SAVE THE MANATEE TRUST FUND

FISCAL YEAR ANNUAL REPORT

JULY 1, 2015—JUNE 30, 2016

Florida Fish and Wildlife
Conservation Commission

MyFWC.com

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

1-888-404-FWCC (3922)

to report fish and wildlife violations, as well as manatee injuries and mortalities

Nick Wiley, Executive Director

Gil McRae, Director
Fish and Wildlife Research Institute

Leslie Ward-Geiger, Section Leader
Marine Mammal Research, Fish and Wildlife Research Institute

Carol Knox, Section Leader
Division of Habitat and Species Conservation

Ron Mezich, Biological Administrator
Imperiled Species Management, Division of Habitat and Species Conservation

REPORT CONTRIBUTORS:

Editing and Coordination Jamie Shelley, Andrea Mosier
Review Ron Mezich, Leslie Ward-Geiger
Content Bonnie Abellera, Scott Calleson, Dr. Chip Deutsch, Dr. Martine deWit, Mary Duncan, Dr. Holly Edwards, Tim Gowan, Katie Jackson, Carol Knox, Ron Mezich, Tom Pitchford, Kari Rood, Kent Smith, Donna Szemer, Leslie Ward-Geiger, Hope White
Layout Jamie Shelley
Cover photo FWC biologists rescue an injured manatee
Photographs Courtesy of FWC, unless otherwise noted

Research activities involving live manatees were conducted under Federal permit #MA773494

SAVE THE MANATEE TRUST FUND

Annual Report

FY 2015-2016

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

Table of Contents

Executive Summary

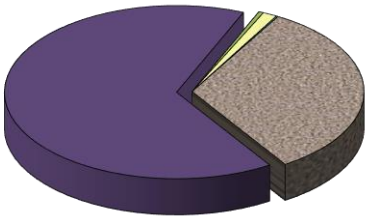
The Florida Fish and Wildlife Conservation Commission (FWC) is pleased to submit the annual report on the expenditures from the Save the Manatee Trust Fund (Trust Fund), per section 379.2431(4)(b), Florida Statutes (F.S.). The Trust Fund is the primary source of funding for the State's manatee-related research and conservation activities. As required by Florida law, the report is provided to the President of the Florida Senate and the Speaker of the Florida House of Representatives by December 1, annually. This report covers the period from July 1, 2015 through June 30, 2016.

A key component of FWC's guiding conservation goal for the Florida manatee is to effectively manage the wildlife resource in perpetuity throughout Florida. The word "perpetuity" underscores the commitment of the agency to manage this treasured public trust resource for intergenerational benefit. Several conservation objectives, laid out in FWC's Manatee Management Plan, highlight essential information needs and actions in line with the principal responsibility to maintaining viable wildlife populations that are capable of enduring environmental catastrophes, periodic large-scale die-offs, changes in environmental conditions, and human-related stressors. FWC highlights important steps made in carrying out conservation plans throughout this and previous annual reports. These steps include using sharper science to build upon species and habitat knowledge in support of effective management actions. With the long-term support of the Trust Fund, FWC has developed state-of-the-art techniques to monitor manatee abundance, trends in abundance, and threats using data from multiple research efforts, such as aerial surveys, high quality cause of death evaluations, statewide rescue operations, survival rate estimation, risk estimators/assessments, and habitat quality. The rigor and investment in these approaches is appropriate and necessary given the many environmental challenges faced by Florida. Evidence contained in this annual report, such as anthropogenic-related mortality and rescues, underscore the conservation reliance of the species-meaning that threats cannot be eliminated, but only managed. Through sound conservation practices and strong public stewardship, the species can be sustained and human-related threats reduced. The significant achievements made thus far as well as ongoing and future commitment to monitoring, evaluation, and timely management actions position FWC along with many conservation partners to successfully fulfill public trust obligations; ensuring with high certainty the long-term persistence and vigor of the Florida manatee population.

These activities are possible because of the funding of the Trust Fund. The Trust Fund receives money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. Revenues for FY 2015-2016 totaled $3,826,539. Appropriations from the Trust Fund for the same period were $3,836,602, with $325,000 provided for manatee research activities at Mote Marine Laboratory (Mote), and a service charge to General Revenue of $304,874 that most trust funds are required by law to pay. In FY 2015-2016, FWC's Division of Habitat and Species Conservation expended $1,079,716 for conservation activities and the Fish and Wildlife Research Institute expended $1,871,174 on research and monitoring. Details of revenues, appropriations, and expenditures are shown on page 6 of this report.

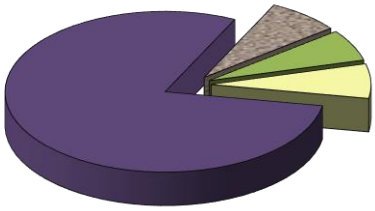
Trust Fund FY 2015–2016 Revenues and Expenditures

REVENUES
$3,826,538



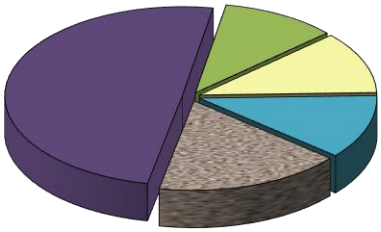
- Save the Manatee License Plate ($1,246,478)
- Vessel Registrations ($2,504,387)
- Interest ($17,446)
- Decals and Donations ($51,807)
- Sale of Surplus Property ($6,420)

APPROPRIATIONS
$4,421,401



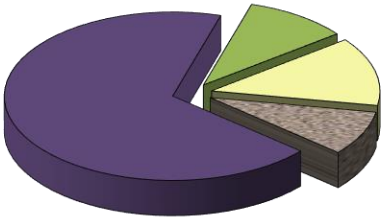
- FWC Manatee Program ($3,511,602)
- Mote Marine Laboratory ($325,000)
- Administrative Overhead ($279,925)
- Service Charge to General Revenue ($304,874)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES
$1,079,716



- Manatee Protection Zones ($183,843)
- Plan and Permit Reviews ($536,061)
- Habitat Protection ($113,677)
- Data Distribution ($121,344)
- Public Outreach ($124,791)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES
$1,871,174



- Behavioral Ecology ($158,982)
- Mortality and Rescue ($1,278,853)
- Photo Identification (Life History) ($186,824)
- Population Assessment and Monitoring ($246,515)

Manatee Basics

COMMON NAME Florida manatee

SCIENTIFIC NAME *Trichechus manatus latirostris* (Order: Sirenia)

STATUS Endangered (Federal)

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

MAXIMUM CENSUS 6,250 in 2016

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

A CLOSER LOOK

Adult manatees average 8-10 feet (2.5-3 meters) in length and weigh around 1,000 pounds (454 kilograms). The largest manatees may reach 14 feet (4.2 meters) in length and weigh over 3,500 pounds (1,588 kilograms). 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 meters) 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. Manatees 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 in waters warmer than 68°F (20°C). 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.

