



Mike Knox

# SAVE THE MANATEE TRUST FUND 2007–2008 ANNUAL REPORT



Florida Fish and Wildlife  
Conservation Commission

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# FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

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# SAVE THE MANATEE TRUST FUND

Annual Report  
2007-2008



**Florida Fish and Wildlife Conservation Commission**  
620 South Meridian Street  
Tallahassee, FL 32399-1600

<http://MyFWC.com>

SUBMITTED BY

**FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION**

Fish and Wildlife Research Institute

and

Division of Habitat and Species Conservation



# Executive Summary

The Florida Fish and Wildlife Conservation Commission (FWC) is pleased to submit this annual report on the expenditures from the Save the Manatee Trust Fund (Trust Fund). The report covers the period from July 1, 2007 through June 30 2008. As required by Florida law, §379.2431(4)(b), Florida Statutes (F.S.), the report is provided to the President of the Florida Senate and the Speaker of the Florida House of Representatives by December 1, each year. The Trust Fund receives money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. It is the primary source of funding for the state's manatee-related research and conservation activities. Revenues for Fiscal Year (FY) 2007–2008 totaled \$3,760,716. Appropriations from the Trust Fund for the same period were \$3,849,763.

In FY 2007-2008, the Division of Habitat and Species Conservation expended \$989,528 for management and conservation activities and the Fish and Wildlife Research Institute expended \$1,761,403 on research and monitoring. In the pages that follow, we provide details of these expenditures and highlight specific accomplishments.

The Florida manatee is native to the rivers and coastal waters of the state. First protected legislatively in Florida 1892, today it is protected by the Florida Manatee Sanctuary Act (§379.2431(2), F.S.) and federally by both the Marine Mammal Protection Act and the Endangered Species Act.

In December 2007, FWC Commissioners voted to approve the first state Manatee Management Plan (Plan). A FWC team developed the Plan over the course of 18 months and received extensive stakeholder and public review. The Manatee Forum, a group of 22 stakeholders, met to discuss the Plan on two occasions. The FWC received

over 15,000 written or email comments on the Plan. At the December 2007 Commission meeting, representatives from fishing groups, marine industries, and conservation groups all supported the Plan and recommended approval; the Plan was unanimously approved by the Commission. At the same meeting, the Commission decided not to reclassify the manatee as threatened as had been proposed by an independent scientific review panel. This was, in part, based on concerns expressed by the public, scientists, and some environmental groups, that the Commission's listing rule was inadequate. Instead, the Commissioners elected to maintain the manatee's classification as endangered and directed staff to reexamine the process used to classify imperiled species and report back with options for possible changes.

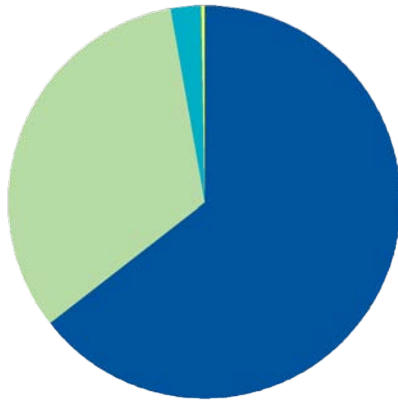
The goal of the Manatee Management Plan is to remove the manatee from the state imperiled species list and effectively manage the population in perpetuity by securing habitat and minimizing threats. The Plan includes many tasks that are deemed necessary in order to conserve manatees, with a planning horizon of five years. While there is considerable public debate on where the manatee should be placed on the state imperiled species list, and specifically, debate on what it should be called – endangered or threatened - there is also strong consensus and agreement on the importance of protecting and conserving this unique Florida native species. The Plan lays out a course of action that, if fully implemented, will secure the long-term survival of the manatee. In future years, this annual report will serve as a way to measure our progress in implementing the conservation measures called for in the Plan. While many challenges remain, the FWC is optimistic about the future of the manatee in Florida.



# Trust Fund 2007–2008 Revenues and Expenditures

## REVENUES

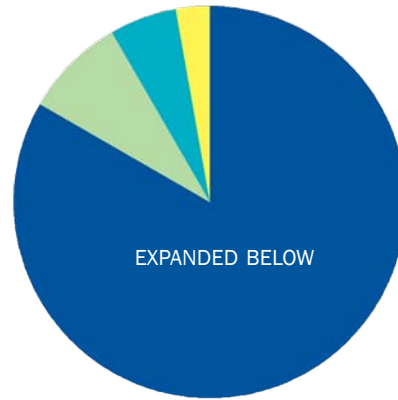
\$3,760,716



- Vessel Registration (\$2,428,058)
- Save the Manatee License Plate (\$1,232,564)
- Decals and Donations (\$87,244)
- Interest (\$10,085)
- Miscellaneous (\$2,765)

## APPROPRIATIONS

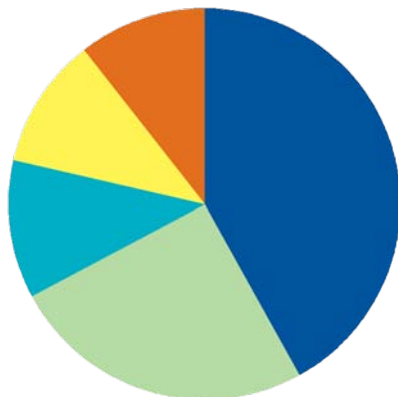
\$3,849,763



- FWC Manatee Program (\$3,206,352)
- Mote Marine Laboratory (\$325,000)
- Administrative Overhead (\$215,145)
- Service Charge to General Revenue (\$103,266)

## FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES

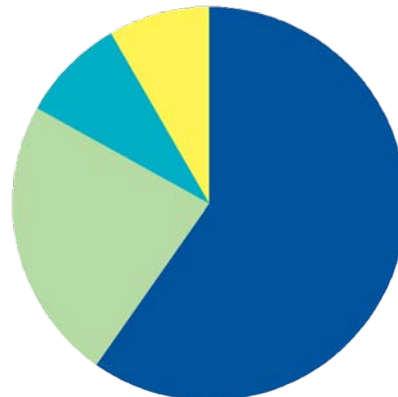
\$989,584



- Planning and Permitting (\$415,050)
- Rule Development (\$248,896)
- Habitat Protection (\$113,381)
- Education and Information (\$106,880)
- Data Distribution (\$105,377)

## FWC MANATEE PROGRAM RESEARCH EXPENDITURES

\$1,761,403



- Mortality and Rescue (\$1,053,435)
- Population Assessment and Monitoring (\$409,920)
- Photo Identification (Life History) (\$151,476)
- Behavioral Ecology (\$146,572)





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	Human Dimensions
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	Mote Marine Laboratory Manatee Research Projects

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# Manatee Basics



**COMMON NAME** Florida manatee

**SCIENTIFIC NAME** *Trichechus manatus latirostris*

**STATUS** Endangered (federal and state)

**RANGE** Throughout Florida (summer months into southeastern states but reported as far north as Cape Cod and as far west as Texas)

**MAXIMUM CENSUS** 3,300 counted in 2001

**HISTORY** A native species found in the fossil record and recorded by earliest explorers

**DIET** Freshwater and marine species of plants

**REPRODUCTION** Breed year-round; most calves born in spring; mature female can produce one calf approximately every three years, rarely twins

**LIFE SPAN** Can live over 50 years, but this is rare

**UNUSUAL FACT** Age determined by counting growth layers in a thin cross section of the earbone, similar to counting rings in a tree

## A CLOSER LOOK

Adult manatees average 8-10 feet in length and weigh around 1,000 pounds. The largest manatees may reach 14 feet in length and weigh over 3,500 pounds. Adults are gray in color, with sparse hairs distributed over much of the body. Algae growing on the skin may make them appear green or brown. Manatees that live in saltwater may also have barnacles growing on their skin. Stiff whiskers (vibrissae) grow around the face and lips. Despite their large size, manatees can be difficult to see in the wild because of their color and behavior. Manatees eat a variety of marine and freshwater aquatic plants and are often seen near natural or artificial freshwater sources.

During periods of cold weather, manatees aggregate, or gather, in waters warmer than 68° F. This warm water may be in south Florida or may be from an artesian spring or industrial discharge. Manatees mate year-round; however, most calves are born in the spring. Gestation lasts approximately 13 months and results in the birth of a calf (rarely twins) measuring 3-4 feet in length. The calves remain with their mothers for up to two years.

There are a variety of threats to manatees. They may die from exposure to harmful algal blooms (red tide), the effects of cold weather, and disease. Human-related causes of death include collisions with watercraft, crushing in water control gates and boat locks, and entanglement in fishing gear. Manatee habitat loss or degradation, including future changes in artificial warmwater refuges and reductions in natural spring flows used as refuges, is also of concern.

# Manatee Management Plan



Mike Knox

A major achievement for this year was the completion of the Florida Manatee Management Plan. The Plan was approved at the December 2007 FWC Commission meeting. Work began in summer 2006, with the Plan being drafted by a team of seven staff from across the agency with assistance from many other staff who contributed their time and talents to the effort. Significant stakeholder and public input assisted staff in developing a comprehensive blueprint for manatee conservation. The final document includes 267 pages and provides a detailed listing of tasks with timelines for both research and management activities. In addition, extensive appendices provide the general history of the program, legal framework and case summaries, support documentation for various management actions, compilations of available manatee data, and an extensive list of published research on manatee related topics.

