



2018

ANNUAL
REPORT



BENEATH THE WAVES

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OVERVIEW

Beneath the Waves is devoted to using science to help protect large areas of the ocean. Due to their highly migratory nature, wide appeal, and ecological importance, Beneath the Waves believes sharks offer one of the greatest opportunities to generate the evidence needed to protect 30% of our oceans by 2030.



OUR MISSION & VISION

MISSION

Beneath the Waves is dedicated to advancing the conservation of sharks and the habitats they occupy through cutting-edge scientific research.

VISION

An expanded network of marine protected areas covering 30% of the ocean by 2030, where sharks and other threatened marine species can thrive.



FROM THE CEO

There were several moments in 2018 when I took a moment to pause with great appreciation for what was happening in front of me. Whether it was watching our graduate students engage with local stakeholders in New England, or seeing the reaction of Bahamian students when they touched a shark for the first time, these moments were truly special and underscored the value of what we are trying to accomplish with Beneath the Waves.

In 2018 we invested a significant amount of time and resources into growing our existing research programs. As a result, we had the most productive, engaged, and exciting year yet. Across our programs, we spent a total of 143 days doing research on the water. This resulted in an incredible amount of data collected for 10 studies across our major programs. This information is advancing scientific discovery in our oceans. In terms of scientific outputs, we remain highly productive as a regular and impactful contributor to the marine science and conservation literature, highlighted by our record number of publications.

We also built capacity by mentoring and supporting dozens of graduate, undergraduate, and high-school level students who are interested in careers in the sciences.

I am particularly proud of the fact that our work is catalyzing ocean policy by informing real-world conservation planning and decision-making. This applied element of our work is something that is important to our team and our supporters, and I expect to see much more of this moving forward.

We are deeply grateful to our donors, supporters, and advisors for their dedication and belief in our mission and vision. I firmly believe that the work we are doing is having a measurable impact on our oceans.

Sincerely,

Austin Gallagher, PhD
CEO & CHIEF SCIENTIST

BOARD & STAFF

BOARD OF DIRECTORS

- Austin Gallagher, PhD
- Rosemary Mann
- Malik Adunni
- Erica Staaterman, PhD
- Steve Feron
- Jeffrey Pankey

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- Brendan Shea, MSc, MANAGER OF FIELD OPERATIONS
- Oliver Shipley, RESEARCH ASSISTANT
- Christine de Silva, RESEARCH ASSISTANT
- Connor Benson, RESEARCH ASSISTANT
- Sydney Coulter, RESEARCH ASSISTANT
- Kelly Dooling, RESEARCH ASSISTANT
- Cindy Gonzalez, RESEARCH ASSISTANT
- Hana Ishihara, RESEARCH ASSISTANT
- Lindsay Phenix, RESEARCH ASSISTANT
- Jessica Roth, RESEARCH ASSISTANT

OPERATIONS

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- Enrique Quintero, MARINE TECHNICIAN

COMMUNICATIONS

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- Jamie Fitzgerald, MEDIA & COMMUNICATIONS MANAGER
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/ OCEANSCAPES PHOTOGRAPHY
- Jason Halvorsen, M/Y MARCATO
- Andi Cross, MARKETING CONSULTANT
- Tony Gilbert, INTERNATIONAL SEAKEEPERS SOCIETY

