

Shark Research Institute Global Headquarters
 PO Box 40 • Princeton, NJ 08542 • USA • Phone: 609-921-3522 • www.sharks.org

New Marine Protected Areas created by Brazil, Niue and Chile

On March 20, 2018, a campaign in Brazil that united civil society organizations, researchers, and industry leaders, resulted in a landmark achievement when the President of Brazil, Michel Temer, announced the establishment of the two new Marine Protected Areas (MPA) of São Pedro & São Paulo and Trindade & Martim Vaz archipelagos. This brings the country's MPA coverage to approximately 25% of its jurisdictional waters.

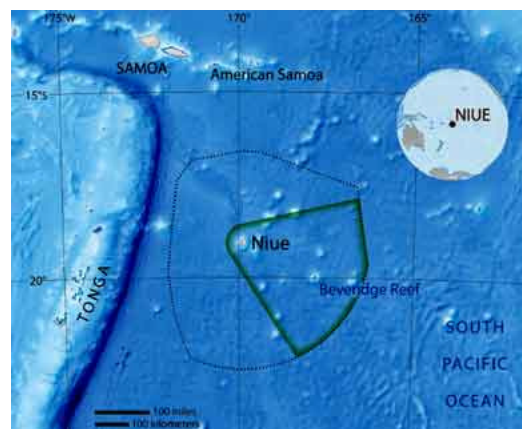


No-take zones will cover 11,691,798 hectares (28,891,062 acres or 45,142 square miles), encompassing part of the islands, seamounts and relevant features of the seabed, while the entire EEZ around the archipelagos will become multiple-use reserves, an additional 80,942,945 hectares (200,014,373 acres or 312,522 square miles) placed under sustainable use regimes. The areas will be jointly managed by the National Biodiversity Institute and the Navy, which should develop management plans in the next 180 days.

According to José Palazzo, Public Policy Development Officer for the Brazilian Humpback Whale Institute, one of the leading NGOs campaigning for the establishment of these new MPAs, "it is an historic moment for Brazil as we jump from a mere 1.5% of protected marine and coastal environments to almost a quarter of our seas, ensuring protection for key pelagic environments which are essential for countless species, from sharks to beached whales to endemic reef fish."

"Our work is far from complete", adds Palazzo. "We still need to expand the National Marine Park of Abrolhos to safeguard the largest coral bank in the South Atlantic and create many more coastal sanctuaries. But it all begins with the political will to establish it and this we have achieved."

The South Pacific island nation of Niue, with a population of roughly 1,600, has turned 40% of its exclusive economic zone into a marine park. The Niue reserve encompasses the island itself, various seamounts and offshore reefs, and Beveridge Reef, an uninhabited, semi-submerged atoll. The reserve protects 49,000 square miles of ocean – more than 30 square miles for each man, woman, and child on the island.



IN THIS ISSUE:

| | | | |
|---------------------------------|---|---------------------------|----|
| <i>Our Supporters</i> | 3 | <i>Illegal Gill Nets</i> | 7 |
| <i>New Board Member</i> | 4 | <i>Kids' Corner</i> | 8 |
| <i>Shark Fin Trade Bill</i> | 4 | <i>Art Contest Winner</i> | 9 |
| <i>Hong Kong crackdown</i> | 4 | <i>News from the Cage</i> | 10 |
| <i>Basking Sharks massing</i> | 5 | <i>Bookshelf</i> | 11 |
| <i>Sea World Indonesia</i> | 5 | <i>Events</i> | 12 |
| <i>Shark Tooth Showdown</i> | 6 | <i>Shark Tournaments</i> | 13 |
| <i>LEDs, a shark deterrent?</i> | 6 | <i>Expeditions</i> | 14 |
| <i>Sea Turtle Rescues</i> | 7 | <i>Sharks in Peru</i> | 15 |
| | | <i>Journal Articles</i> | 18 |
| | | <i>Shark Store</i> | 20 |

Since 2010, Chile has designated more than 400,000 square miles of marine parks - an area larger than Egypt. In September 2018, Chile announced an MPA around Rapa Nui Rahui (also known as Easter Island), The area encompasses the entire economic zone of Easter Island, and safeguards 142 marine



Silverseas.com

species found nowhere else on Earth, of which 27 are threatened or in danger of extinction. The MPA, roughly as large as Chile itself, will be managed by Chile and Rapa Nui, but unlike the Chilean marine parks at Diego Ramírez and Juan Fernández, much of Rapa Nui Rahui will permit artisanal fishing. However artisanal fishing within marine reserves can take a toll. Enric Sala of Pristine Seas points to a 2017 study he coauthored* showing that “no-take” marine reserves that fully ban extractive activities preserve markedly more biomass within marine ecosystems than those with only partial protections.

On February 18, 2018, Chile’s President Michelle Bachelet signed into law new protections for nearly 240,000 square miles of the ocean – an area roughly the size of France, saying fisheries must have significant protection if they are to have a future. Most fisheries in Chile’s waters are fully exploited or overexploited, but the Chilean government recognizes that there is no future of fisheries without significant protection. Industrial fishing is now banned in these zones.

At 187,000 square miles, the new marine park around Chile’s Juan Fernández Islands is the largest of its kind in South America, and nearly all of the area’s fish species are unique to the region. The lobster fisheries in the Juan Fernández Islands have been well-managed for a long time. “The Juan Fernández fishing community has become a global model for marine conservation,” said Felipe Paredes, a Juan Fernández local leader, in a statement. “This large marine park will provide us shelter and sustenance forever.” Large fisheries from China had been especially active in the area around Easter Island and around the Juan Fernandez Islands. Most of the fishing was for lobster exported to China.



PristineSeas/National Geographic

Another of Chile’s new MPAs protects around 55,600 square miles of ocean around the Diego Ramírez Islands, Chile’s southernmost point. The reserve contains towering kelp forests and temperate and Antarctic species, including seals, sea lions, and whales. The islands also serve as nesting grounds for the rockhopper penguin, the black-browed albatross, and nearly 80% of the world’s population of blue petrels. The waters of the archipelago are some of the last intact ecosystems just outside the Antarctic. “It’s really wild and pristine,” said Alex Muñoz, director for Latin America of Pristine Seas, the initiative from the National Geographic Society that

provided scientific support for the creation of the Juan Fernández and Diego Ramirez protected regions.



* Sala E, Giakoumi S. **No-take marine reserves are the most effective protected areas in the ocean.** *ICES Journal of Marine Science*, <https://doi.org/10.1093/icesjms/fsx059>

Thank You to Our Supporters!

