Responsible Conservation

of Florida's Wildlife Heritage

SAVE THE MANATEE TRUST FUND

ANNUAL REPORT

FISCAL YEAR 2017-18

MyFWC.com

SUBMITTED BY
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
Fish and Wildlife Research Institute
and
Division of Habitat and Species Conservation

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

1-888-404-FWCC (3922)

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

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Cover photo Florida manatees
Photographs Courtesy of FWC, unless otherwise noted

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

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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, 2017 through June 30, 2018.

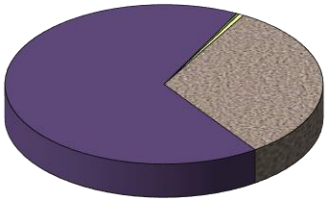
Through the long-term public support of the Trust Fund, critical information gained from the FWC's research and monitoring efforts continues to provide conservation managers and the public with reliable information needed to guide current and future conservation actions. The FWC's guiding conservation goal for the Florida manatee is to effectively manage the wildlife resource in perpetuity throughout Florida. In order to accomplish this goal, the species must recover from a threatened status and be effectively managed so that manatees can endure future impacts that can affect their population including: large-scale die-offs from red tide and cold stress, human-related impacts and continued degradation and loss of important habitats. As with all species, future resiliency is associated with population size and distribution, growth rate, health, and habitat quality. Together these factors will impact the ability of manatees to cope with future changes. The FWC and partners continue to monitor the manatee population and essential habitat using innovative, rigorous, scientific methods to better understand population resiliency as well as susceptibilities. For example, information gathered from the FWC's manatee rescue and necropsy program provides a window for the public to better understand the state of manatee health and vulnerabilities. During this report period, staff prepared a report for review by a federally mandated panel of experts, referred to as the Working Group on Marine Mammal Unusual Morality Events. The Working Group later declared a Repeat Mortality Event (RME) involving red tide and manatees in southwest Florida. This was the 12th officially declared mortality event in Florida (and ninth related to red tide) since 1996, roughly an event every other year over the past two decades. What will the longer-term impacts of such large-scale die-offs be on the manatee population in Florida? Mathematical models help to integrate various streams of information about the

population including: prevalence of certain reasons for death, adult survival rates, and reproduction that, when taken in context of each other, improve our understanding of population dynamics. With timely information like this, managers can adapt management strategies to help mitigate impacts to the manatee population, furthering our efforts to maintain a resilient 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 2017-2018 totaled $3,824,172. Appropriations from the Trust Fund for the same period were $ 4,133,413, with $325,000 provided for manatee research activities at Mote Marine Laboratory (Mote), and a service charge to General Revenue of $307,598 that most trust funds are required by law to pay. In FY 2017-2018, FWC's Division of Habitat and Species Conservation expended $1,006,000 for conservation activities and the Fish and Wildlife Research Institute expended $1,830,895 on research and monitoring. Details of revenues, appropriations, and expenditures are shown on page 6 of this report.

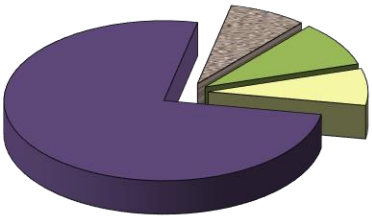
TRUST FUND FY 2017-18
REVENUES AND EXPENDITURES

REVENUES
$3,824,172



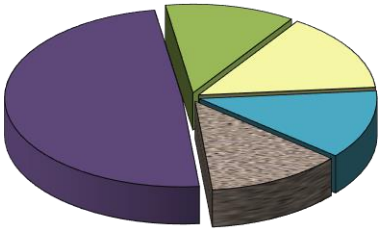
- Save the Manatee License Plate ($1,223,253)
- Vessel Registrations ($2,571,003)
- Interest ($10,976)
- Decals, Donations, Other ($18,940)

APPROPRIATIONS
$4,133,413



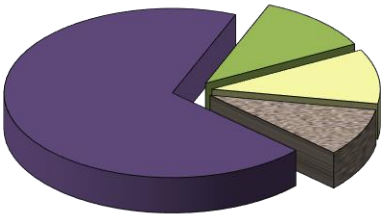
- FWC Manatee Program ($3,125,815)
- Mote Marine Laboratory ($325,000)
- Administrative Overhead ($375,000)
- Service Charge to General Revenue ($307,598)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES
$1,006,000



