

Spring 2021

SHARK RESEARCH INSTITUTE

Newsletter

Shark Research Institute Global Headquarters
70 Heather Lane • Princeton, NJ 08540 • USA • Phone: 609-915-5211 • www.sharks.org

Line-Sailing the Horse Latitudes and Fighting the Florida Current

By Dave Grant, Conservation Director



NOAA vessel *Ronald H. Brown* (R-104)

“When I am playful, I use the meridians of longitude and parallels of latitude for a seine, and drag the Atlantic Ocean for whales!” Mark Twain

When I am lucky, I get invited to go to sea. So, when contacted about a month-long cruise to retrieve oceanographic equipment that climate scientists anchored between the Bahamas and Cape Verde Islands, I leapt at the opportunity. Research cruises are costly and time-consuming, so to best utilize precious ship-time, they are multifaceted to

accommodate interdisciplinary projects and scientists. Since I have an interest in plankton, I was asked to add the sampling of neuston to my anticipated duties onboard, if a proper net could be secured. In most oceanography texts, only allusions are made to this small community of aquatic organisms inhabiting the interface of sea and air, and moving about via the surface tension of water. I was a bit concerned that my familiarity with neuston consisted of merely a primer during an invertebrate zoology lecture by my college advisor, legendary Monmouth University professor William Garner. Nevertheless, he did pique my curiosity in the most unusual members of that group — water striders (Halobates) — one of the few insects to invade the sea. So, the invitation to study such peculiar inhabitants of the Gulf Stream was irresistible.

We shipped out of Charleston, South Carolina on the 274-foot *Ronald H. Brown*, NOAA’s largest research vessel; sailing south for two days to check-in with Bahamian port authorities before turning east.

Spread between Florida and Africa, sensors dangle at various depths from buoys secured with miles-long cables anchored by tons of old repurposed railroad wheels. This electronic “picket fence” of current, temperature and salinity meters, records the massive transfer of heat from the tropical Atlantic to the Arctic via the Gulf Stream, and the centuries-long redistribution of that warmth throughout the oceans via the Global Ocean Conveyor Belt of deep-sea currents. The fence’s purpose is to monitor changes in these currents that drive our climate.

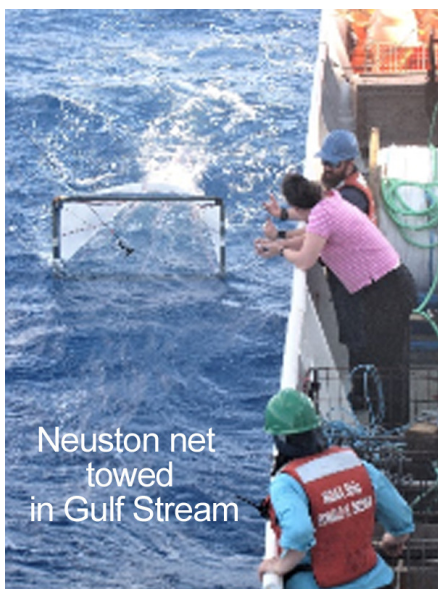
Before ship’s chronometers were perfected to determine longitude, mariners would shoot-the-sun to sail along known lines of latitude until they came to their destination. We are line-sailing along 26°N — the Horse Latitudes — where atmospheric heat rising at the equator is down-welling back to the surface to diverge north as the “Westerlies” and south as the “Trade Winds”. This calm band of sub-tropical air often halted the progress of sailing vessels. The presence of dead livestock, jettisoned from becalmed and stranded ships, became engrained in sailors’ lore — as well as eerie prose for teenage songwriter Jim Morrison (“When the still sea conspires...and her sullen and aborted...currents breed tiny monsters...true sailing is dead”. The Doors, 1967)

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This well-studied atmospheric phenomenon often produces flat, mirror-like sea surfaces which made our task of hauling up miles of cable less arduous during

Continued on next page...



