

# MOTE

M A G A Z I N E

FALL 2023

## LENDING A CLAW

Caribbean king crabs in Mote's new hatchery will aid reef restoration

### REEF SHARK RESEARCH

Global study reveals where sharks need help

### RAYS & PREY

Studying the shellfish-eating habits of spotted eagle rays

### 'PIER' INTO LOCAL WATERS

Mote opens new facility on Anna Maria City Pier

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*Mote Magazine* (ISSN 1553-1104) is published by Mote Marine Laboratory, a world-class nonprofit research and science education organization devoted to the ocean and its future. Through marine science stories, Mote hopes to enhance ocean literacy among the public and encourage conservation and sustainable use of marine resources.

**PRESIDENT & CEO** Dr. Michael P. Crosby

**EDITOR** Hayley Rutger

**DESIGN EDITOR** Alexis Crabtree

**CONTRIBUTING WRITERS**

Alexis Crabtree, Olivia Cameron, Kaitlyn Fusco, Emma McIntyre, Mote's Manatee Research Program, Hayley Rutger, Sean Stover

**CONTRIBUTING DESIGNERS/ILLUSTRATORS**

Alexis Crabtree, Hannah Proper, Hazel Robinson, Hayley Rutger

**CONTRIBUTING PHOTOGRAPHERS**

Olivia Cameron, Richard Carey/Adobe Stock, Damedias/Adobe Stock, EAD72/Adobe Stock, Conor Goulding, Boris Kopaj/Adobe Stock, Steve Laycock/Wikimedia Commons, Kevin/Adobe Stock, Kevin Lino/NOAA/NMFS/PIFSC/ESD, Phil Lowe/Adobe Stock Andy Mann, Mote's Manatee Research Program, Mote's Marine Macroalgae Herbarium, Hayley Rutger, Walt Stearns, Wildestanimal/AdobeStock

## Sarasota Magazine

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**On the cover**

A Caribbean king crab in Mote's new hatchery. Mote scientists are raising these crabs to eat algae on restored coral reefs.

**Story:** Page 14

*Photo by: Hayley Rutger*



## 10 ROUGH SEAS FOR REEF SHARKS

Meet the reef sharks who need our help and learn how and why Mote Marine Laboratory works to save them.

PHOTO BY: ANDY MANN

## 03 MANATEE HALL OF FAME

Mote scientists share stories of remarkable local manatees.

**COVER STORY**

## 06 KINGS OF CORAL RESTORATION

Caribbean king crabs are Mote's allies in fighting algae overgrowth on coral reefs.

## 14 OF RAYS & PREY

What do spotted eagle rays eat, and how can we protect their favorite seafood and our own?

## 17 NEW (MARINE) LIFE FOR HISTORIC PIER

Mote's new outreach center reveals what dwells beneath the Anna Maria City Pier, a revived community landmark.

## 20 MOTE MILESTONES & EVENTS CALENDAR

Goliath grouper face an uncertain future; Sea Turtle Protection Zone invites boaters to slow down in Sarasota County hotspots; Mote remembers a sea turtle champion; the biggest exhibit in our new Aquarium comes together; and exciting events are on the way through spring 2024.

# MANATEE HALL OF FAME



BY MOTE'S MANATEE RESEARCH PROGRAM & HAYLEY RUTGER

**Meet some of Florida's most memorable manatees! You might have seen these animals in local waters, but do you know their stories? Mote Marine Laboratory scientists do. We have studied these and other manatees for decades to support conservation.**

**M**ote scientists recognize each manatee by taking photos of its unique markings, especially scars from boat propellers. We catalog these photos in a Manatee Individual Photo Identification System maintained in partnership with the U.S. Geological Survey and Florida Fish and Wildlife Conservation Commission (FWC) to help reveal how manatee populations are doing. ■



## ROSEANNE ♀

**First Seen by Mote:** June 17, 1993

**Last Seen:** Jan. 31, 2022

**Locations:** Sarasota Bay, Palma Sola Bay, Turtle Bay, Orange River/Lee County Manatee Park, Matlacha Pass

### **Her claim to fame: A trip to... Kentucky?**

In January 2002, Roseanne was tagged to track her location for a study in Charlotte Harbor/Matlacha. In spring, she and her calf returned north to Sarasota Bay and Anna Maria Sound. In early August, scientists discovered that her tag was no longer attached to her. Strangely, the tag began transmitting its location in Kentucky! With help from a U.S. Fish and Wildlife Service officer, Mote scientists recovered the tag from a man who had vacationed in Florida. He denied taking it, but the tag led the researchers right to him. It's unclear if he removed Roseanne's tag or found it detached. Fortunately, we've continued to document Roseanne. She's had at least seven calves.

MOTE  
SIGHTINGS  
115



MOTE  
SIGHTINGS  
262

## TOMO-BELLA ♀

**First Seen:** June 8, 1993

**Last Seen:** Aug. 29, 2022

**Locations:** Sarasota Bay, Roberts Bay, Matlacha Pass, Orange River/Lee County Manatee Park, Charlotte Harbor

### Her claim to fame: Twins for the win

Perhaps Tomo-Bella's lucky number is 2. In 2016, she gave birth to twins—a rarity for her species.

Tomo-Bella's name is also a two-parter. When this curious manatee kept approaching Mote's research boat, a Japanese volunteer on board named her "Tomo" (friend). A different group of Mote volunteers called her "Blue Bella" because she temporarily had blue paint on her after rubbing on a boat. The names were combined to "Tomo-bella." Over her lifetime, Tomo-bella has had 10 documented calves. In July 2012, she and her calf were rescued by FWC and Mote with signs of red tide toxicity. They were successfully rehabilitated at Tampa's Lowry Park Zoo (now ZooTampa) and released—a double happy ending!

## MANX ♀

**First Seen:** Nov. 6, 1995

**Last Seen:** June 13, 2013

**Deceased:** August 2013 (watercraft injury)

**Locations:** Sarasota Bay, Anna Maria Sound, Lemon Bay, Palma Sola Bay, Blackburn Bay, and one winter sighting in the Orange River (Fort Myers)

### Her claim to fame: Looking rough but hanging tough

Manx was named by an FWC staff member because her cut-off tail reminded him of a manx cat (with a bob tail). Because of her tail and her many scars from boat strikes, Mote and FWC received many phone calls from people who saw Manx floating and assumed she was deceased. After she died in 2013, wildlife biologists documented more than 50 different scar patterns from watercraft injuries over the years.



MOTE  
SIGHTINGS  
107



### Manx's life is a reminder that manatees need our protection.

Report stranded manatees and other large marine animals in Sarasota & Manatee counties to **Mote: 888-345-2335**. Elsewhere in Florida, contact **FWC: 888-404-3922**.