ACTIVE RESEARCH PARTNERS & COLLABORATORS

- Andrew Altieri, PhD, UNIVERSITY OF FLORIDA
- Judith Bakker, PhD, UNIVERSITY OF SALFORD
- Adam Barnett, PhD, JAMES COOK UNIVERSITY
- Ashwin Bhandiwad, PhD, RESEARCH SCIENTIST
- Camrin Braun, PhD, UNIVERSITY OF WASHINGTON
- Mark Bond, PhD, FLORIDA INTERNATIONAL UNIVERSITY
- Edd Brooks, PhD, CAPE ELEUTHERA INSTITUTE
THE ISLAND SCHOOL
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- Tristan Guttridge, PhD, BIMINI BIOLOGICAL FIELD STATION
- Neil Hammerschlag, PhD, UNIVERSITY OF MIAMI
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- Stefano Mariani, UNIVERSITY OF SALFORD
- Lauren Meyer, PhD, FLINDERS UNIVERSITY
- Matt Ogburn, PhD, SMITHSONIAN
- Nick Payne, PhD, TRINITY COLLEGE IN DUBLIN
- Yannis Papastamatiou, PhD, FLORIDA INTERNATIONAL UNIVERSITY
- Heidi Pethybridge, PhD, CSIRO
- Brennan Phillips, PhD, UNIVERSITY OF RHODE ISLAND
- Joe Romeiro, ATLANTIC SHARK INSTITUTE
- Jodie Rummer, PhD, JAMES COOK UNIVERSITY
- David Sims, UNIVERSITY OF SOUTHAMPTON
- Rachel Skubel, UNIVERSITY OF MIAMI
- James Sulikowski, PhD, UNIVERSITY OF NEW ENGLAND
- Peter Trull, WILD CAPE COD
- Alex Wilson, PhD, UNIVERSITY OF NEWCASTLE

OUR IMPACT

We measure our impact on the oceans in a variety of ways – from our success in the field, to our outputs, and our ability to educate and raise awareness.

This year, we accomplished the following:

CATALYZED OCEAN POLICY

Assessment of and conservation action for threatened species: Creation of policy-documents synthesizing new data for the 2019 proposals for oceanic sharks to be listed on the Convention of International Trade of Endangered Species (CITES). CITES is a multilateral treaty to conserve endangered flora and fauna through the improved reporting of trade of products made from endangered species (e.g., shark fin).

New protected areas: Identification of 3 critical biological hotspots within the Bahamas Exclusive Economic Zone to be considered as marine reserves under the country's commitment to protecting 20% of its waters by 2020.

First long-term study of shark sanctuaries: Working with a diverse team of collaborators, in 2018 we launched the world's first ever study of how large-scale marine protected areas may benefit sharks. We also established acoustic monitoring systems off two primary islands, Nassau and Great Exuma.

INCREASED GLOBAL AWARENESS THROUGH EDUCATION

Earned Media: Online press from partnerships and news stories have garnered over 240 million impressions in 2018

Social media: Highly active presence on Instagram and Facebook, reaching over 30,000 unique followers daily with news stories, conservation, and engaging media. Our in-house produced content has generated over 100,000 views.

Speaking: Members of our team have delivered 13 presentations and keynote lectures to universities and groups around the world, including an invited keynote in Hong Kong at the Royal Geographical Society in 2018.

Film and TV shoots: Featured on the leading show on Discovery Channel's Shark Week in 2018 (Shaq, over 5 million viewers).



4
BIODIVERSITY HOTSPOTS
IDENTIFIED FOR PROTECTION



43
COLLABORATING SCIENTISTS
& POLICY MAKERS



9
RESEARCH
EXPEDITIONS



154
SHARKS SAFELY
TAGGED & RELEASED



10
PUBLISHED PAPERS
IN SCIENTIFIC JOURNALS



2
SPECIES OF SHARKS'
GLOBAL CONSERVATION PROGRAMS



600,000
SQUARE MILES OF
PROTECTED AREA STUDIED

PROGRAM FOCUS: SHARK SANCTUARIES

The Shark Sanctuary Initiative aims to provide the world's first-ever scientific evaluation of the benefits and conservation value of protecting sharks in large-scale protected areas. In the last decade, shark sanctuaries have been adopted by over a dozen countries that are interested in protecting sharks in their national waters. These marine parks prohibit the fishing and harvest of sharks year round; however, their efficacy has not been adequately tested. Understanding how sharks use such sanctuaries throughout the year could catalyze other countries into adopting similar strategies.

To address this research gap, this year we conducted three successful long-range expeditions in the Bahamas Shark Sanctuary. We were able to tag and release a total of 62 sharks from seven species across two islands in the Bahamas (New Providence and Great Exuma). A subset of 32 sharks were implanted with 10-year acoustic transmitters which will provide data on their residency and connectivity throughout the Bahamas, as they are recorded by acoustic receivers. Our array of acoustic receivers spans New Providence Island and part of the Exumas Island chain. Over 200 tissue samples were also collected from these sharks, which will be analyzed to shed light on their health status, dietary preferences, and genetic relatedness. This is a multi-year program that will continue to shed light on the importance of marine protected areas for sharks.





