



SAVE THE MANATEE TRUST FUND

ANNUAL REPORT

FISCAL YEAR 2019-20



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

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

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

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Cover photo Florida manatee rescue operations

Photographs Courtesy of FWC, unless otherwise noted

Research activities involving live manatees were conducted under Federal permit #MA773494-11



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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, 2019 through June 30, 2020.

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 2019-2020 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 Mortality Events (Working Group). The Working Group declared a Repeat Mortality Event (RME) involving red tide and manatees in southwest Florida. This was the 13th officially declared mortality event in Florida (and 10th 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? 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.

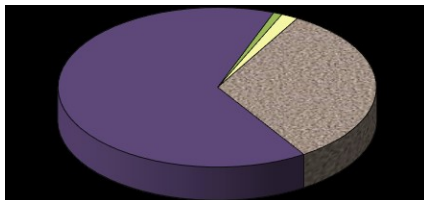


These activities are possible because of the funding of the Trust Fund. The Trust Fund receives money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. Revenues for FY 2019-2020 totaled \$3,909,746. Appropriations from the Trust Fund for the same period were \$3,578,803 to FWC plus \$313,310 provided for manatee research activities at Mote Marine Laboratory (Mote), and a service charge to General Revenue of \$308,401 that most trust funds are required by law to pay. In FY 2019-2020, FWC's Division of Habitat and Species Conservation expended \$1,000,628 for conservation activities and the Fish and Wildlife Research Institute expended \$1,878,025 on research and monitoring. Details of revenues, appropriations, and expenditures are shown on page 6 of this report.



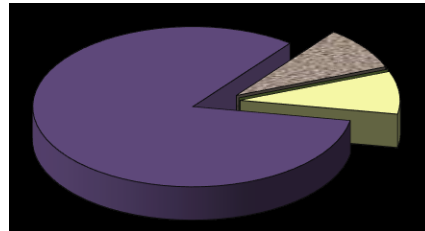
TRUST FUND FY 2019-20 REVENUES AND EXPENDITURES

REVENUES \$3,909,746



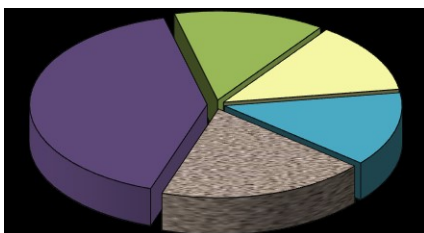
- Save the Manatee License Plate (\$1,273,871)
- Vessel Registrations (\$2,533,278)
- Interest (\$34,839)
- Decals, Donations, Other (\$67,758)

APPROPRIATIONS \$3,578,803



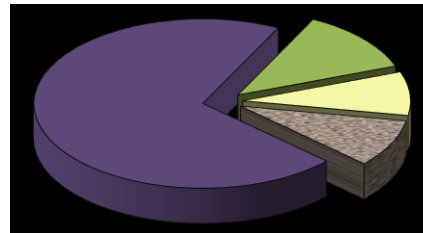
- FWC Manatee Program (\$2,957,092)
- Mote Marine Laboratory (\$313,310)
- Administrative Overhead (\$0)
- Service Charge to General Revenue (\$308,401)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES \$1,000,628



- Manatee Protection Zones (\$190,477)
- Plan and Permit Reviews (\$409,614)
- Habitat Protection (\$137,565)
- Data Distribution (\$128,275)
- Public Outreach (\$134,697)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES \$1,878,025



- Behavioral Ecology (\$171,186)
- Mortality and Rescue (\$1,323,666)
- Photo Identification (Life History) (\$226,591)
- Population Assessment and Monitoring (\$156,582)



MANATEE BASICS

COMMON NAME	Florida manatee
SCIENTIFIC NAME	<i>Trichechus manatus latirostris</i> (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 Events¹ (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 (<https://myfwc.com/research/manatee/rescue-mortality-response/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 Zoo, 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).

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 <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-unusual-mortality-events> for more information.



