Responsible Conservation of Florida's Wildlife Heritage

SAVE THE MANATEE TRUST FUND

ANNUAL REPORT

FISCAL YEAR 2022-23

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 manatee rescue operations
Photographs Courtesy of FWC, unless otherwise noted

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) is pleased to submit the annual report on the expenditures from the Save the Manatee Trust Fund (Trust Fund), per section (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, 2022 through June 30, 2023.

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. Over the past decade, the Indian River Lagoon (IRL) has experienced significant water quality degradation, leading to the repeated occurrence of harmful algal blooms and widespread loss of seagrass, the preferred food for manatees. An Unusual Mortality Event (UME) caused by starvation due to lack of forage in the IRL started in December 2020 and its investigation is ongoing on the Atlantic coast. The Atlantic region event is the 14th officially declared mortality event in Florida since 1996, roughly an event every other year over the past two decades. The IRL is central in manatee migration patterns on the Atlantic coast, and health effects of starvation and chronic malnutrition were documented in all of the Atlantic management region. Although few cases of chronic malnutrition continued to be documented, the rescue and mortality numbers were much lower during this FY compared to the two previous years. Mortality in this event peaked during the previous two winters because colder temperatures add extra health stressors to manatees that are already compromised by chronic malnutrition. One of the main factors causing the lower number of manatee deaths this past year was some recovery of seagrass in parts of the northern IRL during summer 2022, which presumably

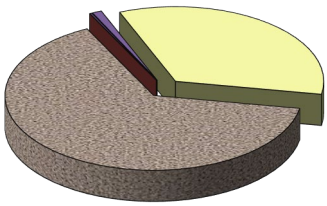
improved manatee condition compared to the previous years. FWC and the USFWS partnered to lead proactive efforts including habitat restoration projects and implementation of a supplemental feeding trial. The supplemental feeding program aimed to reduce the negative health impacts of prolonged starvation and possibly reduce the numbers of deaths and manatees needing rescue. Please find more information on our FWC website: Manatee Mortality Event Along The East Coast: 2020-ongoing | FWC (myfwc.com). Additionally, over 120 manatee mortalities were attributed to a red tide bloom in southwest Florida during this report period. Ten manatees with signs of red tide impacts were rescued and brought into rehabilitation for treatment and have since been released back into the wild.

The long-term impacts of such large-scale die-offs on the manatee population in Florida are not currently known. Investigating these events is key to understanding the cause, understanding potential impacts on the population as well as developing conservation measures that protect the species affected and the marine environment where the UME is taking place. 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 2022-2023 totaled $4,334,889. Appropriations from the Trust Fund for the same period were $4,624,849 with $313,310 provided for manatee research activities at Mote Marine Laboratory (Mote), and a service charge to General Revenue of $351,165 that most trust funds are required by law to pay. In FY 2022-2023, FWC's Division of Habitat and Species Conservation expended $905,974 for conservation activities and the Fish and Wildlife Research Institute expended $1,991,223 on research and monitoring. Details of revenues, appropriations, and expenditures are shown on page 6 of this report.

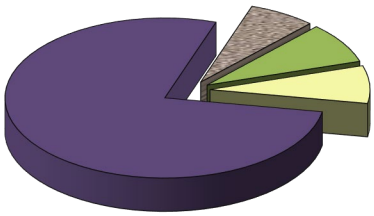
TRUST FUND FY 2022-2023 REVENUES AND EXPENDITURES

REVENUES
$4,334,889



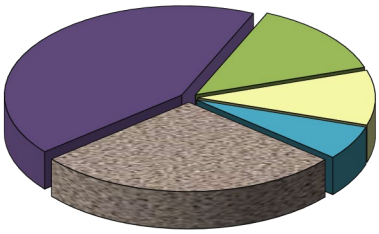
- Vessel Registrations ($2,809,625)
- Misc. Receipts ($147)
- Save the Manatee Donations ($11,138)
- Interest ($43,945)
- Manatee License Plate Sales ($1,470,034)

APPROPRIATIONS
$4,624,849



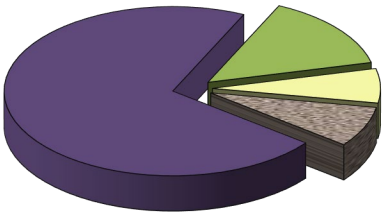
- FWC Manatee Program ($3,580,559)
- Mote Marine Laboratory ($313,310)
- Administrative Overhead ($379,815)
- Service Charge to General Revenue ($351,165)

FWC MANATEE PROGRAM CONSERVATION MANAGEMENT EXPENDITURES
$905,974



- Manatee Protection Zones ($253,079)
- Plan and Permit Reviews ($385,595)
- Habitat Protection ($121,507)
- Data Distribution ($89,971)
- Public Outreach ($55,281)

FWC MANATEE PROGRAM RESEARCH EXPENDITURES
$1,991,223



- Behavioral Ecology ($153,411)
- Mortality and Rescue ($1,423,114)
- Photo Identification (Life History) ($284,253)
- Population Assessment and Monitoring ($130,445)

MANATEE BASICS

COMMON NAME	**Florida manatee**
SCIENTIFIC NAME	*Trichechus manatus latirostris* (Order: Sirenia)
STATUS	Threatened (Federal)
RANGE	Throughout Florida (summer months into southeastern states but reported as far north as Cape Cod and as far west as Texas)
MAXIMUM SYNOPTIC SURVEY COUNT	6,620 in 2017
HISTORY	A native species found in Florida's fossil record and recorded by earliest explorers
DIET	Freshwater and marine species of plants
REPRODUCTION	Breed year-round; most calves born in spring; mature female can produce one calf approximately every three years, rarely twins
LIFE SPAN	Can live over 60 years; of manatees that reach adulthood, about half are expected to survive at least into their early 20's

A CLOSER LOOK

Adult manatees average 8-10 feet (2.5-3 meters) in length and weigh around 1,000 pounds (454 kilograms). The largest manatees may reach 14 feet (4.2 meters) in length and weigh over 3,500 pounds (1,588 kilograms). Adults are gray in color, with sparse hairs distributed over much of the body. Algae growing on the skin may make them appear green or brown. Manatees that live in saltwater may also have barnacles growing on their skin. Stiff whiskers (called "vibrissae") grow around the face and lips. Despite their large size, manatees can be difficult to see in the wild because of their color and behavior.

Manatees eat a variety of marine and freshwater aquatic plants and are often seen near natural or artificial freshwater sources. Manatees mate year-round; however, most calves are born in the spring. Gestation lasts approximately 13 months and results in the birth of a calf (rarely twins) measuring 3-4 feet (1-1.2 meters) in length. The calves remain with their mothers for up to two years.

