Winter 2017

Greetings and Happy New Year!

This edition of our newsletter brings you updates on just a few of the many projects that have been keeping us busy this summer and fall. We’re excited to introduce you to two new members of the Aquarium’s Research and Conservation team. We celebrated International Whale Shark Day by making a major announcement regarding yet another expansion to our global whale shark research as well as a change in the conservation status of whale sharks. We’ll also report on the latest whale shark expedition to the Galapagos Islands, the second in as many years. Our coral research team was back in the Florida Keys for this year’s massive coral spawning event and brought back some unusual souvenirs. The Georgia Aquarium Conservation Field Station was busy all summer long with research and rescue efforts with our partners in NE Florida. We bid farewell to one of our long-time Georgia Aquarium residents when we released T.J. the loggerhead sea turtle in September. Nutritionist Dr. Lisa Hoopes continued her spotted eagle ray nutrition studies with a trip to Sarasota for collaborative work with Mote Marine Laboratory. Dr. Hoopes was also a mentor for one of the two Cherokee Christian School STEM interns who worked on projects at the Aquarium this summer and we will report on their findings. We have an update on the status of the manatees that were a part of the Georgia Aquarium sponsored health assessments earlier this year, and we are excited to share some news about wildlife conservation, including whale sharks and mantas, in Mexico. Since 2006, our Research and Conservation program has collaborated with over 15 universities as well as multiple state and federal government agencies resulting in 127 scientific publications.

As always, it’s an exciting time for Georgia Aquarium and its Research and Conservation team. Please enjoy this latest edition of our newsletter and keep watching for the next one.

Gregory Bossart, V.M.D., Ph.D.
Senior Vice President
Animal Health, Research and Conservation
Welcome Katelyn Herman, Project Coordinator

Georgia Aquarium’s Research and Conservation team is excited to introduce you to our newest full time team member, Project Coordinator Katelyn Herman. Katelyn is a Georgia native, a 2012 UGA graduate and recently received her Masters in Marine Conservation & Policy at New York’s Stony Brook University. Her professional assets include extensive photo identification and cataloging experience with various cetaceans as well as Weddell seals and familiarity with ArcGIS, a global mapping software. Katelyn has worked in both field research and ecotourism in Hawaii and Alaska as well as bottlenose dolphin research along Georgia’s coast. She joins fellow Project Coordinator Harry Webb in managing the Aquarium’s field research.

Of her return to Georgia for this job, Katelyn says, “Marine science has always been my passion and I’ve been incredibly fortunate to follow this passion around the world and through higher education. I never imagined it would ultimately lead me back home to Atlanta for my dream job. Joining the Research and Conservation department at Georgia Aquarium is my most thrilling and challenging endeavor yet and I’m beyond excited to be part of this innovative team and amazing institution.” Please join us in welcoming Katelyn to the Georgia Aquarium family.

New Post-Doctoral Candidate On Board for Whale Shark Genomics

Georgia Aquarium would like to introduce and welcome research collaborator and postdoctoral fellow, Dr. Milton Tan to the Aquarium team. Dr. Tan will be based out of Emory University and will continue work on the whale shark genome project. In early 2015, Georgia Aquarium and Emory University co-published a paper documenting the first ever complete map of the whale shark genome. Aquarium and Emory researchers have been working on this project for many years. Postdoctoral fellows have been an integral part of the genome project and Dr. Tan will join the team as genomic testing continues to advance. Genetic mapping can give you clear insight into the species being studied, especially complex biological systems and processes. Not only can we learn more about whale sharks specifically, but this information can help fill in the picture of shark genetics and even animal DNA as a whole. There’s an almost endless amount of material to be collected.

Milton comes to Emory from Auburn University, where he received his Ph.D. in Biological Sciences after receiving a B.S. in Biological Sciences with a concentration in Ecology and Organismal Biology from the University of Delaware. Dr. Tan has been interested in fish since receiving an aquarium as a 12th birthday present. He sum up the trajectory of his career by saying, “I couldn’t just keep fish, I had to learn all I could about them, and that has continued to become a lifelong obsession. Now I feel lucky to be able to study the diversity and evolution of some of the coolest fishes, and that includes this opportunity to study the whale shark.”
International Whale Shark Day and Other Whale Shark News

August 30, 2016 marked another International Whale Shark Day celebrated at Georgia Aquarium, with educational stations and games throughout the facility to teach guests about our research and conservation efforts both on site and in the field. This year, it was especially important to celebrate Whale Shark Day because the International Union for Conservation of Nature (IUCN) has just recently downgraded the whale shark to Endangered status. The IUCN bases its conservation status on the most affected population. On a global scale, whale shark populations seem to be remaining stable, but the population in the South China Sea and surrounding waters has seen a decline in numbers, mostly due to illegal fishing.