FY 2019-20 HIGHLIGHTS

-  Statewide, there were 643 manatee carcasses documented in Florida during FY 2019-20. Additionally, fourteen carcasses were documented in Georgia, one in Alabama, two in Mississippi, three in North Carolina, three in South Carolina, one in New Jersey, one in Texas, and one in Virginia.
-  116 rescues were performed statewide during FY 2019-20. As of June 30, 2020, 61 of the manatees rescued statewide were released back into the wild, 27 died and the remaining 28 animals are still being rehabilitated in facilities around the state. Due to storm flooding and subsequent entrapment, two manatees were rescued after Hurricane Dorian and four manatees were rescued after Tropical Storm Cristobal. Additionally, there were four out of state rescues of entrapped manatees (one in South Carolina and three in Georgia), of which one died from complications of cold stress, two were rehabilitated and released in Florida, and one was released on site, and two cold stress-related rescues in Georgia which were rehabilitated and released in Florida.
-  A Repeat Mortality Event associated with a red tide bloom was declared for southwest Florida in the fall and winter of FY 2019-20. During FY 2019-20, there were at least 33 red tide-related mortalities (preliminary number) determined through necropsy, and eight red tide-related rescues. At least 84 carcasses were not necropsied on the Gulf Coast during the first half of FY 2019-20, 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 2019-2020.
-  Researchers collected tissue samples for genetic analysis from most carcasses. Other samples were collected for archival, advanced diagnostic analyses, and requests from external researchers. FWC staff verified and recorded all carcass reports but did not perform necropsies during April and May 2020 due to the COVID-19 pandemic.



Manatee Rescues FY 2019-20

<i>Type of Rescue</i>	<i>Number of Rescues</i>
Calf—Alone	17
Calf—With Rescued Mother	6
Mother of Rescued Calf	0
Human—Entanglement	15
Human—Entrapment*	9
Human—Watercraft-Related	30
Human-Other*	2
Natural—Includes Red Tide	30
Undetermined; Other	7
Total	116

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

*related to cow/calf pair on east side of locks in Cape Canaveral that were under construction

Manatee Mortality

FY 2019-20 (preliminary numbers)

<i>Cause of Death</i>	<i>Number of Deaths</i>
Human-Flood Gate or Canal Lock	4
Human - Other	9
Human-Watercraft Related	87
Natural - Cold Stress	58
Natural - Other	76
Perinatal	90
Undetermined	104
Verified, Not Recovered	215
Total	643



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 has provided a solid foundation of high-quality data from which we can make sound 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 aerial surveys to determine regional abundance and distribution of manatees and 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. These surveys also provide information about manatee distribution among warm water sites throughout the state. Synoptic surveys are conducted annually, weather permitting, pursuant to s. 379.2431(4)(a), F.S. Because of warmer than average winter weather conditions, FWC did not conduct the annual statewide manatee synoptic survey in 2020. The state developed specific weather criteria for these surveys because less than favorable conditions may produce low counts, as many animals may be missed. Conditions this winter never met the state's minimum requirements.



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 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.

An integrated population model (IPM) for the Florida manatee was also recently developed to reconstruct population dynamics in the southwest region of the state over the past 20 years. In contrast to the CBM, the IPM is designed to reconstruct historical population dynamics and abundance, filling in gaps in observation data by integrating information from multiple sources (e.g., survival, abundance, mortality). The IPM also provides estimates of population abundance in years when abundance surveys were not flown. A manuscript describing the IPM and its results for the southwest region will be submitted for peer review publication in FY 2020-2021.




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 2019-20 HIGHLIGHTS

-  An integrated population model (IPM) was developed for the southwest region as a phase one approach that will be expanded to other regions. The IPM manuscript was submitted for peer-review. The IPM is used to integrate information from multiple sources, including abundance surveys, mortality, and survival and reproductive rates. The model estimates abundance and growth rate in years between abundance surveys.
-  FWRI St. Petersburg based staff members and interns spent 61 days conducting land and boat-based photo-ID research during 120+ visits to sites used by manatees. Statewide, other FWC field staff, research partners, and volunteers photo-documented manatees. More than 14,000 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, 2019, were made available for analyses.
-  143 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 4,933 animals and more than 114,000 sighting records.




