



Newsletter

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Western Australia Shark Cull

In what may be the most unscientific, idiotic, knee-jerk reaction by a politician, the shark cull in Western Australia has begun. Despite vehement protests by WA citizens and against the advice of Australia's top scientists as well as scientists around the world, Colin Barnett, the premier of WA, ordered the cull after seven people were killed by sharks off the coast in a three-year timespan. The sharks are being drawn close to bathing beaches by baited drumlines. How does it work? The sharks (all species) are drawn close to bathing beaches using baited drumlines, then shot.



Thousands of people have gathered on beaches across Australia demanding the end of the policy. On Cottesloe Beach in Perth, an estimated 6,000 people, including environmentalists, divers and surfers, gathered and called for an end to the cull, chanting "Rights, rights, rights for great whites," About 2,000 people rallied at Manly Beach in Sydney's north. Sharon Burden, mother of boogie-boarder Kyle Burden who was killed by a white shark at Bunker Bay, Western Australia in September 2011, criticized the lack of scientific evidence for the cull and said the environmental impact could be devastating. Paul de Gelder, Anthony Joyce and others who have been bitten by sharks in Australian waters are also publicly protesting the cull.

Hundreds of South Australians protested at Glenelg. Rodney Fox, who was bitten by a shark in 1963, said at the Glenelg rally that the money being spent on culling sharks should be used to research their behaviour. "We've tagged them with satellite tags with sonic tags. There's just not enough money to put enough sonic or satellite tags to find out where they go, what time of year, when there's more [sharks] around. The money should be put into science," he said.

Celebrities, too, are criticizing the cull. Sir Richard Branson said it is "very sad" such a bad example is being set to the rest of the world. "Last year, Australia was praised all over the world for creating the biggest marine reserves," he said. "This year, the world is looking at Australia — and particularly Western Australia — and wondering 'what on earth is going on?'"

SRI has phoned, emailed and sent numerous letters to Colin Barnett, as have physicians and surgeons from the Global Shark Attack File, explaining why the cull will simply not be effective in preventing interactions with sharks, and why it may actually increase the risk of shark attacks to swimmers, surfers and divers. Barnett refuses to respond. He continues to ignore the advice of scientists and will of Australian citizens who are now

calling for his resignation. Not only will the cull fail to prevent shark attacks, attract sharks closer to bathing beaches, disrupt the WA ecosystem, damage WA's dive tourism, further threaten already endangered species of sharks, it is a waste of taxpayers dollars — dollars that should be spent instead on solving real problems.

The cull is 1970s "JAWS" stupidity at its worst.

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Whale Shark Slaughterhouse Exposed in China



Hong Kong-based wildlife conservation NGO WildLifeRisk has revealed that at least one factory in China's Zhejiang Province is killing more than 600 whale sharks annually in what appears to be the world's largest wholesale slaughter of an internationally-protected endangered species. Investigators believe that the PuQi factory is only one of many engaged in the trade of endangered sharks and their products throughout coastal China.

A processing plant, China Wenzhou Yueqing Marine Organisms Health Protection Foods Co Ltd., in PuQi township near Wenzhou, Zhejiang Province, China, was the target of their investigation from January 2010 to December 2013. They found that the plant processes at least 600 whale sharks year. The whale shark fins

are dried in PuQi, then sent to Guangzhou where they are sold to restaurants that often put them on display. The shark skins are sold as leather into the bag trade, stomach and flesh are sold into the restaurant trade as "food". Whale shark is sought after domestically for its fins and for a delicacy in southern China called "shark lips." However, the real money-maker is the shark's liver. Shark oil is concentrated in high quantities in the liver and sold to manufacturers of skin care products and lipstick, and Omega-3 health supplements. These supplements are currently being sold internationally in contravention of CITES, as well as relevant Chinese national laws and regulations. Factory general manager Mr. Li Guang also admitted intentionally smuggling other whale shark products out of the country to be sold for human consumption. Meat is exported to Sri Lanka and to Chinese restaurants in Italy and France.