Florida Manatee Management Plan

"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."

The Florida Manatee Management Plan (Plan), approved at the December 2007 FWC Commission meeting, guides key conservation work supported through the 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 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 report serves as a way to present progress in implementing key conservation strategies described in the Plan.

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. The responsibility of manatee carcass salvage and necropsy, and field coordination of the rescue program were transferred to the State of Florida by the U.S. Fish and Wildlife Service (USFWS) in 1985; therefore, now rest largely with FWC's Fish and Wildlife Research Institute (FWRI).

FWC staff members from five coastal field stations retrieve all reported carcasses, a key monitoring activity described in the Plan. 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 FWC'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[1] (UMEs). Through this work, FWC contributes significantly to the evaluation of threats facing Florida manatees and provides key information to resource managers and partner agencies. MMPL makes timely mortality information available on the FWC website (http://myfwc.com/research/manatee/rescue-mortality-response/mortality-statistics/).

In addition to manatee carcass salvage, FWC receives calls from the public reporting manatees in distress. Field staff members respond to these calls, coordinate rescues, and when necessary, transport manatees to rehabilitation facilities.

FWC is a contributing organization to multiagency efforts to release and track rehabilitated manatees that were rescued due to injury, cold stress, or other problems. The Manatee Rehabilitation Partnership consists of representatives from Federal and State agencies (USFWS, U.S. Geological Survey - USGS, DEP, FWC), academic institutions (University of Florida - UF), non-governmental organizations (Save the Manatee Club, Sea to Shore Alliance), and private oceanaria (Cincinnati Zoo, Columbus Zoo, Lowry Park Zoo, Jacksonville Zoo, Miami Seaquarium, Mote, The Seas at Epcot, Sea World Orlando, South Florida Museum).

[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.

FY 2015–2016 highlights

- Statewide, there were 466 manatee carcasses documented in Florida during FY 2015-2016. All but 35 were recovered and examined. Additionally, five carcasses were documented in Georgia, one in Mississippi, one in Maryland, and one in Alabama.

- Eighty-eight rescues were performed statewide during FY 2015-2016. As of October 11, 2016, 49 of the manatees rescued statewide were released back into the wild, 25 died, and the remaining 14 animals were still being rehabilitated in facilities around the State.

- A Manatee Unusual Mortality Event declared for Indian River Lagoon in 2012 continued during FY 2015-2016. During this time, 11 manatee deaths were documented in this event. The cause of the UME is still under investigation.

- Researchers collected tissue samples for genetic analysis from most carcasses. Other samples were collected for advanced diagnostic analyses, aging, and requests from external researchers.

- MMPL staff members conducted several capture training sessions in order to build and sustain a network of trained stranding partners in the Florida Panhandle.

Manatee Mortality FY 2015-2016

Cause of Death	*Number of Deaths*
Human—Flood Gate or Canal Lock	3
Human—Other (entanglements, etc.)	7
Human—Watercraft Related	99
Natural—Cold Stress	18
Natural—Other (includes red tide)	69
Perinatal (total body length less than 150 centimeters or about 5 feet)	102
Undetermined (decomposed or other)	133
Verified, Not Recovered	35
Total	466

Manatee Rescues FY 2015-2016

Type of Rescue	*Number of Rescues*
Calf—Alone	8
Calf—With Rescued Mother	4
Mother—With Rescued Calf	1
Human—Entanglement	14
Human— Entrapment*	7
Human—Watercraft- Related	27
Human—Other	1
Natural–Includes Red Tide	22
Undetermined; Other	4
Total	88

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

Population Monitoring and Assessment

research activities

FWC 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 population size and probability of persistence into the future (i.e., risk of extinction).

In December 2015 an aerial survey was flown on the west coast of Florida, from the Alabama-Florida State line to Monroe County, to estimate manatee abundance. The east coast of Florida will be surveyed in December 2016. These surveys will then be combined and analyzed using newly designed methods resulting in an updated statewide abundance estimate. The findings from this survey approach represent a significant improvement over the traditional synoptic survey. Results from synoptic surveys, flown after winter cold fronts, provide a minimum number of manatees known to be alive using warm water and winter habitats on a particular survey day. Synoptic surveys are conducted annually, weather permitting, pursuant to section 379.2431(4)(a), F.S. A traditional synoptic survey was conducted in February 2016. While survey conditions aided biologists in documenting a record high manatee count (6,250),the count was not a statistical estimate of total population size nor was it comparable to previous synoptic counts. This limitation is because of the inability to account for manatees not seen during the synoptic-style fly over (related to weather and water conditions and manatee behavior), which results in counts that vary widely across surveys.

The abundance survey is a benchmark achievement in monitoring Florida manatees. The new survey design provides a sound estimate of the Florida manatee population. Reliable estimates can be used to track population changes over time; and as part of population projection models to provide valuable feedback to conservation managers. Abundance estimates will be included in future comprehensive population models, which will provide conservation managers with robust evaluations of the population and incorporate the most current information regarding the biology of manatees as well as leading threats to their long-term survival.

FWC researchers have been working closely with partner agencies to revise and combine multiple sources of manatee monitoring information; such as adult survival rates and reproductive rates obtained through photo-identification studies. Updated population models and data from monitoring programs will help researchers better understand the long-term implications of recent unusual mortality events on manatee population projections.

Reliable population models include information on manatee life history, essential for

assessing manatee population dynamics and recovery. Specifically, long-term data on survival of individuals and reproductive performance of mature females are included within 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 are usually the result of encounters with boats, but they can also be caused by entanglement in fishing gear, cold-stress lesions, and injury caused by infections. This research is conducted through a partnership between FWC, the U.S. Geological Survey (USGS), and 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 and reproductive rates, and reproductive parameters such as calving intervals (time between births), and length of calf dependency.