Pictured here is Mabel, an 11-foot female tiger shark that lives off of New Providence Island. We first tagged her in February 2018 with the Maverick group.

In May, we returned to the same site at New Providence on the M/Y Marcato, and the very first shark that we tagged was Mabel! She was looking strong and healthy, with the satellite tag still in place. She was also detected on acoustic receivers in that area throughout the spring. Clearly Mabel is a homebody, spending a lot of time around New Providence, which highlights the need for year-round protection of sharks in this area.

PROGRAM FOCUS:

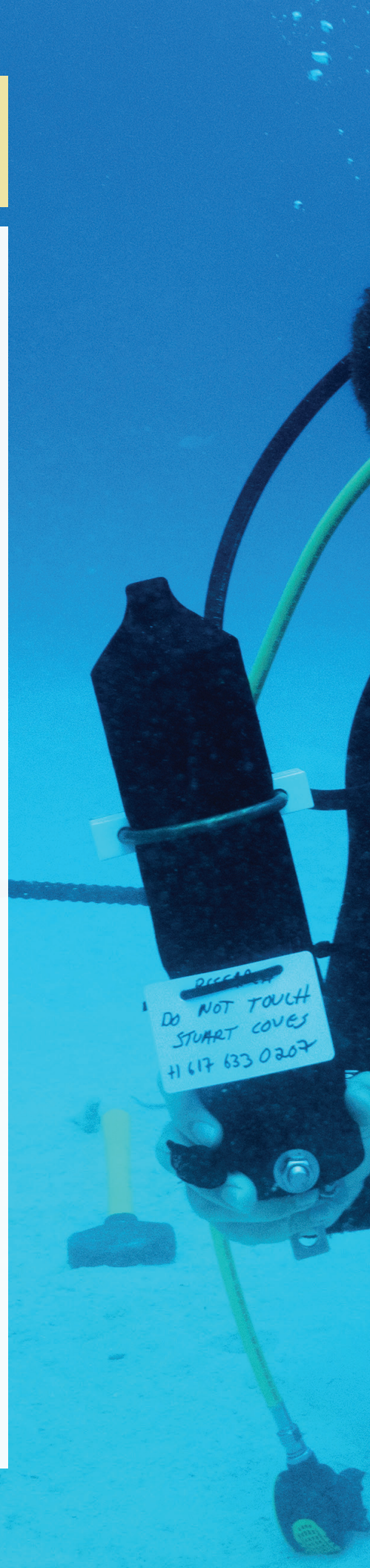
SHARK SANCTUARIES (CONT'D)

FINDINGS SO FAR:

Obtaining the scientific data needed to advance our work in the Bahamas is a challenging endeavor. First, finding, safely capturing, and surgically implanting tags into sharks can be logistically difficult and time-intensive. Second, we must install and later recover data from the acoustic receivers which are anchored to the seafloor. In November 2018, working with International Seakeepers Society, Fleet Miami, and Shedd Aquarium, we successfully recovered our first collection of shark detections from the waters near Nassau. Throughout the course of a day, we traversed the island using GPS waypoints to locate the receivers, at which point our SCUBA team dives to recover the instruments.

Opening up the instruments and downloading the data is always an exciting moment for the team. Our first download from the array revealed exciting and surprising results on shark behavior in the sanctuary. Preliminary findings suggest that tiger sharks are highly residential to New Providence Island throughout the year, whereas Caribbean reef sharks appear to be highly seasonal, with peaks appearing in the late fall. There also seems to be a high degree of individual variation in behavior. For example, one Caribbean reef shark was detected 32,000 times at a single site over the course of 5 months!

A special thanks to our foundational partners in this program: International Seakeepers Association, Maverick 1000, Grand Isle Resort and Villas, The Exumas Foundation, and Stuart Cove's Dive Center.





Our team recovering acoustic receivers from the seafloor in the Bahamas. These monitoring devices listen continuously for the nearly 100 sharks that are implanted with acoustic pingers. When a shark swims near one of the receivers, its detection is logged, and we can better understand their residency and activity over time.

