Autumn 2019

SHARK RESEARCH INSTITUTE

Newsletter

Shark Research Institute Global Headquarters
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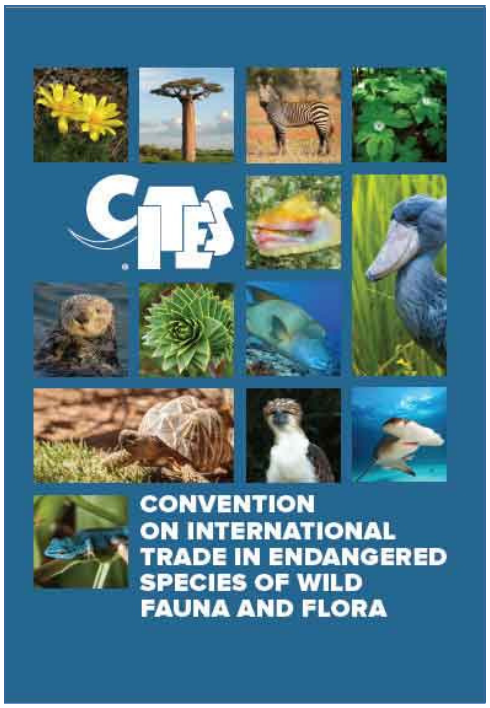
Big Win for Sharks and Rays at CITES!

by Marie Levine

"Nature is declining globally at rates unprecedented in human history — and the rate of species extinctions is accelerating, with grave impacts on people around the world now likely," warns the new landmark report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Service (IPBES). Up to one million species, including 33% of sharks and rays, are threatened with extinction.

One of the most powerful tools to put the brakes on the depletion of species is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Its goal is "to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The 183 member nations (Parties) that are signatories to CITES are legally bound to implement its decisions. A listing of a commercial species on CITES Appendix I or II requires a two-thirds majority vote of the 183 Parties. An Appendix I listing prohibits all international trade in the species, while a species listed on Appendix II can still be traded but all trade is regulated and monitored.

Shark Research Institute has been sending our scientists to CITES since 2002 (CoP12). CITES convened again in Geneva, Switzerland from August 17-28, 2019 at CoP18 (18th Convention of Parties). At CITES our scientists provide delegates with peer-reviewed data to support listings of sharks, rays and other endangered species.



Over the past 17 years, delegates have shown increasing concern for marine species. Whale sharks and basking sharks were listed on Appendix II at CoP12 as were white sharks at CoP13. All sawfishes were listed on Appendix I at CoP14 and CoP16. At CoP16 three species of hammerhead sharks (great hammerhead, scalloped hammerhead and smooth hammerheads), porbeagle sharks, oceanic whitetip sharks, and all manta rays were listed on Appendix II, and all species of thresher sharks, silky sharks, and devil rays (mobula spp) were listed on Appendix II at CoP17. Nine species of freshwater rays were also listed at CoP16 & CoP17. These species are common in the global shark fin trade and, in the case of rays, valued for their fins, gills, meat, or their alleged medicinal properties in some Asian countries. As a result, many species, once considered bycatch in commercial fisheries, are now actively targeted.

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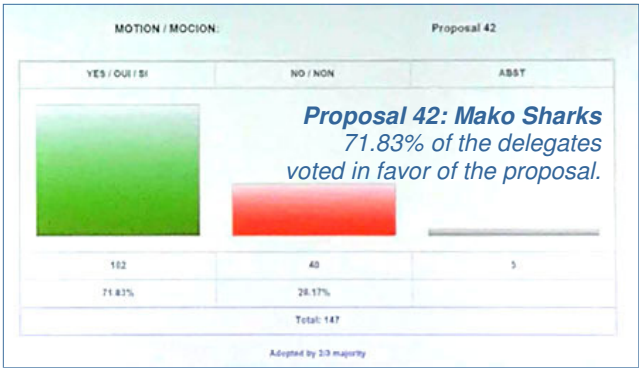
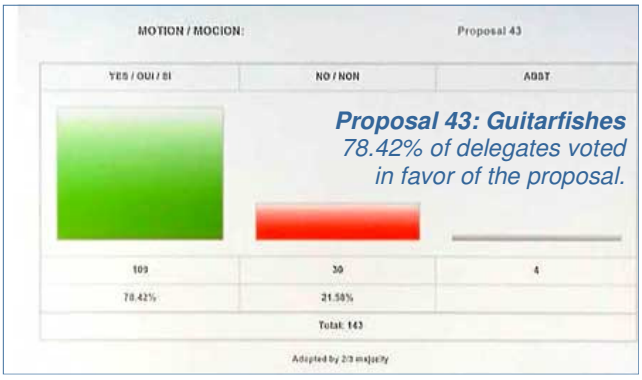
At CoP18, the delegates demonstrated their growing concern for dwindling global shark populations by listing both species of mako sharks (longfin and shortfin), guitarfishes (giant, blackchin and sharpnose), and the entire family of wedgefishes on Appendix II by more than the required two-thirds majority. The proposals won by such wide margins none were challenged during the ratification in Plenary at close of CoP18!

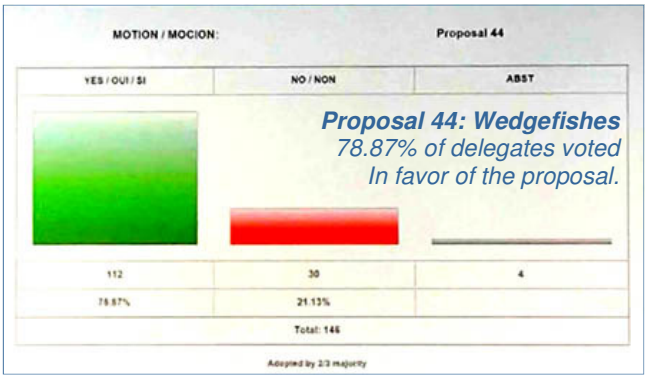
CITES also extended protection to many other species: three species of sea cucumbers and giraffes were listed on Appendix II. Unfortunately Namibia's population of the southern white rhino, formerly on Appendix I, was moved to Appendix II, despite that country's abysmal conviction rate for poaching and illegal trade. Only one of 85 poaching and trafficking cases between 2016 and October 2018 resulted in a conviction. The most frequently traded Indian star tortoise was placed on Appendix I as were two species of otters, the black-crowned crane, and several species of lizards.

