogan "Manatees Forever," which was used for the decal. All participants and their sponsoring teachers received certificates of participation or appreciation. Both Stephanie and Maricela received manatee decals for their efforts. (See back page for decal sample.)

◆ Brochures for Brevard, Lee and other counties were updated, printed and sent out to law enforcement officers and marinas. The site-specific maps and information help boaters understand what they should be doing while boating in these particular areas.

◆ Other educational materials were created for distribution around the state. The manatee mini poster was updated with new graphics and most BPSM publications were updated for content. The Manatee News Quarterly newsletter continues to be popular with over 400 individuals receiving the publication. **Figure 5** above shows monthly information requests—it does not reflect the newsletter mailings or the materials sent to the tax collection offices in Florida's 67 counties. ❖

Figure 4 - 2001-2002 Information Requests



Education staff at Citrus County Manatee Festival

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 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. Currently, ACEE has four projects nearing the end of the 2001-2002 grant cycle, and four projects selected for the 2002-2003 grant cycle.

ACEE - Grant Program Ending 2001

The organizations selected for support enter into fixed-cost, performance-based contracts with the Florida Fish and Wildlife Conservation Commission.

- **Brevard County Natural Resource Management Office** produced and installed 12 manatee and boating safety educational kiosks at Brevard County public boat ramps. The objective of the project was to educate boaters concerning actions they can take to reduce manatee injury and mortality. The kiosks contain manatee regulatory information, protection tips and information for reporting dead or injured manatees. Safe boating practices and litter reduction on waterways were also emphasized. (Due to unsettled speed zone regulations in Brevard County during this grant cycle, all phases of the kiosks were completed except the center speed zone panels. The center panels contain information about monofilament recovery and recycling.) Total project cost: $79,472; ACEE grant amount: $67,680. (See samples of kiosks on page 24, 25)

- **Charlotte Harbor Environmental Center** developed and conducted the Charlotte/DeSoto Third Grade Manatee Program aimed at educating all third-grade students and their teachers in those two counties about manatees, seagrass habitats and man-made threats to their well-being and continued existence. The program included the Manatee Fantasea road show, incorporating a video tape and a puppet show to educate students. After the presentations, children designed and produced informational brochures distributed in new resident packets. In addition, a workshop on manatees and seagrass habitat was offered to third-grade teachers in Charlotte and DeSoto counties. A total of 1,758 third graders participated. Total project cost: $13,995; grant amount: $13,259.

- **Diane Wilkins Productions** produced a Manatee Education Program consisting of two videotapes. The project aimed to increase understanding and awareness among residents and visitors of the importance of coastal and related freshwater ecosystems to the survival of the manatee. One video conveys basic information on manatees, including threats to their continued survival, and shows their significance as a part of the state's natural ecological heritage. The other video focuses on specific safe boating practices and proper boating and personal watercraft techniques in manatee areas. The goal was to reduce boating-related manatee injuries and deaths by educating the public. Volunteer organizations, boating safety class providers, and the Florida Fish and Wildlife Conservation Commission disseminated the videos for use throughout the state. Total project cost: $52,452; grant amount: $44,800.

- **ECOES Consulting, Inc.**, developed Learning the Links. The program increased public awareness of the link between human population growth and development and coastal habitat degradation and fragmentation. After surveys to determine the level of knowledge of the target audience groups, educational messages were developed to educate local citizens and area visitors about the implications of their actions, whether positive or negative, on coastal habitats, manatees, human health and the community's quality of life. Various media, such as brochures, restaurant table-top displays and placemats, newspaper inserts, presentations and eco-tours were utilized to deliver the messages to a maximum number of people. A Web site contains more detailed information. The final phase of the project evaluated the effectiveness of the educational effort in changing people's perceptions, attitudes and personal actions. Total project cost: $57,560; grant amount: $49,000.