Georgia Aquarium also used International Whale Shark Day to announce a new partnership with Conservation International (CI). Georgia Aquarium and CI researchers are joining forces to conduct health studies on whale sharks in the Cenderawasih Bay in Indonesia. Using techniques perfected at Georgia Aquarium, researchers will perform health exams and bloodwork as well as assist CI researchers in mounting satellite tracking tags directly to their fins for longer coverage. These health exams, which have never before been conducted on this species in their natural habitat, will be performed to understand baseline health and ensure animal welfare during tagging research. Researchers at Georgia Aquarium have studied whale sharks in the Yucatan Peninsula, St. Helena Island in the Atlantic, and in the Galapagos. Georgia Aquarium is very excited to expand our whale shark research yet again. Please visit https://youtu.be/rGKhCqxMnTY to see a video describing our Conservation International partnership.

Loggerhead Sea Turtle Release

In July, 2007, on a beach in South Georgia, a loggerhead turtle hatchling had difficulty leaving his nest and making the short but perilous journey to the ocean waters just out of reach. Nine years later, that turtle was given the opportunity to finish his journey.

In the years since his birth, T.J. had been living at various rehabilitation and zoological facilities, including Georgia Aquarium where he has lived since 2011. Once T.J. had grown to a size where a successful release was likely, Aquarium husbandry staff began to prepare him for ocean life by transitioning him strictly to live food and reducing his dependency on humans. When staffers were confident that he could be released safely, a date was set. On September 19th, T.J. was successfully released on Jekyll Island, not far from where his life began.

A few days before his release, Research and Conservation Project Coordinator Harry Webb prepared a SPOT 5 tag for the husbandry team. The satellite tag, permanently affixed to T.J.’s shell using neoprene for comfort and epoxy for adhesive, transmitted a signal to a passing satellite when T.J. surfaced for a breath. That signal communicated his location and the temperature of the water, giving us a peak at his new life in the Atlantic Ocean. The tag lasted for about 90 days. Project Coordinator Harry Webb monitored T.J.’s progress using Argos software and mapped his journey.

T.J.’s story is just one of many that highlights Georgia Aquarium’s commitment to research and conservation here in Georgia as well as around the world.
Georgia Aquarium Conservation Field Station Summer Update

The Georgia Aquarium Conservation Field Station (GACFS) has had a very busy summer, carrying out established projects around the Jacksonville/St. Augustine waterways, working with partners in the Indian River Lagoon, as well as assisting with the unfortunate yet common problem of dolphin entanglement. Below is an update on this summer’s activities:

Multiple weeks throughout the summer, GACFS staff have worked with personnel from Harbor Branch Oceanographic Institute and Florida Institute of Technology to collect remote biopsy samples from resident dolphins in the greater Matanzas River Basin. These biopsy samples contain a small amount of skin and blubber and can be subsampled and processed to determine genetics, contaminant loads, and diagnosing infectious diseases. “This is the next step in expanding our dolphin health assessment research which investigates the bottlenose dolphin as a sentinel species for ocean and human health,” says Dr. Greg Bossart, who oversees Georgia Aquarium’s research and conservation programs.

In August, GACFS worked together with HUBBS Sea World Research Institute and Harbor Branch Oceanographic Institute to survey the entirety of the Indian River Lagoon Estuary System (IRLES) for 3 consecutive weeks. The IRLES comprises roughly 1/3 of the east coast of Florida and has been plagued with algal blooms, fish kills, manatee die offs and multiple dolphin Unusual Mortality Events in recent years. Through these surveys, researchers hope to obtain baseline data and answer basic questions surrounding the population of dolphins regarding their abundance and distribution.

The Northeast Florida Dolphin Research Consortium is in its 5th year of collaborative survey efforts. This year, the three summer surveys were piggy-backed off of the IRL survey efforts to provide an even larger snapshot of dolphin abundance and distribution over a ~300 linear mile range spanning from St. Lucie Inlet to the Florida/Georgia State Line.

On Sept 14th, GACFS helped with a collaborative dolphin disentanglement. A calf was observed struggling to swim with its mother near Daytona Beach. It was determined that the calf was tangled up in fishing gear and after a meeting with federal and private partners, the animals were caught the following day and the gear was successfully removed. The calf was given a physical exam where antibiotics were administered to stave off infection from its wounds. Please visit the link below for the full story.