We are very grateful for the continued support of:

- Adventure Aquarium
- AfriOceans
- Apex Shark Expeditions
- Atlantis Philippines
- Atlantis Oil & Gas
- Michael Aw
- Howard Azer & Associates
- Barcelo
- Beneath the Sea
- The Bennett Family Foundation
- Philip Bourke
- Clive Branson
- William Bunting, Jr.
- Nick Calyonis
- Angus Campbell
- Caradonna Dive Adventures
- Andy Casagrande
- Heather Cifuentes
- Patricia Chock
- Grant Christensen
- Cathy Church
- Ralph Collier
- Fred Colucci
- Dr. Leonard J. V. Compagno
- Kathy Coyle
- Crayola
- Sandra Critelli
- Christy Crossley
- Seth Davidson
- Deep Blue Resort
- Dive Experience, St. Croix
- Dive Pro International
- Dive Voyager
- Diving with Sharks, SA
- Brian Donato
- David Doubilet
- Dr. Sylvia Earle
- Richard Ellis
- Epic Diving
- Robin Ernst
- Ben Fackler
- Chris & Monique Fallows
- Rochelle Fernands
- Robert & Deena Ferrara
- Dean Fessler
- Lynn Funkhouser
- Susan Galli
- Mike Gerken
- Steven Gold
- Stephen Goodman
- Edmund C. Grainger, III
- Dave Grant
- Barbara Greenberg
- Craig & Susan Grube
- Grant Guiliano
- Patrick Haemmig
- Kenneth Hanczrik
- Joshua Hanks
- Dr. Jennifer Hayes
- David Helvarg
- Erik Herschfeld
- The Horgan Family
- Dr. Gordon Hubbell
- Jenkinson's Aquarium
- Juliet Sailing and Diving
- Kids Sea Camp
- Jupp Baron Kerkerinck Zur Borg
- Jeff Kurr
- Sharon Kwok
- Pascal LeCocq
- Elise Levin
- The Levine Family
- Tom Lipkin
- Lotus 333 Productions
- Allison Martinez
- Brandon McCloskey
- Nancy McGee
- Beth & Tom McKenna
- The McNally Family
- Caroline & Guy Merison
- Microwave Telemetry
- Rich Miller
- Paul Mischenko
- Carolyn Monier
- Susan Mottley
- Amos Nachoum
- Taylor Neisen
- Gail Noren
- Ocean Geographic Society
- Ocean Ramsey
- Occidental Cozumel
- Olympus Dive Center
- Margo Peyton
- The Philanthropic Group
- Pindito
- Michelle Pugh
- Shiloh Pyne
- Bahman Rabaii
- Ripley's Aquarium of Canada
- Mike Rissi
- Lesley Rochat
- The Roddenberry Foundation
- Michael Rodricks
- The Rohauer Collection Foundation
- Rolex Watch USA
- Joe Romeiro
- Roots
- F. Peter Rose
- Wiltraud Salm
- San Diego Shark Diving
- Dr. Jennifer V. Schmidt
- Neil Schwartzman
- The Shark Finatics
- Marty Snyderman
- Greg Sparks
- Liz Sparks
- Paul Spielvogel
- Donald Nichols Storch
- Rick Stratton
- Studio 1143
- Oakleigh B. Thorne
- Barbara & Donald Tober Foundation
- Jim Toomey
- Undersea Images
- Joyce van den Berg
- John Vincenti
- My Virtual Solution
- Phil Watson
- The Wave Foundation
- Wildleaks
- Winston Park K-8 Center
- The Whole Earth Center
- John Yavorksky

Thank You from Michael Aw

“Of all the awards accorded to me through the years, I am most proud of this one presented to me in 2008 by Stan Waterman on behalf of the Shark Research Institute and Peter Benchley for my work in conservation of Sharks. Stan Waterman was Guest of Honour nine years ago at ADEX, the year last dedicated to sharks. In 2018, ADEX once again dedicated the expo to sharks. We are proud to dedicate our next edition of Ocean Geographic magazine to sharks and Stan Waterman.”...*Michael Aw*



SRI Welcomes our Newest Board Member — Michael Feld

An avid and passionate scuba diver, Michael Feld is also on the Board of Directors of NAUI and the Sea Turtle Conservancy. He is a proven business leader with extensive experience in digital marketing and interactive media. He has worked in key strategic, product development, and technical roles at media and advertising companies including ESPN, Conde Nast, Time Inc., TBWA/Chiat/Day, DraftFCB, Grey Healthcare, and others.

In 2006, Michael established Oceanblue Divers, one of the largest dive clubs in the U.S.A with more than 1,500 members, and 11,000 plus Facebook fans. The club hosted hundreds of events including fundraisers, happy hours featuring noted dive-, world-, and ocean-related speakers, and more than 50 trips to dive destinations worldwide.



Shark Fin Trade Bill Gains Support

A bipartisan bill introduced to the United States House of Representatives on March 13th would require new certifications for countries importing shark, and skate parts and products to the U.S.A.

H.R. 5248, the Sustainable Shark Fisheries and Trade Act, would require all countries exporting products related to sharks, rays, and skates to the USA would have to obtain certification by the National Oceanic and Atmospheric Administration. Certification would require evidence that the country has conservation policies, management, and enforcement in place comparable to similar programs in the U.S.A.

The goal is to promote the science-based regulations the U.S.A. had in place for years while leveling the playing field among U.S. fishermen. Supporters include the Garden State Seafood Association, Directed Sustainable Fisheries, the North Carolina Fisheries Association, and conservationists.

The global trade of shark, ray and skate products is approaching US\$1 billion in value. In 2011, global trade in shark, ray, and skate parts and products was valued at US\$438 million for shark fins alone. In many countries, the shark, ray and skate fisheries are subject to little oversight, and passage of the Sustainable Shark Fisheries and Trade Act could have a significant impact to reduce the slaughter of species important to the health of the oceans. It has been referred to the House Subcommittee on Water, Power and Oceans.

Hong Kong Places Stiffer Penalties on Illegal Wildlife Trade

Hong Kong has long been known as the center of the global trade in shark fins as well as many illegal wildlife products. On January 31st, Hong Kong's Legislative Council took a step toward ending that image by adopting stiffer penalties for illicit trade in endangered sharks and rays.

By a 49-4 vote, the council passed an amendment to The Protection of Endangered Species of Animals and Plants Act that increases maximum fines from \$6,400 (\$HK50,000) to \$1.3 million (HK\$10 million), and increased prison sentences from two to 10 years for those convicted of illegally selling or buying products derived from any species listed under Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) – including three species of thresher sharks, oceanic whitetip sharks, three hammerhead shark species, manta and mobula rays, and 11 other shark and ray species. Trade in Appendix II-listed animals is allowed only if shown to be legal and sustainable. Sharks play a critical role in the marine food web and researchers have reported an alarming imbalance in ecosystems where shark populations have declined.

Basking Sharks Aggregating off New England & New York



Photo by Wayne Davis

Numbers of basking sharks ranging from 30 to nearly 1,400 individual animals have been aggregating in the western Atlantic Ocean from Nova Scotia to Long Island. Although individual sightings are somewhat common, seeing large aggregations is not.

The reason why the sharks congregate is not clearly understood, although previous studies suggested the aggregations were related to courtship and socializing as in some other shark species. A study by NOAA's Northeast Fisheries Center suggests it may be related to feeding.

In almost 40 years of aerial surveys for right whales, 10 large basking shark aggregations were opportunistically recorded and photographed. When data was compared with earth-orbiting satellites, oceanographic databases, and the NEFSC's ecosystem monitoring (EcoMon) cruises in the region, researchers found the aggregations occurred in summer and fall when sea surface temperatures ranged between 55°F and 75°F (13°C to 24°C).

On November 5, 2013, during the largest aggregation ever recorded on aerial survey in southern New England waters, data indicated there was a high concentration of zooplankton prey present. The presence of juveniles and an abundance of zooplankton on the continental shelf during aggregations suggests foraging plays a role. Feeding while their massive mouths are open creates drag and some researchers suggest they may be utilizing the slipstream of the shark in front, resulting in less expansion of energy.

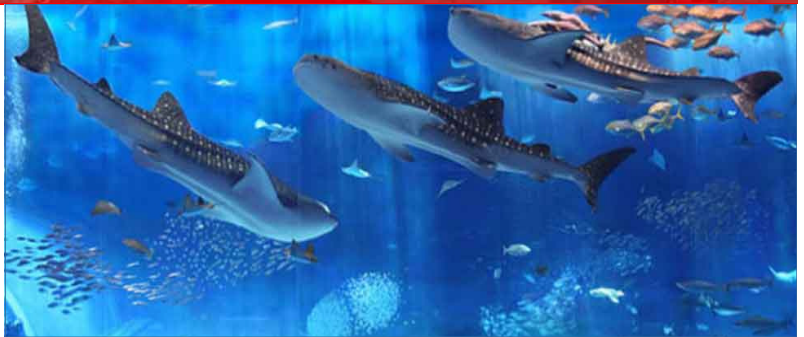


Basking sharks are the world's second biggest fish, reaching a length of up to 32 feet and weighing more than five tons. These highly migratory, slow-moving sharks are usually sighted close to the surface with their large mouths open to filter zooplankton from seawater.