- Manatee Protection Zones ($124,172)
- Plan and Permit Reviews ($493,576)
- Habitat Protection ($119,330)
- Data Distribution ($142,940)
- Public Outreach ($125,982)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES
$1,830,895



- Behavioral Ecology ($166,837)
- Mortality and Rescue ($1,267,987)
- Photo Identification (Life History) ($204,482)
- Population Assessment and Monitoring ($191,589)

MANATEE BASICS

COMMON NAME	**Florida manatee**
SCIENTIFIC NAME	*Trichechus manatus latirostris* (Order: Sirenia)
STATUS	Threatened (Federal)
RANGE	Throughout Florida (summer months into southeastern states but reported as far north as Cape Cod and as far west as Texas)
MAXIMUM SYNOPTIC SURVEY COUNT	6,620 in 2017
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 is also of concern, including future changes in artificial warm-water refuges and reductions in natural spring flows.

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 Plan 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

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 was transferred to the State of Florida by the United States Fish and Wildlife Service (USFWS) in 1985.

Staff from FWC's Fish and Wildlife Research Institute (FWRI) are located in five coastal field stations and respond to all reported carcasses as well as public reports of manatees in distress. These stations are located around the State: Jacksonville, Melbourne Beach, Tequesta, Port Charlotte, and St. Petersburg. Carcasses are transported by field personnel from recovery locations to FWC's Marine Mammal Pathobiology Laboratory (MMPL) in St. Petersburg or are necropsied in the field. Staff perform consistent, high quality, post-mortem examinations to determine cause of death. Field staff also coordinate rescues, and when necessary, transport manatees to rehabilitation facilities. 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 and rescue information available on the FWC website (http://myfwc.com/research/manatee/rescue-mortality-response/mortality-statistics/).

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, Department of Environmental Protection - DEP, FWC), academic institutions (University of Florida - UF), non-governmental organizations (Save the Manatee Club, Sea to Shore Alliance), and private oceanaria (Cincinnati Zoo, Clearwater

[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.

Pittsburgh Zoo, Dallas World Aquarium, Jacksonville Zoo and Gardens, Miami Seaquarium, Mote Marine Laboratory, SeaWorld Orlando, South Florida Museum, ZooTampa at Lowry Park, and Walt Disney World's The Seas).

FY 2017-18 HIGHLIGHTS

- Statewide, there were 645 manatee carcasses documented in Florida during FY 2017-18. All but 59 were recovered and examined. Additionally, six carcasses were documented in Georgia, one in Mississippi, two in South Carolina, and one in Alabama.

- One hundred-nineteen rescues were performed statewide during FY 2017-18. As of July 31, 2018, 64 of the manatees rescued statewide were released back into the wild, 28 died, and the remaining 27 animals were still being rehabilitated in facilities around the State. Additionally, there were 12 manatees rescued in Charleston, South Carolina, due to cold weather and unfavorable location. Eleven of these were moved to warmer waters in Florida and released immediately, and one was taken to a rehabilitation facility and released later.

- FWC and partners captured and relocated 10 manatees that were entrapped from storm surge after Hurricane Irma. Additionally, three manatees were assisted by citizens during the storm and reported to FWC afterwards.

- A red tide bloom has persisted in southwest Florida since November 2017. Elevated manatee mortality was documented in this region early April 2018. A Repeat Mortality Event was declared in July 2018. During FY 2017-18, there were 85 red tide-related mortalities and 3 red tide-related rescues. A Manatee Unusual Mortality Event (UME) declared for Indian River Lagoon in 2012 continued during FY 2017-18. During this report period, 13 manatee deaths were documented in association with 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.

Manatee Rescues FY 2017-18

Type of Rescue	*Number of Rescues*
Calf—Alone	18
Calf—With Rescued Mother	4
Human—Entanglement	18
Human—Entrapment*	24
Human—Watercraft-Related	27
Natural—Includes Red Tide	23
Undetermined; Other	5
Total	**119**

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

Manatee Mortality FY 2017-18

Cause of Death	*Number of Death*
Human-Flood Gate or Canal Lock	4
Human – Other	16
Human-Watercraft Related	120
Natural – Cold Stress	72
Natural – Other	104
Perinatal	94
Undetermined	176
Verified, Not Recovered	59
Total	**645**

POPULATION MONITORING AND ASSESSMENT

research activities

Long-term research and monitoring of the Florida manatee population by FWC and our key partners (USGS, Mote Marine Lab) has provided a solid foundation of high-quality data from which we can make strong inferences about manatee population status and trends throughout Florida. 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 abundance and distribution of manatees; and c) estimating survival and reproductive rates through photo-identification and genetic identification. Assessments also include estimates of risk to the population, including projected population growth and probability of persistence into the future (i.e., risk of extinction).

