Responsible Conservation

***of* Florida's Wildlife Heritage**

SAVE THE MANATEE TRUST FUND

ANNUAL REPORT

FISCAL YEAR 2018-19

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

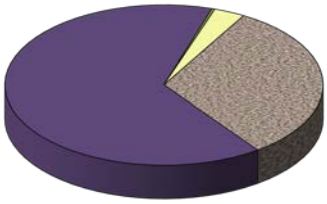
The Florida Fish and Wildlife Conservation Commission (FWC) is pleased to submit the annual report on the expenditures from the Save the Manatee Trust Fund (Trust Fund), per section (s.) 379.2431(4)(b), Florida Statutes (F.S.). The Trust Fund is the primary source of funding for the State's manatee-related 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, 2018 through June 30, 2019.

Through the long-term public support of the Trust Fund, the FWC actively implements science-based conservation programs and engages partnerships that are making a difference for manatees and habitat. 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. During the 2017-2019 red tide bloom, 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 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. The most recent RME was unprecedented in manatee mortality, geographical area, and duration. What will the longer-term impacts of such large-scale die-offs be on the manatee population in Florida? To help address this, the FWC monitors multiple aspects of the manatee 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. 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 and are the focus of conservation work.

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 2018-2019 totaled $3,706,450. Appropriations from the Trust Fund for the same period were $3,513,420, 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 2018-2019, FWC's Division of Habitat and Species Conservation expended $1,160,869 for conservation activities and the Fish and Wildlife Research Institute expended $1,978,365 on research and monitoring. Details of revenues, appropriations, and expenditures are shown on page 6 of this report.

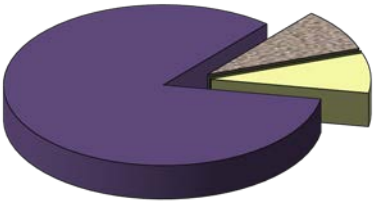
TRUST FUND FY 2018-19
REVENUES AND EXPENDITURES

REVENUES
$3,706,450



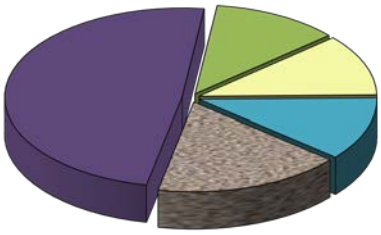
- Save the Manatee License Plate ($1,173,178)
- Vessel Registrations ($2,405,964)
- Interest ($11,030)
- Decals, Donations, Other ($116,923)

APPROPRIATIONS
$3,513,420



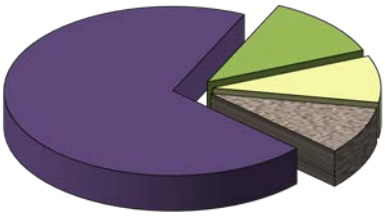
- FWC Manatee Program ($3,188,420)
- Mote Marine Laboratory ($325,000)
- Administrative Overhead ($0)
- Service Charge to General Revenue ($307,598)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES
$1,160,869



- Manatee Protection Zones ($198,573)
- Plan and Permit Reviews ($566,264)
- Habitat Protection ($134,666)
- Data Distribution ($129,491)
- Public Outreach ($131,875)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES
$1,978,365



- Behavioral Ecology ($179,334)
- Mortality and Rescue ($1,387,582)
- Photo Identification (Life History) ($234,227)
- Population Assessment and Monitoring ($177,222)

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	5,733 in 2019
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), and private oceanaria (Cincinnati Zoo, Clearwater Marine Aquarium, Columbus

[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 2018-19 HIGHLIGHTS

- Statewide, there were 700 manatee carcasses documented in Florida during FY 2018-19. All but 96 were recovered and examined. Additionally, eight carcasses were documented in Georgia, one in Louisiana, one in Virginia, three in South Carolina, two in North Carolina, and three in Alabama.

- 104 rescues were performed statewide during FY 2018-19. As of July 31, 2019, 63 of the manatees rescued statewide were released back into the wild, 20 died and the remaining 21 animals are still being rehabilitated in facilities around the State. Additionally, a manatee was rescued in Charleston, South Carolina in November of 2018, due to cold weather and unfavorable location. The manatee has since been released.