# MANATEE CH335 ♂

**First seen:** Sept. 13, 2011

**Last seen:** May 23, 2023

**Locations:** Sarasota Bay, Roberts Bay

MOTE  
SIGHTINGS  
56

## His claim to fame: Hanging in there

Mote scientists have documented CH335 since he was the size of a 2nd-year calf (baby). While manatee calves can stay with mom for up to two years, CH335 was seen with a different adult every time Mote documented him, suggesting he might have lost his mom early in life. Also, Mote scientists documented peculiar scarring and damage on his tail, suggesting CH335 had a serious injury as a calf. Despite his rough start, he has seemingly done well, and he's been documented 13 times in mating herds.



# SNORTY ♀

**First Seen:** July 26, 1993

**Last Seen:** May 23, 2023

**Locations:** Sarasota Bay, Roberts Bay

MOTE  
SIGHTINGS  
191

## Her claim to fame: Making us snort with laughter

Snorty is named for the snorting sound she made when coming up for air the first few times she was seen. She has been documented with nine calves so far. Her story is simple, but it's a great reminder: Not every manatee announces herself with a snort, and boaters should always be careful to spot and avoid striking marine animals.



**How can I help keep manatees safe?**

Boaters should heed any posted speed-zone signs, wear polarized sunglasses to see and avoid manatees in your path, and ask one of your passengers to be the designated wildlife spotter.

MOTE'S MANATEE RESEARCH IS CONDUCTED UNDER THE APPROPRIATE GOVERNMENT PERMITS.




# *Kings* of coral restoration

**In a groundbreaking effort to save Florida's Coral Reef from algae overgrowth, Mote Marine Laboratory & Aquarium has curated its first fully operational hatchery for the algae-eating Caribbean king crabs.**

BY OLIVIA CAMERON





This September, Mote President & CEO Dr. Michael P. Crosby cut the ribbon for the new facility, Mote's Florida Coral Reef Restoration Crab Hatchery Research Center, alongside Mote's Coral Reef Restoration Research Program Manager Dr. Jason Spadaro and his teammates. The facility was funded in part by an award from the National Marine Sanctuary Foundation as part of the *Mission: Iconic Reefs (M:IR)* Capacity Building Grant program.

Mote is a longstanding pioneer and leader in coral restoration research and methods being used by *M:IR*, which is led by the National Oceanic and Atmospheric Administration (NOAA) in partnership with Mote and other organizations. With the new crab hatchery, Mote also stands at the forefront of tackling two key challenges to long-term coral reef restoration—mitigating overgrowth of algae that compete with corals and preventing, or potentially reversing, seaweed dominance—by growing a program to bolster populations of algae-eating Caribbean king crabs.

As algae populations surge, driven by multiple human-caused environmental shifts, they can smother and weaken corals, leaving them vulnerable to disease and bleaching events.

Caribbean king crabs consume more algae than any parrotfish species in the Caribbean and rival the consumption rates of another important grazer group: urchins. Further, the crabs readily consume algae that are chemically defended and avoided by other local grazers.

It took time and research to recognize these crabs as coral reef champions. Their unique ability to control algae was masked by their low natural abundance. But research by Spadaro and others suggests that increasing the crabs' abundance can facilitate the growth, survival and recruitment of corals, dramatically improving coral reef restoration outcomes—including increases in reef fish numbers and species.

That's exactly what Mote scientists aim to achieve with their new crab hatchery.

**Top:** Caribbean king crab in Mote's facility.

**Bottom left:** Preserved specimens of *Dictyota* and *Halimeda* algae, which can compete with corals but are eaten by Caribbean king crabs.

**Bottom right:** Staghorn coral in Bonaire. Mote scientists are working to restore this species and many others to Florida's Coral Reef, now with the help of Caribbean king crabs.

CREDITS: ALGAE: MOTE'S MARINE MACROALGAE HERBARIUM COLLECTION. CORAL: CONOR GOULDING

## From first hatch to new hatchery

In February 2022, Spadaro was working as a Postdoctoral Research Fellow at Mote's Elizabeth Moore International Center for Coral Reef Research & Restoration (IC2R3) on Summerland Key (Florida Keys) when the team hatched Mote's first clutch of Caribbean king crabs.

Now, Spadaro and his team have welcomed 100 broodstock crabs—adults that can breed—to Mote's new, 6,000-square-foot hatchery facility at Mote Aquaculture Research Park in Sarasota County, Florida. Mote scientists aim to gradually increase this to 300-400 adult broodstock and, eventually, produce about 250,000 juvenile crabs every year. Once the baby crabs reach a releasable size, three to five months after hatching, they will be screened by a veterinarian and

**Photo:** Ribbon cutting for Mote's Florida Coral Reef Restoration Crab Hatchery Research Center. From left: Mote's Dr. Jason Spadaro, State Rep. Fiona McFarland, U.S. Rep. Greg Steube, Mote President & CEO Dr. Michael P. Crosby, NMSF VP Shannon Colbert, Mote VP Kevin Claridge.



**Above from left:** NOAA staff member Michelle Lowe and National Marine Sanctuary Foundation (NMSF) VP of External Affairs Shannon Colbert join Mote President & CEO Dr. Michael P. Crosby and Mote's Coral Reef Restoration Research Program Manager Dr. Jason Spadaro to view Caribbean king crabs in Mote's new hatchery.



**Photo:** Mote's Ceirra Bair works in the new crab hatchery.



# Long live the crabs





then transported to Mote's Summerland Key campus for release onto restoration sites along Florida's Coral Reef.

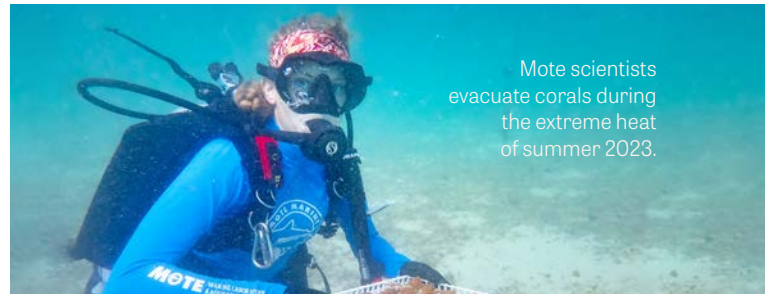
"We understand the potential of the Caribbean king crab in supporting coral recruitment and reef fish diversity," said Spadaro. "With this new facility, we will continually manage aquaculture systems that support mass production and survival of crabs to support large-scale coral reef restoration."

