

UNIVERSITY
OF MIAMI

R.J. DUNLAP MARINE
CONSERVATION PROGRAM



2014

ANNUAL REPORT

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This document is a report summarizing the achievements and progress of the University of Miami's RJ Dunlap Marine Conservation Program (RJD) in 2014.

UNIVERSITY OF MIAMI
ABESS CENTER
for ECOSYSTEM
SCIENCE & POLICY



UNIVERSITY OF MIAMI
ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



RJD is a joint initiative of the Rosenstiel School of Marine & Atmospheric Science (RSMAS) and the Leonard and Jayne Abess Center for Ecosystem Science and Policy at the University of Miami.

A LETTER FROM THE DIRECTOR

Dear RJD Friends, Colleagues and Supporters,

This past year was full of many new changes, challenges and successes. We expanded our shark research surveys to include more trips out of Miami and Palm Beach. We ran two expeditions to the Bahamas and started several new local projects out of Miami, including studies of fish communities in Southern Biscayne Bay and in the restored mangrove forests off Key Biscayne. Once again we participated in many community functions and festivals, such as the Tortuga Music Festival, and our students presented at numerous scientific conferences. In 2014 alone, we brought over 1,200 citizen scientists, 1000 of who were students, out on research vessels with us to participate in our science, and learn about local conservation issues. They ranged in age from 10 to 73, came from 46 states, 40 countries, and included representatives from 33 schools, community organizations and public corporations. Our research was published in numerous scientific journals and featured in various media outlets. This past year also saw the graduation of several of our interns and students that will be missed and who will surely move on to do incredible things. Our accomplishments could not have happened without the dedication, passion and support of our students, staff, collaborators, donors, partners and institutions – thank you!

Neil Hammerschlag, Ph.D.

Director, RJ Dunlap Marine Conservation Program
Research Assistant Professor,
Rosenstiel School of Marine and Atmospheric Science -
Abess Center(CESP)



The mission of the University of Miami's RJ Dunlap Marine Conservation Program (RJD) is to advance ocean conservation and scientific literacy by conducting cutting edge scientific research and providing innovative and meaningful outreach opportunities for students through exhilarating hands-on research and virtual learning experiences in marine biology. Focusing primarily on the study and conservation of sharks, the Program's full-immersion approach allows students to actively grow as future scientists.

Setting us apart

The RJ Dunlap Marine Conservation Program (RJD) addresses 3 major needs in the United States and abroad:

1

a lack of engaging science education opportunities that inspire youth to learn STEM skills



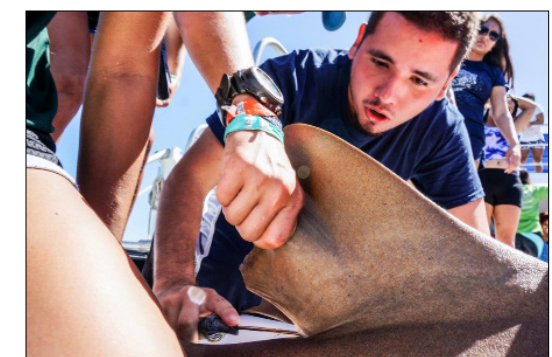
2

a lack of knowledge and awareness about marine ecology and conservation



3

the need to inspire the next generation of conservation leaders



2014 HIGHLIGHTS

Tortuga Music Festival

Once again, RJD was grateful to have the chance to host a booth at **Rock the Ocean's Tortuga Music Festival** in Ft. Lauderdale. This music festival is unique in that it features a large and interactive Conservation Village, where festival patrons can learn about the marine environment and ocean conservation. Students from RJD were able to engage with concertgoers and taught them about our research projects, shark conservation, and ways they can get involved through citizen science trips. RJD was just one of many top-notch organizations showcasing their work including others such as: REEF, Bimini Biological Field Station, the Guy Harvey Research Institute, Tampa Bay Watch, and the National Coral Reef Institute.



Rescue A Reef

In 2013, RJD partnered with the University of Miami's Coral Restoration Research Lab led by Dr. Diego Lirman to initiate a unique program called Rescue A Reef. Mirroring RJD's citizen science outreach, **Rescue A Reef** aims to engage citizens to join scientists underwater to help restore threatened staghorn coral. Using underwater coral nurseries, researchers can create a sustainable source of healthy coral colonies to transplant back onto degraded reefs, in hopes of mitigating negative impacts on wild populations. This initiative is one of the largest Acropora restoration projects along the Florida Reef Tract, starting with only 200 small coral fragments to having produced over 6,000 healthy corals at the end of 2014. The Rescue A Reef Program was officially launched in May 2015 and citizen scientists have already outplanted > 150 nursery-grown staghorn colonies onto degraded reefs.



Shark Tagging with Richard Branson

RJD had the rare opportunity to head up the first ever shark tagging trip in the **British Virgin Islands** with none other than Richard Branson. Though we only caught one juvenile Caribbean reef shark aptly named "Huck" for Huckleberry Fin, it was a groundbreaking and momentous occasion for shark research and conservation in the Islands, as the BVIs are in the process of declaring their waters a shark sanctuary. Very little is known about the number of sharks in the BVIs or their habitat, and RJD was lucky to be able to kick start some new research in this area.



For more information: <http://www.virgin.com/richard-branson/tagging-the-first-ever-shark-in-the-bvi>

These aren't ecotourism trips, they are serious science, and they gather an extraordinary amount of data on the sharks. — Richard Branson



Taste of the Sea

The RJD Program was proud to be invited to participate in the inaugural **"Taste of the Sea"** Sea Delight Ocean Fund's Responsibly Sourced Seafood Tasting Event, which highlighted and offered samples of sustainable seafood. Local celebrity chefs created responsibly-sourced seafood dishes while guests enjoyed a Conservation Village. Students from RJD engaged with the guests at the event by showcasing our research and goals towards shark and marine conservation all while enjoying an evening benefiting fisheries improvement projects.

2014 HIGHLIGHTS

Sharks International

Traveling to Durban, South Africa, RJD was well represented at the **2nd Sharks International conference**, a gathering of the world's leading shark and ray researchers. This conference only happens every four years, and last year over 300 researchers and conservationists from more than 38 countries gathered to discuss shark and ray conservation, biology, ecology, physiology, and so much more. Director, Dr. Neil Hammerschlag and two PhD students: Austin Gallagher (at the time of this publication, Dr. Gallagher) and David Shiffman all spoke on their respective research they do as part of the RJ Dunlap Marine Conservation Program. From the implications of using telemetry tags to track migratory patterns of sharks, to the importance of social media in conservation, sharing and learning new shark science made this conference a huge success and our lab looks forward to attending in the future.