DISCOVERY FOCUS: DEEP SEA SHARKS

A first-ever for ocean science and deep sea exploration:

Almost nothing is known about the deep sea. In May 2018 we begun a pilot study to develop rapid, low-cost, high-efficiency tools for discovering deep-sea hotspots. Working with ocean engineer and deep-sea imaging expert Dr. Brennan Phillips from the University of Rhode Island, we were able to build and deploy deep-sea drop cameras in the Tongue of the Ocean, at our study sites off Nassau, Bahamas.

The deep-sea camera rig feature consists of a vertically oriented, carbon-fiber frame with pressure-tolerant flotation and an acoustic weight-release system (see picture below). Two GoPro cameras are attached and housed within deepwater housings that allow recordings of 4K video and stills at depths up to 1000m (3300 feet). A small amount of bait is used to attract animals in for behavioral observations. After recording for a period of 5-7 hours, we use an acoustic release to signal its return to the surface, and we locate the rig with a handheld GPS. The entire rig fits inside a pelican case!

On one drop, we were lucky enough to record an extremely rare and little-known species of shark, the sharpnose sevengill shark (see *photos at right*). The species was seen at 718 meters depth (~2400 feet), in water temperatures of 9° C (48° F), allowing for visual analysis of behavior in its natural environment. These were the first ever video recordings of a live specimen of this



species! Our team and followers have been incredibly inspired by discoveries like this, underscoring the need to conduct further explorations of deep-water shark diversity and distribution in the Caribbean. This pilot project was eventually published in the scientific literature to advance scientific discovery, but most importantly it catalyzed an ongoing expansion of our work in the deep.





DISCOVERY FOCUS: NORTH ATLANTIC

The waters off New England are some of the most abundant and economically-important in North America. Our work in the Atlantic Ocean is driven by the need to understand how its food webs are connected and the role that top predators play in them. This information will help fishery scientists better manage overfished and recovering populations.

2018 was our second season conducting basic and applied research off Cape Cod Massachusetts, USA. Powered by our ambitious Northeastern University graduate students and Thayer Academy high-school students, we completed projects evaluating the influence of great white sharks on the behavior and physiology of mobile fish species. Inferring the ecological significance of great white sharks is critical given their recent population recovery in the northwest Atlantic.

FINDINGS SO FAR:

Using baited remove underwater videos (BRUVs), we found that exposure to white sharks significantly decreased the abundance and shifted the behavior of a number of fish species. This means that the mere presence of white sharks can actually scare potential prey items and change their distribution. Interestingly, feeding rates of smooth dogfish (a potential prey item of great white sharks) were significantly suppressed in areas of high white shark exposure. This study has yielded important new insights into the ecological interactions of white sharks with other members of the food web, which will refine our understanding of predator-prey interactions in these dynamic areas.

Special thanks to our partners: Northeastern University, Thayer Academy, Pleasant Bay Community Boating, Hindsight Sport Fishing, Goose Hummock Pro Shop, and the DeSilva Family.