The factory general manager, also admitted — on camera — that countless basking sharks and great white sharks are also being industrially processed at his PuQi factory. Oil from whale and basking sharks is being sent to another processing plant on China's Hainan Island: Hainan Jiahua Marine Products Bio Pharmaceutical Co Ltd. In Hainan, the oil is blended with other types of shark liver oil in preparation for export to the United States and Canada. It has further been suggested that the Jiahua Omega-3 pills may contain heavy metals such as methyl-mercury, although this has not yet been independently verified.

Undercover footage and audio recordings obtained by WildLifeRisk revealed that the whale sharks are being caught in the territorial waters of Australia, Philippines, and Indonesia. Evidence gathered points to an extensive trade network fanning out from China across the globe. At the factory in PuQi, the investigators obtained oil for DNA testing to confirm that the products were in fact of endangered species origin. On each visit to PuQi whale shark products were readily available; including fins, skin, meat and oil.

On a single day in 2012, investigators counted 260 large fins for sale in the seafood markets of Guangzhou; QingPing market, ShanHai Town, as well the dried seafood markets of YueXiu, GuangZhou suburb. The breakdown is as follows: *Whale shark*: 136; *Basking shark*: 69; *Great white shark*: 55. In China all three species are protected, which means it is illegal to hunt them without a special permit granted by the Chinese Government. All three species of sharks are Appendix II CITES listed species, this means that they are not necessarily threatened with extinction, but may become so unless the trade is subject to stricter regulations



Video footage is available at <http://vimeo.com/84925609>

Images are available at <https://www.dropbox.com/sh/gymokdgux39g68/KxgzO6BnL5>

To hear a podcast interview with the investigators — Alex Hofford and Paul Hilton — go to:

<http://behindtheschemes.org/BehindTheSchemesEpisode33>.

Thank You to Our Supporters!

We are very grateful for the continued support of:

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- The Barbara & Donald Tober Foundation
- Al Vinjamur
- The WAVE Foundation
- Kathrin Winkler & Angus Campbell

NOAA Fisheries

In 1976, in an attempt to prevent overfishing of fish stocks in United States territorial waters, the Magnuson-Stevens Act was enacted and it remains the primary law governing fisheries management in the country. As result of diminishing shark populations due to the shark fin trade, in 2010, the federal government passed the Shark Conservation Act, which prohibits the finning of sharks in US waters, but the Act failed to address importation of fins from other countries. To close the loophole in the Shark Conservation Act, eleven US states and territories passed laws banning the possession, sale and trade in shark fins within their borders, and similar legislation is pending in additional states. Last May, NOAA Fisheries (the federal agency which protects the fishing industry) announced that it might overturn the state laws.

On February 4, 2014, NOAA Fisheries announced on their website that they would not challenge the laws passed by California, Maryland and Washington because they conform with the Magnuson-Stevens Act. "It was important for NOAA to confirm that these state laws did not restrict the possession of shark fins in a way that would create problems for fishermen fishing legally for sharks in federal waters," the agency said. NOAA Fisheries says hopes it will be able to reach similar agreements with other states. However, the Magnuson Stevens Act clearly states "nothing in this Act shall be construed as extending or diminishing the jurisdiction or authority of any State within its boundaries." We are hopeful that NOAA Fisheries will withdraw the preemption provision from their proposed ruling.

www.nmfs.noaa.gov/mediacenter/2014/02/04_02_sca_state_fed_consistent.html



Meet the Bloggers on our Website



Shark Culture by Patrick Nason

Patrick is a cultural anthropologist specializing in the human dimensions of ocean conservation. What began as a summer job at a dive shop in Erie, Pennsylvania cascaded into a decade of education and work at sea, including a Bachelor's degree from the unique Sport Management–Diving Industry program at Barry University followed by one Master's degree in Anthropology from Florida Atlantic University and another from Columbia University in New York, where he is currently working on his doctorate in ecological anthropology.

Each year for several months, Patrick travels across the Pacific to live among communities in Papua New Guinea that practice traditional “shark calling.” Paddling beyond the horizon in handcrafted canoes, these esteemed watermen employ strength, skill, and magic to build social relationships between the shark, their ancestors, and life on the reef below. Through ongoing collaborations with Pacific Islanders and Western shark scientists, Patrick aims to break down the barriers that stand in the way of conservation policy by better understanding the diverse bonds between humans and the sea.