Demographic parameters in need of refinement to better model manatee status and recovery include annual reproductive rates, annual gender-specific movement between the northwest and southwest federal management units, gender-specific adult survival rates in the southwest region, and survival rates for calves and young adults. These parameters can sometimes be difficult to estimate through photo-identification because of unfavorable photographic conditions and limited animal accessibility. 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. FWC implemented a genetic identification (ID) sampling program in 2008 to collect skin biopsy samples from wild manatees and have included these samples in a genetic-ID database. Once the genetic-ID database includes enough years of sampling, it can be used to help estimate these population parameters through statistical analysis. FWC continues to conduct dedicated genetic sampling surveys in southwest Florida during the winter and is collaborating with USGS to develop statistical models that integrate population data.

FY 2015–2016 highlights

- A record-high count of 6,250 manatees resulted from the 2016 synoptic survey effort and represents a minimum number of manatees known to be alive using warm water and winter habitats over the particular survey days.

- FWRI St. Petersburg based staff members and interns spent over 80 days conducting land and boat-based photo-ID research during 190+ visits to sites used by manatees. Additionally, other FWC volunteers, research partners, and field lab staff statewide photo-documented manatees. More than 17,000 images documenting the unique features of individual manatees were taken and archived by FWC. Manatee photo-ID data were processed and analyzed in order to support updated adult survival and reproductive rates—key input parameters in ongoing population modeling efforts. Data for the southwest region through April 30, 2015, was made available for analyses.

- One hundred fifty-five manatees meeting specific photo-ID criteria were added to the southwest portion of the MIPS catalog of uniquely identifiable animals. The statewide MIPS catalog currently includes 3,909 animals.

- Genetic sampling surveys were conducted in southwest Florida. A total of 528 samples were collected from free swimming manatees: 101 samples at Port of the Islands (Collier County), 211 samples in the Orange River (Lee County), and 216 samples in the Tampa Bay area.

- The manatee genetic-ID database currently includes 1,595 unique individuals identified by skin samples collected from live manatees in our southwest Florida pilot study area.

Photo-ID cataloged manatee known as TB496 with first-year calf at Tampa Electric Company's Big Bend Power Station discharge canal.

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 Global Positioning System (GPS) locations provide a detailed record of manatee movements over long periods of time. In the field, biologists locate these study animals by homing in on the tag's unique radio signals in order to obtain data on behavior, group size, and habitat attributes. 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 or decline of industrial and natural spring sources is deemed a key long-term threat to the manatee population. With the shutdown of four power plants along the east coast since 2010, one permanently and three for repowering, the warm-water network that manatees have relied on has been changing. The principal focus of multiagency monitoring efforts since that time has been on how manatees respond to a change in primary warm-water habitat associated with the modernization of the Florida Power & Light (FPL) Cape Canaveral power plant in the northern Indian River Lagoon (NIRL) near Titusville. In partnership with the USGS and primarily funded by FPL, FWC conducted a satellite-linked GPS tracking study to characterize manatee movements and use of warm-water sources and foraging habitat in the region. Temperature monitoring of known and potential warm-water sites was also a crucial part of the effort. The Plan provides further information on this subject (see Chapter 10, "Ongoing and Future Research" pp. 102).

Watercraft collision is the single greatest human threat to manatees in Florida and ongoing research efforts address various aspects of this issue. With support from Florida Sea Grant, FWC is collaborating with researchers and students at the University of Florida (UF) and the University of South Florida to develop a comprehensive risk assessment framework that quantitatively evaluates the probabilities of manatee-boat encounter, collision, and death as a function of boat speed and habitat variables. This project integrates information on the density and distribution of manatees and watercraft with data on manatee behavior, including swim speed, diving behavior, and response to approaching boats. This work will contribute to evaluation of high-risk areas, optimization of speed zone configurations, and conservation plans for protection areas. These projects address key issues identified in the Plan (see Chapter 10, "Ongoing and Future Research" p. 107).

FY 2015–2016 highlights

- To investigate manatee response to the repowering of the FPL Cape Canaveral power plant—including use of warm-water habitat and foraging movements in the NIRL—biologists captured, tagged, and tracked a total of 57 manatees with Argos-linked GPS tags during the five winters from 2010-11 through 2014-15. The data was analyzed and a comprehensive final report on the study was completed in 2016.

- Winter movements of these tagged manatees were dynamic. Their combined winter range extended along nearly 800 km of waterways from northeast Florida to Biscayne Bay. Manatees readily found and used the warm-water discharges that changed location during the FPL plant's modernization process. Adults commonly fasted for a week at a warm-water refuge during very cold periods, with the record being 32 days. Manatee foraging range was constrained by water temperature, shrinking considerably during cold weather, when foraging trips were often quite brief. Despite sometimes cold conditions in the lagoon, the manatees' use of warm-water refuges allowed them to limit their exposure to cold water.

- FWC monitored water temperatures during the winter with temperature data recorders placed at many warm-water habitats and associated ambient sites throughout much of the manatees' winter range. Several passive thermal sites (i.e., non-discharge sites such as canals) were investigated for their potential to provide sufficient warmth to sustain manatees through cold winter periods.

- A paper that presents a quantitative framework for estimating the probability of encounters between marine wildlife (i.e., manatees, right whales) and vessels was published in the peer-reviewed scientific journal, *Methods in Ecology and Evolution*. The mathematical analysis showed that the number of encounters between watercraft and manatees and/or whales increases with distance travelled by a vessel, and encounter rate increases with vessel speed.

- A paper that documents the effect of a manatee's diving behavior on their risk of collision with watercraft was published in the online peer-reviewed scientific journal, *PLoS ONE*. The study showed that manatees were found, on average, only 1.1 m (3.6 ft) below the surface, demonstrating how vulnerable this species is to vessel strikes. Despite the manatee's shallow-water lifestyle, the data loggers recorded maximum depths over a dredged shipping channel up to 16.2 m (53.1 ft), a record for a manatee!

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 [section 379.2431(4), F.S]. FWC collaborates with Federal, State, and non-governmental organization partners to carry out field research, mainly aerial surveys, biopsy sampling, disentanglement and stranding events. Efforts to protect this species are outlined in the North Atlantic Right Whale Recovery Plan (http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_right_northatlantic.pdf). The North Atlantic right whale is one of the most endangered large whales in the world with a population estimated at approximately 500 individuals. 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. Efforts to prevent human-caused mortality are a priority.