Traditional 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 s. 379.2431(4)(a), F.S. A traditional synoptic survey was conducted on January 6,7, and 8 and resulted in a count of 6,131 manatees. Although the count is not a statistical estimate of total population size nor is it comparable to previous synoptic counts, it does provide information to managers about manatee distribution among warm water sites throughout the State. Sustaining adequate winter habitat for manatees remains a statewide conservation goal and a key factor in long-term recovery of manatees.

A different survey approach called an abundance survey represents a significant improvement over the traditional synoptic survey by providing a sound estimate of the Florida manatee population. In December 2016, an abundance aerial survey was flown on the east coast of Florida, from the Georgia-Florida State line to Monroe County, to estimate the manatee population. These surveys were combined with the west coast survey conducted in 2015. An updated analysis using the more recent surveys is well underway and will produce the latest population abundance estimate to date. Reliable estimates from the new abundance surveys can be used to track population changes over time and as part of population projection models. The recently published (Martin et al 2015) statewide abundance estimate was included in the latest update of the Core Biological Model (CBM). This model (Runge et

al 2017) is designed to forecast Florida manatee population dynamics in what is referred to as a population viability analysis. The findings in the report represent a comprehensive update to the structure and components (parameters) of the CBM. The model provides a framework to assess the status of manatees, understand the relative influence of the threats manatees face, and evaluate concerns around potentially emerging threats.

Reliable population models such as the CBM 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 these 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, 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 sex-specific movement between federal management units, sex-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, particularly in the southwest region. Genetic analysis can help in the identification of calves and other individuals with no markings, as well as carcasses. 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 continued with this effort.

FY 2017-18 HIGHLIGHTS

- A count of 6,131 manatees resulted from the 2018 traditional 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 80 days conducting land and boat-based photo-ID research during 200+ visits to sites used by manatees. Statewide, other FWC field staff, research partners, and volunteers photo-documented manatees. More than 22,000 images documenting the unique features of individual manatees were taken and archived by FWC. Manatee photo-ID data were processed and analyzed to support updated adult survival and reproductive rates—key input parameters in ongoing population modeling efforts. Data for the southwest region through April 30, 2017, were made available for analyses.
- One hundred eighty-two 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 4,587 animals and more than 106,000 sighting records.
- Genetic sampling surveys were conducted in southwest Florida. A total of 504 samples were collected from free swimming manatees during the 2018 winter: 107 samples at Port of the Islands (Collier County), 152 samples in the Orange River (Lee County), and 245 samples in the Tampa Bay area.
- The manatee genetic-ID database currently includes 1,850 unique individuals identified by skin samples collected from live manatees in our southwest Florida study area, with approximately 342 new individuals pending addition from 2018 winter sampling.

Photo-ID cataloged manatee known as TB405 nursing her 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 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. For more information on FWC's manatee telemetry program—including photos, maps, and an animated movement track—please see: http://myfwc.com/research/manatee/research/radiotelemetry-tracking/.

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. Therefore, managers are taking proactive steps to restore spring systems and to mitigate for the expected loss of other warm-water habitats. One crucial site being considered for restoration in southwest Florida is Warm Mineral Springs, which flows via Salt Creek into the lower Myakka River. Manatees are precluded from accessing the warm-water refuge at low tides because of sedimentation from past human activities. FWC biologists are monitoring water temperatures, water levels, and manatee use along the spring run during winter to establish a pre-restoration baseline. A passive thermal basin that has provided warm-water habitat for a large aggregation of manatees at Port of the Islands is expected to disappear once hydrologic restoration of sheet flow in the Picayune Strand is completed in a few years. To mitigate this loss, the South Florida Water Management District and Army Corps of Engineers—in consultation with FWC, USFWS, and USGS—created deep pools that are designed to provide and hold warm, saline ground water. Researchers are monitoring manatee winter use of the newly-created habitat and evaluating water temperature

conditions there and at other aggregation sites in the region. The Plan provides further information on this subject (see Chapter 10, "Ongoing and Future Research" pp. 103).