- Due to flooding from Hurricane Michael, 3 manatees swam over a spillway into a retention pond in Oldsmar. All 3 manatees were given health assessments and released. In December of 2018, 12 manatees were trapped behind a weir in Crystal River after an extremely high tide due to wind and rain. The manatees were released, and the structure was modified to prevent further access.

- A red tide bloom persisted in southwest Florida throughout most of 2018, and extended to the south and central east coast in the fall of 2018. A Repeat Mortality Event was declared in July 2018. This event had the largest geographical area and longest duration on record in the history of manatee mortality. During FY 2018-19, there were at least 136 red tide-related mortalities (preliminary number) determined through necropsy, and 3 red tide-related rescues. At least 56 carcasses were not necropsied on the Gulf coast during the first half of FY 2018-19, and it is likely many of these were also red tide-related. The investigation into the cause for the Manatee Unusual Mortality Event (UME) declared for Indian River Lagoon in 2012 continued, but was not associated with significant mortality during FY 2018-2019.

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

Manatee Rescues FY 2018-19

Type of Rescue	*Number of Rescues*
Calf—Alone	10
Calf—With Rescued Mother	3
Mother of Rescued Calf	1
Human—Entanglement	10
Human—Entrapment*	22
Human—Watercraft-Related	23
Human-Other[+]	2
Natural—Includes Red Tide	32
Undetermined; Other	1
Total	**104**

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

[+]related to human trash in the water; one resulted in death

Manatee Mortality FY 2018-19 (preliminary numbers)

Cause of Death	*Number of Death*
Human-Flood Gate or Canal Lock	6
Human – Other	13
Human-Watercraft Related	146
Natural – Cold Stress	46
Natural – Other	161
Perinatal	102
Undetermined	130
Verified, Not Recovered	96
Total	**700**

Manatee rescue team members monitor a manatee removed from a retention pond in Oldsmar, Pinellas County.

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 and past 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 28th to February 2nd and resulted in a count of 5,733 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.

Manatees at the Tampa Electric Power Station in Apollo Beach, FL during the Synoptic Survey.

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 produced the latest population abundance estimate to date. These results are available in Technical Report TR-23 at https://f50006a.eos-intl.net/F50006A/OPAC/Details/Record.aspx?BibCode=1864664. Reliable estimates from the new abundance surveys can be used to track population changes over time and as part of population projection models. A published statewide abundance estimate (Martin et al 2015) 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 2018-19 HIGHLIGHTS

- An updated analysis using the more recent abundance surveys produced the latest population abundance estimate to date. Those updates are available in Technical Report TR-23 entitled Updated Statewide Abundance Estimate for the Florida Manatee. We estimated that the number of manatees in Florida in 2015–2016 was 8,810 (95% Bayesian credible interval 7,520–10,280), of which 4,810 (3,820–6,010) were on the west coast of Florida and 4,000 (3,240–4,910) were on the east coast.
- A count of 5,733 manatees resulted from the 2019 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 68 days conducting land and boat-based photo-ID research during 160+ visits to sites used by manatees. Statewide, other FWC field staff, research partners, and volunteers photo-documented manatees. More than 17,000 images documenting the unique features of individual manatees were taken and archived by FWC. Manatee photo-ID data were processed and analyzed to support updated adult survival and reproductive rates—key input parameters in ongoing population modeling efforts. Data for the southwest region through April 30, 2018, were made available for analyses.
- 86 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 4,761 animals and more than 111,000 sighting records.
- The FWC photo-ID program completed the transition to a new, more efficient and

stable, image management software application, including the transfer of images and associated metadata for over half a million images.

- Genetic sampling surveys were conducted in southwest Florida. A total of 458 samples were collected from free swimming manatees during the 2019 winter: 92 samples at Port of the Islands (Collier County), 151 samples in the Orange River (Lee County), and 215 samples in the Tampa Bay area.

- The manatee genetic-ID database currently includes 2,178 unique individuals identified by skin samples collected from live manatees in our southwest Florida study area through the 2018 winter.

Photo-ID cataloged manatee known as TB659 coming up for a breath in Palma Sola Bay.

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. 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).

A manatee rests quietly on its back after feeding in the Indian River Lagoon (Chip Deutsch, FWC).