The problems faced in securing protection for many critically endangered species include poaching, corruption, illegal trafficking, vote-buying (providing aid to a Party in exchange for their vote), a Party's resolution of national debt in exchange for granting an autonomous port to China, one of three nations (along with Japan and the USA) that opposed many of the proposed listings at CoP18.

CITES was intended to be governed by science but Parties are strongly lobbied by the wildlife trade and an increasing number of well-funded trophy hunting organizations such as the Safari Club International Foundation, Dallas Safari Club, IWMC World Conservation Trust, and the Ivory Education Institute. Although the wildlife trade will continue as a powerful opponent, Shark Research Institute will never give up the fight to protect sharks and endangered marine species.







Screen shots of the votes on the shark & ray proposals by Marie Levine and Rich Miller

From the names of donors who responded to our request for assitance to offset CITES expenses, we have drawn the name of the manatee print winner. Congratulations, Kimberlee McClure! We will send out your prize immediately. Thank you to EVERYONE who faithfully and generously contributes to our work. The real winners, as always, are those who can't articulate their own thank you: the world's SHARKS!

Seychelles President Recipient of Ocean Heritage Award

Danny Faure, President of the Seychelles, has received the prestigious Ocean Heritage Award from the Shark Research Institute. Faure is a world leader who has successfully established globally significant protected areas, including a marine reserve encompassing 30 percent of the exclusive economic zone (EEZ) of the Seychelles.

The award was formally presented to Faure by David Rowat, Ph.D., of the Shark Research Institute and the chair of Marine Conservation Society Seychelles (MCSS). “I am honoured to receive this award on behalf of the government, and I dedicate it to the people of Seychelles. As a Small Island Developing State being affected by climate change, it is crucial that we work collectively to safeguard our future generations,” Faure said. He noted that protecting our environment is “not just the right thing to do; it is the necessary thing to do.”

Faure also expressed his appreciation to the Shark Research Institute for the award and commended Rowat and his team for the amazing work being done in environmental conservation by both MCSS and the Institute. When presenting the award, Rowat said, “This award is very important for Seychelles as it reflects that what we are doing is having an impact globally.”

The Ocean Heritage Award is only given to heads of states who have made outstanding contributions to the health of the ocean ecosystem, including sharks and the marine habitat. It is hoped that their leadership will encourage other nations to follow suit.

Two previous recipients of the Shark Research Institute's Ocean Heritage Award include the presidents of the Philippines and Palau. Gloria Macapagal-Arroyo, former President of the Philippines, was recognized with the Ocean Heritage Award for her decades of efforts to protect sharks and the ocean ecosystem as the foundation for a stable, productive and sustainable society. She made unprecedented strides to protect marine resources throughout South Asia’s Coral Triangle, creating and expanding marine parks, personally funding marine conservation projects, and hosting marine conservation symposiums in the Asia Pacific region. Johnson Toribiong, President of Palau, received the Ocean Heritage Award for designating the entire 237,000 square miles of Palau's EEZ as the world's first shark sanctuary.

A Huge "Thank You" to EcoSmarte on Behalf of our Scientists & Filmmakers

by Jupp Kerckerinck, CEO

Thanks to our sponsor, Ecosmarte, SRI's equipment test pool contains *only* fresh water. In the past, testing our equipment and camera equipment in a chlorine pool or salt water pool involved rinsing it in multiple baths of fresh water after every use. But now, no more caustic chemicals and gone forever are the tubs of water to rinse equipment after use or testing in the pool!

Most pools today are salt water or use chlorine which breaks down into many different chemicals, including hypochlorous acid (HOCl) and hypochlorite ion (OCl^-). Although not considered hazardous to humans in concentrations used in swimming pools, repeated exposure to hypochlorites corrodes metals, necessitating lengthy fresh water baths for some the expensive scientific equipment we use in the field and camera equipment. (And we all know what chlorine and salt water do to scuba gear!) Due to the unusual depth of SRI's test pool, there is a thermocline so a wetsuit is still recommended!

Unexpected bonus: SRI's EcoSmarte pool is far less expensive and easier to maintain than last season when it was a chlorine pool. If you have a swimming pool, consider converting it to an EcoSmarte pool!

Working with REEF to Combat an Invasive Species

Banner at Fort Lauderdale

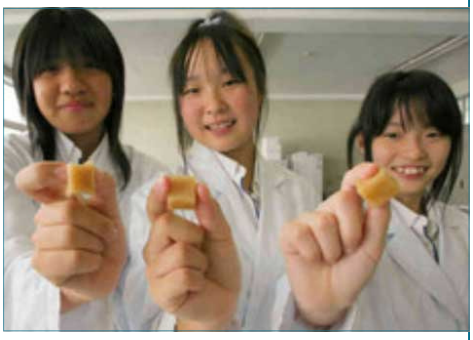
The lionfish is an invasive species wreaking havoc to resident fish populations on the East Coast of the USA. Shark Research Institute is one of the sponsors of Reef Environmental Education Foundation (REEF) Lionfish Derbys and provides prizes to winners of their derbys and raffles. We received the following thank you note from Dr. Alli Candelmo, Invasive Species Program Manager at REEF, after one of its recent derbys in Florida.

> *We wanted to reach out and thank the Shark Institute for your support of REEF's 8th Annual Fort Lauderdale Lionfish Derby. Despite a stormy start both Saturday and Sunday, this year's event brought in 417 individual Lionfish. In addition to the success of the hunting that day, we were able to engage a great local community about lionfish thanks to your efforts.*
>
> *"Of course, the derby would not have been possible without your support. Your dedication to remediation efforts of lionfish has kept this derby successful for the last eight years. From all of us at REEF, we want to say thank you. We are looking forward to the Sarasota Derby this weekend and Upper Keys September 15th.*

"When Life Hands You Lemons, Make Lemonade...or Candy"

When fishermen in the Sea of Japan found their nets invaded by huge swarms of giant jellyfish, *Nemopilema nomurai,* known as *echizen kurage*, each one weighing up to 450 pounds and measuring two metres wide, enterprising students at Obama Fisheries High School (located in the Japanese town of Obama no less!) took up the challenge.

Consuming the jellyfish is potentially dangerous if the toxic part is not thoroughly cleaned and cooked. However the students developed a sweet and salty caramel made out of sugar, starch syrup, and jellyfish powder, which is produced by boiling jellyfish into a paste and grinding it into tiny particles.



