Save the Manatee Trust Fund

2009–2010 Annual Report

Florida Fish and Wildlife
Conservation Commission

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SAVE THE MANATEE TRUST FUND

Annual Report
2009-2010

Florida Fish and Wildlife Conservation Commission
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SUBMITTED BY
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
Fish and Wildlife Research Institute
and
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Executive Summary

A year like no other...

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), per §379.2431(4)(b), Florida Statutes (F.S.). Since the first report was submitted in 1991, this was a year like no other. In 2010, events both natural and man-made created unprecedented challenges for the State's manatee conservation program.

On January 15th, the low temperature in Tallahassee was 30 °F. While that qualifies as cold for most Floridians, it was not a record low. What was a record however, was the fact that it was the 14th straight day in a row of sub-freezing temperatures in Florida's capital city. Similar conditions occurred in many places around the state. Overall- this was a historic cold snap in terms of both duration and magnitude. The persistent cold weather that gripped Florida in January, as well as subsequent periods of lower than normal temperatures, had both acute and chronic impacts on Florida plants and wildlife, including manatees.

When the mercury drops, manatees head for warm waters like those found at power plant discharges and artesian springs. That is the cue for scientists to take to the air for the annual manatee synoptic survey. This year, during the second week of January, FWC scientists and partners observed a record 5,076 manatees. This surpassed the previous high count by more than 1,200 manatees. While the media and manatee lovers were celebrating the record count, FWC staff were bracing for what they knew would be sure to follow: cold-stressed manatees. These worst fears were realized. From January through April, 503 manatee carcasses were reported and at least 252 were attributed to the cold. The majority of the carcasses with undetermined cause of death (197) was likely due to the unprecedented weather.

This cold event made Fiscal Year (FY) 2009-2010 the worst year on record for manatee deaths, with a total of 756 deaths in Florida and another nine outside state waters. The excitement over the record manatee count was short-lived.

Then, on April 20 2010, another disaster struck. The Deepwater Horizon oil platform burned and sunk to the bottom of the Gulf of Mexico and began what would become the world's largest accidental oil spill. FWC played a critical role in the response to this disaster and staff members that work with manatees were an integral part of the FWC team. Response and rescue plans were developed, and marine mammal rescue equipment was moved to staging locations in preparation for the possible worst-case scenarios. Some staff was recruited to work in the State Emergency Operations Center (EOC) which operated seven days a week. Other activities included flying reconnaissance missions looking for manatees, dolphins, and other sea life and documenting the distribution of manatees and condition of habitat coincident with impacted areas. Fortunately, this man-caused disaster did not have any known immediate impacts on manatees in that no manatee deaths or rescues have been attributed to the spill so far. However, possible long-term impacts, including impacts to manatee habitat, are not known at this time.

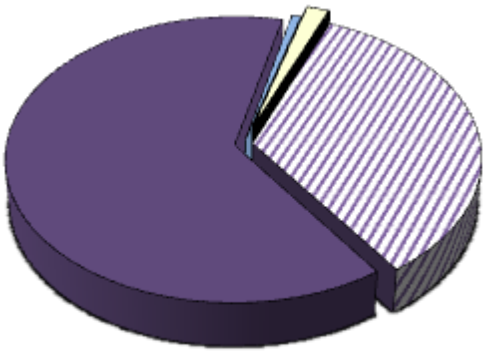
Executive Summary (continued)

Of course, throughout the year there were other issues and activities outside of the cold weather event and the oil spill that affected manatee populations. This report provides an overview of progress, accomplishments, and challenges related to manatee conservation and research that occurred this past fiscal year. These activities are possible because of funding from the Save the Manatee Trust Fund. The Trust Fund received money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. Revenues for FY 2009-2010 totaled $3,909,653. Appropriations from the Trust Fund for the same period were $4,039,099. In FY 2009-2010, the Division of Habitat and Species Conservation spent $1,037,125 for species management and conservation activities and the Fish and Wildlife Research Institute spent $1,728,929 on research and monitoring.

The events of this year demonstrated that unexpected and unplanned events can present significant challenges for efforts to conserve and recover species that are endangered or threatened. Fortunately, the State of Florida, along with its partners, has a very robust manatee conservation program in place that allows the agency to meet these unexpected challenges. Decades of conservation have helped contribute to growing manatee numbers that provide much needed resiliency as we face an uncertain future. Priority conservation work as outlined in the state manatee management plan will provide a better understanding of the impacts of primary threats, such as severe cold snaps and loss of warm water, on manatee population growth.

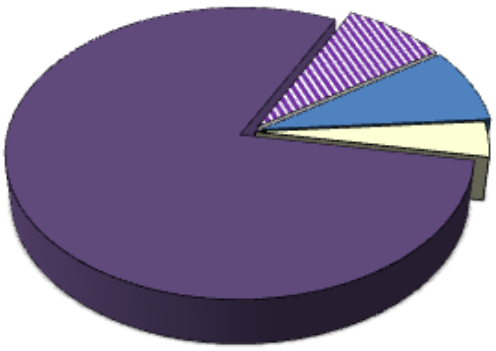
Trust Fund 2009–2010
Revenues and Expenditures

REVENUES
$3,909,653



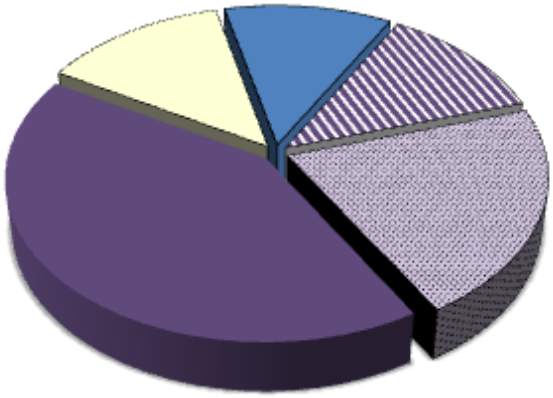
- Save the Manatee License Plate ($1,334,437)
- Vessel Registrations ($2,478,903)
- Interest ($27,979)
- Decals and Donations ($68,334)

APPROPRIATIONS
$4,039,099



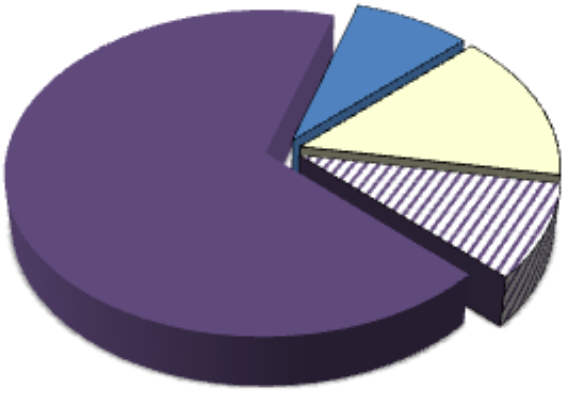
- FWC Manatee Program ($3,217,939)
- Mote Marine Laboratory ($325,000)
- Administrative Overhead ($337,576)
- Service Charge to General Revenue ($158,584)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES
$1,037,125



- Rule Administration ($219,888)
- Planning and Permitting ($433,586)
- Habitat Protection ($134,965)
- Data Distribution ($122,566)
- Education and Information ($126,120)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES
$1,728,929



- Behavioral Ecology ($161,885)
- Mortality and Rescue ($1,167,527)
- Photo Identification (Life History) ($143,564)
- Population Assessment and Monitoring ($255,953)

Special Section: Winter Season 2010

Background: Manatees are unique among marine mammals in that they are entirely herbivorous (i.e., they feed only on plants) and have a low rate of metabolism as well as high thermal conductance (i.e., they lose body heat rapidly). This unusual physiology influences the winter migration of manatees to warm-water areas such as springs and warm-water outfalls from industrial or electric plants or by their travel to coastal areas and estuaries in the southernmost parts of Florida.