Between travel and teaching, Patrick has worked as divemaster and captain of the *American Dream II*, a recreational dive boat in South Florida, and has safely delivered various other boats up and down the East Coast, the Bahamas, and the Caribbean. At present, he lives aboard a 33-foot sloop in New York Harbor

Shark Science by Dr. Jennifer V. Schmidt

Jennifer joined SRI when she was a post doc Fellow in the Department of Molecular Biology at Princeton University. In 2002, Jennifer and molecular biologist Robin were the first to ever isolate genetic markers of whale sharks.

Jennifer attended the First International Whale Shark Conference in Perth (2005), and the Second International Whale Shark Conference at Holbox, Mexico (2008). She is also on the Gujarat (India) Whale Shark Advisory Committee and advises on the tissue sampling and genetic analysis of the Gujarati *whale sharks*. A 2009 paper by Jennifer, Robin and Marie, *Low Genetic Differentiation across Three Major Ocean Populations of the Whale Shark*, is on our website at: <http://www.sharks.org/pdfs/journal0906.pdf>. Jennifer collaborated with Dr. Shoou-Jeng Joung of the National Taiwan Ocean University to determine paternity of 29 embryonic pups of different gestational ages which were taken from the only pregnant whale shark examined by scientists. <http://www.sharks.org/index.php/shark-news/scientific-publication>. Each year, Jennifer leads the SRI expeditions to the Afuera, the huge massing of whale sharks off the coast of Mexico.



A Voice for the Voiceless by Doug Hack (a.k.a. sharkbait)

An articulate and passionate ocean activist and conservationist, Doug speaks for sharks, manta rays, bluefin tuna, whales and dolphin. He calls it like he sees it, and his well-researched blogs are always informative.

Ocean Log by Marie Levine

Marie keeps members informed of legislative issues, regionally, nationally and internationally. A surfer and diver, she has lobbied for protections for sharks and marine for more than a decade. A Fellow of the famed Explorers Club, she has worked with sharks in more than 40 countries, and is a member of the Women Divers Hall of Fame.

Two new Apps for iPhone Users



SharkByte: A new App on iTunes by SRI member Eric Knox, who is also working on an Android version. The app allows users to locate beaches where shark attacks have taken place by country, area or location. It also includes info about various shark species, how to avoid attacks and how to protect sharks, and provides some cool shark wallpapers. The cost of the app is 99 cents, and Eric is donating 5% of the proceeds of his sales to SRI.



SharkNet: This App allows iPhone users track great white sharks off the California coast in real time. It taps into a small network of satellite-enabled buoys that "listen" for the tagged sharks from Big Sur to the Farallon Islands. The app lets users get to know sharks by their names. Each of the sharks being tracked has a biography and photo of its dorsal fin, and some also have interactive 3-D models and videos that allow users to see how they swim and to become acquainted with them.

News & Notes

Email from one of the winners in our 2013 Shark Celebrity Auction:

"We FINALLY had time to meet filmmaker Jeff Kurr while Rebecca over Christmas. What a wonderful guy!!! Becca was over the moon listening to his shark stories. Lots to ponder as she heads back to University. Thank you again for putting these auctions together."

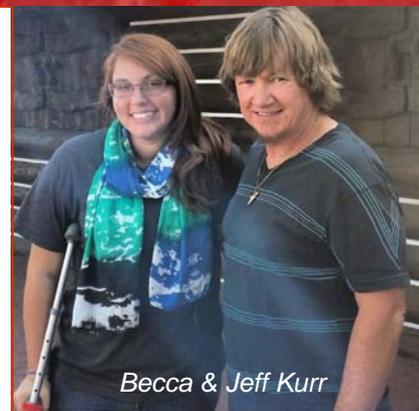
- Dawn Ziegler

Our **Annual Spring Auction** will run April 12 through 19, 2014. Do you have any paintings, sculpture, dive vacations, gold doubloons, anything weird or wonderful that you'd like to donate? If so, please contact SRI-HQ. Every donor will receive a tax receipt for the full retail value of their donation, verification of a charitable deduction for their 2014 US Federal income taxes.