The Obama students aren't content with just producing a jellyfish caramel candy. The high schoolers have also requested that the Japan Aerospace Exploration Agency (JAXA) put the caramels on the menu for astronauts journeying to the International Space Station, presumably in a bid to raise awareness of their tasty solution to the jellyfish problem.

Previous to producing space candy, the Obama students developed jellyfish-infused cookies, dubbed "Ekura-chan saku-saku cookies." The cookies, sold in boxes of 10, are available in a Fukui prefecture store for 580 yen.

Ekura-chan saku-saku cookies

Tango Jersey Dairy vanilla jellyfish ice cream (note the enlarged chunk of jellyfish on the tip of the spoon in the right upper quadrant of the photo). "The jellyfish is soaked overnight in milk to reduce its smell, and is then diced," wrote Sebastian Moffett in the Wall Street Journal.

The Kyoto-based Tango Jersey Dairy has also taken advantage of the mass jellyfish invasion by producing jellyfish ice cream, a sweet dessert made from diced giant Nomura jellyfish mixed with milk. Apparently it is somewhat chewy but very tasty.

Scientists in Japan's Jellyfish Research Laboratory in Saitama, with support from the Japan Science and Technology Agency, as well as cosmetics enterprise Nikka Chemical Company and the food company Maruwa Oil & Fat, are developing a range of jellyfish beauty and cosmetic products as well as soft drinks and snacks. Technoble is working on beauty products from collagen extracted from the jellyfish.

People and Sharks Prepare for Hurricanes

By Hunter Noren

As I am sure many of you have been seeing on the news, hurricane season is once again upon us. Every year between June 1st and November 30th, hurricanes form in the Atlantic. As we go to press, Hurricane Dorian has ravaged the Bahamas and is now headed to US southern east coast. They are fed by the warm waters heated during the spring and early summer. Global warming has raised the temperature of our oceans to unprecedented highs which, in turn, has led to larger, more destructive hurricanes. When Dorian hit the Bahamas, it was the strongest Atlantic storm on record to hit land.

While hurricanes are very destructive, nature has evolved ways to protect against hurricanes. In Florida, mangrove forests have stilt roots that absorb waves and protect shorelines. Up and down the coast, native dunes and dune grasses reduce erosion from large storms. As storms get larger and more destructive, it is important to recognize the value of these natural resources and protect them so they can protect us.

We can see on the news when a hurricane is brewing weeks before it is even close to us! But how do animals prepare for a hurricane? Many animals can sense changes in barometric pressure that precede hurricanes. Sharks are a good example of this. They can sense pressure changes through special sensory organs called lateral lines. When sharks sense incoming large storms they often move from shallower to deeper waters or away from coastlines in order to avoid the storm.

What can you do? If you are in a hurricane-prone area, make sure you are prepared well in advance with enough food and water. When people wait until the last minute to buy emergency supplies, they find that stores are sold out, lines are long, traffic is heavy, and much time is spent making simple shopping trips.

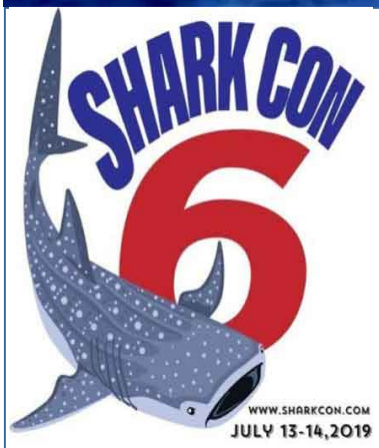
Listen to advisories and evacuate as needed, but before you head for safer ground, make sure you walk around and secure or remove anything plastic that can blow away and possibly land in the ocean. That way when the sharks return after the hurricane, they won't find their habitat full of trash.

More Evidence of Climate Change

On Friday, August 30th, as Executive Director Marie Levine flew over Greenland, she shot these images of the glacial melt and exposed permafrost.

Shark Con

by Dr. Jennifer Schmidt



Every July the Florida State Fairgrounds at Tampa explodes with shark science, shark conservation, shark education, and just plain shark mania! SRI was at Shark-Con 6 this year, communicating shark research and conservation to the thousands of attendees. Over two very busy days Shark Research Institute Director of Science and Research, Jennifer Schmidt,Ph.D., and SRI Texas Director Mike Tichenor spoke with adults and kids from toddlers to college-age about SRI's studies on whale sharks, our public research expeditions, our campaigns against shark finning, and many other sharky topics. People signed the petitions we use to advocate for legislation against the collection and transport of fins, and we hope some will be inspired to join us as SRI members.

The Florida Aquarium provided an interactive exhibit. The Clearwater Aquarium demonstrated marine mammal rescue and brought touch tanks. Florida Fish and Wildlife taught shark and ray identification. There was a 22-foot shark slide and more than 100 booths of vendors focused on art, scuba, sharks and the ocean.

Speakers from Shark Week, National Geographic and Animal Planet included Mikki McComb-Kobza, Emma Cassagrande, Liz Parkinson, and members of the cast of SpongeBob Squarepants.

Shark-Con offered two full days of fascinating presentations by renowned shark researchers, conservationists and photographers. This year's lineup included University of Miami shark researcher Dr. Neil Hammerschlag, Ph.D., Ocean First's Mikki McComb-Kobza, Ph.D., diver and conservationist Cristina Zenato, deep-water shark expert Paul Clerkin, Ph.D., and more.

It was fun to catch up with colleagues at Fins Attached, Shark Allies, Oceana, Tampa Bay Watch, Sharks 4 Kids and others. Educational activities were offered by many groups, including a live aquarium with bamboo sharks, dissections of preserved shark specimens, an exhibit on fossils of extinct sharks and much more.

Shark-Con is about shark fun as well as education. Shark costumes and clothing and accessories were everywhere, inside and even outside the convention hall! Vendors sold shark- and ocean-themed products of every type, and many of the stars from Jaws, Sharknado and other movies were there for photos and autographs. You could buy a shark dress, and get one for your dog too!

You could have your picture taken inside a life-sized Megalodon jaw, find shark themed décor for your house, even get a shark tattoo, all while your kids played on the inflatable shark slide or experienced scuba for the first time at the large training pool.

Shark-Con 7 is already scheduled for July 11-12, 2020. Mark your calendars!

Some Summer Weekends at SRI

June 13-14th was **Shark Awareness Weekend** at Jenkinson's Aquarium, Point Pleasant, NJ. There was a great turnout! At our table Ella Merkle and Heather Cifuentes discussed sharks, kids tested their knowledge about sharks, and gifts and prizes were awarded. Dave Grant gave two talks in the Aquarium's lecture room: one on whale sharks and another on Greenland sharks.