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 researchers collaborated with colleagues and students at the University of Florida, the University of South Florida, and USGS to develop a comprehensive risk assessment framework that quantitatively evaluates the probabilities of manatee-boat encounters. 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, estimation of speed zone effectiveness, and optimization of speed zone configurations. These projects address key issues identified in the Plan (see Chapter 10, "Ongoing and Future Research" p. 111).

Manatees exit the warm water refuge at Warm Mineral Springs through a narrow travel corridor

FY 2017-18 HIGHLIGHTS

- Manatee distribution and abundance at Salt Creek and? Warm Mineral Springs was investigated in relation to ambient temperature during winter using ground surveys. Continuous monitoring of water temperatures and tidally-influenced water levels within the creek provide a baseline for future comparison to the system after restoration.
- Manatee use of the newly-created mitigation pools at Port of the Islands, as well as at nearby warm-water sites, was assessed during a cold front. The spatial distribution of manatees using these winter sites was mapped with aerial video and methods were developed to estimate abundance.
- 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 (e.g., dredged basins or canals) were investigated for their potential to provide sufficient warmth to sustain manatees through cold winter periods.
- A study that documented manatee behavioral response to passing boats was published in the peer-reviewed journal, *Marine Mammal Science*. The project used a combination of manatee-borne electronic tags (digital acoustic recording tags [DTAG] and GPS tags) and boat-based observations. The DTAG provided a continuous record of boat noise and other sounds and recorded a suite of behavioral parameters, allowing a three-dimensional reconstruction of manatee movements, depth, and orientation underwater.
- Risk assessment of manatee-boat collisions was advanced through a collaborative project between FWC and other institutions. The quantitative risk assessment framework models the probabilities of manatee-boat encounter, collision, and death as a function of boat speed and habitat variables. A paper on this work—entitled "Integrating encounter rate theory with decision analysis to evaluate collision risk and determine optimal protection zones for wildlife"—was provisionally accepted in the peer-reviewed *Journal of Applied Ecology*.

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); however, portions of some staff salaries are provided by the Trust Fund [s. 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 response. Efforts to protect this species are outlined in the North Atlantic Right Whale Recovery Plan[1].

The North Atlantic right whale is one of the most endangered large whales in the world with an estimated 450 individuals in the population[2]. Entanglement in fishing gear and vessel collisions 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 United States (U.S.) is the primary calving area for the North Atlantic right whale. In 1994 and 2016, NOAA Fisheries 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 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—

[1] https://www.fisheries.noaa.gov/resource/document/recovery-plan-north-atlantic-right-whale-eubalaena-glacialis
[2] https://www.fisheries.noaa.gov/species/north-atlantic-right-whale#overview

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 2017-18 HIGHLIGHTS

- In late 2017, NOAA Fisheries declared a North Atlantic right whale unusual mortality event (UME) due to elevated mortalities in Canada and U.S.[3] In 2017 there were 18 confirmed right whale deaths (17 are included in the UME) and one additional whale was found dead in January 2018. This unprecedented number of deaths represents over 3% of the population. FWC staff assisted with the necropsy of an adult female right whale (Catalog #3893) found floating off Virginia in late January. Cause of death was determined to be entanglement in commercial trap/pot gear set for snow crab in Canada.

[3] https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2018-north-atlantic-right-whale-unusual-mortality-event#more-information

- In total, 12 individual right whales were documented in the southeastern U.S. during the calving season (November 15 – April 15). For the first time since surveys began in the 1980's, no right whale calves were sighted. In 2017 and 2018, deaths outnumbered births nearly four to one.

- 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 54 aerial surveys and identified five right whales during preliminary photo analysis, all of which were unique individuals. Select photos from the calving season can be viewed here: http://myfwc.com/research/wildlife/right-whales/images/

- FWC also worked to confirm sightings of large whales reported by the public, including a juvenile right whale in the Gulf of Mexico. Between December 26, 2017, and March 17, 2018, 14 public right whale sightings were reported along the west coast of Florida from Panama City to Naples. FWC, NOAA Fisheries, and other partners used their social media platforms to request public sighting reports and discourage harassment. Aircraft and boats were launched to investigate these sighting reports and to assess and mitigate risks. Researchers also worked with the public to collect any available documentation of the whale for individual identification. Right whale sightings in the Gulf of Mexico are rare. Prior to this winter, the most recent sightings were of a cow-calf pair in 2006.