RESEARCH FOCUS

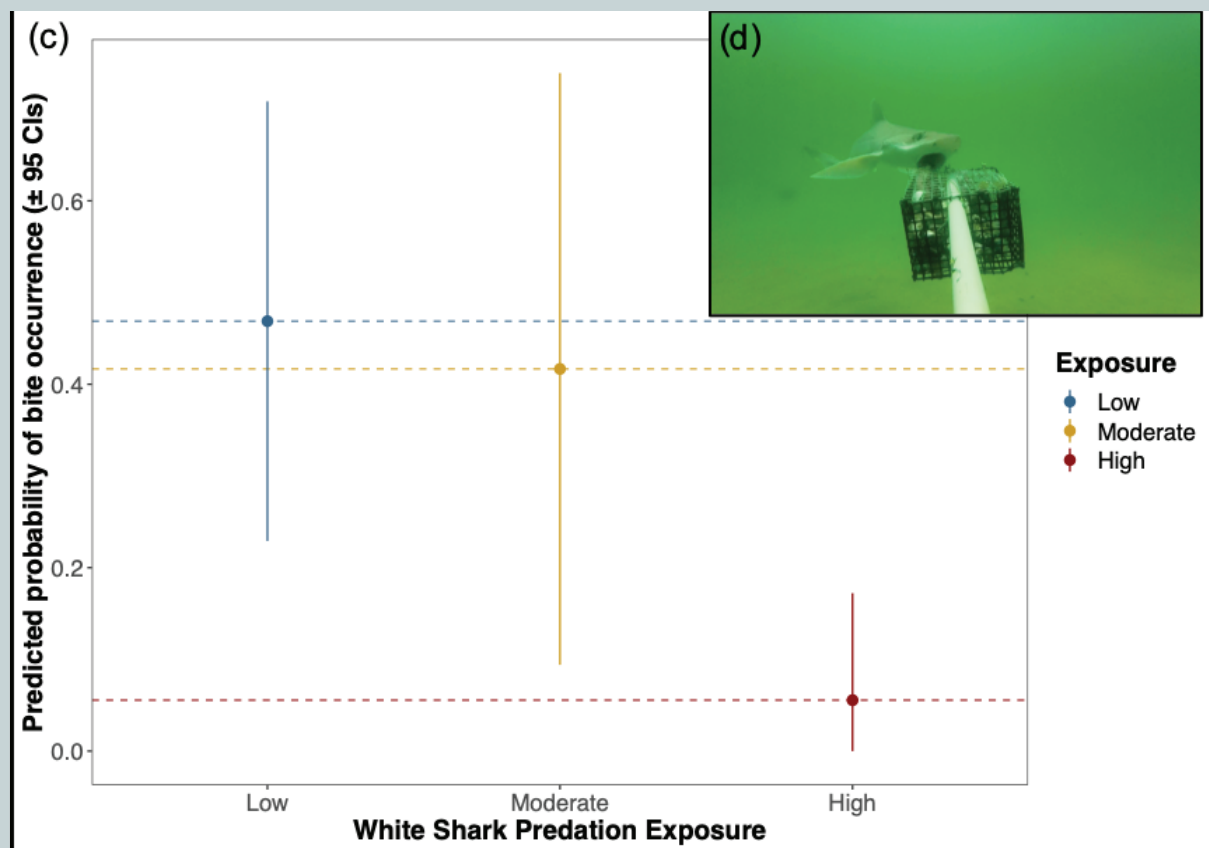


ABOVE: A juvenile white shark passes by our camera system





RIGHT: Dogfish foraging on camera was significantly suppressed in areas where white sharks are present, suggesting white sharks may scare prey and control food webs in ways beyond simply eating large marine mammals like seals.



PERSONNEL SPOTLIGHTS:



JASON HALVORSEN

Where does your passion for the ocean come from?

Growing up in South Florida I have always been around the water. While attending high school I signed up for a dual enrollment program with a technical college. I would attend morning classes at a high school, then drive to the technical school to take marine mechanics classes in the afternoon. During this time, I earned an after school and summer job as a deckhand on a local tour boat that gave me time to learn from captains, on the water. When I graduated high school in 2000, I had already received my first captain's license and had a marine mechanics degree.

In my career, I have captained commercial dinner boats, owned a small yacht management company, captained tow boats specializing in large yacht towing in South Florida, been a salvage master, and have run yachts of all sizes up to my present position as Captain on the 43 meter M/Y Marcato.

How can we inspire people to become global ambassadors for oceans?

I strongly feel that the yachting community, especially its crew, are becoming more aware of our environmental impact. My partnership with Beneath The Waves has allowed me, my crew and guests the unique opportunity to have a hands on approach to the science that will hopefully help lead to future discoveries and the protection of sharks worldwide.





KRISTIN HETTERMANN

Where does your passion for the ocean come from?

I have always felt most at home when I am close to the sea. As a child, I remember walking beaches scouring for sand dollars on the beaches of North Carolina, and collecting crabs in the salty rock inlets of Cape Cod. Transitioning into a high achieving environment in the suburbs of Washington, DC, there was not a lot of extra time to just play in nature. My brief desire to become an oceanographer was forgotten as soon as I realized how much I was challenged by chemistry and physics.

