SAVE THE MANATEE TRUST FUND

FISCAL YEAR ANNUAL REPORT

JULY 1, 2014—JUNE 30, 2015

Florida Fish and Wildlife
Conservation Commission

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

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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 2014–2015

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

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Executive Summary

The Florida Fish and Wildlife Conservation Commission (FWC) is pleased to submit this annual report on the expenditures from the Save the Manatee Trust Fund (Trust Fund), 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, each year. This report covers the period from July 1, 2014, through June 30, 2015.

During FY 2014-15, FWC accomplished a key goal of the Manatee Management Plan (MMP) with the publication of results from the first statewide abundance estimate of the Florida manatee in the journal, *Biological Conservation*. The findings represent a significant improvement over the traditional survey, commonly called the "synoptic survey." Although the synoptic approach provides researchers with a count of manatees visible in Florida waters at the time of the survey, these traditional methods do not allow estimation of the number of manatees that are not visible during the surveys, therefore the count is considered to be a minimum count of the statewide population. A traditional synoptic survey was conducted in February 2015, and while survey conditions aided biologists in documenting a record high manatee count—6,063, the count is not statistically 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. Such weaknesses were recognized in the MMP, which establishes a primary conservation goal to "implement peer-reviewed and statistically sound methods to estimate the manatee population and monitor trends".

Designing a new method for estimating manatees has been challenging because manatees occur over large landscapes and are often in near shore habitats that make it difficult to apply typical survey methods. To meet this challenge, a state-of-the-art approach was designed, tested, and vetted. The new, recently published approach is a benchmark achievement in monitoring manatees that includes an innovative sampling design and incorporates statistical methods to help account for key sources of variation. The new methods not only provide an estimate of the Florida manatee population, but also, an associated level of confidence, thus giving conservation managers a good sense of how far it may fall from reality. Using the new technique, FWC researchers estimate that manatee statewide abundance for the period of 2011 and 2012 was likely between 5,310 – 7,390 animals, with a best estimate of 6,350.

Importantly, abundance estimates will be included in comprehensive population models that provide conservation managers with robust evaluations of the population and incorporate the best current information regarding the biology of manatees, as well as leading threats to their long-term survival. Model results forecast the population dynamics of the Florida manatee and are a tool to aid conservation decision making. 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.

Manatee management staff continued to work with partners and stakeholders to provide manatee conservation measures for a wide variety of activities. Staff have two ongoing habitat protection and restoration projects in development phases. One project is at Three Sisters Springs in Citrus County, which will be under construction in the summer of 2016, and the other is in Sarasota County, currently in the data collection and engineering phase. Both projects, when completed, will provide benefits to manatee and other fish and wildlife habitat and to recreational visitors to these natural spring systems.

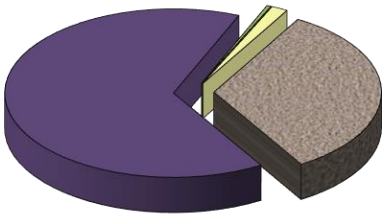
Partners in Federal, State and county governments are working with manatee management staff to revise the Comprehensive Everglades Restoration Plan's (CERP) Manatee Protection Guidelines that were first developed in 2006. This document provides guidelines that can be implemented for CERP projects that will assist planners to protect manatees and expedite their permitting process. FWC is also working closely with the U.S. Army Corps of Engineers and the South Florida Water Management District to reduce entrapments and manatee deaths at water-control structures and navigational locks in the Everglades region. Both the U.S. Army Corps of Engineers and the South Florida Water Management District are investigating new technologies that will continue to make these structures safer, with the added benefit of having protection systems that are less costly to install and maintain. The efforts made by these agencies to date have resulted in safer structures for manatee passage, and the future looks promising for additional progress.