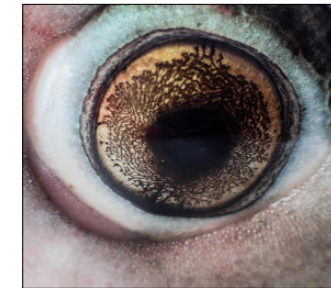


Media Spotlight

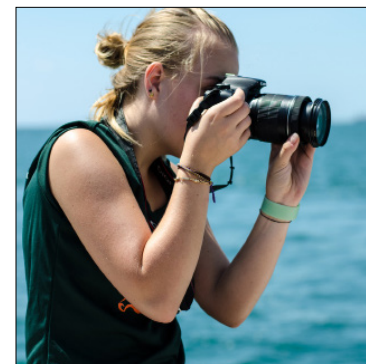
There are a total of four photographers that help RJD capture the trips.



Frank Gibson



"I think, that to a certain extent, photography has the ability to change the world. With a program like this, I think it's important to show others what we are doing, since it has the potential

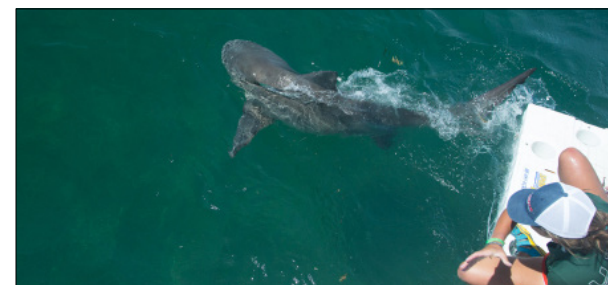


Sarah Hirth

to change peoples' thoughts and behaviors regarding sharks. Peoples' attention spans constantly decrease, and fewer people are willing to read long articles. Looking at a photograph, however, still fits in most peoples' attention spans, and I think that's what gives photography power, especially in the field of science. People can see what we do on the boat, and they can create their own perception of sharks, by looking at our photographs." - **Sarah Hirth**



Cat Schulz



Colin Li



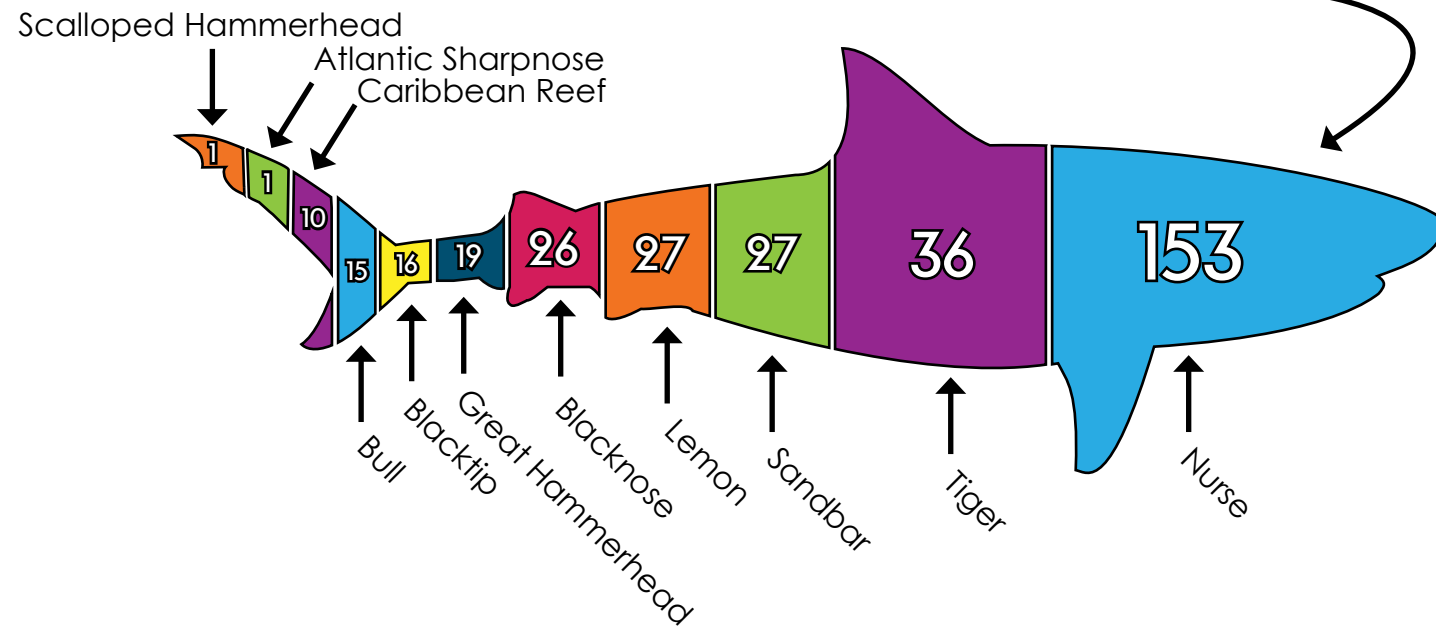
RESEARCH

Go Fish!

2,010 BAITS DEPLOYED

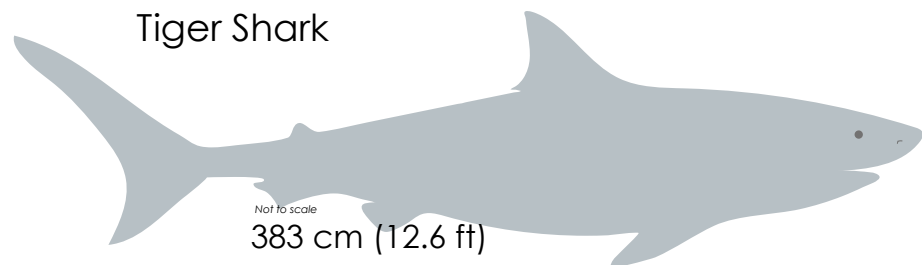
ACROSS 67 RESEARCH TRIPS

REELING IN...