- Although right whale sightings in the Southeast U.S. continue to be lower than average, aerial survey teams have documented an increase in humpback whale sightings over the past two seasons. During the winter of 2017-2018, FWC recorded 23 humpback whale sightings and, based on preliminary photo analysis, at least 16 individuals were sighted off the coast of Florida and Georgia. Two of these individuals (both juveniles) were later found dead: one due to blunt force trauma (vessel strike) and the other was linked to chronic entanglement. There is an ongoing humpback whale UME along the Atlantic Coast (2016-2018) that now includes Florida[4].

[4] https://www.fisheries.noaa.gov/national/marine-life-distress/2016-2018-humpback-whale-unusual-mortality-event-along-atlantic-coast

RESEARCH PUBLICATIONS AND REPORTS

research activities

2017-18 PUBLICATIONS: (*FWC authors in bold type*)

Harvey, J. W., K. E. Harr, D. Murphy, M. T. Walsh, **M. de Wit**, **C. J. Deutsch**, and R. K. Bonde. 2018. Serum proteins in healthy and diseased Florida manatees (*Trichechus manatus latirostris*). *Comparative Clinical Pathology* 27(6): 1707-1716. https://doi.org/10.1007/s00580-018-2797-z.

Krzystan, A. M., **T. A. Gowan**, W. L. Kendall, **J. Martin**, J. G. Ortega-Ortiz, **K. Jackson**, A. R. Knowlton, P. Naessig, M. Zani, D. W. Schulte, and C. R. Taylor. Characterizing residence patterns of North Atlantic right whales in the southeastern U.S. with a multistate open robust design model. Endangered Species Research 36:279-295. https://doi.org/10.3354/esr00902.

Martin, J., M. C. Runge, **L. J. Flewelling**, **C. J. Deutsch**, and **J. H. Landsberg**. 2017. An expert elicitation process to project the frequency and magnitude of Florida manatee mortality events caused by red tide (*Karenia brevis*). U.S. Geological Survey Open-File Report 2017-1132, 17 p. https://doi.org/10.3133/ofr20171132.

Rycyk, A. M., **C. J. Deutsch**, **M. E. Barlas**, **S. K. Hardy**, **K. Frisch**, E. Leone, and D. P. Nowacek. 2018. Manatee behavioral response to boats. *Marine Mammal Science* 34(4): 924-962. https://doi.org/10.1111/mms.12491.

Surrey-Marsden, C., K. Howe, M. White, C. George, **T. Gowan**, P. Hamilton, **K. Jackson**, **J. Jakush**, **T. Pitchford**, C. Taylor, **L. Ward**, and B. Zoodsma. 2017. North Atlantic Right Whale Calving Area Surveys: 2015/2016 Results. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFS-SER-6, 13 p https://repository.library.noaa.gov/view/noaa/17112.

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 2017-2018:

- 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 conducted a detailed hydrographic characterization of the southernmost section of the north Cape Coral canal system to better understand the ability of the canals to sustain manatees through cold winter periods.

- Aerial Surveys of Manatees— Mote staff participated in the statewide synoptic survey in January 2018. Mote also conducted a survey to map locations of manatees in portions of the St. Johns River and associated waterways as assess a future survey flight path for this region.

- 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 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 2017-18, the Manatee Forum met twice, once in November 2017 and once in May 2018. During the November meeting, the presentation topics focused on the current and future health of Florida springs as well as springs that provide important manatee habitat. In addition, presentations regarding restoration of submerged aquatic vegetation and manatee warm-water habitat were provided. The May meeting included presentations focused on the FWC's Manatee Management program's past and future efforts including: the review and implementation of Manatee Protection Plans, interagency efforts to reduce conflicts associated with water-control structures, review of coastal construction projects and 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.

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 2017-18 HIGHLIGHTS

- FWC reviewed and provided comments on 302 requests for manatee protection recommendations for actions being taken by DEP), Water Management Districts (WMDs), State Clearinghouse, Florida Department of Transportation (DOT), U.S. Army Corps of Engineers (USACOE), and USFWS.
- Staff assisted with three events where manatees were trapped in culverts or storm water pipes and required rescue or recovery. Staff assists with these incidents by ensuring that adequate barriers are installed on the culverts to prohibit future manatee entrapment.
- Ten 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 six projects conducting in-water work in manatee habitat.
- During a dredging event in Tampa Harbor, a new born calf was found and recovered within the spoil barge during operations. While it was determined to be alive when it was born, the cause of death is inconclusive regarding whether it was related to the dredging operations.