Thank you to all our supporters who have already donated items. **We really appreciate your creativity and generosity!**

Winner: Michael Beneson of Rye, New York, was the winner of the recent draw for a lifetime adoption of a whale shark and an art print by Rogest.

TEDx: This superb, common sense TEDx presentation by Dr. Vic Peddemors can be viewed at **TEDxCanberra Talk @ www.youtube.com/watch?v=KlcZwSsceL0**



Becca & Jeff Kurr



We spotted our No Shark Finning sticker on the drums of our favorite band: Sharks on Bicycles

Wildleaks.org: This is the first secure, online whistleblower platform dedicated to wildlife crime. Wildleaks receives and evaluates "anonymous information about wildlife crimes and transforms it into actionable items." We hope this will prove to be an effective tool to help with fighting international wildlife crime! <https://wildleaks.org/>

Trading in last year's ipad or laptop? Consider donating it to SRI's education department instead. **We will provide a tax receipt for the full retail value for your 2014 US Federal taxes.** For more information, call 609-921-3522

Basking Sharks Beginning a Recovery?

Basking sharks are the world's second biggest fish and may grow to a length of 26 feet (11 metres). Like the whale shark, they feed on plankton. Every summer basking sharks aggregate in large numbers around small islands off Scotland's west coast.

Until 19 years ago, basking sharks were hunted in the seas off Scotland for their liver oil. By 2002, so few were left that the species was listed on Appendix II of the United Nations Treaty Convention on International Trade in Endangered Species (CITES).



A basking shark near HWDT's research vessel *Silurian*

Sightings of basking sharks off Scotland's west coast increased in 2013, according to the Hebridean Whale and Dolphin Trust (HWDT). The results of their latest research survey included 32 encounters with basking sharks. Fifty of the massive sharks were counted over just nine days in during the trust's annual study.

In Development: Sonar to Locate Sharks Underwater

Thanks to a \$273,000 grant from the State Government, scientists from the University of Western Australia are developing technology to warn lifesavers if a large shark is in the area.

Using footage from beach patrol helicopters, they are developing computer algorithms to detect sharks. The computer "learns" from the terabytes of data to recognise a whale, dolphin, swimmer and even different species of sharks. The project is led by Winthrop Professor Mohammed Bennamoun, who previously used cameras to analyse the movements of Australian Olympic swimmers.



"Its main advantage over traditional sonar", says Mr. Shane Chambers of UWA's School of Physics, "is that it could distinguish between a three metre shark, swimmers and other marine wildlife. Usually when we are looking for a reflection of a fish we are using a swim bladder as a reflection point, but sharks do not have swim bladders." Chambers describes sharks as the most stealthy creature in the ocean, "We are really battling millions of years of evolution, he said. "There is a reason they are the top of the food chain and it's because no one else can see them."

A beach trial of the shark detection system is planned for the second half of the year once the algorithm is fully developed. To be tested will be the "acoustic return" from sharks at different frequencies, and establish the ranges at which sharks can be detected and identified with sonar imaging.

A variety of sonar devices will also be tested, operating at different frequencies, beam width and power. If successful, the study could lead to the development of a sonar image shark monitoring system to alert lifeguards whenever a large shark approaches bathing beaches and making shark nets and shark culls things of the past.

Mexico Bans Fishing for White Sharks

Last month, the Mexican government announced a permanent ban on fishing for white sharks. The measure applies to Mexico's national waters on both coasts and means that white sharks, whether caught as bycatch by commercial fishermen, or accidentally by or recreational fishermen, must be immediately released back into the sea. In 2011, Mexico announced a temporary moratorium on all fishing for sharks and stingrays effective in 2012. The new ban offers permanent protection. SRI applauds Mexico for their leadership!

"Extinct" Shark Species Found

It had been 106 years since scientists had seen a smoothtooth blacktip shark, *Carcharhinus leiodon*. Then, in 2008, shark specialist Alec Moore spotted one in a Kuwaiti fish market. Later study confirmed that the specimen was indeed a smoothtooth blacktip and it was almost 2,000 miles from where the last one had been found. An additional 47 specimens were eventually found in the area's fish markets. Now researchers know more about the species, such as how they grow and their numbers of pups, and hope to use that knowledge to devise a conservation plan.

