



# INWATER RESEARCH GROUP, INC



Annual Report

2016

## Our Mission Statement:

**“Our mission is to provide the scientific community and general public with information to promote conservation of coastal and marine species and their habitats.”**



## Message from the President

Through our continued commitment to research, conservation and education, Inwater Research Group continued to be in the forefront of issues affecting marine turtles in the southeastern United States in 2016.

Our efforts continued to assess the damage from the catastrophic Deepwater Horizon oil spill in the Gulf of Mexico. In 2016, IRG researchers provided field assistance to researchers from the University of Central Florida in capturing and satellite tagging small pelagic stage juvenile green, loggerhead, and Kemp's ridley sea turtles in the area of the 2010 spill offshore of Venice, Louisiana. This research will help shed some light on the very poorly understood migratory pathways of the age class of turtles perhaps most severely affected by the oil spill. In 2016, IRG also received continuing support in the form of an anonymous grant from the Donor Advised Fidelity Trust that will aid in the continuation of our sea turtle work in the Gulf of Mexico.

In 2016, IRG continued our contract with the Florida Power and Light Company to manage the sea turtle conservation program at the St. Lucie Nuclear Power Plant on Hutchinson Island in St. Lucie County, Florida. This is a hands-on program that safely captures and frees sea turtles from the cooling water system at the power plant. In addition to capturing and releasing turtles from the plant's intake canal, we also conducted sea turtle nesting surveys on the northern 19 kilometers of Hutchinson Island. The Florida Power and Light project is extremely valuable conservation work, and generates a vast amount of data used by scientists and regulatory agencies. Analyzing and disseminating data collected from nesting surveys and captures at the intake canal will forward our mission goals and add to our understanding of marine species in coastal ecosystems.

In 2016, we also continued what we hope will be another long-term research project in Florida waters, this one in the "Big Bend" area of the Florida west coast. The shallow marine habitats in

this region represent important developmental areas for maturing sea turtles. We conducted transect surveys and capture efforts in the St. Martins Keys Aquatic Preserve to identify size class distributions, growth rates, genetic origins, and sex ratios of sea turtles found there. A surprising finding from this work was an unexpectedly high prevalence of the tumor disease fibropapillomatosis in the green turtle population, an ominous indicator that all may not be well in this seemingly pristine environment. We have initiated a collaborative study to identify immune system parameters associated with the disease.

With the continued assistance of our research collaborators, granting agencies, donor and sponsor support, Inwater Research Group looks forward to continuing our mission to conduct high quality research and use those research products to further the conservation of marine species and their habitats in 2017 and beyond.

Michael J. Bresette

President, Inwater Research Group, Inc.



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## **Our Staff**

Steve T. Weege  
Biologist  
St. Lucie Power Plant Project

Ryan Welsh  
Biologist  
St. Lucie Power Plant Project

Jeff R. Guertin, M.S.  
Biologist  
St. Lucie Power Plant Project

Cody R. Mott, M.S.  
Biologist  
St. Lucie Power Plant Project

Rebecca Mott  
Education Manager



## 2016 Milestones and Accomplishments

### Research Projects:

Key West National Wildlife Refuge: The results of IRG's work in the western section of the Key West National Wildlife refuge on green turtles in the vicinity of the Marquesas Keys was published in the journal *Endangered Species Research*. The paper, titled "Size-class partitioning and herding in a foraging group of green turtles *Chelonia mydas*" is a result of our discovery that the green turtles in the Marquesas area have partitioned themselves by size into two very distinct assemblages, the smaller size individuals in the shallow seagrass habitats of Mooney Harbor, and the larger sized individuals in the deeper more open-water habitats of the adjacent Eastern Quicksands. Despite the very close proximity of these two areas, there was virtually no overlap in the size classes of green turtles present. The paper also documents the formation of foraging herds by the larger size class of turtles in the Eastern Quicksands.