The team aims to introduce roughly 2.8 million of these crabs at the seven *M:IR* restoration sites over the next two decades.

"As we embark on this groundbreaking journey with our new state-of-the-art facility, we are not merely constructing walls and laboratories; we are forging a beacon of hope for the world's imperiled coral reefs," said Kevin Claridge, Vice President of Sponsored Research & Coastal Policy Programs at Mote. "Through relentless exploration and collaboration, we shall not

only save coral reefs but also inspire a global movement dedicated to preserving the intricate tapestries of life beneath the waves."

This work is conducted under permits FKNMS-2021-044 and SAL-23-2536-SRP, and with funding from philanthropic support for Mote's Postdoctoral Research Fellowship program and funding from the National Marine Sanctuary Foundation. ■



Mote scientists evacuate corals during the extreme heat of summer 2023.

## For coral reefs, the heat is on

Coral reefs worldwide are declining from many kinds of stress. Beyond algae overgrowth, corals also face increasing ocean temperatures, ocean acidification, disease outbreaks and more. Mote's efforts to restore Caribbean king crabs are one part of our multifaceted, science-based strategy to restore resilient coral reefs.

Mote scientists have restored more than 218,000 corals to Florida's Coral Reef, and we apply cutting-edge research at every step in our restoration pipeline—coral breeding, growout, genetic management, resilience testing, outplanting, monitoring and more.

This summer, endangered corals in Florida waters faced a true emergency—dangerous heat waves—and Mote scientists took unprecedented action to help them. With the aid of more than 70 staff members, six Mote research vessels and immense support from the Keys community, Mote scientists carefully transported thousands of stressed corals from our offshore coral-restoration nurseries in Sand Key, Looe Key, Islamorada and Key Largo, in a matter of days to our land-based coral nurseries in Summerland Key, Key Largo, Islamorada and Mote Aquaculture Research Park in Sarasota County.

These evacuated corals have a major part to play in Mote's long-term, science-based reef restoration. And as Mote's crab hatchery ramps up production, these and future corals will have new, crabby allies in their corner.

55-85%  
reduction

of algae cover was documented on test reefs where Caribbean king crabs were added in a peer-reviewed study.

SPADARO, A.J., & BUTLER, M.J. (2021). *CURRENT BIOLOGY* 31, 853-859. [HTTPS://DOI.ORG/10.1016/J.CUB.2020.10.097](https://doi.org/10.1016/j.cub.2020.10.097)

**Yum!**

**Caribbean king crabs will eat algae some animals avoid, like species of *Dictyota* and *Halimeda* that have chemical and/or physical defenses.**

**Photos:**  
*Halimeda*  
algae



Rough seas for

# REEF SHARKS

The five main shark species on coral reefs—grey reef, blacktip reef, whitetip reef, nurse and Caribbean reef sharks—have declined by 63% worldwide according to a peer-reviewed study co-authored this year by Mote Marine Laboratory scientists who are leading global efforts to save sharks. These misunderstood fishes play crucial roles in maintaining the delicate balance of underwater ecosystems, including coral reefs worldwide.

BY SEAN STOVER

This study came from Global FinPrint, a five-year research effort funded by the Paul G. Allen Family Foundation. "These are some of the best estimates of population decline of widespread shark species because of the very large number of reefs and countries sampled," said Dr. Colin Simpfendorfer, lead author of the study, adjunct professor of Marine and Aquaculture Science at James Cook University in Australia and alumnus at Mote. "This tells us the problem for sharks on coral reefs is far worse and more widespread than anyone thought."

"While overfishing and poor governance are associated with the absence of these species, they are still common in marine protected areas (MPAs) and places where shark fishing is banned or highly regulated," said Dr. Demian Chapman, Director of the Sharks & Rays Conservation Research Program at Mote. Chapman led Global FinPrint while working at Florida International University (FIU). At Mote, he and his team are turning FinPrint findings into conservation impacts through a new

Previous estimates of the status of reef sharks and ray species have been geographically limited, varying among surveyed reefs from abundant to locally extinct. The Global FinPrint study, published in the prestigious peer-reviewed journal *Science*, revealed the depth of this crisis across an extensive geographic range. Over the course of the study, a staggering 22,000 hours of video footage captured from 22,756 baited underwater video stations were thoroughly analyzed. These stations were expanded across 391 reefs in 67 nations and territories, providing an overall indication that widespread overfishing is the main culprit driving reef sharks toward extinction.

**Below:** How Global FinPrint uncovered reef shark declines

**Left:** Blacktip reef sharks.

PHOTO BY: DAMEDIAS/ADOBE STOCK

**READ IT STRAIGHT FROM THE SOURCE**

Simpfendorfer, C.A., et al. (2023) Widespread diversity deficits of coral reef sharks and rays. *Science* 380, 1155–1160. DOI:10.1126/science.ade4884



67 NATIONS & TERRITORIES • 391 REEFS



in reef sharks estimated by FinPrint team. This knowledge is now guiding conservation efforts to balance the needs of sharks & people.

22,756 baited remote underwater video cameras document reef sharks & rays.



SHARKS & RAYS COUNTED from video



MONITORED REEFS ARE COMPARED WITH UNFISHED REEFS and results are weighted by the coral reef area of nations.



FINPRINT GLOBAL DATABASE



effort: Expanding the Global FinPrint. "Reef sharks can be important for human livelihoods through dive tourism and if carefully fished. An investment in reef shark conservation can therefore be good for people, too," Chapman said.

On the flip side, the loss of sharks could have a negative impact on the overall health and function of coral reef ecosystems.

"People need healthy coral reefs," said Dr. Mike Heithaus, co-author of the study and executive dean of the College of Arts, Sciences & Education at FIU. "We are seeing that when sharks disappear, that causes other changes in these ecosystems. Keeping shark populations healthy, or rebuilding them, is important for maintaining their roles for healthy reefs."

Early results from this study were previously used to update the status of four shark species to more threatened categories on the International Union for the Conservation of Natures (IUCN) Red List.

PHOTO CREDITS: CLOCKWISE FROM CARIBBEAN REEF SHARK: ANDY MANN; DAMEDIAS/ADOBE STOCK; STEVE LAYCOCK/WIKIMEDIA COMMONS; RICHARD CAREY/ADOBE STOCK; KEVIN LINO NOAA/NMFS/PIFSC/ESD

## WHY DO SHARKS MATTER?

- Many people around the world catch sharks, and their cousins, rays and skates, for food and to earn a living.
- A growing number of people earn a living by guiding dive and snorkel tours where visitors can see sharks, rays and skates in the ocean—one type of "ecotourism."
- These fishes do important jobs for their ocean homes, which scientists are only beginning to understand. By eating prey in open water and swimming onto reefs, sharks can bring nutrients that help support reef life. Some sharks seem to influence seagrass beds, important natural communities, by scaring away seagrass-eating animals.
- Sharks, rays and skates have natural superpowers, including disease resistance. Their biology is giving scientists clues to improve human medical care.
- These fishes are important symbols in some cultures. For people around the world, they inspire wonder and a desire to protect the oceans.