FY 2018-19 HIGHLIGHTS

- Manatee distribution and abundance in Salt Creek, which is the outflow from 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 mid-winter cold front. The spatial distribution of manatees using these winter sites was mapped with aerial video and methods for estimating abundance were refined.
- 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.
- Risk assessment of manatee-boat collisions was advanced through a collaborative project between FWC and other institutions (see above). The quantitative risk assessment framework incorporates 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 published in the peer-reviewed *Journal of Applied Ecology* and featured in a journal spotlight on conservation in marine habitats.
- A study that quantified the accuracy, precision, and error associated with estimating age of dead manatees from growth rings in their earbones was published in the peer-reviewed *Journal of Mammalogy*. This information will help researchers assess the utility of age data in manatee population models.

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 400 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. Since 1994, portions of Florida and Georgia coastal waters have been designated as critical habitat by NOAA Fisheries. 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 inception in 1993.

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 2018-2019 HIGHLIGHTS

- In total, 23 individual right whales, including seven mother-calf pairs, were documented in the southeastern U.S. during the calving season (November 15th – April 15th).

- From December 1st – March 31st, FWC collaborated with the Georgia Department of Natural Resources and the Clearwater Marine Aquarium Research Institute (formerly Sea to Shore Alliance) to survey between Canaveral National Seashore, Florida, and Sapelo Island, Georgia, out to approximately 30 nautical miles offshore. FWC conducted 56 aerial surveys and detected 53 right whale sightings over that time. Select photos from the calving season can be viewed here: http://myfwc.com/research/wildlife/right-whales/images/

- Biopsy (genetic) sampling was conducted in collaboration with NOAA Fisheries Service and the Georgia Department of Natural Resources. During the calving season, 40 vessel trips were conducted, resulting in samples from six right whale calves and two

humpback whales. The skin samples will be used to determine individual identification, sex, and parentage. This information helps close demographic information gaps, improve population estimates, and identify carcasses.

- FWC researchers gather information from the public about reports of whales and collaborate with local volunteer sighting networks. These efforts are especially helpful in central and southeastern Florida where there is less aerial survey effort and right whale sightings typically occur nearshore where the potential for human interaction is greater. This was the case during the 2018-2019 season when whale distribution was shifted south of the primary survey area during February and March. All seven mother-calf pairs were sighted close to shore between St. Augustine, FL and Jupiter, FL, including four that were documented south of Cape Canaveral.

- NOAA Fisheries declared a North Atlantic right whale unusual mortality event[3] (UME) in 2017 due to elevated deaths. This UME remained active in 2019. Between April 1, 2017 and June 30, 2019, there were 27 confirmed right whale mortalities (nineteen in Canada, eight in the U.S.). This unprecedented number of deaths far outnumbers the births documented between 2017 and 2019 (n=12). The majority of dead whales examined under this UME had injuries consistent with vessel strike and fishing gear entanglement. Additionally, the majority of whales were adults, including ten adult females, which will impact reproductive success in the coming years.

A pair of potential mothers, Catalog #2503 and #3370, traveling south together approximately 18 nautical miles off Ponte Vedra Beach, FL - January 1, 2019. (taken under NOAA permit 20556-01)

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

RESEARCH PUBLICATIONS AND REPORTS

research activities

2018-19 PUBLICATIONS: (*FWC authors in bold type*)

Crum N, Gowan T, **Krzystan A**, **Martin J**. 2019. Quantifying risk of whale–vessel collisions across space, time, and management policies. Ecosphere. 10(4):e02713. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2713

Gowan TA, Ortega-Ortiz JG, **Hostetler JA**, Hamilton PK, Knowlton AR, **Jackson KA**, George RC, Taylor CR, Naessig PJ. 2019. Temporal and demographic variation in partial migration of the North Atlantic right whale. Sci Rep. 9(1). https://www.nature.com/articles/s41598-018-36723-3

Hostetler, Jeffrey A., **Edwards, Holly H.**, **Martin, Julien**, and Schueller, Paul. 2018. Updated Statewide Abundance Estimates for the Florida Manatee. Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute Technical Report No. 23. https://f50006a.eos-intl.net/F50006A/OPAC/Details/Record.aspx?BibCode=1864664

Lonati GL, **Howell AR**, **Hostetler JA**, Schueller P, **de Wit M**, **Bassett BL**, **Deutsch CJ**, **Ward-Geiger LI**. 2019. Accuracy, precision, and error in age estimation of Florida manatees using growth layer groups in earbones. J Mammal. 100(4): 1350-1363. https://academic.oup.com/jmammal/article/100/4/1350/5506580