Basking sharks present no dangers to humans other than those posed by their large size and rough skin.

Sea World Plans to Exhibit Whale Sharks

Sea World Ancol in Jakarta, Indonesia – which continues to exhibit orcas – also now plans to exhibit whale sharks (at right, an image from the aquarium website). Local environmentalists and residents in Berau, East Kalimantan, are protesting plans to capture and transport whale sharks to Sea World due to concerns about the protected fish's well-being. According to Jakarta newspapers, the Indonesian Maritime Youth Forum in East Kalimantan set up an online petition on change.org protesting the plan.



Shark-tooth Hunting Sparks Showdown in South Carolina

At issue is a 1991 state law intended to protect historic artifacts and fossils from being carted off by private collectors. The law requires anyone diving for shark's teeth to get a license and report each quarter what they have found. At present, the state decides if any of the fossils are important enough to put in a museum. Most divers receive permission to keep the fossilized sharks' teeth they find. The regulations do not apply to beachcombers who pick up sharks' teeth on the seashore. South Carolina State law requires one of two types of licenses to collect fossil shark's teeth or other artifacts. One is a hobby permit, which hundreds of divers have, to collect fossilized teeth on a small scale. The other is a commercial permit that applies mostly to large operations.

Mike Harris, a Beaufort diver known as the "Shark Tooth Fairy," became popular in the Beaufort-Hilton Head Island area for leading children on shark tooth hunts. After collecting a batch of shark's teeth from the ocean, Harris would spread them on beaches, then have children search for them. Once the kids found the shark's teeth, he would teach them about the gargantuan ancient sharks that once swam the seas off of South Carolina. His permit, which was not renewed for two years and prohibited him from doing any more educational events, was restored in late 2017.

The state fears that doing away with the regulations could pave the way for fossil-collecting businesses to take and sell valuable artifacts that deserve state protection. Bruce Orr, a historian and former law enforcement officer, said some divers want to collect shark's teeth to make money. The tooth of a megalodon can bring in up to \$7,000. A woolly mammoth skeleton, reportedly found in a Beaufort river, could bring \$500,000, he said. "We are talking (about) the exploitation of our historical record for somebody else's commercial gain."

According to Harris, the system is a bureaucratic mess. He and others favor doing away with some of the licensing requirements. After speaking with Harris, state Rep. Shannon Erickson, R-Beaufort, introduced a bill to abolish licensing requirements for "hobby" collectors, individuals not collecting large quantities of sharks' teeth from the ocean and tidelands. While the bill's chances of making it through the Legislature are limited this year, Charleston shark tooth salesman John Taylor said something needs to change. He said state officials are too tough on collectors.

LED Lights as Deterrents?

Prof. Nathan Hart of the Department of Biological Sciences at Macquarie University in Sydney, Australia, has been studying the senses of sharks to better understand how they perceive their surroundings and, based on his findings, has begun to develop improved shark deterrents. He worked with an Australian company to develop camouflaged wetsuits based on his research of sharks' visual system. His team

has also investigated the use of loud underwater sounds (including the calls of orcas), bubble curtains, and the effects of bright flashing lights on the behavior of a range of shark species, including white and tiger sharks.

In an interview on April 8th, Prof Hart said flashing led lights, in a specific pattern, show promise as a deterrent – particularly for white sharks, ambush predators that tend to approach from below and rely on visual cues.



Pukas, the biggest surfboard factory in Europe, designed some colored LED surfboards and sent them off to some surfers to try them out.



A Call for Protocols in Rescue of Sea Turtles from Shark Nets in Australia

The death of an endangered leatherback turtle on Australia's New South Wales north coast is prompting calls for marine animal rescue groups and shark net contractors to work together.

A leatherback turtle was released from the shark nets at Shelly Beach in Ballina, and just two days later a leatherback washed up 80 km away at Yamba minus flippers and with net marks around its body.

The western Pacific population of leatherbacks is regarded as one of the most endangered sea turtle populations anywhere in the world. "We've had one visual sighting of a leatherback offshore about three months ago, and that's the only other sighting we've had of living leatherback turtle in the last several years," said Keith Williams of Seabird Rescue. He added that this is not the first case of an endangered turtle being released from the nets only to have the same species wash up dead or injured days later.



The dead leatherback at Yamba bore net marks on its body.

Seabird Rescue, which has one of the best equipped sea turtle hospitals on the east coast, is asking the Division of Primary Industries to implement new protocols that would see any marine turtles caught in nets be handed over to them. "It's not good enough that animals are being released severely compromised and ending up dead on our beaches...but there has been no positive response from the DPI," said Williams. He believes a reluctance of the DPI to cooperate with Seabird Rescue may be due to his organization's vocal opposition to shark nets.

Thankfully, that is not the case on Queensland's Gold Coast. Marnie Horton of SeaWorld said their vocal and long-held opposition to shark nets has not hindered their relationship with the contractors who service the shark nets. "Here at SeaWorld, we've been calling for nets to be pulled out for many decades. It's not the shark contractor's decision to have those nets there; he's simply servicing them. If they've got an animal that they believe needs further rehabilitation after being caught on a drum line or in the nets, then they'll just simply give us a call and we will assist," she said. Horton hopes Seabird Rescue and the DPI could work together in future, for the health and wellbeing of marine life.

Illegal Gill Netting of Sharks in Florida

A 5- to 6-foot bull shark was found on the north end of Hollywood Beach, Florida, on April 2nd. Two days later, 18 young sharks were found dead in another net in the ocean off the same part of the beach. Most of the young sharks appeared to be Atlantic sharpnose sharks, according to Robert Klepper of the Florida Fish and Wildlife Conservation Commission. Also caught was an Atlantic guitarfish. Klepper said the sharks appear to have been caught in gill nets, banned in Florida state waters in 1995 despite bitter opposition by commercial fishermen. The cases have been referred to the agency's law enforcement division. Anyone with information about these cases is urged to call the state's Wildlife Alert Hotline at 888-404-3922.



The young bull shark found April 2nd on Hollywood Beach

Tracey Kurilla, who discovered both fishing nets while paddleboarding, said the net that caught several sharks appeared to be about 50 feet long and had also trapped fish and a lobster. She freed all that appeared to be alive. "To throw in a 50-foot net to catch and kill fish so close to shore is disgusting," she said. "It damages reefs, kills turtles, rays, fish, etc. This is not sport fishing. This is an annihilation of sea life."

Kids' Corner

by Gail Noren

Despite many entries to our Spring Challenge, regretfully, there were no winners. While everyone found the names of 20 sharks in the search puzzle, hermit crabs were marked as "good pets."

If Hermit Crabs Could Talk

If you think hermit crabs make good pets and LIKE living in a plastic cage smaller than a watermelon, you don't know hermit crabs!

Pretend you are a land hermit crab. Come on, I'll help you. Close your eyes and imagine you are bustling about on a balmy beach with your buddies in the Caribbean. Your soft abdomen spiraling down into your cozy home tightly clutches the little column of your shell.

But you've been eating well and you've been G-R-O-W-I-N-G!