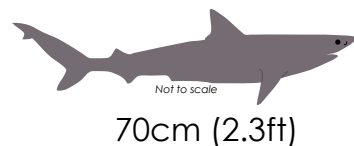


FOR A TOTAL OF 331 SHARKS CAUGHT IN 2014

LARGEST SHARK TAGGED:
Tiger Shark



SMALLEST SHARK TAGGED:
Atlantic Sharpnose



WHAT A 'TYPICAL' SHARK WORKUP LOOKS LIKE:

During our shark sampling we are committed to ensuring shark welfare while allowing our researchers to gather sufficient data in a timely and safe manner. Our lab is constantly engaged in training sessions to ensure we safely handle and return the sharks to their natural habitat with minimal stress, while promoting shark vitality and survival.

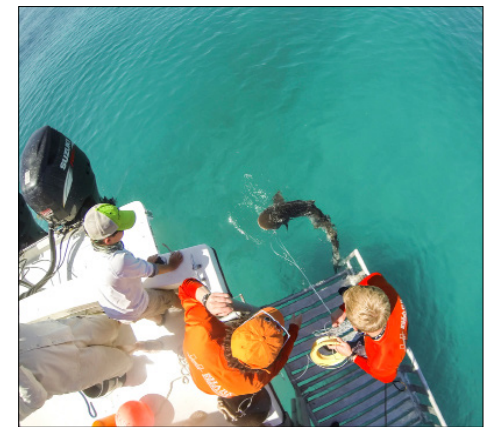


1. Setting The Lines

Before any work ups can begin, baited circle hooks are set at strategic study sites to attract and catch sharks for research. Custom-designed fishing gear is used to maximize the chances of hooking sharks in their mouths whereby the hook can easily be removed and the remaining superficial wound quickly healed. Additionally, our gear allows sharks to swim in large circles, ensuring they can pass water through its gills and promoting vitality.

2. We got one

Once a shark has been hooked, the team quickly leads it towards the boat and secures it on our unique platform. Placing a ventilation pump in its mouth flushes highly oxygenated sea water over the shark's gills allowing for its continued breathing.



3. Nictitating Membrane

After the shark is secured on the platform, we first test the shark's reflexes to quantify the level of stress they may be encountering. To do this, seawater is flushed into the shark's eye to see if its nictitating membrane (similar to an inner eyelid) responds by involuntarily closing and at what speed.

RESEARCH

4. Taking Length Measurements



Our team takes numerous different measurements along the shark's body, including lengths, girths and fin dimensions. Additional basic information, like species and gender, are recorded for population surveys.

5. Tags

All sharks are tagged in the base of the dorsal fin with an identification tag. If the shark is recaptured by our team or someone else, we are able to identify that shark based on its tag number. On certain species of sharks, like hammerhead and tiger sharks, we also attach a satellite tag. Every time the shark surfaces, it transmits information to orbiting satellites which can be used by our researchers to track the shark's migratory routes, residency patterns, diving depths and environmental conditions encountered, such as temperature.



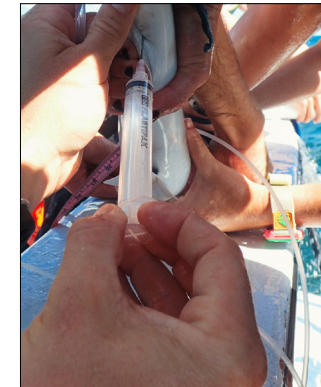
6. Fin Clip

Using medical grade equipment, our team takes a small clipping of the trailing edge of the shark's dorsal fin. Since shark fins are comprised of cartilage and have neither nerve endings nor blood supply, taking this sample does not harm or injure the shark. This piece of fin allows our team to collect information for later analyses on genetics, isotopes, and the presence of toxins.



7. Drawing Blood

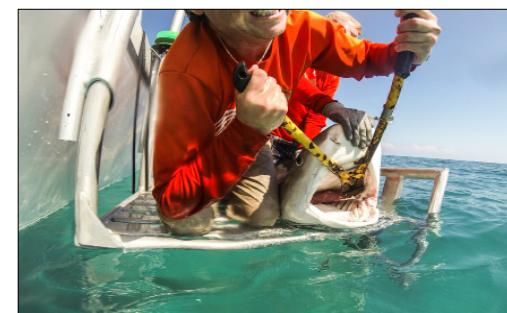
Blood samples are taken from the caudal vein to test for a variety of parameters. This is a non-invasive way to obtain information about a shark's diet, how they react to stress, reproductive status, and screen for toxins in a shark's environment. The unique things about these blood samples are that they can actually be centrifuged and processed right in our onboard laboratory.



8. Release and Post-release

Since our team is a well-oiled machine, all of our samples are taken within three to five minutes, minimizing the time shark is out of the water. Once all our samples have been taken, we carefully cut and remove the hook and release the shark back into the ocean. As one of the last procedures prior to release, our team injects the shark with vitamins and an anti-inflammatory shot to promote its vitality and reduce its stress levels even after release.

We monitor the shark's condition upon release and taking underwater photo and video allows for later scientific review.



RESEARCH

SHARK SATELLITE TRACK SPOTLIGHT

Caught and tagged in the warm waters of the Bahamas, tiger shark "Sebastian Abess" represents a multi-generational relationship between the University of Miami and the Abess family. From grandfather to father, and now Leonard Abess himself, a trustee since **1997**, the University of Miami has counted on the strong support and leadership of this remarkable and pioneering Miami family. The Abess family's generous legacy extends to the Leonard and Jayne Abess Center for Ecosystem Science and Policy at the University as they continue to support the center's mission of finding innovative solutions to complex environmental problems. In recognition of Leonard's dedication and support to the school as well as conservation science, named for the University of Miami's mascot Sebastian the Ibis and the Abess family, RJD has tagged "**Sebastian Abess**," as a tribute to his exemplary service to the U and personal dedication to championing the incredible research and experiential learning opportunities it offers, like shark tagging. Support, like that which is given by the Abess family, is a fundamental reason why RJD is not only successful in our research but also in how we shape minds about ocean and shark conservation.