Martony M, Hernandez JA, **de Wit M**, St Leger J, Erlacher-Reid C, Vandenberg J, Stacy NI. 2019. Clinicopathological prognostic indicators of survival and pathological findings in cold-stressed Florida manatees *Trichechus manatus latirostris*. Dis Aquat Org. 132(2):85–97. https://www.int-res.com/abstracts/dao/v132/n2/p85-97/

Sharp, S.M., McLellan, W.A., Rotstein, D., Costidis, A.M., Barco, S.G., **Pitchford, T.D.**, **Jackson, K.A.**, Daoust, P.Y., Wimmer, T., Couture, E.L., Bourque, L., Fauquier, D., Rowles, T., Hamilton, P., Pettis, H., Moore, M.J. (2019) Gross and histopathologic diagnoses from North Atlantic right whale *Eubalaena glacialis* mortalities between 2003 and 2018. Diseases of Aquatic Organisms 135:1-31. https://www.int-res.com/abstracts/dao/v135/n1/p1-31/

Surrey-Marsden, C., C. Accardo, M. White, C. George, **T. Gowan**, P. Hamilton, **K. Jackson**, **J. Jakush**, **T. Pitchford**, C. Taylor, **L. Ward**, and B. Zoodsma. 2018. North Atlantic Right Whale Calving Area Surveys: 2016/2017 Results. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFS-SER-8, 16 p https://repository.library.noaa.gov/view/noaa/19250

Udell BJ, Martin J, Fletcher Jr. RJ, Bonneau M, **Edwards HH**, **Gowan TA**, **Hardy SK**, Gurarie E, Calleson CS, **Deutsch CJ**. 2019. Integrating encounter theory with decision analysis to evaluate collision risk and determine optimal protection zones for wildlife. J Appl Ecol. 56(5):1050-1062. https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2664.13290

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 2018-2019:

- 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 Winter 2019. 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 2018-19, the Manatee Forum met twice, once in December 2018 and once in May 2019. During the December meeting, the presentation topics focused on the red tide effects on manatees in southwest Florida, the new manatee abundance estimate and FWC waterway signs and a study regarding manatee behavioral response to boats The May meeting focused on new manatee distribution surveys being conducted and an update on the Crystal River National Wildlife Refuge protocols for manatee protection during the winter months. This meeting was also the first Manatee Forum meeting that has been conducted remotely. All participants viewed the presentations by Adobe-Connect and listened to the presentations by phone. Future plans are for the Manatee Forum to conduct one meeting each year in person and one using this technology. The new format will provide efficiencies and save resources for Forum members and participating agencies. 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 2018-19 HIGHLIGHTS

- FWC reviewed and provided comments on 330 requests for manatee protection measures for actions being taken by the Department of Environmental Protection (DEP), Water Management Districts (WMDs), State Clearinghouse, Florida Department of Transportation (DOT), U.S. Army Corps of Engineers (USACOE), and USFWS.
- Staff facilitated the installation of a barrier by providing technical assistance to the owner of a culvert that caused the entrapment of a manatee. This barrier will prohibit future manatee entrapments at this site.

By Susan Lowe

Photos of manatee entrapment incident in a stormwater culvert in the Banana River, Cocoa Beach, Brevard County.

Florida Port Activities

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

Manatee Protection Plans

- **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 2018-19 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.

- **Monitoring Activities** — FWC staff coordinate some data collection activities that assist in the program's monitoring of existing manatee habitat. This information includes manatee distribution data, vessel use patterns and speed zone compliance. These data sets aid in the review of existing or potential manatee protection areas in addition to manatee protection planning and agency permit reviews. FWC staff participated in several monitoring activities in FY 2018-19.

    - Western Pinellas County — 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 and were completed in advance of the posting of regulatory markers in western Pinellas County, which were adopted in December 2015. This study is currently being repeated as of September 2018, which

was approximately eleven months after the regulatory markers were installed. The "post-manatee zone rule" surveys will help to determine if the new speed zone regulations result in changes in vessel distribution or travel patterns and to gauge compliance with the zones.

- Indian River County — FWC staff initiated a manatee distribution aerial survey in Indian River County in October 2018. The study consists of 24 individual surveys, over a one-year period, and will allow for an understanding of manatee distribution, seasonal trends, and migratory patterns. Similar aerial surveys have taken place previously in this county in 2002-04 and 1985-87.