The southeastern U.S. is the primary calving area for the North Atlantic right whale. In 1994 and 2016, NOAA Fisheries Service designated portions of Florida and Georgia coastal waters as critical habitat. Federal and State efforts to protect right whales in their calving area resulted in the formation of the Southeast U.S. Right Whale Recovery Plan Implementation Team (SEIT), a multi-agency and citizen advisory group. FWC has been a member of the SEIT since its 1993 inception.

FWC has conducted aerial surveys to monitor seasonal presence of right whales, mitigate vessel-whale collisions, and assess population dynamics since 1987. An Early Warning System communication network, coordinated by NOAA Fisheries Service with assistance from FWC, is utilized to protect right whales from vessel collisions by notifying key agencies, ports, and mariners via email or text message when and where right whales have been sighted. FWC is also one of a handful of major contributors to the North Atlantic Right Whale Identification Database—the central repository for archiving and maintaining photographs and sighting data on right whales. Photographs taken by staff 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 human-related scars. Over time, population demographics, reproductive success, mortality, and trends in health are monitored in part through this photo-identification research, as well as through genetic sampling. FWC has worked closely with partners to compile years of aerial survey data into a GIS program. Analysis of these spatial data help 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.

FWC has developed the infrastructure and analytical tools for monitoring commercial vessel traffic in the right whale calving area using the Automatic Identification System (AIS). Commercial vessels are required by Federal regulations to be equipped with an AIS transponder and to broadcast their location and speed as determined by GPS. Ongoing analyses characterize vessel traffic patterns and estimate compliance with Federal speed

regulations. Data on whale distribution, habitat preferences, environmental conditions, and vessel traffic provides a framework for quantifying the risk of vessel strikes and informs and evaluates the effectiveness of proposed management plans.

FY 2015–2016 highlights

- In total, 34 individual right whales, including 14 mother-calf pairs, were documented in the southeastern U.S. during the calving season (November 15 – April 15).

- From December 1 – March 31, FWC collaborated with the Georgia Department of Natural Resources and Sea to Shore Alliance to survey between Canaveral National Seashore, Florida, and Sapelo Island, Georgia, out to approximately 30 nautical miles offshore. FWC conducted 56 aerial surveys and identified 117 right whales during preliminary photo analysis, of which 27 (including calves) were unique individuals.

- Biopsy (genetic) sampling was conducted in collaboration with NOAA Fisheries Service and the Georgia Department of Natural Resources. During the calving season, 53 vessel trips were conducted, resulting in samples from thirteen calves and 2 adult females. The skin samples will be used to determine individual identification, sex, and parentage. This information helps close demographic information gaps, improve population estimates and identify carcasses.

- Researchers completed the second field season of a multi-year, multi-agency tagging project aimed at improving minimally invasive satellite tags for right whales in order to better document habitat use and migration routes. These tags have been deployed on seven North Atlantic right whales. One whale's tag transmitted for 50 days and another for 15 days, but the rest lasted less than a week. This project is a collaboration between Alaska SeaLife Center/University of Alaska Fairbanks, FWC, Georgia Department of Natural Resources, NOAA Fisheries Service and Sea to Shore Alliance.

- Two adult females were documented in poor/declining health during the calving season: one with severe entanglement wounds and another with moderate entanglement wounds and an injury to the mouth. Both whales are unlikely to recover. More than 60 right whales with serious injury/human impact are currently being monitored by researchers. The majority of these injuries are entanglement related, followed by vessel strikes.

- FWC, in consultation with NOAA Fisheries Service, monitored two right whales that swam into Sebastian Inlet, February 8, 2016. The mother-calf pair appeared healthy so the goal was to quiet vessel traffic in the inlet and allow the whales to negotiate their exit without further human intervention. Research and stranding partners from Harbor Branch Oceanographic Institute, Hubbs-SeaWorld Research Institute and the Marine Resources Council, as well as FWC Law Enforcement were on-hand to assist with vessel traffic, crowd control, and education and outreach until the whales departed the inlet, February 9.

Research Publications and Reports

research activities

FY 2015-2016

Adimey, N.M., M. Ross, M. Hall, J.P. Reid, **M.E. Barlas**, L.W. Keith Diagne and R.K. Bonde. Twenty-six years of post-release monitoring of Florida manatees (Trichechus manatus latirostris): evaluation of a cooperative rehabilitation program. Aquatic Mammals 42(3):376-391. DOI 10.1578/AM42.3.2016.376

Deutsch, C. J. and **M. E. Barlas**. 2016. Manatee response to the conversion of the FPL Cape Canaveral power plant: Movements, warm-water habitat use, and thermal regime of satellite-tagged manatees during winters 2010-11 through 2014-15. Final Report to Florida Power & Light Company. FWC/FWRI file F2864-10-15-F. 113 pp. + appendices.

Deutsch, C. J. and **M. E. Barlas**. 2015. Manatee response to the conversion of the FPL Cape Canaveral power plant: Movements, warm-water habitat use, and thermal regime of satellite-tagged manatees during winter 2014-2015. Annual Report to Florida Power & Light Company. FWC/FWRI file F2864-10-A5. 76 pp.

Deutsch, C. J., S. M. Koslovsky, and **T. A. Cross**. 2015. Manatee warm-water refugia and mortality. Final Report to the Disney Worldwide Conservation Fund, through the Fish and Wildlife Foundation of Florida. Grant No. WFF-12-01 (FWRI Grant No. 4094). FWC/FWRI file F4094-12-15-F. 30 pp.

Edwards, H. H., and **B. B. Ackerman**, eds. 2016. Aerial surveys of manatee distribution in Florida, 1984–2004. Fish and Wildlife Research Institute Technical Report TR-1

Edwards, H. H., J. Martin, C. J. Deutsch, R. G. Muller, S. M. Koslovsky, A. J. Smith, and **M. E. Barlas.** 2016. Influence of manatees' diving on their risk of collision with watercraft. PLoS ONE 11(4):e0151450.

Nicholas A. Farmer, **Timothy A. Gowan**, Jessica R. Powell & Barbara J. Zoodsma. 2016. Evaluation of Alternatives to Winter Closure of Black Sea Bass Pot Gear: Projected Impacts on Catch and Risk of Entanglement with North Atlantic Right Whales Eubalaena glacialis. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science, 8(1): 202-221.