Prolonged exposure to water temperatures below 20 °C (68 °F) can cause a condition called manatee cold stress syndrome, which can result in death. The problems related to cold stress may be acute, such as succumbing rapidly to hypothermia, or they may be longer-lasting. In general, cold stress syndrome is a complex disease process which involves metabolic, nutritional, and immunologic factors. Symptoms may include emaciation, skin lesions or abscesses, fat store depletion, dehydration, constipation and other gastrointestinal disorders, internal abscesses, and other secondary infections. Behavioral alterations related to cold exposure can include shivering, changes in resting patterns, and cessation of feeding. Over the nearly forty-year span of the statewide carcass recovery program, documented cases of cold-related mortality have been reported in manatees and were highest during the severe winters of 1976-77, when 38 manatees died, 1980-81, when 30 manatees died, 1983-84, with 34 cold-related manatee deaths, and 1989-90, with 56 cold-related manatee deaths. In 1986, cold stress was added as a cause of death category in the mortality database because of the relative frequency of its occurrence and magnitude over time. Over the past decade, several winter seasons resulted in elevated cold stress mortality. To read more about recent cold stress mortality please visit FWC's web site at: http://research.myfwc.com/features/view_article.asp?id=33589.

Winter 2009-2010: The winter season of 2009-2010 was one of the coldest on record in Florida. The period of January 2-13 was the coldest twelve-day period on record in parts of south Florida (Naples, West Palm Beach), setting new records there with twelve consecutive days at or below 7°C (45°F). In central-east Florida, average daily temperatures during this period were about 8 to 11°C (15 to 20°F) below normal. Weather patterns changed in the latter half of January as air temperatures warmed to near or slightly above normal values, continuing into early February. Unseasonably cold temperatures returned on or about February 7, remained for much of the rest of the month, and even lasted through March. The coldest period in March was during the first week when a cold air mass moved into south Florida, generating more record lows and freezing temperatures. The average March air temperatures at Vero Beach and Naples were the coldest on record. Colder than normal Gulf waters kept maximum air temperatures in southwest Florida much lower than normal.

The first report of the year of a live, cold stressed manatee came from Duval county (northeastern Florida) on January 4. Subsequently on January 7, a female manatee calf was rescued from a canal in Pinellas County where the water temperature was 12°C (53°F). On this same date, reports of cold stress-related manatee deaths were starting to occur, with the first cases of the year occurring in Brevard and Broward Counties on the east coast of Florida. From there, the carcass count escalated. Over a four month period from January through April, 503 manatee carcasses were recorded in Florida. The count during this period surpassed the record high annual count of 429 set in 2009. Mortality was particularly high in the central-east and southwest regions. During this same four month period, an additional 58 rescues of live manatees were conducted.

The United States Fish and Wildlife Service (USFWS) and the FWC consulted with the Working Group on Marine Mammal Unusual Mortality Events (Working Group). The Working Group was formalized many years ago when Congress passed the 1992 amendments to the Marine Mammal Protection Act. The Working Group declared the event to be an official Unusual Mortality Event (UME) on February 26. Early on, the FWC assembled a response team as outlined in contingency plans specifically developed for these events. The response team directed the course of the investigation, maintained close communications among response team leaders, provided information to partner agencies and organizations, and contributed to daily operations. Sub-teams included: rescue/carcass salvage logistics, environmental sampling, aerial survey and ground monitoring, data management/GIS, necropsy/medical, and media relations. Responding to this event was truly a team effort. Law enforcement officers or volunteers secured carcasses at boat ramps and field biologists retrieved them for transport to the Marine Mammal Pathobiology Laboratory (MMPL) for necropsy. Staff from FWC and partner agencies assisted with this monumental effort.

Overall, the winter of 2010 was a very difficult season that will long be remembered for the extensive impacts of extreme cold weather to wildlife. FWC and partners made tremendous efforts to respond to live animals that were in distress, recover carcasses, and determine cause of death for most cases. The effects of this mortality event on the Florida manatee population are of concern due to the high number of deaths as well as the wide geographic extent; however, scientists also recognize that this and other cold weather events are part of natural variation. Previous work recognizes the importance of effectively managing adequate warm-water habitat for the long-term protection of manatees in Florida. FWC's understanding of manatee population dynamics is based on the integration of ecological information and mathematical models. The agency intends to incorporate information about this mortality event into future modeling efforts in an attempt to better understand the roles of various threats and improve the ability to forecast population changes.

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 5,076 in 2009–2010

HISTORY A native species found in Florida's 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 60 years; of manatees that reach adulthood, about half are expected to survive at least into their early 20's

UNUSUAL FACT Manatees are distant cousins of elephants.

A CLOSER LOOK

Adult manatees average 8-10 feet (2.5-3 meters) in length and weigh around 1,000 pounds (450 kg). The largest manatees may reach 14 feet (4.2 m) in length and weigh over 3,500 pounds (1,450 kg). 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 (called "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. 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 (1-1.2 m) in length. The calves remain with their mothers for up to two years.

There are a variety of threats to manatees, both natural and human-related. 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. During periods of cold weather, manatees gather, or gather in waters warmer than 20°C (68°F). This warm water may be in south Florida or may be from an artesian spring or industrial discharge. Manatee habitat loss, including future changes in artificial warm-water refuges and reductions in natural spring flows, is also of concern.

Manatee Management Plan

GOAL

"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."

FWC Manatee Management Plan, December 2007

Approved at the December 2007 FWC Commission meeting, the Florida Manatee Management Plan (Plan), guides key conservation work supported through the Save the Manatee Trust Fund. The 267-page document provides an overview of the myriad programs, initiatives, and strategies implemented to protect and conserve manatees and their habitat along with a detailed listing of tasks with timelines for both research and management activities.

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

The Plan relies on the ongoing collection of manatee-related data and the transfer of that 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

This annual report serves as a way to present progress in implementing key conservation strategies described in the Plan. Copies of the Plan can be downloaded from the Commission Web site:

http://www.myfwc.com/docs/WildlifeHabitats/Manatee_Mgmt_Plan.pdf

Research Activities

Mortality and Rescue
Population Monitoring and Assessment
Behavioral Ecology
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 the Florida Fish and Wildlife Conservation Commission (FWC)'s Fish and Wildlife Research Institute (FWRI).

FWRI staff members from five coastal field stations retrieve all reported carcasses, a key monitoring activity described in the Manatee Management Plan (see Chapter 9, "Monitoring Activities" p.90). 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. MMPL performs consistent, high-quality, post-mortem examinations to determine cause of death. Information gained from the carcass salvage and manatee rescue program is crucial to providing wildlife managers with information about manatee health, mortality factors, life history, and general and reproductive biology as well as potential causes for Unusual Mortality Events (UMEs)[1].

Through this work, FWRI contributes significantly to the evaluation of threats facing Florida manatees and provides crucial information to resource managers and partner agencies. MMPL maintains a database that contains mortality information and provides timely information that is made available on the FWRI website (http://research.myfwc.com/features/category_main.asp?id=1578).

In addition to manatee carcass salvage, FWC receives calls from the public reporting manatees in distress. Field staff members respond to these calls and coordinate a network of personnel from various agencies and organizations to work with FWC biologists to rescue and, when necessary, transport manatees to rehabilitation facilities.

[1] Unusual Mortality Events are defined by the Marine Mammal Protection Act as, "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response." See http://www.nmfs.noaa.gov/pr/health/mmume/ for more information.

Carcass Salvage

- Statewide, there were a record 756 manatee carcasses documented in Florida. All but 72 were recovered and examined. Additionally, one carcass was documented in Maryland, five in Georgia, two in South Carolina, and one in Alabama.

- A statewide cold-related UME was declared by the federal Working Group on Marine Mammal Unusual Mortality Events. Prolonged cold temperatures during the winter of 2010 resulted in unprecedented numbers of cold-related mortalities and numerous rescues of cold-stressed animals. Preliminary data demonstrate that at least 250 manatees died from exposure to cold during this event and a majority of the Undetermined and Verified, Not Recovered mortalities are likely cold-related as well, based on timing and location.

- The cold temperatures affected all sizes of manatees. Some of the animals died from acute exposure to cold, whereas later on, others suffered from chronic cold stress, a more complex disease process.

Manatee Mortality FY 2009-2010

Cause of Death	Number of Deaths
Human—flood gate or canal lock	0
Human—other (entanglements, etc.)	7
Human—watercraft related	94
Natural—cold stress	250
Natural—other (includes red tide)	33
Perinatal (total body length less than 150 cm or about 5 feet)	96
Undetermined (decomposed or other)	204
Verified, Not Recovered	72
Total Carcasses July 1, 2009—June 30, 2010	756

Rescue and Rehabilitation

- Researchers collected tissue samples for genetic analysis from 692 carcasses. Other tissues were collected for toxicology, histology, aging and for external researchers.
- One hundred-eight rescues were performed statewide during FY 2009-2010. As of June 2010, 45 of these rescued manatees were released back into the wild, 32 died, and the remaining 31 animals were still being rehabilitated in facilities around the state.