Additionally, during the past year, program outreach staff made a concerted effort to inform the paddling community about compatible manatee viewing. FWC outreach materials were developed to coincide with an increasing interest in recreational kayaking, canoeing, and paddle boarding. These activities can often place paddlers in close proximity to manatees and their habitat. Management staff developed informational materials including updated brochures and web links that now specifically address paddle sport enthusiasts. In conjunction with the paddle sports effort, program outreach staff also developed wildlife viewing guidelines, as well as this year's Florida manatee decal with a paddle sports graphic.

These activities are possible because of funding from the Save the Manatee Trust Fund. The Trust Fund receives money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. Revenues for FY 2014-2015 totaled $3,825,986. Appropriations from the Trust Fund for the same period were $4,386,958, with $325,000 provided for manatee research activities at Mote Marine Laboratory, and a service charge to General Revenue of $306,454, which most trust funds are required by law to pay. In FY 2014-2015, FWC's Division of Habitat and Species Conservation expended $1,073,121 for conservation activities and the Fish and Wildlife Research Institute expended $1,863,014 on research and monitoring. Details of revenues, appropriations, and expenditures are shown on page seven of this report.

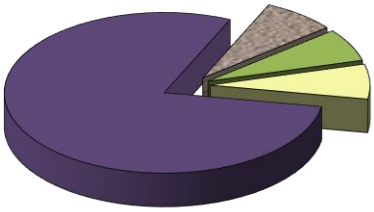
Trust Fund FY 2014–2015 Revenues and Expenditures

REVENUES
$3,825,986



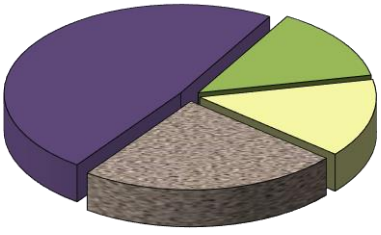
- Save the Manatee License Plate ($1,262,429)
- Vessel Registrations ($2,487,263)
- Interest ($15,131)
- Decals and Donations ($61,163)

APPROPRIATIONS
$4,386,958



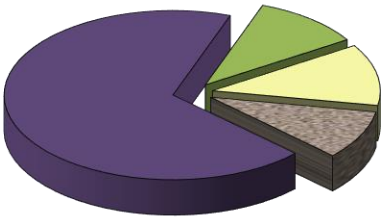
- FWC Manatee Program ($3,465,525)
- Mote Marine Laboratory ($325,000)
- Administrative Overhead ($289,979)
- Service Charge to General Revenue ($306,454)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES
$1,073,121



- Manatee Protection Zones ($255,934)
- Plan and Permit Reviews ($519,969)
- Habitat Protection ($143,619)
- Public Outreach ($153,599)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES
$1,863,014



- Behavioral Ecology ($173,649)
- Mortality and Rescue ($1,274,606)
- Photo Identification (Life History) ($195,882)
- Population Assessment and Monitoring ($218,877)

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 6,063 in 2015

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

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."

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 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 can be downloaded from the FWC Web site: http://www.myfwc.com/media/415297/Manatee_MgmtPlan.pdf

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 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) and 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 Florida Manatee Management 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 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.

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 Rescue & 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 Marine Laboratory, 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 2014–2015 highlights

- Statewide, there were 410 manatee carcasses documented in Florida during FY 2014-2015. All but 27 were recovered and examined. Additionally, three carcasses were documented in Georgia, two in Mississippi, and two in Alabama.

- Eighty-six rescues were performed statewide during fiscal year2014-2015. Twenty of these rescues were part of a mass entrapment in a culvert in Satellite Beach. As of September 2015, 50 of the manatees rescued statewide were released back into the wild, 14 died, and the remaining 22 animals were still being rehabilitated in facilities around the State. Additionally, four manatees were rescued for cold stress out of State (one in Texas, one in Georgia, and two in Alabama).

- A Manatee Unusual Mortality Event declared for Indian River Lagoon in 2012 continued during FY 2014-2015. During this FY, 14 manatee deaths were documented in this event. The cause of the UMEis still under investigation.

