



2016 Annual Report



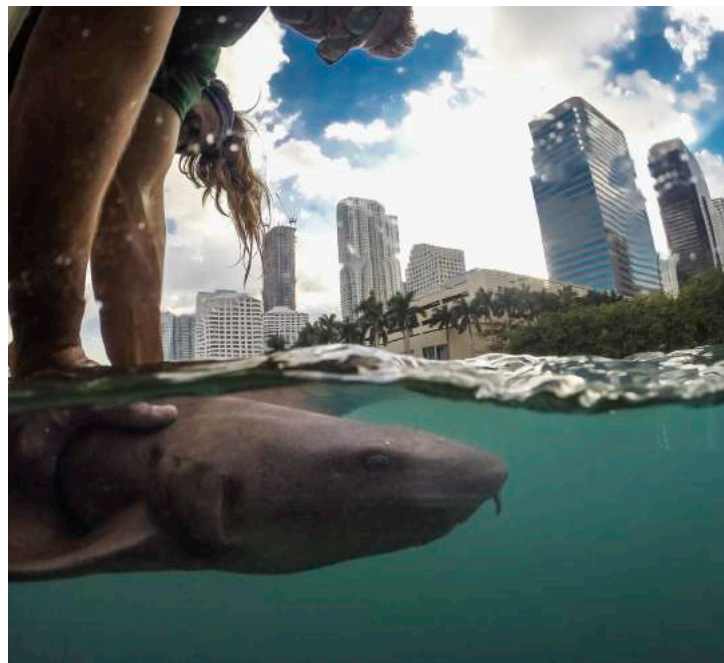
SHARK
RESEARCH & CONSERVATION

UNIVERSITY
OF MIAMI



TABLE OF CONTENTS

- 2 Letter from the Director
- 3 SRC's Mission
- 4 2016 Highlights
- 5 Where will you find SRC?
- 7 By the Numbers
- 9 Publications
- 11 Rescue a Reef
- 12 Satellite Tag Spotlight
- 13 SRC in the Media
- 14 Hook & Tackle Shark Swag
- 15 Sponsors
- 16 The Team
- 17 Group Photos



UNIVERSITY OF MIAMI
ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



UNIVERSITY OF MIAMI
ABESS CENTER
for ECOSYSTEM
SCIENCE & POLICY



SRC 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 (CESP) at the University of Miami.

Annual Report made with collaborative effort by Alex Anstett, Gammon Koval, Emily Nelson, Stephen Cain, and Neil Hammerschlag

“Repeatedly yesterday and today I heard from Maya words of gratitude and appreciation about this experience, seeing live sharks in the wild, and active science in the field”

- Citizen Scientist, from FINS

LETTER FROM THE DIRECTOR

Dear SRC Friends, Colleagues, and Supporters,

2016 was a busy and epic one for SRC. We conducted 80 days of shark surveys at sites across Miami, Palm Beach, Rhode Island and the Bahamas. A new record for the team, we sampled and tagged 358 sharks of 12 different species! Our research was published in 16 scientific papers on a variety of topics. We collaborated with UM's medical school on a project in which we discovered shark fins and meat contain high levels of neurotoxins linked with human development of Alzheimer's disease, suggesting consumers are at a health risk. Our research was widely covered in the media, including Discovery Channel, NPR, and National Geographic. We were also fortunate enough to once again participate in many community functions and festivals. Our students presented at numerous scientific conferences, including the American Elasmobranch Society annual meeting. In terms of public outreach, this past year we brought 1071 Citizen Scientists out on research vessels ranging in age from 8-70 with us to participate in our science and learn about local conservation issues. We graduated 3 Masters Students and 1 Ph.D. Student and launched our new program called F.I.N.S. (Females in the Natural Sciences) to provide girls with hands-on experience in marine science. These achievements could not have occurred without the dedication, passion and support of our students, interns, staff, collaborators, partners, institutions and generous donors.

We thank you!
Neil Hammerschlag, Ph.D.
Director, Shark Research
and Conservation Program



SRC'S MISSION

SRC at the University of Miami conducts cutting-edge research while fostering scientific literacy and environmental ethic in youth through unique public education and outreach



SRC is comprised of UM undergraduate, masters, and doctoral students. SRC would be nowhere without its hardworking team, dedicated to the research and conservation of sharks

"The shark tagging experience was fantastic... I got to touch a shark which was great and it was so fun meeting you all and seeing what you do."