Kid Power

- On November 17, 2011, at the urging of SRI CEO Jupp Kerckerinck, Senator Bennett introduced SB 1002, a bill to ban the shark fin trade in Florida, but the bill was withdrawn in January 2012 when it failed to gain the necessary support. Recently, a 13-year-old Florida boy, Thomas Ponce, began lobbying state lawmakers to outlaw the sale of shark fins. "The only way we can change, to see real change, is if we change the law," said Thomas. He approached Florida Sen. David Simmons with his concerns. Initially, the senator was skeptical, but he listened to what the teen had to say, and became convinced. On December 18, 2013, Senator Simmons filed Senate Bill 540 on December 18, 2013, saying "*It is a viable, legitimate issue that needs to be acted on.*" Great work, Thomas!

- SRI member Sara Brenes, also known as "The Shark Whisperer", decided that it would be a great idea to "Pay It Forward" and have a Shark Whisperer Organization **Kidz Conservation Awards** program. Sara wants to reach out "*to those who make conservation efforts in order to acknowledge their efforts. No matter how big or small their contribution, each person makes a difference. Today's youth will be tomorrow's future ocean guardians*".

Any child 17 or younger may participate. Or, any group or organization run or administered by children 17 or younger will qualify. In order to meet eligibility requirements the child or group must be actively involved in shark, beach or ocean conservation. Sara is hoping to inspire the next generation to be actively involved in caring about sharks and our oceans and the planet's future.

Winners are randomly chosen. In order to be considered please email Sara@SharkWhisperer.org a short essay about yourself, your nominee or your group or organization. Include a description of what the nominee does and the conservation theme that they are involved in. Include how the nominee's efforts benefit conservation and the results of the nominee's effort's. Note if there is a history of commitment and accomplishment. Describe how the nominee is an inspiration to others.

Nominees will be notified of their award via email and subsequent postings on Facebook and the Shark Whisperer Organization Blog and Website. Winners will receive a Stand Up Paddleboard Tour, Shark Whisperer goody bag and lunch with Sara the Shark Whisperer. In cases where the winner is not able to meet in person, Sara will Skype the winner to speak with them personally. Winners not able to go on a paddle board tour will receive a Shark Whisperer Organization gift basket. All winners will receive a Shark Whisperer Medal of Honor and a Shark Whisperer T-Shirt.

Calendar of Events

February 14-16, 2014: *Our World Underwater*. Venue: Donald E. Stephens Convention Center, Rosemont, Illinois. www.ourworldunderwater.com. *A terrific show if you are in the area!*

February 14, 2014 at 7 pm: *Dean Fessler, speaking on sharks*. Venue: New Jersey Maritime Museum, 528 Dock Road, Beach Haven, NJ 08009. No charge, but seating is limited. For reservations, phone 609-492-0202. <http://www.museumofnjmh.org>

February 14-16, 2014: *LIDS*. Venue: ExCel, London, United Kingdom. www.diveshows.co.uk. *This is always a good show.*

March 3, 2014: *World Wildlife Day*

March 8-9, 2014: *Boston Sea Rovers*. Venue: Coco Key Hotel and Water Resort, Danvers, Massachusetts. www.bostonsearovers.com. *Although aimed primarily at wreck divers, this is a superb show.*

March 14, 2014: *Hopewell Elementary Science Fair*. Venue: Hopewell Elementary School, Hopewell, New Jersey from 5 to 7 pm *A favorite; these children love sharks, and do not hesitate to write letters to legislators about marine conservation issues.*

March 22, 2014: *Northeast Pacific Shark Symposium*. Venue: Seattle Aquarium, Seattle, Washington. <http://www.seattleaquarium.org/shark-workshop>

March 22–24, 2014. *Beneath the Sea (a.k.a. BTS)* is the world's largest consumer dive show in the USA. Held at the Meadowlands Convention Center, it is only 10 minutes from New York City. Diving legend Eugenie Clark will be the honored guest at BTS. With 164 exhibitors and workshops and seminars on wreck diving, education, deep explorations, photography, travel, dive medicine, environment and shark diving there is something for everyone. **And be sure to visit SRI at Booth 221**, join one of our expeditions, pick up a new book on sharks, or hang out and 'talk shark'. If you haven't bought tickets yet, they are available at www.beneaththesea.org