There are a variety of threats to manatees, both natural and human-related. Manatees may die from exposure to harmful algal blooms (red tide), the effects of cold weather, and disease. Human-related causes of death include collisions with watercraft, crushing in water control gates and boat locks, and entanglement in fishing gear. During periods of cold weather, manatees gather in waters warmer than 68°F (20°C). This warm water may be in south Florida or may be from an artesian spring or industrial discharge. Manatee habitat loss is also of concern, including future changes in artificial warm-water refuges and reductions in natural spring flows.

FLORIDA MANATEE MANAGEMENT PLAN

"To remove the manatee from the State imperiled species list and effectively manage the population in perpetuity throughout Florida by securing habitat and minimizing threats."

The Florida Manatee Management Plan (Plan), approved at the December 2007 FWC Commission meeting, guides key conservation work supported through the Trust Fund. The Plan provides an overview of the myriad programs, initiatives and strategies implemented to protect and conserve manatees and their habitat, along with a detailed listing of tasks with timelines for both research and management activities.

The primary objectives of the Plan upon which the individual tasks are based are:

- Implement improved methods to estimate manatee population and trends.
- Reduce the human-caused mortality rate by reducing human-caused threats.
- Develop and implement plans to address future changes in power plant operation.
- Assist in the development of minimum flow rules at Florida springs.
- Enhance management practices to secure seagrass and freshwater vegetation.
- Use measurable biological goals to measure progress toward recovery.

The Plan relies on the ongoing collection of manatee-related data to support science-informed decisions and to guide management actions. The major areas of focus are:

- Speed zone review
- Improve enforcement efforts.
- Improve permit review process.
- Review and development of county-level Manatee Protection Plans
- Secure warm-water resources
- Monitor and protect seagrass.
- Retrofit water control structures.
- Launch new outreach initiatives.

MORTALITY AND RESCUE

research activities

A network of researchers and law enforcement agencies was established in 1974 to recover manatee carcasses and assist injured manatees. The responsibility of manatee carcass salvage and necropsy and field coordination of the rescue program was transferred to the State of Florida by the United States Fish and Wildlife Service (USFWS) in 1985.

Staff from FWC's Fish and Wildlife Research Institute (FWRI) are located in five coastal field stations and respond to all reported carcasses as well as public reports of manatees in distress. These stations are located around the State: Jacksonville, Melbourne Beach, Tequesta, Port Charlotte, and St. Petersburg. Using objective-driven criteria, carcasses are selected for transport by field personnel from recovery locations to FWC's Marine Mammal Pathobiology Laboratory (MMPL) in St. Petersburg or are examined 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 (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 Rescue and 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, Walt Disney World's The Seas, and others).

[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 2022-23 HIGHLIGHTS

- Statewide, there were 531 manatee carcasses documented in Florida during FY 2022-23. Additionally, five carcasses were documented in Georgia, three in Alabama, three in Mississippi, one in North Carolina, three in South Carolina, one in Texas, and two in Louisiana.

- Statewide, 121 rescues were performed in Florida during FY 2022-23. As of 16 August 2023, of the 121 manatees rescued, 61 were released back into the wild *(30 were Assist & Release)*, 32 died and the remaining 28 animals are still being rehabilitated. Additionally, there was one out of state rescue in Georgia.

- An Unusual Mortality Event (UME) associated with mass starvation was declared for the Atlantic Management Unit in the winter of FY 2020-21 and the investigation is ongoing. During FY 2022-23, 136 carcasses (from all causes of death) were reported and 42 manatees (all causes) were rescued within this region. Although few cases of chronic malnutrition continued to be documented, the rescue and mortality numbers were much lower during this FY compared to the two previous years (FY 2020-21= 794 carcasses and 84 rescues; FY2021-22= 588 carcasses and 75 rescues). The cause of the UME is centered in the Indian River Lagoon (IRL) where a decade of significant water quality degradation and repeated occurrence of harmful algal blooms led to widespread loss of seagrass. The IRL is central in manatee migration patterns on the Atlantic coast, and health effects of starvation and chronic malnutrition have been documented in all of the Atlantic management region. Mortality in this event peaked during the previous two winters because colder temperatures add extra health stressors to manatees that are already compromised by chronic malnutrition. One of the main factors causing the lower number of manatee deaths this past year was some recovery of seagrass in parts of the northern IRL during summer 2022, which presumably improved manatee condition compared to the previous years.

  Please visit https://myfwc.com/research/manatee/rescue-mortality-response/ume/ and https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/ume-carcass/ for more information regarding the Atlantic coast manatee UME.

- Approximately 124 mortalities were attributed to a red tide bloom in southwest Florida during FY 2022-23. Ten manatees with signs of brevetoxicosis were rescued and brought into rehabilitation for treatment. All ten manatees have been released back into the wild.

Manatee Rescues FY 2022-23 (preliminary numbers)

Type of Rescue	*Number of Rescues*
Calf—Alone	10
Calf—With Rescued Mother	6
Mother of Rescued Calf	1
Human—Entanglement	13
Human—Entrapment*	16
Human—Watercraft-Related	27
Human-Other	0
Natural—Includes Red Tide	48
Undetermined; Other	0
Total	**121**

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

Manatee Mortality FY 2022-23 (preliminary numbers)

Cause of Death	*Number of Deaths*
Human-Flood Gate or Canal Lock	15
Human - Other	7
Human-Watercraft Related	89
Natural - Cold Stress	16
Natural - Other	81
Perinatal	72
Undetermined	48
Verified, Not Recovered	203
Total	**531**

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).

FWC conducted six aerial surveys from October 2022 to May 2023 in the Indian River Lagoon, from Ponce Inlet to Jupiter Inlet, as part of the response to the unprecedented manatee Unusual Mortality Event (https://myfwc.com/research/manatee/rescue-mortality-response/ume/ for more information regarding the Atlantic coast manatee UME). These surveys were conducted to document manatee numbers and distribution during the declared UME. Counts of manatees in the Indian River Lagoon ranged from 723 in October to 1,931 in

March. The region with the highest number of manatees counted in each survey was the northern portion of the survey area in Mosquito Lagoon.

Abundance surveys employ the latest scientific methods to provide conservation managers and the public with a sound estimate of the Florida manatee population. The statewide survey is flown over two consecutive winters, one coast per season. An analysis using surveys from 2015 and 2016 produced the latest population abundance estimate to date and is described in Technical Report TR-23 at https://f50006a.eos-intl.net/F50006A/OPAC/Details/Record.aspx?BibCode=1864664. The estimate will be updated using data collected in December 2021 and November and December 2022. Data entry, verification, and analysis for this survey have been completed, and a technical report of the results is anticipated in fall of 2023. The estimates can also be used as part of population projection models, like the Core Biological Model (CBM; Runge et al 2017), which are designed to forecast Florida manatee population dynamics, understand the relative influence of the threat's 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). In the future, regional and eventually a statewide IPM framework will provide estimates of population abundance in years when the intensive abundance surveys were not flown.