Neuston net towed in Gulf Stream

some remarkably calm days. Examining and servicing the sensors is like reading a chapter on marine ecology. Canisters moored at the warm, sunlit surface were covered with bio-fouling organisms typical of shallow water – algae, hydroids, worms, mollusks, bryozoans and barnacles. As sensors from dark, deep and colder waters were hauled up, the variety of organisms diminished quickly; although surprisingly, the number of tooth marks from shark bites. With a plankton net, I collected a variety of Morrison’s “tiny monsters” from these offshore waters; some of the zooplankton being quite colorful. Pteropods (pelagic sea snails) were particularly abundant in the samples. Besides being important food for whales and fish, the shells of these sea butterflies are an environmental yardstick for paleo-geologists, since they accumulate at relatively shallow ocean depths. *R.S. Wimpenny* (*The Plankton of the Sea*, 1966) calculated that extensive deposits of “pteropod ooze” from their sinking shells cover portions of the Atlantic seafloor equivalent to the area of the Gulf of Mexico.

Regardless of the mission on a research vessel, some hopeful mariner always brings a fishing pole, and one of the British researchers finally caught a “tuna” (A generic name regularly tossed about on boats). Fortunately, we were able to email an image to my “go-to guy” for such occasions – Jeff Dement, SRI supporter and fish tagging director at the American Littoral Society. He quickly responded and identified it as a “lesser amberjack, *Seriola fasciata*, based upon the shape of the snout, and the eye stripe length”; so, we were able to document it properly before release.

Besides contemplating the vast horizon, empty of any ships or reference points, and our sunset assemblages to try to catch a view of the green flash, I was constantly reminded of the immensity of the ocean during our daily chores. Warm, 85°F surface water contrasted sharply with bone-chilling 38°F samples and equipment retrieved from miles below the surface, and when deploying the refurbished equipment overboard, the lengths of buoy cable required to reach the bottom stretched all the way to the horizon before their anchors were finally launched off the stern. Data downloaded, batteries charged and surfaces scrubbed clean of fouling organisms, the picket fence was secured to operate for another 18-months.

Our offshore mission complete, it was time to depart placid Bahamian waters to initiate our sampling across what was described to me as the boaters’ Wild West. This is the narrowest and perhaps most perilous stretch of the Gulf Stream – the Florida Current. I was forewarned that it is demanding work in the Straits, since for a day and a night we would be taking hourly water samples throughout the water



Inch-long Phyllosoma larvae on a glass slide (one of the tropical lobsters from the Gulf Stream)



Fireworm from the bio-fouling community



Sea strider and Gulfweed pipefish



Pteropod shell from plankton



Gulfweed frogfish



Neuston net samples

column and in strong currents, as we retrieved samples from the neuston net.

We arrived on station after dark, under the sweep of the Jupiter Inlet lighthouse, in the glade of a full moon and choppy seas, and to the delight of homesick crew – within the range of cell phone towers. We began our transect to a cacophony of radio chatter, hodge-podge of recreational, commercial and research vessels, and bombardment by disoriented seabirds bumping into deck lights (And my work helmet!). This is as good as it gets – a navigator’s nightmare, but a biologist’s bonanza. Each hour, we hauled up scores of King Neptune’s rare treats – fabled creatures, all golden-brown to match their home, and endlessly adrift in their unique Sargassum ecosystem: Gulfweed shrimp (*Leander*), tiny swimming crabs (*Portunus*), nudibranchs (*Scyllaea*), filefish (*Monacanthus*), and the oddest ichthyological treat of all, the frogfish (*Histrio*).

As the sample bottles were filled each hour and daylight increased, the volume of organisms decreased proportionately – a textbook example of the diurnal vertical migration pattern of movement exhibited by some fishes, larvae and zooplankton, like copepods. Regularly captured throughout the study were fragile little sea striders – the inch-long creatures that originally intrigued me in college. How these peculiar seagoing insects thrive by dancing across the everchanging sea surface continues to mystify me.