Harshaw, L. T., I. V. Larkin, R. K. Bonde, **C. J. Deutsch**, and R. C. Hill. 2016. Morphometric body condition indices of wild Florida manatees (*Trichechus manatus latirostris*). *Aquatic Mammals* 42(4): 428-439. doi:10.1578/AM.42.4.2016.428.

Martin, J., Q. Sabatier, **T. A. Gowan**, C. Giraud, E. Gurarie, **C. S. Calleson**, J. G. Ortega-Ortiz, **C. J. Deutsch,** A. Rycyk, and **S. M. Koslovsky**. 2016. A quantitative framework for estimating risk of collision between marine wildlife and boats. *Methods in Ecology and Evolution* 7:42–50. http://onlinelibrary.wiley.com/doi/10.1111/2041-210X.12447/epdf

L.N. Smith, D.S. Rotstein, R.L. Ball, T.J. Gerlach, M. Kinsel, M. Rodriguez, **M. de Wit**. 2015. Reproductive neoplasia in wild and long-term captive female Florida manatees (*Trichechus manatus latirostris*). Journal of Zoo and Wildlife Medicine 46(4):895-903.

Zoodsma, Barb, K. Howe, M. White, **J. Jakush**, C. George, **T. Gowan**, P. Hamilton, **K, Jackson**, **T. Pitchford**, C. Taylor, and **L. Ward**. 2016. North Atlantic Right Whale Calving Area Surveys: 2014/2015 Results. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFSSER-4, 10 p. doi:10.7289/V5/TM-NMFS-SER-4

*FWC authors in **bold typeface***

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, in Sarasota, Florida. The following projects were funded in FY 2015-2016:

- Photo-Identification and Genetic Sampling 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 FWC, USGS, and other partner organizations; 2) continue field work to perpetuate the long-term photo-identification and other data collection efforts in southwest Florida; and 3) contribute to genetic sampling of wild manatees.

- Manatee Rescue and Verification—Mote is 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.

- Assessment of water temperature data collection in southwest Florida—Mote conducted water temperature monitoring in association with photo-identification efforts to better understand winter-habitat of manatees. Mote studied a passive thermal basin in southwest Florida to better understand the ability of the basin to sustain manatees through cold winter periods.

- Aerial Surveys of Manatees— Mote staff participated in the statewide synoptic survey in February 2016. Mote also participated in the west coast Abundance survey that took place the week of December 1, 2015.

- Program Oversight— The program leader 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.

Manatee Forum

management activities

In 2004, FWC and the USFWS established the Manatee Forum, a diverse stakeholder group with the goal of reducing litigation by establishing areas of common ground, identifying problems or conflicts, developing potential solutions, and accepting differences through increased communication. During FY 2015-2016, the Manatee Forum met twice, once in November and once in May. During the November meeting, presentations were provided on manatee warm-water habitat, habitat restoration and manatee use of springs on the St. Johns River. The May meeting included updates on the USFWS proposed manatee reclassification, manatee entanglement in fishing gear (and other debris), and the FWC rule review of the Collier County manatee protection zones. FWC believes in the importance of having a stakeholder group focused on manatee issues. The opportunity for information exchange and the discussion of ideas is very valuable to all parties.

Photo of manatees foraging on smooth cord grass (Volusia County). Photo by Mallory Brooks, Marine Discovery Center

Manatee Protection Planning and Permit Reviews

management activities

FWC reviews proposed development projects and provides biological opinions to State regulatory agencies for Environmental Resource Permits, Sovereign Submerged Land leases, State Clearinghouse projects, Comprehensive Everglades Restoration Plan projects and Developments of Regional Impact. FWC 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).

FY 2015 – 2016 highlights

- FWC reviewed 307 requests to review and provide manatee protection recommendations for regulatory or planning actions being taken by the Department of Environmental Protection (DEP), the Water Management Districts (WMDs), the State Clearinghouse, the Department of Economic Opportunity (DEO), the Florida Department of Transportation (DOT), Florida ports, the U.S. Army Corps of Engineers (USACOE), and the USFWS. Staff provided recommendations of these 237 proposed actions.

- Manatees becoming trapped in culverts or pipes and requiring rescue or recovery occurred seven times during this time period. FWC management assists research staff on these incidents through the permitting process to ensure that adequate barriers are installed, if necessary, to prohibit future manatee entrapment.

- Nineteen boat facilities coordinated with FWC for manatee education materials or manatee informational signs for use at their facilities. Technical assistance and approval of manatee observers was provided for 12 projects with in-water work located important manatee habitat.

- Staff reviewed and coordinated new consultation procedures with U.S. Coast Guard Sector Miami and with the USFWS, in anticipation of a submittal for an Environmental Assessment regarding marine events.

- Staff continues revisions to the guidelines to protect manatees associated with the Comprehensive Everglades Restoration Plan (CERP), originally developed in 2006.

Florida Port Activities

FWC staff provided recommendations on how to offset expected impacts to manatees for proposed port projects. Reviews included submitted permit applications for Jacksonville Harbor, Canaveral Port Authority dredging, and minor work at Port of Palm Beach, Port

Everglades, Port Manatee and Mayport.

Manatee Protection Plans

- **Charlotte County MPP**: A final draft of the plan, which was drafted by Charlotte County and FWC, has been reviewed and approved by the USFWS as well as the local advisory committee. The next step in the process for approval is for the draft plan to be open for public review and comment. The final adoption by the County is expected in late summer 2016.

- **Miami-Dade County MPP:** FWC continues to provide technical assistance to the County in their efforts to revise their existing plan.

- **Flagler County MPP:** A final MPP was approved by Flagler County, FWC and the USFWS in May 2016.

Photo of a manatee trapped behind a weir that was later rescued (Hendry County).

Manatee Protection Zones

management activities

FWC establishes 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 FWC 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).

FY 2015–2016 highlights

- **Pinellas County** (68C-22.016, F.A.C.) — FWC staff began working on this project in late 2010 and most of the statutorily required work with the Local Rule Review Committee was completed in FY 2013-14. The majority of the formal rule making process for this rule occurred during FY 2014-15, including publication of a proposed rule in December 2014. Staff-conducted public hearings in Pinellas County in January 2015, and approval of a final rule by the FWC Commissioners occurred in June 2015. A Notice of Change was published early in July 2015, but adoption of the rule was delayed due to two rule challenges that were filed regarding the approved zones in Indian Rocks Beach. The rule was reconsidered at the November 2015 Commission meeting, where the FWC Commissioners approved a change to resolve the challenges. A second Notice of Change was published later that month and the final rule was filed for adoption with the Department of State in December 2015. Planning is underway to post regulatory markers for the new zones, with posting expected to occur this FY.

