

SAVE THE MANATEE TRUST FUND
FISCAL YEAR 1995-1996
ANNUAL REPORT



Florida Department of Environmental Protection
Division of Marine Resources

December 1, 1996



Florida manatees are marine mammals that inhabit the coastal and riverine waters of the state throughout the year. They have been listed by the Federal government as an endangered species because of low population numbers and the uncertain future of their habitat. The largest animals in the population may reach fourteen feet in length and weigh almost 3800 pounds, but most individuals are shorter and smaller. Manatees are herbivores (eating aquatic plants), and are not aggressive towards humans. Female manatees usually give birth to a single calf measuring about three to four feet in length; calves remain with their mothers for up to two years. The recovery of the manatee population is impeded by the high numbers of mortalities from human-related causes -- e.g., from collisions with watercraft, becoming trapped in flood gates and locks, and becoming entangled in fishing gear.

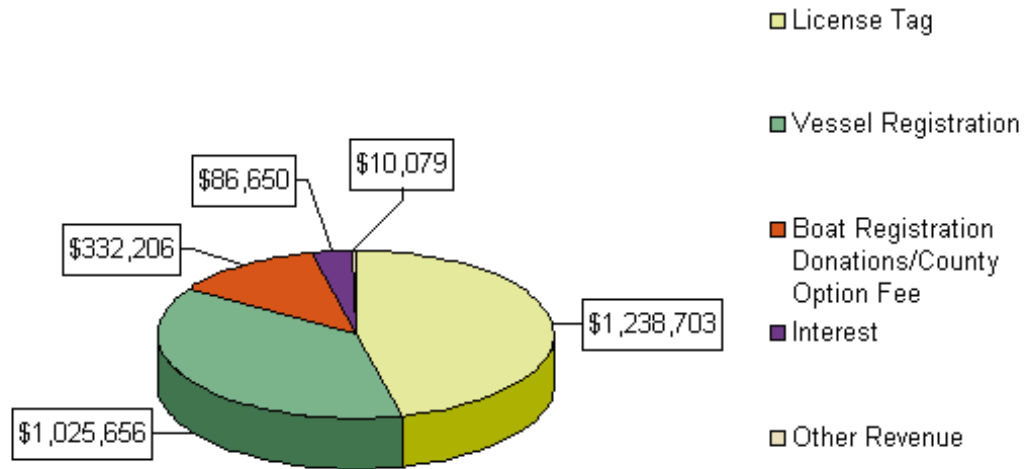
Protection of manatees in Florida has been legislatively mandated since 1892, following depletion of the population by settlers in the 1800's. The cornerstones of current state efforts to recover the population are the Florida Manatee Sanctuary Act of 1978 and the revised Florida Manatee Recovery Plan of 1995. The Florida Manatee Sanctuary Act declared the state to be a refuge and sanctuary for the manatee. The Act and subsequent amendments gave the Department of Environmental Protection (formerly the Department of Natural Resources) the authority to protect manatees from disturbance and harassment, injury, and intentional mortality. The second revised Florida Manatee Recovery Plan lists 126 separate tasks that need to be accomplished to recover the Florida population of the West Indian manatee to a point that it is no longer in danger of extinction. Many of these tasks are specific research and management initiatives that are addressed through a cooperative effort between federal, state, and local governments.

Funding for research and management activities in Florida was authorized through the Save the Manatee Trust Fund, which contains money from sales of a manatee specialty license plate, partial proceeds from state boat registration fees, county-imposed boat registration fees, voluntary contributions, and interest income. Revenues for the Save the Manatee Trust Fund for Fiscal Year 1995-1996 totaled almost \$2.7 million, as shown in the accompanying pie chart. The legislative appropriation for manatee and marine mammal programs in 1995-1996 was allocated to FDEP manatee and marine mammal research and management programs within the Division of Marine Resources, contracts to other research organizations, and oceanaria participating in the rescue and rehabilitation of manatees. Research activities coordinated by the Division's Florida Marine Research Institute in St. Petersburg cost \$1,290,221. Management activities conducted by the Division's Bureau of Protected Species Management, including oceanaria contracts, totaled \$1,714,559. 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 FDEP personnel at the Florida Marine Research Institute and the Bureau of Protected Species Management.

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 Florida Manatee 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 and clean water regulatory controls, assuring that the habitat quality that sustains manatees can be improved and maintained within the State of Florida.