But as a young adult, I found myself again called to the sea, making decisions to relocate my life to the coastlines of the lowcountry of Charleston, SC and then to Maui, Hawaii. It was on these coastlines,

camera always in tow, that the artist in me retreated in a therapeutic effort to find peace, balance, and understanding of nature and the world around me. In Hawaii I began to explore more of the beautiful undersea world and saltwater began to run through my veins. I met my fiancé, Sven Lindblad, in 2015 and he invited me to get my scuba diving certification. The rest is history. We have spent the past four years traveling and documenting the world's oceans, and in the process my activism platform for ocean conservation, **OCEANSCAPES**, was born.

How can we inspire people to become global ambassadors for oceans?

I think that the more people feel connected to the ocean, the more they will care about the ocean. With the human species living and breathing “above sea level” it’s understandable that there would be a disconnect. However, indigenous cultures and long-standing spiritual revelations have recognized the connection and importance of blue to green, and humans have long revered the ocean for the inherent power it holds. But modern society - as it’s developed through the industrial revolution and into the age of technology - I believe has inspired a separation between man and nature.

But at that same time, we have an unprecedented opportunity to work with technology to understand the ocean. As we have begun to develop the undersea technology and capability to explore more, mainly in the past 70 years, we have learned so much. There’s nothing that better supports understanding than experience. When you are able to witness something, or witness something through someone else’s eyes, I think this opens up a path of feeling and empathy.

My tagline is “feel the ocean,” and in today’s world, the more we can feel the pain the ocean is experiencing through our misunderstanding and disregard for the connection of all of our natural systems, the more people will naturally be inspired to act.

SCIENTIFIC PUBLICATIONS

- Phillips BT, Shipley ON, Halvorsen J, Sternlicht JK, Gallagher AJ. (2018) First in situ observations of the sharpnose sevengill shark (*Heptranchias perlo*), from the Tongue of the Ocean, Bahamas. *Journal of the Ocean Science Foundation* 32:17-32.
- Gallagher AJ, Klimley AP. (2018) The biology and conservation status of the large hammerhead shark complex: the great, scalloped, and smooth hammerheads. *Reviews in Fish Biology and Fisheries* 29:777-794.
- Gallagher AJ, Huveneers C. (2018). Emerging challenges in shark-diving tourism. *Marine Policy* 96:9-12.
- Trull, PF, Finnegan, S, Gallagher AJ. (2018) A new method for capturing Wilson's Storm Petrels (*Oceanites oceanicus*) at sea. *Marine Ornithology* 46:125-127.
- Lennox RJ, Gallagher AJ, Ritchie EG, Cooke SJ. (2018) Evaluating the efficacy of predator removal in a conflict-prone world. *Biological Conservation* 224:277-289.
- Gallagher AJ, Papastamatiou YP, Barnett A. (2018) Apex predatory sharks and crocodiles simultaneously scavenge a whale carcass. *Journal of Ethology* 36:205-209.
- Hammerschlag N, Skubel RA, Irschick DJ, Sulikowski J, Gallagher AJ (2018) A comparison of reproductive and energetic states in a marine apex predator (the tiger shark, *Galeocerdo cuvier*). *Physiological and Biochemical Zoology* 91:933-942.
- Staatterman ER, Brandl SJ, Hauer M, Casey JM, Gallagher AJ, Rice AN (2018) Individual Voices in a Cluttered Soundscape: Acoustic Ecology of the Bocon Toadfish, *Amphichthys cryptocentrus*. *Environmental Biology of Fishes* 101: 979-995.
- Maxwell MJ, Zolderdo AJ, de Bruijn R, Brownscombe JW, Staatterman ER, Gallagher AJ, Cooke SJ. (2018) Does motor noise from recreational boats alter stage-specific parental care behaviour of a nesting freshwater fish? *Aquatic Conservation* 28:969-978.
- Lawrence MJ, Schlaepfer SJ, Zolderdo AJ, Algera DA, Gilmour KA, Gallagher AJ, Cooke SJ. (2018) Is 3 minutes good enough for obtaining baseline physiological samples from teleost fish? *Canadian Journal of Zoology* 96: 774-786.