June 27th **Just A White Shark.** Dean Fessler wowed packed houses at Princeton's Garden Theatre pre-show screenings of JAWS. Long after the shows ended, Dean and Terri Lieb answered many questions from the audience, especially about the seasonal abundance of white sharks off the NJ coast.

Shark Show II, the Annual Shark Conservation Benefit Concert hosted by Elise Levin and Kritty Kesoglides of Fine Life was held this year at the Bushwick Public House in Brooklyn, New York on July 13th The concert also featured Juander, Chris Keys, Flying Machine Collective, and SRI's own Dean Fessler. The event included a raffle, silent auction, and visual artists Ash Showler and Wayne Levin. (Elise's father is a world-famous shark photographer). It was one of the hottest nights of the summer, but the crowd was huge and enthusiastic! It was a night to remember and treasure!

Our **beach clean-ups in Texas and New Jersey** kept staff and volunteers busy throughout the summer. It is appalling how much plastic trash (bags, bottles, straws, ice-cream wrappers and even flip-flops) is simply dumped on the sand within a few feet of trash barrels!

On a positive note, **SRI's monthly fossil shark tooth hunts** have proven to be a fun way to introduce paleontology to kids and their parents,These hands-on "treasure hunts," organized by Heather Cifuentes, got off to a great start in June and continued throughout the summer. Joining Heather in July was paleontologist Dr. Dana Ehret, one of the USA's leading authorities on fossil shark teeth.

Who doesn't love wading or sitting in a cool brook on a scorching hot summer day!

Upcoming Events

September 5-7, 2019: Surf Expo—Cancelled. The world's largest and longest-running Surf Show with 28,600 attendees and the pre-show outdoor festival at the Orange County Convention Center in Orlando, Florida are cancelled due to the continued threat of Hurricane Dorian on Orlando, the state of Florida, the southeast and the east coast. ***https://www.surfexpo.com/***

September 23, 2019: Climate Action Summit. Venue: United Nations, New York City. To boost ambition and accelerate action to implement the Paris Agreement, leaders from 19 countries and international organizations will meet with concrete, realistic plans to reduce greenhouse gas emissions by 45% over the next decade and to net zero emissions by 2050. ***https://www.un.org/en/climatechange/un-climate-summit-2019.shtml***

September-October, 2019: Tiger Shark Identification Expeditions. See page 13 for additional information. To reserve your space, contact: ***Charlie@sharks.org***

November 13-16, 2019: DEMA Show 2019. Venue: Orange County Convention Center, Orlando FL, United States This is the largest diving show in the world. This event brings together around 650 exhibitors. It is only accessible to professionals of the scuba diving industry. ***https://www.demashow.com/DEMA2019***

November 29, 2019: Shark Research Winter Auctions open. The catalogs and links into the auctions will be on our website.

November 27 to December 5, 2020 or December 5 to 11, 2020: Djibouti Expeditions. Join a Shark Research Institute expedition to assist with research on this fascinating population of the world's largest shark. To reserve your space, contact: ***Jennifer@sharks.org***

Although the 2019 Djibouti Expeditions are full watch our website for additional 2020 Field Expeditions.

Interview with Dr. Dana Ehret

by Heather Cifuentes, Outreach Director

On our July fossil shark tooth hunt, we were fortunate to be joined by Dr. Dana Ehret, Assistant Curator of Natural History at the New Jersey State Museum in Trenton. Dana is a paleontologist and he assisted all of our budding shark paleontologists with the identification of their finds. Afterwards, he granted me a brief interview.

Heather Cifuentes (HC): What is a typical day for you?
Dr. Dana Ehret (DE): I am both a paleontologist and a biologist. While I do a lot of shark research and outreach explaining how fossils are collected, I spend time in the lab preparing and designing exhibits for museum visitors, such as the Pinelands exhibit we have now.

HC: What is your most treasured fossil and why?
DE: One of the coolest fossils that I found while working in Peru was a piece of a whale jawbone. It had a dimple in the bone on the outside. When a chunk of the bone broke off, embedded inside was the tip of a fossil tooth from *Carchardon hubbelli* (transitional white shark named in honor of Dr. Gordon Hubble).

HC: When did you know you wanted to be a paleontologist and what got you interested?
DE: I was about five or six years old. My family would take me fossil collecting at Shark River Park as a child; I guess I just never grew out of it!

HC: What are your thoughts regarding the recent speculation that Megalodon is still in the ocean somewhere?
DE: It is not, definitely not. I was on *Shark Week* last summer talking about the mockumentary they had aired. I had published a paper about when they went extinct. Based on the fossil record and their distribution, it appears they went extinct about 4 million years ago. Teeth found in the continental shelf environment show that they were near shore sharks, and preyed on whales. To survive all this time, they would have had to evolve to eat other things. The most popular theory of them being in the Mariana Trench would not be a good candidate for where they could reside, because of a lack of food resources. They ate a ton of food a day in order to maintain their weight and size.

HC: What is s the most important information we can learn from the fossil record?
DE: My take home, with why fossils are important, is looking at how organisms reacted to their changing environments in the past. This is extremely important to help us model how organisms might respond going forward. The fossil record can teach us about what the earth might look like in the future as we are in a period of climate change right now.

HC: Do you think it's possible that we are in the midst of an MEE (Mass Extinction Event)?
DE: I think we are on the leading edge of one, yes. I think it's related in this case to human interaction; man-made climate change, deforestation, and overfishing are affecting the rates of extinction.

HC: What is your advice for someone seeking a career in Paleontology?
DE: Study hard. In paleontology you need a Masters degree or a Ph.D. to actively work as a paleontologist. Anyone can be an amateur paleontologist of course, sifting for fossils in creeks like this. It takes a lot of schooling and good grades. For instance, a medical doctor only needs to know about one species, man. A paleontologist is expected to know about every species that ever lived!

After thanking Dr. Ehret for his time, Heather directs members to his Instagram and Twitter profile ***@drdanaehret***, and notes that he is active on science research pages on social media.

Kids' Corner

by Gail Noren

In Tyrone, PA, I happened upon the May 2019 Grier School Newspaper, *Green and Gold,* and found a wonderful and inspirational article written by high school senior Rachel Stuber, who is now a freshman studying Marine Science at Jacksonville University in Florida. It was easy enough to track her down and when I did, she gave SRI permission, as did her school newspaper, to reprint her article. We hope to hear more from Rachel Stuber, defender of sharks, in the future.