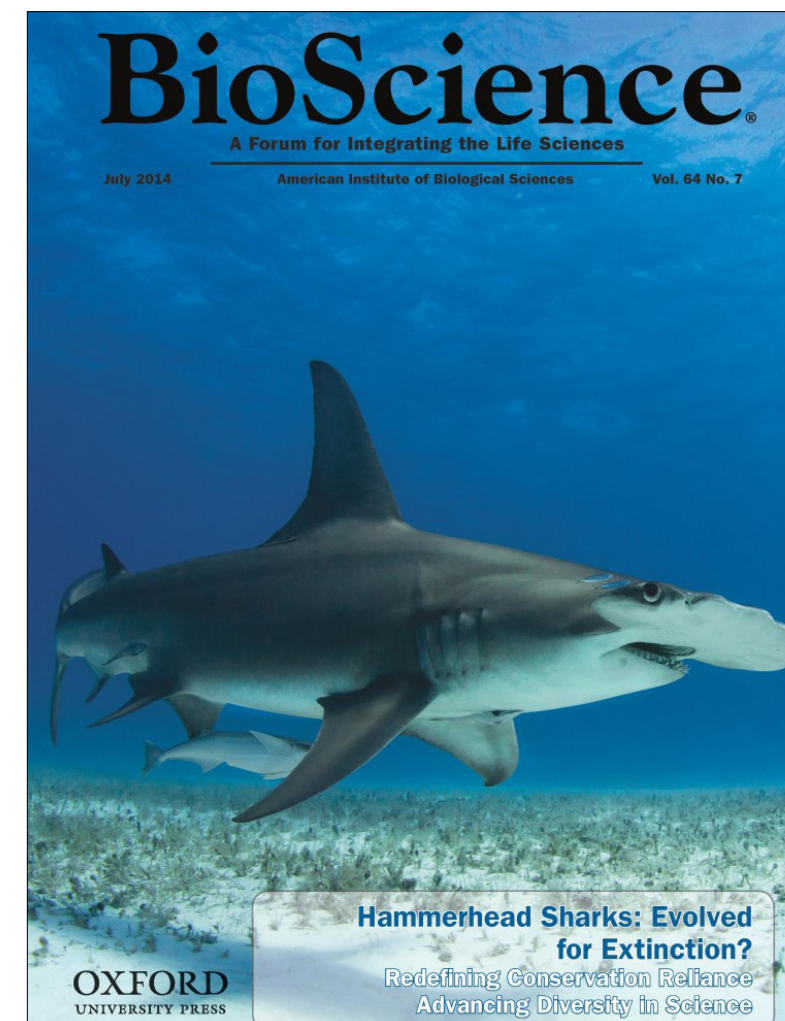


THIS YEAR'S SCIENTIFIC PUBLICATIONS

Evolved for extinction: the cost and conservation implications of extreme specialization in hammerhead sharks

Although sharks are among the oldest groups of living vertebrates, due to destructive fishing practices, they are also among the **most threatened** globally. Hammerhead sharks (*Sphyrnidae*) exhibit extremely specialized traits and complex behaviors which have made them increasingly vulnerable to human exploitation and population declines. The aim of this study was to explore the idea that relatively extreme specialization in hammerheads and drastic declines in populations are causally related, therefore

impeding conservation efforts. Researchers analyzed published data on **hammerhead** shark phylogeny, morphology, biology, physiology, and ecology, and argue that the same adaptations and unique traits that have given hammerheads evolutionary success may also be maladaptive under current levels and methods of exploitation. They suggest that future management be made in light of – rather than in spite of – the unique evolutionary and ecological traits possessed by hammerhead sharks.



Gallagher, Austin J., Neil Hammerschlag, David S. Shiffman, and Sean T. Giery. "Evolved for extinction: the cost and conservation implications of specialization in hammerhead sharks." *BioScience* 64, no. 7 (2014): 619-624

Link to the paper: <http://rjd.miami.edu/wp-content/uploads/2014/06/BioScience-2014-Gallagher-biosci-biu071.pdf>

RESEARCH

An assessment of the scale, practices, and conservation implications of Florida's charterboat-based recreational shark fishery

Trying to assess the scale of Florida's charterboat **shark fishing industry**, researchers used a combination of website content analysis and charterboat captain surveys to examine the knowledge, attitudes, and practices of captains whose clients primarily target sharks in Florida waters. Often the most expensive trip option, it was found that sharks are economically important to the charter boat fishing industry, and that captains with a strong conservation ethic tend to practice catch-and-release fishing. While some species are better candidates for catch-and-release fishing due to biology and post-release mortality, researchers concluded that Florida's recreational shark fishery is very valuable and that it is economically important to have **healthy shark populations**. While SCUBA diving and 'ecotourism conservation' have often been touted as successful ways to utilize sharks in a nonconsumptive way, this study suggests that we may need to also think about catch-and-release fishing for future conservation efforts.

Shiffman, David Samuel, and Neil Hammerschlag. "An Assessment of the Scale, Practices, and Conservation Implications of Florida's Charter Boat-Based Recreational Shark Fishery." *Fisheries* 39, no. 9 (2014): 395-407.

Link to the paper: http://rsmas.miami.edu/assets/Shiffman_Hammerschlag_2014_Fisheries.pdf
Vimeo Link: <https://vimeo.com/92185745>



Additional 2014 Scientific Publications:

Physiological stress response, reflex impairment, and survival of five sympatric shark species following experimental capture and release

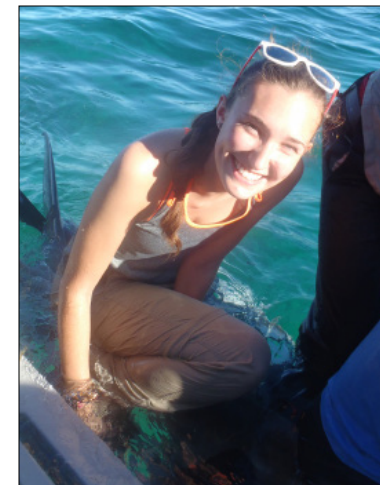
Gallagher, A. J., J. E. Serafy, S. J. Cooke, and N. Hammerschlag. "Physiological stress response, reflex impairment, and survival of five sympatric shark species following experimental capture and release." *Marine Ecology Progress Series* 496 (2014): 207-218.