This management plan provides an overview of the myriad programs, initiatives, and strategies implemented to protect and conserve manatees and their habitat. The overall conservation goal of the Plan is:

***“To remove the manatee from the state imperiled species list and effectively manage the population in perpetuity throughout Florida by securing habitat and minimizing threats”***

Humans have radically altered manatee habitat in many ways: dredging canals, inlets, and bays; damming rivers; introducing

non-native plants; inadequately protecting seagrasses; and through proliferation of artificial warm-water discharges. All of these human actions likely have had some effect on the distribution and seasonal abundance of manatees. However, historical records indicate that, before these alterations, manatees ranged throughout Florida and into other southern states. Accordingly, the Plan calls for the management and conservation of manatees across Florida, from Nassau County to Monroe County on the Atlantic coast; from Monroe County through the Florida Panhandle on the Gulf coast; and in the numerous rivers of interior Florida, including the St. Johns and Suwannee river systems and the Okeechobee waterway.

While the Plan considers the statewide population, it is helpful to monitor and evaluate the progress of management actions on a regional basis. To ensure manatees thrive in all parts of Florida, the Plan divides the state into four management units: the Atlantic, the Southwest, the Northwest, and the Upper St. Johns River. The latest population models indicate that the manatee population is growing in three out of the four management units, with the population in southwest Florida likely declining.

The primary objectives of the Plan upon which the individual tasks are based are:

- Implement improved methods to estimate manatee population and trends
- Reduce the human-caused mortality rate by reducing human-caused threats
- Develop and implement plans to address future changes in power plant operation

- Assist in the development of minimum flow rules at Florida springs
- Enhance management practices to secure seagrass and freshwater vegetation
- Use measurable biological goals to measure progress toward recovery

Implementation of the many tasks described in the Plan will require the cooperation of many state agencies, the federal government, local governments, and the private sector. The FWC will not be the lead agency on some critical tasks, such as setting minimum flows and levels of springs, which is a responsibility dependent upon implementation by the respective water management districts (WMDs). Inclusion of tasks which the FWC is not the lead agency in this plan constitutes a commitment that the FWC will work to influence and assist the responsible agencies to accomplish the targeted tasks.

The Plan also relies on the ongoing acquisition of manatee-related data and the transfer of those data into information and knowledge, in order to support science-informed decisions and to guide management actions. The major areas of focus are:

- Speed zone review
- Improve enforcement efforts
- Improve permit review process
- Review and development of county-level Manatee Protection Plans
- Secure warm water resources
- Monitor and protect seagrass
- Retrofit water control structures
- Launch new outreach initiatives

Overall, the primary focus of research and management efforts over the past 35 years has been to understand, control, and eliminate, where possible, human-caused manatee mortality. The best available science indicates that increasing adult survival rates has a profound impact on manatee population

growth. The responsibility for human-caused mortality is ours, and there is more opportunity for controlling and mitigating these factors. Therefore, efforts to reduce risks from watercraft collisions, structure-related deaths, and other human-caused mortality factors will continue.

To reduce or eliminate the threat of extinction for manatees, the FWC and its partners must implement the many tasks described in the Plan. However, radical changes to existing manatee conservation measures are not necessary to accomplish the conservation goal and objectives of the Plan. We are confident that with adequate funding, cooperation, and the application of science-informed management, we can continue to make strides in manatee conservation.

Copies of the Plan can be downloaded from the Commission Web site: <http://myfwc.com/imperiledspecies/plans/Manatee-Mgmt-Plan.pdf>





## Research Activities

*Mortality and Rescue*

*Population Monitoring and Assessment*

*Behavioral Ecology*

*Human Dimensions*

*Right Whales*

*Research Publications and Reports*

*Mote Marine Laboratory Manatee Research Projects*



# Mortality and Rescue

research activities



A network of researchers and law enforcement agencies was established in 1974 to recover manatee carcasses and assist injured manatees. In 1985, the responsibility of the manatee carcass salvage, necropsy, and rescue program was transferred to the State of Florida by the U.S. Fish and Wildlife Service (USFWS) and therefore now rests largely with FWC’s Fish and Wildlife Research Institute (FWRI).

FWRI staff members from five coastal field stations retrieve all reported carcasses. These stations are located around the state: Jacksonville, Melbourne, Tequesta, Port Charlotte, and St. Petersburg. Most recovered carcasses are transported by field

personnel from recovery locations to FWRI’s Marine Mammal Pathobiology Laboratory (MMPL), in St. Petersburg. Staff at MMPL perform consistent, high quality, post-mortem examinations to determine cause of death. Information gained through carcass salvage and manatee rescue and rehabilitation is crucial to providing wildlife managers with information about manatee health, mortality factors, life history, and general and reproductive biology. Through this work, FWRI significantly contributes to the evaluation of threats facing Florida manatees and provides crucial information to resource managers and partner agencies.

## 2007–2008 highlights

### Carcass Salvage

- Statewide, there were 305 manatee carcasses documented in Florida (an additional two carcasses were documented in South Carolina, two in Georgia and one carcass was found in Louisiana) during FY 2007-2008. All but six were recovered and examined. (see figure 1)
- Researchers collected tissue samples for genetic analysis from 301 carcasses. Other tissues were collected for toxicology, histology, and aging studies and for external researchers.

Manatee Mortality FY 2007–2008	
Cause of Death	Number of Deaths
Human – flood gate or canal lock	1
Human – other (entanglements, etc.)	6
Human – watercraft related	80
Natural – cold stress	19
Natural – other (includes red tide)	49
Perinatal (total body length less than 150 cm or about 5 feet)	79
Undetermined (decomposed or other)	65
Carcasses Not Recovered	6
<b>Total Carcasses July 1, 2006 – June 30, 2007</b>	<b>305</b>

Figure 1



## 2007–2008 highlights, continued

- No “Unusual Mortality Events” were declared during FY 2007-2008. However, for the first time, multiple manatee deaths were attributed to the red tide toxin on the east coast of Florida. From the end of October 2007 to early January 2008, 11 red tide-related carcasses were recovered from the waterways between Volusia and Indian River counties. An “Unusual Mortality Event” involves a significant number of unexpected deaths in a marine mammal population in a localized area and/or during a discreet period of time.
- MMPL staff members conducted several necropsy training workshops and classes for the following groups:
  - Veterinarians and students from the multi-institutional and international Envirovet Program (<http://www.cvm.uiuc.edu/envirovet>)
  - Veterinary students from the University of Florida (UF) Seavet I Program, (<http://conference.ifas.ufl.edu/ame/seaveti/index.html>)
  - Veterinary students from the non-profit Marine Veterinary Medicine Program (<http://www.marvet.org>)
  - Biologists from the Puerto Rican Department of Natural and Environmental Resources
  - Veterinary students from the UF Senior Clerkship course (VEM 5810)
  - National Oceanographic and Atmospheric Administration’s National Marine Fisheries Service (NOAA Fisheries Service)-Prescott Stranding Program

### *Rescue and Rehabilitation*

- Eighty-four rescues were performed statewide during FY 2007-2008. As of June 2008, 47 of these rescued manatees were released back into the wild, 14 died, and the remaining 23 animals were still being rehabilitated in facilities around the state. (see figure 2)

Manatee Rescues FY 2007-2008	
Type of Rescue	Number of Rescues
Calf—Alone	9
Calf—With Rescued Mother	3
Mother of Rescued Calf	2
Human—Entanglement	27
Human—Entrapment *	5
Human—Watercraft Related	11
Natural—Includes Red Tide	27
Total	84
* includes power plant intake canals, irrigation canals, weirs, culverts, man-made canals, man-made lakes, etc.	

Figure 2



# Population Monitoring and Assessment

*research activities*

**F**WRI scientists use a variety of methods to assess and monitor the current and future status of the Florida manatee population. Population assessments currently include conducting manatee counts at winter aggregation sites, distributional aerial surveys to determine regional distribution of manatees and to assess habitat use, and estimating survival, population growth, and reproductive rates through photo-identification and the potential application of genetic markers. Assessments also include estimates of risk to the population, including projected declines in population size and probability of persistence into the future (i.e., risk of extinction).

The FWC traditionally uses two types of aerial surveys to monitor manatees. These surveys provide minimum counts and information about habitat use and seasonal distribution. Statewide synoptic surveys provide a count of manatees at known aggregation sites and other sites in winter. These surveys are conducted annually to meet §379.2431(4)(a), F.S., requiring an, “impartial scientific benchmark census of the manatee population in the state.” The counts, conducted 24 times since 1991, are flown after cold fronts, when animals aggregate at natural springs and thermal discharges from power plants. The traditional synoptic survey design yields minimum counts of the number of manatees using these warm-water sites and is dependent on specific weather conditions. Additionally, these methods are impaired by detection and availability biases and therefore no statistical estimates of population size are possible. On a regional basis, FWC uses distribution surveys to determine the seasonal distribution and habitat use of manatees. These surveys usually are flown twice monthly in specified counties for a period of two years.