Finished fighting the current, and now riding with it, we headed north towards Charleston, and according to scuttlebutt, would arrive home a day early. However, King Neptune had a trick for us – a rapidly passing storm, head winds and huge waves. So instead, we arrived a day late, with great admiration for our captain, crew, the “*Ron Brown*” and Matthew Arnold’s poetry of the sea.

“Now the great winds shoreward blow;
Now the salt tides seaward flow;
Now the wild white horses play,
Champ and chafe and toss the spray.”

Notes: Images and drawings by Dave Grant on the NOAA vessel *Ronald H. Brown*. For an update on the Gulf Stream, boundary currents and climate issues (“Atlantic Ocean circulation weakens, sparking climate worries”) follow the link below.

<https://www.yahoo.com/news/atlantic-ocean-circulation-weakens-sparking-012148067.html>:



Remembering Armand Zigahn 1931 - 2021



It is with deep sadness that we note the passing of Armand Zigahn.

Zig, the name the thousands of men and women his life touched knew him as Zig. He touched and enriched the lives of thousands of divers throughout the world.

Zig was the Founder and Executive Director of Beneath the Sea, the largest consumer ocean exposition, dive, and travel show in America. Through Zig's generosity and concern, many thousands of divers have been educated about sharks, their critical role in the ocean ecosystem, and the need for their conservation. Every year at Beneath the Sea, Zig always reserved a hall exclusively for shark presentations and workshops, and showcased the finest new films about sharks at the show's Film Festival.

With his wife, Joann, he co-founded Ocean Pals, the children's oriented environmental education section of Beneath the Sea and co-founded The Women Divers Hall of Fame.

Zig co-founded the Sea of Tomorrow Society, which raised nearly a million dollars for the Maria Fareri Children's Hospital at the Westchester Medical Center and underwater programs for their young patients. He served on the hospital's board, the Board of the New York Aquarium and was a former Executive Vice President of the Underwater Society of America. In 2000, for his efforts on behalf of the scuba diving community in 2000, he received the Nick Icorn award for establishing the Beneath the Sea Museum of Diving History. In 2004, he received the prestigious NOGI Award for Sports and Education from the Academy of Underwater Arts and Sciences. In 2008, Zig received the Accolade award from the Island of Bonaire for his contributions to the Island and the sport of scuba diving. The International Scuba Diving Hall of Fame inducted Zig and Joann for their contributions to the sport in 2012. In 2019, DEMA (Dive Equipment Marketing Association) awarded Zig and Joann their coveted Reaching Out award for Beneath the Seas' contributions to the dive industry.

Throughout the years, Zig received Diver of the Year awards from the Long Island Divers Association (LIDA), the New York State Divers Association (NYSDA), The Scuba Sports Club, and the Handicapped Scuba Association. He received awards from Lifeguard Systems Service and the Divers Alert Network (DAN). In 2010, Beneath the Sea surprised Zig by awarding him their Diver of the Year award for Service. In 2011, the Aquatic Adventures dive club honored Zig and Beneath the Sea, for his work in the sport of diving. Westchester County issued a Proclamation honoring Zig for his charitable work promoting education and community service. Other awards hanging in Zig's office are from PADI's Project Aware Foundation and Sea Space/PADI for Environmental Awareness. He was an honorary member of the Yonkers Police Scuba Club. Zig served a Captain in the United States Air Force in command of communication centers, NY 10801 and was a retired Project and Development Manager for IBM.

Zig was so much more than Beneath the Sea. He was a real-life Hero.

Finding “Mini”-Nemo By Dean Fessler

The name *Nemo* was made famous in tales from Jules Verne's submarine *Captain* to Disney's animated clownfish. Now, for South Africa's white shark researchers, the name offers hope.

For years, a small island off the South African coast, Dyer Island, has been a habitat and feeding area for white sharks due to the abundance of available prey items, such as cape fur seals, fish, crustaceans, and other species of shark. In fact, the oil-laden livers of sharks are irresistible to white sharks and other oceanic predators. The relatively predictable presence of white sharks offers unique opportunities for white shark researchers, divers, and ecotourism operators.