- Thirty-nine of the 52 rescues within the "Natural" category were related to cold stress. Three of these manatees were in unfavorable locations (i.e., cold water) and were moved and released in warm water the same day.

Manatee Rescues FY 2009-2010

Type of Rescue	Number of Rescues
Calf—Alone	10
Calf—With Rescued Mother	1
Mom-With Rescued Calf	1
Human—Entanglement	18
Human—Entrapment*	7
Human—Watercraft-Related	16
Human—Other	1
Natural—Includes Red Tide	52
Undetermined	2
Total	108

*includes power plant intake canals, irrigation canals, weirs, culverts, man-made canals, man-made lakes, etc.

Population Monitoring and Assessment

research activities

FWRI scientists use a variety of methods to assess and monitor the current and future status of the Florida manatee population. Population assessments currently include: a) conducting manatee counts at winter aggregation sites, b) aerial surveys to determine regional distribution of manatees and to assess habitat use, and c) estimating survival, population growth, and reproductive rates through photo-identification and genetic-identification. 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).

FWC traditionally uses two types of aerial surveys to monitor manatees. These surveys provide minimum counts and information about habitat use and seasonal distribution. The first type of survey (known as the 'synoptic survey') is flown statewide and provides a minimum count of manatees at known aggregation sites and other sites in winter. These surveys are conducted annually pursuant to §379.2431(4)(a), F.S., requiring an "impartial scientific benchmark census of the manatee population in the State." The counts, conducted 26 times since 1991, are flown after cold fronts, and under specific weather conditions, 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. Because weather and water conditions (among other factors) change year-to-year, the ability to see and detect manatees on any given day, at any given site, may change appreciably. Therefore, statistical estimates of population size are not possible from these surveys. During the week of January 19, 2010, a team of 21 observers from ten organizations counted 2,780 manatees on Florida's east coast and 2,296 on the west coast for an all-time-high total of 5,076 manatees statewide.

The second type of survey is flown on a regional basis, and FWC uses these distributional surveys to determine the seasonal distribution and habitat use of manatees. These surveys usually are flown twice monthly in a specified county (or counties) for a period of two years. The location of the survey (or surveys) is determined based on management needs.

Currently, FWRI researchers are developing new techniques for both surveys with the goal of providing precise and reliable estimates of population size and improved information on manatee distribution. These new methods and resulting data will 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 2009-2010, distributional surveys incorporating the new survey methods were conducted in West Pinellas County twice monthly . This survey will end in August of 2010. In addition, data were collected twice monthly for the Eastern part of Pinellas County in partnership with Pinellas County.

A separate pilot study to test new methods for the statewide synoptic survey was flown in the winters of 2008 and 2009 in

southwest Florida. The new methods are not as dependent on cold weather as the traditional methods. Following the successful testing and revision, the new methodology will replace the existing synoptic survey methods. In the interim, preparatory activities will include expanding and adapting the methods to other areas in the state. Details are described in the Manatee Management Plan (see Chapter 9, "Monitoring Activities" p. 86 and Chapter 10, "Ongoing and Future Research" p .114, Manatee Management Plan).

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. 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 U. S. Geological Survey (USGS), and Mote Marine Laboratory (Mote). Partners work collaboratively to photograph Florida manatees throughout their range, process images, identify manatees, and manage an integrated sightings database, known as the Manatee Individual Photo-Identification System (MIPS). The records in MIPS 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 (time between births) and length of calf dependency.

Critical data gaps still exist in Florida manatee population assessments. Three demographic parameters are in need of refinement to better model manatee status and recovery, annual reproductive rates, annual gender-specific movement between the northwest and southwest regions, and gender-specific adult survival rates in the southwest region. In the southwest region, these vital statistics have been difficult to estimate through photo-identification because of unfavorable photographic conditions, limited animal accessibility, and other extrinsic factors. Identification of individuals through the analysis of genetic markers, also known as DNA fingerprinting or genotyping, offers a complementary means to analyze life history that could greatly enhance existing manatee monitoring and population assessment studies statewide, particularly in the southwest. Genetic analysis can help in the identification of calves and other individuals with no markings, as well as carcasses in an advanced state of decomposition. Genetic markers can also be used to determine the gender of identified individuals. The Manatee Management Plan identified the need to implement a genetic identification program (see Chapter 10, "Ongoing and Future Research," p.115, Manatee Management Plan). During the winters of 2009 and 2010, FWC conducted dedicated genetic sampling surveys in southwest Florida. Additionally, FWC is collaborating with USGS to develop statistical models that integrate population data from photo-identification, genetic-identification surveys, and the carcass recovery program.

2009–2010 highlights

- During the annual statewide manatee synoptic survey, 5,076 manatees were counted – a record high.

- Beginning in September 2008, twice-monthly distribution surveys in the western part of Pinellas County were conducted. Surveys will end in August 2010.

- Beginning in October 2009, twice-monthly distribution surveys in the eastern part of Pinellas County were conducted. Surveys will end in September 2011.

- In October 2009, FWRI held an aerial survey safety workshop to improve the safety of FWC aerial observers.

- FWRI staff members and interns spent over 130 days conducting land- and boat-based photo-identification research during 350+ visits to sites used by manatees in the Tampa Bay area and southwest Florida. Additionally, other FWC volunteers, outside organizations, and field lab staff statewide photo-documented manatees with unique features. More than 13,000 images documenting the unique features of individual manatees were taken and archived.

- FWC and Mote manatee photo-identification data through the 2003-2004 winter season are currently being analyzed and will yield an updated estimate of adult survival rate for southwest Florida. Progress continues on processing and reviewing for quality assurance and quality control data from subsequent years.

- Eighty-six manatees meeting specific photo-documentation criteria were added to the southwest portion of the MIPS catalog of uniquely identifiable animals.

- Thanks to the completion of the scanning of all manatee carcass slides in FY 2008-2009, 57 manatee carcasses were identified as previously known southwest MIPS animals.

- Genetic sampling surveys were conducted in southwest Florida. A total of 445 samples were collected from free swimming manatees: 77 samples at Port of the Islands (Collier County) during four survey days, 199 samples in the Orange River (Lee County) during three survey days, 160 during three survey days at the Big Bend Power Plant discharge canal (Hillsborough County), and nine samples during photo-ID surveys at the Bartow Power Plant discharge area (Pinellas County).

Behavioral Ecology

research activities

Research 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 through their aquatic environment, FWC biologists obtain valuable information about manatee seasonal and daily movements, migratory behavior, site fidelity, diving behavior, and habitat requirements.

To track manatees, researchers place a padded belt around a manatee's tail and attach a buoyant radio-tag containing a satellite-linked transmitter to the belt. The GPS (Global Positioning System) 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 used in devising strategies for manatee conservation and recovery.

Warm-water habitat is of particular concern because the predicted future loss of this habitat is deemed a key long-term threat to the manatee population. With the scheduled shutdown of three power plants along the east coast this year, one permanently and two for repowering, the warm-water network that manatees have relied on is changing. This year FWC carried out or funded studies to provide baseline data on abundance, distribution, movements, and behavior of manatees that spend the winter in Brevard County, (see Population Monitoring and Assessment). An important component of this research and monitoring initiative is a tracking study of how manatees use warm-water sources and nearby foraging habitat in the region, and how that may change with power plant conversion. Temperature monitoring and hydrographic characterization of known and potential warm-water sites is also a crucial part of the effort. The Manatee Management Plan provides further information on this issue (see Chapter 10, "Ongoing and Future Research," pp. 102-3).

Watercraft collision is the single greatest human threat to manatees in Florida. In collaboration with researchers at Florida State University (FSU), Duke University, and Woods Hole Oceanographic Institution, FWC conducted a study on interactions between tagged manatees and motorized boats in southwest Florida. The goal of the project is to create a combined picture of manatee behavior, acoustics, and vessel trajectories to document manatee responses to approaching boats and the acoustic cues that may elicit such responses. The research combined state-of-the-art, manatee-borne electronic tags with boat-based observations and aerial videography. This project is a key component identified in the Manatee Management Plan (see Chapter 10, "Ongoing and Future Research," p. 107).