-  The FWC photo-ID program worked with partners to publish “First documented round-trip movement between Cuba and the continental United States by a Florida Manatee” in April 2020 issue of Sirennews.
-  Genetic sampling surveys were conducted in southwest Florida. A total of 468 samples were collected from free swimming manatees during the 2020 winter: 76 samples at Port of the Islands (Collier County), 192 samples in the Orange River (Lee County), and 200 samples in the Tampa Bay area.
-  The manatee genetic-ID database currently includes 2,474 unique individuals identified by skin samples collected from live manatees in our southwest Florida study area through the 2019 winter.



Photo-ID cataloged manatee known as TB645 with calf at the TECO Big Bend Power Plant.



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 planned 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.










A researcher enters the water in the Indian River Lagoon to replace a satellite-monitored tag on a manatee (Chip Deutsch, FWC).



FY 2019-20 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.
-  A manuscript has been prepared on manatee use of the newly-created mitigation pools at Port of the Islands, as well as at nearby warm-water sites, during winter cold fronts. High-resolution video acquired using an unmanned aerial system was used to map distribution and estimate abundance by accounting for imperfect detection.
-  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.
-  Cold-related manatee mortality in central Florida was analyzed in relation to ambient air and water temperatures over six winters, including two with unusual mortality events during severe cold. The findings were published in the peer-reviewed journal *Public Library of Science ONE (PLOS ONE)*.
-  A study that employed tetracycline marks to validate the annual deposition of growth rings in manatee earbones over timespans up to 37 years was submitted to the peer-reviewed journal *Wildlife Society Bulletin*. 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 Plan¹.

The North Atlantic right whale is one of the most endangered large whales in the world with an estimated 400 individuals in the population². 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 2019-2020 HIGHLIGHTS

-  In total, 35 individual right whales, including 10 mother-calf pairs, were documented in the southeastern U.S. during the calving season (November 15th - April 15th). Right whale births have been very low since 2017.
-  From December 1st - March 31st, FWC collaborated with the Georgia Department of Natural Resources and the Clearwater Marine Aquarium Research Institute to survey between Canaveral National Seashore, Florida, and Tybee Island, Georgia, out to approximately 30 nautical miles offshore. FWC conducted 59 aerial surveys and detected 48 right whale sightings over that time. Preliminary photo analysis indicates FWC documented 22 individual right whales (including nine calves). 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, 51 vessel



trips were conducted, resulting in samples from eight right whale calves, two juvenile right whales, 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 areas with little or no aerial survey coverage and contribute to the overall understanding of right whale demographics, distribution, and habitat use in the southeastern U.S. Notable public sightings from the 2019-2020 calving season included: several adult females sighted in November prior to the start of aerial surveys; mother-calf pairs visible from shore off South Carolina, including a previously undocumented calf; three yearling whales sighted off Florida, south of the primary survey area; and a mother-calf pair in the Gulf of Mexico.



After spending approximately 1.5 months in the primary calving grounds off Northeast Florida, Catalog #3560 and her newborn calf moved south along the east coast of Florida during February and eventually into the Gulf of Mexico. Right whale sightings in the Gulf of Mexico are rare and little is known about their movements in and out of the Gulf. Prior to March 2020, there had never been a verified right whale sighting around the Florida Keys. FWC, NOAA Fisheries, and other partners used their social media platforms to request public sighting reports in order to track the whales' movements and discourage harassment during this event. On March 11, a charter fisherman reported the pair offshore of Pensacola, FL and the whales were sighted along the Florida Panhandle from March 11-15. Later, they were spotted making their way south between Clearwater and Marco Bay from March 20-22, on the Gulf side of the Florida Keys on March 24-25, and in the Straits of Florida on March 26-27. On April 6, the pair was reported off Cape Lookout, NC, which helped confirm that they had made their way back to the Atlantic Ocean and were migrating north toward their feeding grounds in New England and Canada.