- Researchers collected tissue samples for genetic analysis from most carcasses. Other samples were collected for microscopic study, 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 2014-2015

Cause of Death	*Number of Deaths*
Human—Flood Gate or Canal Lock	5
Human—Other (entanglements, etc.)	10
Human—Watercraft Related	83
Natural—Cold Stress	28
Natural—Other (includes red tide)	33
Perinatal (total body length less than 150 centimeters or about 5 feet)	98
Undetermined (decomposed or other)	126
Verified, Not Recovered	27
Total Carcasses July 1, 2014-June 30, 2015	410

Manatee Rescues FY 2014-2015

Type of Rescue	*Number of Rescues*
Calf—Alone	10
Calf—With Rescued Mother	2
Mother—With Rescued Calf	4
Human—Entanglement	7
Human— Entrapment*	23
Human—Watercraft- Related	17
Human—Other	1
Natural–Includes Red Tide	20
Undetermined; Other	2
Total	86

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

FWC has accomplished a key goal of the Manatee Management Plan (Plan) with the publication of results from the first statewide abundance estimate of the Florida manatee in the journal, *Biological Conservation*. A primary conservation goal of the Plan was to "implement peer-reviewed and statistically sound methods to estimate the manatee population and monitor trends."

The findings represent a significant improvement over the traditional synoptic survey approach. Results from synoptic surveys, flown after winter cold fronts, provide only a minimum number of manatees known to be alive using warm water and winter habitats on a particular census 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 2015, and while survey conditions aided biologists in documenting a record high manatee count—6,063- the count is not a statistical estimate of total population size nor is 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.

Designing a new method for estimating manatees has been challenging because manatees occur over large landscapes and are often in near-shore habitats that make it difficult to apply traditional, statistically-sound survey methods. To meet this challenge, an innovative approach was designed, tested, and vetted. This approach is based on a random sampling design and combines multiple sources of information. A combination of a double-observer protocol (i.e., multiple observers in each plane), repeated passes, and detailed diving behavior data were used to account for imperfect detection of animals.

The new abundance survey is a benchmark achievement in monitoring Florida manatees. The new survey design accounts for key sources of bias and variation and provides an 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. The new methods not only provide an estimate of the Florida manatee population, but also a level of confidence associated with that estimate, thus giving conservation managers a good sense of how far it may fall from reality. Using the

new technique, FWC researchers estimate that manatee statewide abundance for the period of 2011 and 2012 was likely between 5,310 – 7,390 animals, with a best estimate of 6,350. Importantly, abundance estimates will be included in comprehensive population models that provide conservation managers with robust evaluations of the population and incorporate the best 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 growth and survival of individuals, reproductive performance of mature females, and health of manatees 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 usually are 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 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.

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 has 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 2014–2015 highlights

- FWC accomplished a key goal of the Manatee Management Plan (MMP) with the publication of results from the first statewide abundance estimate of the Florida manatee in the journal, *Biological Conservation*. The findings represent a significant improvement over the traditional survey, commonly called the "synoptic survey."

- FWC staff members and interns spent over 130 days conducting land and boat-based photo-ID research during 290+ visits to sites used by manatees. Additionally, other FWC volunteers, research partners, and field lab staff statewide photo-documented manatees. More than 19,000 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.

- One hundred thirty-four manatees meeting specific photo-ID criteria were added to the southwest portion of the MIPS catalog of uniquely identifiable animals.

- Genetic sampling surveys were conducted in southwest Florida. A total of 308 samples were collected from free swimming manatees: 67 samples at Port of the Islands (Collier County), 127 samples in the Orange River (Lee County), and 114 samples in the Tampa Bay area.

- The manatee genetic-ID database currently includes 1,262 unique individuals identified by skin samples collected from live manatees in our southwest Florida pilot study area.