MAJOR PRESS

Discovery



Forbes



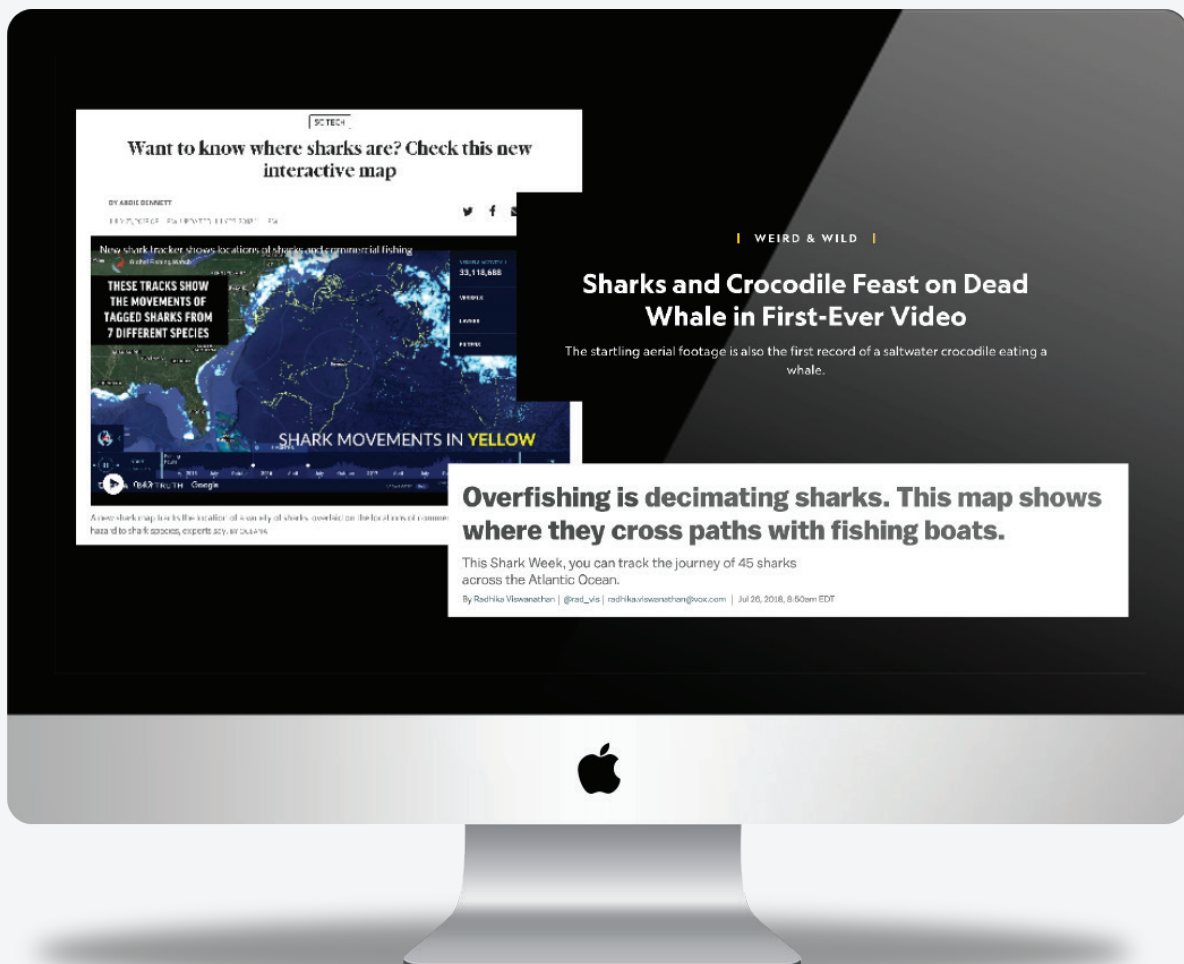
NATIONAL GEOGRAPHIC

Coverage of our research across 16 major press outlets generated over 240 million impressions.