Like feet that have outgrown their shoes and need new ones, your cramped crab body craves more room. Your shell is too tight for comfort. A too-small shell is not merely uncomfortable, however. It can also be dangerous! When hermit crabs outgrow their shells, they cannot retreat and hide away, as turtles do. Picture yourself hanging partly out of your shell. As you know, this poses a problem when predators lurk about!



Photos by Hunter Noren



So today you are on the prowl for a larger shell. It's a splendid day for inspecting new homes. Scattered on the sea-swept sand are empty shells for the taking. But finding one the perfect size is only half the battle. You must also lay claim to it before a neighbor beats you to it.

There's nothing finer than a partly cloudy beach day, little hermit crab! Feel those warm breezes blowing! And wafting on the wind, fragrant aromas of food mingle with the salt spray of the waves. The humid tropical air helps you breathe. You have gills, after all, not lungs!

Shell shopping on such a glorious day should be a pleasure—and it is—but, alas, you are not alone! Scuttling from shell to shell, you face fierce competition. Hermit crabs are social animals and your friends have you surrounded! Everyone scrambles to find a suitable new home.

Suddenly, a claw-like thing plucks you up and drops you into a bucket. House-hunting can be stressful, but this is different. What happened to the damp, compacted sand you love? You find yourself atop a frightened pile of friends all as confused as you.

I wish I could say this story has a happy ending, but for the majority of hermit crabs stolen from their native homes, a journey of sadness begins the moment they are kidnapped and spirited away from their original habitats.

Meanwhile, if hermit crabs could talk, would they say, "Take us home!" or "Leave us alone!"?

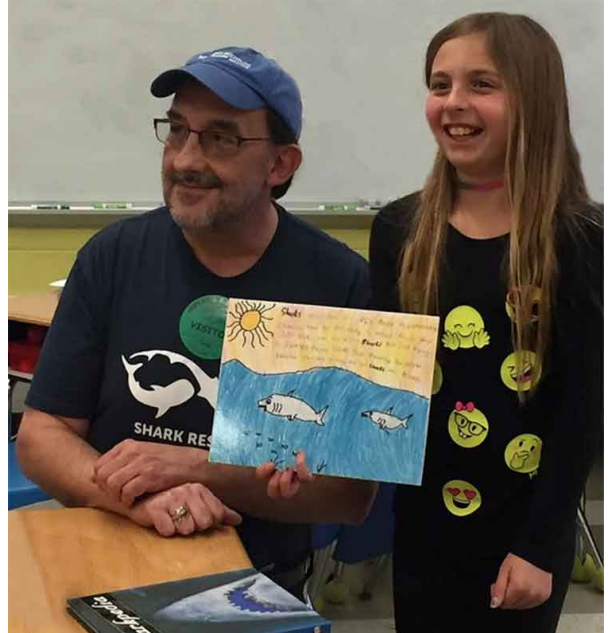
TO BE CONTINUED . . .

Art Contest Winner!

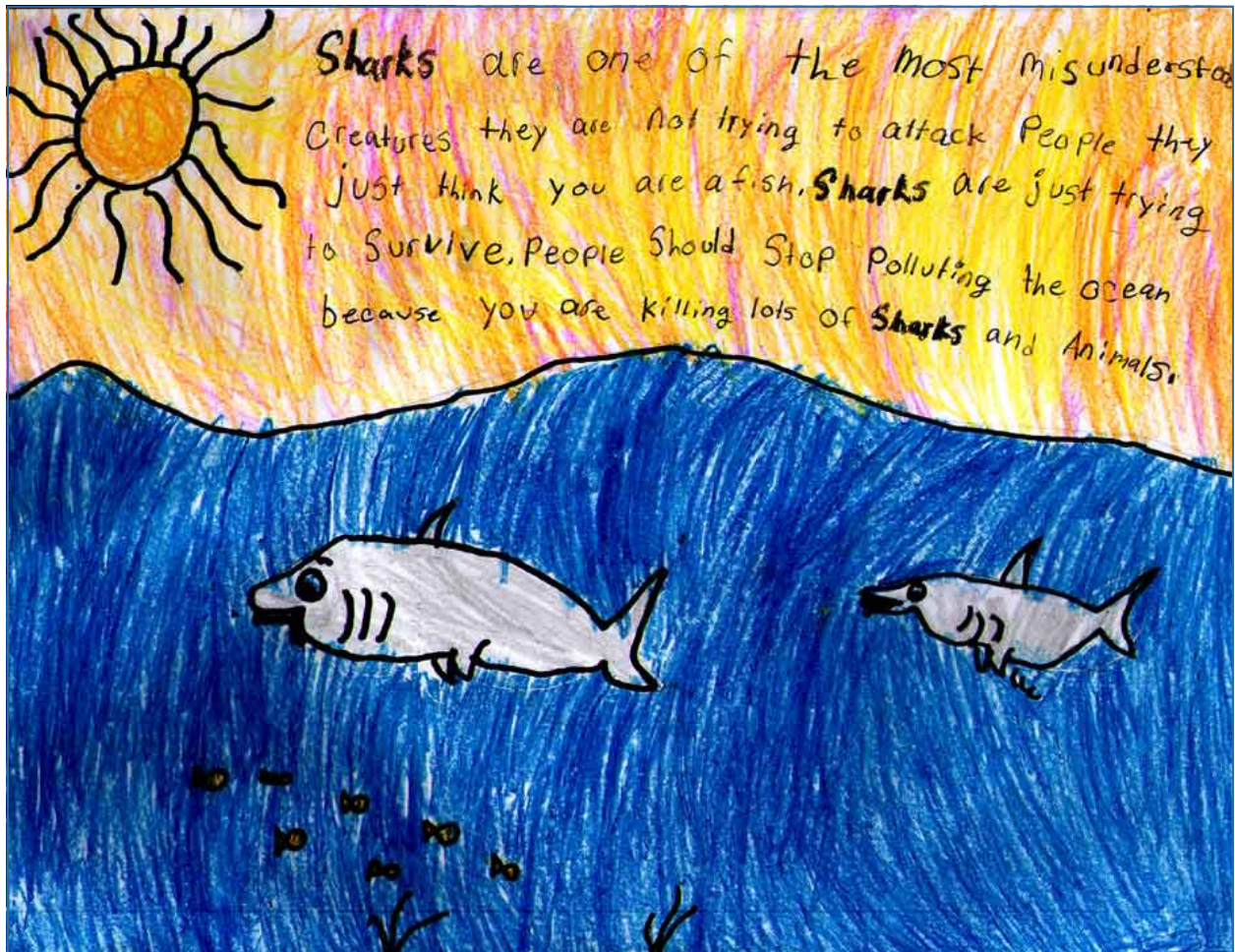


We are happy to announce the grand prize winner of SRI's 2018 Spring Art Contest: Chelsea Cahall, age 10, from New Jersey.

Dr. Dean Fessler presented Chelsea with a Lifetime Adoption of a whale shark and a specially autographed edition of *Sharkpedia* at her school. Dean, Chelsea and her friend Theodora, showed the award to Chelsea's homeroom and math class, and Dean answered the students' many questions about sharks.



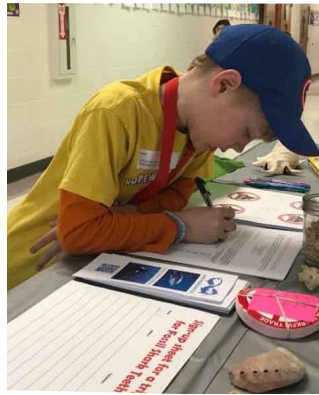
Chelsea's drawing will be featured in our new set of postcards.