Unfortunately, in 2017 the dynamics and balance of this aquatic food chain was disrupted when five white sharks were preyed upon by orcas, *Orcinus orcas*, aka killer whales. The orcas fed upon the sharks' livers. Most of the remainder of the white sharks' bodies were discarded after their livers were consumed. As a result, white shark sightings and encounters soon dropped to zero as white sharks relocated to other areas.



On February 17, 2021, a white shark initially identified in 2012 as “Mini-Nemo,” was spotted off Dyer Island by Marine Dynamics, a long established and regulated South African white shark research and ecotourism operation. The rediscovery of this lone shark has generated renewed hope for the return of this species off Dyer Island.

Cheers for Mini Nemo and Marine Dynamics!

A Reprieve for Sharks in the UAE



The Ministry of Climate Change and Environment (MOCCA) of the United Arab Emirates has imposed a ban (Ministerial Resolution No. 43 of 2019) on shark fishing until June 30. The ban allows fishermen, who use permitted shark fishing gear and run registered lynch boats to fish sharks from July 1 of each year until the last day of February of the following year.

Halima Al Jasmi, head of the Fisheries Section at MOCCA, said: "The seasonal ban on shark fishing and trade aligns with the Ministry's strategic goal of preserving ecosystems and marine life, as it helps sustain the population of the species through giving

them time to reproduce." The Ministerial Resolution No. 43 of 2019 is an effective tool for alleviating the pressure on sharks due to overfishing and habitat degradation.

In addition to the seasonal ban, the resolution imposes a permanent ban on fishing shark and ray species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and the Federal Law No. 23 of 1999 concerning the exploitation, protection, and development of living aquatic resources in the UAE and its amendments. The Resolution has permanently banned pleasure vessels from fishing sharks. It also permanently prohibits the import and re-export of shark fins — fresh, frozen, dried, salted, smoked, canned, or in any other form — excluding fins that are imported for scientific purposes, subject to approval of the Ministry

And Good News for Dolphins in New South Wales, Australia



Captive dolphins will no longer be commercially bred or imported into the Australian state of New South Wales. New regulations introduced by environment minister Matt Kean prohibits the setting up of any future dolphin amusement parks and ends the breeding of dolphins, whales and porpoises for entertainment.

A dolphin born today could live for up to 50 years, which means the animal could still be in a dolphinarium in 2071. Dolphins do not exist for our entertainment. They deserve a life worth living, and NSW has recognized this with these regulations. Queensland is now the only state in Australia still breeding dolphins for entertainment. The Animal Justice Party will be working to implement similar regulations passed in Queensland.

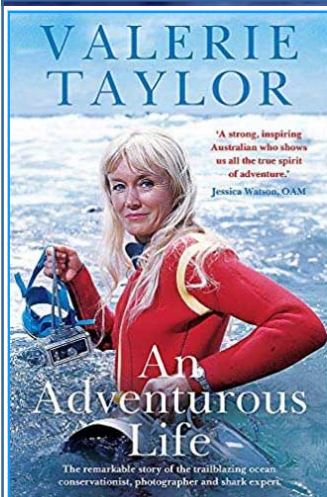
A Visual Feast

Of more than 3,000 entries in Oceanographic Magazine's Photography contest highlighting the sheer magic of the sea, Nadia Aly's magnificent image of rays off of Baja, California took first place.

To see more of these spectacular award-winning images go to: <https://tenderly.medium.com/these-stunning-photos-celebrate-the-strange-magic-of-our-oceans-95bcf4a0979a>



Bookshelf



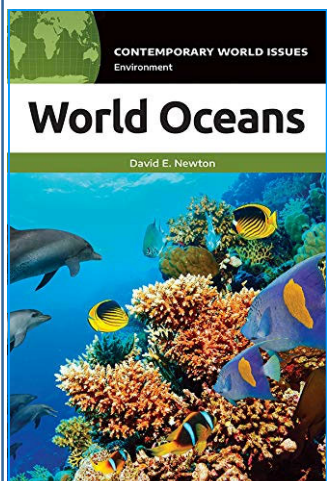
Valerie Taylor: An Adventurous Life: The remarkable story of the trailblazing ocean conservationist, photographer and shark expert

Kindle \$9.99 or paperback \$24.99, available June 29, 2021 from [AmazonSmile.com](https://www.amazon.com/smile)

This is the biography of an incredible woman. In the 1950s, Valerie and Ron Taylor met, married and their adventures began. Together they sailed the world, photographing and filming for magazines, TV and movies, and making many documentaries.