**CARIBBEAN REEF SHARK**  
*Carcharhinus perezii*



**GREY REEF SHARK**  
*Carcharhinus amblyrhynchos*



**BLACKTIP REEF SHARK**  
*Carcharhinus melanopterus*



**WHITETIP REEF SHARK**  
*Triaenodon obesus*



**NURSE SHARK**  
*Ginglymostoma cirratum*



The results were also presented during the most recent Conference of the Parties of the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES), helping world governments to make the groundbreaking decision to better regulate trade in these and more than 50 additional species of sharks.

“This means no trade should come from nations where the take of the species will threaten its survival,” Simpfendorfer said. “This study can be used to help identify those nations where such catches would be detrimental. We need to act now to stop widespread extinction of shark species in many parts of the world.”

In all locations with programs actively managing and enforcing MPA regulations, measurements indicate that reef shark populations and coral reef conditions are healthier compared to those around them. Recent studies show that populations of reef sharks can rebound in under a decade with appropriate management strategies that reduce fishing pressure. If not addressed,

pressures causing the shark and ray diversity loss will continue to result in a loss of species, ecological functions, and ecosystem services that support sustainable livelihoods for millions of people worldwide.

Now, Mote is working with the FinPrint data and a network of collaborators to turn these lessons learned into conservation successes. This Expanding the Global FinPrint team is partnering with local grassroots organizations, governments and fisherfolk in countries where there is high conservation potential for reef sharks. Mote is providing financial and scientific support to these people so that they can implement the right management approaches for their country, ensuring benefits for sharks and people. ■

LEARN MORE: [MOTE.ORG/FIN](https://mote.org/fin)



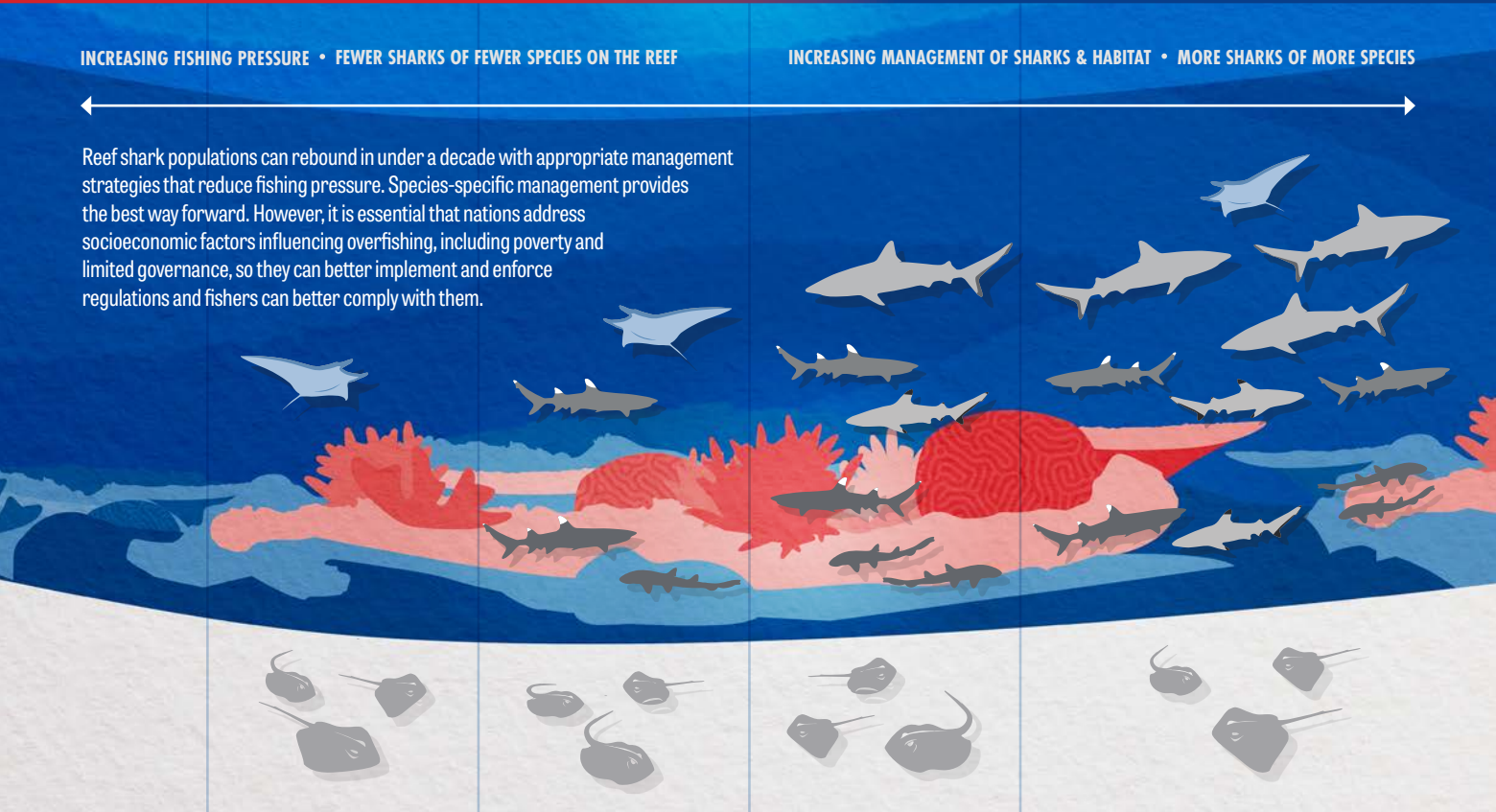
## OVERFISHING THREATENS REEF SHARKS—BUT THERE'S HOPE



INCREASING FISHING PRESSURE • FEWER SHARKS OF FEWER SPECIES ON THE REEF

INCREASING MANAGEMENT OF SHARKS & HABITAT • MORE SHARKS OF MORE SPECIES

Reef shark populations can rebound in under a decade with appropriate management strategies that reduce fishing pressure. Species-specific management provides the best way forward. However, it is essential that nations address socioeconomic factors influencing overfishing, including poverty and limited governance, so they can better implement and enforce regulations and fishers can better comply with them.