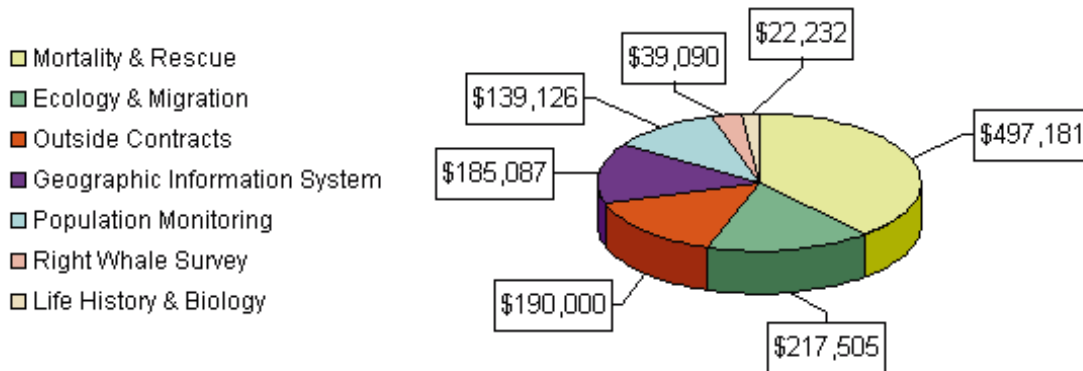
SAVE THE MANATEE TRUST FUND REVENUES

Fiscal Year 1995-1996
Total Revenues = \$2,693,294



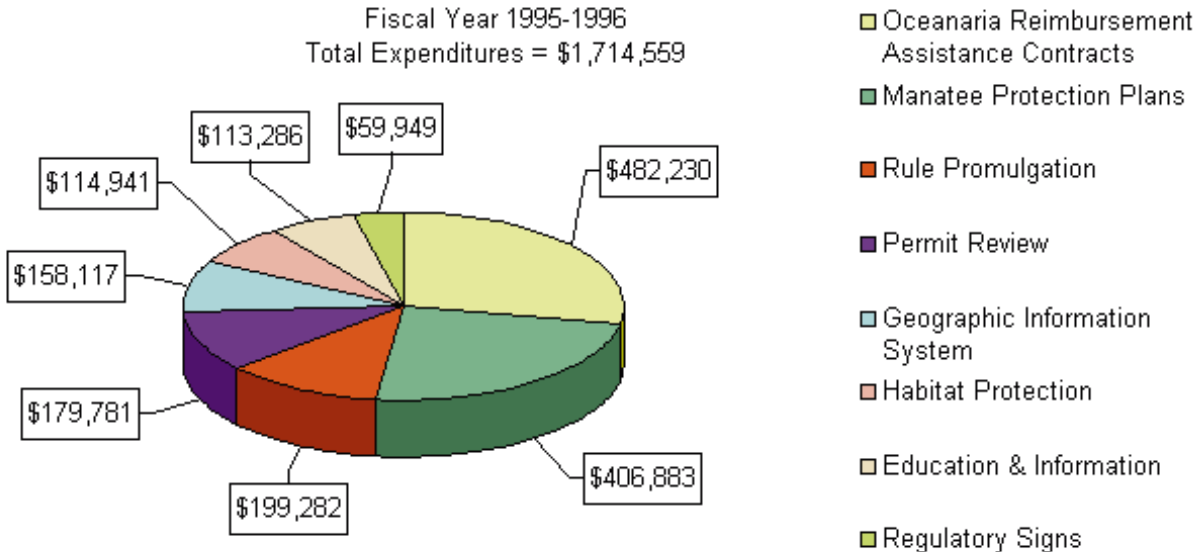
Expenditures for Marine Mammal Research

Fiscal Year 1995-1996
Total Expenditures = \$1,290,221



Expenditures for Management/Implementation

Fiscal Year 1995-1996
Total Expenditures = \$1,714,559



FMRI MARINE MAMMALS RESEARCH

The Marine Mammals Research Program is headquartered at the Florida Marine Research Institute (FMRI) in downtown St. Petersburg. Additional staff are located at the FMRI Marine Mammal Pathobiology Laboratory 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 system (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 manatee mortality network was established in 1974 by the U.S. Fish and Wildlife Service (USFWS) and the University of Miami to collect data on the cause of death for every dead manatee reported in the southeastern United States. The FDEP assumed responsibility for the program within Florida in 1985, and a pathobiologist was hired to direct the entire mortality and rescue program. A Marine Mammal Pathobiology Laboratory (MMPL) was built on the campus of Eckerd College in St. Petersburg with funds from a USFWS Endangered Species Grant and was occupied by FDEP staff in 1993. To determine why manatees die, every manatee carcass that is not badly decomposed is transported inside a insulated trailer to the MMPL for necropsy. Staff of the MMPL also coordinate manatee rescues statewide.

Manatee mortality in Florida for 1995 totaled 201 animals, the highest count since the record high of 206 in 1990, and represents the highest annual mortality in a year when there were no major cold fronts or other singular events. Forty-two animals were killed

in watercraft-related incidents during 1995, seven less than the 1994 total. Although it is encouraging that the number of watercraft-related deaths was lower during 1995, the overall increase in this category over the last six years is cause for concern. Deaths of newborn calves rose from 46 in 1994 to 56 in 1995. That total is the highest during the last 22 years.

During an eight-week period from March through May of 1996, a die-off of manatees (an epizootic event) claimed 158 manatees in the southwest counties of Collier, Lee, Charlotte, and Sarasota. The MMPL along with additional FMRI scientists and numerous collaborators responded to the largest manatee epizootic in history. After exhaustive and thorough research efforts, red tide toxins were implicated as the primary cause of the deaths. The magnitude of the investigation, as well as the national and international media attention, provided a very positive image of the Department and the responsiveness of state government in general. Research continues to determine the mechanism by which manatees are killed by the red tide toxin and to characterize the effect of the epizootic event on the manatee population in southwest Florida.