FWC staff conducting genetic sampling in the TECO Big Bend 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. 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 over the past five years, one permanently and three for repowering, the warm-water network that manatees have relied on has been changing. The focus of multiagency monitoring efforts 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 near Titusville. This winter was the last year of a five-year study, and the second in which FPL operated its newly repowered plant. In partnership with the USGS and primarily funded by FPL, FWC conducted a 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 Florida Manatee Management 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. 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. In the future, this work will contribute to evaluation of high-risk areas and inform conservation plans for protections areas. To address knowledge gaps in manatee behavior, FWC, in collaboration with researchers at Florida State University, Duke University, and Woods Hole Oceanographic Institution, previously conducted a field study on manatee responses to motorized boats in southwest Florida. The research combined manatee-borne electronic tags [digital acoustic recording tags (DTAG) and GPS tags] with boat-based observations and aerial videography. The DTAG provided a continuous record of sound (including boat noise) and recorded a suite of behavioral parameters, allowing a three-dimensional reconstruction of movements, depth,

and orientation underwater. These projects address key issues identified in the Florida Manatee Management Plan (see Chapter 10, "Ongoing and Future Research" p. 107).

FY 2014–2015 highlights

- To investigate winter attendance patterns and foraging movements around the FPL Canaveral power plant and passive thermal basins in the northern Indian River Lagoon, biologists captured, tagged, and released 12 manatees in December 2014. A team of scientists and veterinarians from FWC, USGS, and UF assessed the health and body condition of each animal to further understand the health of the wild population.

- Satellite-linked GPS tags and temperature loggers provided data on fine-scale movements, habitat use, and water temperatures throughout the winter. Researchers tracked 12 manatees in Brevard County through mid-March 2015, when tagging gear was recovered. Six of the tagged manatees migrated considerable distances out of the county for part of the winter; the combined winter range extended along 280 miles (450 km) of coastline, from Ormond-By-The-Sea to Biscayne Bay.

- 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 manuscript that presents a quantitative framework for estimating the probability of encounters between marine wildlife (manatees, right whales) and vessels was accepted for publication in a peer-reviewed scientific journal.

FWC researcher observes a tagged manatee and its companion

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). With a population estimated at approximately 500 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. 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, 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.

Since 1987, FWC has conducted aerial surveys to monitor seasonal presence of right whales, mitigate vessel-whale collisions, and assess population dynamics. An Early Warning System communication network, coordinated by NOAA Fisheries Service with assistance from FWC ~~staff~~, 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 provide a framework for quantifying the risk of vessel strikes and inform and evaluate the effectiveness of proposed management plans.

FY 2014–2015 highlights

- In total, 47 individual right whales, including 17 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 25 nautical miles offshore. FWC conducted 51 aerial surveys and identified 74 right whales during preliminary photo analysis, of which 24 (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, 41 vessel trips were conducted, resulting in samples from fifteen calves, one juvenile, and three adult females. The skin samples will be used for individual identification, gender determination, and health assessment, as well as information on kinship, stock identity, and genetic variability within the population.

- During the 2014-2015 season, FWC participated in a multi-agency right whale tagging project to improve minimally invasive satellite tags in order to better document right whale habitat usage and migration routes. Five tagging cruises were conducted, and LIMPET (satellite) tags were attached to three right whales. More information is available at: (http://www.alaskasealife.org/New/research/index.php?page=sat_tagging.php)

- No entangled whales were sighted in the southeastern U.S. during the calving season. However, four whales with recent entanglement wounds were documented by researchers, including one adult female with severe wounds on her right lip, and tail. Documentation of injuries like these has shown that over 80% of the North Atlantic right whale population bears scars from fishing gear interactions, and over half of these whales have been entangled more than once. Ongoing research indicates that entanglements have a negative impact on the overall health and reproductive success of the species.

- FWC researchers collaborate with local volunteer sighting networks to gather information about public reports of whales. These efforts are especially helpful in Central and Southeast Florida where right whale sightings are less common, but also typically occur nearshore where the potential for human interaction is greater.

Research Publications and Reports

research activities

FY 2014-2015

Calleson CS (2014) Issues and opportunities associated with using manatee mortality data to evaluate the effectiveness of manatee protection efforts in Florida. Endang Species Res 26:127-136

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T.J. Gerlach, A.H. Estrada, I.S. Sosa, M. Powell, K.E. Lamb, R. L. Ball, **M. de Wit**, M.T. Walsh. 2015. Establishment of echocardiographic parameters of clinically healthy Florida manatees (Trichechus manatus latirostris). Journal of Zoo and Wildlife Medicine 46(2): 205-212.