Currently, researchers are developing new aerial survey techniques that will provide precise and reliable estimates of distribution and population size. These new methods and

resultant data will contribute to models that incorporate information about how well observers detect manatees from the air and will relate environmental variables to the number of animals counted by observers. In FY 2007-2008, distribution surveys incorporating the new survey methods were conducted in Collier County. Traditional data were collected and the results from the new methods currently are being analyzed. A separate pilot study to test new methods for the statewide synoptic survey was flown in winter 2008 in southwest Florida. These methods are not as dependent on cold weather as traditional methods are to be successful. Data are being evaluated and results will be used to inform and refine the design for an improved statewide survey design. Details are described in the “Monitoring Activities” and “Ongoing and Future Research” sections of the Manatee Management Plan (<http://myfwc.com/imperiledspecies/plans/Manatee-Mgmt-Plan.pdf>).

Information on manatee life history is essential for assessing manatee population dynamics and recovery. Specifically, long-term data on growth and survival of individuals, reproductive performance of mature females, and health of manatees are important to the development of reliable population models. These data are gathered using a variety of research tools such as photo-identification of distinctly scarred individuals. Manatee photo-identification is a research technique that uses the unique pattern of scars and mutilations on a manatee’s body and tail to identify individual animals over time. The scars usually are the result of encounters with boats, but they can be caused by entanglement in fishing gear and by infections. This research is conducted through a partnership between FWRI, the United States Geological Survey (USGS) Sirenia Project, and Mote Marine Laboratory (Mote). Partners work collaboratively to photograph Florida manatees throughout their range, pro-

cess images, identify manatees, and manage an integrated sightings database, known as the Manatee Individual Photo-Identification System (MIPS). These data provide insights into manatee movements, site fidelity (i.e., the tendency to return to the same location year after year), adult survival rates, and reproductive parameters such as calving intervals and length of calf dependency.

Critical data gaps still exist in Florida manatee population assessments. In particular, vital statistics have been difficult to estimate for Florida manatees in southwest Florida through photo-identification because of poor photographic conditions, animal accessibility, and other extrinsic factors. Three demographic parameters are in need of refinement to better model manatee status and recovery: annual reproductive rates, annual gender-specific

movement probabilities between the northwest and southwest regions, and gender-specific adult survival rates in the southwest region. Genetic testing offers a complementary means of identifying individual manatees and its application could greatly enhance existing monitoring and assessment studies. The Manatee Management Plan identified the need for optimal genetic tissue-sampling protocols for free-swimming manatees in order to implement a robust genetic identification program for the above-described monitoring applications. Sampling devices were tested this year on captive and free-ranging manatees. A comparative analysis of two sampling devices and various field collection strategies was conducted and an evaluation is underway. The results of the evaluation will help plan genetic field sampling work to be performed during winter 2009.

## 2007–2008 highlights

- The annual statewide manatee synoptic survey was not conducted this winter due to above average temperatures and no significant cold fronts. According to the National Weather Service, La Niña conditions in Florida lead to winter temperatures well above average.
- A preliminary survey to test new methods for the statewide synoptic survey was flown in February 2008. Six counties in southwest region of the state (Tampa Bay to Monroe County) were flown and data were compiled and currently are being analyzed.
- Twice-monthly distribution surveys in the northern part of Collier County were completed in June 2008.
- In August 2007, FWRI held an aerial survey safety workshop to improve the safety of FWC aerial observers.
- FWC staff members and interns spent over 150 days conducting land- and boat-based photo-identification research during over 530 visits to sites used by manatees in the Tampa Bay area and southwest Florida. Additionally, other FWC volunteers, outside organizations, and field lab staff across the state spent over 180 days documenting manatees during over 280 visits to sites used by manatees. Over 20,000 images documenting the unique features of individual manatees were taken and archived.
- Twenty-six manatees meeting specific photo-documentation criteria were added to the southwest portion of the MIPS catalog of uniquely identifiable animals.
- In a continued effort to transition to a digital platform, FWC completed the scanning and archiving of all manatee carcass slides. Over 43,000 slides dating back to 1980 have been scanned. This will facilitate photo-identification of these carcasses to known animals.
- In FY 2007-2008, 16 manatee carcasses were identified as previously known southwest MIPS animals. Two of those identifications were confirmed based on Passive Integrated Transponder (PIT) tags, which are subcutaneous tags that uniquely identify animals and can be detected by a special scanning device.
- Genetics research was conducted that compared sample collection methods on live manatees.

# Behavioral Ecology

*research activities*



**R**esearch on manatee use of Florida's coastal and riverine habitats is essential to understanding the resources required to recover and sustain a healthy population. By tracking the movements of individual manatees in fresh, brackish, and saltwater habitats, FWC biologists obtain valuable information about manatee seasonal and daily movement patterns, migratory behavior, site fidelity, diving behavior, and habitat requirements.

To track manatees, researchers place a padded belt around a manatee's tail and tether a floating radio-tag containing a satellite-linked transmitter to the belt. The satellite-derived locations provide a detailed record of manatee movements over long periods. In the field, biologists locate these study animals by homing in on the tag's unique radio and ultrasonic signals in order to obtain data on behavior, group size, habitat, and movements. Processed data are mapped in a Geographic Information System (GIS) and are made available to managers for use in devising strategies for manatee conservation and recovery, developing regulations, and evaluating permits.

In FY 2007-2008, the behavioral ecology program continued research studying manatee interactions with motorized watercraft in collaboration with researchers at Florida State University (FSU) and Woods Hole Oceanographic Institution. A thorough understanding of the behavioral and sensory mechanisms underlying manatee-boat collisions is necessary in order to devise effective avoidance approaches. The goal of the project is to create a combined picture of manatee behavior, acoustics, and vessel trajectories so that we can better understand

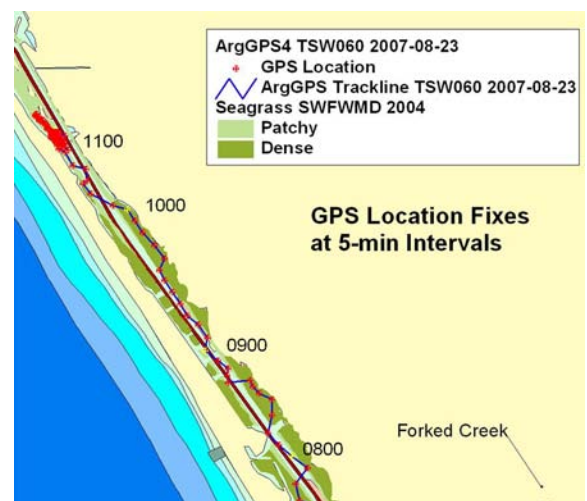
the responses displayed by manatees when approached by boats and the acoustic cues that may mediate such responses.

In FY 2006-2007, work focused on research, development, and pilot testing of a state-of-the-art digital acoustic recording tag ("dTag") designed to record manatee response to vessels. In FY 2007-2008, the first full field season was conducted on tagged manatees in southwest Florida. In addition to the Trust Fund, this project was funded by the FWC Florida Manatee Avoidance Technology Program, the FWC Office of Boating and Waterways, and the Disney Wildlife Conservation Fund.

Habitat is a key factor influencing manatee population dynamics. In particular, warm-water carrying capacity is of great interest to FWC and agency partners because predicted loss of warm-water habitat is deemed a key threat to the manatee population. Current estimates of carrying capacity are based on expert opinion. A conceptual framework of studies to determine carrying capacity is needed, as identified within the Manatee Management Plan. FWRI has worked with management staff and outside partners to advance the development of a conceptual framework for studies to determine warm-water carrying capacity as well as broader warm-water habitat issues. A conceptual framework will help to identify critical information gaps to ensure that limited resources are directed towards the highest-priority research needs. The aim is to place warm-water research in the context of over-arching management needs and to provide a common vision for the future on this important issue.

## 2007–2008 highlights

- FWRI and FSU staff and students carried out an intensive study to quantify the frequency of manatee interactions with motorized watercraft and to characterize manatee response to moving vessels in Charlotte and Sarasota counties.
  - During the summer of 2007 and the spring/summer of 2008, 18 wild manatees were captured and tagged with multi-sensor archival dTags and Global Positioning System (GPS) tags linked through the Argos satellite system. One rehabilitated manatee was also tagged in Biscayne Bay at its release in July 2007.
  - GPS tags provided a detailed record of manatee locations, movements, and habitat use at 5-min intervals for 1-2 months. The dTag provided a continuous 36-48 hr record of sound (ambient noise, vocalizations, and boat noise), and also recorded a suite of behavioral parameters permitting detailed three-dimensional reconstruction of the manatee's movements, behavior, depth, and orientation underwater.
  - A five-person field team tracked the tagged manatees by boat, recording characteristics and paths of passing vessels and manatee responses. Boat-manatee interactions also were videotaped from a circling airplane to provide a clearer perspective on manatee behavior.
  - During the captures, a team of scientists and veterinarians from FWRI and UF assessed the health and body condition of captured manatees to further understand the health of the wild population.
- FWRI researchers from the Ecosystem Assessment and Restoration Section continued to monitor manatee foraging on seagrasses near a major winter aggregation site in Tampa Bay until September 2007. Using a combination of aerial photography, exclosures (restricting manatee access), and biomass cores, this work provides a complete picture of the annual cycle of seagrass biomass, productivity, and coverage area, allowing an evaluation of the degree of seagrass recovery after winter. The research was supported in part by a grant from the Wildlife Foundation of Florida.
  - FWRI participated as a contributing organization to the multi-agency Manatee Rehabilitation Partnership (<http://www.wildtracks.org/Florida/home.html>), consisting of representatives from federal (USFWS, USGS), state (FWC), academic (UF), NGOs (Caribbean Stranding Network, Hubbs-SeaWorld Research Institute, Save the Manatee Club, Wildlife Trust), and private oceanaria (Cincinnati Zoo, Columbus Zoo, The Seas at Epcot, Lowry Park Zoo, Miami Seaquarium, SeaWorld Orlando). As part of that partnership, FWRI staff assisted Wildlife Trust in the release, field tracking, rescue, and health assessments of several rehabilitated manatees.
  - FWRI scientists and Imperiled Species Management Section (ISM) staff, along with partners at USFWS and USGS, have begun development of a carrying capacity research framework that will define habitat carrying capacity for manatees in Florida waters. Prioritized research will yield more robust habitat carrying capacity estimates based on winter warm-water refuge sites and foraging habitat available to regional manatee populations.