Link to the paper: <http://rjd.miami.edu/wp-content/uploads/2014/01/Gallagher-et-al.-2014.pdf>

Considering the fate of electronic tags: user responsibility and interactions when encountering tagged marine animals

Hammerschlag, Neil, Steven J. Cooke, Austin J. Gallagher, and Brendan J. Godley. "Considering the fate of electronic tags: interactions with stakeholders and user responsibility when encountering tagged aquatic animals." *Methods in Ecology and Evolution* 5, no. 11 (2014): 1147-1153.

Link to the paper: https://rjd.miami.edu/wp-content/uploads/2014/09/Hammerschlag-et-al.-MEE_Fate-of-Tags.pdf



use the **ultrasound** to observe the ovaries of the sharks. While we have already found that this area of the Bahamas is used by pregnant tiger sharks, we also see immature and mature non-pregnant adults in the area as well. Our ultimate goal is to assess how effective ultrasonography is as well as to gain a stronger understanding of what these Tiger Beach shark populations are doing in terms of reproduction.

"The collaboration between RJD and the University of New England has allowed me to diversify my research interests and use my skills to answer new important questions. Working with the extremely dedicated RJD researchers has been a great experience that I will carry with me. The reproductive data collected on these trips will be instrumental to a better understanding of tiger shark biology and the Tiger Beach area." -**Carolyn Wheeler**

"During my time with RJD I have had the opportunity to experience multiple **tiger beach research expeditions**. These trips have had an immense impact on my research interests and success as a scientist. Spending time in the field with these incredible animals sparks an energy among the crew that is indescribable. We work together to take morphological measurements, draw blood, implant an acoustic transmitter, perform an ultrasound, and attach a satellite tag to the tiger shark in as little as 15 minutes. There is nothing quite like the adrenaline rush and surge of positivity that comes from successfully completing a work up. There is nothing quite like the anticipation that follows as we wait to see the data and what each shark will reveal to us over time."

-**Emily Nelson**



TIGER BEACH TRIPS

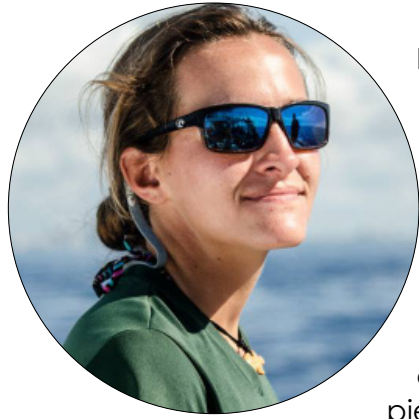
The collaboration between RJD and **Dr. James Sulikowski's lab** from the University of New England started in 2011 because of a mutual interest in determining areas that are possible pupping/and or gestation grounds for female tiger sharks. In the past, this type of data had been collected through dissections, but using non-invasive methods like ultrasonography, we can collect our data and still maintain the welfare of the sharks.

Using these non-invasive ultrasound methods, we can observe sharks' reproductive organs and developing embryos. Once pups are located in a pregnant female tiger shark, pictures can be taken for taking later measurements and documentation. We can also



INSIDE RJD

RJD Intern Daniela Escontrela



I have had the pleasure of being an intern for the RJ Dunlap Program for three years. I started interning my freshman year and never did I think that it would take me this far. Along the way I have had the opportunity to grow as an intern not only getting the chance to go on shark research trips but also getting to lead them, getting to teach intern training sessions and going to local schools to speak about what we do. In the process I have also had the ability to start working on my **senior thesis project** with some of the data that we have gathered. Along with the help of other interns, we were able to add another step to our shark work up process which allowed us to take a series of twelve morphological measurements. This new piece of data has opened up the doors to many new studies.

In my senior thesis I will be using some of these **morphological measurements** to study shark condition, or health. With a special formula we plug in some of these measurements, which include length and girth measurements. We get an index of health from this formula with low numbers starting at zero meaning the shark is unhealthy and upwards numbers being a sign of health. Due to the anthropogenic impacts our ocean faces daily, I am interested in finding out if sharks are healthier in some areas than others. More specifically, I want to find out if sharks are in better condition the farther away they are from large urban centers.



RJD PhD Student David Shiffman



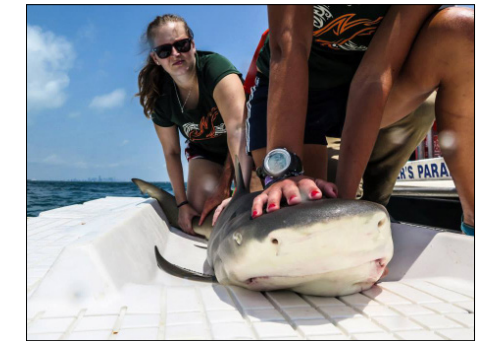
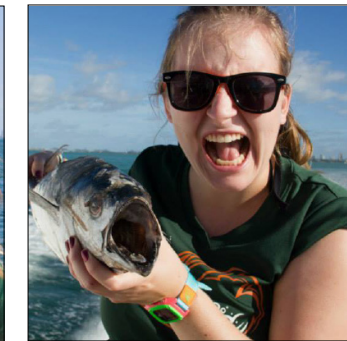
I am studying the **ecosystem role** that sharks play in coastal South Florida, as well as what different groups of stakeholders here think that ecosystem role is. Stakeholders I am studying include fishers/anglers, conservation activists, and scientists. Social media outreach and education is a large part of my research.

RJD Masters Student Jake Jerome



I am currently aiming to determine how sharks off the coast of Florida differ in **metabolic capacity** based on muscle enzyme activities. Metabolic enzyme activities associated with aerobic and anaerobic capacities can be used as an indicator for how different species of sharks are able to handle situations that may cause them added stress. Organisms rely on anaerobic glycolysis during times in which oxygen levels in their body do not meet their demands, an event that can occur during exercise. Lactate Dehydrogenase (LDH) is the terminal enzyme in anaerobic glycolysis and produces the harmful by-product lactate. By measuring how different species vary in terms of LDH activity, I hope to gain a better understanding of how these species are able to handle situations that require them to rely on anaerobic glycolysis. This research could help to add to our basic understanding of the variation in shark metabolic capacities and potentially aid in the **protection** of more sensitive species.