News Around The Cage

Hopewell Elementary Science Fair and Expo March 23rd

Heather Cifuentes reported that many young scientists visited SRI's table. They signed our Ban the Shark Fin Trade sheets, registered for upcoming fossil shark tooth hunts, entered our Spring Challenge, and tested their knowledge of sharks with our quizzes.



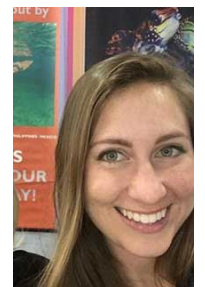
*Just as scientists of the past nurtured us,
we nurture the scientists of tomorrow!*



Beneath The Sea March 23, 24 & 25

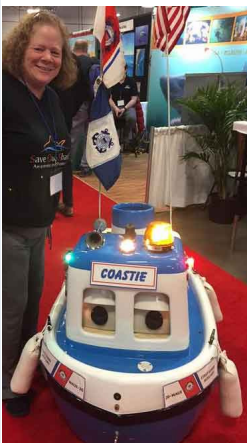
BTS, the biggest dive consumer trade show in the USA, was attended by some 16,000 divers and 400 exhibitors. It featured more than 100 seminars, workshops, an Ocean Pals program for children, the Go Dive New Pool that lets people experience scuba diving, an imaging competition, poster contest, and a superb film festival.

SRI has participated every year since BTS began; we connect with old friends and new, examine the latest technology, and inform new divers about our work and programs.



Alex Rose at OG

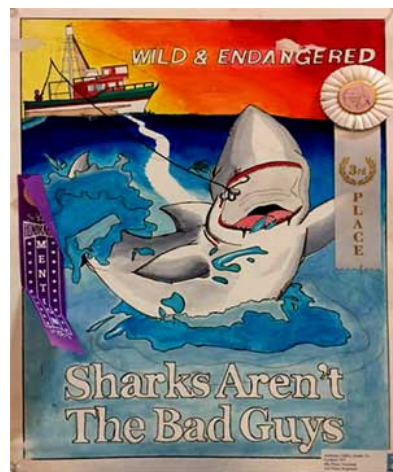
Here are a few of our favorite photos.



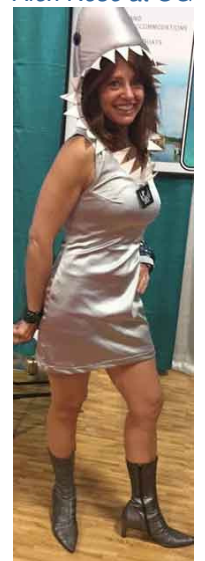
Chris Romo &
U.S. Coastguard's
Coastie



Alex Antoniou & Dean Fessler



Loved this poster!

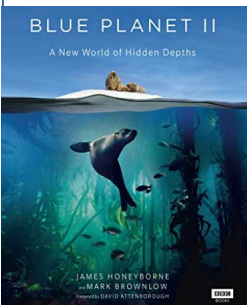
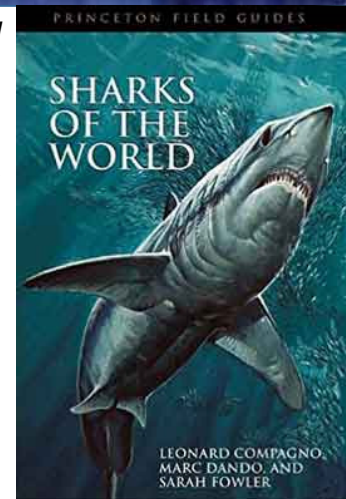


Jamie-the-Shark

Bookshelf

Sharks of the World (Princeton Field Guides) by Leonard Compagno and Sarah Fowler. Paperback: \$22.52 from AmazonSmile.com.

Still rated as the #1 best selling guide to sharks! Written by two of the world's leading authorities and superbly illustrated by wildlife artist Marc Dando, this is the only comprehensive field guide to all 440-plus shark species. Color plates illustrate all species, and detailed accounts include diagnostic line drawings and a distribution map for each species. Introductory chapters treat physiology, behavior, reproduction, ecology, diet, and sharks' relationships with humans. It features more than 125 original full-color illustrations for fast and accurate identification of each shark family, clear identification information for each species with details of size, habitat, behavior, and biology. Also included is a quick ID guide helpful for differentiating similar species with geographic distribution maps for each species. *Sharks of the World* is a must-have for libraries of researchers and everyone who wants to learn more about sharks!

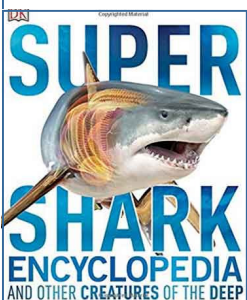
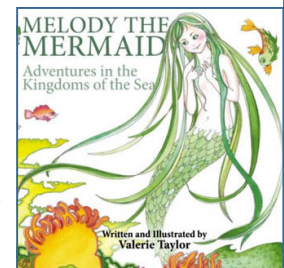


Blue Planet II, by James Honeyborne and Mark Brownlow. Hardcover: \$27.51, Kindle: \$17.99 from AmazonSmile.com.

Blue Planet II, which accompanies an epic seven-part series on BBC1, is a ground-breaking new look at the variety of underwater life across our planet. The understanding of ocean life has changed dramatically in the last decade, with new species, new behaviors, and new habitats being discovered at a rapid rate. The spectacular images illustrate a variety of habitats, migrations and how ocean communities are connected. The final chapter discusses the future of marine life based on recent discoveries.

Melody the Mermaid: Adventures in the Kingdoms of the Sea by Valerie Taylor (Author & Illustrator) and Cathryn Castle Garcia (Editor). Paperback: \$22.95 from AmazonSmile.com.

Melody is a confident, adventurous young mermaid, daughter of the king and queen of the Kingdom of Pearl. While her seven mersisters all have golden curls, Melody's long hair is a beautiful shade of green. Melody's adventurous nature — and her unusual looks — get her into trouble when she goes looking for her friend Leafy, a young leafy sea dragon who's gone missing. Melody sees Leafy being lured away by two moray eels. Soon Leafy gets caught in a dangerous current and is carried away. Melody must rescue Leafy. To do so, she has to leave the safety of her own kingdom and venture far into other kingdoms of the sea. In her quest to save Leafy, Melody faces dangerous challenges. Children of all ages will be cheering for Melody as she saves her friend Leafy and returns home safely to the Kingdom of Pearl.



Super Shark Encyclopedia by DK publishing. Hardcover: \$15.40 from AmazonSmile.com.

This book presents secrets of 80 sharks and other sea creatures from blue sharks to hammerheads, rays to eels, starfish to batfish, surfing penguins to deep-sea creatures and more. Packed with facts about animal behavior and anatomy, its new x-ray artworks utilize cross-sections and show key anatomical features in detail. It showcases record-breaking animals and explains how and why their bodies work the way they do. This is a visual guide to the oceans' most incredible creatures.