Right whales are part of an ongoing Unusual Mortality Event³ (UME) declared in 2017 by NOAA Fisheries due to elevated mortality for this species. Deaths have been exceeding births in recent years, leading to further population decline. Vessel strikes and entanglement are the leading causes of death for the right whales examined. During the 2019-2020 calving season, FWC photographed two injured right whales; one adult male (#3960) with known, resolving entanglement injuries and a neonate calf (2020 calf of #2360) with recent vessel strike injuries. A multi-agency response to the injured calf included remote antibiotic delivery at sea. Despite these efforts, the calf is presumed dead. Following the calving season, the 2020 calf of #3560 was found dead off the coast of New Jersey at the end of June. Necropsy results indicated that the calf suffered two separate vessel strikes, the first causing significant damage to its head and body and a second across the peduncle that was the likely cause of death.

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





Right whale #2360 nuzzles her severely injured calf approximately 8 nautical miles off Altamaha Sound, GA- January 8, 2020. (NOAA Permit #20556-01)

RESEARCH PUBLICATIONS AND REPORTS

research activities

2019-20 PUBLICATIONS: (*FWC authors in bold type*)

Hardy S.K., C.J. Deutsch, T.A. Cross, M. de Wit, J.A. Hostetler (2019) Cold-related Florida manatee mortality in relation to air and water temperatures. PLoS ONE 14(11): e0225048. <https://doi.org/10.1371/journal.pone.0225048>







Harvey, J.W., K.E. Harr, D. Murphy, M.T. Walsh, **M. de Wit, C.J. Deutsch, R.K. Bonde**. 2019. Serum iron analytes in healthy and diseased Florida manatees. *Journal of Comparative Pathology* 173: 58-70.

Mazzoil, M., Q. Gibson, W. Noke Durden, R. Borkowski, G. Biedenbach, Z. McKenna, **N. Gordon**, K. Brightwell, M. Denny, E. Howells, **J. Jakush**, L. Moreland, **A. Perna**, G. Pinto, and M. Caldwell. 2020 Spatiotemporal Movements of Common Bottlenose Dolphins (*Tursiops truncatus truncatus*) in Northeast Florida, USA *Aquatic Mammals* 2020, 46(3), 285-300, DOI 10.1578/AM.46.3.2020.285

MOTE MARINE LABORATORY MANATEE RESEARCH PROJECTS

research activities

The Legislature annually appropriates \$313,310 from the Trust Fund for the Manatee Research Program at Mote, in Sarasota, Florida. The following projects were funded in FY 2019-20:

-  **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 ill manatees, primarily in Manatee and Sarasota counties.
-  **Aerial Surveys of Manatees**— Mote staff conducted aerial surveys of manatees within the Withlacoochee & St. Johns River. The surveys contributed to understanding of manatee habitat and distribution in these regions.
-  **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 2019-20, the Manatee Forum met twice remotely through video and teleconference, once in November 2019 and once in May 2020. During the November meeting, the presentation topics focused on the current conditions of the Indian River Lagoon, the manatee salvage and necropsy program, the Warm-Water Action Plan, and the Electric Power Research Institute workshop. The May meeting included updates on the FWC water control structure meeting, cold-related manatee mortality, and FWC and USFWS research and management activities. For both meetings this fiscal year, 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. The 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

The 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. The 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 2019-20 HIGHLIGHTS





-  The FWC reviewed and provided comments on 360 requests for manatee protection measures for actions being taken by the Florida 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 has continued conversations with the City of Oldsmar Engineering Division regarding the most recent entrapment event where three manatees entered a retention pond by swimming over a city-owned weir structure. Similar entrapment events have taken place in 2012, 2017, and 2018. FWC staff have provided suggestions for manatee barrier designs to prohibit future manatee entrapments at this site, and while no official action to retrofit the weir have been taken at this time, the City has indicated they are exploring funding options to complete this work during FY 2020-21.
-  Staff facilitated conversations with the Pasco County Engineering Division regarding the installation of a manatee barrier at a culvert that caused the entrapment of a manatee in June 2020. At the time of this report, the culvert has not been retrofitted, though FWC staff will continue to provide technical assistance to the County.