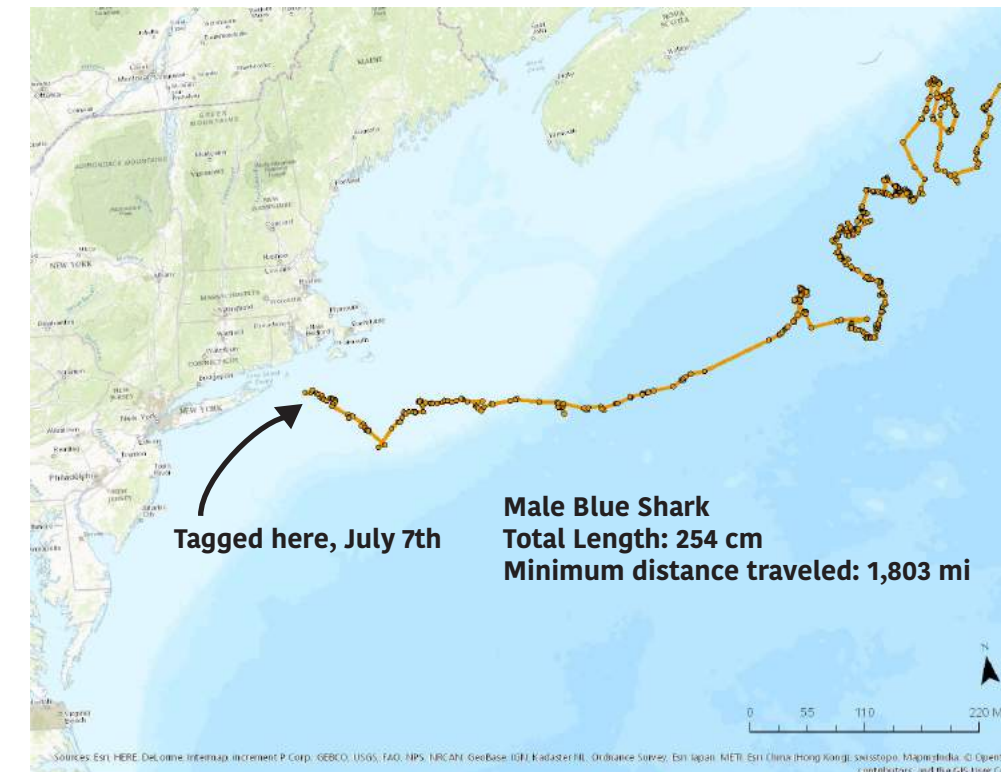
-Anju Sabu, Citizen Scientist from India

Since 2010, SRC has brought out thousands of people, mostly students, on our research vessels to gain hands-on experience in marine biology

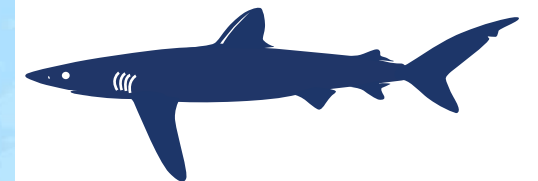


2016 HIGHLIGHTS

Rhode Island Blue Shark Tagging with Beneath the Waves



In June and July, SRC and Beneath the Waves satellite tagged 16 Blue sharks off the coast of Rhode Island. To the left is an image of a track from one of the tagged sharks.