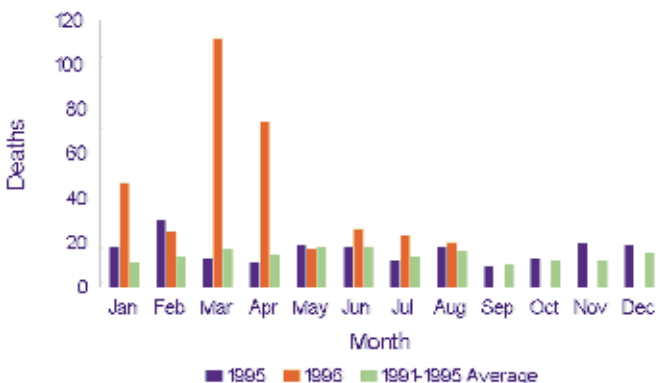
Secretary Wetherell and Governor Chiles with Pathobiology Staff. (l. to r. Dr. Scott Wright, Mark Sweat, Donna Banowetz and Derek Fagone)

1995-96 Highlights:

- Rescues of 57 sick or injured manatees, a record high, occurred from July 1995 through June 1996. Most of the rescued manatees were ill by natural cause or had been debilitated by cold weather. Success in treatment is reflected by the successful release of more than half of the animals. Part of the success was due to the rapid and effective response of the FDEP staff in coordinating and accomplishing the rescues. Of the causes for rescue related to human activity, manatees becoming entangled in crab traps has long been the principal cause.
- A tissue bank was established so that potential pathogens of manatees can be evaluated. This frozen collection of tissues will be critical to understanding potential natural threats to manatees. An agreement to participate in the National Marine Mammal Tissue Bank operated by the National Marine Fisheries Service was also completed. This bank holds representative tissues of manatees so that they can be analyzed as new advances in environmental monitoring and toxicant detection evolve.
- Manatee-specific cell lines were isolated and maintained in culture. These are the only cell lines of manatees known to science. Their value is immeasurable for isolating viruses from manatees as well as for testing biotoxins and other potential threats to manatees.

Florida Manatee Mortality All Causes by Month

1995 vs 1996 to Date



POPULATION MONITORING

Aerial surveys are invaluable in acquiring information on manatee distribution, relative abundance, and use of habitat types. 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.



Despite higher counts during statewide surveys, 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 numbers of deaths in recent years remain a major impediment to the recovery of the species. Continued high rates of mortality from watercraft collisions, habitat loss, and environmental degradation are serious, ongoing concerns.

1995-96 Highlights:

- ♦ Two interagency, comprehensive aerial surveys of manatees were conducted in 1996: January 9-11 and February 17-18. Record counts were taken on both surveys: 2,274 manatees in January and 2,639 in February. Counts were much higher than in previous surveys, primarily due to the excellent survey conditions.
- ♦ Twice-monthly aerial surveys were conducted of manatee distribution in Wakulla County, Tampa Bay, and Lee County. Partial funding was provided for manatee survey flights of Florida Bay conducted by Everglades National Park staff.
- ♦ Eight multi-plane surveys documented manatee distribution during the mortality event. The surveys were conducted from Sarasota to the Port of the Islands in Collier County. Sightings from these surveys were rapidly entered into the GIS system for real-time assessment of manatees at risk during the manatee epizootic.
- ♦ Tests to determine the accuracy of using the Global Positioning System (GPS) for the rapid entry of aerial sighting locations were initiated. GPS is already used to document generalized 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. A telemetry project to track manatees on Florida's west coast was initiated at FMRI in February 1991. 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.



From the start of the project through June 1996, a total of 59 manatees have been tagged and tracked. Wild manatees tagged in Tampa Bay have been tracked as far south as the Ten Thousand Islands in Everglades National Park and as far north as the Suwannee River before returning to the Tampa Bay power plants in the winter. Some of the manatees released back into the wild from rehabilitation facilities are also tagged to monitor the success of their reintroduction. As the database of tagged-animal locations and behaviors grows, patterns are beginning to emerge about migratory routes around Tampa Bay and along the Gulf coast. Areas of high use, habitat preferences, and individual activity patterns are also being documented. The data acquisition phase of the project is scheduled for completion in December 1996, after which the data will be analyzed and a final report generated.

1995-96 Highlights:

- ♦ During 1995-96, between 10 and 14 manatees were tagged at any time. One tagged mature female manatee, Debbie, who wintered in Tampa Bay, quickly moved to the Caloosahatchee River in Lee County in May. She continued upriver, through the lock system, and into the Rim Canal of Lake Okeechobee. Debbie was the first tagged animal during the study to use Lake Okeechobee waters.

- ♦ Lieutenant Governor Buddy MacKay participated in the manatee capture event at the Tampa Electric Big Bend power plant in January. National television crews from CNN, NBC, and ABC, as well as the local television stations, covered the capture event and subsequent field tracking, producing favorable media coverage and increased public awareness.
- ♦ Seven animals rehabilitated from injury or raised in captivity were tagged and tracked. A long-term captive mother, her two-year-old calf, and an adopted orphan were released into Everglades National Park and quickly adjusted to the natural habitats there. Naples, a large female released in July 1994, was observed with a new calf in September 1995. RPM, a juvenile male rehabilitated from a boat strike, was released in the Caloosahatchee River and exhibited behaviors similar to those of wild manatees: he moved into the thermal discharge waters of the FPL power plant after cold fronts and moved into Matlacha Pass to feed during warmer weather. Sweet Pea, an animal rescued during the winter in Houston, Texas, moved from Homosassa Springs to the St. Marks River area south of Tallahassee on release and was usually located in the company of other manatees. Tallahassee staff of BPSM helped in the tracking efforts in northwest Florida.
- ♦ A team composed of telemetry and manatee GIS staff formulated a plan for analyzing data, creating and verifying GIS coverages, and completing project segments that will comprise the final report.