Spring & Summer Events

April 20, 2018: Earth Day Colloquium. Venue: Molloy College, 132 Clyde Street, Room 8, West Sayville, NY 11796. *Dave Grant will give a presentation on Sharks / Ocean Acidification.*

April 21, 2018: Beach Sweeps. Join a Clean Ocean Action Beach Sweep 9 am to 12:30 pm. Sweeps are being organized in the following New Jersey Counties: Atlantic, Burlington, Cape May, Essex, Monmouth, and Ocean. For more information or to register call Clean Ocean Action at **(732) 872-0111** or outreach@cleanoceanaction.org

April 22, 2018: Earth Day. A day to inspire awareness and appreciation for Earth's environment. This year the focus is on the elimination of single use plastics. In addition to SRI beach clean-ups, the American Littoral Society will have a cleanup at Moores Beach, Delmont, NJ from 10 am to 1 pm. Sign up with quinn@littoralsociety.org. For a 10 am cleanup of Jamaica Bay at Kaiser Bay, Brooklyn, NY, sign up with donriepel@littoralsociety.org

May 5-12, 2018: Cathy Church's Underwater Photo Fest 2018. Venue: Grand Cayman Island. <http://www.cathychurch.com/index.php/uwoverview/uw-photo-fest>

May 12, 2018: 18th Annual CASA Kids Superhero 5K Race. Venue: Princeton Pike Corporate Center, Lawrenceville NJ. The race starts at 9 am. Contact sharkman@yahoo.com for more information. To compete in the race, contact: jpotthoff@casamercer.org

May 4-13, 2018: Sharks & Rays of the Gulf of California. To reserve your space on this expedition, contact Jennifer@sharks.org (*see page 14 for more information*)

May 31 to June 3, 2018: 5th Annual Shark Shootout. The event is part photo workshop, part competition, and just a good ol' time diving one of North America's healthiest marine ecosystems. The multi-day shootout is run by pro shooter Mike Gerken in conjunction with Olympus Dive Center. There are a selection of prizes to be won for top-notch images and videos. To grab your spot, go to: <http://www.evolutionunderwater.com/5th-annual-north-carolina-wreck-shark-shootout-mike-gerken-olympus-dive-center>

May 11, 2018: Fintastic Friday. Kids around the world show their support for shark conservation.

June 8, 2018: World Oceans Day. Wear blue & tell others why a healthy ocean is important. Beach clean-ups are being organized in coastal states by many organizations.

June 9, 2018: March for the Ocean. Washington, D.C. www.marchfortheocean.org

"I would be honored if you would join me to March for the Ocean on June 9th! Together, we CAN protect the ocean! The fish can't be there, nor can the whales, dolphins, sea turtles or sharks; we need to speak for those who cannot speak for themselves. The decisions we make now, the voices we have today, will shape the future." Dr. Sylvia Earle, Honorary President of the Shark Research Institute



June 23, 2018: Fossil Shark Tooth Hunt in Big Brook, NJ. Call (609) 921-3522 to register

June 23-24, 2018: Scuba Show Long Beach. Venue: Long Beach Convention Center, Long Beach, CA. Exhibits, seminars, and education: <https://scubashow.com/>

June 28–30, 2018: Annual Scientific Meeting of the Undersea & Hyperbaric Medical Society. Venue: Disney's Coronado Springs Resort, Lake Buena Vista, FL 32830 <https://www.uhms.org/>

July 13, 2018: Benefit Concert for SRI by singer, songwriter, and actor, Elise Levin, and her band: Fine Life. Also showcased will be Every Flavor Weather Machine, KAPO and SANiTY. Visual Artists include world class underwater photographer Wayne Levin, SJK171, and Ash Showler. Venue: The Well, 272 Meserole Street, Brooklyn, NY 11206.

July 14 & 15, 2018: Shark Con 2018. Venue: Florida State Fairgrounds, 4800 US Hwy 301 North, Tampa, Florida. An event dedicated to raising awareness about shark and ocean conservation, Shark Con brings those who love the ocean together for a weekend of education and the fun of a Comic Con. *Dr. Jennifer Schmidt will give a talk and appear on a panel discussion about women in science. Be sure to stop by SRI's booth to "talk shark."* <http://shark-con.com/contact/>

July 22, 2018: Shark Week on Discovery Channel, a full week of shark films. See SRI member Nick Caloyianis' stunning footage of Greenland sharks!

July 27-31, 2018 (Afuera Expedition 1) and August 1-5, 2018 (Afuera Expedition 2). Join Dr. Jennifer Schmidt to snorkel and document behavior of whale sharks in the Caribbean. (*See page 15*)

August 11, 2018: Shark Tooth Hunt in Big Brook, NJ. *Call (609) 921-3522 to register*

September 6-8, 2018: Surf Expo. The world's largest and longest-running Surf Show with 28,600 attendees. Venue: Orange County Convention Center, North Halls A-B, 9899, International Drive, Orlando, Florida. 32819. <https://www.surfexpo.com/>.

Protests Planned at Shark Tournaments

Shark fishing tournaments are scheduled along the northeast coast of the USA. At a time when shark populations are declining, these tournaments are unacceptable. Below is a partial list of 2018 tournaments. Times and locations are on the internet. Local groups are forming to protest at these so-called "sporting events."

- **June 1-3, 2018: Mako Mania Shark Tournament.** Venue: Ocean City, MD.
<http://ococean.com/events/mako-mania-tournament-2018>. Several events are being planned to protest this killing of sharks. For more info contact Rock Kulish—rockthediver@gmail.com
- **June 6-9: South Jersey Shark Tournament,** Cape May, NJ.
<http://www.capemay.com/eventcalendar/index.php?elD=22338>
- **June 21-23: Montauk Marine Basin Shark Tournament,** Montauk, NY
<http://www.marinebasin.com/tournaments&key=010>
- **June 23-24: Mako Mania,** Point Pleasant, NJ
<http://www.makomanianj.com/makomania-home.html>
- **July 12-14: Block Island Giant Shark Tournament,** Block Island, RI
www.blockislandgiantshark.com
- **July 12-15: North Atlantic Monster Shark Tournament,** New Bedford, MA
<https://www.facebook.com/The-North-Atlantic-Monster-Shark-Tournament-369636506510036/>

SHARKS AND RAYS OF THE GULF OF CALIFORNIA

Women Researchers in Science - Journey to the Sea of Cortez

MAY 4 to 13, 2018 — 10-day expedition

Expedition cost is US\$2,995 and includes airport transfers, accommodations on the boat, meals, drinks, equipment, and use of the ship's library. All payments are non-refundable. Space is limited to 12 spots.

Not included: Air transportation to La Paz, crew gratuity, evening meal in La Paz, and cost for ultralight flights. Diving and travel insurance are required.

Expedition Highlights:

- Expedition leaders: Dr. Jennifer Schmidt, Dr. Deni Ramirez Macias and Lela Sankeralli.
- 10 days/9 nights onboard the ship *MV Adventure*
- Whale sharks, carcharhiniform sharks and mobula ray research
- Whale shark research may include: documenting whale sharks by photo ID, recording size, injuries and scars, collecting and analyzing plankton samples and tissue sampling.
- Shark and mobula research may include; capture, species measurements, tagging and release.
- The expedition offers a rare opportunity to work alongside scientists studying sharks, rays and whale sharks, all in one program.
- Guests will be assisting in the various stages of the research.
- Addition activities available: hiking, snorkeling with sea lions, kayaking, & visiting remote communities.



For more information or to reserve your space, contact co-expedition leader:
Dr. Jennifer Schmidt at Jennifer@sharks.org

The AFUERA

The Great Massing of Whale Sharks in the Caribbean

July 27 to 31, 2018 & August 1 to 5, 2018

The largest gathering of whale sharks in the world occurs each June through August in the Caribbean off Mexico's Yucatan Peninsula. Known as the Afuera, more than 600 whale sharks have been observed during a single aerial survey. The sharks mass in a patch of ocean about the size of several football fields where the water is 20 to 60 feet deep to feed on dense patches of fish eggs, a rare place where you can observe and photograph whale sharks in blue water.



Aerial photo of whale sharks during the Afuera

The expedition dates coincide with the peak of the Afuera. Each expedition is five days in length, including three days

snorkeling with the sharks (weather and sea permitting) and a travel day on either end.