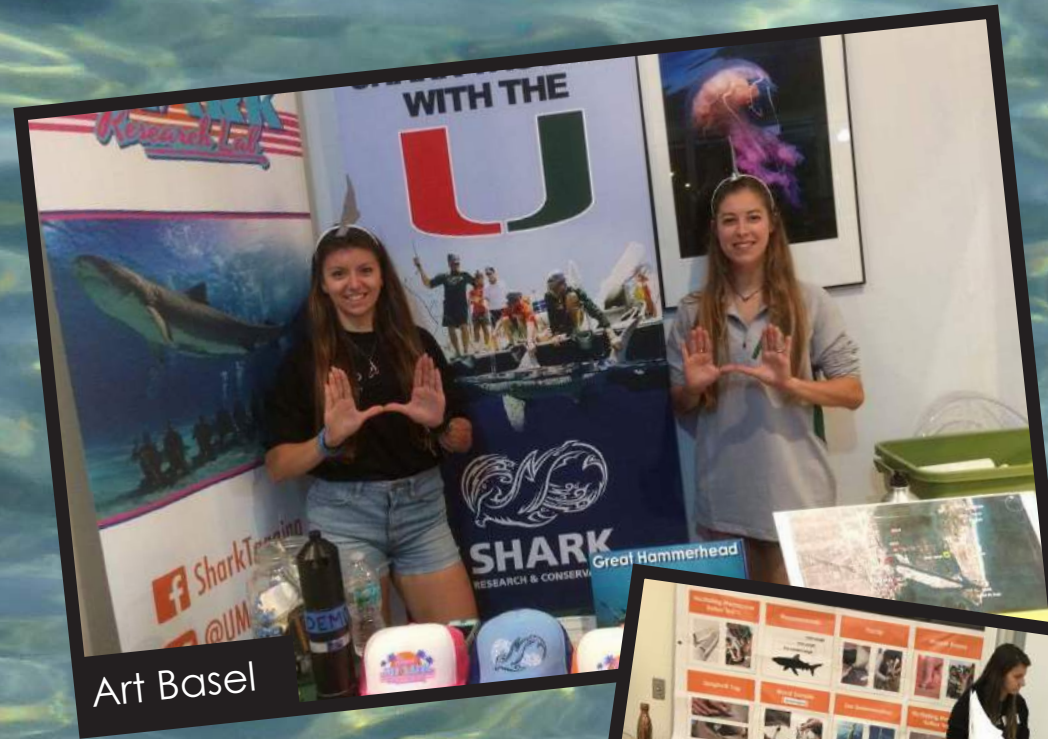


Females in Natural Science (FINS)

This year SRC also launched a new program for young women interested in the natural sciences. So far, we have embarked on three trips with FINS, interacting with 46 future female scientists, and giving them hands-on experience as shark researchers.



WHERE WILL YOU FIND SRC?



Art Basel



Riviera Day School



Taste of the Sea



KB Elementary School



Miami Science Barge



Tortuga Music Festival

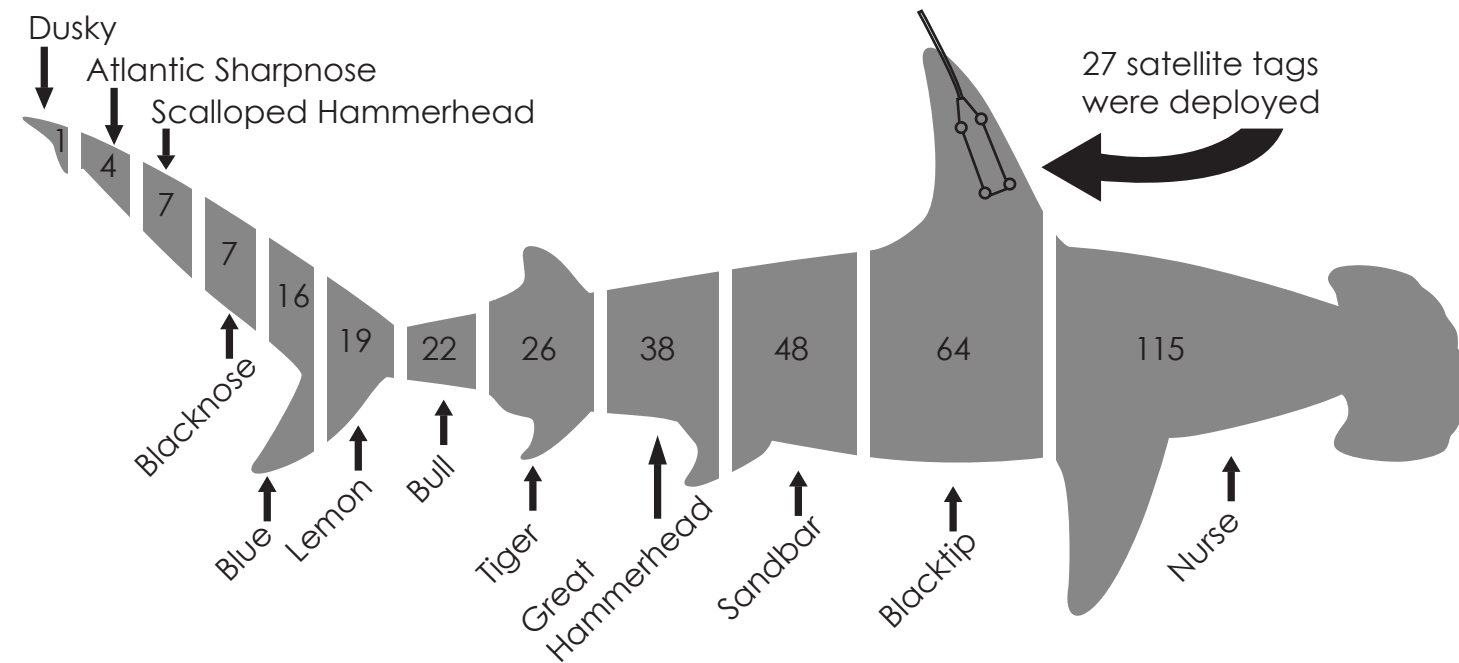
American Elasmobranch Society (AES)
This past year, SRC presented six talks at the AES annual meeting in New Orleans.