# Human Dimensions

*research activities*



**T**raditionally, wildlife resource managers rely on biological data to assess manatee status and set recovery goals. Resource managers then use laws, regulations, and outreach as tools to achieve these goals. Human behavior ultimately determines the success of wildlife management actions. Human-dimension research investigates human use of habitats shared with wildlife and how to apply research results and influence human behavior to achieve cost-effective manatee protection (e.g., increased voluntary compliance with speed zones). Human-dimension research can lead to approaches that allow agencies and citizens to be more effective and work cooperatively on manatee protection issues.

## 2007–2008 highlights

- Staff developed a framework for conducting analyses of risk of collision between boats and manatees. The highlights of this framework are: (1) application of a weight-of-evidence approach, (2) mapping spatial coincidence of boats and manatees, and (3) interpretation of risk based on coincidence and other relevant data. This framework is designed to evolve over time as new knowledge or techniques become available.
- In a cooperative effort with ISM, staff completed a preliminary risk analysis of collisions between manatees and boats, using Brevard County as the test area. Using aerial surveys of manatees and of boats, the emphasis was on mapping the extent that manatees and boats occupied the same areas.
- Staff initiated a refinement of the map of manatee distribution used in the above mentioned coincidence studies. The new method, called a “distance-limiting spatial filter”, was developed based on an analysis of existing telemetry data collected on manatees and resolves some previous processing problems.
- Staff initiated a regional assessment for Volusia, Brevard, and Indian River counties. This is a GIS-based synthesis of information spanning the given area to improve our understanding of the complex relationships between humans and manatees. Staff compiled, mapped, and interpreted data describing manatee habitat and movement, manatee distribution and abundance, mortality, and boating patterns.

# Right Whales

research activities



In addition to manatee recovery efforts, FWC is involved in recovery efforts for other endangered marine mammals, including the North Atlantic right whale, *Eubalaena glacialis*, one of the most endangered of the world's large whales. Most of this work is supported through grant funding provided by the NOAA Fisheries Service; however, portions of some salaries are provided by the Trust Fund. Efforts to prevent human-caused mortality in this species have been increased. Even one death per year has a significant effect on the population, which is estimated to number fewer than 400 individuals. In 1994, NOAA Fisheries Service designated portions of Florida and Georgia coastal waters as critical habitat for the right whale. This region is the only known calving ground of the North Atlantic right whale. FWC is dedicated to assisting NOAA Fisheries Service in its efforts to protect the North Atlantic right whale as outlined in the 2004 revision of the North Atlantic Right Whale Recovery Plan.

Federal and state efforts to protect right whales in the critical habitat have resulted in the formation of the Southeast U.S. Right Whale Recovery Plan Implementation Team (SEIT), a multi-agency and citizen advisory group. The team develops management and research recommendations and assists in implementing the recovery plan. FWC has been a member of the SEIT since its 1993 inception and FWRI staff have chaired the team for the past six years.

Since 1987, FWRI staff have conducted numerous aerial surveys to monitor seasonal presence of right whales, determine the

number of calves born, and possibly mitigate ship-whale collisions. Over the past several years, FWRI has worked closely with federal, state, and NGO partners to compile years of calving ground aerial-survey data into GIS format. Analyses of these spatial data will help scientists better define right whale distribution patterns in the southeast calving grounds in relation to human activities and environmental factors, such as sea surface temperatures and bathymetry (water depth).

In an attempt to prevent ship strikes, which can kill or injure right whales, NOAA Fisheries Service and the U.S. Coast Guard implemented the Mandatory Ship Reporting System (MSRS) in July 1999. Under the MSRS, all commercial ships greater than 300 gross tons are required to report when entering the area surrounding the designated critical habitat off the coasts of Florida and Georgia between November 15 and April 16 (the calving season). Upon entry to the region, ship captains are required to report vessel position, speed, and destination into the MSRS. Once the MSRS server receives a report, a message providing information about recent right whale locations and advisories is relayed to the ship. FWRI aerial survey staff report whale sightings into the MSRS and transmit sighting information to mariners as part of an Early Warning System (EWS) designed to protect right whales from vessel collisions. As part of the EWS, FWRI coordinates a whale-alert network that notifies key agencies, ports, and mariners via email, text message, or pager when and where right whales have been sighted. This timely information allows ships to take evasive action if necessary to avoid whales.

Recently FWRI has developed the infrastructure and processing systems to take advantage of a new technology called the Automatic Identification System (AIS) that provides expanded vessel data. Transponder-equipped vessels use shipboard GPS to precisely determine vessel characteristics such as position and speed and broadcast this information via VHF. FWRI has established receiving stations that provide coverage of important right whale habitat and has

standardized processing methods to convert the raw signals into usable GIS data. On-going analyses include characterization of vessel traffic patterns, including compliance with NOAA Fisheries Service recommendations.

Together, data on whale distributions, habitat variables, and vessel traffic provide a framework for quantifying the risk of vessel collisions and the effectiveness of proposed management plans.

## 2007–2008 highlights

- Twenty-three mother/calf pairs were documented during the 2007-2008 North Atlantic right whale calving season. FWRI conducted 70 right whale aerial surveys between December 1, 2007 and March 31, 2008. The FWRI team documented 86 right whale sightings consisting of 218 whales (not necessarily unique individuals). Preliminary photo analysis indicates FWRI documented 99 individual right whales (excluding calves). This is likely the highest number of individual right whales documented by FWRI during a single calving season. In addition, the FWRI team documented 68 leatherback sea turtles and a badly decomposed humpback whale carcass (Hubbs-0816-Mn).
- In addition to the aerial survey sightings, FWRI staff documented 10 right whale sightings from land during the 2007-2008 calving season. These sightings occurred opportunistically as well as in response to sightings generated by the public between December 5, 2007 and February 27, 2008. FWRI staff also assisted NOAA Fisheries Service with a verified right whale sighting report off Miami and followed-up with several sighting reports north of Miami subsequent to the initial sighting on March 22, 2008. Responding to land-based sightings gave FWRI staff a valuable opportunity to interact with and offer educational information to home owners and beachgoers along the east coast of Florida.
- Prior to the start of the 2007-2008 North Atlantic right whale calving season, observations of red tide blooms, uncommon to the region, were documented off northeast Florida. By December 2007, the red tide had shifted south and reports of dead manatees, dolphins, turtles, and fish were being reported from New Smyrna Beach to south of Cape Canaveral. The coastal area affected by the red tide overlapped with right whale critical habitat and by mid-December 2007 the presence of right whales in Florida was well documented. On December 20, 2007, the FWRI aerial survey team flew a coastal survey from St. Augustine south to the edge of the designated critical habitat (28°00 N) near Melbourne. Areas of red tide were documented near New Smyrna Beach, Cape Canaveral, and Melbourne. No right whales were sighted during the flight.
- FWRI staff participated in three disentanglement responses during the 2007-2008 calving season.
  - Eg#3333, juvenile male right whale: On January 29, 2008, FWRI staff responded to the location of an entangled right whale, off Jacksonville. FWRI staff participated in the development of a disentanglement plan, but difficult sighting behavior and long dive times