In 2016, we were able to take advantage of the capabilities of our new larger 27-foot custom built research vessel to more easily and safely access this remote area and continue our studies of this unique aggregation of turtles. Our recent work in the Quicksands area has focused on the population of adult and sub-adult green turtles that use the area as a developmental habitat, and has included continued censusing of abundance as well as collection of blood and tissue samples for genetic analysis. In 2016, we also investigated the feasibility of installing an acoustic tracking array to determine daily movements and home ranges of turtles in this, the only documented developmental habitat for adult green turtles in the continental United States. In an exciting collaboration begun in 2016, we have collaborated with the National Save

a Sea Turtle Foundation on work in the Quicksands, and taken advantage of their 60 foot sportfishing vessel the *R/V Hawksbill* as a “mother ship” to stay in the area for days at a time.

Inwater Research Group received funding in 2010 and 2011 through the Florida Sea Turtle License Plate Grant fund to conduct research into the hawksbill sea turtle population in the Key West National Wildlife Refuge. This research takes advantage of our discovery in 2008 of a specific area within the refuge that has a high abundance of hawksbills that showed very strong site fidelity, which facilitates capture and recapture efficiency. Field work continued in 2012 to capture and tag hawksbills and collect morphometric and genetic information. These data will allow IRG to describe the size class structure and sex ratio of the population, calculate growth rates for juvenile and subadult hawksbills in the Refuge, and to determine the genetic origin (the geographic area where the individuals were hatched) through mitochondrial DNA analysis. In 2014, we published the results of this long term study in a paper titled “Characterization of a subtropical hawksbill sea turtle (*Eretmochelys imbricata*) assemblage utilizing shallow water natural and artificial habitats in the Florida Keys” in the journal *PLOSone*.

All of this work has stemmed from our long-term effort to characterize sea turtle populations in the Key West National Wildlife Refuge. That effort, underway since 2003, has produced extremely valuable results and has provided crucial information to refuge managers about how best to conserve and manage the Refuge. The continuation of this work has been identified by the Board of Directors as the highest priority for the future, and IRG is actively seeking long term funding for this effort. In 2016, IRG received an anonymous grant from the Donor Advised Fidelity Trust that will aid in the continuation of this project.

Lake Worth Lagoon, Palm Beach County: Inwater Research Group has been conducting research to characterize the sea turtle populations of this large and urbanized estuarine system since 2005. This work has been funded by the Palm Beach County Department of Environmental Resource Management in order to learn about the species of sea turtles that utilize the Lagoon and the habitats in which they are found. In 2016, under a contract with Palm Beach County,

IRG continued our field work in the area, contributing to a long-term data set that is crucial for assessing population trends. Information from this work is used by the County Environmental Resource Management staff in the planning and execution of their comprehensive restoration program for the Lagoon. Since sea turtles are such a high-profile species, the presence of sea turtles in the Lagoon and their dependence on the Lagoon as a developmental habitat helps raise public awareness about the progress and benefits of the restoration effort. Also in 2016, we published the results of our decade of research in Lake Worth Lagoon in the paper “Green turtles (*Chelonia mydas*) in an urban estuary system: Lake Worth Lagoon, Florida” in the journal *Florida Scientist*.

Big Bend Developmental Habitats: In 2016, we continued what we hope will be another long-term research project in Florida waters, this one in the “Big Bend” area of the Florida west coast. The shallow marine habitats in this region represent important developmental habitats for maturing sea turtles. Using the vessel based visual transect study method pioneered by IRG, we identified and mapped the occurrence of hundreds of green, Kemp’s ridley, and loggerhead sea turtles and were able to identify “hotspots” of particularly high sea turtle abundance. In 2016, we also continued capture efforts to identify size class distributions, growth rates, genetic origins, and sex ratios of Big Bend turtles.

A surprising finding from this work was an unexpectedly high prevalence of the tumor disease fibropapillomatosis in the green turtle population, an ominous indicator that all may not be well in this seemingly pristine environment. In 2015, we initiated a collaborative study to identify immune system parameters associated with the disease.

The shallow seagrass beds of the Big Bend that are home to these turtles are also home to the immensely popular recreational bay scallop fishery, with hundreds of vessels transiting our study area each day in the summer. To look at what effect this vessel traffic and human activity might have on the turtle population, we initiated a collaboration in 2016 with researchers from

Florida State University to satellite tag turtles and look at their movements and home ranges before, during, and after the bay scallop season.