Jacksonville Zoo
SRC joined the Jacksonville Zoo for a day of spreading conservation awareness.

BY THE NUMBERS

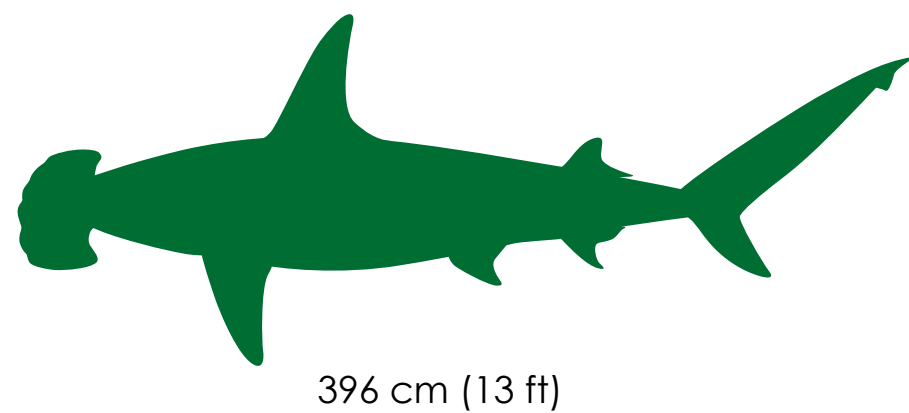
Sharks

This year we deployed a total of 2,138 drumlines over 87 research trips

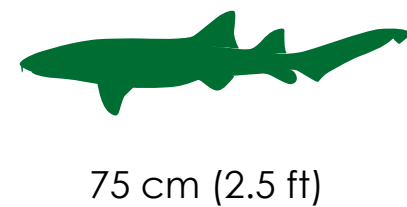


Grand Total: 367 sharks caught, tagged, and released

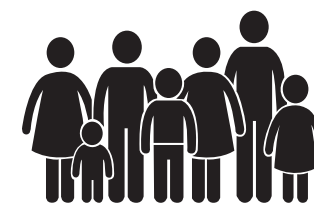
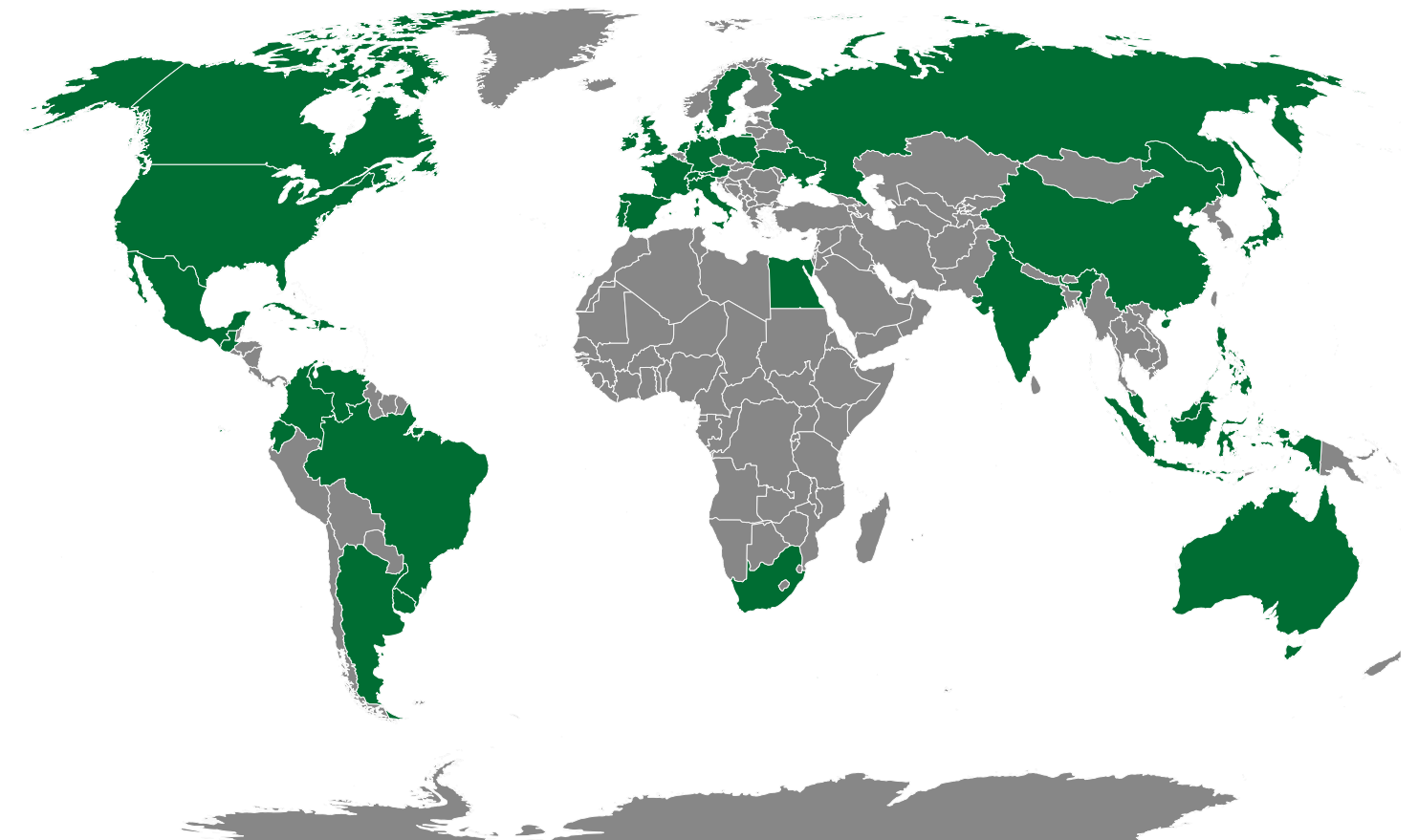
The largest shark tagged:
Great Hammerhead



The smallest shark tagged:
Nurse



Participants



1,071
Participants

Oldest Participant:

70



43
Countries

Youngest Participant:

8



42
States

PUBLICATIONS

Rangel BdS, Wosnick N, Hammerschlag N, Ciena AP, Kfoury Junior JR, Rici REG (2016). **A preliminary investigation into the morphology of oral papillae and denticles of blue sharks (*Prionace glauca*) with inferences about its functional significance across life stages.** Journal of Anatomy. doi: 10.1111/joa.12574

Hammerschlag N, Meyer C, Grace M, Kessel S, Sutton T, Harvey E, Paris C, Kerstetter D, Cooke SJ. (2016). **Shining a light on fish at night: an overview of patterns and processes operating in fish and fisheries at night and in the perpetual darkness of deep and polar seas.** Bulletin of Marine Science