- **Collier County** (68C-22.023, F.A.C.) — The Plan identifies the Collier County rule as one of the next existing rules to be reviewed to determine if modifications to the manatee protection zones are needed(the rules for Sarasota County and Broward County were similarly reviewed during past fiscal years). FWC staff began compiling and reviewing data and coordinating with County staff and the city of Naples in 2014. FWC staff formally notified the County in March 2016 that rule changes were being considered and the County then formed a Local Rule Review Committee (LRRC) as required by statute. Staff held a public meeting in Naples in March and then presented preliminary information to the LRRC at its first meeting later that month. The LRRC met seven times through mid-May to discuss issues and develop recommendations. FWC staff attended every LRRC meeting either in person or by teleconference. The LRRC submitted its report to the FWC in late May. A Notice of Rule Development was published in June 2016 and staff conducted a public workshop in July. This rule action is expected to be completed in FY 2016-17, with a draft proposed rule considered by the FWC Commissioners in November 2016;d a final rule to be considered in the first half of 2017.

- **Flagler County** (68C-22.028, F.A.C.) — In August 2015, Flagler County requested an amendment to the existing rule to expand the zone near Lehigh Canal in association with planned boat facility development in the area. FWC staff formally notified the County in October 2015 that a rule change was being considered. Because this area had

already been reviewed in 2010, and in order to expedite the process, the County elected not to form a LRRC. The FWC Commissioners approved a proposed change at the February 2016 Commission meeting and the proposed rule was published in March. The final rule was approved by the FWC Commissioners in April 2016 and the final rule was filed for adoption with the Department of State in May 2016. Planning is underway to post revised regulatory markers, with posting expected to occur early this FY.

- **Citrus County** (68C-22.011, F.A.C.) — In September 2015, Citrus County requested an

Photo of an FWC public meeting held during the Collier County rule review. (Collier County).

amendment to the existing rule to address a regulatory marker issue on the Homosassa River. FWC staff formally notified the County in October 2015 that a rule change was being considered. In order to expedite the process, the County elected not to form a LRRC. The FWC Commissioners approved a proposed change at the February 2016 Commission meeting and the proposed rule was published later in the month. A Notice of Change was published in March to correct a transcription error and the final rule was filed for adoption with the Department of State in April 2016. Revised regulatory markers were posted in May.

- **Brevard County** (68C-22.006, F.A.C.) — In January 2016, Brevard County passed a resolution that included a request for the existing rule to be reviewed. A final order denying the request was issued in May 2016. The request was denied in part because no information was provided indicating that the existing zones were not appropriate and in part because there are other rules that have already been identified for review based on the age of the rule and the availability of data on which to base a review.

- **Local Ordinances** — FWC staff coordinated with staff from several local governments on issues related to potential or existing local manatee protection ordinances.

    - In November 2015, staff from the City of Cape Coral (Lee County) inquired about the potential for the City to establish local zones in the North Spreader Canal system. The City adopted a local ordinance (19-16) in April 2016 and the FWC formally approved the ordinance in June.

    - The City of Port St. Lucie (St. Lucie County) is considering a local ordinance to improve manatee protection on the C-24 Canal. City staff provided a draft ordinance in February 2016 and FWC staff is working with the City to review the draft and consider options. As of the end of the FY, the City had not taken any formal action on the ordinance.

    - Wakulla County also is considering a local ordinance to formally establish local zones on portions of the Wakulla and St. Marks rivers. Zones are already marked on these rivers, but the markers were never fully permitted so the County is working to correct this issue as well as similar issues with some local boating safety zones. As of the end of the FY, the County had not taken any formal action on an ordinance.

- **Boating Compliance Studies** — FWC completed the final report for the boating study conducted last fiscal year to evaluate changes in behavior and boater compliance with the manatee protections zones in Sarasota County. Staff also began a similar study evaluating western Pinellas County. The first data collection efforts are "pre-rule" observations in advance of the regulatory markers being posted for the zones that were adopted in December 2015. Observations from five land-based locations were collected over 80 survey days between August 2015 and July 2016. Collection of "post-rule" observations will begin after the zones have been posted for at least six months. An interim report on pre-rule data collection in western Pinellas County will be completed by December 2016.

- **Regulated Areas** — FWC staff continued work to develop county-specific GIS data layers that combine FWC manatee protection zones, boating safety zones, and USFWS manatee protection zones. This allows the calculation of acres of regulated water for each county and will eventually allow composite maps to be produced that show all three zones on the same maps (with the maps depicting the most restrictive zone if more than one apply to the same area). These efforts have been completed for counties on the Atlantic coast of Florida and are in process for the Gulf coast of Florida.

- **Variances and Waivers** — The variance and waiver process is governed by section 120.542, F.S., and Chapter 28-104, F.A.C. FWC did not receive any requests for variances or waivers from manatee protection rules during FY 2015-2016.

- **Permits** — Rule 68C-22.003, F.A.C., allows FWC to issue a number of different types of permits for activities that would otherwise be prohibited by the manatee protection rules. Most of these permits are for commercial fishing or professional fishing guide

activities. There are typically 150 – 200 of these permits in effect at any given time. FWC worked on six requests for other types of permits during FY 2015-2016.

- In July 2015, a permit was issued in response to the request from the Georgia Aquarium for a permit to allow higher speed boat operation during dolphin capture and health assessment activities in portions of Brevard County, as covered by a federal authorization issued by the National Marine Fisheries Service.

- In October 2015, a resident submitted a request for a permit to allow access to the No Entry zone in the Pansy Bayou in Sarasota County in order to construct a kayak launch. A permit was issued in November 2015.

- In October 2015, FWRI submitted a request for a permit to allow access to the No Entry zone in Salt Creek / Warm Mineral Springs in Sarasota County in order to install data loggers for research purposes. A permit was issued in January 2016.

- In November 2015, researchers at the University of Florida submitted a request for a permit to allow higher speed boat operation during turtle captures in the Tampa Bay area, as covered by a federal authorization issued by the National Marine Fisheries Service. A permit was issued in February 2016.