RJD Intern Dani Ferraro



Hi all,

With my last (hopefully not ever) tagging trip behind me, I just wanted to reach out to the four of you. Thank you, for the guidance, wisdom, and knowledge that you've passed along to me through this internship. RJD has easily been the defining point in my undergraduate career. Even though I was just involved this past year, it's taught me more than I could have ever imagined.

This team made all of the difference. You welcomed me in as a senior and still gave me every opportunity for a hands-on learning experience unparalleled by any other. It's been a pleasure and an honor working for this lab and this group of spectacular people. I can't begin to describe what I've learned, both in a professional and personal capacity, as a result of being part of this organization.

So thank you for everything. I can't wait to see what this lab does in the future.

Cheers,

Dani Ferraro

EDUCATION

RJD staff and interns work closely with local educators to give high school students a chance to experience scientific research in marine biology. These experiences both promote environmental stewardship and foster scientific career pathways. Additionally, face-to-face teaching builds relationships between high school and college students.



Student Field Trips

One of the core components of the RJD Program is providing experiential learning opportunities to young adults. RJD offers empowering and inspiring educational experiences to groups of high school students throughout the year. Classes take an active role in research projects, learn the scientific method, and assist in protecting some of the world's most threatened animals. Within the 2014 season, the team was able to embark on **71 research trips** bringing **over 1,100 people** on the water to participate in hands-on science.

Public Presentations

RJD scientists and educators gave over 20 public presentations in 2014 to **800+** audience members ranging from elementary school children to leading marine scientists and communicators. RJD research was presented at the American Elasmobranch Society Meeting, Society of Conservation Biology, the International Congress for Conservation Biology, Benthic Ecology, and the ScienceOnline Oceans Conference.



Undergraduate and Graduate Internships

The RJD Internship Program offers shark field research, data management, field photography, interactive media and conservation writing internships. Students are exposed to a variety of disciplines within marine conservation and given the opportunity to learn hands-on with experts. In 2014, RJD hosted 28 undergraduate and graduate interns.

As a student interested in science and nature, I was thrilled to be part of a marine science program for all four years of high school. But nothing compared to the experiences provided by Dr. Neil and his team at RSMAS doing real, hands-on field research. At the ripe old age of fourteen, I dove right into the heart of field ecology and wildlife conservation-- an experience that has stayed with me through my university education, and certainly will stay with me my whole life. Sharks are a charismatic icon of the ocean: a strong, powerful, and bold image in any and all media. But working with them face-to-face, that paradigm was totally shattered and replaced with reality; they are elusive, fragile, respectful, incredible creatures who need our help. My experience brought another realization to me-- that I could BE that help. The problems faced by our oceans and the life therein are no longer abstract concepts; they are real, accessible and understandable thanks to Dr. Neil's shark program, and inspire me to pursue my own path toward ecological field science."
- Tallulah Orcel, South Broward HS



"Things you wouldn't get inside a typical high school class are brought to our interest, in the most extraordinary way."
- Vilma Sooknanan, South Broward High School Student

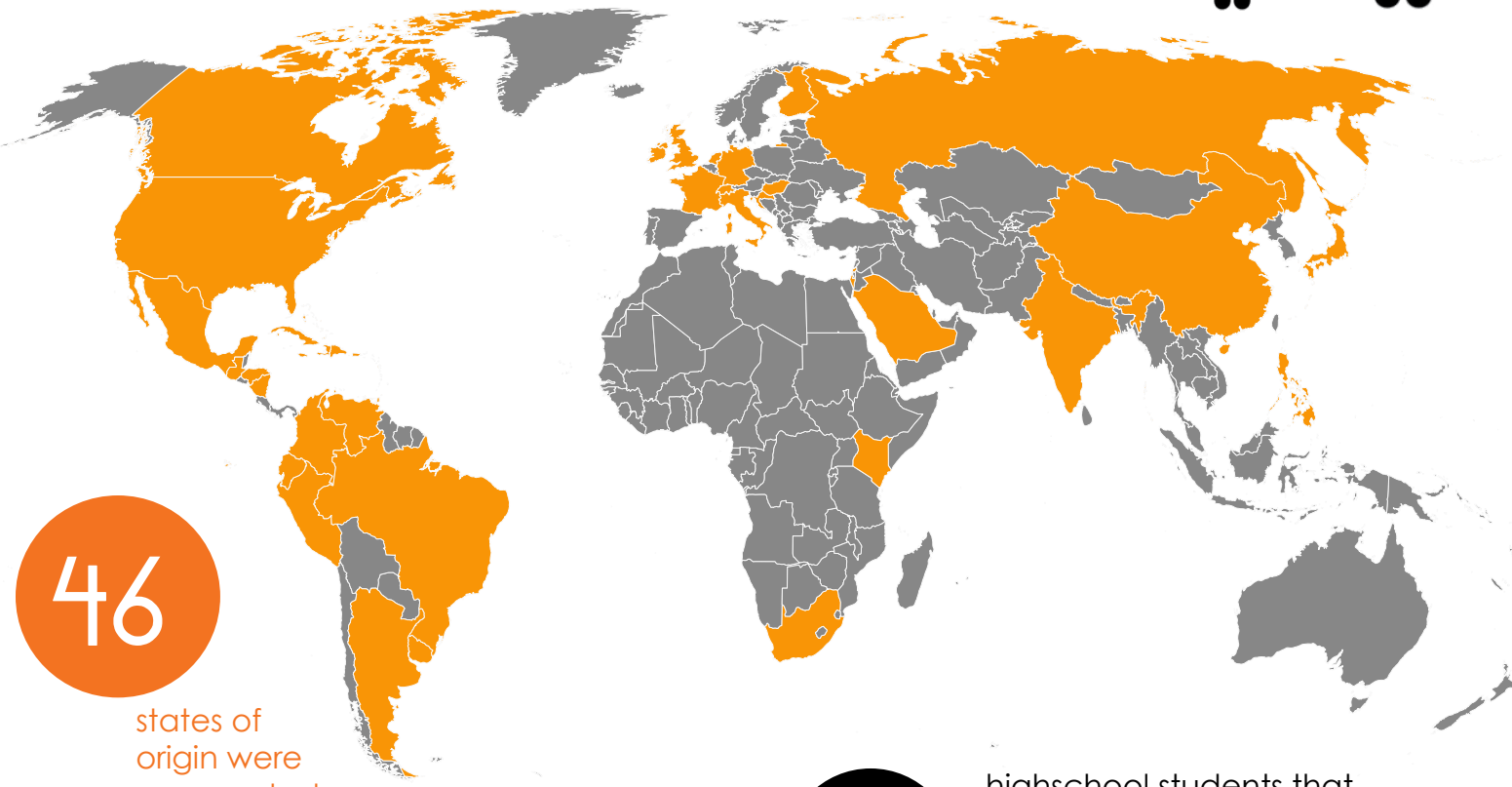
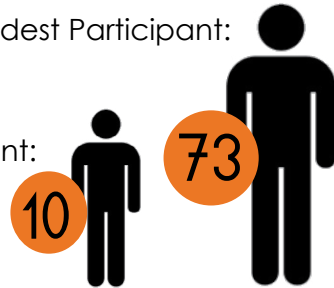
"Because the R.J. Dunlap Marine Conservation Program lies squarely in the intersection between science and policy, it will provide students across the University of Miami, and high school students, including those in underserved populations, with access to field experiences that will foster intellectual curiosity and help to position them as effective environmental leaders for the future."
- Donna Shalala, President, University of Miami