Gallagher AJ, Hammerschlag N, Danylchuk AJ, Cooke SJ. (2016). **Shark recreational fisheries: Status, challenges, and research needs.** Ambio. doi:10.1007/s13280-016-0856-8

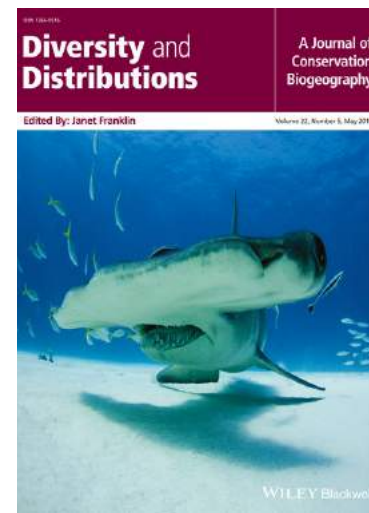
Gallagher AJ, Staaterman ER, Cooke SJ, Hammerschlag N. (2016). **Behavioral responses to fisheries capture among various shark species reveal mechanisms of species-specific sensitivity.** Canadian Journal of Fisheries and Aquatic Sciences, doi:10.1139/cjfas-2016-0165

Hammerschlag N, Skubel R, Calich H, Nelson ER, Shiffman DS, Wester J, Macdonald C, Cain S, Jennings L, Enchaeta A, Gallagher AJ. (2016). **Nocturnal and crepuscular behavior in elasmobranchs: a review of movement, habitat use, foraging, and reproduction in the dark.** Bulletin of Marine Science, doi: 10.5343/bms.2016.1046

Fallows C, Fallows M, Hammerschlag N. (2016). **Effects of lunar phase on predator-prey interactions between white shark (*Carcharodon carcharias*) and Cape fur seals (*Arctocephalus pusillus pusillus*).** Environmental Biology of Fishes; doi:10.1007/s10641-016-0515-8

Hammerschlag N, Davis DA, Mondo K, Seely MS, Murch SJ, Glover WB, Divoll T, Evers DC, Mash DC. (2016). **Cyanobacterial Neurotoxin BMAA and Mercury in Sharks.** Toxins 2016, 8, 238.

Hammerschlag N, Bell I, Fitzpatrick I, Gallagher AJ, Hawkes LA, Meekan MG, Stevens JD, Thums M, Witt MJ, Barnett A. (2016). **Behavioral evidence suggests facultative scavenging by a marine apex predator during a food pulse.** Behavioral Ecology and Sociobiology, doi:10.1007/s00265-016-2183-2



Roemer RP, Gallagher AJ, Hammerschlag N. (2016). **Shallow water tidal flat use and associated specialized foraging behavior of the great hammerhead shark (*Sphyrna mokarran*).** Marine and Freshwater Behaviour and Physiology, doi: 10.1080/10236244.2016.1168089

Cooke SJ, Nguyen VM, Wilson AD, Donaldson MR, Gallagher A, Hammerschlag N, Haddaway NR. (2016). **The need for speed in a crisis discipline: perspectives on peer review duration and implications for conservation science.** Endangered Species Research 30: 11-19

Shiffman, D.S. and Hammerschlag, N. (2016). **Shark Conservation and Management Policy: A Review and Primer for Non-Specialists.** Animal Conservation

Fu A, Lauder G, Wilga C, Kuo C, Hammerschlag N, Irschick DJ. (2016). **Ontogeny of head and caudal fin shape of an apex marine predator: the tiger shark (*Galeocerdo cuvier*).** Journal of Morphology.

Shiffman, DS and Hammerschlag, N. (2016). **Preferred conservation policies of shark researchers.** Conservation Biology.