2009–2010 highlights

Winter Use of Warm-water Sources in the Northern Indian River Lagoon

- Five manatees were captured and four were tagged at the Florida Power and Light (FPL) Canaveral power plant in December 2009 to study winter attendance patterns at industrial warm-water sources and foraging movements in Brevard County. The manatees carried GPS tags and temperature loggers that provided data on fine-scale movements, habitat use, and temperatures experienced throughout the winter.

- A team of scientists and veterinarians from FWRI and the University of Florida (UF) assessed the health and body condition of captured manatees to further understand the health of the wild population.

- During the extreme cold event of early January 2010, one of the tagged manatees migrated over 200 km (124 miles) to Riviera Beach, encountering water temperatures as low as 9.5°C (49 °F). The other three manatees remained in the FPL Canaveral power plant discharge area, apparently without feeding, for two consecutive weeks.

Warm-water Habitat Research

- FWC scientists and managers, along with USGS, Mote, and FPL partners, have formulated plans to monitor how manatees will respond to a major change at traditionally used warm-water sites—FPL Canaveral and Riviera Beach power plants along the east coast that are scheduled to be repowered over the next few years. Riviera Beach power plant has installed an interim heating system for manatees after decommissioning the plant.

- FWRI continued to monitor water temperature during the 2010 winter with data loggers placed at many warm-water and ambient sites throughout much of the manatee's winter range. Several 'passive' thermal sites (i.e., non-discharge sites such as canals) are being investigated for their potential to provide sufficient warmth to sustain manatees through cold winter periods.

- Detailed temperature and depth surveys of the discharge areas at the FPL Canaveral power plant and the FPL Riviera Beach interim refuge were conducted to determine the extent and depth of the warm-water plume produced at each site. Simultaneous aerial counts and mapping of manatee distribution in the discharge areas will permit a better understanding of manatee use of warm-water refuges.

- For the first time, manatees were visually monitored for external signs of cold stress at several warm-water aggregation sites, using a newly developed protocol. This monitoring holds the potential to identify cold-related health issues at a site early before the situation leads to mortality.

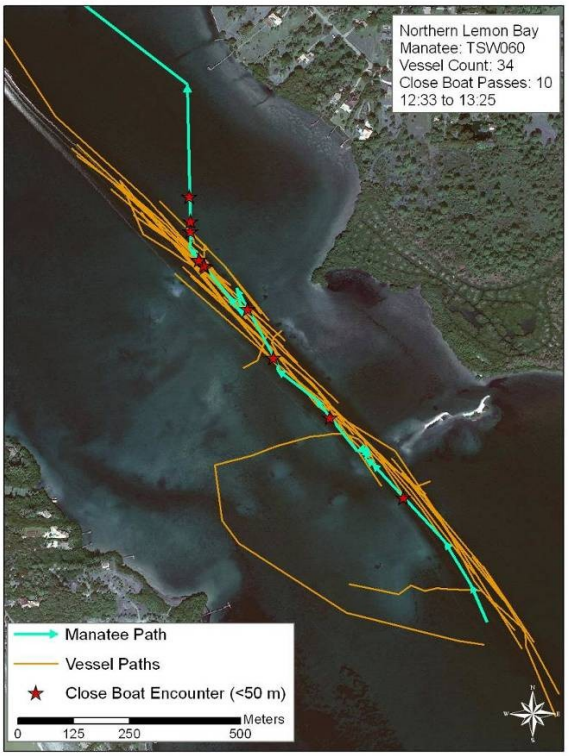
2009–2010 highlights, continued

Post-release Monitoring of Rehabilitated Manatees:

- FWRI participated as a contributing organization to multi-agency efforts to release and track rehabilitated manatees that were rescued due to injury, cold stress, or other problems. The Manatee Rehabilitation Partnership (http://www.wildtracks.org) consists of representatives from federal organizations (USFWS, USGS), state agencies (FWC), academic institutions (UF), Non-governmental Organizations (NGOs)-(Caribbean Stranding Network, Hubbs-SeaWorld Research Institute, Save the Manatee Club, Sea to Shore Alliance), and private oceanaria (Cincinnati Zoo, Columbus Zoo, Lowry Park Zoo, Miami Seaquarium, The Seas at Epcot, SeaWorld Orlando, South Florida Museum). As part of that partnership, FWRI staff participated in pre-release health assessments and releases of rehabilitated manatees in various parts of the state, and assisted in monitoring two manatees in Brevard County.

Manatee Response to Boats

- FWRI and FSU staff entered, verified, and processed manatee, boat, and acoustic data collected during a two-year field study to characterize manatee response to moving vessels. The frequency of manatee interactions with motorized watercraft in southwest Florida was also quantified.
- Twenty tagged manatees carried multi-sensor digital acoustic recording tags (DTAG) and GPS tags. The DTAG provided a continuous record of sound (ambient noise, vocalizations, and boat noise) and recorded a suite of behavioral parameters, allowing a three-dimensional reconstruction of movements, depth, and orientation underwater. The acoustic and behavioral records are being analyzed to assess manatee response in relation to speed and distance of approaching boats.



Right Whales

research activities

In addition to manatee recovery efforts, FWC is involved in the recovery of other endangered marine mammals, including the North Atlantic right whale, *Eubalaena glacialis*. Most of this work is supported by grant funding provided by the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration (NOAA Fisheries Service); however, portions of some staff salaries are provided by the Trust Fund (§379.2431 (4) F.S). FWC is dedicated to assisting NOAA Fisheries Service in its efforts to protect this species as outlined in the North Atlantic Right Whale Recovery Plan. With a population estimated at fewer than 450 individuals, the North Atlantic right whale is one of the most endangered large whales in the world. Vessel collisions and entanglement in fishing gear are the leading known causes of death in this species. Even one unnatural death per year could have a significant effect on the population and efforts to prevent human-caused mortality are a priority.

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 area of the North Atlantic right whale. Federal and state efforts to protect right whales in their critical habitat have resulted in the formation of the Southeast U.S. Right Whale Recovery Plan Implementation Team, 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 Southeast U.S. Right Whale Recovery Plan Implementation Team since its 1993 inception and FWRI staff has chaired the team for the past eight years.

NOAA and the U.S. Coast Guard (Coast Guard) implemented the Mandatory Ship Reporting System in July 1999. Under this system, all commercial ships greater than 300 gross tons are required to report position, speed, and destination when entering the area surrounding the designated critical habitat during the calving season (between November 15 and April 15) and, in turn, are provided information about recent right whale locations and related advisories. The Early Warning System (EWS) communication network, coordinated by NOAA Fisheries Service with assistance from FWRI staff, is designed to protect right whales from vessel collisions by notifying key agencies, ports, and mariners via email, text message, or pager when and where right whales have been sighted. This near real-time information allows ships to take action if necessary to avoid whales. In the continued effort to reduce right whale death and serious injury cases resulting from vessel collisions, NOAA Fisheries Service implemented the Right Whale Ship Strike Reduction Rule on December 9, 2008. This rule established a seasonal speed restriction of 10 knots for vessels 65 feet in length or greater traveling in designated seasonal management areas. A Seasonal Management Area is in effect from November 15 through April 15 in the southeastern U.S..

Since 1987, FWRI has conducted aerial surveys to monitor seasonal presence of right whales, mitigate vessel-whale collisions, and assess population dynamics. Photographs taken by aerial observers are used to identify individual right whales based on the callosity pattern (a natural growth of rough, cornified skin) on their heads as well as natural marks and human-related scars. Over time, popula-

tion demographics, reproductive success, mortality, and trends in health are monitored in part through this photo-identification research. FWRI is one of a handful of major contributors to the North Atlantic Right Whale Catalog – the central repository for archiving and maintaining photographs and sighting data on right whales. FWRI has also worked closely with federal, state, and NGO partners to compile years of aerial-survey data into a GIS program. Analyses of this spatial data helps scientists and managers to evaluate right whale distribution patterns in the calving grounds in relation to environmental factors, such as sea surface temperatures and water depth, and human activities, such as vessel traffic.