## 2007–2008 highlights, continued

- made tracking Eg#3333 difficult. Despite efforts by the FWRI aerial survey team and on-water response vessels from Georgia and Florida, Eg#3333 was lost. However, On May 7, 2008, Eg#3333 was sighted in the Great South Channel (Massachusetts) by the NOAA Fisheries Service aerial survey team and appeared to be gear free.
- Eg#3530, juvenile male right whale: On January 29, 2008, Eg#3530 was observed by the New England Aquarium aerial survey team with numerous fresh wounds believed to have been caused by an entanglement. Due to the nature of his injuries, Eg#3530 was the target of several aerial and vessel documentation attempts throughout the 2007-2008 calving season. The last of these attempts occurred on February 20, 2008, when FWRI along with NOAA Fisheries Service and University of Florida staff responded to document Eg#3530 by using a thermal imaging camera. The FWRI aerial survey team was the last team to site Eg#3530 in the southeastern U.S. on February 21, 2008. Since March 28, 2008, Eg#3530 has been sighted several times feeding in Cape Cod Bay by the Provincetown Center for Coastal Studies and his injuries continue to heal.
  - Eg#3346, juvenile male right whale: Since his birth in 2003, Eg#3346 has been sighted each winter in the southeastern U.S. calving ground. As a yearling, Eg#3346 was the target of a large scale disentanglement effort during the 2003-2004 calving season and since then has been observed with a small portion of remaining gear wrapped around his right flipper. The FWRI aerial survey team sighted Eg#3346 on February 11 and 12, 2008. On February 15, 2008, FWRI staff responded by vessel to further document Eg#3346's health status and entanglement. Analysis of the photographs revealed Eg#3346 to be in good health and his entanglement status continues to be classified as "monitor".
- FWRI staff participated in the retrieval and subsequent necropsy of two North Atlantic right whale calves (Hubbs-0803-Eg and FWRI-EgNEFL0802), a juvenile fin whale (Hubbs-0814Bp), and a badly decomposed adult humpback whale (Hubbs-0816Mn) between January and March 2008. Both right whale calves (neonates) were determined to have died from complications at birth.
  - FWRI staff in collaboration with Georgia Department of Natural Resources staff and NOAA Fisheries Service conducted 31 right whale biopsy sampling trips which resulted in 24 biopsy samples collected from 23 individual whales. The skin samples will be used to generate information on kinship, individual identification and gender, stock identity, and genetic variability within the population. The blubber portion of the samples will be used to determine contaminant levels and to gain information about feeding ecology and nutritional condition.
  - FWRI staff worked with partners on assessing relative risk of ship collisions via statistical modeling. The manuscript, "Bayesian hierarchical model for evaluating the risk of vessel strikes on North Atlantic right whales in the southeastern United States" was prepared and submitted for publication. Risk analyses help support decision making aimed to mitigate the impacts of vessel traffic on right whale populations.



# Publications

research activities



Steve Bradley

## 2007

Deutsch, C. J., H. H. Edwards, and A. J. Smith. 2007. Manatee winter movements and attendance patterns at a warm-water refuge as revealed by Argos-linked GPS tags. Pages 4-5 in *Manatee Habitat Workshop: Proceedings of the Manatee Habitat Workshop*, Delray Beach, Florida, November 30 and December 1, 2004. Edited by J. A. Valade, N. Adimey, W. Perkins, K. Smith, R. Mezich, C. Taylor, and D. Ferrell. U. S. Fish and Wildlife Service. [Abstract]

Deutsch, C. J. and P. Carlson. 2007. Florida manatee foraging behavior and effects on seagrass communities around a winter warm-water refuge. Final Report to the Wildlife Foundation of Florida. Grant No. CWT0506-01. FWC/FWRI file FCWT0506-01-F. 83 pp.

Deutsch, C. J., C. Self-Sullivan, and A. A. Mignucci-Giannoni. 2007. *Trichechus manatus*. In: IUCN 2007. 2007 Red List of Threatened Species. <[www.iucnredlist.org](http://www.iucnredlist.org)>.

Edwards, H. H., K. H. Pollock, B. B. Ackerman, J. E. Reynolds, III, and J. A. Powell. 2007. Estimation of detection probability in manatee aerial surveys at a winter aggregation site. *Journal of Wildlife Management* 71:2502-2060.

Flamm, R. O. and M. Mueller. 2007. Development of a process for evaluating habitat-based ESA reclassification criteria of endangered marine mammals: manatees

as a case study. Phase 1: Database development. Report submitted to the Marine Mammal Commission. 66pp.

Morris, J. K., S. K. Jacobson, and R. O. Flamm. 2007. Lessons from an evaluation of a boater outreach program for manatee management. *Environmental Management* 40:596-602.

Sidman, C., T. Fik, B. Swett, B. Sargent, R. Flamm, and J. Gorzelany. 2007. Greater Charlotte Harbor. A comparative spatial analysis of mail and aerial survey derived boating data. Florida Sea Grant publication, NOAA Award Number NA05NOS4191074. 31 pp.

## 2008

Tringali, M.D., M. C. Davis, M. A. Rodriguez-lopez, E. E. Bolen, J. G. Sullivan, E. M. Haubold. 2008. Simultaneous use of the X- and Y-chromosome genes SMCX, SMCY, and DBY for sex determination in the Florida manatee (*Trichechus manatus latirostris*). *Marine Mammal Science* 24:218-224.

Tringali, M.D., S. Seyoum, S.L. Carney, M.C. Davis, M.A. Rodriguez-Lopez, J.E. Reynolds III, E. Haubold. 2008. Eighteen new polymorphic microsatellite markers for the endangered Florida manatee, *Trichechus manatus latirostris*. *Molecular Ecology Resources* 8:328-331.

# Mote Marine Laboratory Manatee Research Projects

*research activities*



The Legislature annually appropriates \$325,000 from the Trust Fund for the Manatee Research Program at Mote Marine Laboratory. The following projects were funded in FY 2007-2008:

- Photo-Identification Studies of Manatees in Southwest Florida-- The objectives of this project were to: 1) ensure that Mote's photographic catalog and data are thoroughly checked for quality and completeness and are shared with partner organizations (FWRI and USGS-Sirenia); and 2) continue field work to perpetuate the long-term photo-identification and other data collection efforts in southwest Florida.
- Manatee Rescue and Verification—Mote acts as a federally-registered partner in the manatee carcass salvage and rescue program. Mote researchers are permitted to verify carcasses and assist in rescues of injured or trapped manatees, primarily in Manatee and Sarasota counties.
- Program Oversight—Programmatic oversight includes salary and operational support for the program leader who is responsible for periodic reports, coordination with state scientists and managers for activities associated with manatee recovery planning, and oversight of manatee research projects conducted by Mote.



# Management Activities

*Management Activities*  
*Plan and Permit Review*  
*Rule Administration*  
*Data Distribution and Technical Support*  
*Habitat Characterization, Assessment and Protection*  
*Outreach and Information*



Ash Engineering

# Management Activities

*management activities*



## *Manatee Forum*

For this fiscal year, the Manatee Forum met once in August to discuss the future direction of the Forum and to identify possible efforts that could be cooperatively undertaken. During this meeting, discussions centered on the future work of the Forum. The major focus of discussion concerned the potential loss of law enforcement positions due to state budget cuts. All Forum members expressed support for maintaining law enforcement positions. No other meetings were held during this fiscal year. Forum members were provided copies of new publications related to manatees and notices of relevant information during the year. The Forum members were active participants providing feedback to staff on the state's Manatee Management Plan both with written comments and attendance at Commission

meetings where the Plan was considered for approval. The agency continues to believe in the importance of having a stakeholder group focused on manatee issues. The benefit provided by the interactions among the members and with agency staff has been immeasurable and will continue in the future.

## *Federal Recovery Team Working Groups*

In September 2007, the USFWS held a meeting to officially disband the federal Manatee Recovery Team. During the meeting, an overview of accomplishments of the various working groups was presented. The USFWS awarded all the members with certificates of appreciation for their work on the teams on behalf of manatee recovery.

# Plan and Permit Review

*management activities*

ISM staff conduct reviews of county Manatee Protection Plans (MPP), environmental resource permits, submerged lands leases, and various types of planning documents such as local government comprehensive plans.

ISM permit reviews and MPP efforts are coordinated closely with USFWS. The USFWS participates in the development of county MPPs and provides concurrence with FWC approvals of county MPPs. Because MPPs are implemented by both the FWC and USFWS during reviews of projects, this results in more predictable outcomes for applicants. It also increases efficiencies in permit reviews for counties with approved plans, while still providing protection for manatees and their habitat.

## *Manatee Protection Plans*

Manatee Protection Plans are one tool that can assist in the long-term protection of manatees

and their habitat. County-specific MPPs include descriptions of manatee use in the county, boat facility siting strategies, habitat protection and enhancement, manatee-specific education and information programs, and waterway-use regulations. Indirectly, MPPs also may increase boating safety, facilitate recreational planning, and protect aquatic habitat critical to many other species. MPPs may take several years to develop because of the complexity of issues a county must address and the range of information that must be collected. Under §379.2431 (2)(g) F. S., 13 specific counties are required to develop county-wide manatee protection plans. These counties are: Brevard, Broward, Citrus, Collier, Duval, Indian River, Lee, Martin, Miami-Dade, Palm Beach, Sarasota, St. Lucie, and Volusia. As of July 1, 2008, all of the 13 counties have state-approved MPPs. In addition, Clay County voluntarily completed a comprehensive MPP which received state approval in 2006.

## 2007–2008 highlights

- Broward and Palm Beach counties both finalized their MPPs and gained state approval in 2007. This involved extensive coordination with USFWS during the review and approval process.
- ISM staff initiated discussions and attended meetings with Collier and Duval counties related to future MPP revisions.
- In November 2007, ISM staff attended a multi-agency meeting in Pinellas County with county staff and USFWS to discuss future manatee protection strategies in response to recent denials of federal permits in that county.
- In March 2008, ISM staff held the annual coordination meeting of the 13 MPP counties. Volusia County hosted the annual

meeting in Deland. The meeting included discussions of new information relevant to these counties and provided opportunities for them to share strategies and provide feedback to FWC on local efforts to implement MPPs. The implementation of the newly-approved Manatee Management Plan was discussed, particularly regarding how the counties may be affected.