OUTREACH

2014 PARTICIPANT SUMMARY

Oldest Participant:

Youngest Participant:



564 highschool students that participated in RJD shark trips during the 2014 season

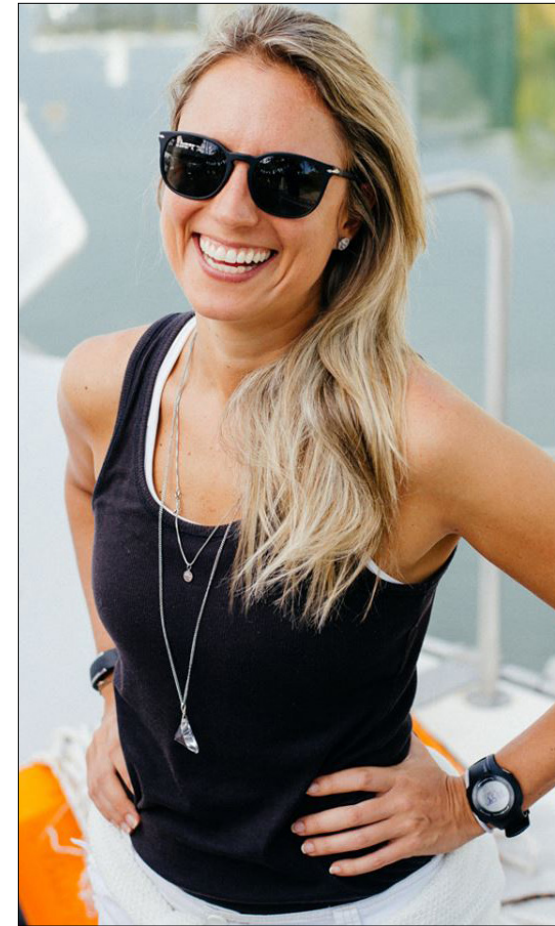
1257 individuals participated in RJD shark trips during the 2014 season.

40 countries of origin were represented.

Participant Follow-Up

“ Since I was in the shark tagging program for the first time, I felt like I wanted to do it over and over but unfortunately I live in Brazil and it's a little too far away. Everyone is incredible and I was able to learn so much about sharks. My dream came true, when I started to work in the volunteer program, where I have been able to help RJD with the research. This makes me feel so good and so alive. Every time on the boat is different, every shark is different and the knowledge never ends. I think the program is the best opportunity for people to change their minds about sharks and for them to learn to not be afraid of them anymore. When you see them arriving near the boat and when you see them on the boat, you realize what they are all about and start to admire them. I am so happy that we have this amazing program to take care of our sharks and protect them, Dr. Neil, Christian, Jake, Robbie, and the entire team work with their heart and soul and it is so easy to feel this.

-Maria Carolina, Citizen Scientist from Brazil



Q: How much have shark populations declined?

A: Multiple research methods have shown that some species of sharks have declined in population by 90% or more during the last several decades in areas where they were formerly abundant. For example, studies suggest that some hammerhead species in the northwest Atlantic have declined over 89% between 1986 and 2000. According to the IUCN Shark Specialist Group, 15% of all shark species and 1/3 of all open ocean shark species are Threatened, Endangered, or Critically Endangered.

OUTREACH

RJD hosts James Jones Legacy Foundation and underprivileged children from the homeless assistance center



In July, we proudly took former Miami Heat basketball player **James Jones** and dozens of underprivileged children through the **James Jones Legacy Foundation** out on the water for a day of science education. Working with the James Jones Legacy Foundation program 'Crew 22 Training Camp', the University of Miami Rosenstiel School hosted **75 children** from the homeless assistance center, Chapman Partnership, for a week long training camp filled with numerous **educational activities** and interactive experiences that included shark tagging, aviation skills & lessons at Experience Aviation, marine life animal interactions, conservation education classes and hands-on experiments at Miami Seaquarium.



UM Alumni Leadership Trips

University of Miami alumni leadership volunteers got the experience of a lifetime when they were treated to three separate shark tagging excursions off of Key Biscayne with RJD. The excursions allowed members to immerse themselves in UM research in a way that they would never forget. A total of **60 leaders**, including President's Council, Alumni Board of Directors and Alumni Council members, joined Dr. Neil and his talented crew at sea, tagging and releasing a grand total of 20 sharks, including a rare great hammerhead, over the course of three trips.

"The opportunity to be personally engaged with obtaining blood and tissue samples from sharks truly altered my appreciation of sharks and their critical role in maintaining our fragile salt water ecosystems. While I have always held RSMAS in high regard, the shark tagging experience with Dr. Hammerschlag clearly demonstrated the **importance** of the mission of **RSMAS** for our future," said UM Alumni Association Past President and current President's Council member Pat Barron, B.B.A. '75.



President's Council member Raul Cosio, B.S.E.E. '74, gives the bait a kiss for good luck, and it worked! The crew caught a total of 10 sharks in one excursion!



The RJD team and President's Council members enjoyed the day off Diver's Paradise on Saturday, February 21, 2014.