Photo of weir at retention pond in Oldsmar, Pinellas County (left). Photo of a stormwater culvert in Hudson, Pasco County (right).

Florida Port Activities

-  FWC staff provided recommendations on how to offset expected impacts to manatees for eleven port projects including Port Everglades, Port of Miami, Port of Tampa Bay, and Port Canaveral.

Manatee Protection Plans

-  **Indian River County MPP:** FWC staff began evaluating recently collected manatee distribution data for an understanding of seasonal trends and migratory patterns since the establishment of the 2004 MPP. This information will allow for future updates to his county's MPP.
-  **Broward County MPP:** The FWC continued correspondence with county staff regarding slip allocation and future revisions to their existing plan.
-  **Sarasota County MPP:** FWC and Sarasota County staff began discussion on data collection efforts and needs that would aid in the review of their existing plan.



MANATEE PROTECTION ZONES

management activities

The 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 2019-20 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. The rule was filed for adoption with the Department of State in January 2018 and became effective in February 2018. Staff worked with the FWC Division of Law Enforcement to develop a sign-posting plan to mark the changes to county’s manatee protection zones. The plan commenced in March 2020 and all new signs were posted by June.



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 2019-20.

- **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 was repeated and data collection was completed in November 2019. The “post-manatee zone rule” surveys were evaluated in comparison to the “pre-manatee zone rule” surveys and will aid staff in understanding how speed zone regulations change vessel distribution or travel patterns and to gauge compliance with the zones.
- **Indian River County** – FWC staff completed a manatee distribution aerial survey in Indian River County in October 2019. The study consisted of 24 individual surveys,



over a one-year period, with similar aerial surveys in this county in 1985-87 and 2002-04. In March 2020, staff began evaluating the most recent data set for an understanding of manatee distribution, seasonal trends, and migratory patterns that may or may have not changed since prior surveys. This information will allow for future rule analyses in this county.

- Eastern Panhandle Region – FWC staff also continued a two-year manatee distribution aerial survey in the eastern Florida panhandle covering portions of Franklin, Gulf, Jefferson, Taylor, and Wakulla 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 2021 and will provide valuable information about manatee distribution and habitat.
- Withlacoochee River - Staff initiated a vessel compliance study at the mouth of the Withlacoochee River in Levy County in March 2020. The one-year study will aid in the review of an existing manatee protection zone that may no longer be serving the purpose of manatee protection as intended when the zone was adopted in 1985.



Photo of the seasonal Manatee Protection Zone sign at the mouth of the Withlacoochee River, Levy County (November 2019).



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



- In late 2019, staff from Lee County coordinated with the FWC on the removal of several local boating safety zones that were no longer in compliance with Rule 68D, F.A.C. These zones, although not their intended purpose, provided protection to manatees in several portions of the county where no state or federal manatee protection zones currently exist. FWC staff worked with the county to address these concerns and offered remedies for replacing several of the zones with local manatee protection zones.
- In April 2020, staff from the Town of Ft. Myers Beach (Lee County) inquired about the potential for the Town to establish local manatee protection zones along the eastern shoreline of Estero Island and in a small lagoon north of Big Carlos Pass. FWC staff provided guidance on the local ordinance process, including the development of a draft ordinance to present to the Town Council. As of the end of FY 2019-20, no formal request for FWC approval of local manatee protection zones has been made.
- In May 2020, staff from the City of Sanibel (Lee County) inquired about the potential for the City to establish a local manatee protection zone along the eastern shoreline of southern Sanibel Island. FWC staff provided guidance on the local ordinance process; however, as of the end of FY 2019-20, the City had not taken any formal action on their local ordinance.



Permits – Rule 68C-22.003, F.A.C., allows the 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 occurring within some manatee protection zones. There are approximately 175 of these permits in effect at any given time. The FWC worked on two requests for other types of permits during FY 2019-20.