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Walsh, C.J., M. Butawan, J. Yordy, R. Ball, L. Flewelling, **M. deWit**, and R.K. Bonde. 2015. Sublethal red tide toxin exposure in free-ranging manatees (Trichechus manatus) affects the immune system through reduced lymphocyteproliferation responses, inflammation, and oxidative stress. Aquatic Toxicology 161:73-84.

*FWC authors in **bold typeface**.*

Mote Marine Laboratory
Manatee Research Projects

research activities

The Legislature annually appropriates $325,000 from the Save the Manatee Trust Fund for the Manatee Research Program at Mote Marine Laboratory (Mote), in Sarasota, Florida. The following projects were funded in FY 2014-2015:

- 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 partner organizations, FWC, and USGS; 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 Manatee Use of the Hillsborough River—Mote staff reviewed existing manatee data for the Hillsborough River and conducted land-based and aerial surveys of the area from October to March.

- Effects of Cold Stress on Manatees and Conservation Applications of Biomarkers—Mote continued using selected biomarkers to assess effects of cold stress and other physical compromises in manatees, assess rehabilitation time requirements for cold-stressed manatees, and to shed light on impacts of cold stress on exposed manatee populations.

- Aerial Surveys of Manatees— Mote staff participated in the statewide synoptic survey in February 2015. Aerial surveys were conducted along the western side of Lake Okeechobee and its tributaries to assess habitat use of manatees in the area.

- 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 2014-2015, the Manatee Forum met twice, once in October and once in May. During the October meeting, presentations were provided on manatee carrying capacity at 11 Florida warm-water sites, results of aerial surveys in Brevard County, and an update on the USFWS' management of Three Sisters Springs. The May meeting included updates on Minimum Flows and Levels for Florida springs, results of an FWC study of boater compliance with manatee speed zones in Sarasota County, updates on manatee warm-water sites in Citrus and Collier counties and a new approach to conducting the statewide manatee abundance estimate. The Manatee Forum is an important group that provides the opportunity for information exchange and the discussion of ideas among a diverse group of stakeholders.

Photo of manatees using Three Sisters Springs at the Crystal River National Wildlife Refuge (Citrus County).

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 2014 – 2015 highlights

- FWC reviewed 375 requests to provide comments and provided opinions on 280 proposed regulatory actions regarding potential adverse impacts to manatees for 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, Florida ports, the Army Corps of Engineers, and the USFWS.

- Fifteen boat facilities coordinated with FWC for manatee education materials or manatee informational signs. Technical assistance and approval of manatee observers was provided for eight projects with in-water work in important manatee habitat.

- FWC continues to provide technical assistance to the USFWS regarding several high speed boat races proposed in Florida. Races reviewed this year included the Bradenton/Manatee River F2, and the St. Petersburg Grand Prix.

- At least five incidents of manatees becoming trapped and requiring rescue occurred during the fiscal year. Four incidents involved culverts or pipes, in Volusia, Brevard, Manatee and Broward counties. One incident had nineteen manatees entrapped at the same time in a culvert system in Brevard County. In these cases, FWC works through the permitting process to ensure that barriers are installed, if necessary, to prohibit future manatee entrapment. For the first time, a manatee became entrapped behind a man-made living shoreline/oyster restoration project. FWC worked with DEP to develop new recommendations for this type of project, and established potential permit conditions to reduce the likelihood of such entrapments happening in the future.

- Staff reviewed and provided comments to proposed rulemaking by DEP, including the second revision to the Statewide Environmental Resource Permitting program, and a proposed General Permit for mooring fields for local governments.

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

- Staff visited the U.S. Army Corps of Engineers' clamshell dredging operation at the Mayport Naval Basin, Jacksonville, as part of FWC's internal continuing coordination and educational activities.