FWRI has developed the infrastructure and analytical tools for monitoring commercial vessel traffic in the right whale calving area using the Automatic Identification System. Commercial vessels are required by U.S. Federal Regulations to be equipped with an Automatic Identification System transponder and to broadcast their location and speed as determined by a global navigation satellite system. FWRI has established Automatic Identification System receiving stations that provide coverage of important right whale habitat in the southeastern U.S. and has standardized processing methods to convert the raw transmissions into GIS data. Ongoing analyses characterize vessel traffic patterns and estimate compliance with Federal speed regulations.

Data on whale distribution, habitat preferences, environmental conditions, and vessel traffic provide a framework for quantifying the risk of vessel strikes and inform and evaluate the effectiveness of proposed management plans.

2009–2010 highlights

- FWRI and NOAA Fisheries Service responded to an apparent shift this season in whale distribution by flying surveys south of the EWS area. These surveys generated whale sightings which triggered Dynamic Management Areas and afforded some protection for the right whales south of the southeastern U.S. Seasonal Management Area. The shift in distribution was likely caused by cooler sea surface temperatures throughout the calving area.

- In total, nineteen mother/calf pairs were documented in the southeastern U.S. during the 2009-2010 North Atlantic right whale calving season.

- FWRI conducted 63 right whale aerial surveys totaling 18,697 nautical miles between December 1, 2009 and April 5, 2010. The FWRI team documented 603 right whales (including re-sightings) from 238 sighting events (average of 3.9 whales per sighting). Of these, 37 were mother/calf pairs, one was a mother/yearling pair, 83 were single adults (including pregnant females) or juveniles, 38 were pairs, and 79 were groups of three or more whales. Preliminary photo analysis indicates FWRI documented 162 individual right whales (excluding calves). This is the highest number of individual right whales documented by FWRI during a single calving season in the last seven years. In addition, the FWRI team documented 40 leatherback sea turtles and 11 humpback whales, including one severely entangled individual.

- Five entanglement related events were documented by FWRI in the southeastern U.S. during the 2009-2010 calving season. FWRI as well as the Georgia Department of Natural Resources, New England Aquarium, NOAA Fisheries Service, Provincetown Center for Coastal Studies, and Wildlife Trust participated in the documentation of the events.

- In March 2010, FWRI recorded behavioral observations and photographed a mother/calf pair approximately one hour after the mother, catalog #2360, was observed giving birth offshore St. Augustine, FL by another survey team. FWRI sighted whale #2360 and her calf on three subsequent occasions when the calf was five, eleven, and sixteen days old.

- FWRI worked in collaboration with the Marine Resource Council and Marineland Right Whale Project to verify and document seven public right whale and two humpback whale sightings in the vicinity of St. Augustine and Ponte Vedra, FL. Responding to land-based sightings gave FWRI a valuable opportunity to interact with and conduct outreach with home owners and beachgoers in northeast Florida.

- FWRI, in collaboration with NOAA Fisheries Service and the Georgia Department of Natural Resources, conducted 34 right whale biopsy sampling trips, resulting in samples from ten calves and several previously unsampled juvenile and adult whales. The skin samples will be used for individual identification and gender determination, as well as information on kinship, 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 documented four juvenile whales with healing wounds on their bodies and heads. The wounds observed on all four whales vary in size, shape, and location; but, all are similar to injuries caused by a vessel's propeller, skeg, keel, or rudder observed on Florida manatees.

- No right whale carcasses were stranded or sighted in the southeastern U.S. during this calving season; however, there was one photo-documented loss of a calf.

- FWRI analyzed ship traffic data collected through Automatic Identification System tracking to monitor compliance with vessel speed regulations.

A surface active group of right whales off Ponte Vedra Beach, FL

Research Publications and Reports

research activities

2009

Deutsch, C. J., A. Rycyk, M. E. Barlas, D. P. Nowacek, S. M. Koslovsky, and K. Frisch. 2009. Response of manatees to vessel traffic: Simultaneous measurements of behavioral responses and the acoustic environment. Final Progress Report to Florida Fish and Wildlife Conservation Commission. Project Contract No. 021426 to Florida State University. 111 pp.

Fonnesbeck, C. J., H. Edwards, and J. E. Reynolds III. 2009. A hierarchical covariate model for detection, availability and abundance of Florida manatees at a warm water aggregation site. Pp. 563-578 in: D.L. Thomson et al. (eds.), *Modeling Demographic Processes in Marked Populations*, Environmental and Ecological Statistics 3, DOI 10.1007/978-0-387-78151-8 24.

Harvey, J.W.; Harr, K.E.; Murphy, D.; Walsh, M.T.; Nolan, E.C.; Bonde, R.K.; Pate, M.G.; Deutsch, C.J.; Edwards, H.H.; Clapp, W.L. 2009. *Hematology of healthy Florida manatees.* Veterinary Clinical Pathobiology, v.38 no.2, p. 183-193.

2010

Deutsch, C. J. and J. E. Reynolds III. *In press.* Florida manatee status and conservation issues: a primer. In: *Sirenian Conservation: Issues and Strategies in Developing Countries.* Edited by E. Hines, J. E. Reynolds III, L. V. Aragones, A. A. Mignucci-Giannoni, and M. Marmontel. University of Florida Press, Gainesville.

Tripp, K. M., J. P. Verstegen, **C. J. Deutsch**, R. K. Bonde, **M. de Wit**, C. A. Manire, J. Gaspard, and K. E. Harr. 2010. Evaluation of adrenocortical function in Florida manatees (Trichechus manatus latirostris). Zoo Biology 29: 1-15.

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 (Mote). The following projects were funded in FY 2009-2010:

- 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 FWC's Fish and Wildlife Research Institute and U.S. Geological Survey; 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.

- Aerial Surveys—Mote participated in a statewide synoptic survey flown in January 2010. Aerial surveys were also conducted in Brevard County to assess the relative number of manatees using several warm-water sources. The surveys will develop baselines against which future survey results will be compared to judge manatee response to changing operating conditions at a major warm-water site (Florida Power and Light Company Canaveral plant).

- Recreational Boating Studies of Pinellas County—A boat traffic study was initiated in 2008 for western Pinellas County. Surveys were completed in 2009 and data were compiled into GIS format and quality controlled. A report was completed detailing the interpretation discussion of boating patterns in the county, including maps of the survey results. This data will be used in future evaluations of western Pinellas County for possible new manatee speed zones in 2011.

- 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

Management Activities

Manatee Forum

In 2004, the Florida Fish and Wildlife Conservation (FWC) and the U.S. Fish and Wildlife Service (USFWS) established the Manatee Forum, a diverse stakeholder group, with the goal of reducing litigation by establishing areas of common ground, identifying problems or conflict, developing potential solutions, and accepting differences through increased communication. During this fiscal year, the Manatee Forum met twice, once in November and once in February. During the November meeting, the agencies reiterated their support for the Forum and the value it provides to the agencies of learning about the stakeholders' perspectives on agency activities. It also provides the agencies a format to inform the most engaged stakeholders about the latest manatee-related information, research findings, and management activities. The Forum members reviewed the existing Forum governance guidelines, made a few changes, and agreed to support the revised governance during future meetings.

The February meeting covered extensive updates from the agencies and in particular discussed the record manatee count from the 2010 synoptic survey and the developing Unusual Mortality Event due to the extremely cold winter. The Forum members also discussed their goals for the upcoming legislative session. FWC continues to believe in the importance of having a stakeholder group focused on manatee issues. The opportunity provided for communication of information and ideas is very valuable to both agencies and both are committed to the Forum for the long term.

Manatee Protection Plans and Permit Reviews

management activities

The FWC's Imperiled Species Management section (ISM) reviews proposed development projects and provides biological opinions to state regulatory agencies for Environmental Resource Permits (ERP), Sovereign Submerged Land Leases (SSL), State Clearinghouse projects (SAI) and Development of Regional Impacts (DRIs). ISM is also heavily involved in the development and implementation of county-specific Manatee Protection Plans (MPPs), and provides comments concerning manatees for various types of planning documents such as county Comprehensive Plans. See Chapter 7 "Management Actions" in the Manatee Management Plan for further details about these programs (p.45 for Permit Review and p. 49 for MPPs).

Permit Reviews

Of the ERP/SSL applications reviewed, 55% did not require a Request for Additional Information (RAI) of the applicant. Thirty-one percent (31%) required one RAI, 10% required two RAIs, and only 4% required more than two RAIs. Six of the projects reviewed were related to permit enforcement and compliance actions by the permitting agencies, Department of Environmental Protection (DEP) and Water Management Districts (WMD).