The couple became strong shark and ocean conservationists. They filmed all the live shark sequences in the movie *Jaws*, and James Cameron decided he wanted to become a filmmaker because of Valerie and her husband.

Valerie Taylor is a member of SRI's Advisory Board. Her articles have appeared in our monthly newsletters for members.



World Oceans: A Reference Handbook (Contemporary World Issues) by David Newton

Available from Amazon Simile as Kindle \$47.49 or hardcover \$63

This book provides in-depth discussion of the world's oceans. It discusses the marine life that is dependent on the sea as well as the problems threatening the health of the ocean and its wildlife. It also includes an overview of the history of human knowledge and understanding of the oceans and cryosphere, along with related scientific, technological, social, political, and other factors. It presents and discusses about a dozen major problems facing the Earth's oceans today, along with possible solutions and provides a bibliography, a chronology, and a glossary, to assist the reader in her or his further study of the issue.

Read the essay, "Coral Reef Bleaching-Is There Hope?", by SRI webmaster Cherilyn Chin in this book.



Sharks for Kids: A Junior Scientist's Guide to Great Whites, Hammerheads and Other Sharks in the Sea by David McGuire

Paperback \$8.47 from [AmazonSmile.com](https://www.amazon.com/smile) (Ages 6 to 9)

Sharks, the ocean's apex predators, come in all shapes and sizes, from giant whale sharks the size of school buses to tiny dwarf lanternsharks only eight inches long. This book introduces children to these magnificent creatures through vivid illustrations and photographs of some of the biggest, smallest, and strangest sharks swimming the sea from goblin sharks, to thresher sharks and many more. They will find tons of facts about some favorite sharks: how sharks see, smell, and communicate in the deep sea,

how they hunt, their life cycles, what they eat and how people around the world are working with them. The author, David McGuire, is the founder and director of the nonprofit Shark Stewards, one of SRI Affiliates. David is a marine biologist and the writer, producer, and underwater cinematographer of several award-winning documentaries, including an Emmy Award-winning series on a Philippines biodiversity expedition called Reefs to Rainforests.

You can support SRI every time you shop at Amazon.com. Simply go to [AmazonSmile](https://www.amazon.com/smile) and choose "[Shark Research Institute](https://www.amazon.com/smile)" as your favorite charity. Although no extra charge is added to your bill, Amazon makes a donation to SRI.

Kids' Page

We invite kids of all ages to submit essays and posters about sharks and the ocean, and let us know new ways they are helping to save sharks and the ocean.



Connor D.

As an 8th grade student from Arlington Heights, Illinois, I studied the numbers of shark finning and why it is happening in my English-language arts class. I picked this topic because I like the ocean, and I love Shark Week where I first learned about this problem that has greatly influenced the decreased numbers of sharks.

Imagine being a shark, one of the biggest, fastest predators in your many miles-long habitat. You are hungry because your food supply is growing increasingly scarce from rope-looking things. You see a high value prey item that is just waiting for the taking then...boom all of a sudden you are being reeled in, and you fight as hard as you can. After hours of trying to escape, you run out of energy and are brought onto a boat that has parts of your kind hanging everywhere. You are beaten till you cannot even move and just want to go to that ocean below, but you stay alive. Then you feel a wet warm absence of your tail fins... then your pectoral fins... You are left finless and thrown back into the ocean. You struggle to move at all, your own blood everywhere. You sink

to the bottom, a lifeless snake-looking creature with blood everywhere. Is this how cruel we have become? Cutting off the part of the shark we like best to eat (tasteless though it may be) and leaving the rest of the shark to lay waste and drown from not being able to move correctly. We need to change this. If it was happening at a place where they grow sharks like pigs for the slaughter, it might be ok. However, these are live, undisturbed sharks, and we need to leave them be for the rest of the ocean to recover with them.