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 scar catalog, use of passive integrated transponders (PIT tags), and non-invasive body condition indices.



The development of the manatee scar catalog program and the Manatee Individual Photo-identification System (MIPS) was innovated by the federal Sirenia Project in Gainesville, Florida. Many individual manatees can be recognized by scars on their bodies and tails resulting from wounds inflicted primarily by power boats. The scar catalog is maintained as a computer database that comprises images, sketches, coded scar features, and sighting data.

FMRI is responsible for managing the scar-catalog data from manatees in areas extending from south of Crystal River to the Everglades on the west coast of Florida. The catalog contains data from scarred manatees found all along the coast, but most of the FMRI data comes from the Tampa Bay, Sarasota Bay, Fort Myers, and Marco Island areas.

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. Following a successful pilot study by FMRI staff, all manatees handled for rescue, rehabilitation, or tagging are now marked using two PIT tags. To help assess the success of reintroducing rehabilitated animals to the wild, all dead manatees are scanned for tags before necropsy.

FMRI staff is conducting a study in which a portable ultrasound device is used to measure blubber thickness. Staff use this measurement and data concerning the manatee's length, weight, and girth to assess the body condition of individual wild and captive manatees. Data concerning animals captured during the telemetry project and animals at oceanaria have been used to establish baseline values that are helpful in assessing whether free-ranging manatees are undernourished and may require care and in assessing whether rehabilitated captives have adjusted properly following reintroduction to the wild.

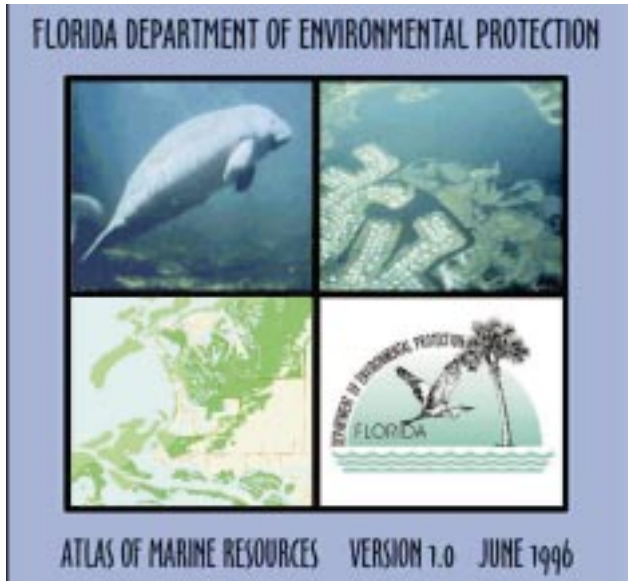
1995-96 Highlights:

- ♦ The FMRI scar catalog consists of approximately 1250 images representing 320 photo-documented scarred manatees. More than two thousand sightings have been recorded. Future goals include incorporating sighting data into the manatee geographical information system (GIS) and expanding research to areas in southwest Florida now surveyed only opportunistically.
- ♦ PIT tag deployment using the FMRI protocol is now standard procedure at all oceanaria and rescue operations. Tag scanners are available at all field stations so that staff can check for markers in badly decomposed carcasses that are not transported to the MMPL in St. Petersburg.
- ♦ The FMRI body-condition study results have proven effective in evaluating manatees in the field and in a clinical setting. Biologists at the federal Sirenia Project have been trained in this methodology to be used in other regions of the state, not readily reached by FMRI staff.

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. The key to GIS is the ability to combine coverages representing different data themes to pictorially or numerically answer questions relevant to manatees and their environment. The Marine Mammals GIS (MMGIS), initiated in 1986, develops, manages, and analyzes GIS coverages. Coverages developed include: carcass recovery sites, aerial sighting locations, and locations of animals tracked by satellites. Analysis involves understanding the

spatial aspects of manatee abundance and travel patterns. The MMGIS is also a module of the larger Marine Resources GIS which facilitates access by scientists and managers to a wide variety of manatee-related data for use in studying associations of manatee mortality, distribution and abundance, and travel patterns with natural habitat features like seagrass and water depth or human-related features like channels, boat ramps, and warm-water discharges. The MMGIS staff work with both research and management project teams to provide manatee data in GIS format to develop spatial analysis and modeling capabilities for manatee protection and ecosystem management.



1995-96 Highlights:

- ◆ Version 1.0 of the FDEP Atlas of Marine Resources on CD-ROM was completed and made available to GIS users. Compiling this CD, which involved extensive effort, has made considerable data and information from state, federal, and local agencies easily available to organizations involved with manatee protection. The CDs have been widely distributed through the Manatee GIS Working Group and through scientific forum presentations. Annual updates are planned and will include new data layers and additional background material on the data.
- ◆ Databases used to monitor the spring 1996 manatee mortality event in southwest Florida were created, including carcass location, aerial survey results, red tide sampling stations, and basic hydrological data. Numerous maps were prepared for briefings, meetings, and press conferences related to the epizootic event. The GIS served as a primary research tool for the synthesis, visualization, and analysis of spatial biological and environmental data.
- ◆ A new analysis tool to map manatee distribution and abundance from aerial survey data was completed. The fixed-area, flexible-shaped, spatial-filtering algorithm developed by MMGIS research staff was used to create maps of environmentally sensitive areas that could be used by those responding to oil spills and to compare manatee distribution and abundance through time in Tampa Bay. Charlotte County managers will be using this algorithm to aid in determining marina sites.