Number of Final Comment Letters	Type of Review	Agency/Entity comments are sent to:
287	ERP or SSL	(197) DEP (90) WMD
8	SAI	State Clearinghouse
5	Comprehensive Plan or DRI	Department of Community Affairs or Regional Planning Council
9	Preliminary comments	Agencies and Applicants
9	Permanent manatee sign approvals	Permittees
3	MPPs or MPP revisions	Charlotte, Miami-Dade and Duval counties
2	Responses	Concerned Citizens
Total: 323		

2009–2010 highlights

MPP Update

- **Collier County** – Originally approved in 1995, recent reviews by FWC indicated that the Collier County MPP requires revision to better reflect current data. Data needed to review and revise the MPP was collected beginning in 2007 and continued through FY 2009-2010. This year FWC staff traveled to Collier County and assisted County staff with updating the marine facilities inventory, by verifying numbers of slips and boat ramps at boat facilities. In addition, the fixed point boat study contracted by the County was completed. The MPP revision tasks were divided up between FWC and the County, to share the workload and facilitate completing the revisions.

- **Charlotte County** – Although not required to develop an MPP (not one of the original 13 "Key" counties identified in statute), this County is considering developing an MPP. The county has significant manatee use and the number of manatee watercraft-related deaths has increased over the last decade. The County may develop an MPP in order to facilitate future coastal construction projects and permitting at the state and federal level. In an effort to provide assistance, FWC staff has attended the monthly Charlotte County Marine Task Force teleconferences. The Charlotte County Board of County Commissioners approved the establishment of an advisory group to determine whether or not an MPP should be developed.

- **Duval County -** Approved in 1999, reviews by FWC indicated that the Duval County MPP needs to be revised using more up-to-date data. An increasing trend in the number of manatee watercraft-related deaths has been unprecedented, and annual numbers have consistently exceeded the recommended threshold suggested in the current MPP. Data needed to review and revise the MPP was completed. FWC staff assisted County staff with updating the marine facilities inventory. In addition, the boating activity study was finalized. The MPP has been divided into sections and assigned to either the FWC or the County's subcontractor, to share the workload and facilitate reviewing and revising the MPP. Some revisions to sections of the MPP have been drafted and are under review.

- **Miami-Dade County** – The Miami-Dade County MPP has an existing MPP that was approved in 1995. The Miami-Dade Board of County Commissioners established an MPP Review Committee, which met for 20 months ending in October 2009. This committee produced a set of motions recommending changes to the County MPP. FWC staff provided the County an initial review and comments on the committee's motions in February 2010. The County requested a second more detailed review of the committee recommendations in April of 2010 and FWC is currently developing that response (response provided in August 2010– delayed due to staff deployments on oil spill activities).

- **Sarasota County** – The Sarasota MPP was originally approved in 2004, and recommended a five-year review cycle based on new relevant data. Sarasota County completed a boat traffic study in 2007. New manatee distributional data was collected by Mote Marine Lab for the County as well, providing new data to use to evaluate the need for plan revisions. FWC has assisted the County's subcontractor with data analysis, the review of the MPP and possible revisions. The County is currently working with the contractor to develop revisions to the MPP.

2009–2010 highlights, continued

Statewide Activities:

- Attended numerous teleconferences with the U.S. Fish and Wildlife Service (USFWS) and the Army Corps of Engineers (the Corps) regarding a draft programmatic manatee biological opinion for new watercraft access facilities. FWC, in cooperation with the USFWS and the Corps made numerous revisions to the draft opinion, and it was cross-referenced with the Corps' "Manatee Key," which is now being revised

- Provided comments to the DEP for their proposed Noticed General Permit, which will allow easier permitting for some types of boat ramps while maintaining protection for manatees and their habitat. Staff also testified in favor of this rulemaking during a rule development workshop.

- Revised the manatee observer approval process and drafted marine species observer guidelines to streamline this process.

- Facilitated agency Right Whale comments for a newly proposed navy training range and activities in the Atlantic Ocean.

- Revised permanent manatee educational sign brochure.

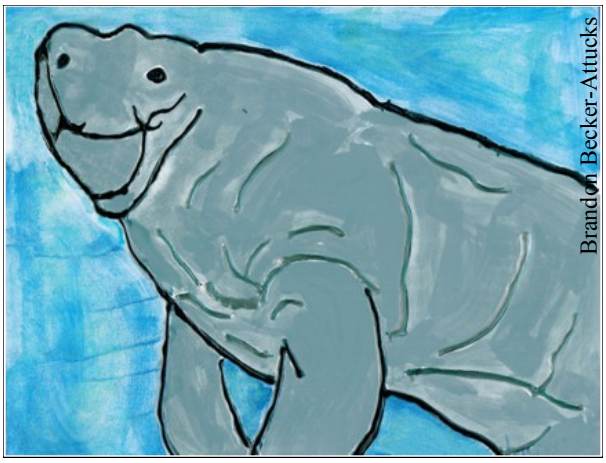
- Drafted a template/outline to be used for new and revised MPPs. This first draft is currently under review by the USFWS.

- Continued development of a state consultation guide similar to the federal "Manatee Key," which once completed should facilitate state permitting and complement the federal permit process.

- Began data analysis and collection for the development of a relative risk assessment, to guide manatee management priorities after 2012.

Rule Administration

management activities



The FWC's Imperiled Species Management section oversees promulgation of manatee protection rules, including boat speed zones and restricted access areas, and administers activities related to these rules. 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. (See Chapter 7, "Management Actions", p. 36, Manatee Management Plan)

2009–2010 highlights

Broward County (68C-22.010, FAC) – The Manatee Management Plan identifies this rule for review. During the last few months of 2009 and early 2010, FWC reviewed new and old data and identified areas that needed further review for possible changes to the existing manatee protection rule. FWC coordinated with law enforcement as well as County staff before notifying the Broward County Commission in March 2010 that the County needed to form a Local Rule Review Committee (LRRC) to provide input on any potential rule changes, pursuant to §379.2431(2)(f), F.S. The County appointed the LRRC members in April 2010, and the LRRC held several organizational meetings in June. The LRRC is expected to meet through August 2010 and submit its report by the end of that month.

Flagler County (and coastal St. Johns County) – The Manatee Management Plan identifies this area for review. During the last few months of 2009 and early 2010, FWC reviewed available data for both counties and identified areas that needed further evaluation to determine if new zones were needed. FWC determined that Flagler County should be evaluated for new zones. FWC notified the St. Johns County Commission in March 2010 that no rule making was warranted unless the County disagreed. St. Johns County concurred with the FWC determination. In March 2010, FWC coordinated with Flagler County staff before notifying the Flagler County Commission that the County needed to form a LRRC to provide input on potential new zones, pursuant to §379.2431(2)(f), F.S. Flagler County appointed its LRRC members in May 2010. The LRRC met four times in May and June 2010, and is expected to complete its work and submit its report by the end of July 2010. FWC attended all of the LRRC meetings to provide assistance and answer questions.

Pinellas County (City of Gulfport) – In April 2009, staff of the City of Gulfport sent a draft local manatee protection ordinance to FWC's Imperiled Species Management section for preliminary review and comment. After obtaining some additional information from the City, the Imperiled Species Management section provided comments back to the City in September 2009. As of the end of June 2010, the City had not submitted a formal ordinance or sought additional information from FWC.

Sarasota County (68C-22.026, FAC) – The Manatee Management Plan identifies this rule for review. Consideration of the potential need for rule changes began in late 2008 and continued into FY 2009-10. The LRRC that had been formed by Sarasota County in May 2009 pursuant to §379.2431(2)(f), F.S. held its final meeting in July 2009 and submitted its report at the end of the month. FWC attended all of the LRRC meetings to provide assistance and answer questions. FWC reviewed the LRRC report and re-evaluated all potential rule changes before preparing the required written response to the LRRC report. In December 2009, FWC's Imperiled Species Management section presented a draft rule to the FWC Commissioners. A proposed rule was published in February 2010 and FWC's Imperiled Species Management section conducted a public hearing in Sarasota in March. FWC Commissioners approved final rule amendments in April 2010 and filed the rule for adoption in June 2010.