Sharks With Superpowers: Mapping the Great White Shark Genome

by Rachel Stuber

"All this machine does is swim and eat and make little sharks, and that's all." This quote from Matt Hooper, the marine biologist in "Jaws" goes to show that sharks have been highly villainized for centuries in movies as well as other media. These apex predators are seen as cold, vicious, killing machines. For this reason, the amount of sharks killed by humans far exceeds the amount of fatal shark attacks each year. Inspired by fear, people go out of their way to kill these fish, not to mention, destructive fishing practices such as finning are causing already endangered shark populations to dwindle. However, through recent research, scientists may have found a new reason to conserve and study these mysterious creatures. The mapping of the great white shark genome may hold the secret to longevity and cancer resistance.

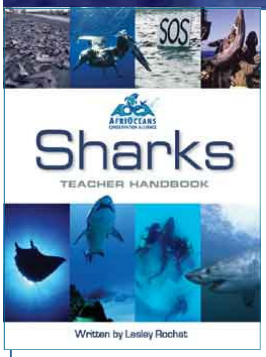
For four years scientists worked to map the great white shark genome. To put into perspective the time and effort that went into this project, it is important to mention that the genome of the great white shark is almost double that of the human genome. Here is what scientists have learned through this painstaking process. Much like comic book superheroes, sharks have a variety of unique attributes. Compared to other organisms, sharks have an unusual resistance to injury, with quick blood clotting and tissue regeneration. Scientists such as Mahmood Shivji, one of the co-authors of the shark genome study, also say that that for the size and lifespan of a great white, that sharks should have ample time to develop diseases like cancer, but when studying wild sharks it is incredibly rare to find an unhealthy shark. With these findings, many people are now asking the question, "What does this mean to the public?"

The implications of this research are incredibly beneficial. While there is not much that can be done with this research immediately, in the long term scientists hope to use this knowledge for everything from healing technology to cancer treatments. By using a more complex genome than that of humans, scientists hope to get a better grasp on how the human genome could be improved with genetic modification. People like Shivji hope to blend the genes of humans and great white sharks in order to promote cancer resistance and faster skin regeneration. If successful, these innovations could be groundbreaking in the medical field, allowing cancers to be treated more efficiently and allowing healing in trauma or post-op to be shortened significantly.

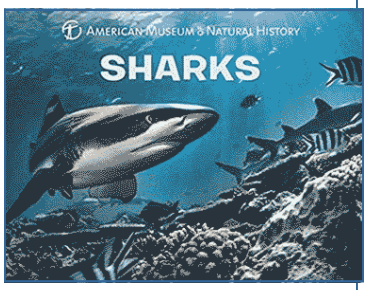
While this research on sharks has been primarily advantageous for humans, it has had an adverse effect on sharks. The problem mainly stems from the myth that a shark's powers can be gained simply by eating shark meat. These tall tales result in the overfishing of sharks worldwide. Unfortunately, while sharks may be able to provide insight into human longevity and overall health, many people misunderstand how. Rather than finning sharks for foods such as shark fin soup, sharks need to be protected and studied.

Despite their reputation, these intimidating ichthyes, could actually be more helpful than harmful to humans. If people help sharks rather than harm them, scientists will be able to study sharks for years to come. These creatures, like superheroes, may be able to contribute their powers to medicine. While sharks may not allow us to become invincible, they can help us to understand our own genome better. These fish are not animals to fear, rather they are animals that humans should get to know better.

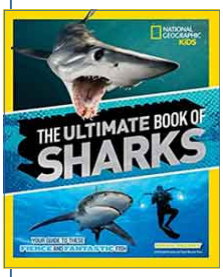
Bookshelf and more



Sharks : Teacher Handbook *by Lesley Rochat. (We reviewed this book in our last newsletter but want to make certain everyone has a copy—it is a superb book...and it is FREE.)* "I'm offering a free download of my book, a wonderful resource for teachers and their students, as well as for biology students or anyone who loves sharks and wants to know more about them. Must add, it is a great resource for PADI Shark Speciality course as a supporting and complimenting resource. You're welcome to a copy for your kids, or students, or just for yourself." The book is divided into 8 chapters which consist of a Core Knowledge section, a Teacher Guide, and activities which can be photocopied for handouts for students.
http:www.aoca.org.za/resources/



Sharks (Science for Toddlers) $7.95, purchase through Amazon.com.
Created in collaboration with the American Museum of Natural History, this beautiful board book lets young children learn about sharks. The book introduces nine different sharks to your budding marine biologist—from the five-foot-long blue shark to the school bus-sized whale shark. Thanks to the book's graduated tabbed format, kids can really see and compare the various size and shapes of these special animals.



The Ultimate Book of Sharks (National Geographic Kids) by Brian Skerry (for kids ages 8 ot 12). Hardcover $13.99 through Amazon.com.
Readers join an underwater adventure to track the sharks of the world, from the tiniest dogfish to the magnificent white shark. This "ultimate" book features awesome photos, fascinating facts, the latest science, and first-hand stories of real-life encounters with these incredible creatures. Learn how sharks live, how they eat, the challenges they face, and that you are not on their menu!

Film: **Chasing The Thunder:** A high seas eco-thriller of the epic 10,000-mile chase by Sea Shepherd of the world's most notorious pirate fishing vessel *Thunder*. Poaching is a high-stakes criminal enterprise and the *Thunder* the world's most notorious poaching vessel. The two Sea Shepherd vessels, the *Bob Barker* and the *Sam Simon,* their captains and crew, trail and harass the *Thunder*, observing and filming their illegal operations and pulling up their nets for evidence beginning in frigid Antarctic waters and through Southern Ocean storms. The chase ends dramatically in the South Atlantic when, after 110 days, the captain of the *Thunder* sinks his vessel. The finale of the film is the onscreen arrest of Antonio Vidal Suarez, the alleged kingpin of the illegal fishing industry in Galicia, Spain by the Spanish Guardia Civil and Interpol. Executive producer of the film, Paul Allen said: "Go after the big fish in the crimes against the ocean story." Apparently, Suarez, a multimillionaire, is one of the biggest fish of all.