- **Florida Department of Environmental Protection/Southeast District** provided the Waterway Signs and Manatee Awareness Program. The program educated citizens about the importance of coastal estuarine ecosystems utilized extensively by manatees, and encouraged responsible watercraft operation to reduce

(Continued on page 26)

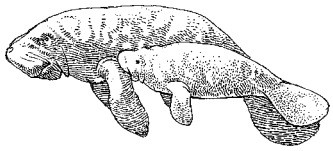


Table 2: ACEE FUNDED PROJECTS

(Projects 1-9 ended in 2001)
(Projects 10-13 will end in 2002)

	GRANTEE	PROJECT	AMOUNT FUNDED
1	Brevard County Natural Resource Office	Manatee and Boating Safety Educational Kiosks	$67,680
2	Charlotte Harbor Environmental Center	Charlotte/DeSoto Third Grade Manatee Program	$13,259
3	Diane Wilkins Productions	Manatee Education Program (2 videos produced)	$44,800
4	ECOES Consulting, Inc.	Learning the Links (pop. growth & coastal health)	$49,000
5	Florida DEP/Southeast District	Waterway Signs and Manatee Awareness Program	$34,543
6	Manatee Observation and Education Center	Targeting Seagrass Conservation and Manatee Protection	$33,660
7	DEP St. Martins Marsh Aquatic Preserve	Citrus County Boater's Guide and Manatee Awareness Outreach	$53,645
8	Tampa BayWatch, Inc	Tampa Bay Manatee Watch project	$64,978
9	Tampa Electric Company	TECO Manatee Viewing Center at Apollo Beach Outreach	$41,500
10	SFRPC contract with CHEC	Manatee Fantasea Program	$14,500
11	Lee County Natural Resources Division	Boater Education Kiosks	$16,425
12	FMRI Tampa Bay, Inc. Assessment	Manatee Watch education program	$76,285
13	Brevard County Nat. Res. Mgmt. Office	Monofilament Recovery & Recycling Program (MRRP)	$34,694

watercraft-related manatee injuries and mortality. Methods applied included a 30-second television public service announcement produced in both English and Spanish, two-sided waterproof placards on boating safety in relation to manatee and habitat protection and a boater's guide for Lake Worth Lagoon. Overall, the program was successful at increasing knowledge, changing attitudes, and self-reported changes in behaviors. Total project cost: $57,075; grant amount: $34,543.

- **Manatee Observation and Education Center** in Ft. Pierce developed the project Targeting Seagrass Conservation and Manatee Protection in St. Lucie County. The project educated a diverse audience about the environmental and economic importance of seagrass habitats. It also promoted critical thinking, problem-solving and decision-making skills with regard to safe boating, seagrass habitat and water-quality improvement. Selected eleventh and twelfth grade students from the St. Lucie County International Baccalaureate program were trained as interns to develop curricula about habitat conservation. The students educated ninth and tenth grade students, sixth to twelfth grade teachers, certified boating safety class participants, sportfishing clubs, guests at local inns, and Sea Scout groups about manatee and habitat protection and personal responsibility. As a result of this project, target audiences increased their knowledge by 13 percent, experienced positive attitude changes of 6 percent, and behavior changes of 4 percent, in addition to other positive outcomes. Total project cost: $57,860; grant amount: $33,660.

- **St. Martins Marsh Aquatic Preserve** (FDEP) implemented the Citrus County Boater's Guide and Manatee Awareness Outreach program. The project focused on the importance of seagrass habitats to manatees and other species, and actions community members may take to minimize negative impacts to this habitat. Five educational kiosks were placed at locations of high waterway usage. In addition, a laminated boater's guide for Citrus County was produced and distributed at planned local businesses and outreach events. Program evaluation included written surveys distributed with the guide, oral interviews at kiosks, a random community survey and comparisons of manatee-related boating citations before and after the kiosk installations and boater's guide distribution. Total project cost: $66,045; grant amount: $53,645

- **Tampa BayWatch, Inc.**, in cooperation with the Florida Marine Research Institute, launched the Tampa Bay Manatee Watch Project. The project educated boaters about safe boating practices in an effort to reduce watercraft-related injuries and mortality of West Indian manatees in the Tampa Bay area. The three-year project gathered pertinent data on boaters during its first year. This second-year phase involved boater education in defined boating locations, with selected materials partly based on year one's research. Local boating activity was monitored during this phase of the project. In order to enlist strong community support for manatee protection, stewardship through

waterfront neighborhood homeowner's associations was promoted. Total project cost: $182,769; grant amount: $64,978.