In one of the sites I used it said, "The dish shark fin soup (the main thing the fins are used for) originated in the year 960 in China. That is when it started, and there are traces of shark fisheries that date back 200 years ago. But now we use commercial fishing boats, and because we catch so many, we use it as a way of making money. In U.S. currency it costs \$400 per kilo of shark fin. We fin between 6.4 percent and 7.9 percent of the overall shark population. This number goes up nearly every year despite the 4.9 percent population decrease limit that would help to sustain a steady population." It all started so long ago and yet it is still somehow acceptable to people that it continues at this rate. Not enough people have the knowledge that is even happening.

We need to act fast because in the near future, if these numbers continue, there may not even be sharks for future generations to enjoy seeing. Based on fishing stock and other numbers, one site I found projected that the money/stocks of ecotourism in the coming years may be worth more than the stocks/money made from fish, shark finning, and fishing for sharks as a source of money/food. Sharks are one of the biggest parts of these tours, and without them, it could have catastrophic effects in the stock markets and fishing companies. ... *Connor D.*

Upcoming Events, Expeditions, Dive and Surf Shows

Most events in the USA have been cancelled or rescheduled due to the pandemic. Those elsewhere are tentative, depending on what the virus decides to do and the availability of vaccines. President Biden says the vaccine will be available to all adults in the USA by late April.

Beneath The Sea 2021. BTS, the largest consumer dive show in the USA held annually at The Meadowlands, Secaucus, New Jersey, has been cancelled due to the pandemic.

Fossil Shark Tooth Hunts. Tentative Dates: May 22, June 19, July 24, August 21, September 18, October 9, 2021. See our website for times. Registration is required due to limitation of participants by site regulations and because we provide equipment for every participant. All participants find plenty of shellfish fossils, some shark teeth and a few find fossil teeth of Moasours. All participants must observe social distancing. Contact Heather Cifuentes at heather@sharks.org to register.

Five expeditions open to scuba divers to catalog tiger sharks in Hawaii.

- Ka Mua: Sept 15 to 20
- Ka Lua: Sept 22 to 27
- Ke Kolu: Sept 29 to Oct 4
- Ka 'ehā: Oct 13 to 18
- Ka Lima: Oct 20 to 25

See the website for details or contact Charlie Fasano, Expedition Leader, at charlie@sharks.org



Juvenile Whale Shark Study: Djibouti
December 3 to 11, 2021.

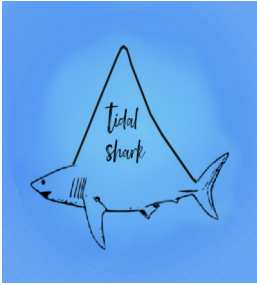
Join Dr. Jennifer Schmidt on location in this remote but stunning part of the world. This project is ground breaking and open to experienced sport divers. Contact jennifer@sharks.org for more information and to reserve a space.



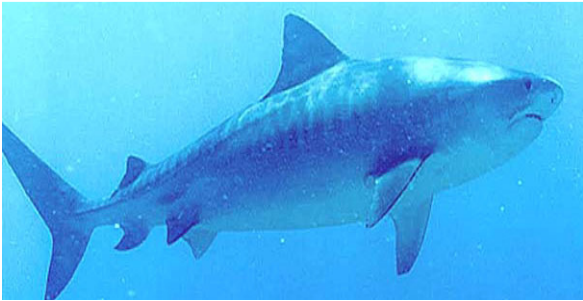
Note: Dr. Schmidt will also be working with whale sharks in Mexico in August 2021, Please contact her directly if you'd like to assist with this research.