# *of rays & prey*

BY OLIVIA CAMERON

# (CRUNCH!)

A clam is crushed by the jaws of a hungry whitespotted eagle ray. These large stingrays eat multiple kinds of shellfish and use the ocean ecosystems that shellfish help maintain—just like we do.

Sadly, many shellfish populations are declining due to environmental stress. Conservation teams and shellfish farmers are striving to restore shellfish populations and maintain healthy ecosystems and our seafood supply—but they have a puzzle to solve. How can we prevent wild eagle rays from snacking on farmed shellfish?

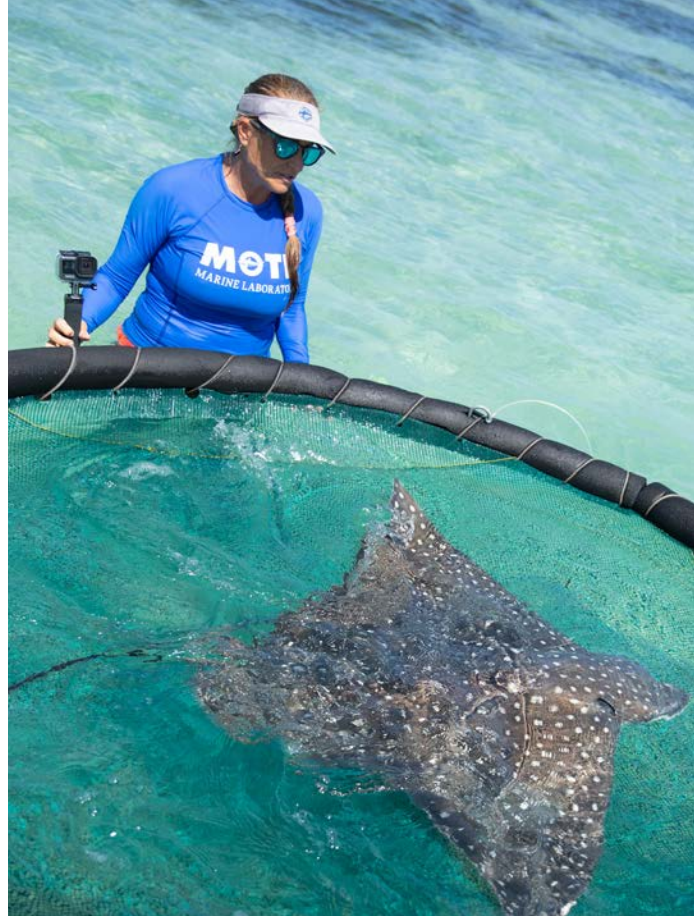
Scientists from Mote Marine Laboratory in Sarasota and Florida Atlantic University's Harbor Branch Oceanographic Institute (FAU-HBOI) have been seeking answers by studying the relationship between whitespotted eagle rays and their shellfish prey. This year, the team tested suction-cup-mounted "helmet" tags on the rays to collect movement and acoustic data—including sounds of rays eating shellfish.

This new tag technology is part of a five-year project launched in March 2022 and funded by a grant from the National Science Foundation Faculty Early Career Development Program (NSF CAREER) to Dr. Matthew Ajemian at FAU-HBOI. Ajemian is leading this research in partnership with Mote and Woods Hole Oceanographic Institution (WHOI).

The team is applying recent technologies to better understand how and what whitespotted eagle rays and other large shellfish predators eat, and how that affects the overall health of the ecosystem.

"We're finding that whitespotted eagle rays consume hard-shelled marine organisms that are ecologically and economically important," said Mote's Sharks & Rays Conservation Research Program Senior Biologist Kim Bassos-Hull, who is partnering in the study with Ajemian and WHOI Associate Scientist T. Aran Mooney. "These shellfish provide food resources to humans and marine life, maintain and improve coastal water quality, create habitat for a variety of species, and stabilize and protect sensitive shorelines—but their populations are declining amid warming water temperatures, ocean acidification and other stressors. With this study, we're looking at where and when whitespotted eagle rays and other predators prey on these organisms, with hopes of developing stronger capacity to mitigate the worldwide declines of shellfish populations."

The research partners conducted trials with the suction cup tags on eight whitespotted eagle rays this spring in Mote's Marine Experimental Research Facility (MERF). These devices, known as "CATS-CAM" tags (Contoured Adducted Trochanteric-Controlled Alignment Method), record audio of the rays crushing their prey, along with video and fine-scale body movements.



**Above:** Mote Marine Laboratory Senior Biologist Kim Bassos-Hull prepares to release a whitespotted eagle ray (*Aetobatus narinari*) that was tagged for a multi-partner research project.

**Below:** Eagle ray swims through the marine environment.



LEFT PHOTO BY: EAD72/ADOBE STOCK  
BOTTOM RIGHT PHOTO BY: KEVIN/ADOBE STOCK

By recording predation events with rays temporarily brought to Mote's facility, the researchers can build training "libraries" of sounds to develop AI-based algorithms to detect and classify similar-sounding interactions recorded by sensors at sea.

"We're using the acoustics to learn what different types of prey crunching sounds like," said Ajemian. "Does the ray feeding on a clam sound different than a ray feeding on a conch? This is integrating tagging with computer science and engineering. The goal of this project is to give us a window into their world, to understand how they are affecting prey and seabed communities."

"The eventual goal is to help us understand and mitigate predator activity around shellfish aquaculture and restoration activities," Bassos-Hull said.

Bassos-Hull and Ajemian have partnered with Sarasota Bay Watch, a local NGO restoring clams in Sarasota-Manatee coastal waters, to understand eagle ray interactions at these sites. Their preliminary results were presented in June at the International Conference on Fish Telemetry (ICFT) in Sète, France.