Permit Rule for Commercial Fishing and Professional Guiding Activities (68C-22.003, FAC) – The Manatee Management Plan identifies this rule for review and recommends that available permits be scaled back so that permits are only available to commercial fishers while actively setting nets. In September 2009, FWC prepared an issue paper to discuss potential rule changes. FWC solicited input from current permit holders and various stakeholder groups and held four public meetings at various locations around the state in October 2009. In December 2009, FWC's Imperiled Species Management section updated FWC Commissioners and recommended consideration of potential changes be put on hold until the economy improves. No timeline for reconsidering this issue has been set. (see Chapter 6, "Permitting Framework," p. 33, Manatee Management Plan)

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

- In April 2009, FWC received a request from an airboat tour operator for a variance allowing higher speeds while conducting tours in the Goodland Bay area of Collier County. FWC's Imperiled Species Management section coordinated with various law enforcement agencies and other interested parties and also requested additional information from the applicant. In September 2009, FWC issued an order denying the petition because issuance of the requested variance would not meet the purposes of the underlying statute, §379.2431(2), F.S.

- In March 2010, FWC received a request for a variance allowing higher speeds in the Jensen Beach area of Martin County for a powerboat racing event. A Notice of Receipt was published in April 2010 but the applicant withdrew the request later that month.

- Also in March 2010, the FWC received a request from a "wakeskater" for a variance allowing higher speeds in western portions of Manatee County while he trained and performed other activities associated with his professional wakeskating career. A Notice of Receipt was published in April 2010. FWC's Imperiled Species Management section coordinated with various law enforcement agencies and other interested parties and also requested additional information from the applicant. Review of this request was ongoing as of the end of June 2010.

2009–2010 highlights, continued


Terri Calleson

Permits – Rule 68C-22.003, FAC, allows FWC to issue a number of different types of permits for activities that would otherwise be prohibited by the manatee protection rules. The most numerous of these permits 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. Staff worked on six requests for other types of permits during the fiscal year.

- In September 2009, FWC received a request from the Boston Whaler boat manufacturer to renew its vessel testing permit in coastal Volusia County. After requesting and receiving additional information, FWC issued a new permit in March 2010.

- In October 2009, FWC received a request from the U.S. Geological Survey Sirenia Project for a permit to allow access to No Entry zones near the power plants in Brevard County in order to conduct research. The FWC issued a permit in November 2009.

- In November 2009, FWC received a request from a consultant for a permit to allow access to the zone where motor boats are normally prohibited in Palm Beach County for environmental monitoring. The request was associated with the Florida Power and Light (FPL) Riviera Beach power plant conversion project. After requesting and receiving additional information, FWC issued a permit in December 2009.

- In February 2010, FWC received a request from Mote Marine Laboratory for a permit to allow higher speeds in portions of Manatee and Sarasota counties in order to conduct dolphin captures and health assessments research. FWC issued a permit in May 2010.


Photo by Jay Gorzelany

Data Distribution and Technical Support

management activities

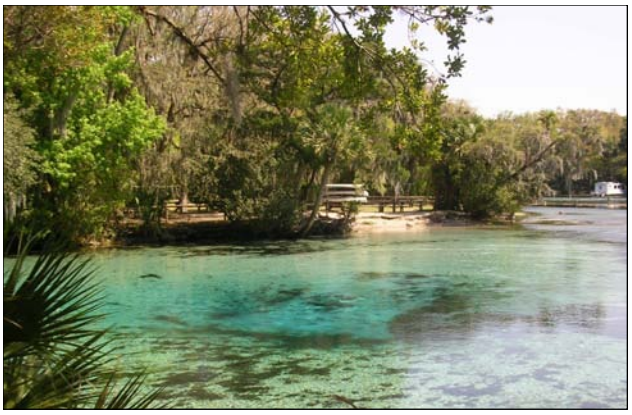
ISM staff provides manatee-related data and analysis for both internal and external use. This data can be viewed using geographic computer programs that display information on maps. Internal users are staff who work on manatee rule promulgation, permit reviews, manatee protection plans, habitat protection, and outreach materials. External customers include environmental consultants, state and federal agencies, local governments, stakeholders, and interested members of the public. Much of this data is made available via the FWC website as well.

2009–2010 highlights

- Prepared data and assisted in analysis and documentation for the Sarasota County and Broward County rule reviews.
- Aided with data analysis and mapping in preparation for upcoming revisions to the Sarasota, Duval, and Collier counties MPPs.
- Continued preparations for implementing the federal "Manatee Key" via a GIS format for use by state permitting agencies. This effort should improve permitting efficiencies and eliminate the need for review by FWC.
- Continued a joint FWC/USFWS boat facilities mapping project and completed Duval County.
- Received and reviewed ten years of aerial survey data from the Crystal River Refuge.
- In response to the Deepwater Horizon oil spill, data support was provided to the Emergency Operations Center and FWC staff, including wildlife & habitat reconnaissance flight path digitization, database development, and wildlife recovery.
- Assisted in the creation of new manatee educational entanglement sign.

Habitat Characterization, Assessment and Protection

management activities



The long term conservation of manatees relies on having enough healthy, suitable habitat available throughout their range in Florida. Human-related activities have over time resulted in habitat destruction and reduced water quality. These activities have caused loss of seagrasses – the manatee's primary food. 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. Anticipated operational changes at power plants and future power plant retirements also pose possible threats to established artificial warm-water refuges. Understanding the manatee's habitat needs and habitat carrying capacity and assuring habitat health and stability is a primary focus of habitat protection programs. (See Chapter 7, "Management Actions," p.55 Manatee Management Plan)

2009–2010 highlights

Structure Related Manatee Deaths

- Four manatees died as a result of interactions with water control structures during the past year. These four deaths increase the overall total of water control structure - related deaths to a total of 196 since 1974. The average annual number of structure-related deaths before retrofitting structures with manatee protection devices was 6.5 manatees per year from 1974 to 1999. That number has decreased to a post-retrofitting average of 3.5 manatees per year (2000 to 2009). There are only two remaining water-control structures requiring installation of manatee protection devices and these should be retrofitted over the course of the next two years, assuming continued funding. Overall, coordinated efforts are having a significant influence on reducing structure-caused mortality at retrofitted structures (see Chapter 7, "Management Actions," p.63, Manatee Management Plan).
- FWC coordinates with the Corps, the South Florida Water Management District and the Southwest Florida Water Management District to address central and south Florida water control structure-related manatee mortality issues through the Interagency Task Force for Water Control Structures. Members of the task force working to resolve issues related to the replacement of the acoustical array at the Cape Canaveral Locks is a great example of the group's accomplishments this past year. Concerns raised by other stakeholders including recreational boaters, the U.S. Coast Guard and NASA have been resolved and repairs should be completed by June 2011. The task force has also provided comments on a revision of the Corps' Manatee Protection Plan's Standard Operating Procedures related to the operations of water-control structures and navigational locks. FWC staff chair the task force.

2009–2010 highlights, continued

Manatee Warm Water Habitat

A major focus of the Manatee Management Plan is addressing the long-term availability of warm -water habitat, as this type of habitat is necessary for the long term viability of the manatee population in Florida waters. Generally, warm-water habitat consists of natural springs and the warm-water effluent produced by power plants. (See Chapter 7, "Management Actions," p.56, Manatee Management Plan).

Springs

- FWC is working with the Water Management Districts 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 Springs, Fanning Springs, and the Weeki Wachee Spring system have all been developed using criteria to protect winter warm-water manatee use.

- FWC is working with The Nature Conservancy (TNC) and the U.S. Fish and Wildlife Service (USFWS) to identify and complete restoration and enhancement projects for Florida springs systems that will improve manatee access to warm-water habitat. To date, staff has identified a potential restoration project at Fanning Springs that will enhance access to the spring for manatees and Gulf sturgeon. Currently, TNC has provided funding for an engineering feasibility study and FWC's staff Aquatic Habitat Restoration and Enhancement Section will provide funding to complete the project during the 2011-2012 funding cycle.

- FWC staff evaluated both Manatee Springs and Weeki Wachee Springs to see if manatee access could be improved. It was ultimately decided that these two spring systems had adequate access for manatees at this time.

- FWC worked with Sarasota County and several volunteers to remove a weir from the Warm Mineral Springs run, which will enhance spring flow and increase manatee access to natural warm water.