Sea Shepherd Conservation Society, founded by Captain Paul Watson who also co-founded Greenpeace, is an NGO actively enforcing laws that other countries and navies have not prioritized or cannot afford. Their only significant official ally is Interpol, which does not have a mandate to do what Sea Shepherd does. The need for major policy changes by governments to step up their own official enforcement to protect the world's oceans is illuminated in stark and urgent terms.

TIGER SHARK IDENTIFICATION EXPEDITIONS

Join a Shark Research Institute expedition in Hawaii to assist with research on tiger sharks

Multiple dates during September and October 2019

Two expeditions will be led by Charlie Fasano, SRI Regional Director-Hawaii. Citizen scientists participate in cataloging individual tiger sharks. The objective is to determine tiger sharks' annual use of the area. The project will also increase the biological information available to guide conservation efforts for this species, on both a regional (Hawaiian) and global scale, with important data such as life history, species distribution, abundance and diversity, population productivity, and extinction risk. This information will then be used to inform international conservation forums such as CITES, as well as local fishery risk assessment and management plans. An education and awareness campaign on the status of Hawaii tiger sharks will be conducted in conjunction with the survey to increase awareness of the habitat use of the species.

Location
Kailua Kona, Hawaii

Cost
Expedition #1 - Eight days-$3,750 (double occupancy), $4,250 (single occupancy)
Expedition #2 - Five days-$2,500 (double occupancy), $2,900 (single occupancy)
Payments made through PayPal will incur an additional $50 per person processing fee. All payments are non-refundable. Dive insurance and travel insurance are required.

Included
Resort accommodations at King Kamehameha Kona Beach Hotel Courtyard Marriott, Kailua Kona, HI (garden room; upgrades available). All passengers embark and disembark at the hotel pier. The expedition includes daily boat dives to catalog resident tiger sharks of Big Island, Hawaii. Tiger sharks and dolphins will be viewable. Nitrox is available, recommended, and is mandated for five day expeditions.

Not included
Airfare To Kailua Kona, Hawaii. Manta Ray and tethered Blackwater night dives are available at an additional cost.

For more details or to reserve your space, contact the expedition leader at ***Charlie@sharks.org***

DJIBOUTI WHALE SHARK EXPEDITIONS

Join a Shark Research Institute expedition to assist with research on this fascinating population of the world's largest shark

November 27 to December 5, 2020 or December 4 to 12, 2020

Join an expedition led by SRI Director of Science & Research, Dr. Jennifer Schmidt to study the whale sharks that aggregate in the Gulf of Tadjoura, Djibouti, Africa. Djibouti hosts an aggregation of the youngest whale sharks found anywhere. Most sharks are between three and five metres with two metre animals occasionally seen. Participants will act as research assistants, documenting whale sharks by photo identification, collecting and analyzing plankton samples and hopefully observing night-feeding behavior. Research goals are to understand where these animals come from, why young sharks congregate in the area, and where they go when they leave.

Our home for this liveaboard expedition is the *M/V Deli*, a Turkish gulet that accommodates 12 people in shared rooms with private baths. The chef prepares a daily menu of local and continental cuisine. Whale shark interactions are snorkel only, but excellent diving is available from the boat at sites such as Ras Korali, Turtle Point, Moucha Island and La Faille, a convergence of tectonic plates. Whale shark interactions and diving are available each day, and participants may choose any combination of activities.

Cost: $2,300* includes shared accommodation on the boat, double occupancy hotel for the nights of November 28th and December 4th or December 5th and 11th, all meals on the ship, hotel and port transfers, and a tax-deductible donation to the Shark Research Institute. Not included are airfare, Djibouti visa, soda and beer, and meals off the ship. Post-trip excursions are available to explore the geologic formations and vast salt lakes of the East African rift valley.

The site is remote, and accommodations basic, but the experience is unmatched. Share this unique wildlife expedition to a stark and beautiful corner of the world.

For more details or to reserve your space, contact the expedition leader at ***Jennifer@sharks.org***

*Payments made through PayPal will incur an additional $50 per person processing fee.

Shark Shop

Support SRI and show you care about sharks by wearing a t-shirt, tank top, long-sleeve shirt, v-neck or hoodie. Sizes range from youth to adult XL. Check out the variety of colors and styles! More designs will be added every few months.

Shipping dates vary depending on when orders are placed, but shirts usually arrive within three weeks.

Order an Infinity Sharks shirt: ***https://www.bonfire.com/shark-research-institute***
Save Our Sharks: ***https://www.bonfire.com/shark-research-institute-Save***

Aware that some municipalities still permit shark fishing from swimming and surfing beaches, putting people at needless risk, SRI member Jerry Taggart designed a series of **Warning Flags** to alert marine resource users when these hazards are present. The flags may soon be appearing in Florida and New Zealand. For more information about how your local officials can order the flags, email: ***tagchum@gmail.com***

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.***

Our **Café Press** store is open. Show your love of sharks and support of the Shark Research Institute with our cool new logo gear: mugs, glasses, smartphone cases, hats, toys, clothing, blankets, pillows, and much more. Shop now at: **https://www.cafepress.com/SharkResearchInstitute**

And please remember you can support SRI every time you shop at ***Amazon.com***. Just go to **AmazonSmile** and choose **"Shark Research Institute"** as your favorite charity. Amazon makes a donation to SRI that costs you nothing!

White Shark Nursery

Tamburin E, Hoyos-Padilla M, Sánchez-González A, Hernández-Herrera A, Elorriaga-Verplancken FR, Galván-Magaña F. (2019) **New Nursery Area for White Sharks (Carcharodon carcharias) in the Eastern Pacific Ocean.** *Turkish Journal of Fisheries and Aquatic Sciences*. **DOI:10.4194/1303-2712-v20_4_08**

The white shark is a worldwide protected species. Although coastal nursery grounds and juvenile aggregation areas have been reported, actual information about birth or nursery areas for this species is still lacking. From 2015 to 2017 we obtained data on twelve neonates and juveniles around Isla Cedros in the western coast of Baja California, Mexico suggesting this island is an important nursery area for white sharks. This information will help in management plans for conservation in aggregation habitats of young white sharks.

Are Shark Bites Decreasing Worldwide?