Florida Port Activities

FWC provided opinions on how to offset expected impacts to manatees for proposed port projects. Reviews included the review of submitted permit applications for Port Everglades (maintenance dredging, wetland enhancement, Turning Notch extension, slip 2 extension), Canaveral Port Authority (shoreline stabilization), Port of Palm Beach (slip 3 modification), Port Manatee (berth 9 reconstruction), and Port of Tampa (berths 150, 151, 152 and Spoil Island 2D improvements).

Manatee Protection Plans

- **Charlotte County MPP:** Charlotte County, the USFWS, and FWC continue to work to develop an MPP for Charlotte County.

- **Sarasota County MPP:** FWC assisted the County with revisions to update the local code in order to be consistent with the most recent revisions to the MPP.

- **Duval County MPP:** The final revised MPP was accepted and approved by the County, the USFWS, and FWC in August 2014. Staff also attended the first Law Enforcement Task Force meeting recommended in the MPP's Law Enforcement Implementation Plan.

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

- **Flagler County MPP:** FWC has reviewed and provided comments to the County's first draft of a manatee protection plan.

Manatee Protection Zones

management activities

FWC Commissioners 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 2014–2015 highlights

- **Pinellas County** (68C-22.016, FAC) — The Florida Manatee Management Plan identifies the western portion of Pinellas County as an area to be evaluated for consideration of new manatee protection zones. FWC began working on this project in late 2010, and considerable coordination with County staff and others occurred before this fiscal year. FWC completed most of the statutorily required work with the Local Rule Review Committee during the previous fiscal year (FY 2013-2014). This fiscal year, FWC staff held a public workshop in Pinellas County in September 2014, before taking a draft proposed rule to the FWC Commission at their November 2014 meeting. A proposed rule was published in December 2014, and FWC held two public hearings in Pinellas County in January 2015. The FWC Commissioners approved a final rule at their June 2015 meeting. As of the end of June, staff was working to publish a Notice of Change and preparing the rule for filing with the Department of State.

- **Collier County** (68C-22.023, FAC) — The Florida Manatee Management Plan identifies the Collier County rule as one of the next existing rules to be reviewed to determine if modifications to manatee protection zones are needed. (The rules for Sarasota County and Broward County were similarly reviewed during past fiscal years.) During this fiscal year, FWC staff began compiling and reviewing data and coordinating with County staff. A June 2014 request from the city of Naples for a zone in the Moorings Bay system will be included in this review.

- **Local Ordinances** — FWC coordinated with staff from several local governments on issues related to potential or existing local manatee protection ordinances, but no formal actions were taken at the local level.

- **Boating Compliance Studies** — FWC completed a one-year boating study in order to evaluate changes in boater behavior and compliance with the manatee protection zones along portions of the Intracoastal Waterway in Sarasota County. Observations were made from four boat-based locations over 40 survey days between March 2014 and February 2015. FWC expects to have a final report available early next fiscal year.

- **Regulated Areas** — FWC continued work to develop county-specific GIS data layers that combine FWC manatee protection zones, boating safety zones, and USFWS manatee protection zones. These data layers will allow for 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 applies to the same area).

- **Variances and Waivers** — The variance and waiver process is governed by section 120.542, F.S., and Chapter 28-104, FAC. FWC did not receive any requests for variances or waivers from manatee protection rules during FY 2014-2015.

- **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 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 four requests for other types of permits and on one permit revocation during FY 2014-2015.

    - In September 2014, Boston Whaler submitted a request to renew its existing permit allowing vessel testing activities in portions of Mosquito Lagoon in Volusia County. A new permit was issued in January 2015.

    - In February 2015, a graduate student at Florida Atlantic University submitted a request for a permit to allow hydrophones to be deployed in the No Entry zone in the Harbor Branch canal in St. Lucie County. A permit was issued in June 2015.

    - In May 2015, Mote Marine Laboratory submitted a request to reissue 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. The previous permit had expired in April 2015. A permit was issued later in May 2015.

    - In May 2015, Georgia Aquarium submitted a request 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. A permit was issued in early July 2015.