- ISM staff reviewed comprehensive MPP amendments for Brevard, Hillsborough, and St. Lucie counties.
- ISM staff provided technical assistance to the Town of Ponce Inlet and Daytona Beach staffs as they worked to finalize ordinances to incorporate the provisions of the Volusia County MPP.

## Permit Reviews

The Department of Environmental Protection and the WMDs are responsible for issuing state environmental resource permits and submerged lands leases for activities related to coastal development that may impact Florida's wetland resources. These agencies request assistance in reviewing such activities to determine potential impacts to manatees and their habitat. ISM staff provides recommendations to reduce or eliminate potentially adverse effects of proposed projects. Part of that process may include requests

for additional information regarding the project. Once enough information is provided, staff can finalize their recommendations to the permitting agencies or decision making board. These final comments can range from relatively standard recommendations to more critical recommendations. Staff routinely assists applicants and agency processors in understanding the manatee implications of a particular project and, when appropriate, suggest modifications to improve the project design in consideration of manatee impacts.

## 2007–2008 highlights

- FWC met with USFWS staff in November 2007 in Tallahassee to discuss coordination on permit reviews for manatee impacts and law enforcement coordination. The meeting included the FWC Executive Director and the Southeast Regional Director for the USFWS.
- Staff continued to participate in revising an agency-wide environmental commenting process.
- Throughout the year, ISM staff worked extensively with the USFWS and the U.S. Army Corps of Engineers (USACOE) to revise the federal consultation process for assessing potential manatee impacts of projects (also referred to as the “Manatee Key”).
- Staff attended meetings related to large-scale port projects in Broward and Duval counties.

Projects Reviewed FY 2007-2008	
Type of Project	Number of Reviews
Requests for Additional Information	489
Standard Comments (including miscellaneous correspondence)	283
Critical Comments (projects with significant impacts to manatees)	36

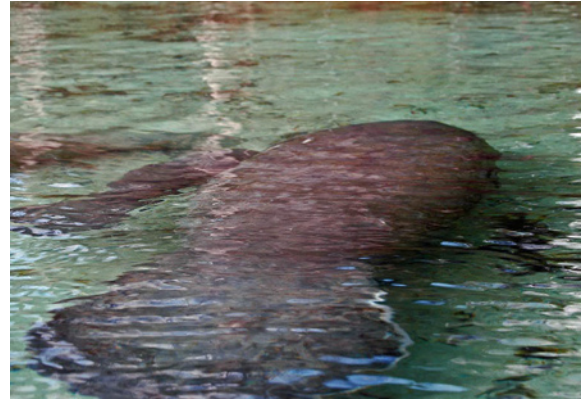


Ash Engineering



# Rule Administration

*management activities*



Mike Knox

ISM staff oversees promulgation of manatee protection boat speed and access rules and administers activities related to these zones, including permit and variance reviews. Staff evaluates data and develops proposed rules for consideration by the Commission and also reviews and comments on local manatee protection ordinances developed by city and county governments.

## 2007–2008 highlights

### *Brevard County (68C-22.006, FAC)*

Staff from ISM and FWRI continued work to develop new tools to use in a re-evaluation of an informal petition submitted by a local boating group requesting changes to some of the existing zones. The petition provides staff the opportunity to test new evaluation tools that may be useful in future evaluations around the state. New aerial surveys of boating activity, which began in April 2006, were completed in September 2007. Staff also developed and posted a web-based survey to collect information on current and historical water-sport activities in the county. The survey was available from September 18 through December 3, 2007, and generated 83 responses. Much of staff's work to date has focused on developing an analytical approach that uses aerial survey data to investigate spatial coincidence of manatees and boats. Preliminary results were presented to the local boating group in February 2008 and discussions with the group are ongoing. Staff is continuing to investigate alternative ways of processing both the manatee and boating aerial survey data for use in this and other analyses.

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

In mid-2007, an advisory board for the City of Crystal River convened to discuss the need for additional manatee protection zones in the Kings Bay area. One option considered was to request an amendment to the FWC rule. ISM staff attended one of the early meetings in July and provided additional information to the board. The advisory board made recommendations to the City, and in August 2007 the City passed a resolution asking the USFWS to look in to a number of issues and also requesting that the FWC consider a year-round Slow Speed zone in Kings Bay. The FWC replied to the City in October 2007 by stating FWC would be willing to consider the change to the zones when the entire Citrus County rule is reviewed in the future, but also suggesting the City could accomplish the same result by adopting a local ordinance. The City Council did consider a local ordinance but ultimately voted against the new speed zone.

### *Duval County*

In June 2007, the City of Jacksonville adopted a city ordinance to conform its local manatee protection zones to the FWC zones as amended in January 2007. The FWC formally approved the ordinance in July 2007.

### *Hillsborough County*

In mid-2007, Hillsborough County formed a task force to consider a possible “pole and troll” zone in the Little Cockroach Bay area (between Cockroach Bay and the Little Manatee River) as a part of county efforts to develop a seagrass management plan. ISM staff traveled to Ruskin to attend one of the task force meetings and participated in another meeting by conference call. To date, Hillsborough County has not taken any action proposing local speed zones or requesting FWC to consider rule action.

### *Lee County (68C-22.005, FAC)*

A boating citation was issued in August 2007 for violation of speed zones in Lee County. The citation was contested in county court. A hearing was held in November 2007 and continued until February 2008, at which time the court upheld the citation and assessed a fine. Another boater currently is contesting in county court a citation issued in January 2008. An initial hearing was held in April 2008, but it was continued until August 2008.

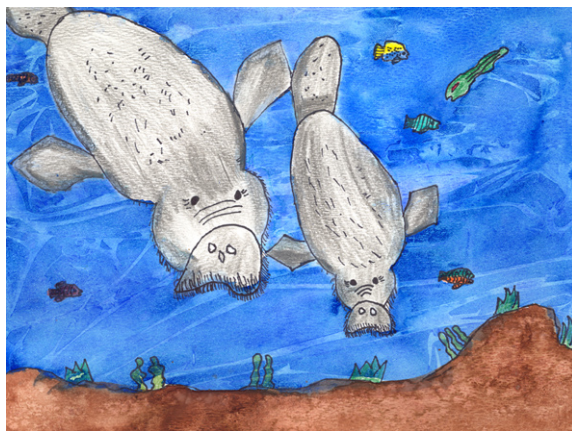
### *Sarasota County (68C-22.026, FAC)*

Review of this rule is identified for action in the Manatee Management Plan. Staff has assessed and acquired the needed data for this task. Internal FWC review of the existing protection zones will begin in the latter half of 2008, to be followed by consultation and coordination with non-FWC parties, including Sarasota County staff, USFWS, and the general public.

### *Variations and Waivers*

FWC staff worked on two requests for variances from manatee protection rules during the fiscal year. The variance and waiver process is governed by §120.542, F.S., and Chapter 28-104, FAC.

- In July 2007, FWC received a petition from the producers of the television show, “CSI: Miami” for an emergency variance from a portion of the Miami-Dade County rule to allow higher speeds during filming of a scene for the television series. A notice was posted on the FWC web site announcing receipt of the petition and opening a 5-day public comment period. One week after receiving the petition, the FWC issued an order granting the request.
- In October 2007, the FWC received a request from a Sarasota-based water ski organization for renewal of a variance allowing higher speeds in order to conduct water ski-related activities in the City Island area of Sarasota County. A Notice of Receipt was published in November and the FWC issued an order granting the request in December 2007.



Daniel Hunt

### *Permits*

Rule 68C-22.003, FAC, allows the FWC to issue a number of different types of permits for activities that would otherwise be prohibited by manatee protection rules. The most numerous of these permits are those that are handled by the Division of Law Enforcement for commercial fishing or professional fishing guide activities. There are typically 150 – 200 of these permits in effect at any given time. Besides these permits, staff worked on four requests for other types of permits during the fiscal year:

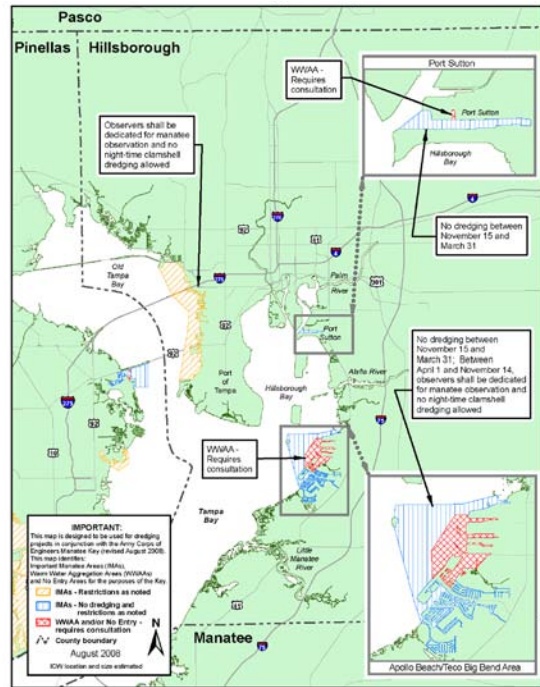


- In March 2007, FWC received a request from Mote for a permit to allow higher speeds in portions of Manatee and Sarasota counties to set nets to capture dolphins, as authorized by a federal permit. After requesting and receiving additional information from Mote, the FWC issued a permit in July 2007.
- In August 2007, FWC received a request from Sarasota County for a permit to allow access to the No Entry zone in Pansy Bayou in order to map seagrasses. After requesting and receiving additional information, the FWC issued a permit in October 2007.
- In October 2007, Mote submitted a request to renew its permit to allow access to the No Entry zone in Pansy Bayou for the purposes of conducting manatee photographic identification and habitat characterization research. The FWC issued a new permit later in the month.
- In March 2008, FWRI submitted a request for a permit to allow access to several of the No Entry zones in southwest Florida in order to conduct research. The FWC issued a new permit later in the month.