Erich Ritter E, Amin R, Cahn K and Lee J. (2019). **Against Common Assumptions, the World's Shark Bite Rates Are Decreasing.** *Journal of Marine Biology*. **https://doi.org/10.1155/2019/7184634**

The trends of the world's top ten countries relating to shark bite rates, defined as the ratio of the annual number of shark bites of a country and its resident human population, were analyzed for the period 2000-2016. A nonparametric permutation-based methodology was used to determine whether the slope of the regression line of a country remained constant over time or whether so-called joinpoints, a core feature of the statistical software *Joinpoint*, occurred, at which the slope changes and a better fit could be obtained by applying a straight-line model. More than 90% of all shark bite incidents occurred along the US, Australia, South Africa, and New Zealand coasts. Since three of these coasts showed a negative trend when transformed into bite rates, the overall global trend is decreasing. Potential reasons for this decrease in shark bite rates—besides an increase in the world's human population, resulting in more beach going people, and a decrease of sharks due to overfishing—are discussed.

Or Are They Increasing?

McPhee, Daryl. (2014) **Unprovoked Shark Bites: Are They Becoming More Prevalent?** *Coastal Management*, **DOI: 10.1080/08920753.2014.9242046**

An unprovoked shark bite is extremely infrequent, but highly disturbing hazard for water sport participants in many parts of the world. Information was analysed on the total number of unprovoked shark bites between 1982 and 2011. In this period, unprovoked shark bites were recorded from 56 countries with 27 recording fatalities; however 84.5% occurred in only six countries: United States, Australia, South Africa, Brazil, Bahamas and Reunion Island. The three shark species commonly responsible for unprovoked bites are the white shark (*Carcharodon carcharias*), the tiger shark (*Galeocerdo cuvier*), and the bull shark (*Carcharhinus leucas*). Over the period examined, the total number of unprovoked shark bites and the number that were fatal increased in frequency. However, fatalities from unprovoked fatal shark bites still represented an infrequent hazard to people utilising the coastal zone for water-based leisure activities. The increase in unprovoked shark bites could not be explained entirely by increases in human population, and this article also concluded that changes in the population of relevant shark species were also unlikely to explain the increase. The paper concluded that both natural and anthropogenic factors may change the amount of spatial overlap between relevant shark species and areas of human use.

Habitat Use and Feeding Ecology of White Sharks and Mako Sharks

Tamburin E, Kim SL, Elorriaga-Verplancken R, Madigan DJ, Hoyos-Padilla M, Sanchez-González A, Hernández-Herrera A, Castillo-Geniz JL, Godinez-Padilla CJ, Galván-Magaña F. (2019). **Isotopic niche and resource sharing among young sharks (*Carcharodon carcharias* and *Isurus oxyrinchus*) in Baja California, Mexico.** *EPS (Marine Ecology Progress Series)* 613:107-124 (2019) ***DOI: https://doi.org/10.3354/meps12884***

White sharks, *Carcharodon carcharias,* and shortfin mako sharks, *Isurus oxyrinchus,* are globally distributed apex predators and keystone species. However, regional information regarding juvenile biology, such as habitat preferences and trophic ecology, is lacking. This study investigates habitat use and feeding ecology of juvenile shortfin mako and white sharks in an aggregation site with high catch of these species by artisanal fisheries in Sebastian Vizcaino Bay (SVB; Baja California, Mexico) using stable isotope analysis (SIA) of carbon (δ13C) and nitrogen (δ15N). During 2015 and 2016, we collected muscle samples from newborn, young of the year, and juvenile shortfin mako and white sharks from individuals with similar body size, as well as local prey, to develop a conceptual foraging framework based on SIA. We found a positive relationship between shortfin mako length and δ15N values, indicating ontogenetic changes in diet based on prey or locality. Bayesian isotopic mixing models (MixSIR) using prey from different regions in the North Eastern Pacific suggested diet shifts in shortfin makos from offshore, northern habitats to inshore habitats of southern Baja (e.g. SVB), while analysis of white sharks reflected use of inshore habitats of both southern California, northern Baja, and SVB. Our results suggest shared resource use between these shark species and potentially high consumption of prey from SVB and other similar coastal regions in southern Baja. This study characterizes high use of inshore regions for juvenile shortfin mako and white sharks, which has important implications for management and conservation practices.

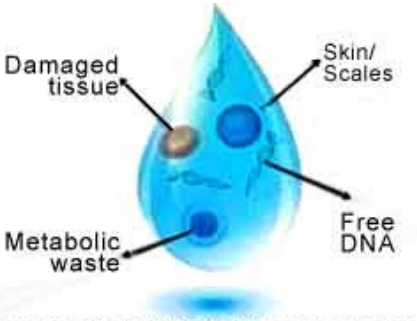
White Sharks at Guadalupe Island

Edgar E, Becerril-García EE, Hoyos-Padilla M, Micarelli P, Galván-Magaña F, Sperone E (2019). **The surface behaviour of white sharks during ecotourism: A baseline for monitoring this threatened species around Guadalupe Island, Mexico.** ***https://doi.org/10.1002/aqc.3057***

Cage diving is the most important activity for the sustainable use of white sharks (*Carcharodon carcharias*). However, information related to their behaviour during ecotourism is scarce. This study provides useful information for monitoring *C. carcharias* during cage diving activities around Guadalupe Island, Mexico. Surface behaviour of 106 white sharks was recorded for 87 days onboard six cage-diving boats in 2012, 2013, and 2014. Of the observed sharks, 63% were immature specimens (n = 67) and 37% were considered mature (n = 39). Seventy one per cent were males (n = 75) and 29% were females (n = 31). Interactions were classified into one of the 11 behaviours: parading, close inspection, horizontal attack, vertical attack, bait catching, feeding, not feeding, buoy catching, encounter, escape, and staying. Parading, close inspections, and horizontal attacks were performed more often by mature males, whereas immature females performed more vertical attacks, with no differences between mature and immature males. A total of 1,542 ethograms were registered. Each ethogram consisted on average of 6.3 ± 5.6 behaviours with a significant transitional pattern from horizontal attacks to parading and close inspections, and from vertical and horizontal attacks to bait being caught. A pattern related to feeding in a simple stimulus response reflex was observed. The shark's length seems to play an important role in the efficiency of the attacks, presumably resulting from the experience of mature individuals. Intentional feeding should be avoided to prevent negative effects related to ecotourism. This study constitutes a baseline for future research on white shark behaviour. It can be applied in other regions regardless of environmental conditions, quantity and size of the boats, and types of bait. Using this standard method could improve the monitoring, management, and conservation of this vulnerable species.

eDNA Detects Occurrences of Shark Species

Boussarie G, Bakker J, Wangensteen OS, Mariani S, Bonnin L, Juhel JB, Kiszka JJ, Kulbicki M, Manel S, Robbins WD, Vigliola L and Mouillot D (2018) **Environmental DNA illuminates the dark diversity of sharks**. *Science Advances,* Vol. 4, no. 5, ***DOI: 10.1126/sciadv.aap9661***