    - In May 2015, FWC revoked the permits that had been issued to a professional fishing guide due to repeated citations he had been issued by FWC and USFWS law enforcement officers for violating the manatee protection zones in Indian River County and St. Lucie County.

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 habitat carrying capacity 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 2014–2015 highlights

- FWC worked with Florida Power and Light (FPL) to ensure the presence of a manatee warm-water refuge at the Port Everglades power plant in Broward County during the conversion of this plant from oil burning turbines to the more efficient combined cycle natural gas units. Power Plant conversions are complete at FPL Cape Canaveral and Riviera Beach Energy Centers, and the final manatee monitoring reports are being completed for these plants. The Port Everglades plant is entering its last winter with an interim heating system, and manatee monitoring will continue at this site until the plant conversion is finished. The data collected during the conversions of these three plants 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 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 2015, FWC staff reviewed MFL information for Rainbow Springs (Marion County) and began discussions and provided information for Wekiva Springs (Orange County) and DeLeon Springs (Volusia County). Past MFL coordination at springs with manatee habitat 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 are leading a multi-agency effort to update the 2006 "Guidelines for Manatee Conservation during CERP Implementation," in coordination with the U.S. Fish and Wildlife Service, the South Florida Water Management District and the U.S. Army

Corps of Engineers. This document and associated maps are tools used in the planning and decision making processes for the Comprehensive Everglades Restoration Plan (CERP), containing recommendations for minimizing or avoiding manatee conflicts.

- FWC is working with a variety of partners to identify and complete a restoration project that will improve manatee access to natural warm-water habitat at Salt Creek and Warm Mineral Springs Creek (Sarasota County). Agency staff are also working with the City of Crystal River, Citrus County, the USFWS, and the Southwest Florida WMD to stabilize the banks of the warm-water refuge at Three Sisters Springs (Citrus County). Agency funding will be matched with Southwest Florida WMD funds to implement the shoreline stabilization project using biodegradable sediment bags and natural lime rock. This project is planned to be completed during the spring and summer of 2016.

- FWC worked with staff from the St. John's River Water Management District and the University of Florida to monitor the effects of repeated and prolonged algal blooms in the Indian River Lagoon, Mosquito Lagoon, and Banana River systems caused in part by persistent high salinity and nutrient conditions. The effects of the bloom continued to affect the available seagrass in the Indian River Lagoon system over the last year, but signs of seagrass recovery have been documented at a number of monitoring sites. Monitoring of these systems for recurrent blooms and available seagrass foraging habitat continue with partner coordination.

- 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 restoration and monitoring projects.

- FWC works to control invasive, nonnative aquatic plants and to 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 (Volusia County) 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 also coordinated extensively over the past year with the USFWS, Citrus County, DEP, and the South Florida WMD on aquatic plant management activities as they relate to manatee warm-water refuge issues in the Crystal River and Homosassa River systems.

- FWC participated in interagency coordination through such groups as the Kings Bay Working Group (Citrus County) 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.

- Manatees can be killed in water control structures and navigation locks. FWC works with agencies responsible for these structures to eliminate these types of deaths. Three manatees died in 2014 as a result of interactions with a water control structure–

related deaths to 228 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 3.8 manatees per year (2001-2014).

- FWC coordinates with the U.S. Army Corps of Engineers, the South Florida WMD, and the Southwest Florida WMD 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.

Shoal grass (*Halodule wrightii*) transplant unit used in a restoration project in a Florida Bay prop scar

Public Outreach

management activities

FY 2014-2015 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 injury and death from boat collisions.

- FWC's main outreach focus this year was on paddle-sport activities, such as canoeing, kayaking, and use of paddle boards. Staff researched various programs and safety-related sites and queried wildlife conservation staff to establish a list of guidelines related to paddle-sports and manatees. These guidelines were developed as a result of a noticed increase in these recreational activities along with the need to address manatee interactions related to these activities. As a result of this awareness campaign, several changes or updates occurred in FWC's outreach materials. The agency's manatee program web pages were updated, compiling boating related information into one section, and a new paddle-sport page was created and added to the site http://www.myfwc.com/education/wildlife/manatee/for-paddlers/.