Photo of Clam Shell dredge in Tampa Bay

Florida Port Activities

- FWC staff provided recommendations on how to offset expected impacts to manatees for six port projects.

Manatee Protection Plans

- **City of Jacksonville MPP**: An amendment to the existing plan, increasing the number of slips in the downtown special development area in Jacksonville, was approved by FWC in March 2018.

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

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, as well as 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 2017-18 HIGHLIGHTS

- **Collier County** (68C-22.023, F.A.C.) — The Florida Manatee Management Plan identified the Collier County rule as an existing rule to be reviewed for modification to manatee protection zones as needed. Staff began reviewing data and coordinating with the county in 2014 and a rule proposal was brought before the FWC Commissioners at the final public hearing in April 2017. At this meeting, FWC Commissioners agreed with the staff's proposed amendments to the rule, including the recommendation to not add manatee speed zones in Clam Bay. A Notice of Change was published in April 2017, but adoption of the rule was delayed due to a rule challenge that was filed regarding the approved decision not to add zones to Clam Bay. An administrative hearing was held in October 2017 and the Administrative Law Judge ruled in the State's favor in January 2018. The judge's decision was appealed but no decision has been made by the District Court of Appeals at the time of this report. The rule was filed for adoption with the Department of State in January 2018 and became effective in February 2018. Due to the uncertainty of the appeal outcome, FWC's regulatory marker posting plans have not been implemented and the county remains marked in accordance with the 1997 Collier County rule.

- **Pinellas County** (68C-22.016, F.A.C.) — The Florida Manatee Management Plan identified western Pinellas County as an area to be evaluated for consideration of new manatee protection zones. FWC staff began working on this project in late 2010 and the final rule was adopted in December 2015. Posting of regulatory markers was completed in September 2017.

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

    - In December 2016, staff from the City of Tampa (Hillsborough County) inquired about the potential for the city to establish local manatee protection and boating

safety zones on portions of the Hillsborough River in the vicinity of Ulele Spring. City staff provided a draft ordinance in October 2017 and FWC staff have worked with the city to review the draft and provide recommendations for this waterway. As of the end of this fiscal year (or June 30, 2018), the city had not taken any formal action on their local ordinance.

- The Town of Welaka is also considering a local ordinance to improve manatee protection at Welaka Springs on the St. Johns River. As of the end of this fiscal year, the city had not taken any formal action on the ordinance.

Boating Compliance Studies — The first year of a recreational boating study in western Pinellas County was completed in August 2016. These data collection efforts represent "pre-manatee zone rule" surveys that were completed in advance of the posting of regulatory markers in western Pinellas County, which were adopted in December 2015. This study will be repeated at least six months after the regulatory markers are in place to determine if the new speed zone regulations resulted in changes in vessel distribution or travel patterns and to gauge compliance with the zones. The "post-manatee zone rule" surveys were initiated in September of 2018.

Variances and Waivers — The variance and waiver process is governed by s. 120.542, F.S., and Chapter 28-104, F.A.C. FWC received one request for a variance from manatee protection rules during FY 2017-18.

- Sarasota County manatee protection rule. The variance request was to allow faster speeds for motorboats engaging in show-ski operations and training within a portion of the Slow Speed zone near City Island. Similar variances have been granted to this organization in 2003, 2007 and 2012. The variance was granted by FWC in January 2018.

Permits — Rule 68C-22.003, F.A.C., allows FWC to issue different types of permits for activities that would otherwise be prohibited by the manatee protection rules. Most of these permits are for commercial fishing, professional fishing guides and research activities. There are approximately 175 of these permits in effect at any given time. FWC worked on eight requests for other types of permits during FY 2017-18.

- In June 2017, Mote Marine Laboratory submitted a request to renew a permit allowing access to the Pansy Bayou No Entry zone in Sarasota County to conduct manatee photographic identification, habitat characterization research, and genetic sampling. A permit was issued later that month.