Sources of eDNA in a drop of seawater

In the era of "Anthropocene defaunation," large species are often no longer detected in habitats where they formerly occurred. However, it is unclear whether this apparent missing, or "dark" diversity of megafauna results from local species extirpations or from failure to detect elusive remaining individuals. We find that despite two orders of magnitude less sampling effort, environmental DNA (eDNA) detects 44% more shark species than traditional underwater visual censuses and baited videos across the New Caledonian archipelago (south-western Pacific). Furthermore, eDNA analysis reveals the presence of previously unobserved shark species in human-impacted areas. Overall, our results highlight a greater prevalence of sharks than described by traditional survey methods in both impacted and wilderness areas. This indicates an urgent need for large-scale eDNA assessments to improve monitoring of threatened and elusive megafauna. Finally, our findings emphasize the need for conservation efforts specifically geared toward the protection of elusive, residual populations.

Functional Areas of CITES, CMS and CBD

Mauerhofer V. (2019) **Activities of Environmental Convention-Secretariats: Laws, Functions and Discretions.** *Sustainability.* 11*(11), 3116
https://doi.org/10.3390/su111131116

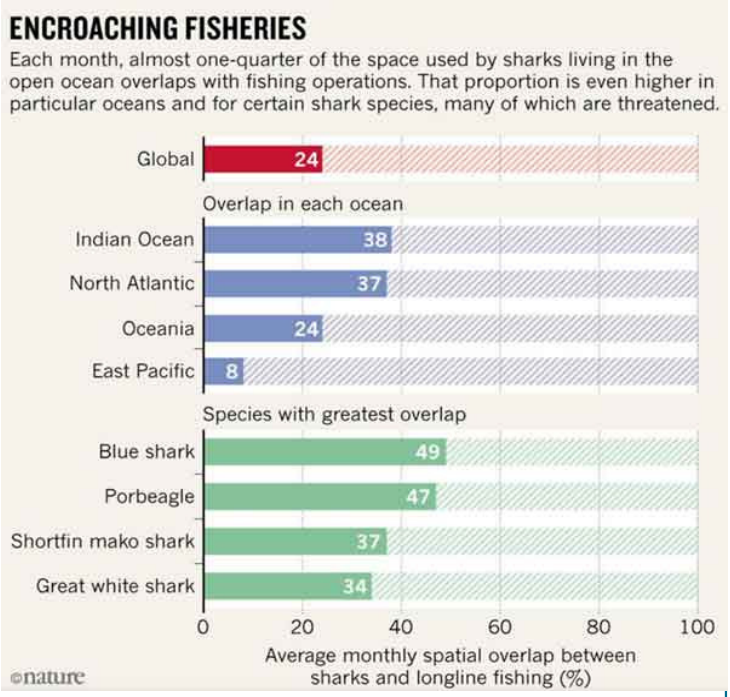
Multilateral Environmental Agreements—MEAs—are indispensable legal frameworks for environmental sustainability and also define the operating rules of their implementation bodies ("Secretariats"). The contribution assesses how far the norms defining Secretariats' functions differ and also reflect on actual functions for three MEAs, namely (1) the Convention on International Trade in Endangered Species of Wild Fauna and Flora-CITES (1973), (2) the Convention on Biological Diversity—CBD (1992), and (3) the Convention on Migratory Species—CMS (1979). It does so by comparative legal interpretation of the main norms of these MEAs laying down the functions of its respective Secretariats as well as an in-depth review of academic literature about these functions. The results for these three conventions divide into nine functional areas and show an unexpectedly wide range of different functions laid down in the conventions as well as extensive variety in the discretion for many of these functional areas. Some potential explanations of these formal differences are provided. The paper further finds that actually executed functions may not be fully covered by the underlying legal norms but rather by "flexible" highest governing bodies of MEAs and concludes that occasionally an unusual legislative style was chosen, and shows potential solutions and future research directions.

**This article belongs to the Special Issue Environmental Law for Sustainability 2018)*

Sharks and Fisheries

Queiroz N, Humphries NE, Sims DW (2019) **Global spatial risk assessment of sharks under the footprint of fisheries.** *Nature.* Vol. 572, pp 461–466. ***https://doi.org/10.10.38/s41586-019-1444-4***

Effective ocean management and the conservation of highly migratory species depend on resolving the overlap between animal movements and distributions, and fishing effort. However, this information is lacking at a global scale. Here we show, using a big-data approach that combines satellite-tracked movements of pelagic sharks and global fishing fleets, that 24% of the mean monthly space used by sharks falls under the footprint of pelagic longline fisheries. Space-use hotspots of commercially valuable sharks and of internationally protected species had the highest overlap with longlines (up to 76% and 64%, respectively), and were also associated with significant increases in fishing effort. We conclude that pelagic sharks have limited spatial refuge from current levels of fishing effort in marine areas beyond national jurisdictions (the high seas).



Our results demonstrate an urgent need for conservation and management measures at high-seas hotspots of shark space use, and highlight the potential of simultaneous satellite surveillance of megafauna and fishers as a tool for near-real-time, dynamic management.

Tracking Data in Conservation Policy and Management

Graeme HC, Bailey H, Bograd SJ, Bowen WD, Campagna C, Carmichael RH, Casale P, Chiaradia A, Costa DP, Cuevas E, Nico de Bruyn PJ, Dias MP, Duarte CM, Dunn DC, Dutton PH, Esteban N, Friedlaender A, Goetz KT, Godley BJ, Halpin PN, Hamann M, Hammerschlag N, et al. (2019). **Translating Marine Animal Tracking Data into Conservation Policy and Management.** *Trends in Ecology & Evolution*; 34(5): 459-473. ***https://doi.org/10.1016/j.tree.2019.01.009***

There have been efforts around the globe to track individuals of many marine species and assess their movements and distribution with the putative goal of supporting their conservation and management. Determining whether, and how, tracking data have been successfully applied to address real-world conservation issues is, however, difficult. Here we compile a broad range of case studies from diverse marine taxa to show how tracking data have helped inform conservation police and management, including reductions in fisheries bycatch and vessel strikes, and the design and administration of marine protected areas and important habitats. Using these examples, we highlight pathways through which the past and future investiment in collecting animal tracking data might be better used to achieve tangible conservation benefits.

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