Louisiana and the Gulf of Mexico. Our efforts continued to assess the damage from the catastrophic Deepwater Horizon oil spill in the Gulf of Mexico. In 2016, IRG researchers provided field assistance to researchers from the University of Central Florida in capturing and satellite tagging small pelagic stage juvenile green, loggerhead, and Kemp's ridley sea turtles in the area of the 2010 spill offshore of Venice, Louisiana. In 2016 we also began working on this same population of turtles in the area offshore of Sarasota, Florida using our 27-foot offshore vessel, the *R/V Boyd Lyon*. This research will help shed some light on the very poorly understood migratory pathways of the age class of turtles perhaps most severely affected by the oil spill. In 2016, IRG also received continued funding from the Donor Advised Fidelity Trust that will help support future research efforts in the area.

Biscayne Bay. We were very excited to discover another promising site for long-term research in 2016. Although Biscayne Bay is right in the shadow of one of the largest cities in the country, very little is known about the sea turtle population that calls the bay home. The bay has vast areas of seagrass and hardbottom habitat beneath its shallow clear waters – ideal sea turtle developmental habitat. Much of Biscayne Bay is included in Biscayne National Park, and we began work last year with park staff to collect basic information on the distribution and abundance of sea turtles both inside the bay and in the nearshore area of the ocean side. Our preliminary work has been very successful, and IRG has secured funding from the National Save a Sea Turtle Foundation and submitted a grant application to the Florida Sea Turtle License Plate Grant Program to continue work there in 2017.

## **Conservation and Environmental Monitoring Projects:**

Florida Power and Light Company Sea Turtle Conservation Program: Since 2009, Inwater Research Group has been contracted by Florida Power and Light Company to conduct the sea turtle conservation program at the St. Lucie Nuclear Power Plant on Hutchinson Island. To fulfill this contract, IRG has biologists on site and on call 365 days a year to monitor the plants cooling water intake system and safely capture and release any sea turtles that become trapped in the canal. Data from these turtles are extremely valuable to the scientific community, and IRG will be collecting and managing this data set, as well as disseminating information collected through the FPL program via publications, data sharing and collaborations with other researchers, and presentations at scientific meetings and symposia.

Our work at the Florida Power and Light St. Lucie Plant in 2016 provided the opportunity for IRG staff to collaborate with several researchers by providing data, specimens, and samples to support their research interests. IRG biologists at the St. Lucie power plant continued to collaborate with other researchers on four research projects in 2016. Staff biologists collected blood samples from juvenile green turtles for analysis of health parameters by the University of Georgia and the Georgia Sea Turtle Center. Unhatched eggs from loggerhead nests were provided for stable isotope analysis by Florida Fish and Wildlife Research Institute (FWRI). Measurements of hatchlings orientation direction were also collected for a separate study by FWRI. Lastly, IRG biologists collaborated with Southeastern Louisiana State University to collect blood to examine stress levels in adult female loggerheads.

## **Education and Public Outreach:**

In 2016, IRG expanded its educational presence both locally and statewide. Our lesson plans made their way to classrooms all over the United State while we focused hands-on education experiences in our surrounding school districts. The most popular program to date has been our Traveling Turtles Trunk program, which launched in October 2015. These trunks contain 4

all-inclusive comprehensive sea turtle lessons that take students on a journey from sea turtle biology to what Inwater researchers do on a daily basis. The trunks place students in the role of biologists as they sample populations of sea turtles (classmates) and work up their own sea turtle (model). Students are able to use real tools of the trade to collect data and make assessments. They use inquiry-based learning as well as first-hand experience to make connections to the world of conservation. Teachers may borrow these trunks and their lessons for up to three weeks at no cost.