- A renewal application for authorization to operate at higher speeds to capture bottlenose dolphins in portions of Manatee and Sarasota County was sent by Mote

Marine Laboratory in October 2017. Permits for this activity have been previously issued in 2007, 2010, 2015 and 2016. A permit was issued to Mote in December 2017.

- In January 2018, a permit was issued to Tampa Bay Watch allowing authorization to operate airboats at higher speeds in certain Slow Speed zones in portions of the Alafia River in Hillsborough County while conducting a derelict crab trap removal effort. The four-hour permit was issued in late January.

- In April 2017, Florida Power and Light Company was issued a permit for access to the year round No Entry zone at the Lauderdale Power Plant in Broward County to conduct maintenance and inspection of equipment and to conduct bathymetric surveys. In March 2018, an amended permit was issued to expand authorized activities to include in-water work related to the construction of the temporary manatee warm-water refuge as well as required oil spill containment drills.

- In February 2018, The Chappell Group, Inc. submitted a request for a permit to allow access to the No Entry zone adjacent to the Port Everglades Power Plant in Broward County to perform activities associated with Phase III of the Port Everglades Wetland Enhancement Project. A permit was issued in April 2018.

- An application for access to the Pansy Bayou No Entry zone in Sarasota County was received by FWC staff in March 2018. A permit authorizing access to this area for dock construction was issued to the Water Resource Associates, Inc. in April 2018.

- In June 2018, a permit was issued in response to a request from the Georgia Aquarium for exemption from certain Slow Speed zones in portions of Flagler and Volusia County while conducting dolphin captures and health assessments. A permit was issued in August 2018.

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 2017-18 HIGHLIGHTS

WARM-WATER HABITAT

- FWC continued to work with Florida Power and Light (FPL) and other power plants along Florida's coastline to ensure the protection of manatees during the conversion of their existing facilities from oil or coal burning turbines to the more efficient combined cycle natural gas units. Data collected during these conversions will assist FWC in monitoring the health of manatees in this area during the conversion process and provide information regarding how manatees respond to changes in warm water availability during winter seasons. The monitoring conducted through the efforts of FPL and FWC will be useful to FWC and agency partners in developing future warm-water habitat plans. During 2017 and 2018, FPL continued the permitting process to convert the Lauderdale power plant.

- Additionally, Tampa Electric Company's Big Bend Power Plant began the permitting process to repower an existing coal and gas fired unit with a combined-cycle natural gas unit.

- 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 and an updated version is expected to be completed by the end of FY 2018-19.

- 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 natural manatee warm-water refuge along Florida's southwest coast. This project will improve access and habitat quality for manatees. The data collection and survey work began in April 2017 and all modeling and engineering is expected to be completed by the end of 2018.

- FWC staff is also working collaboratively with DEP's Division of Recreation and Parks and a variety of other partners to stabilize severely eroding banks along the Blue Spring Run (Volusia County), a high use recreational area and critical manatee warm-water refuge. Data collection and survey work began in April 2018 and project construction is anticipated to begin in spring 2019.

- In addition to these ongoing projects, FWC staff are coordinating with the U.S. Forest Service and other partners to investigate the need for shoreline stabilization at Silver Glen Springs, a 1st magnitude spring in the St. Johns River (Marion County).

- During the 2018 Legislative Session, the Legislature appropriated $50 million for springs restoration. FWC staff coordinated a review of the 2018-19 project proposals received for consideration of this DEP funding and continue to ensure selected projects are incorporated into regional planning and ongoing efforts as projects commence.

MINIMUM FLOWS AND LEVELS

- Coordination continues with the WMDs in the development of Minimum Flows and Levels (MFLs) for river and spring systems that provide warm-water habitat for manatees.

WATER-CONTROL STRUCTURES

- FWC coordinates the Interagency Task Force for Water Control Structures, which is comprised of USFWS, Miami-Dade County, USACOE, the SFWMD, DEP and SWFWMD. This working group addresses central and south Florida water control structure-related manatee mortality issues. This past year, three manatees died as a result of interactions with water control structures. These deaths increased the overall total of water control structure–related deaths to 231 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 (2001-2016). The Interagency Task Force met in February 2018 to discuss issues and concerns that occurred during the previous year.

AQUATIC VEGETATION

- 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 staff continues to work with DEP to revise the Uniform Mitigation Assessment Method for submerged aquatic habitat.