The expeditions are led by Dr. Jennifer Schmidt, Director of Science and Research at the Shark Research Institute, who has worked with whale sharks for nearly 20 years. By Mexico's regulations, all expeditions and whale shark ecotourism trips are snorkel only because scuba bubbles disturb the sharks when they are feeding. But excellent diving and many other activities are available before and after the expedition.

Both expeditions will be led by Dr. Jennifer Schmidt, Director of Science and Research at the Shark Research Institute.

The cost includes four nights double occupancy hotel in Cancun, three days of whale shark interactions, lectures on whale sharks by Dr. Schmidt, snorkeling at Isla Mujeres, and lunch on whale shark days. It does not include airfare to Cancun, airport transfers, or dinners.

The share per person is \$1,400 if paid by check in USD (\$1,450 if paid online via Paypal) based on double occupancy. A single supplement is \$200. A \$500 deposit is required to hold your space. All payments are non-refundable. Dive and travel insurance are required. Maximum of nine participants per expedition.

These expeditions are filling very fast, so reserve your space now!

For more information or to reserve a spot, contact info@sharks.org

Optional side trips are available and can be arranged in Cancun. After the expedition you could dive Manchones Reef, visit the Cave of the Sleeping Sharks of Isla Mujeres, dive one of Mexico's crystal clear cenotes, or visit some of the world-famous Mayan ruins of the Yucatan such as Tulum or Chichen Itza.

Sharks in Peru! Who Knew!

Dave Grant, our intrepid explorer, recently visited the ancient Peruvian ceremonial center of Huaca Pucllana. He discovered that coastal beaches, lakebeds, and Big Brook, New Jersey are not the only places where shark teeth turn up!

If you're in the mood for an article with an archaeological bent, read Dave's travel notes of an ancient society that not only celebrated sharks and other marine life, but replicated their images in works of art. Alas, the poor beleaguered shark never catches a break; despite their reverence for sharks, it seems the ancients also ate them. Happily, however, Dave unearthed no evidence that they finned or their sharks. If you're pressed for time and skimming, do at least read Dave's last paragraph because he saved the best news for last!

The Temple of the Worshipers of the Sea *By Dave Grant*

We usually associate ancient Peru with the Inca civilization shattered by the Spanish conquest in the 1500s. However, other societies predate the Incas by more than a thousand years, leaving behind many impressive assemblages and artifacts. The Lima Culture was a society that developed in the Peruvian Central Coast between 200 and 700 AD and included the archaeological complex of Huaca Pucllana, a huge adobe and clay pyramid located in the midst of Miraflores, a lively commercial hub adjacent to the city of Lima.



The pyramid consists of seven staggered platforms that served as an important ceremonial and administrative center. The structure is surrounded by a plaza bordering the outer limits and a large wall dividing it into two separate sections. One section evidences deep pits where offerings of fish and other marine life took place to gain favor of the gods. The other section is an administrative area. The enclosure boasts over 1,640 feet in length, 328 in width and 72 in height.



Museum exhibit of a ceremonial shark event



Large stylized ceramic shark

Most of the façade of Pucllana looks like orderly shelves of library books, but some alternating "bookshelves" have tilted bricks acting as cross-supports (similar to my own disorderly collection of books), as well as strategically-placed buttressing incorporated to reinforce the walls when the ground shakes, as it does regularly along this slice of the Pacific's Ring of Fire. Miraculously, most of the pyramid remains intact owing to the arid conditions, foresight of community leaders, and prehistoric construction

designs that buffer it during earthquakes. In spite of my personal biases, (read: lack of cultural awareness), it is an impressive testament to human ingenuity which I found mesmerizing to gaze upon, even without its connection to sharks.

I was beginning to think Huaca Pucllana was planned by a committee of argumentative architects with its million, hand-made, unfired adobe bricks assembled by rival crews of contractors and freelancers. Fortunately, the challenge of climbing Escher-like platforms in the midday heat rewarded me with cool sea breezes off the Pacific. In addition, well-trained and enthusiastic young docents shared insights explaining how this chaotic-looking edifice evolved over generations as successive leaders added personal touches and buried older portions while constructing new ones.

Ancient celebratory banquets featured corn beer and shark meat, but ceremonies relating to the expansion of the great pyramid also involved human sacrifice, so sharks were not the only casualties. Ceramic effigies, textile images, and the presence of other artifacts, including shark teeth, confirm archaeologists' understanding that the Lima people's belief system revolved around the sea.



Representations of teeth were incorporated in the design of this pot.

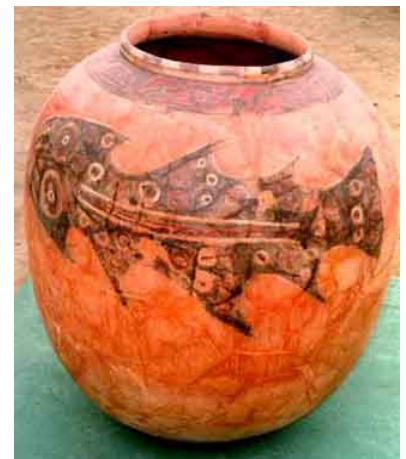
The marine life exploited by the Lima Society included coastal species like the copper shark, *Carcharhinus brachyurus*, a temperate species that ventures into lagoons and rivers, and likely follows vast schools of anchoveta. Blue and white sharks were taken from wooden boats, farther offshore in the Humboldt Current.

Surrounding the pyramid are modern displays with items representing the daily lives of the hunters, growers and fishers. Also uncovered are the remains of a number of marine creatures, including crustaceans, mollusks, and three species of sharks: tiburón azul, tiburón cobrizo, and tiburón blanco (blue, copper and white sharks).

I finished my day gleaning what information I could from the museum staff about this remarkable culture so connected to the sea and zealous about sharks. Checking in at the gourmet restaurant, I was relieved to find that shark was not on the menu; perusing the gift shop, this grateful tourist purchased a t-shirt!



Recreation ritual offering vessel depicting a shark, Lima culture



Of special interest is the recent discovery of white shark teeth in ritual offering features.



Shark pins in the gift shop

How Shark Poo Keeps Coral Reefs Healthy

Williams JJ, Papastamatiou YP, Caselle JE, Bradley D, Jacoby DMP. **Mobile marine predators: an understudied source of nutrients to coral reefs in an unfished atoll.** *Royal Society*. 2018 Mar 21; (285):1875. DOI: [10.1098/rspb.2017.2456](https://doi.org/10.1098/rspb.2017.2456)

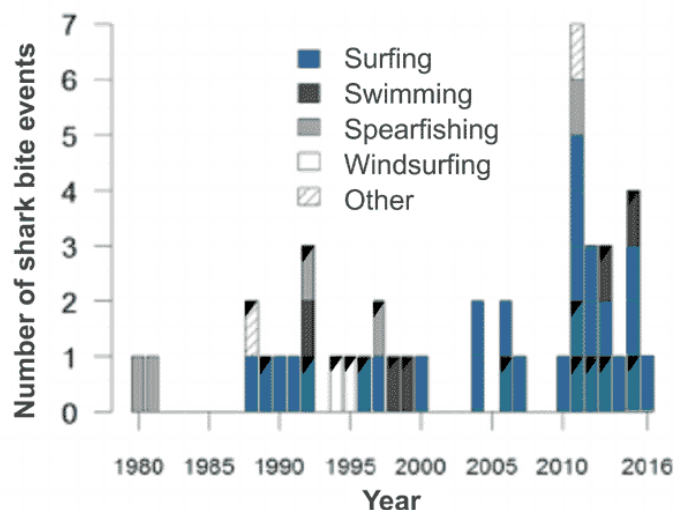
Animal movements can facilitate important ecological processes, and wide-ranging marine predators, such as sharks, potentially contribute significantly towards nutrient transfer between habitats. We applied network theory to four years of acoustic telemetry data for grey reef sharks, *Carcharhinus amblyrhynchos*, at Palmyra, an unfished atoll, to assess their potential role in nutrient dynamics throughout this remote ecosystem. We evaluated the dynamics of habitat connectivity and used network metrics to quantify shark-mediated nutrient distribution. Predator movements were consistent within years, but differed between years and by sex. Females used higher numbers of routes throughout the system, distributing nutrients over a larger proportion of the atoll. Extrapolations of tagged sharks to the population level suggest that prey consumption and subsequent egestion leads to the heterogeneous deposition of 94.5 kg d^{-1} of nitrogen around the atoll, with approximately 86% of this probably derived from pelagic resources. These results suggest that sharks may contribute substantially to nutrient transfer from offshore waters to near-shore reefs, subsidies that are important for coral reef health.