Monitoring efforts in the Port of the Islands (POI), Collier County, FL continued in winter 2023. FWC developed an innovative mark-recapture method to estimate manatee abundance and detection from count data at aggregation sites using an Unmanned Aerial System (UAS). This information is being used as a baseline measurement for mapping distribution and abundance to help determine the impact of the Comprehensive Everglades Restoration Plan's Picayune Strand Restoration Project on manatee use of warm-water sites in the POI region.

Long-term data on survival of individuals and reproductive performance of mature females are included within manatee 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. Florida manatees are photographed throughout their range and the sightings are incorporated into a 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. Staff continued priority work to transfer the long-term oversight and support of the federal MIPS database to the FWC including updating the database and front-end application.

Demographic parameters, particularly survival rates for calves and young adults, can sometimes be difficult to estimate through photo-identification because of unfavorable photographic conditions, limited animal accessibility, and the lack of scars on young individuals. 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 2022-23 HIGHLIGHTS

- FWC conducted 6 aerial surveys in the Indian River Lagoon as part of the investigation to the manatee Unusual Mortality Event (UME) within the Atlantic coast region.
- FWC and partners conducted a manatee abundance aerial survey in November and December 2022 on the east coast of Florida, from Monroe County to the Florida/Georgia state line. The survey occurred over 7 days and was conducted by 16 observers during 18 flights. An abundance survey on the west coast of Florida was conducted in December 2021.
- FWRI staff members and interns spent 260+ days conducting land and boat-based photo-ID research during 570+ visits to sites used by manatees. Other research partners and volunteers also provided additional photo-documentation of manatees. Manatee photo-ID data were processed and will be analyzed to support updated adult survival and reproductive rates—key input parameters in ongoing population modeling efforts.
- The statewide MIPS catalog currently includes 5,146 animals and more than 122,800 sighting records. In addition, this year 144 carcasses were matched to animals known through photo-identification.
- Transfer of responsibility for the longstanding Manatee Individual Photo-Identification System database, including data, responsibilities, and leadership, from USGS to FWC continued. In addition, the transfer of data from a USGS led MIPS SQL database to a FWC led MIPS SQL database was completed and work on the development of an associated front-end application continued.
- Genetic sampling surveys were conducted in southwest Florida. A total of 301 samples were collected from free swimming manatees during the 2023 winter: 6 samples at Port of the Islands (Collier County), 59 samples in the Orange River (Lee County), and 213 samples in the Tampa Bay area. 23 samples were also collected from manatees at the Cape Canaveral Energy Center as part of a pilot project to expand genetic sampling to the east coast.
- The manatee genetic-ID database 3,379 unique individuals identified by skin samples collected from live manatees through the 2023 winter.

Manatees resting at Crystal River in January 2023.

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 currently undergoing restoration in southwest Florida is Warm Mineral Springs, which flows via Salt Creek into the lower Myakka River in Sarasota County (see Habitat Management highlights). 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, Collier County, is expected to disappear once hydrologic restoration of sheet flow in the Picayune Strand is completed as part of the Comprehensive Everglades Restoration Plan. 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 other aggregation sites in the region.

Another serious habitat-related threat to manatees is the large-scale loss of seagrass in the Indian River Lagoon and along much of Florida's east coast. Although manatees feed on a variety of aquatic vegetation, they rely primarily on seagrass and macroalgae in estuarine environments. The unprecedented loss of forage in this crucial region has led to widespread malnutrition and starvation of manatees. FWC's investigation into this manatee unusual mortality event includes research into manatee health, ecology, behavior, and population impacts (https://myfwc.com/research/manatee/rescue-mortality-response/ume/).

Group of manatees socializing and slowly cavorting in the northern Indian River, Brevard County.

FY 2022-23 HIGHLIGHTS

- As part of the Atlantic coast Unusual Mortality Event investigation, FWC again collaborated with the U.S. Geological Survey (USGS) to tag and track manatees with satellite-linked GPS tags, and to evaluate submerged aquatic vegetation used by tagged manatees in the northern Indian River Lagoon. A team of scientists and veterinarians from FWC, USGS, University of Florida, and other partners assessed the health and body condition of each animal to further understand the health of the wild population.

- FWC continued its collaboration with USGS and Clearwater Marine Aquarium Research Institute to help track experienced rehabilitated manatees with GPS tags along the east coast after their release from facilities. Manatee movement data in relation to environmental information is providing insights into manatee behavioral response to seagrass loss and to the winter supplemental feeding trial.

- FWC made considerable progress on a NOAA-funded actionable science grant for a project entitled, "Creating Secure Warm-water Habitat Networks for Manatees along Florida's Gulf Coast: Developing a Vision, Identifying Gaps, and Prioritizing Restoration Sites." The goal of this interdivisional and interagency project (including U.S. Fish and Wildlife Service) is for state and federal managers and researchers to jointly develop plans to identify and address the highest research priorities to meet management needs regarding the restoration, enhancement, creation, or protection of warm-water habitats for manatees.

- 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, which should be completed in 2023.

- Monitoring of manatee use of manmade passive thermal basins near Port of the Islands, as well as at nearby warm-water sites, continued during winter 2022-23. High-resolution video acquired with an unmanned aerial system was used to map manatee distribution and to estimate abundance during mid-winter cold periods at aggregation sites by accounting for imperfect detection with an innovative sight-resight method. This will provide insights into manatee response to the creation of a new warm-water refuge once the traditionally used site disappears due to hydrologic restoration.

- 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.

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 and develop rigorous analytical products. Efforts to protect this species are outlined in the North Atlantic Right Whale Recovery Plan[1] and NOAA Fisheries 2021-2025 Priority Action Plan[2].

The North Atlantic right whale is one of the most endangered large whales in the world with fewer than 350 individuals[3]. The population has been in decline since 2010 and an Unusual Mortality Event (UME)[4] has been in effect since 2017. Entanglement in fishing gear and vessel collisions are the leading known causes of death in this species and 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

[1] https://www.fisheries.noaa.gov/resource/document/recovery-plan-north-atlantic-right-whale-eubalaena-glacialis
[2] https://www.fisheries.noaa.gov/resource/document/species-spotlight-priority-actions-2021-2025-north-atlantic-right-whale
[3] https://www.fisheries.noaa.gov/species/north-atlantic-right-whale#overview
[4] https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2023-north-atlantic-right-whale-unusual-mortality-event

calving area resulted in the formation of the Southeast U.S. Right Whale Recovery Plan Implementation Team (SEIT). FWC has been a member of the SEIT since its inception in 1993 and currently serves as Team Leader for this federal recovery team.