- ◆ A computer model designed by MMGIS staff for estimating manatee travel routes from satellite telemetry and visual locations is being refined to increase its flexibility for analyses. This flexibility should increase our understanding of how manatees use habitats in relation to time of day, season, or year.
- ◆ Meetings of the Manatee GIS Working Group, with participants from a wide variety of organizations, have been held twice-yearly since 1994 and focus on data and analysis issues. Working Group teams were formed to address data acquisition, data sharing, data-use ethics, and analysis issues. Through these teams, the Group seeks to create an environment where everyone has access to the same data and knowledge about analytical methods is available to all participants.

RIGHT WHALES

In addition to manatee recovery efforts, the FDEP has responsibility for the recovery efforts of other endangered marine mammals, including the northern right whale, *Eubalaena glacialis*, the most endangered of the world's large whales. Even one mortality per year is a significant blow to this endangered species, whose North Atlantic population numbers fewer than 350 individuals. In June 1994, the National Marine Fisheries Service (NMFS) designated three areas as critical habitat, including the Northeast Florida and Georgia coastal waters, the only known calving areas for right whales. NMFS has lead responsibility for recovery of the right whale, but the Department is committed to assisting NMFS in its efforts. These efforts follow tasks set out in the 1991 Northern Right Whale Recovery Plan.



Efforts to protect right whales that use the Florida and Georgia calving area brought about the formation of a multi-agency/citizens advisory group known as the Southeastern U.S. Implementation Team for the Recovery of the Northern Right Whale. 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. In addition, FMRI staff have conducted winter aerial surveys of right whales in Florida since 1987 to monitor the seasonal presence of whales and to determine the number of calves born during the season.

1995-96 Highlights:

- ◆ During the 1995-96 winter season, right whales were documented from Charleston, South Carolina, to Fort Pierce, Florida, and also up to 40 miles offshore of Jacksonville.
- ◆ FDEP/FMRI, the New England Aquarium, and the Georgia Department of Natural Resources documented twenty-one mother and calf pairs and forty-eight other individual right whales (ninety whales) during the winter 1995-96 season. This was an all-time high for both mother and calf pairs and for other individual whales documented in the critical habitat. All but one of the documented whales have been matched to the North Atlantic Right Whale Catalog. The one unmatched whale is new to the catalog; the good news is she had a calf this year and can be added to the small reproductive population.
- ◆ FMRI received a \$20,000 grant from NMFS to assist in right whale recovery efforts. Funding was used for nearshore aerial surveys and for producing informational materials for boaters and the general public. FDEP continues work to establish a ESA Section 6 agreement with NMFS that will provide additional funding for right whale recovery efforts.
- ◆ FMRI and Georgia DNR staff conducted a pilot study of right whale use of offshore habitat in February. NMFS provided an additional \$15,000 directly to the National Oceanic and Atmospheric Administration's (NOAA) Air Corps for aircraft services for the offshore surveys.
- ◆ Five whale mortalities (an adult male, a sub-adult female, and three calves) were documented during the 1995-96 winter. FMRI staff assisted in confirmation, recovery, and necropsy of four right whale carcasses from northeast coastal Florida and southeast Georgia.
- ◆ A right whale component was established as part of the Marine Mammal Geographic Information System maintained at FMRI. The results of right whale aerial surveys and the measurements of oceanic surface water temperature obtained from NOAA weather satellites and of water depth (bathymetry) were all three created as data layers that can be mapped and analyzed with the GIS system.

SCIENTIFIC AND PUBLIC OUTREACH

FDEP/FMRI staff made 14 presentations at the 11th Biennial Conference on the Biology of Marine Mammals, December 14-18, 1995, in Orlando, Florida. These included presentations on manatee telemetry, aerial surveys, population models, toxicology, body-condition indices, photo-identification, right whale aerial surveys, and a keynote speech by FMRI Chief Ken Haddad. The conference was attended by 1500 marine mammal researchers from around the world.

The proceedings volume from the March 1992 Technical Workshop on Manatee Population Biology was published in December 1995. The workshop and the publication, co-sponsored by the FDEP and the National Biological Service, contained 17 scientific papers on manatee population biology, six coauthored by FDEP staff.

BUREAU OF PROTECTED SPECIES MANAGEMENT

The Bureau of Protected Species Management (BPSM), 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 Game and Fresh Water Fish Commission. 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 with the assistance of local governments.

MANATEE PROTECTION PLAN DEVELOPMENT AND IMPLEMENTATION



Comprehensive, multifaceted 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 ecosystems approach to environmental protection. Plans 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 will also address finding solutions to manatee mortality caused by locks, gates, large vessels and ships while reducing any adverse effects that commercial fishing practices have upon manatees. The preferred mechanism to put an MPP into effect is for each local government to append the plan to its comprehensive plan. Priority in developing these plans has been given to 13 key counties where manatee mortality rates and essential habitat protection needs are the greatest. BPSM staff assists with protection planning for counties other than the key counties when requested by a specific local government.