- An application for access to the Pansy Bayou No Entry zone in Sarasota County was received by the FWC in July 2019. A permit authorizing access to this area for dock construction was issued to Custom Dock & Davit, Inc. in July 2019.
- In November 2019, the FWC received a request from the Clearwater Marine Aquarium Research Institute for exemption from certain No Entry and Motorboats Prohibited zones, in ten counties, to conduct manatee captures and monitoring of tagged manatees at warm-water sites. A permit was issued in January 2020.
- **Variances or Waivers** - The variance and waiver process is governed by s. 120.542, F.S., and Chapter 28-104, F.A.C. The FWC received one request for a variance from manatee protection rules during FY 2019-20.



The variance request was received by the FWC for the Volusia County manatee protection rule to permanently allow faster speeds for seaplanes engaging in landing and take-off operations within a portion of a Slow Speed zone in the Halifax River. Appropriate manatee protection measures could not be guaranteed as a result of this activity, and the variance request was denied in May 2020.

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 2019-20 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 these efforts will be useful to the FWC and agency partners in developing future warm-water habitat plans. During 2019 and 2020, the Tampa Electric Company's Big Bend Power Plant completed the permitting process to repower an existing coal and gas fired unit with a combined-cycle natural gas unit and the biological monitoring is anticipated



to start in spring 2021.

- FWC staff, in coordination with the USFWS and other partner agencies, are leading an effort to review and update The Florida Manatee Warm Water Habitat Action Plan. This document provides a long-term planning tool for manatee warm-water habitat. An updated version has been drafted and is expected to be released by Fall 2020.
- 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. Through funding and assistance from The Nature Conservancy, the Coastal and Heartland National Estuary Partnership, the U.S. Army Corps of Engineers and FWC's Aquatic Habitat Conservation and Restoration Section, modeling, engineering, final design plans, and submittal of permit applications are expected to be completed in Fall 2020.
- 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 2021.



Photo of severely eroding banks and collapsing trees along the Blue Spring Run, Volusia County.





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

- During FY 2019-20, FWC staff reviewed 10 water-control structure manatee mortality events. In coordination with research staff, ISM mortality notification letters were sent to five structure managers to request operational data and provide technical assistance to prevent future manatee mortality at these sites.
- This past FY, four manatees died as a result of interactions with water control structures. These deaths increased the overall total of water control structure-related deaths to 244 since 1974. The average annual number of structure-related deaths before retro-fitting structures with manatee protection devices was 6.2 manatees per year from 1974-2000. That number has decreased to a post-retrofitting average of 3.8 manatees per year (2001-2020).
- The FWC coordinates the Interagency Task Force for Water Control Structures, which is comprised of USFWS, Miami-Dade County, USACOE, the SFWMD, DEP, SWFWMD and SJRWMD. This working group addresses central and south Florida water control structure-related manatee mortality issues. The Interagency Task Force met in February 2019 to discuss issues and concerns that occurred during the previous year.



Photo of W. P. Franklin Lock gates



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 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 2019-20 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.

FY 2019-2020 HIGHLIGHTS



MANATEE AWARENESS ONLINE ENGAGEMENT

Press releases: Six

- July 9 - New manatee and sea turtle decals
- July 17 - Boating patrols keep boaters and manatees safe
- November 1 - Manatees on the move
- January 16 - Manatee Protection Signs
- March 2 - Wildlife on the move
- March 12 - Slow down to save manatees

Social media engagement and web site information:

- The manatee program's main web page was updated in early 2020. The improvements help customers find program information with fewer clicks on the page.
- FB posts: Seven
 - Show your Love for sea turtles and manatees! 16,728 reach
 - Manatee Awareness Month: Look out! Manatees on the move! 61,274 reach
 - Manatee Awareness Month: In search of warm water! 119,842 reach
 - Manatee Awareness Month: Thank you for not feeding manatees! 30,434 reach
 - Slow down, save manatees! 45,883 reach
 - Fun activities for kids! (online activity pages to help families during pandemic) 51,495 reach
 - Wildlife-friendly Summer Fun! 27,018 reach