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 a major contributor to the North Atlantic Right Whale Consortium—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 2022-2023 HIGHLIGHTS

- During the North Atlantic right whale calving season (November 15th – April 15th), four research teams conducted aerial surveys in coastal Atlantic waters from North Carolina to Florida. In total, 59 unique right whales, including 11 mother-calf pairs[5], were documented. FWC collaborated with the Georgia Department of Natural Resources (GDNR) and the Clearwater Marine Aquarium Research Institute (CMARI) to survey the area between Canaveral National Seashore, Florida, and Tybee Island, Georgia, out to approximately 30 nautical miles offshore. FWC conducted 56 aerial surveys and detected 51 right whale sightings between December 1st and March 31st. Preliminary photo analysis indicates FWC documented 35 unique right whales, including 10 calves. Select photos from the calving season can be viewed here: http://myfwc.com/research/wildlife/right-whales/images/

- Genetic sampling was conducted in collaboration with NOAA Fisheries Service and the Georgia Department of Natural Resources. During the calving season, 50 vessel trips were conducted, resulting in samples from eleven right whale calves, two adult females, and two juvenile right whales. The skin samples will be used to determine individual identification, sex, and parentage. This genetic data helps identify carcasses, improve population estimates, and close demographic information gaps.

- Three chronically-entangled right whales were observed in the southeast U.S. this winter. On 08 January, Catalog #4904, a juvenile female in poor condition, was sighted off Rodanthe, NC with a complex, life-threatening entanglement including rope embedded across the rostrum and wrapped around the peduncle and flukes. Due to the whale's location, a rapid vessel response was not possible and there have been no subsequent sightings of this whale. On 20 January, the FWC aerial survey team sighted Catalog #3812, an adult male in fair condition, off Jekyll Island, GA. The entanglement consisted of rope exiting both sides of the mouth, creating a loop on the right and trailing several hundred feet behind the flukes on the left. A multi-agency response was mounted. A third entangled right whale, Catalog #1218, an adult male in poor condition, was sighted on 27 January off Surf City, NC[6]. The entanglement consisted of multiple embedded wraps around the peduncle at the fluke insertion, two metal mesh traps, and trailing line. Again, a multi-agency response was mounted. Gear removed from #3812 and #1218 was examined by NOAA Fisheries Service and Fisheries and Oceans Canada (DFO). The 375ft of rope collected from #3812 was determined to be from the Gulf of St. Lawrence snow crab fishery, and the 150ft of rope and two traps recovered from #1218 originated from the

[5] A 12th newborn calf was sighted without its mother near Beaufort Inlet, NC. This calf subsequently died. https://www.fisheries.noaa.gov/national/endangered-species-conservation/north-atlantic-right-whale-calving-season-2023

[6] https://georgiawildlife.blog/2023/02/06/rescuing-a-right-whale/

lobster fishery off Nova Scotia. Catalog #3812 was subsequently sighted gear-free but #1218 has not been re-sighted to date[7].

- 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 (including Central and Southeast Florida) and contribute to the overall understanding of right whale demographics, distribution, and habitat use in the southeastern U.S. This was the case during the 2022-2023 season when a right whale mother-calf pair attracted the attention of the public during the month of January as they traveled close to shore along the coast between Cape Canaveral and Jupiter Inlet. Curious boaters, surfers, and paddleboarders approached the whales, getting dangerously close, putting themselves at risk as well as disrupting the whales' behavior. Monitoring efforts and conservation messaging required a significant amount of coordination within and between FWC, NOAA, USCG, law enforcement and other local responders. The high levels of vessel traffic and general lack of awareness about right whales makes these areas in south Florida a particular concern for both vessel collisions and whale harassment.

- On the morning of 20 February, a vague report was received about a right whale in the vicinity of Mayport Naval Station. A right whale survey plane responded and located a right whale mother-calf pair near the west end of the northern jetty, inside the St. Johns River Entrance. A rapid, multi-agency monitoring effort followed and included close coordination between NOAA, FWC, USCG, JAXPORT, St. Johns Bar harbor pilots, Naval Station Mayport, dredge companies, FWC LE, CMARI and FWC right whale aerial survey teams, and vessel traffic in the area. An outbound container ship, already underway, passed the whales inside the narrow entrance jetty. Another cargo ship delayed entry and remained offshore until the whales were clear of the entrance channel. A USCG small boat escorted the whales until the whales were clear of the entrance channel and FWC relieved the USCG vessel to continue monitoring. In total, the event lasted approximately three hours. The last time a similar event occurred in the St. Johns River was 2011.

[7] https://www.fisheries.noaa.gov/national/endangered-species-conservation/north-atlantic-right-whale-updates

Right whale Catalog #4340 (right) and calf (left) were sighted with bottlenose dolphins on January 2, 2023, by beachgoers off Floridana Beach, FL and reported to the Marine Resources Council (MRC) volunteer sighting network. MRC, FWC, and FWC LE responded to photograph mother and calf, collect a genetic sample from the calf, and provide safe escort as the whales passed Sebastian Inlet. Photo: FWC, NOAA Fisheries permit #20556

Right whale Catalog #2029 sighted December 7, 2022 approximately 18NM off Jekyll Island, GA. Photo: FWC, NOAA Fisheries permit #20556

RESEARCH PUBLICATIONS AND REPORTS

research activities

2022-23 PUBLICATIONS: (*FWC authors in bold type*)

D.S. Rotstein, N.I. Stacy, M.J. Kinsel, **M. de Wit**. 2022. Disseminated histiocytic sarcoma in two free-living Florida manatees (Trichechus manatus latirostris). Journal of Wildlife Diseases 58(3): 685-688. doi: 10.7589/JWD-D-21-00138

Cagle LA, Stacy NI, Harvey JW, **de Wit M**, Adler L, Walsh M, Bonde R and Stokol T. 2023. Cytochemical staining of leukocytes and platelets in the Florida manatee (*Trichechus manatus latirostris*): identification of a bilobed monocyte similar to other members of the *Paenungulata*. *Front. Vet. Sci.* 10:1149000. doi: 10.3389/fvets.2023.1149000

MOTE MARINE LABORATORY MANATEE RESEARCH PROJECTS

research activities

The following projects were funded in FY 2022-23 ($313,310):

- Photo-Identification and Genetic Sampling Studies of Manatees in Southwest Florida —The objectives of this project were to: 1) ensure that an updated photographic catalog and data are thoroughly checked for quality and completeness and are provided to the FWC; 2) continue field effort for photo-identification and other data collection efforts in southwest Florida; and 3) contribute to genetic sampling of wild manatees.