- Eastern Panhandle Region — FWC staff also began a two-year manatee distribution aerial survey in the eastern Florida panhandle covering portions of Gulf, Franklin, Wakulla, Jefferson, and Taylor Counties. Partnering with The Nature Conservancy, who provided funding to the FWC to survey this area that has little information about seasonal manatee distribution in this region. The survey is expected to conclude in May 2021 and will provide valuable information about manatee distribution and habitat.

Local Ordinances — FWC staff coordinated with representatives from a local government on issues related to potential local manatee protection ordinances.

- In August 2018, staff from the Town of Redington Shores (Pinellas County) inquired about the potential for the town to establish local manatee protection zone in a small cove adjacent to the intracoastal waterway. FWC staff provided guidance on the local ordinance process, however, as of the end of this fiscal year, the town had not taken any formal action on their local ordinance.

Permits — Rule 68C-22.003, F.A.C., allows FWC to issue permits for activities that would otherwise be prohibited. Most of these permits are for residential access, commercial fishing and professional fishing guide activities that occur within some manatee protection zones. There are approximately 175 of these permits in effect at any given time. FWC worked on eight requests for permits during FY 2018-19.

- 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.

Photo of the Aucilla Estuary during manatee distribution survey June 2019, Taylor 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 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 2018-19 HIGHLIGHTS

WARM-WATER HABITAT

- FWC continued to work with Florida Power and Light (FPL), Duke Energy, and the Tampa Electric Company to ensure the protection of manatees during the conversion of their existing facilities along Florida's coastline 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 2018 and 2019, the Tampa Electric Company's Big Bend Power Plant continued the permitting process to repower an existing coal and gas fired unit with a combined-cycle natural gas unit.

- FWC staff, in coordination with the 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 2019-20.

- 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 modeling, engineering and final design plans are expected to be completed by the end of FY 2019-20.

Photo of Three Sisters Springs with shoreline stabilization completed, Citrus County.

- 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 summer 2020.

- 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 2019-20 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, six manatees died as a result of interactions with water control structures. These deaths increased the overall total of water control structure–related deaths to 237 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 (2001-2018). 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.

PUBLIC OUTREACH – FY 2018-19 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 ONLINE ENGAGEMENT

Press releases:

Northern Manatee County to get improved manatee protection signs – Jan. 16, 2019

- Volusia County to get improved manatee protection signs on local waterways – Jan. 16, 2019
- Updated statewide abundance estimate for the Florida manatee (7,520 to 10,280 manatees) – Dec. 18, 2018
- Look out, slow down for Florida's migrating manatees – Nov. 13, 2018
- New decals support Florida's manatees, sea turtles – July 5, 2018

Social media engagement and web site information:

- The Imperiled Species Management (ISM) web pages were reviewed and updated in preparation for FWC's update of its website.
- FB post - Looking for manatees on the move - Reach 26,964 with 76 shares
- FB post – Don't boop this snoot! – Reached 90,954 with 671 shares
- FB post – Manatees entangled in monofilament – Reached 50,676 with 422 shares
- FB post – Manatee Appreciation Day – Reached 25,342 with 85 shares
- FB post – Mind your manatee manners – Reached 30,393 with 284 shares
- FWC Banner post – November is Manatee Awareness Month – Reached 6,348 with 82 shares
- Tweets - ~50 manatee related tweets sent out during the year that link people to the press releases or Facebook posts.
- Instagram posts – 16 posts that reinforced the messages above along with other messages that informed people about red tide impacts and watchable wildlife ethics when viewing manatees.

Information requests:

- During FY 2018-19, ISM outreach staff responded to 119 AskFWC customer requests for information with 39 of those requests related to manatees
- Staff mailed out 67 public information requests for educational materials. Most of these requests originated from the agency's on-line Publication Request service.

MANATEE OUTREACH

- North Florida - A new addition to outreach programs in this area was the Edward Ball Wakulla Springs State Park's "Hu-Manatee Mini-Festival" held in November at the park's waterfront area.
- North Florida - During summer 2018, staff set up a manatee display at one library in Leon County. During the winter months, staff assisted with an FWC Backyards & Beyond City Nature Challenge promotion and created displays that were placed in all seven Leon County libraries that had display cabinets or space. The displays stayed in the libraries for two months. This passive outreach service reaches patrons that may not otherwise have contact with FWC or its programs.
- North Florida - ISM manatee outreach staff and a few other FWC programs set up an agency display for the Senior Outdoor Expo held at the Goodwood Carriage House.
- North Florida - ISM outreach staff served on the Community Classroom Consortium Board, which provides opportunities for FWC to be involved with teachers in the Big Bend community and to link up with other outreach staff in agencies or businesses that provide educational programs or events in the area.