This program grew popular with local teachers after its launch that another trunk was developed to keep up with demand. In 2015 alone, the program reached over 4,000 students in Martin and St. Lucie County. Because the program must remain local due to the trunks' cumbersome nature, we decided to launch a program statewide that would allow us to re-create the program for interested organizations. Due to generous funding from the Sea Turtle License Plate Grants Program as well as from the National Save the Sea Turtle Foundation, we were able to re-create 5 trunks with participating organizations across Florida. IRG Education staff built 5 exact replicas and shipped all materials to the organizations, supplying instructions on how best to reach their own schools. These organizations launched their own Traveling Turtles Trunk program at the beginning of the 2015-16 school year.

Additional funds from these grant sources allowed us to develop two additional trunks for our immediate area, totaling 4 to be lent out concurrently. By the end of 2015, we had booked these trunks to capacity for the 2015-16 school year.

In addition to our trunk program, we also continuously seek our new opportunities to connect with the public face to face. We primarily do this through in-class outreach presentations. This aspect of our education is very important to our mission, which is why in 2016, we sought a grant to fund a temporary program called Treasured Turtles: Treasure Coast Sea Turtle Outreach Program for At-risk Youth. This program allowed us to cherry pick the most severely underserved schools in our surrounding school districts and offer them free education programs. We saw schools from four separate school districts and all grade levels. Along with

our regular outreach programs, we were able to reach over 1,600 students from 55 classrooms and gave over 78 presentations in 2016 alone.

IRG scientists traveled extensively in 2016 to present the results of our research projects to the scientific community and the general public, including poster at the International Sea Turtle Symposium in Lima, Peru and 2 presentations and an education workshop at the Southeast Regional Sea Turtle Meeting in Mobile, Alabama. Closer to home, IRG staff presented a talk at the Florida Marine Turtle Permit Holders Meeting in Jacksonville, Florida. Our outreach efforts to bring sea turtle science to the public included presentations at the South Florida Science Museum, Lagoon Fest in Palm Beach County, Florida Atlantic University, the Brevard Zoo and Fern Forest Nature Center.



## Supporters and Volunteers

### **Institutional Supporters:**

Florida Sea Turtle Grants Program  
U.S. Fish and Wildlife Service  
Florida Fish and Wildlife Conservation Commission  
National Marine Fisheries Service  
Norcross Foundation  
National Save a Sea Turtle Foundation  
Brevard Zoo – Women of the Wild  
Palm Beach County Environmental Resource Management  
Florida Power and Light Co.

### **Individual Supporters:**

Anonymous, from the Donor Advised Fidelity Charitable Gift Trust  
Brian and Nicole Stacy  
Deanne Hansen  
Jenifer Margolis  
Vickie Openshaw  
Simone Virgilio

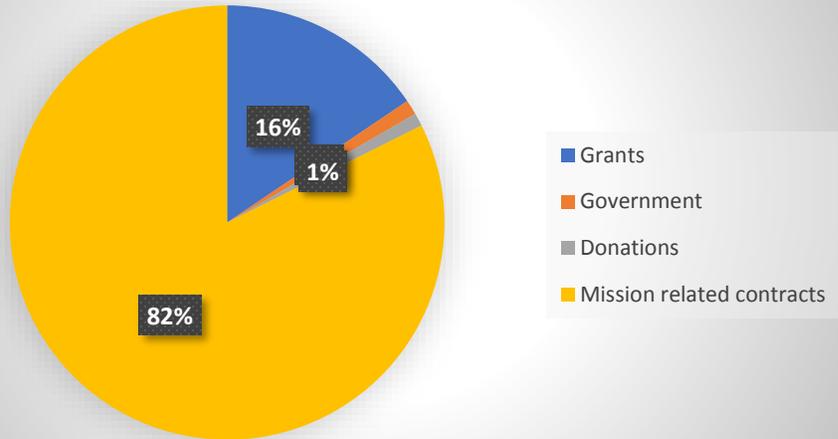
### **Volunteers:**

Karrie Minch, Meghan Koperski  
Dawn Witherington, Wanda Bresette, Laura Herren  
Karen Holloway-Adkins, Sue Schaf



## 2016 Financial Statement

### Revenue 2016 - \$637,110



### Expenses 2016 - \$635,614