- Manatee Rescue and Verification—Mote researchers work under direction of the FWC to verify and transport carcasses using a custom trailer provided by the FWC and assist in responses to reports of injured or ill manatees within a defined response area.

- Aerial Surveys of Manatees— Mote staff conducted aerial survey of manatees. The survey's contributed to understanding of manatee abundance, habitat, and distribution.

- Program Oversight— The program leader is responsible for periodic reports and coordination with State scientists and managers regarding contracted activities conducted by Mote.

MANATEE FORUM

management activities

In 2004, FWC and USFWS staff 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 2022-23, the Manatee Forum met in October 2022 and remotely through teleconference in May 2023. Presentation topics in both of these meetings were related to the ongoing manatee Unusual Mortality Event (UME) along the Atlantic coast and habitat restoration activities. Specifically, updates were provided on agency response efforts, manatee tracking studies, and Indian River Lagoon habitat monitoring. Additionally, an update was provided on manatee habitat restoration projects supported by legislative funding as well as a presentation summarizing the Warm-water Habitat Action Plan workshop. Other presentations included a review of sublethal watercraft interactions, Brevard County's Save our Indian River Lagoon program, and the Indian River Lagoon National Estuarine Program. Both meetings included updates and discussion on FWC and USFWS research and management activities. Based on feedback, a modified approach will be taken with one meeting each year in person and one using virtual 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 valuable to all parties.

MANATEE PROTECTION PLANNING AND PERMIT REVIEWS

management activities

FWC staff review proposed development projects and provide biological opinions to state regulatory agencies for Environmental Resource Permits, Joint Coastal Permits, Special Event 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 sixteen individual county-specific Manatee Protection Plans (MPPs). FWC staff work closely with federal and county representatives regarding revisions to existing MPPs and provide 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 2022-23 HIGHLIGHTS

- The FWC reviewed and provided comments on 420 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 (FDOT), U.S. Army Corps of Engineers (USACOE), and USFWS.

- Staff have continued conversations with the City of Oldsmar Engineering Division regarding the most recent entrapment event where three manatees entered the Mobbly Bayou retention pond by swimming over a city-owned weir structure in summer 2020. Similar entrapment events have taken place in 2012, 2017, and 2018. FWC staff met on-site with the City of Oldsmar and Pinellas County to finalize plans to retrofit the weir through special project funding obtained by the city. FWC staff continue to offer technical assistance in pre-permitting discussions with the regulatory agencies. The weir is expected to be retrofitted in FY 2023-24.

- In response to a manatee entrapment in a stormwater culvert under a Florida Department of Transportation (FDPT) roadway in Cape Canaveral, staff contacted the FDOT to discuss opportunities to retrofit the culvert. FDOT sought technical assistance from FWC staff and installed a grating system on the exposed culvert in May 2023.

- In response to a manatee entrapment behind a living shoreline revetment, FWC staff contacted property managers at a residential community on Brickell Key in Miami-Dade County. Technical assistance on how to remedy the issue was provided and as of June 2023, the proposed plans to modify the living shoreline are under review by the property owner and mediation is planned for this FY.

- Following the report of a documented manatee carcass entrapped in a stormwater culvert in Bayboro, FWC staff contacted the City of St. Petersburg to evaluate opportunities for retrofit of the pipe. After seeking technical assistance on options to grate the culvert, City staff allocated funded and submitted design plans to install exclusion grating on the culvert, which is expected to be completed in FY 2023-24.

Photo of culvert and living shoreline at Brickell Key in Biscayne Bay, Miami-Dade County (left). Photo of grated culvert in Cape Canaveral, Brevard County (right).

Florida Port Activities

- FWC staff provided recommendations on how to offset expected impacts to manatees for four port projects including Port of Tampa Bay, Port of Panama City and Blount Island Marine Terminal.

Manatee Protection Plans

- **Volusia County MPP:** FWC Staff corresponded with Volusia County and USFWS to write a Letter of Concurrence regarding an Addendum to the Volusia County MPP which will provide updated clarification and relevance for the MPP's implementation.

- **Brevard County MPP:** FWC staff worked with Brevard County and USFWS to provide updated guidance for data-driven criteria assessments of the MPP.

- **Duval County MPP:** Duval County staff have initiated correspondence with FWC staff regarding slip allocation tracking and future revisions to their existing plan including development of a Public Service Announcement.

- **Miami Dade County MPP:** FWC staff have continued to meet regularly and provide technical assistance to the County in their efforts to revise their existing plan.

- **Sarasota County MPP**: FWC and Sarasota County staff continued discussions 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 2022-23 HIGHLIGHTS

- **Rule Development** – In response to the ongoing Atlantic Coast manatee UME, an emergency, temporary No Entry Zone in Brevard County was prepared and filed under the provisions in Chapter 120.54(4), Florida Statute. The temporary zone was in effect from November 15, 2022 through February 15, 2023 and was marked with temporary buoys. Additionally, staff began reviewing data and coordinating with Brevard County in August 2022 regarding permanent rulemaking for the No Entry Zone. A rule proposal was brought before the FWC Commissioners as a consent agenda item in a public hearing held in November 2022 (68C-22.029, F.A.C.). The rule was filed for adoption with the Department of State in January 2023 and became effective later that month, superseding the temporary emergency rule in effect. Staff worked with the FWC Division of Law Enforcement to review sign-posting plan to mark the new manatee protection zone. The plan is expected to be completed by November 2023.

- **Monitoring Activities** — FWC staff coordinate 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 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 the following monitoring activities in FY 2022-23.

    - Eastern Panhandle Region — In April 2023, FWC staff completed a two-year manatee distribution aerial survey in the eastern Florida panhandle covering portions of Franklin, Gulf, Jefferson, Taylor, and Wakulla counties. FWC partnered with The

Nature Conservancy, who provided funding to FWC, to survey this region. The resulting data will provide valuable information about manatee distribution and habitat.

- Sarasota County – In FY 2022-23, FWC staff partnered with Sarasota County to finalize a 12-month vessel distribution aerial survey effort to document and record recreational and commercial vessel traffic in Sarasota County waters. This information will aid staff in future evaluations of Manatee Protection Zone and Manatee Protection Plan revisions and updates.

Local Ordinances — In FY 2022-23, FWC staff continued coordination with representatives from Lee County government on issues related to a potential local manatee protection ordinance. In December 2022, staff from Lee County Board of County Commissioners submitted a formal request for approval of the establishment of three year-round slow speed manatee protection zones. After evaluation of the proposed local zones and the best available data, the FWC approved the ordinance (No. 22-26) language in February 2023.

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. FWC staff worked on two additional requests for other types of permits during FY 2022-23.