FWCs manatee mascot traveled around the State for use at the following events:

- East Coast Central Florida - Barrier Island event – a Florida Youth Conservation Center Network partner
- Southeast Florida - FWC Tequesta Field Lab display support at a community event in West Palm Beach
- Southeast Florida - FWC South Region display support at the South Florida Fair
- East Coast Central Florida - FWC Melbourne Field Lab display support at the Blue Spring Manatee Festival

- North Florida - Used at the FWC Take our Daughters and Sons to Work Day (TLH Headquarters)
- North Florida - Worn by a very enthusiastic performer for the WFSU Summer Kick-off (passport) event.

Other Outreach:

- The west coast of Florida has manatee festivals or events where other agencies, groups or research staff attend and share information about manatees (Crystal River, Tampa Bay area, Lee County, Bradenton). The ISM office provides materials upon request for these events.

MANATEE DECAL

- The manatee decal available at tax collector offices this year was titled, "I'm making a difference for manatee conservation". This decal has raised approximately $17,010 to the Save the Manatee Trust Fund. These counties distributed 3,402 decals throughout the State during the annual vehicle/vessel registration period.
- In addition to the decal sales at the tax collector office, individuals may order manatee decals through the Imperiled Species Management office. Decal order forms are available to download from the manatee program's web page: https://myfwc.com/media/20974/manateedecalorderform19_20.pdf. Decals from 1992 to the present fiscal year are available for purchase at $5 each.

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

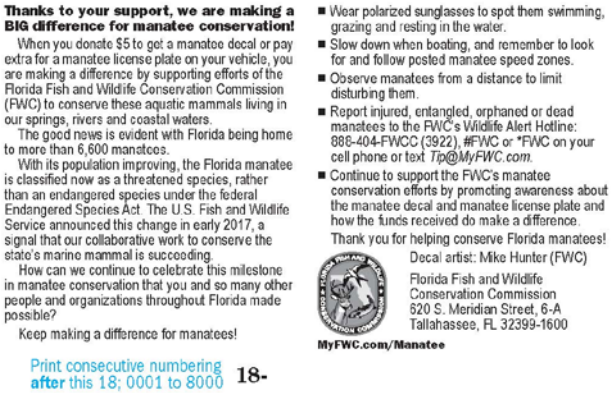
APPENDIX C
MANATEE LICENSE PLATE AND DECAL PROGRAM

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 $1,173,178 for FY 2018-19. 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 2018-19, 3,533 manatee decals were sold for manatee conservation. This year's decal was designed by FWC staff.



Thanks to your support, we are making a BIG difference for manatee conservation!

When you donate $5 to get a manatee decal or pay extra for a manatee license plate on your vehicle, you are making a difference by supporting efforts of the Florida Fish and Wildlife Conservation Commission (FWC) to conserve these aquatic mammals living in our springs, rivers and coastal waters.

The good news is evident with Florida being home to more than 6,600 manatees.

With its population improving, the Florida manatee is classified now as a threatened species, rather than an endangered species under the federal Endangered Species Act. The U.S. Fish and Wildlife Service announced this change in early 2017, a signal that our collaborative work to conserve the state's marine mammal is succeeding.

How can we continue to celebrate this milestone in manatee conservation that you and so many other people and organizations throughout Florida made possible?

Keep making a difference for manatees!

- Wear polarized sunglasses to spot them swimming, grazing and resting in the water.
- Slow down when boating, and remember to look for and follow posted manatee speed zones.
- Observe manatees from a distance to limit disturbing them.
- Report injured, entangled, orphaned or dead manatees to the FWC's Wildlife Alert Hotline: 888-404-FWCC (3922), #FWC or *FWC on your cell phone or text *Tip@MyFWC.com*.
- Continue to support the FWC's manatee conservation efforts by promoting awareness about the manatee decal and manatee license plate and how the funds received do make a difference.

Thank you for helping conserve Florida manatees!

Decal artist: Mike Hunter (FWC)

Florida Fish and Wildlife Conservation Commission
620 S. Meridian Street, 6-A
Tallahassee, FL 32399-1600

MyFWC.com/Manatee

Print consecutive numbering **after** this 18; 0001 to 8000 18-