The individual MPP components, such as the boat facility siting policies, must be compatible with local policies and ordinances. In setting policies to safeguard manatees and their habitats, the MPPs also have the effect of increasing the safety of boaters, facilitating recreation 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.

1995-96 Highlights:

- ◆ Adoption of two MPPs - Collier County in July 1995 and Dade County in December 1995. Efforts focus on implementing both plans. The Dade plan can be considered a model in that it provides strong manatee protection throughout the county.
- ◆ In Citrus County, which has an adopted MPP, staff efforts focused on implementing the plan, attending local meetings, coordinating aquatic plant management efforts, and making recommendations on permits. Staff is working with the county and USFWS to develop public information materials; a protection zone brochure is the first priority.
- ◆ Staff worked actively with Brevard, Duval, Indian River, Lee, and Volusia counties to develop MPPs. Martin, St. Lucie and Palm Beach counties are in the information-gathering phase of MPP development. No staff or resources were allocated by these counties for MPP development, so BPSM staff initiated, funded, and managed several grants to provide technical assistance.
- ◆ A grant was obtained to produce a Brevard County video on manatees and a series of "Manatee Minutes" videos to be shown on hotel cable channels and used as PSAs. The videos have received favorable reviews.
- ◆ MPP staff continued to lend support and technical expertise to local governments that were developing local speed zone rules. Some progress was also made in counties where the local governments have asked for the Department's assistance. For example, Charlotte County contracted with the Southwest Florida Regional Planning Council to develop an MPP section for the proposed Marine Resource Protection Plan.

STRUCTURE-RELATED MORTALITY

Structure-related manatee mortality is the second greatest human-caused mortality factor. From 1974 through 1995, 118 manatee deaths were attributed to crushing or drowning in navigation locks or water-control structures (various types of dams or spillways). Historically, the FDEP has taken an active role in coordinating with the Army Corps of Engineers (Corps) and the South Florida Water Management District (SFWMD) to develop solutions to this problem. In the early 1980s, various operational changes were made that appeared to cause the number of structure-caused deaths to decline; however, there were nine structure-related manatee deaths in 1990 and five in both 1992 and 1993. There is speculation that operational changes may not have played as pivotal a role in the lower number of deaths as did overall rainfall cycles. Regardless of the cause, all the involved agencies have recognized that more needs to be done.

Through the actions of the FDEP, an Interagency Task Force was assembled to solve this serious problem. Members include FDEP, USFWS, the Corps, SFWMD, the Service, and Dade County's Department of Environmental Resource Management. The Task Force set a goal of totally eliminating structure-caused manatee mortality. The Task Force recognized that a number of actions

would be needed to reach this goal, the most important of which is the development of technology that would make the locks and water control structures "manatee-safe."



1995-96 Highlights:

- ◆ Structure-caused manatee deaths declined from a record high of 16 in 1994 to eight in 1995. In 1994, six manatees died at the Ortona Lock and Dam. In 1995, only one manatee was killed by this structure, suggesting that the manatee barriers installed by the Corps are working. During the last year, similar barriers were installed at St. Lucie Dam.
- ◆ Participation on the Interagency Task Force continued. Although early designs of manatee protection devices installed on several structures in south Florida were unsuccessful, a prototype of a new design was developed this year and installation is planned for fall of 1996. If the new design proves successful, installations at additional sites will follow.
- ◆ BPSM staff worked closely with the Office of Greenways and Trails to reduce dangers to manatees at the Rodman reservoir. In 1995, two manatee deaths were attributed to the Rodman dam. In response, the FDEP tried to modify the operating schedule of the dam in order to make it less dangerous for manatees. In addition, two aerial surveys were conducted of the reservoir and the Oklawaha River to document the presence of manatees in the system. No manatees were seen during either survey. The Buckman lock, which is the manatees' only entrance to the reservoir, was closed temporarily to prevent manatee entry.
- ◆ A report was prepared that proposed the permanent closure of some South Florida water-control structures as a means of reducing manatee mortality. Staff developed a site specific assessment process to evaluate the possibility of closing individual water control structures. These assessments are based on criteria such as manatee mortality, use of waters around and foraging habitat quality at these sites. This approach is under review by an interagency working group considering such structure closures.

GEOGRAPHIC INFORMATION SYSTEM, STATISTICS, AND GRAPHICS

The BPSM GIS, Statistics and Graphics Section provides BPSM management staff with the most recent marine mammal research data with the cooperation of FMRI staff in St. Petersburg. Most data layers are acquired from FMRI, although data layers are acquired from other government sources, contracts with academic institutions or created within BPSM. All data created by or contracted for by BPSM are provided to FMRI GIS staff for inclusion in the Marine Resources GIS. Graphic materials for presentation are produced using color printers and a 35mm slide maker.

1995-1996 Highlights:

- ♦ The Tallahassee GIS section distributed 297 GIS maps, 238 AutoCAD maps, 137 35mm slides, 53 SAS printouts, and 153 digital data sets. Assistance was regularly provided to other GIS and graphic groups in the Department and within the Division of Marine Resources.
- ♦ BPSM use of GIS data sets increased after all sections of the Bureau were provided access to ArcView GIS software. For data protection and access, all GIS data that can be exported to the PC are stored in triplicate on the Sun workstation, a GIS PC and on a network drive, as well as on weekly backup tapes.
- ♦ Hardware was upgraded to provide additional data storage and backup capability. An old plotter was replaced by a high-resolution ink jet plotter and software package to facilitate faster and more complex plots of GIS maps and graphics. GIS software and the UNIX operating system were upgraded with the latest software editions.