# Data Distribution and Technical Support

*management activities*

ISM – GIS staff provides quality data, analysis, and maps to the Rules, MPP, Permit Review, and Habitat managers. With FWRI’s online mapping capabilities and the level of ease that ESRI’s ArcMap® program provides, consultants conduct their own analyses and produce their own maps with data electronically provided by FWC. Staff continues to fulfill numerous data requests for consultants, county agencies, FWC’s Boating and Waterways Section, and the USFWS for shapefiles of manatee protection zones, and telemetry and aerial survey data.



## 2007–2008 highlights

- Revised the maps for the “Manatee Key” and produced shapefiles. These are used by staff for permit reviews.
- Conducted extensive modifications to the FWC manatee website (<http://myfwc.com/manatee/>).
- Continued work on a statewide marine facilities mapping project.
- Continued coordination and mapping of manatee signage and buoys for the Boating and Waterways Section.
- Produced maps for meetings with USFWS for Pinellas and Flagler counties for use in the possible development of MPPs.
- Team member on the FWC Cartographic Standards Committee.
- Provided or created educational graphics for presentations, printed materials, and websites for school materials, manatee decal contest, speed zone maps and brochures, and educational signs.

# Habitat Characterization, Assessment, and Protection

*management activities*



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 manatee habitat. Historically, coastal development has resulted in degradation of water quality and destruction of seagrasses and freshwater aquatic plants - important manatee forage. Ways to minimize negative effects of coastal development are being implemented and new strategies 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 operational changes and existing power plant senescence, also poses possible threats to established artificial warm-water refuges. Understanding the manatee's habitat needs, habitat carrying capacity and assessing habitat health and stability is a primary focus of habitat protection work.

FWC staff coordinated with the USACOE, the South Florida Water Management District (SFWMD) and the Southwest Florida Water Management District (SWFWMD) to address central and south Florida structure-related manatee mortality issues through the Interagency Task Force for Water Control Structures. Structure-related manatee mortality has long been identified as the second leading cause of human-related manatee mortality. Since 1991, the ongoing efforts of the Task Force have led the USACOE and SFWMD to retrofit water control structures and revise their operational protocols. These efforts are having a significant influence

on reducing structure-caused mortality at retrofitted structures. A total of 187 manatees have died as a result of interactions with the numerous water control structures located on the state's waterways. The annual average structure related deaths pre-retrofitting has decreased from 6.5 manatees per year (1974-1999) to a post retrofitting of 3.75 manatees per year (2000 to 2007). Provided that there is continued funding, the few remaining water control structures requiring manatee protection should be retrofitted with proven technology over the course of the next three years.

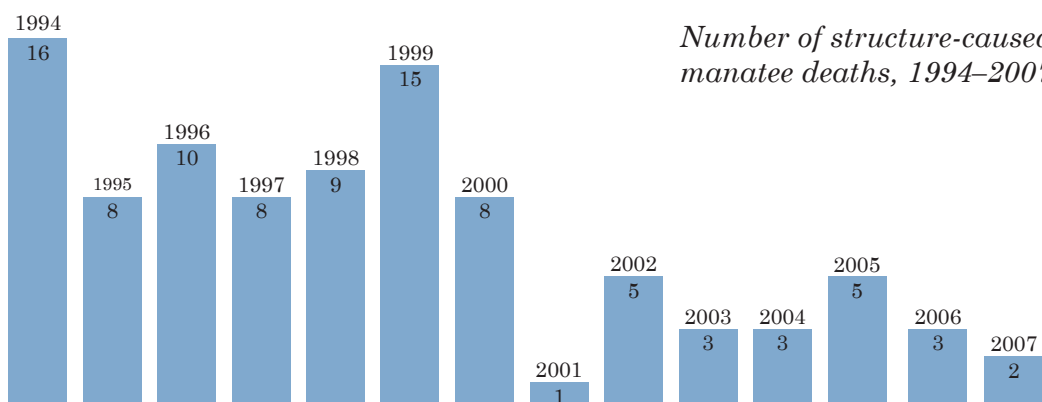
Addressing the long-term future of warm-water habitat is a major focus of manatee conservation. Many tasks related to this issue have been initiated including: 1) meeting with the power companies that produce warm-water discharges used by manatees as warm-water habitat; FWC plans to partner with the industry and others to work on solutions to the potential loss of these warm-water sites; 2) working with the WMDs in the development of Minimum Flows and Levels (MFLs) for spring systems that provide warm-water habitat for manatees (MFLs for Volusia Blue Spring, Manatee and Fanning springs, and the Weeki Wachee Spring system have all been developed using criteria to protect winter warm-water manatee use); 3) updating existing contingency plans to address the unplanned loss of recognized warm-water refuges during the winter months. FWC has also continued to co-chair the Warm-Water Task Force (WWTF) with UFSWS during the past year.

ISM and the Aquatic Habitat Conservation and Restoration sections have continued

working together to address the protection of Florida’s seagrass resources. These efforts have provided recommendations and seagrass protection protocols for coastal construction permits and habitat restoration and monitoring projects in St. George Sound, St. Andrews Bay, and the Indian River Lagoon. FWC also continued working with the Kings Bay Advisory Group to restore submerged aquatic vegetation to Kings Bay in Crystal River. The advisory group is working toward a complete ecological restoration of Kings Bay through regional citizen and interagency coordination as part of the SWFWMD SWIM (Surface Water Improvement and Management) Program. FWC also continues to work with the Legislature to address seagrass protection.



FWC continued to work with USFWS toward the goals set by the former Recovery Team’s Habitat Working Group and participate in a broad range of manatee habitat issues with various partners. These issues include: defining warm water and foraging habitat carrying capacity, assessing effects of reduced spring flow and loss of thermal refuges, and monitoring changes in foraging areas. One focused effort, related to habitat, included applying a habitat assessment tool or “checklist” for identified natural and artificial warm water refuges throughout the state.



# Outreach and Education

*management activities*



Public support of government conservation programs is vital. In order to engender support, the public must be well informed so that they understand the problems facing manatees, as well as the steps that need to be taken to conserve the species. In addition, it is important to target specific user groups that have the most interactions with manatees. Knowledge of manatee habitat requirements, behavior and general biology can contribute towards the reduction of manatee disturbance, harassment, injury and death. ISM staff who focus on outreach and information distribution provides a wide array of materials to a variety of audiences. Our goal is to provide factual, timely information appropriate to the target user groups.

## 2007–2008 highlights

*Wild Treasures of Brevard County—the imperiled species discovery series*

- This year a new outreach program called Wild Treasures of Brevard County debuted to county residents and visitors who use the libraries in Brevard County. The county has 17 libraries. The focus of the series is to provide educational materials and presentations or displays on the various imperiled species found in the county, including manatees. The emphasis is on species awareness, habitat conservation, and educating people about how their behavior can impact wildlife. Manatee educational materials are provided along

with materials on boating safety and right whales.

- ISM staff works with a volunteer coordinator in the county to schedule programs at libraries and to promote Project WILD®, Flying WILD®, and Aquatic WILD® teacher workshops that emphasize imperiled species. During this fiscal year, six libraries hosted nine Wild Treasures programs and displays. Of these, one was a manatee program and three were manatee displays (displays are set up for a month at each library). The outreach from the displays has the potential to reach thousands of people in the county (about

3,000 per library/month when displays are scheduled). FWC research staff assists with the manatee display set up.

- FWC partners with local Brevard County environmental agencies who serve as presenters for the Wild Treasure programs. The materials for the program include posters, bookmarks, laminated education cards, books and activity sheets. The program is anticipated to continue next year as more libraries become involved.

#### *Information Requests*

- A total of 190 information material requests was received this year and processed by ISM staff. Of these, 74 were requests for bulk orders of materials to be distributed through the requestor's organization or at a special event.
- The FWC Knowledge Base (Ask FWC) public service website (available at <http://MyFWC.com>) is now used to handle most of the routine manatee questions that come into the agency. This service provides the individual with an automatic response to their question and a link to the FWC manatee pages for more information. Outreach staff is responsible for updating or adding new questions to the system about manatees and other species. Questions and answers are reviewed on a regular basis so that the information stays current. The overall request for manatee information has dropped off considerably since the web site and other avenues of information dissemination have evolved.

#### *E-Field trips*

- The manatee on-line e-field trip ([www.efieldtrips.org](http://www.efieldtrips.org)) provides an engaging self-guided tour into the life of the manatee and gives elementary to high school students, nationally and internationally, a tool to learn about manatees without traveling to Florida. The on-line field trip provides students with much of the same information as our current educational materials but is more efficient in connecting with a broader range of students. A total of 291 schools

registered (approximately 6,769 students) to use the field trip during the 2007-2008 school year.