- In November 2022, the FWC received a request from Sea & Shoreline Aquatic Restoration for exemption from the seasonal No Entry zone in Warm Mineral Springs creek (Sarasota County) to remove a large piece of debris (namely a damaged dock) obstructing manatee access to warm-water habitat. A short-term permit was issued later that month.

- In December 2022, the FWC issued Consolidated Environmental Engineering, LLC an exemption permit from the No Entry zone adjacent to the Florida Power & Light (FPL) Cape Canaveral Energy Center (CCEC) intake canal in Brevard County to perform activities associated with water quality monitoring within the Indian River Lagoon.

Variances or Waivers – The variance and waiver process is governed by s. 120.542, F.S., and Chapter 28-104, F.A.C. In FY 2022-23, FWC received three new requests for variances from manatee protection rules.

- In August 2022, FWC received a request for permanent variance from portions of a Slow Speed Manatee Protection Zone rule in Sarasota County. Sarasota Ski-A-Rees (Ski-A-Rees) requested variance from the rule to allow for the operation of ski show operations and practices in its historical location. The manatee protection measures included in the variance request were deemed to be appropriate to allow for safe ski operations, and the permanent variance request, with conditions, was approved in November 2022. In April 2023, FWC received a request from Ski-A-Rees for temporary variance from portions of a Slow Speed Manatee Protection Zone rule in Sarasota County to conduct ski tournament practices in the month of June 2023. A temporary (1st-24th June 2023) variance, with conditions, was granted to allow for tournament practice ahead of the regional annual tournament held in Winter Have, FL.

In April 2023, FWC received a request for temporary variance from portions of a Slow Speed Manatee Protection Zone rule in Volusia County. Halifax Rowing Association (HRA) requested variance to operate motorboats, including safety and U.S. Rowing Referee launches, in excess of Slow Speed as necessary to ensure safety of life while accompanying rowing teams during regattas. The manatee protection measures included in the variance request were deemed to be appropriate to allow the safe operation of U.S. Rowing Referee launches, and the temporary variance request, with conditions, was approved in June 2023.

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 ensuring habitat health and stability is a primary focus of habitat protection programs (See Chapter 7, "Management Actions," p. 55 Florida Manatee Management Plan).

FY 2022-23 HIGHLIGHTS

WARM-WATER HABITAT

- The Atlantic Coast Manatee Unusual Mortality Event (UME) has brought renewed attention to existing watershed and ecosystem issues in places like the Indian River Lagoon. In response more resources have become available for efforts to support manatee habitat. FWC staff and partners have worked together to identify projects and collaborative opportunities related to the restoration of aquatic habitats to benefit manatees. In FY 2021-22, eight projects were identified in collaboration with stakeholders and partners around the State for funds authorized by the legislature (SB 2500). In FY 2022-23, contractors were procured to implement these efforts. These projects include restoration of manatee access to critical warm-water habitat in natural springs and habitat restoration in manatee concentrated areas including seagrass habitat enhancement and nursery infrastructure throughout Atlantic coastal estuaries where seagrass declines have occurred. Additional information and updates related to these projects can be found on our webpage at: https://myfwc.com/wildlifehabitats/habitat/ahcr/manatee-projects/

- FWC staff continued to work with Florida Power & Light, 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 staff in monitoring the health of manatees in those areas 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.

- FWC staff, in coordination with the USFWS, completed the revision to *The Florida Manatee Warm-Water Habitat Action Plan* in November of 2020. This document provides a long-term planning tool for manatee warm-water habitat. In FY 2022-23, a workshop composed of representatives from partner agencies, nonprofit organizations, universities, and others was hosted by the Florida Power & Light Company (FPL) to develop strategies for implementing the Action Plan. FWC, in coordination with USFWS and numerous additional partners, is executing actions developed collaboratively at this workshop by developing Regional Partnership Teams and a Steering Committee which will be responsible for implementing The Florida Manatee Warm-Water Habitat Action Plan.

- FWC staff implemented a project to restore and enhance Warm Mineral Springs' downstream outflow (Sarasota County), considered the most important natural manatee warm-water refuge along Florida's southwest coast. This project will improve warm-water access and habitat quality for manatees. Through funding and assistance from multiple partners, including The Nature Conservancy, the Coastal and Heartland National Estuary Partnership, the U.S. Army Corps of Engineers and with FWC's Aquatic Habitat Conservation and Restoration Section's state allocated funding, final design plans were completed and permits acquired in Fall 2020. Construction, funded through Senate Bill 2500, commenced in June of 2022 and is expected to be completed in October of 2023. Significant impacts caused by Hurricane Ian in the fall of 2022 delayed anticipated completion of this project, and additional funding has to be sought to correct sediment augmentation caused by the storm. Additionally, outreach activities within the local community have been led by the National Wildlife Federation through a grant from the Gulf Coast Community Foundation and include informational signage and brochures, community events and messaging.

Photos of Warm Mineral Springs restoration project, Sarasota County.

- FWC staff are 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, Phases I and II of project construction have been completed, and Phase III is anticipated to commence in Spring of 2024. FWC staff continue to monitor this project and implement adaptive management strategies. In the spring of 2023, portions of the run and boil slops were

revegetated due to minor losses from high water level that occurred during Hurricanes Ian and Nicole in 2022.

MINIMUM FLOWS AND LEVELS

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

WATER-CONTROL STRUCTURES

- FWC staff coordinate the Interagency Working Group for Water Control Structures, which is comprised of USFWS, Miami-Dade County, USACOE, FDEP, UESI Engineers, the South Florida WMD, Southwest Florida WMD and St. Johns River WMD. This Working Group addresses central and south Florida navigational lock and water control structure-related manatee mortality issues. The Interagency Working Group met at the St. Johns River Water Management District Sunnyhill Field Station in June 2023 to discuss issues and concerns that occurred during the previous year.

- During FY 2022-23, FWC staff reviewed nineteen structure manatee mortality events and one impingement injury at Working Group on structures. Mortality notification letters were sent to three structure managers to request operational data and provide technical assistance to prevent future manatee mortality at these sites.

- This past FY, fifteen manatees died due to interactions with the above-mentioned structures. These deaths increased the overall total of navigational lock and water control structure-related deaths to 284 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 5.0 manatees per year (2001-2023).

- FWC staff coordinated with St Johns River Water Management District Staff to utilize FCO funds from the legislative session to implement the installation of Manatee Protection Systems. Manatee barriers and/or manatee detection systems are to be installed at three navigational locks to prevent manatee entrapments and construction will be completed during FY 23-24.

Photo of Moss Bluff Lock in Marion County taken at the 2023 Annual Manatee Water Control Structure Working Group Meeting

AQUATIC VEGETATION

- FWC staff continue 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. In FY 2022-23, FWC staff collaborated with partners to implement eelgrass restoration at several locations within tributaries of the Indian

River Lagoon and began construction of several seagrass aquaculture facilities to enhance capacity for future restoration efforts.