"Our day of shark tagging with the student team from RSMAS was as near perfect as a south Florida day can be. The sun shone on Biscayne Bay and the temperature was exactly right. Professor Hammerschlag set the format for the day, and then mostly enabled the students to describe the activities. Everyone participated in the tagging process, working directly with the students who were generous in explaining their responsibilities and academic interests. I returned from the experience once again filled with pride that our University is doing **outstanding and important** work in the field of marine and environmental science. It was a magical day!" said Linda Steckley, M.B.A. '87, Vice President, UM Alumni Association. This unique program allowed alumni a rare glimpse into the behind the scenes research and enabled them to see first-hand the great work being done by UM students.



Alumni Council member Dan Markarin, B.S.Ed. '86, M.S.Ed. '89, conducts a reflex test on the shark's eye with ocean water.



2014 Group Photos from Student & Citizen Science Field Trips



SUPPORT

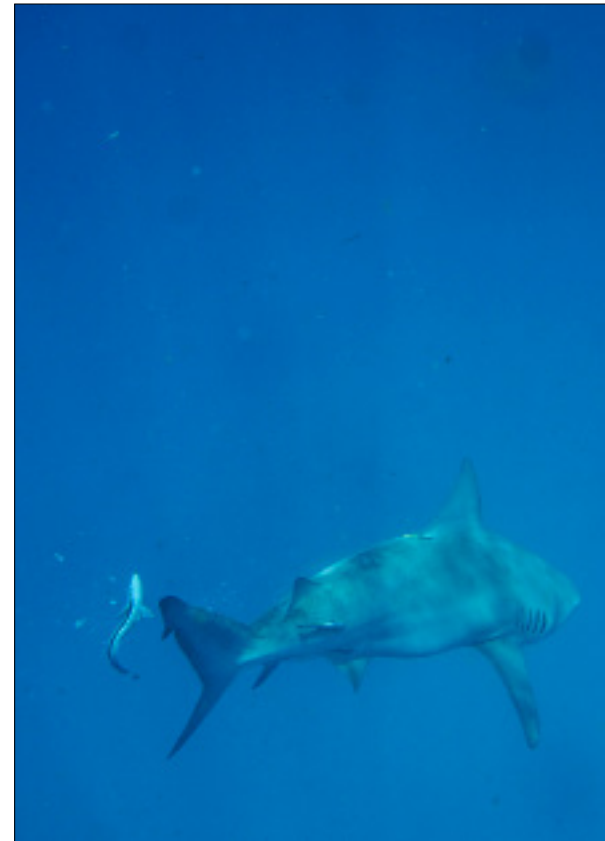


Donations

Established through a founding donation from the recently passed Marian Dunlap in honor of her late husband Richard James Dunlap, the RJD Program is largely supported through the generosity of its donors. Thanks to this support, we have been able to reach thousands of students and individuals to educate and inform them on the oceans and shark conservation. All support for this work is greatly appreciated.

Significant donations in 2014 were made by **individuals** such as: J Weber, W Roberts, J Lindenbaum, J Badger, G. Uffelman, D. Smith, P Lieto, D Thomson, K Wieden, & A Perni.

Significant donations in 2014 were made by **organizations, institutions** and **corporations** including: Batchelor Foundation Inc, Disney Conservation Fund, Guy Harvey Ocean Foundation, Wells Fargo Foundation, MaiTai, Rock the Ocean Foundation, Save Our Seas Foundation, Narragansett Brewing, Biodiversity Research Institute, International Sea Keepers Society, Jacoby Group, New Infinity Concept, The Global Asylum, The Heffner Fund, & Oceana.



Adopt a Shark

Researching these apex predators is neither easy nor cheap. So to ensure RJD's satellite tracking study of sharks continues, the program accepts donations in the amount of \$2,500, which covers the cost to purchase one **new satellite tag**. In return, donors are given the opportunity to name the adopted shark and **follow the shark's movements on our website** using an interactive Google Earth map. Classes and entire schools are also welcome to collectively adopt sharks. The University of Miami is a Florida not-for-profit corporation and all donations are tax deductible as appropriate by law.

New to the Online Store: **Citizen Science field shirts!**

ShopForSharks.com



ShopForSharks.com is a collaboration between designers, researchers, and the B1self clothing company to create an **online store of RJD-branded gear**. 20% of profits come back to support RJD. Our team of scientists and interns proudly wear the RJD field shirts during each trip!

To pledge your support for RJD, visit the "Donate" section of our website: **SharkTagging.com.**

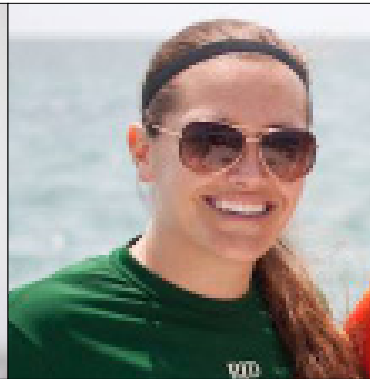


CREDITS

The 2014 RJD Annual Report has been a collaborative effort between these primary contributors:



Neil Hammerschlag



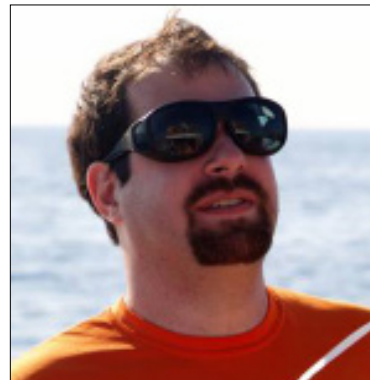
Lindsay Jennings



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Catherine Macdonald



David Shiffmann



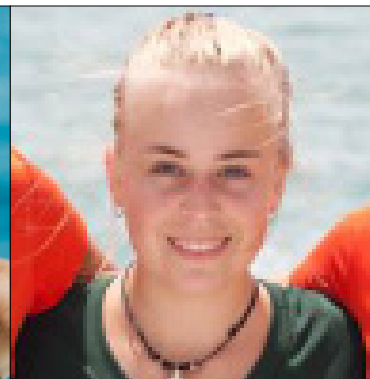
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RJD is a joint initiative of the following:

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ABESS CENTER
for ECOSYSTEM
SCIENCE & POLICY



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ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



Thank you to the dedicated team of RJD staff, students and volunteers!



TOGETHER, WE ARE

MAKING WAVES.



SharkTagging.com

This is a close up of nurse shark skin revealing their specialized 'tooth-like' scales, termed *dermal denticles*