#### *Site Visits*

- Early in 2007, ISM staff, as chair of the State Committee on Environmental Education (SCENE), traveled to Brevard County for two SCENE meetings. Another SCENE meeting was held at the Museum of Natural History in Gainesville. Staff distributed SCENE's Environmental Primer to the Governor's office and Legislature during the legislative session. The Environmental Primer compiles information about environmental terms used in local, state and federal governments. The booklets assist government leaders with locating environmental information in Florida.
- ISM staff presented Voluntary Contribution Campaign award certificates to Florida's tax collectors at their annual conference. The awards recognize the counties who promote manatee and sea turtle conservation through decal sales or donations. Citrus County was the winning county in the 2007-2008 Voluntary Contribution Campaign.
- ISM staff had a booth at the Citrus County Manatee Festival and conducted various outreach activities with the public. The festival continues to be a huge draw for visitors and provides excellent opportunities to communicate with the public about manatees.
- Several FWC employees set up a booth at the Earth Day event held in front of Florida's Capitol building. Participant attendance was exceptional and environmental education was well represented by numerous agencies and groups. ISM staff brought information about manatees and other species to share at the booth.

#### *Manatee Decal Program*

- ISM produces a manatee decal for sale at local tax offices to support manatee research and conservation. Each year, ISM holds an art contest for middle and high school students to submit designs for the annual



manatee decal. The 2007-2008 decal, with artwork designed by Natasha Thornton, a student at Coral Reef Senior High School (Miami), raised \$45,000 for the Save the Manatee Trust Fund.

- 2007-2008 Decal: Manatees ~ Now and Forever: designed by Coral Reef Senior High School student, Natasha Thornton, won top honors in FWC's 2007-2008 Manatee Decal Art Contest. Decals were sold at local tax offices from July 1, 2007 to June 30, 2008.

#### *Outreach Publication Updates*

- The manatee coloring and activity booklet underwent a major overhaul during FY 2007-2008: new graphics throughout; more science-based information and research items; an updated list of the Florida Sunshine State Standards; the new license plate design and more challenging activities for students and teachers. The booklet will be available during FY 2008-2009.

#### *New manatee license plate promotion and debut*

- ISM assisted the Community Relations Office and FWRI Outreach Coordination staff with the design and promotion of the new manatee license plate.

**2007-2008 Decal: Manatees ~ Now and Forever:**  
*designed by Coral Reef Senior High School student, Natasha Thornton, won top honors in FWC's 2007-2008 Manatee Decal Art Contest. Decals were sold at local tax offices from July 1, 2007 to June 30, 2008.*






# Appendix

*Appendix A: Acronyms and Abbreviations*  
*Appendix B: Definitions*  
*Manatee License Plate and Decal Program*

*A new look*  
**for an old favorite**



**FLORIDA**  
**THX YOU**  
Save the Manatee

**A new look for the new year**

The Florida Manatee needs your help.  
Show your support for this Florida favorite  
by purchasing the new manatee license plate.  
Proceeds benefit manatee research and conservation.

 Florida Fish and Wildlife  
Conservation Commission  
MyFWC.com

[buyplate.com](http://buyplate.com)

# Appendix A: Acronyms and Abbreviations

**AIS** — Automatic Identification System

**°C** — degrees Celsius

**cm** — centimeters

**Commission, Commissioners** — refers to the Governor-appointed body and/or members of the FWC Commission

**dTag** — Digital Acoustic Recording Tag

**EWS** — Early Warning System

**°F** — degrees Fahrenheit

**FAC** — Florida Administrative Code

**Forum** — the Manatee Forum, a group of 22 stakeholder organizations organized by FWC and USFWS to address manatee issues

**F.S.** — Florida Statutes

**FSU** — Florida State University

**FWRI** — FWC's Fish and Wildlife Research Institute

**FWC** — Florida Fish and Wildlife Conservation Commission

**FY** — Fiscal Year

**GIS** — Geographic Information System

**GPS** — Global Positioning System

**ISM** — FWC's Imperiled Species Management Section

**kg** — kilogram

**m** — meter

**MFL** — Minimum Flows and Levels

**MIPS** — Manatee Individual Photo-Identification System

**MMPL** — Marine Mammal Pathobiology Laboratory

**Mote** — Mote Marine Laboratory

**MPP** — Manatee Protection Plan

**MSRS** — Mandatory Ship Reporting Systems

**NGO** — Non-Governmental Organization

**NOAA Fisheries Service** — National Oceanic and Atmospheric Administration's National Marine Fisheries Service

**PIT** — Passive Integrated Transponder

**Recovery Team**—the USFWS-led Florida Manatee Recovery and Implementation Team, consisting of over 100 individuals representing about 50 different federal, state, local, academic, NGO, and private organizations

**SCENE** — State Committee on Environmental Education

**SEIT** — Southeast U.S. Right Whale Recovery Plan Implementation Team

**SFWMD** — South Florida Water Management District

**SWFWMD** — Southwest Florida Water Management District

**SWIM** — Surface Water Improvement and Management

**Trust Fund** — Save the Manatee Trust Fund

**UF** — University of Florida

**USACOE** — U.S. Army Corps of Engineers

**USFWS** — U.S. Fish and Wildlife Service

**USGS** — U.S. Geological Survey

**VHF** — Very High Frequency

**WILD** — Wildlife in Learning Design

**WMD** — Water Management District

# Appendix B: Definitions

## **Boating Speeds**

### *Idle Speed*

Minimum speed necessary to make headway and be able to maintain control of the vessel. See 68C-22.002(1), F.A.C., for the complete definition.

### *No Entry Zone*

An area where all activities are prohibited unless specific authorization is given (except for fishing from an adjacent shoreline with a cane pole). See 68C-22.002(11), F.A.C., for the complete definition.

### *Slow Speed*

That speed where a vessel is fully off plane and completely settled in the water, and not creating an excessive wake or other hazardous condition. See 68C-22.002(4), F.A.C., for the complete definition.

# Manatee License Plate and Decal Program



## *Manatee License Plate*

The manatee license plate was enacted on March 16, 1990, and was created to raise funds for manatee research and protection. To date, over 625,000 manatee license plates have been issued and over \$35,000,000 collected to fund manatee research and protection in Florida.

The manatee license plate, once the most popular, dropped to the sixth most popular in 2007. Two explanations for the drop in sales of the manatee license plate are that it has not been marketed as effectively as many of the new plates, and it has not been redesigned since its inception. Statutory changes now allow a portion of the license plate funds to be used for marketing. In addition, the manatee license plate has been redesigned to enhance market potential and to increase revenue. Florida artist Nancy Blauers designed the new tag and it is now available at local tag offices.

The redesigned license plate and attendant marketing campaign were launched in early 2008. The Commission's campaign, "It matters to us what plate you buy" appears in a variety of print media. In addition, the Wildlife Foundation of Florida helped promote the new plate on a new web site: <http://www.buyaplate.com>, and other media outlets.

The manatee license plate generated \$1,232,564 in revenue in FY 2007-2008, with the sale of nearly 62,000 plates. FWC projects a 20% increase in revenue following improved marketing and release of the redesigned plate, which could add several thousand dollars of additional revenue.

**It matters to us  
which plate  
you buy**

**FLORIDA**

**THK YOU**

**Save the Manatee**

**New!  
Give the  
manatee  
plate as  
a gift.**

Florida Fish and Wildlife  
Conservation Commission  
MyFWC.com

**CAT TAG** **TURTLE** **WLDLF** **4 FWC**

Help preserve the future of Florida's gentle giants by purchasing a manatee license plate. Proceeds directly benefit manatee research and conservation. Or, choose one of our official wildlife plates below. Either way you'll be providing much needed support for conservation. It matters to us.

Available at tax collectors' offices and online at [buyaplate.com](http://buyaplate.com)

### ***Manatee Decal***

Chapter 328.72, F.S., provides that a sticker or decal can be given to citizens who donate \$5 or more to the Save the Manatee Trust Fund. Each year, FWC holds an art contest for middle- and high school-age students to submit designs for the annual manatee decal. FWC invites all students who attend public, private, or home schools in Florida to enter the Manatee Decal Art Contest. This art project encourages older students to support protection efforts by learning about manatees and their role in Florida's environment.

Each year tax collectors participate by selling decals at their offices statewide. Money from the decals supports manatee protection efforts such as rescue, rehabilitation, research, and public education. The 2007-2008 decals, with artwork designed by Natasha Thornton of

Coral Reef Senior High School (Miami), were available for sale from July 1, 2007, to June 30, 2008. Approximately 9,000 decals were sold with Thornton's design raising about \$45,000 for the Save the Manatee Trust Fund. Any remaining decals are available for distribution through our decal collection or will be distributed for educational purposes.

In May, a press event was held to present an award to the 2008-2009 Manatee Decal Art Contest winner, Austyn Bynon, a junior at West Boca Raton High School. FWC Commissioner Dwight Stephenson and regional staff were on hand to present the award. Austyn's work outcompeted thirty other entries submitted to the manatee decal art contest this year.

***2008-2009 Decal: Protect Our Future.***  
*West Boca Raton High School student, Austyn Bynon, won top honors in FWC's 2008-2009 Manatee Decal Art Contest. Decals will be on sale at local tax offices from July 1, 2008 to June 30, 2009.*