The current project is supporting the research of Ceclia Hampton, a Ph.D. student supervised by Ajemian, and has been assisted by Ariadna Rojas Corzo, another Ph.D. scientist who is leveraging the opportunity to work with rays in Mote's MERF to test methods to mitigate predator effects on shellfish growout and restoration. Bassos-Hull and her team were also joined by Breanna DeGroot, Research Coordinator at FAU-HBOI. ■

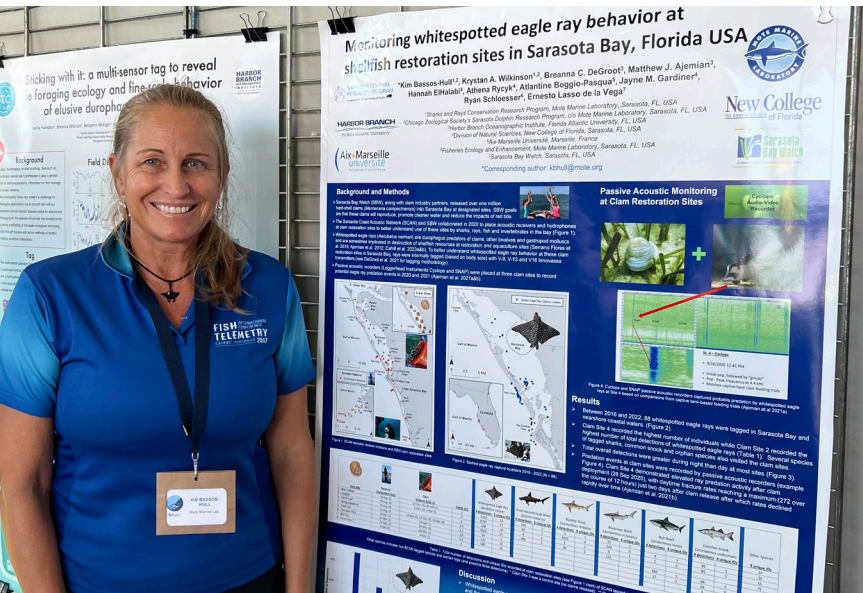


## On our Ray-dar

Mote's Kim Bassos-Hull has been studying whitespotted eagle rays since 2009, working to inform conservation and management of these under-researched animals.

Beyond the current study of rays and their prey, Bassos-Hull and her colleagues in Mote's Sharks & Rays Conservation Research Program tag whitespotted eagle rays with acoustic tags that can be detected by underwater receivers and PIT tags (Passive Integrated Transponders) that can be scanned by scientists if the same ray is recaptured.

Mote's tagging and sampling efforts help reveal the rays' behavior, movement patterns and growth rates. Such data are important for continued conservation and management of the species, which is listed as Endangered on the International Union for Conservation of Nature's Red List of Threatened Species.



**Above:** Mote's Kim Bassos-Hull presents new ray research at a conference in France.

ALL RESEARCH IS CONDUCTED UNDER MOTE'S FWC SPECIAL ACTIVITY LICENSE (SAL-1140) AND REVIEWED BY INSTITUTIONAL ANIMAL CARE AND USE COMMITTEES (IACUCS).



**Above:** Partners in the project by FAU/HBOI, Mote and WHOI collect data on a ray that is about to be released after participating in trials with the new tag that will help detect their feeding behavior.





# NEW (MARINE) LIFE

for historic Anna Maria Pier

BY HAYLEY RUTGER



Mote's new outreach center reveals what dwells beneath this revived community landmark

DIVE IN ►

**“We know that one of the best ways to increase ocean literacy in ways that positively impact human society and the marine environment is to bring people as close as possible to that environment.”**

**— Kevin Cooper, Mote Vice President for Communications & Strategic Initiatives**

Sunsets, fishing, wildlife viewing and old-Florida vibes have drawn people to the Anna Maria City Pier for generations. When this landmark of over 100 years was devastated by Hurricane Irma in 2017, the Anna Maria City Commission launched an ambitious, nearly \$7-million effort to rebuild it. In June 2020 the community regained its local gem, and soon afterward The City Pier Grill and Bait Shop opened in one of two structures on the Pier. After evaluating multiple options for the second structure, the City Commission selected another historic local gem with exciting new plans: Mote Marine Laboratory would create a public marine science education and outreach center spotlighting the region's amazing marine life.

The concept for Mote's Marine Science Education & Outreach Center grew from Mote's deep roots in the Anna Maria community, which was a location beloved by Mote's namesake, Mr. Bill Mote. The Center is one of many expansions to fulfill a key part of Mote's mission: Translate and transfer marine science as a public service to increase ocean literacy.

The Center was constructed through a partnership between Mote, the City of Anna Maria and Manatee County, which allocated \$500,000 of tourist development tax dollars for construction.

The Center is fully funded by Mote and is open to the public at no charge. In addition to welcoming locals and visitors, it allows Mote's Education Department to host field trips for Manatee County students. “We know that one of the best ways to increase ocean literacy in ways that positively impact human society and the marine environment is to bring people as close as possible to that environment,” said Kevin Cooper, Mote's Vice President for Communications & Strategic Initiatives. “At our Marine Science Education & Outreach Center, visitors will overlook Tampa Bay, have an underwater view of everything happening below the pier and engage with Mote educators and volunteers to learn about this critical coastal habitat.”

The focal point of the Center is an interactive touch pool exhibit where guests will literally reach into the water and get in touch with local marine life. A “Draw Alive” station will bring guests' drawings to life, and a multi-station microscope will bring out their inner scientists. Guests will leave with a new appreciation of mangroves, seagrass beds and the living world directly beneath the City Pier. ■



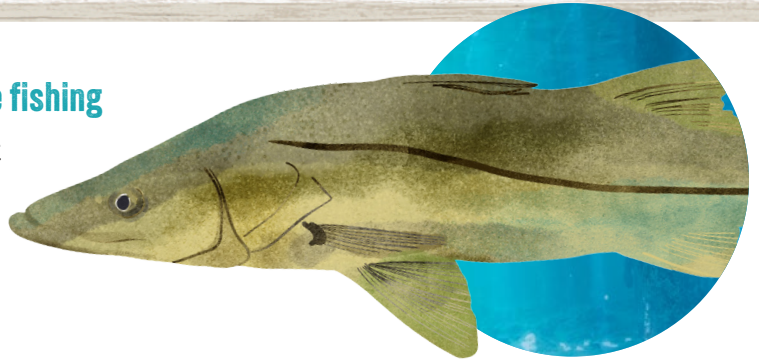
**Left:** A family explores the touch pool at Mote's new Marine Science Education & Outreach Center.

# GO AHEAD—PIER INSIDE!

Here are just a few ways that guests of all ages can learn and play at Mote’s Marine Science Education & Outreach Center on Anna Maria City Pier:

## Discover a magnetic pastime: Sustainable fishing

Use magnetic rods to “catch” Florida fishes and get to know the species that live here.

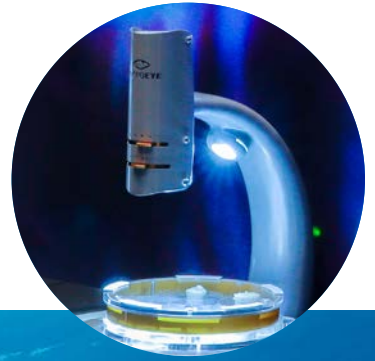


## Peer under the Pier

Watch a special video feed from the world below.