- FWC staff worked with the USFWS to ensure continued manatee access at Sulfur Springs, via a permit request from the City of Tampa to modify the weir at the spring. A plan was developed to ensure that manatees have adequate warm water at the spring during the winter and that operation of the weir will not affect manatee use.

- The 2009-10 MFLs that have associated manatee habitat and are scheduled for development in the upcoming year include Homosassa Springs and the Chassahowitzka River. FWC staff will provide manatee protection information and technical support to Water Management District staff for both these sites (See Chapter 7, "Management Actions," p.60, Manatee Management Plan).

Power Plants

- FWC completed negotiations with Florida Power and Light regarding the necessary short- and long-term measures that are needed for manatee protection during the conversions of the Cape Canaveral and Riviera Beach power plants. Both plants will be required to have an interim warm-water refuge while their primary discharges are offline. Additionally, both plants are required to develop Environmental and Biological Monitoring Plans to be implemented during the conversion process and post conversion, which will last through 2016. These plans will provide for temperature monitoring of the interim thermal refuge and the refuge post -conversion. Manatee distribution data will be collected via aerial surveys and manatee movement data will be collected from satellite tagged manatees and will provide information regarding manatee distribution and identify high-use areas during the winter cold season. In addition, daily health assessments at the interim warm-water refuge are required, so any manatees that may be suffering from cold-stress related symptoms can be identified quickly and an appropriate response can be conducted by FWC or its partners.

- FWC coordinated with power companies during this past winter to insure that individual power plants were adhering to their operational National Pollutant Discharge Elimination System mandated Manatee Protection Plans. Although the power plants maintained warm-water discharges through most of the winter, the extreme cold of 2010 resulted in numerous mechanical difficulties that complicated the operation of power plants throughout the state. These complications provided additional difficulties for manatees seeking consistent warm-water habitat.

- An additional complication to last winter's artificial warm-water concerns was the decision by Reliant Energy to take their Indian River power plant off -line for the foreseeable future and possibly permanently. Reliant did provide one unit on standby to run in case manatees came to the former discharge seeking warm-water. However, this system was not operated after January since manatees went to the more consistent discharge at the FPL Canaveral Power Plant. (See Chapter 7, "Management Actions" p.56, Manatee Management Plan).

- FWC staff coordinated with U.S. Fish and Wildlife Service partners to develop and review a Carrying Capacity study funded by the USFWS that would provide a more quantifiable estimate of the manatee population carrying capacity of warm-water and foraging habitat in Florida waters. The study is currently nearing completion and a report will be generated.

Seagrass Protection

- FWC continued working to address the protection of Florida's seagrass resources. These efforts have provided seagrass protection protocols and recommendations for coastal construction permits as well as initiating restoration and monitoring projects. (See Chapter 7, "Management Actions" p.62, Manatee Management Plan)

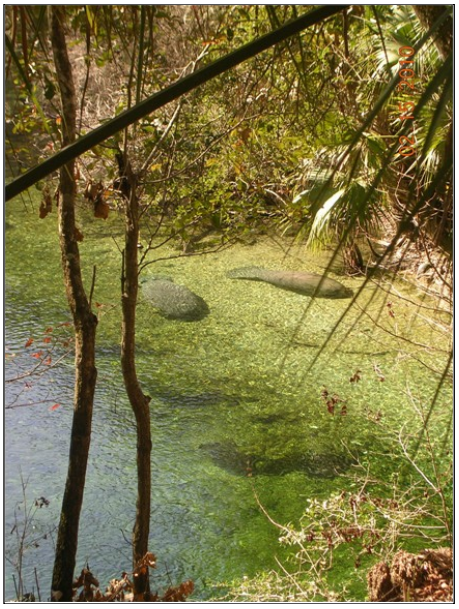
- FWC assisted in conducting seagrass surveys throughout the Big Bend region of Florida, specifically in St. George Sound (Franklin County), St. Andrews Bay (Bay County) and the Indian River Lagoon (St. Lucie County). In addition, staff conducted seagrass surveys to provide baseline information in advance of the Deepwater Horizon oil spill. Staff continues to coordinate with federal partners on damage assessments to seagrasses related to the oil spill as they relate to the Natural Resource Damage Assessment process.

- ISM staff completed field work for a seagrass restoration project in St. Andrews Bay in 2010 and will have a final report in FY 2010-2011. This project looked at repairing prop scars in shallow seagrass beds and using non-regulatory signs to inform vessel operators of the seagrass beds in an effort to reduce future seagrass damage due to prop scars.

- FWC is jointly working to review the use of mooring fields throughout the state as a way to enhance boating in state waters and to reduce adverse effects to marine resources such as seagrass. The use of moorings has been beneficial in reducing adverse effects to hardbottom and coral resources, so the agency is developing a research project to determine whether the same benefits can be verified for seagrasses. FWC is working with DEP staff to identify potential study sites in various locations in the State.

Aquatic Plant Management

- Staff worked to control invasive, non-native aquatic plants and encourage the establishment of native species, particularly in springs systems used by manatees. (See Chapter 7, "Management Actions" p.66, Manatee Management Plan).
- FWC maintained representation on various working groups including the Blue Spring Aquatic Plant Management Working Group and the Crystal River Aquatic Plant Management Working Group.
- Interagency coordination continued with the conservation and restoration of submerged aquatic vegetation in Kings Bay (Citrus County).



Outreach and Information

management activities

Public outreach regarding manatee conservation programs is important so that the public is well-informed about manatees and understands the reasons for the various manatee protection activities. Knowledge of manatee habitat requirements, behavior, and general biology can help the public and waterway users understand ways they can reduce human-related risks to manatees. FWC staff who focus on outreach and information provide a wide array of materials to a variety of audiences. The goal is to provide factual, timely information appropriate to the targeted user groups (See Chapter 7, "Management Actions" p.67, Manatee Management Plan).

Staff edited and reprinted 10,000 copies of the *Florida manatee, Florida treasure* brochure. The "Ask FWC" service on the agency's website generated 848 hits for manatee-related questions posted in the system. Fifty-six questions from the public required more detailed response and investigation. Staff fulfilled 164 requests for printed materials with the majority of the requests for bulk orders. Many of these were for school programs, environmental education centers, county programs and festivals. Manatee displays were set-up at the St. Mark's National Wildlife Refuge, and the Citrus County Manatee Festival (two-day event) at Crystal River. Manatee and other imperiled species information were displayed at the Earth Day at the Capitol Event. Outreach staff concluded the "Wild Treasures of Brevard County– the imperiled species discovery series" and produced a final report.

Appendix

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

Appendix A:
Acronyms and Abbreviations

°C — degrees Celsius
cm — centimeters
Coast Guard— US Coast Guard
Commission, Commissioners — Governor-appointed body and/or members of the FWC Commission
the Corps — U.S. Army Corps of Engineers
DEP—Florida Department of Environmental Protection
DTAG — Digital Acoustic Recording Tag
°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
FPL – Florida Power and Light Company
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
kg — kilogram
°C — degrees Celsius
LRRC—Local Rule Review Committee
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
NGO — Non-Governmental Organization
°C — degrees Celsius
NMV—non-motorized vessel
NOAA — National Oceanic and Atmospheric Administration
RAI—Request for Additional Information
SEIT — Southeast U.S. Right Whale Recovery Plan Implementation Team
TNC—The Nature Conservancy
Trust Fund — Save the Manatee Trust Fund
UF—University of Florida
USFWS — U.S. Fish and Wildlife Service
USGS — U.S. Geological Survey

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 created in 1990 as per §320.08058(1)(c), and §379.2431(4)(d), F.S., to raise funds for manatee research and protection. To date, over 753,263 manatee license plates have been issued and over $37,190,974 collected to fund manatee research and protection in Florida.

The manatee license plate, once the most popular specialty license plate in Florida, is now the sixth most popular. 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 newer plates, and it had not been redesigned since its inception. Statutory changes now allow a portion of the license plate funds to be used for promotion and marketing (§379.2431 (4)(d), F.S.). 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 $1,334,437 in revenue in FY 2009-2010. Over the next few years, FWC projects a 20% increase in revenue as a result of improved marketing and availability of the redesigned plate.

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. This year the decal design was produced in-house. 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 outreach. During FY 2009-2010, 5,816 manatee decals were sold and raised approximately $29,080 for manatee protection.

2009-2010 Decal


Kit Curtain