◆ **Tampa Electric Company (TECO)** improved its educational outreach efforts at the TECO Manatee Viewing Center at Apollo Beach. Through a variety of strategies, including brochures, signage, on-site educators, volunteer training and community involvement, Tampa Electric educated center visitors about the plight of the manatee and the importance of a healthy seagrass habitat to manatee survival. This program incorporated numerous partners, trained 79 educators, involved 213 students from nine schools, and reached over 500,000 secondary participants through community events or program outreach. Total project cost: $162,300; grant amount: $41,500.

Melbourne Kiosk (Brevard County)

ACEE Funded Projects 2001-2002

◆ **Southwest Florida Regional Planning Council** contracted with Charlotte Harbor Environmental Education Center to conduct their "Manatee Fantasea Program" to 45 Lee County third grade classrooms. The Lee County program is based on the Charlotte/ DeSoto Third Grade Manatee Program, aimed at educating third-grade students and their teachers about manatees, seagrass habitats and man-made threats to their well being and continued existence. The program included the Manatee Fantasea road show, incorporated a videotape and a puppet show to educate students. After the presentations, children designed and produced artistic informational brochures that were delivered to Lee County Department of Natural Resources for use at informational boat ramp kiosks. In addition, a third grade teacher workshop on manatees and seagrass habitat was offered to Lee County third grade teachers. Total project cost: $19,000; grant amount: $14,500.

◆ **Lee County Environmental Services, Natural Resources Division** will complete a project designed to help reduce the incidence of watercraft mortality for manatees in Lee County. Boaters will be educated about existing waterway regulations affecting vessel speeds and will learn main and minor channels for vessel travel. Thirteen kiosks will be produced and installed at boat ramp facilities located throughout Lee County. These sites are adjacent to waters inhabited by manatees as well as various species of marine life and the aquatic submerged vegetation vital to manatee survival. Effectiveness of the kiosks will be measured through verbal surveys at selected sites. In addition, increased compliance with speed zones and use of marked channels is expected to result in the reduction in countywide manatee injuries and watercraft related deaths and damage to seagrasses. Total project cost: $32,734; grant amount: $16,425.

◆ **Florida Marine Research Institute** will assess the Tampa BayWatch, Inc. Manatee Watch education program by monitoring boating activities to determine if boating patterns have changed and by conducting telephone surveys to determine if boater intent has changed. The primary project objectives include: 1) identifying the most effective educational approaches for influencing boaters' attitudes toward manatees and 2) improving the process for assessing education efforts applied toward manatee protection. Total project cost: $100,760; grant amount: $76,285.

◆ **Brevard County Natural Resources Management Office** will contract with Midwest Research Institute–Florida to conduct an environmental education project entitled "Monofilament Recovery & Recycling Program (MRRP) Dissemination Project." The mission is to reduce the amount of fishing line in aquatic habitats by implementing fishing line

(Continued on page 28)

Port Canaveral Kiosk Sign (Brevard County)

ACEE - (continued from page 27)

recycling and encouraging angler participation. The MRRP Dissemination Project aims to expand the original pilot project target area to include the entire state of Florida and other national and international interests by sharing materials and expertise on a Web site and holding four workshops around the state. Through a previous ACEE grant, Brevard County MRRP successfully demonstrated that with an increase in angler awareness of fishing line recycling there is a corresponding increase in anglers recycling fishing line. During the first year of MRRP, more than 1,400 pounds of fishing line was collected for recycling. The Dissemination Project will share MRRP education and development materials with agencies throughout the state so that fishing line programs can be implemented efficiently and consistently statewide. Total project cost: $40,330; grant amount: $34,694. ❖

FWC Bureau of Protected Species Management Mission Statement:

To protect Florida's manatees, marine turtles and cetaceans and to conserve and manage their habitat to achieve and maintain optimal populations.

Manatee decals are available at your local tax collector's office for a $5 donation. Decals from past years may be ordered from the Bureau of Protected Species Management web site. The artwork for this decal was created by Stephanie Lemos, a middle school student from Jose Marti Middle School in Hialeah, Florida.

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

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