Graham F, Rynne P, Estevanez M, Luo J, Ault JS, Hammerschlag N. (2016), **Use of marine protected areas and exclusive economic zones in the subtropical western North Atlantic Ocean by large highly mobile sharks.** Diversity and Distributions. doi:10.1111/ddi.12425

Queiroz N, Humphries N.E., Mucientes G., Hammerschlag N, Lima F.P, Scales K.L, Miller P.I., Sousa L.L., Seabra R., Sims D.W. (2016). **Ocean-wide tracking of pelagic sharks reveals extent of overlap with longline fishing hotspots.** Proceedings of the National Academy of Sciences; doi: 10.1073/pnas.1510090113

Sulikowski J, Wheeler CR, Gallagher AJ, Prohaska BK, Langan JA, Hammerschlag N. (2016). **Seasonal and life-stage variation in the reproductive ecology of a marine apex predator, the tiger shark *Galeocerdo cuvier*, at a protected female dominated site.** Aquatic Biology, 24: 175-184

We had a record 16 papers published this year, two of which were featured on covers, viewed to the left.



RESCUE A REEF

SRC is proud to support UM at Rescue a Reef, a citizen-science program dedicated to coral research and restoration in Miami. Here are some of their 2016 Highlights.

Rescue
a Reef

Our project is designed to support coral reef research and restoration activities to restore local staghorn coral (*Acropora cervicornis*) populations on Miami's coral reefs.

Our mission is to educate and engage the local community, increase scientific literacy in coastal and coral reef conservation, and foster ocean stewardship.

Follow Us!
www.rescueareef.com
[@rescueareef](https://www.instagram.com/rescueareef)

As of today, Recue a Reef has conducted **18 expeditions**

With the help of **199 citizen scientists**

7 sites

on local reefs

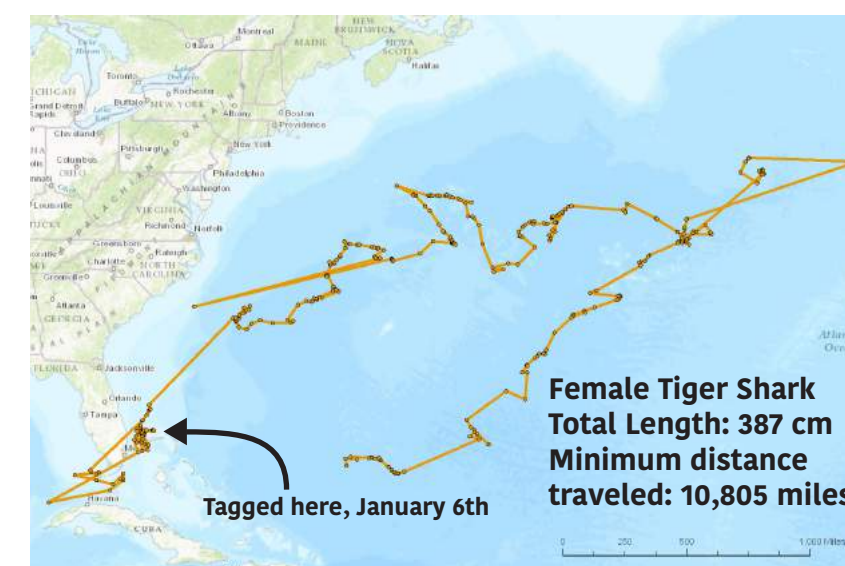
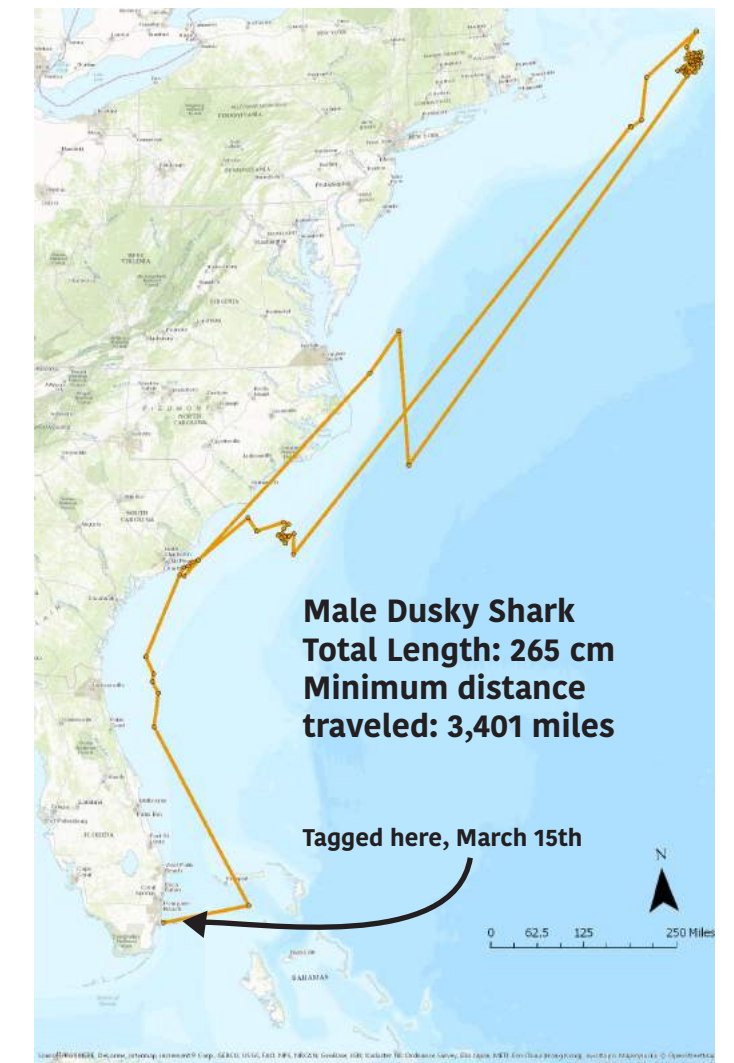
1,257 coral outplants and