- 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 Kings Bay and Blue Spring Aquatic Plant Working Groups are interagency groups that work to implement invasive aquatic plant management plans and address warm and cold season treatment activities and other protection measures for manatees.

Photo of tape grass growing in the Silver River spring run (photo by Carol Knox)

PUBLIC OUTREACH – FY 2017-18 HIGHLIGHTS

management activities

Public outreach regarding manatee conservation programs is important so that the public is well informed about manatees and understand the reasons for various 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.

MANATEE AWARENESS MONTH ONLINE ENGAGEMENT

Press releases:

- Stick on a decal to show support for Florida's manatees, sea turtles - July 19, 2017
- Florida manatees on the move, public stewardship on the water makes a difference - Nov. 1, 2017
- FWC monitoring sea turtles, manatees during cold weather - Jan. 3, 2018
- Statewide manatee counts consistent with previous survey - February 25, 2017
- Look out for manatees when boating - March 15, 2018

Social media and web site hits:

- Report Stranded Manatees! Don't push them back. (FWRI post) 106,447 reached; 2,746 reactions.
- Manatee program web pages had 105,871 users and 144,136-page views during FY 2017-2018.
- During FY 2017-18, Outreach staff responded to 144 AskFWC customer requests for information or replied to comments.

MANATEE OUTREACH

- The popular Manatee Activity Workbook (geared toward 3-7 grades) was updated to include more information about FWC, manatee rescues, career opportunities and links to manatee-related web pages. FWC management and research staff reviewed and updated existing content to continue to make this publication a valuable education and outreach resource for the manatee program. Booklets continue to be distributed to teachers, environmental centers, Project WILD leaders and various parks around the State.

- Staff developed a water-proof vinyl sticker to distribute FREE to boaters. The sticker is designed for placement on boat consoles as a reminder to boaters about precautions they can take to protect manatees when boating.
- Imperiled species displays located in area libraries continued this year. Six displays were set up back to back in two libraries in Leon County for a month at a time. This passive outreach service reaches patrons that may not otherwise have contact with FWC or its programs.
- Outreach staff served on the Community Classroom Consortium Board, which provides opportunities for FWC to be involved with teachers in the community and to link up with other agencies or businesses that provide educational programs or events. The group's summer passport program provided exposure for FWC's Manatee Cultural Art Treasure Quest. The Welcome Back Teachers and the Teacher Refresh events provided exposure about the Manatee Treasure Boxes available for loan to teachers and were instrumental in distributing information about other FWC programs.
- FWCs manatee mascot traveled around the State for use at the following events:
  - Brevard County Environmentally Endangered Lands program – a Florida Youth Conservation Center Network partner
  - FWC Tequesta Field Lab display support at a community event in West Palm Beach
  - FWC South Region display support at the South Florida Fair
  - FWC Melbourne Field Lab display support at the Blue Spring Manatee Festival
  - Used at the FWC Take our Daughters and Sons to Work Day (Headquarters)

MANATEE DECAL

- The manatee decal that was available at tax collector offices this year was titled, "Look Out for Manatee". This decal has raised approximately $17,760 to the Save the Manatee Trust Fund (preliminary count for 63 out of 67 counties). These counties distributed 3,552 decals throughout the State during the annual vehicle/vessel registration period. This manatee decal design also won a third-place award in the Graphics: Advertising/Display Category at the annual Association of Conservation Information conference. ACI is a national nonprofit organization of natural resources communication professionals.

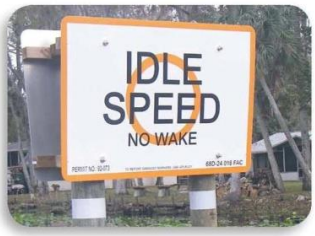
APPENDIX A
ACRONYMS AND ABBREVIATIONS

°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 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

APPENDIX C
MANATEE LICENSE PLATE AND DECAL PROGRAM

Manatee License Plate

The manatee license plate was created in 1990 as per s. 320.08058(1)(c), F.S., and s. 379.2431(4)(d), F.S., to raise funds for manatee research and protection. The manatee license plate generated $1,223,253 for FY 2017-18. These revenues are deposited in full into the Save the Manatee Trust Fund.

Manatee Decal

Section 328.72, Florida Statutes, 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 2017-18, 3,552 manatee decals were sold for manatee conservation. This year's decal was designed by FWC staff.