- Staff contacted statewide paddle-sport groups and other State agencies that provide information to paddle-sport operators to provide them with the link to the new FWC paddle-sport web page. In addition to the web page, the existing brochure, "Florida manatees—A Florida Treasure," was updated to include the new guidelines and renamed to, "Guidelines for protecting native wildlife—Florida manatees." The brochure is targeted to all boat, personal watercraft, and paddle-sport operators and for divers and snorkelers. Printing of this brochure is planned for fiscal year 2015-2016. A draft paddle-sport and manatee awareness sign design was proposed for posting at rental locations around the State.

- To carry the theme into the next year, staff designed the 2015-2016 manatee decal with a focus on paddle-sports. The decal, captioned "Give them space," was sent to tax collectors in June for statewide distribution starting in July. To close out the promotion opportunities for this topic, a new paddle-sport question/answer page was created for the AskFWC service.

- The agency's Ask FWC on-line service generated 227 hits for 10 of the posted manatee-related commonly asked questions. The top two questions viewed related to manatee speed zones (59) and how to interact near manatees (51). FWC staff viewed and sent 531 AskFWC online responses to 384 requests about Florida

imperiled species, and fulfilled 140 manatee-related bulk order or individual requests for printed materials for schools, eco-tour businesses, and visitor centers.

- Keeping up with today's social media networks, outreach staff gathered information from FWC biologists and management staff about Florida's imperiled species for posting as needed on Facebook and Twitter feeds. In addition to this information, several manatee-related events occurred this year that helped educate people about manatees and lit up social media posts.

- During the rescue of 19 manatees that were stuck in a storm-water pipe in Satellite Beach, FWC Community Relations staff interacted with interested followers on social media. During this rescue event almost 6 million Twitter accounts were reached with information about manatees. Tweets were sent out via various news stations and agencies, and messages were reposted as people tracked the progress to extract the manatees until all 19 manatees had been rescued. FWC Facebook posts on this same event reached almost 40,000 individual accounts. Other FWC manatee Facebook posts with high ratings this past year included "Migrating Manatees" with approximately 560,000 people reached and the most shares of any of the posts (4,269), "Marvelous Manatees" (a kids' video) with approximately 200,000 people reached (1,440 shares), and "Missing 'Stokes' the manatee" (a manatee that lost its tracking tag) with approximately 390,000 people reached (2,949 shares). Press releases about the new manatee decal, various rescues or releases, the synoptic count, and manatee migration to and from warm-water sites in autumn and spring rounded out the rest of the awareness posts for the year.

- Staff conducted a program for the League of Environmental Educators in Florida at their mini-conference in the panhandle area and awarded a participant/school with a complete manatee educator's box. In Charlotte Harbor, manatee management and research staff noted that there were several manatees killed by vessels in a short span of time. Staff reached out to the Charlotte Harbor Environmental Center (CHEC) to see if they could assist with providing manatee awareness messages and programs to their visitors. The agency provided the facility with educational items and publications that could be used for this purpose. CHEC staff visited local marinas to distribute material. This service and partnership is valuable to the State's manatee conservation efforts.

Appendix

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

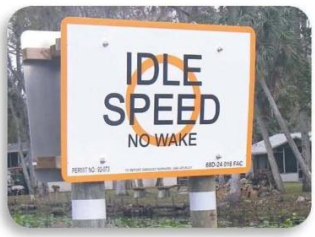
Appendix A:
Acronyms and Abbreviations

°C — degrees Celsius
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**GIS** — Geographic Information System
GPS — Global Positioning System
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
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), and section 379.2431(4)(d), F.S., to raise funds for manatee research and protection. The manatee license plate generated $1,262,429 in FY 2014-2015. 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 2014-2015, 4,542 manatee decals were sold and raised approximately $22,710 for manatee conservation. This year's decal was designed by FWC staff.