Surfers at Highest Risk of Shark Bites at Reunion Island

Lagabrielle E, Allibert A, Kiszka JJ, Loiseau N, Kilfoil JP, Lemahieu A. **Environmental and anthropogenic factors affecting the increasing occurrence of shark-human interactions around a fast-developing Indian Ocean island.** *Sci Rep*. 2018 Feb 27; 8(1):3676. DOI: [10.1038/s41598-018-21553-0](https://doi.org/10.1038/s41598-018-21553-0).

Understanding the environmental drivers of interactions between predators and humans is critical for public safety and management purposes. In the marine environment, this issue is exemplified by shark-human interactions. The annual shark bite incidence rate (SBIR) in La Réunion (Indian Ocean) is among the highest in the world (up to 1 event per 24,000 hours of surfing) and has experienced a 23-fold increase over the 2005-2016 period. Since 1988, 86% of shark bite events on ocean-users involved surfers off the leeward coast, where 96% of surfing activities took place. We modeled the SBIR as a function of environmental variables, including benthic substrate, sea temperature and period of day. The SBIR peaked in winter, during the afternoon and dramatically increased on coral substrate since the mid-2000s. Seasonal patterns of increasing SBIR followed similar fluctuations of large coastal shark occurrences (particularly the bull shark, *Carcharhinus leucas*) consistent with the hypothesis that higher shark presence may result in an increasing likelihood of shark bite events. Potential contributing factors and adaptation of ocean-users to the increasing shark bite hazard are discussed. This interdisciplinary research contributes to a better understanding of shark-human interactions. The modeling method is relevant for wildlife hazard management in general.

Annual shark bite incidence per category of ocean user



Will a Slight Increase in Water Temperature Lead to a Shift in Tiger Shark Populations?

Payne NL, Meyer CG, Smith JA, Houghton JDR, Barnett A, Holmes BJ, Nakamura I, Papastamatiou YP, Royer MA, Coffey DM, Anderson JM, Hutchinson MR, Katsufumi S and Halsey LG. **Combining abundance and performance data reveals how temperature regulates coastal occurrences and activity of a roaming apex predator.** *Glob Change Biol.* 2018;00:1–10. <https://doi.org/10.1111.gcb.14088>

The redistribution of species has emerged as one of the most pervasive impacts of anthropogenic climate warming, and presents many societal challenges. Understanding how temperature regulates species distributions is particularly important for mobile marine fauna such as sharks, given their seemingly rapid responses to warming, and the socio-political implications of human encounters with some dangerous species. The predictability of species distributions can potentially be improved by accounting for temperature's influence on performance, an elusive relationship for most large animals. We combined multi-decadal catch data and bio-logging to show that coastal abundance and swimming performance of tiger sharks, *Galeocerdo cuvier*, are both highest at ~22°C, suggesting thermal constraints on performance may regulate this species' distribution. Tiger sharks are responsible for a large proportion of shark bites on humans and a focus of controversial control measures in several countries.

The combination of distribution and performance data moves towards a mechanistic understanding of the tiger shark's thermal niche, and delivers a simple yet powerful indicator for predicting the location and timing of their occurrences throughout coastlines. For example, tiger sharks are mostly caught at Australia's popular New South Wales beaches (i.e. near Sydney) in the warmest months, but our data suggest similar abundances will occur in winter and summer if annual sea surface temperatures increase by a further 1–2°C.

Factors Affecting White Shark Predation on Cape Fur Seals

Skubel RA, Kirtman BP, Fallows C, Hammerschlag N. **Patterns of long-term climate variability and predation rates by a marine apex predator, the white shark, *Carcharodon carcharias*.** *Marine Ecology Progress Series.* 2018 Jan 11. Vol. 587:129-139. <https://doi.org/10.3354/meps12424>

Understanding potential responses of aquatic animals to climate variability is important given the wide-ranging implications of current and future climatic change scenarios. Here, we used long-term data from natural predator–prey interactions between white sharks, *Carcharodon carcharias*, and Cape fur seals, *Arctocephalus pusillus pusillus*, in False Bay, South Africa, paired with environmental monitoring to examine potential relationships between temperature variability and shark predation rates on seals. Based on generalized linear modelling of a dataset of 941 shark attacks on seals collected over 15 years (1999–2013) during the austral winter (May–September) season, we found water temperature was included as a significant predictor of daily and monthly variability in predation rates. However, the signal of temporal variability over the season emerged as a more predominant predictor. Moreover, inter-annual variability in predation rate appeared linked to other environmental factors (wind, water visibility, and the occurrence of El Niño and La Niña events) rather than water temperature.

Data suggests that water temperatures on an intra-annual scale might contribute to predation patterns in white sharks either directly or indirectly (e.g. due to associated changes in prey availability), but do not implicate water temperature as a primary driver in this scenario, or at an interannual scale. It is possible that (1) the metabolic demand of white sharks may be modulated against temperature variability by their partially endothermic nature, and (2) the predation patterns of white sharks on seals are the result of a complex interplay between ambient physical conditions and broader oceanographic, biological, and ecological factors.

Shark Shop



SRI shirts from **Bonfire.com** in a variety of sizes, more colors, and *new* styles from youth, tank tops (unisex & womens slouchy), womens slim fit, V-neck and warm pullover hoodies.

Order the shirts through our Facebook page or <https://www.bonfire.com/shark-research-institute-campaign2/>

Shipping dates vary depending upon when your order is placed but your shirts usually arrive within three weeks.



And our **Café Press** store is now open. Show your love of sharks and support of the Shark Research Institute with our cool new logo gear. Available are mugs, glasses, smartphone cases, hats, toys, clothing, blankets, pillows, and much more.

Shop now at:

<https://www.cafepress.com/SharkResearchInstitute>

For a unique gift, consider our **Adopt a Whale Shark** program. Although our researchers have cataloged hundreds of whale sharks, only sharks that have been seen within the past year are put up for adoption. Guardians are notified as sharks are re-sighted. Annual Adoptions are \$50. Lifetime Adoptions never need to be renewed and are \$150. All adoptions include an adoption certificate, fact sheet on whale sharks and a photo of your shark.

<https://www.sharks.org/support/whale-shark-adoption>



With summer fast approaching there will be more shark fishing and surf fishing from swimming and surfing beaches. These activities attract marine predators, possibly putting people at needless risk.

Recognizing that some municipalities still permit such activities, SRI member Jerry Taggart designed a series of **Warning Flags** to alert marine resource users when these hazards are present. For more information for your local officials about how to order the flags, email: tagchum@gmail.com

Would you like a guest speaker at your company, restaurant, Rotary Club meeting, dive club, school, or scout group? Would you like one of our staff to teach students about careers in marine science, staff to lead a field trip for your class, teach students how to use a seine net, or help organize a beach clean-up?

Contact SRI at info@sharks.org