- Tweets: 31 total tweets
 - Of the 31 tweets sent out, 14 tweets were sent during November - Manatee Awareness Month
 - Tweet topics: Manatee behavior or characteristics, manatee awareness when boating, manatee habitat, importance of warm water sites, use of polarized glasses to see manatees, support of manatee program through license plate or decal sales, notification of sign replacement, notification and participation at local festivals or events, watching wildlife ethics, manatee rescues, discourage manatee harassment, “Marvelous Manatee” video, manatee migration
- Instagram posts: Three
 - Slow down, save manatees! 19,100 reach
 - Did you know that manatees can’t survive for extended periods of time in waters colder than 68 degrees? 35,300 reach
 - November is Manatee Awareness Month! 23,800 reach

Information requests:

- During FY 2019-2020, Imperiled Species Management (ISM) outreach staff responded to 207 AskFWC customer comments or concerns with 40 of those posts related to manatees.
- Staff mailed out 63 public information requests for educational materials. Most of these requests originated from the agency’s online Publication Request service. Direct email requests were from stakeholders who requested items in bulk.
- Staff created a new Publication Request guidebook to assist all agency outreach or program staff with maintaining this online service for the agency.
- ISM manatee program staff coordinated a warm-water message campaign targeted to 246 vendors around the state.



MANATEE OUTREACH

Note: Due to COVID-19, several events between March and June were cancelled.

- North Florida - ISM outreach staff served on the Community Classroom Consortium Board, which provides opportunities for FWC to be involved with teachers, home school groups or families 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.
- Wakulla Festival attended by ISM staff - provided materials and activities - November 2nd
- Be My Neighbor Day - February 1st Downtown Tallahassee (manatee display and wildlife headband activity)



- Summer Challenge with WFSU online event. Coordinated program with Gina Long (Project WILD) for FWC virtual participation.

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

- East coast - Mascot sent to Barrier Island Center - October 5th
- East coast - Mascot sent to Delray Beach for Lagoon Fest - November 2nd

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, “Warm Water Saves Manatees”. This decal raised approximately \$21,660 for the Save the Manatee Trust Fund. County and ISM staff distributed at least 4,332 decals throughout the state during the annual vehicle/vessel registration period. [Note: at the time of this report, seven counties had not reported back their decal sales, accounting for up to 460 additional decals.]

In addition to the decal sales at the tax collector office, individuals may order manatee decals through the ISM 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.





Manatee display set up at the "Be My Neighbor Day" in Tallahassee



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 Benutzern 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



FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

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.



Protect Manatees at Warm-Water Sites

Florida manatees require warm-water refuges to survive the winter months. Manatees cannot endure water temperatures below 68 degrees for extended periods without suffering from cold stress that can lead to their death. Small calves and juvenile manatees are especially vulnerable to chilly water.

Manatee refuges come in varying sizes and locations, but one thing makes them critical: their warmer waters. The well-known manatee refuges are freshwater springs and power plant discharges, but manatees also find warm waters in canals and basins throughout Florida. These smaller warm-water sites are sometimes used by only a few manatees. While many well-known warm-water refuges are officially marked and protected from human disturbance during winter, this often is not the case for the smaller warm-water sites.

It is important to be aware that any disturbance to manatees using any of Florida's warm-water sites can result in manatees fleeing that refuge and being exposed to life-threatening conditions. Remember, if manatees change their behavior because of your

presence, you are too close. Florida residents and visitors need to follow the wildlife viewing guidelines to help protect manatees that rely on warm-water sites for survival.

- Observe manatees from a distance
- Avoid excessive noise
- Use caution when boating near warm-water sites

Thank you for your decal donation, which supports Florida's manatee conservation efforts. The Save the Manatee Trust Fund provides research, recovery, rehabilitation, management and education resources that benefit Florida's manatees.

Please call the Wildlife Alert number 888-404-3922 to report any manatees that are dead, injured, distressed or being harassed. Use #FWC and *FWC on a cell phone or text to Tip@MyFWC.com.



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

MyFWC.com/Manatee

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