- In February 2016, Mote submitted a request to renew a permit allowing higher speed boat operation during dolphin research activities in portions of Manatee County and Sarasota County, as covered by a federal authorization issued by the National Marine Fisheries Service. Issuance of a permit is on hold, pending Mote's receipt of a new or extended federal permit. No additional activity had occurred as of the end of the fiscal year.

- In April 2016, the USACOE submitted a request to allow higher speed boat operation during aquatic plant control activities in portions of the St. Johns River in Volusia County. FWC staff has been working with USACOE staff and USFWS to review and evaluate the request. No final action had occurred as of the end of the FY.

Habitat Characterization, Assessment and Protection

management activities

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

FY 2015–2016 highlights

- FWC worked with FPL to ensure the presence of a manatee warm-water refuge at several power plants during their conversion from oil burning turbines to the more efficient combined cycle natural gas units. Power Plant conversions are complete at FPL Cape Canaveral, Riviera Beach, and Port Everglades Energy Centers and the data collected during these conversions will provide information regarding how manatees responded to changes in warm water availability along the east coast of Florida during the past six winter seasons. The monitoring that was conducted through the efforts of FPL and FWC will be useful to FWC and agency partners in developing future warm-water habitat plans.

- FWC staff, in coordination with USFWS, and other partner agencies, are leading an effort to review and update The Warm Water Action Plan. This document provides a long term planning tool for manatee warm-water habitat.

- FWC is working with a variety of partners to develop and complete a project to restore and enhance Warm Mineral Springs' downstream run (Sarasota County), considered the most important manatee natural warm-water refuge along Florida's southwest coast. This project will improve access and habitat quality for manatees, and the modeling and engineering work, funded through a cost share agreement between FWC and the USACOE, are expected to begin in fall of 2016. Agency staff are also working with the City of Crystal River, Citrus County, the USFWS, and the SWFWMD to stabilize the banks of the warm-water refuge at Three Sisters Springs (Citrus County). Construction on this project began in May of 2016 and is expected to be completed by the fall of 2016.

- FWC staff continues 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.

- FWC works to control invasive, nonnative aquatic plants and encourage the establishment of native species, particularly in springs systems used by manatees. This is achieved by participation on various aquatic plant working groups. The Blue Spring Aquatic Plant Working Group is one such group that works to implement an invasive aquatic plant management plan, and address warm and cold season treatment activities and other protection measures for manatees. FWC is also working with SWFWMD to develop revegetation and living shoreline projects within Kings Bay system.

- FWC participated in interagency coordination through such groups as the Kings Bay Working Group and the Springs Coast Technical Working Group, with efforts aimed at developing management actions, including the continued conservation and restoration of submerged aquatic and emergent vegetation.

Photo of Three Sister's Springs shoreline stabilization project. (Citrus County).

- FWC continues to work with the WMDs in the development of Minimum Flows and Levels (MFLs) for river and spring systems that provide warm-water habitat for manatees. During 2016, FWC staff provided technical assistance and information related to manatee use of DeLeon Springs. Past MFL coordination with Water Management Districts include Volusia Blue Spring, Manatee Springs (Levy County), Fanning Springs (Gilchrist and Levy counties), Weeki Wachee Spring system (Hernando County) Homosassa River (Citrus County), Ichetucknee Spring (Suwannee County) and the Chassahowitzka River (Citrus County).

- FWC coordinates with the USACOE, the SFWMD and the SWFWMD to address central and south Florida water control structure-related manatee mortality issues through the Interagency Task Force for Water Control Structures. The Task Force meets annually. This past year, five manatees died as a result of interactions with a water control structures. These deaths increased the overall total of water control structure–related deaths to 227 since 1974. The average annual number of structure-related deaths before retro-fitting structures with manatee protection devices was 6.2 manatees per year from 1974-2000. That number has decreased to a post-retrofitting average of 3.7 manatees per year (2001-2015).

Canaveral Locks opening to allow vessel passage to the Indian River Lagoon (Brevard County).

Public Outreach

management activities

FY 2015-2016 highlights

Public outreach regarding manatee conservation programs is important so that the public is well informed about manatees and understands the reasons for 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 such as harassment, entanglement in discarded monofilament line, and obeying posted speed zones to reduce injury and death from boat collisions.

- For a large part of the year, staff assessed the various FWC manatee program web pages to update the text and add pictures to improve the page aesthetics and interest. Two new manatee program web pages were the result of the assessment: Florida Manatee Facts and Information, http://www.myfwc.com/education/wildlife/manatee/facts-and-information/ and a major update of the Permit Signs page, which evolved into Education for Marinas http://www.myfwc.com/wildlifehabitats/managed/manatee/education-for-marinas/. A total of 15 manatee program web pages were updated along with numerous links on these pages.

- Manatee research staff also completed an update to their Radio-telemetry and Tracking web page http://www.myfwc.com/research/manatee/research/radiotelemetry-tracking/ to coincide with and support the 2016-2017 manatee decal that focuses on tracking manatees. Since posting the new information to the agency's web site, a few of the manatee program pages have shown up in social media posts other than what FWC distributes, which has increased the reach of the information.

- In June 2015, the 2015-2016 manatee decal with the caption, "Give them space" and a focus on paddle-sports was sent to tax collectors for statewide distribution and sales starting July 1. The decals typically raise approximately $25,000 for the manatee program. Throughout the year, the creation of the artwork and text for the

upcoming year's manatee decal occurs. The 2016-2017 decal is focused on one of FWRI's manatee research programs with the caption of, "Tracking Manatees."