HABITAT CHARACTERIZATION, ASSESSMENT AND PROTECTION

While BPSM efforts continue to focus on reducing the most commonly recognized causes of both juvenile and adult manatee mortality, the Bureau has also addressed a threat that has the potential to cause even greater long-term harm to the species: the reduction of suitable, high quality habitats. A viable population of manatees cannot exist without the natural resources it needs to flourish. As the manatee's habitat requirements are characterized and the threats to these resources are better understood, management efforts to protect these



essential habitats can then be enhanced. Regional habitat protection is best accomplished through coordinated interagency efforts.

Loss of aquatic habitats continues despite the existence of protection measures around the state. Seagrass is a primary marine food source for manatees. Since 1950, coastal development and decreased water quality have resulted in a loss of an estimated 81 percent of the seagrasses historically found in Tampa Bay, an area heavily used by manatees and other marine mammals on Florida's west coast. Areas such as the Indian River Lagoon (IRL), which is also used extensively by large numbers of manatees, have also experienced drastic losses of seagrass habitat. In the IRL alone, 30 percent of the historical seagrass coverage has been eliminated by human activities. 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 continue to increase. The ecosystem management approach requires that the scientific community increase its emphasis on obtaining and analyzing data regarding habitat characterization and preservation. The health of the habitat is important as an indicator of that habitat's ability to sustain a viable population of manatees and other marine species.

1995-1996 Highlights:

- ♦ Manatee habitat resources within the Lower St. Johns River Basin were sampled through a contract with the St. Johns Water Management District and GIS maps were produced. Preliminary information concerning the effects of dock construction on submerged aquatic vegetation (SAV) continued to be acquired, along with data on the dominance of tapegrass (*Vallisneria americana*) in the SAV community.
- ♦ BPSM staff served on the Crystal River Interagency Working Group to establish plans for using aquatic herbicides in Kings Bay and the Homosassa River. Staff also monitors the seasonal reduction of exotic vegetation used as a forage resource by manatees in Crystal River. This phenomenon has occurred for the last three winter cycles and may impose increased stress to the manatee population using this system as a warm-water refuge. Monitoring of manatee numbers and aquatic vegetation abundance has led to the decision to halt all aquatic plant management activity in Kings Bay and the Homosassa River starting October 1, 1996 and continuing through April 1, 1997.
- ♦ BPSM participates in the Blue Spring Interagency Working Group to ensure that manatee habitat in this area will be sustained and monitored on a biannual basis. The group continues to maintain a ban during winter on aquatic plant management activities in the vicinity of Blue Spring from Lake Beresford to channel marker 85 on the St. Johns River.
- ♦ Reviews were prepared for Conservation and Recreational Lands (CARL) and Florida Communities Trust projects in relation to manatee habitat value. To facilitate the CARL project-review process, a matrix ranking system based on features such as feeding areas, accessible water depths, and use patterns was updated. The updated ranking system was then used to evaluate projects that were proposed for inclusion in the 1995 CARL program.

RULE PROMULGATION



Rule promulgation activities focus primarily on establishing comprehensive manatee protection boat speed zones in 13 key counties and in other essential areas. The 13 key counties are Brevard, Broward, Citrus, Collier, Dade, Duval, Indian River, Lee, Martin, Palm Beach, Sarasota, St. Lucie, and Volusia. Besides developing speed zones, future rule-making activities may involve establishing rules to protect essential manatee habitats and regulating the construction or expansion of marine facilities.

To develop a rule addressing manatee-protection needs throughout a county, BPSM staff works closely with that county's staff and the appropriate municipal governments, exchanging and collecting data, conducting site visits, assessing boating activities, and discussing appropriate speed zone measures in light of both manatee- and public-use needs. Staff also coordinates with other agencies, special interest organizations, and parties who may be affected by the zones. The FDEP's Division of Law Enforcement, Florida Marine Patrol (FMP) reviews preliminary recommendations for boating safety and other navigational considerations. Data summaries and associated documentation justifying the rule proposals are then prepared. Documentation includes detailed legal descriptions of the zones, computer-generated maps showing the proposed zones, and an assessment of the potential economic impacts.

Once a rule proposal is formalized for publication, it is offered to all interested parties for comment and at least one public hearing is held within the affected area. All comments received during this period and at the public hearing are carefully assessed prior to finalizing the proposal. Comments may bring about revisions to the proposal that would either increase the restrictions to provide additional manatee protection or decrease the restrictions to accommodate public use or local recreational needs. This rule-development process ensures that the waterways are not overly regulated, but still provide needed resource protection. When a rule is approved, it is filed with the Department of State and becomes effective in 20 days. Plans for posting regulatory signs are submitted and then reviewed by the Florida Marine Patrol. Enforcement of the rule begins as soon as the signs are properly posted. Prior to fiscal year 1995-96, speed zone rules protecting manatees countywide were approved in 12 of the 13 key counties.