Below are a sample of some of the media outlets that covered our work:

- National Geographic
- Fox News
- Popular Science
- New York Post
- Vox
- The Weather Channel
- Hakai Magazine
- Fast Company
- UK Daily News
- Forbes
- The News and Observer
- Seafood Source

BELOW: Some of the online headlines using our research results



MAJOR SUPPORTERS & PARTNERS

PRIMARY PHILANTHROPIC SUPPORTERS & SPONSORS

- The Sternlicht Family Foundation
- The Elisabeth Fullerton Foundation
- Jack and Mary McClurg
- Michael Saylor
- John C. Miller and Family
- Paul Hastings LLP
- Yan D'Auriol
- Rock the Ocean Foundation
- Peter and Michelle deSilva
- SeaWorld and Busch Gardens Conservation Fund
- The Wanderlust Fund
- GIV Bahamas
- Lush
- Maverick
- Sustainable Restaurant Group
- Grand Isle Resort and Spa
- Virgin Unite
- Oceana

STRATEGIC PARTNERS

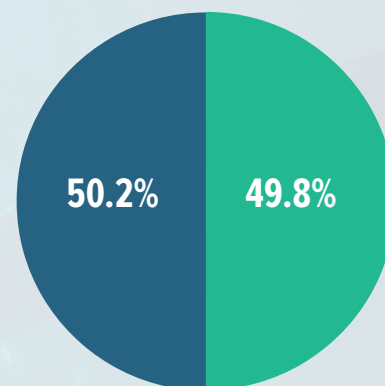
- International Seakeeper's Society
- Thayer Academy
- Stuart Cove's Bahamas
- Northeastern University
- University of Miami
- Pleasant Bay Community Boating
- Goose Hummock
- Hindsight Sportfishing
- Forbes Nonprofit Council



FINANCIALS

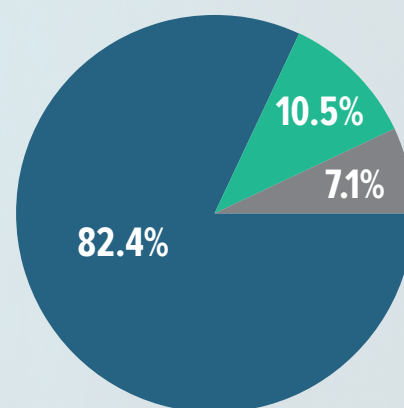
REVENUE:

DONATIONS & GRANTS	\$312,093
PARTNERSHIPS & SPONSORSHIPS	\$310,000
TOTAL REVENUE	\$622,093

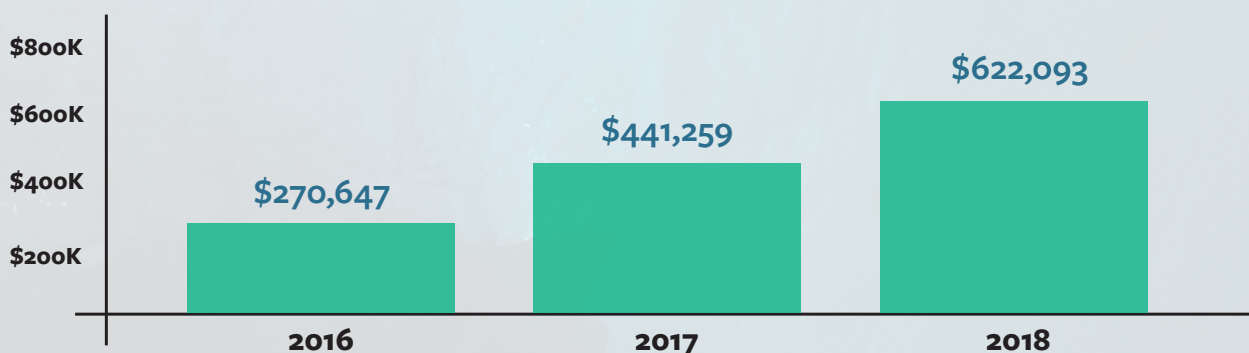


EXPENSES:

PROGRAM SERVICES	\$158,460
ADMINISTRATION	\$20,238
BUSINESS EXPENSES	\$13,569
TOTAL EXPENSES	\$192,267



REVENUE YEAR OVER YEAR:



> 50% average growth rate year over year



PHOTO CREDITS

Sami Kattan

Diego Camejo

Josh Liberman



BENEATH THE WAVES

Beneath the Waves is a global NGO working to conserve sharks and the habitats they occupy through cutting-edge scientific research.

www.beneaththewaves.org