- FWC staff work 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 in various aquatic plant working groups. The Kings Bay and Blue Spring Aquatic Plant Working Groups are two such 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 2022-23 HIGHLIGHTS

management activities

Public outreach regarding manatee conservation programs is important so the public is well informed about manatees and understands 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 or entanglement in discarded monofilament line and why boaters must comply with posted speed zones to reduce manatee injury and death from boat collisions.

During FY 22-23, the Imperiled Species Management Section continued their Internship Program which included manatee management related projects. In the fall and spring semesters, students from Florida universities earned course credit while completing various projects, such as updating outreach material and reviewing manatee Unusual Mortality Event data that moved manatee conservation forward.

MANATEE AWARENESS ONLINE ENGAGEMENT

- Press releases: 5

- **March 23, 2023 –** Go slow and look out below – manatees are on the move
- **March 22, 2023 –** Spring brings more activity from Florida's wildlife
- **February 2, 2023 –** FWC: Governor Ron DeSantis' Framework for Freedom Budget promotes natural resource restoration initiatives and supports law enforcement
- **November 1, 2022 –** It's Manatee Awareness month: FWC reminds boaters to go slow, look out below
- **August 1, 2022 –** Stick with manatees and sea turtles by collecting this year's FWC decals

- FWC staff reviewed both the manatee related MyFWC.com webpages to make sure all areas where the Wildlife Alert information was posted had the current information for reporting dead, injured or distressed manatees. The Tip@MyFWC.com information was removed from these areas to prevent a delay in the reporting from this service, leaving the Wildlife Alert phone numbers. Wildlife Alert text was reworded so that when translated to Spanish through the Google Translator app embedded on the website, the translation was clear.

- Social Media – Staff continued regular and frequent social media engagement through platforms such as Facebook, Instagram, and Twitter. Important messaging included awareness about moving manatees during seasonal migration, "Go Slow, Look Out Below!" aimed at protecting manatees from waterway vessels, and information and updates related to the ongoing manatee UME.

MANATEE OUTREACH

In FY 2022-23, FWC staff participated in several in-person and virtual outreach events, with audience members ranging from elementary school students to adult continued learning participants. ISM staff participated and presented on manatee conservation at the following events:

- Osher Lifelong Learning Institute at Florida State University - The Study of Florida Manatees (3-week term; virtual)
- Manatee Festival – Manatee Research and Management (in-person table display; Crystal River, FL)
- Florida Sierra Club – Manatee Conservation and Population Status (virtual)
- Estuary Day Celebration – Manatee Management (in-person table display; Apalachicola, FL)
- Florida State University Coastal & Marine Lab Open House – Manatees (in-person table display; St. Teresa, FL)
- Day at the Capitol for Legislators – Manatees (in-person table display; Tallahassee, FL)
- Wild Amelia Nature Festival – Manatee Management (in-person table display; Fernandina Beach, FL)
- Right Whale Festival – Manatees (in-person table display; Fernandina Beach, FL)
- Florida State University – Undergraduate Marine Mammal Management (in-person classroom session; Tallahassee, FL)
- Fish and Wildlife Foundation of Florida – Manatee Conservation & Unusual Mortality Event (virtual)

- Marine Turtle Permit Holder Meeting – Manatee Unusual Mortality Event (in-person presentation; Safety Harbor, FL)

MANATEE DECAL

- The manatee decal available at Florida tax collector offices this year was titled, "Manatees in Motion", and was an awareness reminder that manatees travel through Florida's waterways year-round. Boaters, including personal watercraft operators, can do their part to protect manatees by going slow near shallow areas, seagrass beds, and sanctuaries and looking out below by wearing polarized sunglasses. Florida's tax collector offices distributed 5,758 decals through the annual vehicle/vessel registration period and helped raise approximately $28,790 for the Save the Manatee Trust Fund. [Note: at the time of this report, five counties had not reported their decal sales, accounting for 600 decals.]
- In addition to the decal sales at the tax collector office, individuals may order manatee decals through the Manatee Management Program office. Decal order forms are available to download from the manatee program's web page: Manatee Decals | FWC (myfwc.com). The manatee decals continue to bring in additional funds to the Save the Manatee Trust Fund. Decals from 1992 to the present fiscal year are available for donation at $5 each.
- Surplus manatee decals from previous years are also distributed to groups to use at their education events or programs. A total of 9,066 older decals were given away during the year.

MANATEE INFORMATION – UPDATES AND NEW RESOURCES

A new educational manatee sign was developed with the assistance of Imperiled Species Management Section interns and listed on the manatee program web page. The sign is designed to be installed at locations where manatees are present and waterway users are interested in observing them. The Nature Conservancy funded the purchase of 18 aluminum signs that will be distributed to state parks and nature preserves around the state.

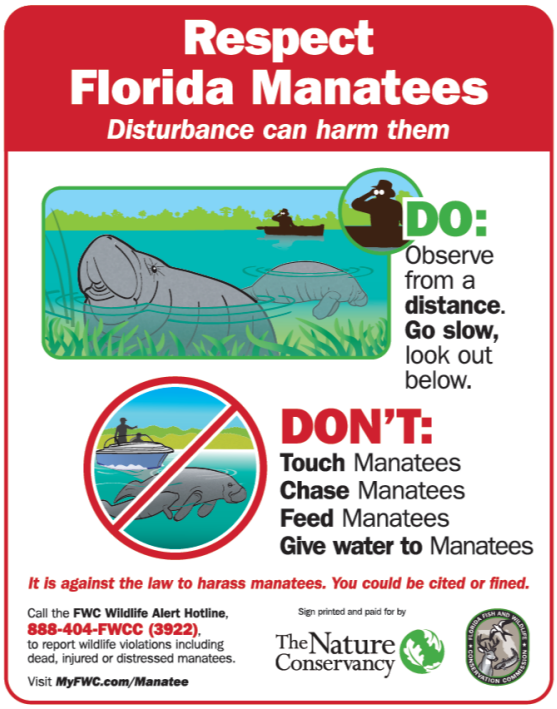


Photo of "Respect Florida Manatees" Educational Signage

Staff maintain a webpage for boat facilities to obtain access to the signage and educational material. All manatee educational signage is available for download here: https://myfwc.com/wildlifehabitats/wildlife/manatee/education-for-marinas/

FWC staff finalized updates and printed the brochure, "Guidelines for protecting Florida Manatees", which had been under review since the last fiscal year. After the brochure was printed, agency research staff assisted with translating the text to Spanish and an ADA version of the translated brochure was posted online. This timely translation allowed research staff in Mexico to use the information for educational purposes when it was discovered that a tagged manatee from Florida was observed using the navigational channels in Cancun, Mexico. The translated information was shared with researchers monitoring the manatee, the protected area administrators, local not-for-profit organizations, tourist guides and the navigation authority of the

Port of Cancun. A digital version of this brochure can be downloaded here: https://myfwc.com/media/25256/guidelinesprotectingmanatees.pdf

New this year is a sticker that can be handed out at outreach events or by law enforcement when interacting with the public. The sticker, "Go Slow – Look Out Below", will aid in reminding water users of the importance of paying attention to nearby manatees who may be in the vicinity of their vessel.