- Social Media: This year's 27 manatee-related social media posts reached over 2 million people and highlighted the following topics:

Date	Topic of Social Media Post	People Reached	Reactions, Likes and Shares
07/01/2015	Check the box and feel good! (decal promotion)	34,326	747
07/02/2015	Three male manatees killed in one area/Boater awareness messages	387,145	9,111
07/17/2015	Orphaned calf rescue	8,238	322
08/06/2015	Give Manatees space/Viewing manatee guidelines	79,440	3,114
09/10/2015	Calf Rescue	82,738	4,140
09/29/2015	Manatee rescue	43,121	1,712
10/01/2015	A heard of sea cows! (seen in St. Andrews Bay)	71,597	4,270
10/14/2015	Rehabilitated manatee released	4,349	151
10/26/2015	Manatee migration to warm water sites "Baby its cold outside"	648,588	30,491
11/02/2015	Migration post "Manatees in motion"	166,077	6,227
11/02/2015	Manatee Awareness Month	6,388	268
11/03/2015	Mother-Calf Rescue	1,643	79
11/23/2015	Manatee rescue	5,132	131
12/18/2015	Researchers assess stranded manatee (FM397)	2,605	135
12/23/2015	Who is holding a selfie-stick? (Three Sisters Spring manatee awareness)	263,070	12,787
01/13/2016	Four rehabbed manatees released	54,841	2,680
02/09/2016	Andy Garrett gives talk/presentation about manatee research/rescue efforts of FWC-	998	28
03/18/2016	Oh, the hu-manatee—It's finally Friday! (General awareness messages)	7,800	337
04/21/2016	Aerial Photo: Manatee near Ponte Vedra Beach	5,326	150
04/29/2016	Manatee Rescue	1,341	73
05/17/2016	Facebook Live: Marine Mammal Pathology Lab	3,893	40
05/24/2016	Rescue and transport of two injured manatees to Miami Seaquarium	2,988	179
05/27/2016	Slow is the coolest speed for manatees (Obey manatee speed zones)	62,508	2,445
05/27/2016	Video: Manatee Mating Behavior	77,375	1,194
06/07/2016	When manatees go a courtin'	37,643	1,565
06/15/2016	Manatee release in St. Petersburg	843	50
06/30/2016	Show your support of manatees and sea turtles! (decal promotion)	4,694	332
	TOTAL	2,064,707	82,758

- Two popular manatee brochures were reprinted this year. A review and an update to the old "Florida manatees—A Florida Treasure" brochure resulted in a brochure name change to "Guidelines for protecting native wildlife—Florida Manatees" and the inclusion of new information for paddle-sport operators. The permit related marina brochure, "A boater's guide to living with Florida Manatees" was also reviewed and reprinted with some minor edits.

- The agency's Ask FWC on-line service generated 216 hits for 10 of the 12 posted manatee related questions/answers. The top two questions viewed were: Manatee Speed Zones (52) and Laws that Protect Manatees (34). FWC staff viewed and responded to 525 Ask FWC online requests of which 110 related to manatees (most of the other posts related to bears). Staff fulfilled 140 manatee-related bulk order or individual publication requests from schools, eco-tour businesses and visitor centers.

- Besides the usual local special events and requested programs, staff increased its outreach opportunities through visits to nearby visitor centers, parks and libraries in north Florida. The latter of which resulted in an opportunity to set up month long displays in two different Leon County libraries over the summer months (both manatee and panther displays were used at two different sites). This outreach will occur again during the next FY to include more sites and community spaces for displays. Library staff were very appreciative of the displays and noted that visitation to the displays was high in each of the facilities.

Photo of waterway sign (Collier County).

Appendix

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

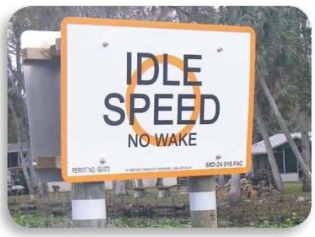
Appendix A:
Acronyms and Abbreviations

°C — degrees Celsius
cm — centimeters
Commission, Commissioners — members of the FWC Commission
DEP—Florida Department of Environmental Protection
DTAG — Digital Acoustic Recording Tag
°F — degrees Fahrenheit
FAC — Florida Administrative Code
FPL – Florida Power and Light Company
F.S. — Florida Statutes
FWC — Florida Fish and Wildlife Conservation Commission
FY — Fiscal Year
FYCCN – Florida Youth Conservation Center Network
GIS — Geographic Information System
GPS — Global Positioning System
kg — kilogram
m – meter
MFL — Minimum Flows and Levels
MIPS — Manatee Individual PhotoIdentification System
MMPL — Marine Mammal Pathobiology Laboratory
Mote — Mote Marine Laboratory
MPP — Manatee Protection Plan
NOAA Fisheries Service — National Oceanic and Atmospheric Administration, National Marine Fisheries Service
Plan — Florida Manatee Management Plan
Trust Fund — Save the Manatee Trust Fund
UF – University of Florida
USFWS — U.S. Fish and Wildlife Service
USGS — U.S. Geological Survey
WMD— Water Management District

Appendix B:
Boat Speed Definitions

All boat operators must comply with posted signs

S = Spanish - Español
F = French - Français
G = German



Lowest speed needed to maintain steerage and forward motion. (Speed ~2-3 mph/3-5 kph*)

S: La velocidad más lenta que se necesita para mantener gobierno.
F: Vitesse la plus basse nécessaire pour maintenir le steerage et le mouvement avant.
G: Die niedrigste Geschwindigkeit, um das Boot auf Kurs zu halten und vorwärts Bewegung zu machen.

Little or no wake. Vessel must be completely settled in the water. (Speed ~5-7 mph/8-11 kph*)

S: Asentado en el agua, sin surcar, estela mínima que no ponga en peligro a otras embarcaciones.
F: Peu ou pas de sillage. Le bateau doit être complètement arrangé dans l'eau.
G: Das Boot ganz im Wasser mit Kielwasser das nicht andere Fahrzeugen oder Wasser Strasse Benutzeren gefährden.

Resume normal safe speed according to current water traffic conditions.

S: Reanude velocidad normal.
F: Reprenez une vitesse sûre selon des états de transport par voie navigable.
G: Fangen Sie eine sichere geschwindigkeit an.

***Note: The specific speed may vary with the size and hull design of the vessel.**

Florida Fish and Wildlife Conservation Commission
MyFWC.com

In an emergency:
Wildlife Alert: 1-888-404-FWCC (3922)
Mobile: #FWC, *FWC VHF Radio: Channel 16

Manatee License Plate and Decal Program

Manatee License Plate

The manatee license plate was created in 1990 as per section 320.08058(1)(c), F.S., and section 379.2431(4)(d), F.S., to raise funds for manatee research and protection. The manatee license plate generated $1,246,478 in FY 2015-2016. These revenues are deposited in full into the Save the Manatee Trust Fund.

Manatee Decal

Section 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 tax collectors participate by selling decals at their offices. Revenues from the decals support manatee protection efforts such as rescue, rehabilitation, research, and outreach. During FY 2015-2016, 3,711 manatee decals were sold and raised approximately $18,555 for manatee conservation. This year's decal was designed by FWC staff.