Two main coral species that make up Florida’s system of reefs, the elkhorn (Acropora palmata) and staghorn (Acropora cervicornis) corals are both considered critically endangered. Many organizations and government institutions have focused their energy on finding ways to stop and even reverse the damage to Florida’s imperiled reefs. Since 2011, thanks to a generous grant by UPS, Georgia Aquarium has teamed up with the Coral Restoration Foundation (CRF) based out of Key Largo, Florida to work at the CRF’s coral nursery site in Marathon Key. At the nursery, fragmented coral pieces taken from affected reefs are suspended from a PVC frame that is anchored to the ocean floor and buoyed with a subsurface float. Here, the fragments can grow to a healthy size where they can then be reattached to an existing reef to stimulate healthy reef growth. Georgia Aquarium team members make the journey a few times a year to help maintain the nurseries and to move corals accordingly.

For the past three years, Aquarium divers have planned one of their annual visits to coincide with the very unique phenomenon of coral spawning. This stunning natural display occurs when corals simultaneously release their eggs and sperm into the water column where they mix and create free swimming planula larvae that will eventually settle and grow into a reef. This process happens for just a few nights every August under the light of a full moon. It has been a practice of researchers to assist this natural event by collecting gametes released during spawning, fertilizing them under laboratory conditions, then releasing the planula back onto the reefs. This year, in an effort to better understand the conditions needed for successful coral spawning and settlement, Aquarium curator Kim Stone and her team collected and brought back approximately 12,000 planulae which were then transferred into experimental tanks equipped with various settlement surfaces and water movement. Over the coming months, husbandry staff will observe the progress of the polyps and share their findings with the scientific communities. This project has always been a multi-institutional effort with this year’s participants including Florida Aquarium, Sea World of Florida, California Academy of Sciences, the Smithsonian and SEZARC (Southeast Zoo Alliance for Reproduction and Conservation), who performed sperm concentration analyses and other trials to quantify best practices for fertilization and shipment of coral planula. Please look for updates on this project in future newsletters.
Aquarium Researchers Return to the Galapagos Islands

Last year Dr. Al Dove, Director of Research and Conservation, joined a group of international researchers on an expedition to the Galapagos Islands to study a migration of large, presumably pregnant whale sharks. In October, Dr. Dove led a team back to the Galapagos. One of the objectives for the expedition was to collect blood from the female whale sharks to confirm the hypothesis that these are indeed pregnant females, possibly on their way to pupping grounds. The second part of the 3-week expedition was to affix tracking tags and collect skin samples of a species of mola found in the colder waters of the southern Galapagos. Unfortunately, in a very uncharacteristic turn of events, there were almost no whale sharks to be found this year. The mola tagging portion of the trip, however, was an enormous success.

Southern sunfish (Mola ramsayi) are found in the waters between and around Fernandina and Isabella Islands. Dr. Alex Hearn, a researcher from Universidad San Francisco de Quito and Turtle Island Restoration Network was the organizer of last year’s Galapagos expedition and a participant in this year’s trip. He has studied these sunfish in the past on a small scale. This time, the study was expanded into what may very well be the largest for this species with the goal to learn more about the life history of this large pelagic fish. The purpose is to simply learn more about southern sunfish. Some of the questions the team hopes to answer are: Is this population of mola resident or transient? If resident, what do the environmental conditions in these waters offer the mola to keep them resident? If transient, where else can these fish be found? In an attempt to answer these questions, a total of 21 tags were deployed: 8 archival, 5 real time, 8 acoustic. Four acoustic receivers were also deployed around the island, increasing the total of receiver surrounding the Galapagos Island to over 50! These acoustic receivers will record signals from the acoustic tags which will help in determining residency and habitat usage. The team of 5 Aquarium staff, Dr. Hearn, as well as Ph.D. candidate Clare Prebble from the Marine Megafauna Foundation were able to deploy all the tags and collect skin samples for nutritional and genetic analyses from 8 different animals.

Even though the whale shark portion of the trip did not go as they had hoped, the team was very happy with what they were able to accomplish. The Aquarium acquired some amazing audio visual assets along with the successful mola work. The whale shark blood draw on free swimming whale sharks is still a work in progress but the team is prepared to try again when the opportunity presents itself.
Georgia Aquarium nutritionist Dr. Lisa Hoopes recently joined scientists at Mote Marine Laboratory in Sarasota, Florida to study spotted eagle rays (Aetobatus narinari). Mote researchers had been working on a photo ID catalog and population structure of these rays in Sarasota Bay and have recently begun to study their movement patterns through acoustic tagging. Dr. Hoopes joined this research 3 years ago to better understand the diets of spotted eagle rays in their natural habitat and to use that information to enhance the nutrition of spotted eagle rays under human care.