377 meters of

Staghorn Coral

©TATUM NUGENT

SATELLITE TAG TRACKS



Three examples
of satellite
tagged sharks

SRC IN THE MEDIA

1.37 billion people reached

Interview with NPR

"One of the really neat things about sharks is, even within a species, to see how much individual differences there are in personality... You can identify the individual just based on the way they're moving in the water and the way they approach you..."

-Neil Hammerschlag, SRC Director

TV Highlights

Xploration Awesome Planet with Philippe Cousteau Jr.



NBC's Today Show



Also:

Discovery Channel Shark Week Tiger Beach

National Geographic Shark Fest Mega Hammerheads

Discovery Canada with Duncan Irschick



HOOK & TACKLE SHARK SWAG

This year, SRC collaborated with Hook & Tackle Outfitters to recreate field shirts. In addition to the team wearing these new shirts on tagging expeditions, they are also available for anyone to purchase through the Hook & Tackle website.



Visit <https://hookandtackle.com/collections/collegiate-men> to get yours!



SPONSORS

2016 Primary Contributors:

- UM Leonard and Jayne Abess Center for Ecosystem Science and Policy
- The Batchelor Foundation
- Hook & Tackle
- Jay Goldman
- Daniel Smith
- Donate Well
- AIG
- Oceana
- 360 Destinations Group
- The Rosenberg Family
- International SeaKeepers Society
- Alma Jennings Foundation
- Rock the Ocean Foundation
- TD Charitable Foundation
- Herbert W. Hoover Foundation
- William J. Gallwey, III
- Canon USA
- Give Back Brands Foundation
- Disney Conservation Fund
- Leonard and Jayne Abess
- UM Rosenstiel School of Marine & Atmospheric Science
- Save Our Seas Foundation
- Heffner Fund
- **All generous individuals and groups who have adopted a shark**

Photographs by:

Alex Anstett
 Gammon Koval
 Nicole Lin
 Josh Liberman
 Frank Gibson
 Neil Hammerschlag

Supported and printed:



THE TEAM



Congratulations to SRC graduates

David Shiffman



Hannah Calich



Alison Enchelmaier



Jake Jerome



SRC Awardees

Rachel Skubel - National Science and Engineering Research Council Post-Graduate Scholarship - Doctoral (NSERC PGS-D) Award & UM fellowship

Robbie Roemer - International Federation of Fly Fishermen Conservation Grant Recipient & Florida Outdoor Writers Association Graduate Scholarship Recipient

Stephen Cain - M.P.S. Award for Ocean Excellence and Stewardship

Thanks to all the students and citizen scientists who joined us!



2016 GROUP PHOTOS



SHARK

RESEARCH & CONSERVATION