Shark Shop



Tidal Shark is a new company started February 1st by 16-year-old Cammie Marcello and Matthew Mojena. They are very generously donating 50% of their profits to SRI. Tidal Shark offers necklaces, and will be adding more to their stock. Here is the link to their Etsy shop: at <https://www.etsy.com/shop/TidalShark> You can also see them on Instagram at: [tidalshark.co](https://www.instagram.com/cammie_marcello/?hl_en) or https://www.instagram.com/cammie_marcello/?hl_en



For a unique gift, consider our **Adopt a Tiger Shark Program**. Our researchers in Hawaii continue to catalog tiger sharks and several of those sharks are available for adoption. The guardian will receive a Certificate of Adoption, a fact sheet on tiger sharks and an 8" x 10" photo of their shark, and is notified each time their shark is re-sighted. Lifetime Adoptions are \$150 and never need to be renewed. <https://www.sharks.org/adopt-a-tiger-shark>



Our **Café Press** store is 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>



Warning Flags

With spring on the horizon, there will be soon be shark fishing and surf fishing at swimming and surfing beaches, and fishermen will start chumming just offshore. 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 about how your local officials may order the flags, or email: tagchum@gmail.com



Shirts to Show You Care

Support SRI by ordering a t-shirt, tank top, or hoodie. Sizes range from youth to adult XL. Check out the variety of colors and styles! Shipping dates vary depending on when orders are placed, but shirts usually arrive within three weeks.

Order a shirt on our Facebook page or use the links below:

Infinity Sharks

<https://www.bonfire.com/sharks/>

Save Our Sharks

<https://www.bonfire.com/sharks-save/>

Ban the Shark Fin Trade

<https://www.bonfire.com/sharks-ban/>

Protect Great White Sharks

<https://www.bonfire.com/protect-sharks/>

I Love Sharks

<https://www.bonfire.com/i-love-sharks/>

Ray of Hope-1 (White on dark-colored shirts) <https://www.bonfire.com/ray-of-hope-1/>

Ray of Hope-2 (Black on light-colored shirts) <https://www.bonfire.com/ray-of-hope-2/>

White Hai (White on dark-colored shirts)

<https://www.bonfire.com/white-hai/>

Kai's Shadow (Black on light-colored shirts)

<https://www.bonfire.com/kais-shadow/>

We all have to wear **face masks** these days. Here are three high-quality masks for you that show your concern for sharks and marine species.

<https://www.bonfire.com/ray-of-hope-mask/>

<https://www.bonfire.com/infinity-shark-mask/>

<https://www.bonfire.com/sea-life-mask/>



Change of Menu to Conserve Sharks

Braccini M, Blay N, Harry A, Newman SJ. (2020) **Would Ending Shark Meat Consumption in Australia Contribute to the Conservation of White Sharks in South Africa?** *Marine Policy*, Vol. 120, October 2020, <https://doi.org/10.1016/j.marpol.2020.104144>

South African white sharks have disappeared from one of the world's aggregation 'hot spots'. This has led to speculation that unsustainable fishing of smaller shark species may have displaced white sharks by removing their primary food source. Most of the catch from these fisheries is exported to Australia to supply the domestic 'fish and chips' market so a link has been made between the disappearance of South Africa's white sharks and shark consumption in Australia. As cooked seafood is not properly labelled in Australia, consumers cannot readily distinguish between sustainable and non-sustainable seafood. Hence, a highly promoted campaign was recently initiated to encourage Australians to stop eating 'fish and chips' and as such save South Africa's white sharks. However, most of the consumed shark in Australia is sourced from sustainable domestic fisheries and encouraging Australian consumers to stop eating 'fish and chips' would not help South African white sharks as it would simply displace the issue. It would not address any South African sustainability concerns and would negatively impact a legitimate and sustainable Australian industry. Instead, we encourage the South African government to establish and enforce a governance system for sustainably managing sharks and the Australian government to legislate and enforce the accurate labelling of all types of seafood.