Dr. Hoopes explained her part in the study by saying, “To understand what spotted eagle rays are eating in Sarasota Bay, we are using feeding ecology techniques based on the principle that ‘you are what you eat’ and that tissues of consumers reflect the chemical composition (largely unaltered) of their prey. We are using a variety of techniques to help answer these questions, including blood sampling, stomach contents, genetics, stable isotopes, and fatty acid analysis. To improve the nutrition of spotted eagle rays managed in aquaria, we are looking at changes in blood vitamin and trace mineral levels in wild animals compared to aquaria animals. This information, combined with knowing what they eat in the wild, will allow zoological institutions to make the best dietary decisions with regard to nutritional health.”

This is Dr. Hoopes’ second time joining the Mote Marine Laboratory team for this work. Unfortunately, a red tide event prevented the team’s ability to sample the eagle rays in the bay, but they were able to successfully sample two rays, in addition to collecting many suspected food items. Mote continues this work every year from Spring until Fall and Dr. Hoopes hopes to join them again in the near future.

**Cherokee Christian School Summer Interns**

The relationship with the Cherokee Christian School STEM internship program continued this summer with two more interns. Senior Benjimen Goss worked under the guidance of Project Coordinator Harry Webb to generate most probable movement tracks of whale sharks and manta rays from satellite telemetry data acquired during Aquarium research expeditions in St. Helena and northeast Florida.

Fellow Senior Benjamin Koehler was mentored by Aquarium Nutritionist Dr. Lisa Hoopes and worked on a project to assess the nutritional quality of the common hobbyist live food source, *Daphnia sp.*, when gut loaded with various diets. The students spent the summer working on their individual projects then gave a presentation at the conclusion of their internship. We wish both students the best of luck.
Georgia Manatee Update

In May, Georgia Aquarium and Conservation Field Station staff joined a team led by the Sea to Shore Alliance and Georgia Department of Natural Resources to collect, assess, and tag a small sample of Florida manatees (Trichechus manatus) that utilize Georgia’s coastal waters during the summer months. “Five manatees were part of this 2nd year health assessment study which is patterned after the Aquarium’s dolphin health assessment program,” says Dr. Greg Bossart, Senior Vice President of Animal Health, Research and Conservation. One animal from 2015 and three animals from 2016 still have their satellite tags attached and have been recorded moving up and down the coast between south Georgia and central Florida. All manatees were tagged around St. Mary’s, Georgia and the corresponding map points out some of their preferred places to travel. The quick-release tail mounted satellite tags will continue to transmit their locations for as long as the battery is functional and the tag is attached. This information will help in understanding how manatees utilize the coasts of both Georgia and Florida throughout the year. We will continue to pass along updates as we receive them.

New Marine Protected Area, Mexico’s Largest, Will Help Preserve Whale Shark Feeding Grounds

On December 5, President Enrique Peña Nieto announced the creation of the Mexican Caribbean Biosphere Reserve, which will be the largest such marine protected area in Mexico. Georgia Aquarium is excited about this announcement as the Reserve will include the site known as the “afuera”, where the world’s largest aggregation of whale sharks comes to feed every summer. Until now, this area was outside any government jurisdiction, which made it difficult to control the rapidly expanding eco-tourism industry built around swimming with whale sharks as well as the commercial shipping lanes that moved perilously close to the afuera feeding grounds. Aquarium team members witnessed first-hand the increasing amount of boats and humans and its adverse effect on the animals of the afuera as researchers returned to this site annually to study the whale shark and manta populations.

With the creation of this new 14,000,000-acre Reserve, the coastal waters from Isla Mujeres to Tulum will be protected and policed by the National Commission of Protected Areas (CONANP) as well as the Mexican Navy. It will also connect with the Whale Shark Biosphere Reserve, which Georgia Aquarium helped establish, and includes the waters around Isla Holbox to Isla Contoy, essentially making the whole coastal state of Quintana Roo a protected area.

Director of Research and Conservation, Dr. Al Dove, is very excited about this announcement and the Aquarium’s role in making this a reality. He says, “There’s no doubt that the afuera whale shark work we have done over the past 10 years has been part of this development, as has the increase in profile for the area generally, including the light we have shed on ecotourism practices and commercial shipping. We should all feel good about this development, because we played a part and because it should increase protections for some of our flagship species including whale sharks, manta rays, dolphins and coral reefs.”
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