## Bring out your inner scientist

What can you see through the microscope? Discover the tools Mote scientists use to observe marine life.



## Make contact

Enjoy a touch pool featuring marine life found in local waters. Whether they’re smooth, slippery, or spiny, they’re safe to touch gently with two fingers.

## Enjoy marine life responsibly

Learn about protecting vulnerable marine animals and discover how Mote scientists lead research for the conservation of sharks, manatees, sea turtles and more.



**Above:** Manatees are threatened, iconic Florida mammals.

**Left:** A lemon shark—one of many local species studied by Mote scientists over the years.



SHARK PHOTO CREDIT: WILDESTANIMAL/ADOBE STOCK  
MANATEE PHOTO CREDIT: PHIL LOWE/ADOBE STOCK



## Uncertain future for Goliath grouper

BY OLIVIA CAMERON

Goliath grouper—the largest Atlantic grouper species—have experienced population declines since 2013, according to new peer-reviewed research led by Mote Marine Laboratory.

The study, published in the international, peer-reviewed, scientific journal *Fishes*, found fewer Goliath grouper in 2022 vs. 2013 at five of the six primary spawning aggregation sites studied off Jupiter, Florida.

“The Atlantic Goliath grouper is a long-lived native species and is an essential species for the maintenance of a balanced ecosystem. We do not want the population of this species to decline,” said Dr. James Locascio, Manager of Mote’s

Fisheries Habitat Ecology & Acoustics Research Program, who led this study with support from the National Oceanic and Atmospheric Administration (NOAA).

After Goliath grouper nearly faced extinction in the 1980s due to overfishing, state and federal agencies prohibited harvest of it. Despite signs of recovery during the moratorium, the lower numbers in this new study indicate that the species must still be monitored carefully.

Mote President and CEO Dr. Michael P. Crosby said, “The results of this particular study by Dr. Locascio and his colleagues will provide valuable insights into Goliath grouper population dynamics as the State of Florida reopened a limited harvest on the species after a 32-year moratorium.”

The Florida Fish and Wildlife Conservation Commission approved a limited recreational harvest of 200 Goliath grouper per year in state waters beginning in

Spring of 2023. However, only 25 Goliath grouper were caught out of the 200 permits issued.

In addition to spawning aggregation sites off Jupiter, Florida, three additional spawning sites off Sarasota have been identified by Locascio. Mote is now seeking support to also use these Sarasota sites to create a long-term monitoring program to track changes in the species’ abundance—an especially relevant goal as this species faces new regulations, lethal red tide events and an uncertain future. ■

**Above:** Goliath grouper, the largest Atlantic grouper species.

PHOTO BY: WALT STEARNS

**SEA TURTLE PROTECTION ZONE**  
GO SLOW FOR THOSE BELOW  
FOR SARASOTA COUNTY BOATERS

**GO SLOW.** Go as slow as safely possible in areas bounded by red lines—the voluntary Sea Turtle Protection Zone. Follow any posted speed-zone signs—it’s required by law.

**WEAR POLARIZED SUNGLASSES** to see and avoid sea turtles in your path, and ask one of your passengers to be the **DESIGNATED WILDLIFE SPOTTER.**

**REPORT STRANDED SEA TURTLES** in Sarasota & Manatee counties to Mote at 888-345-2335. Elsewhere in Florida, contact the Florida Fish and Wildlife Conservation Commission: 888-404-3922.

LONGBOAT KEY, SARASOTA BAY, BOAT RAMP AT CENTERVILLE PARK NEAR 10TH STREET, CITY ISLAND, ST. ARMANDS KEY, NEW PASS, LIDO KEY, BIG SARASOTA PASS, SIESTA KEY, GULF OF MEXICO

MOTE MARINE LABORATORY  
LOGGERHEAD MARINELIFE CENTER  
ARCHIE CARR CENTER FOR SEA TURTLE RESEARCH UNIVERSITY OF FLORIDA

3 MILES



## New way for boaters to protect sea turtles

BY SEAN STOVER

Mote Marine Laboratory is excited to announce a new voluntary Sea Turtle Protection Zone (STPZ) in Sarasota County waters. The zone encourages boaters to

slow down and use vigilance to avoid striking sea turtles—threatened and endangered species.

Mote scientists documented local hotspots of boat-strikes on sea turtles to map the STPZ, which stretches from Longboat Key to Siesta Key, including Sarasota Bay, and extends 1.5 miles offshore.

Specifically, hot spots are Longboat Pass, New Pass, Big Pass, Siesta Key, Venice Inlet, and offshore two miles north of New Pass to two miles south of Big Pass, extending out 1.5 miles.

“We’re excited to partner with the community to help protect sea turtles in the areas where we see the most animals struck by boats,” said Gretchen Lovewell, Mote’s Stranding Investigations Program Manager. “By closely monitoring for changes in stranding numbers and boater speeds, we hope to enhance our monitoring efforts to identify all hot spot areas in the county.”

The project is funded by the Archie Carr Center for Sea Turtle Research with funds from Disney Conservation Fund and in part by a grant awarded from the Sea Turtle Grants Program, which is funded by proceeds from the sale of the Florida Sea Turtle License Plate.

Learn more at: [mote.org/turtlezone](https://mote.org/turtlezone) ■

## Remembering a sea turtle champion

BY EMMA MCINTYRE

Freda Perrotta, longtime volunteer for Longboat Key Turtle Watch (LBKTW), dedicated over 25 years of her life to protecting sea turtles that nest on local beaches and aiding the conservation and education efforts of Mote Marine Laboratory & Aquarium. Freda passed



away peacefully at age 97 on Sept. 2, surrounded by her friends and family. Whether she was patrolling the beach to help monitor sea turtle nest sites, recruiting volunteers or educating the public about sea turtle conservation, her enthusiasm could not be missed. In commemoration of her spirit and dedication, Mote scientists gave the name "Freda" to a green sea turtle they tagged and tracked for research to support conservation in 2021. Freda's passion and devotion lives on through all those that had the opportunity to know her. The Mote family thanks LBKTW for their donation in Freda's honor.

## Mote Science Education Aquarium's largest exhibit comes to life

BY KAITLYN FUSCO

The 400,000-gallon Gulf of Mexico habitat—the largest single exhibit in Mote Science Education Aquarium (Mote SEA)—began coming to life as a crane lifted two massive acrylic windows into place on July 25 and 26.



The windows, weighing 27,900 and 22,000 pounds, will give future visitors an immersive view of sharks, rays, sea turtles, tarpon, snook, red drum, snapper, parrotfish, coral reef formations and many other species that represent Sarasota's blue backyard. One of the windows will also open up into a large multi-purpose room that will host a vast array of educational and community programs.