1995-96 Highlights:

- ♦ The Broward County rule on manatee protection speed zones, under appeal before the Fourth District Court of Appeals, was ruled to be a valid exercise of the delegated legislative authority in May 1996, after almost two years of hearings and appeals. The decision was not appealed again, and progress on implementing the rule has begun.
- ♦ A rule proposal to establish countywide zones in Lee County was ruled invalid for several reasons related to inadequate justification for specific zones and to declared deficiencies in the economic impact statement. The Department elected not to appeal the decision and instead chose to reassess the situation and develop a new proposal with an anticipated publication date of late 1996.
- ♦ BPSM is currently working on an amendment to the Collier County rule, which concerns the county's manatee protection plan approved in July 1995. While the existing rule establishes speeds for most of the county at 30 mph in channels and 20 mph outside channels (30/20), the revised rule will be more site-specific. Many areas will stay at 30/20 (such as the Ten Thousand Islands area and the back bays), but some areas will be changed to either Slow Speed, or 30 mph in channel Slow Speed outside channel to increase protection. Regulations in other areas such as in the Gulf of Mexico within 500 feet of shore, will be removed.
- ♦ BPSM continued to issue speed-zone exemptions to commercial fishermen and professional guides in accordance with provisions set forth in the specific state and county rules. All exemptions issued during fiscal year 1995-96 were issued with an expiration date of July 1, 1996, so that the Department could continue to evaluate the process. All requests for new or renewed exemptions for the period beginning July 1, 1996, were processed using a revised procedure that went into effect in June 1996.

PERMIT REVIEW



Marine development and activities such as dredge and fill projects, dock construction, boat ramps, marinas, and power boat races can have significant negative effects on manatees and their habitat. Reviewing these projects allows FDEP to eliminate or reduce potential negative effects by making recommendations of special permit conditions, mitigation recommendations, or, in rare cases, permit denials. BPSM staff works with applicants and with other agencies to provide comments and suggest protective recommendations to minimize

potential impacts of proposed projects. In addition to internal coordination within FDEP among the various divisions and district offices, other coordinating agencies include; the Water Management Districts, Port Authorities, regional planning councils, local governments, Department of Community Affairs (DCA), USFWS, U.S. Coast Guard and the Corps.

During the past year, implementation of the new permitting process known as Environmental Resource Permitting (ERP) was emphasized. As a result, several ERP activities were delegated to the Water Management Districts including some permits for marina facilities. The Environmental Protection Agency has delegated the federal NPDES permitting responsibility to FDEP. BPSM has begun coordination of reviews for NPDES permit renewals for power plant effluents and discharges of warm water regulated by FDEP's Division of Water Facilities.

1995-96 Highlights:

- ♦ Staff performed 347 manatee-impact reviews, and comments were sent to the appropriate agencies. Of these reviews, 47 were deemed "critical" because of their size, location, complexity, or potential to impact manatees or their habitat.
- ♦ Staff worked with personnel from South Florida, St. Johns River, and Southwest Florida Water Management Districts concerning the use of the Manatee Impact Review Guidelines. These Manatee Impact Review Guidelines were also incorporated into the Division of Environmental Resource Permitting standard operating procedures. Specific manatee "guidelines," or a version of our standard manatee construction conditions, were drafted at the request of the legislature to accompany a statute change for an exemption.

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 continues to participate in the development of public service announcements, television messages, brochures, teachers' guides, posters, pamphlets, and informational and marketing displays for public educational purposes.

1995-1996 Highlights:

- ♦ Public interest in Florida's manatees is growing steadily. BPSM regularly receives requests for information about manatees from all over the world. Informational brochures are developed and reprinted on a regular basis. Additional educational materials are distributed to specific user groups, and presentations to school children and museum groups are handled as time and staffing allows.
- ♦ More than 1,000 requests were answered from individuals, teachers, or other educational staff. To highlight Manatee Awareness Month in November, E&I staff mailed materials to environmental educational groups around the state.

- ♦ New informational materials were developed. One of the most popular handouts is the "Commonly Asked Questions About Manatees, Manatee Protection Rules, and Funding Sources." Three other handouts were developed and distributed: *Seagrasses Found in Florida*, *Manatee Fact Sheet*, and *Where are the Manatees?*
- ♦ BPSM promotion of the Manatee license tags increased during the year. A marketing intern developed five different ad slicks and distributed them to various publications around the state. Three radio public service announcements were also recorded.
- ♦ The Voluntary Contribution Campaign occurred during June 1996 in conjunction with the renewal of boat registrations. County tax collection offices provide a manatee decal to each person who donates \$5.00 or more to the Save the Manatee Trust Fund. More than \$80,000 in donations were collected in June. A portion of these funds goes to the oceanaria facilities (Lowry Park Zoo, Miami Seaquarium and Sea World) engaged in the rescue, rehabilitation, and release of wild manatees. A *Manatee Decal Collection* brochure was also introduced that advertises the decals from previous years to interested manatee supporters. Each year, the E&I staff selects artwork for a new manatee decal from submissions to a contest held in October. The decal information is also accessible from the FDEP Internet homepage.
- ♦ E&I staff obtained funding from the Florida Advisory Council on Environmental Education for additional manatee educational materials. Funding of \$107,000 was available for updating and reprinting some existing materials, designing new posters and a travel activity sheet, developing boater's guides for Citrus and Brevard counties, and producing a manatee education video for Dade County.



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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.