Photo of "Go Slow – Look Out Below" Sticker

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

ES = Spanish - Español
FR = French - Français
DE = German - Deutsch

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

ES: La velocidad más lenta necesaria para mantener gobierno y dirección (velocidad de ~2-3 mph o 3-5 km/h).

FR: Vitesse la plus basse tout en maintenant la gouverne et la direction. (Vitesse ~2-3 mph ou 3-5 km/h)

DE: Die niedrigste Geschwindigkeit, um das Boot auf Kurs zu halten.

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

ES: La embarcación debe estar asentada y nivelada en el agua, sin surcar mientras se mueve con una estela mínima (velocidad de ~5-7 mph o 8-11 km/h).

FR: Peu ou pas de sillage. L'embarcation doit être complétement positionnée dans l'eau. (Vitesse ~5-7 mph ou 8-11 km/h)

DE: Langsame Fahrtgeschwindigkeit, kein Kielwasser, Boot muss vollständig im Wasser sein.

Resume normal safe speed according to current water traffic conditions.

ES: Reanude la velocidad normal y opere de manera segura tomando en cuenta el tráfico en el agua.

FR: Reprendre une vitesse normale et prudente, selon les conditions de transport nautique en vigueur.

DE: Normale und an die Wasserbedingungen angepasste Fahrtgeschwindigkeit wieder aufnehmen.

***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

What can you do to protect Florida's manatees?

ES: ¿Qué puede hacer para proteger a los manatíes de la Florida?
FR: Que pouvez-vous faire pour protéger le lamantin de la Floride?
DE: Was können Sie tun, um Floridas Manatees zu schützen?

Wear polarized sunglasses while operating a boat.
Polarized lenses make it easier to see things under the surface.

ES: Use lentes de sol polarizados mientras opera una embarcación. La polarización facilita ver cosas debajo del agua.
FR: Portez des lunettes solaires polarisées quand vous opérez une embarcation. Les lentilles polarisées facilitent la vision des objets situés sous la surface de l'eau.
DE: Polarisierte Sonnenbrillen tragen, wenn Sie im Boot unterwegs sind. Mit polarisierten Brillengläsern kann man leichter etwas unter der Wasseroberfläche erkennen.

Slow down and observe all manatee speed zones and caution areas.

ES: Reduzca la velocidad en las zonas de manatíes y respete todas las áreas de velocidad restringida o de precaución.
FR: Ralentissez et respectez toutes les zones de vitesse et les zones de prudence concernant les lamantins.
DE: Langsam fahren und alle Geschwindigkeitsbeschränkungen und Warnungen für Manatees beachten.

While swimming or diving, do not approach or chase a manatee.

ES: Mientras nade o bucee no se acerque o persiga a los manatíes.
FR: Lorsque vous nagez ou plongez, n'approchez pas et ne pourchassez pas un lamantin.
DE: Beim Schwimmen oder Tauchen den Manatees nicht zu nahe kommen oder sie verfolgen.

Don't pollute. Pick up trash such as fishing line and plastic bags.

ES: ¡No contamine! Recoja la basura, tal como el hilo de pescar y las bolsas plásticas.
FR: Ne polluez pas! Ramassez les déchets tels que les lignes de pêche et les sacs de plastique.
DE: Die Umwelt nicht verschmutzen! Abfall, z.B. Angelleinen und Plastiktüten, aufheben.

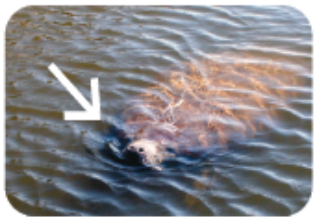
Save the Manatee. savethemanatee.org

Wildlife Alert Hotline:
1-888-404-3922

WILDLIFE ALERT

03/21

Give a proper lookout for manatees when boating



A manatee's snout will break the water's surface when the animal comes up to breathe.

A manatee's back may break the surface before a dive.

A flat swirl on the water's surface, called a manatee "footprint," is created by a manatee's paddle-shaped tail. The edge of the tail may be visible.

Depending on the time of day, water clarity, and reflection of the sun, manatees may be hard to see. Use caution when boating in waters where manatees may be present.

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. In FY 2022-23, the manatee license plate generated $1,470,034. 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, County 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 2022-23, 5,611 manatee decals were sold for manatee conservation. This year's decal was designed by FWC staff and acknowledges 28 years of manatee conservation efforts by recently retired FWC staff Bonnie Abellera.

Manatees in Motion

Manatees travel throughout Florida's waterways and move between freshwater rivers and springs, brackish waters, and coastal salt waters. They even use canals and lock systems to enter lakes or may be found in other inland waterways when storm surges provide access from nearby waterbodies.

While the Florida manatee range is mostly within Florida, some manatees have traveled as far north as Rhode Island, as far west as Mexico, and as far south as Puerto Rico. Researchers place tracking units on the Florida manatees discovered in these distant locations, which help biologists collect information on travel behavior and preferred habitat use.

When boating in Florida, you may share the waterways with manatees. While manatees are difficult to see when water is not clear or when there is a glare on the surface, you can still look out for them. The up and down motion of a manatee's tail creates a round plume on the water's surface when the manatee swims, which looks like a series of circles known as 'manatee footprints.' If you see a manatee footprint or other signs of a manatee in the water (snout, back or tail), slow your vessel or shut off your engine until you locate the manatee(s) and are far enough away to safely move forward again.

Thank you for your contribution to the *Save the Manatee Trust Fund*.

22-

When looking out for manatees:

- **Wear** polarized sunglasses to reduce glare and see below the water's surface.
- **Get** someone to assist you as a proper lookout to help you avoid manatees while boating.

We can all protect our **Manatees in Motion**.

Report manatee deaths, injuries, harassment, accidents, orphaned or distressed manatees to the FWC Wildlife Alert Hotline **888-404-FWCC (3922)**, **#FWC** or ***FWC** on your cell phone.

This decal recognizes ***Bonnie J. Abellera***, who left her own footprint at the FWC by coordinating the manatee decal designs for 28 years.

Florida Fish and Wildlife Conservation Commission
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Tallahassee, FL 32399-1600
MyFWC.com/Manatee