Mote staff celebrated the latest wave of construction with a July 25 gathering of our generous corporate supporters, who have joined Mote's individual donors and government supporters to commit more than \$100 million combined toward the \$130 million goal for creation of Mote SEA.

As a whole, Mote SEA is achieving milestone after milestone. The facility now stands tall with its three stories supported by scaffolding. Concrete has been poured for the second and third floors, and concrete for the first floor will be poured after removal of the scaffolding from the second and third floors, which began in August.

Anticipated for completion in December 2024, Mote SEA will be a regional hub

bridging the gap between complex marine research, accessible science and technology education for all, and environmental awareness to promote science-based change for a healthier ocean.

The Mote SEA experience will be like no other. Visitors will encounter three floors of animal habitats, STEM education labs, onsite diving programs, scientific demonstrations, and interactive technology that will enrich their experience. Guests will learn about the world class research being conducted by Mote on a global scale to address the grand challenges the oceans face.

Learn more about Mote SEA at: [moteoceansforall.org](https://moteoceansforall.org) ■

**Above left:** Freda Perrotta, longtime Mote volunteer who protected sea turtles through her role at Longboat Key Turtle Watch

**Above right:** A huge acrylic window is lifted into place for the Gulf of Mexico exhibit at Mote SEA.

## Events calendar

Registration is required for all. More events: [mote.org/events](https://mote.org/events)

### OCTOBER

#### OCT. 13 & 16

##### Teacher Workday Day Camps

At Mote Aquarium in Sarasota, Florida. Oct. 13 for Manatee County students & Oct. 16 for Sarasota County students. Watch for details: [mote.org/events](https://mote.org/events)

#### OCT. 14

##### Sharktoberfest

At Mote in Sarasota, Florida. Sample local and regional brewery selections and enjoy live entertainment, food stations and more. Tickets and sponsorships are online. [mote.org/sharktoberfest](https://mote.org/sharktoberfest)

#### OCT. 21

##### Breakfast with the Sharks

At Mote in Sarasota, Florida. Enjoy breakfast with Mote's resident sharks, see a live feeding & have your shark questions answered. 8-9:30 a.m. Ticket prices online. [mote.org/breakfast](https://mote.org/breakfast)

#### OCT. 28

##### Oceanic Evening

Mote's signature annual black-tie gala. 6 p.m. Tickets & sponsorships online. [mote.org/oceanicevening](https://mote.org/oceanicevening)

#### OCT. 31

##### A-Scare-ium

Enjoy family-friendly, spooky delights at Mote Aquarium in Sarasota, Florida. 5:30-8 p.m. [mote.org/scare](https://mote.org/scare)

### NOVEMBER

#### ALL NOVEMBER

##### Member Appreciation Month

Free Virtual Reality rides, free Member Movie Night, free Member Holiday Party, daily giveaways and surprises—and

more! Become a Mote Member or renew: [mote.org/membership](https://mote.org/membership)

#### NOV. 4

##### Sensory Saturday

Guests with sensory processing differences or autism spectrum disorders can access Mote Aquarium an hour early for a calmer environment. 8:30-9:30 a.m. Tickets: [mote.org/tickets](https://mote.org/tickets) Details: [mote.org/sensory](https://mote.org/sensory)

#### NOV. 20-22

##### Thanksgiving Day Camps

At Mote in Sarasota, Florida. Watch for details: [mote.org/events](https://mote.org/events)

#### NOV. 25

##### Breakfast with the Sharks

Enjoy breakfast with Mote's resident sharks, see a live feeding & have your shark questions answered. 8-9:30 a.m. Ticket prices online. [mote.org/breakfast](https://mote.org/breakfast)

### DECEMBER

#### DEC. 12

##### Coffee with a Scientist

In-person (Boca Grande, Florida) or virtual lectures from Mote scientists. 10 a.m. Free. [mote.org/coffee](https://mote.org/coffee)

#### DEC. 26 - 29

##### Winter Break Day Camps

At Mote in Sarasota, Florida. Sharks, skates and rays... OH MY! Campers 5-10 years old can enjoy hands-on educational activities focused on Mote's JAW-some research that started with our founder, Dr. Eugenie Clark. [mote.org/winterbreak](https://mote.org/winterbreak)

#### DEC. 30

##### Breakfast with the Sharks

At Mote in Sarasota, Florida. Enjoy breakfast with Mote's resident sharks, see a live feeding

& have your shark questions answered. 8-9:30 a.m. Ticket prices online. [mote.org/breakfast](https://mote.org/breakfast)

### JANUARY

#### JAN. 8, 15, 22 & 29

##### Mote-ivational Mondays

Formerly called Special Lecture Series. In person at Mote in Sarasota, Florida, & virtual. Meet our amazing Mote scientists and discover their latest groundbreaking research. [mote.org/lecture](https://mote.org/lecture)

#### JAN. 16

##### Coffee with a Scientist

In-person (Boca Grande, Florida) or virtual lectures from Mote scientists. 10 a.m. Free. [mote.org/coffee](https://mote.org/coffee)

### FEBRUARY

#### FEB. 4

##### Farm to Fillet

At Mote Aquaculture Research Park in eastern Sarasota County, Florida. Enjoy fine culinary offerings and exclusive, behind-the-scenes tours of the unique research facility where Mote scientists develop new sustainable seafood farming technologies to help feed the world. [mote.org/farmtofillet](https://mote.org/farmtofillet)

#### FEB. 13

##### Coffee with a Scientist

In-person (Boca Grande, Florida) or virtual lectures from Mote scientists. 10 a.m. Free. [mote.org/coffee](https://mote.org/coffee)

## Did you know?

Mote Members receive FREE or discounted admission to **MORE THAN 100** zoos, aquariums, museums and gardens across the country.



Free in October



Free in November



Free in December



Free in January



50% off All Year

Check out the full list at:

**MOTE.ORG/RECIPROCAL**

\*Some restrictions apply. Please see website for details.



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HOPE  
GOES A  
LONG WAY**

when you support ocean-saving  
science at Mote with a monthly gift.

**MOTE**  
MARINE LABORATORY  
& AQUARIUM

ABOVE: A SEA TURTLE HATCHLING SAMPLED AND RELEASED FOR CONSERVATION  
RESEARCH BY MOTE. MOTE'S SEA TURTLE ACTIVITIES ARE CONDUCTED UNDER  
FWC MARINE TURTLE PERMITS 027, 028, 048, 054, 070, 126, 216, and 226.



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