Sharks in Hawaiian History

Puniwai N. (2020) **Pua ka wiliwili, nanahu ka manō: Understanding Sharks in Hawaiian Culture**, *Human Biology*, 2020 Nov 17;92(1):11-17. [doi: 10.13110/humanbiology.1.03.92](https://doi.org/10.13110/humanbiology.1.03.92)

Kanaka Maoli (Indigenous Hawaiians) are blessed with a written literature that documents observations and relationships with their environment in the form of chants, stories, and genealogies passed down orally for centuries. These literatures connect them to their ancestral knowledge and highlight species, places, and processes of importance. Such sayings as *Pua ka wiliwili, nanahu ka manō* (When the wiliwili blossoms, sharks bite), from the Kumulipo (a Kanaka Maoli creation story), are examples of the place of nature, humans, and a specific creature—here the shark, or *manō*—in ecological phenology. This article focuses on *manō* because of the importance of *manō* in Hawaiian culture and the availability of historical references, in contrast to the relatively little available scientific knowledge. *Manō* are understood through Hawaiian Indigenous science in their roles as **'aumakua** (guardians) and as unique individuals. By using *manō* as a lens through which to recognize the uniqueness of the Hawaiian worldview, the author highlights the classification system developed and applies this framework in analyzing management scenarios. She argues that using Hawaiian Indigenous science can help adapt new ways to classify our environmental interactions and relationships that will bring us closer to our living relatives. Management decisions regarding culturally important species need not be based solely on the most current Western scientific data but can utilize the much longer data set of knowledge stored in Kanaka Maoli oral literature.



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- Kenneth Hanczrik
- Joshua Hanks
- Dr. Jennifer Hayes
- Chris Hebel
- 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
- Kritty Kesogrides
- Jeanie and Murray Kilgour
- Jeff Kurr
- Sharon Kwok
- Mr. & Mrs. Mark A. Johnson
- Maureen & Steve Langevin
- Pascal LeCocq
- Elise Levin
- Wayne Levin
- Brad & April Levine
- Brian Levine
- Lewis Levine, M.D.
- The Levine Family
- Tom Lipkin
- Lotus 333 Productions
- Keri Martin
- Allison Martinez
- Brandon McCloskey
- Nancy McGee
- Beth & Tom McKenna
- Melissa Michelson
- Microwave Telemetry
- Paul Mila
- Craig Milan
- Rich Miller
- Paul Mischenko
- Susan Mottley
- Amos Nachoum
- Alex Neff
- Carolyn Nickels
- Gail Noren
- Hunter Noren
- Ocean Geographic Society
- Ocean Ramsey
- Olympus Dive Center
- Padi Foundation
- Patricia Chock
- Hillary Palmer Cree
- Commander Arun Patil
- Brody Penn
- Lee Peterson
- Margo Peyton
- The Philanthropic Group
- Michelle Pugh
- Bahman Rabaii
- Ripley's Aquarium of Canada
- Ripley's Aquarium of South Carolina
- Mike Rissi
- Lesley Rochat
- The Roddenberry Foundation
- Michael Rodricks
- The Rohauer Collection Foundation
- Rolex Watch USA
- Joe Romeiro
- Roots
- F. Peter Rose
- Ryan Johnson
- Wiltraud Salm
- Neil Schartzman
- San Diego Shark Diving
- Dr. Jennifer V. Schmidt
- The Shark Finatics
- Albert Simone
- Debbie Smith
- Marty Snyderman
- Greg Sparks
- Liz Sparks
- Paul Spielvogel
- Donald Nichols Storch
- Rick Stratton
- Studio 1143
- Surf Expo
- Valerie Taylor
- Oakleigh B. Thorne
- Mike Tichenor
- Barbara & Donald Tober Foundation
- Jim Toomey
- Naomi Tucker
- Undersea Images
- John Vincenti
- Phil Watson
- The Wave Foundation
- Catherine Wendt
- Wildleaks
- Winston Park K-8 Center
- The Whole Earth Center
- John Yavorksky
- Cristina Zenato