April 11-13, 2014: *Asia Dive Expo (a.k.a. Adex)* Venue: Marina Bay Sands, Singapore. www.diveguide.com/adex

April 22, 2014: *Earth Day*

May 9, 2014: *Fintastic Friday 2014: Giving Sharks a Voice*. *Every year, WhaleTimes and SRI team up to raise awareness of the plight of sharks through this new holiday: Fintastic Friday is celebrated annually on the second Friday in May.*

May 15-29, 2014: *SRI Annual Spring Auction*. *We will put the catalog and a link into the auction and donors on our home page a week .*

June 2-6, 2014: *The Second Sharks International Symposium*. Venue: KwaZulu-Natal Sharks Board, Durban, South Africa <http://www.sharksinternational.org>. *Likely to have some fascinating presentations. We've been a thorn in the side of the KNZ Shark Board for years because we advocate for removal of their shark nets.*

July 30 to August 8, 2014: *American Elasmobranch Society Meeting*. Venue: Chattanooga, Tennessee. <http://elasmobranch.org>.

September 3–6, 2014: *Surf Expo*. Venue: Orange County Convention Center, South Hall, Orlando, Florida. *This show is a lot of fun and a chance to reach out to surfers. Originally open only to the trade, at least one of the days is now open to consumers.* www.surfexpo.com

November 19-22, 2014, *DEMA Show* (Dive Equipment Marketing Association). Venue: Las Vegas, Nevada. *Open only to the trade but sharks & shark conservation are serious topics here.* www.demashow.org

2015: *CITES*. Venue: Cape Town, South Africa. *Dates to be published.*

SRI Acknowledges the Best Shark Dive Operators

Want to dive with sharks, meet them face to face – safely? Although a few of our research expeditions are open to sport divers, we receive many calls from members who, due to time constraints, are unable to participate, and ask for our advice in choosing a shark dive operation.

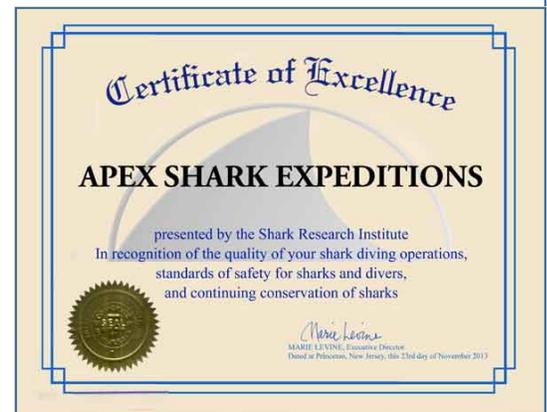
SRI scientists, staff and members have dived with dozens of shark dive operations and devised a rating system. Then we polled sport divers at dive shows, and more than 400 divers responded. While a very few operations were deemed hazardous, most achieved good ratings, and a handful were considered outstanding.

A new page on our website, www.sharks.org/expeditions, steers divers to the shark dive operators who achieved the highest ratings. All actively promote the conservation of sharks, and have earned excellent safety records for both the sharks and divers. The web page provides direct links to their websites.

Sample comments:

- *“Gotta admit that initially I was wary about being in the water with sharks, but they taught me how to interact safely with them. Now I dive with sharks every chance I get!”*
- *“The diving was superb. Their crew briefed us fully before the dive and at no time did we feel at risk. It was a fantastic experience.”*
- *“I rate my shark dives with them as 10 out of 10!”*

While there may be many other excellent shark dive operations that are not listed. Let us know if there are others that you'd recommend based on personal experience, and those to avoid. Email your recommendations (in confidence) to info@sharks.org



The top dive operators were acknowledged by certificates from SRI

Field Expeditions

WHALE SHARKS — Cancun, Mexico

July 27-31, 2014

At present, this is the only open SRI expedition. Dr. Jennifer V. Schmidt, Director of SRI's DNA study and the project leader, will once again be taking swimmers and snorkelers to the Afuera Whale Shark Aggregation. (Note: no scuba; bubbles frighten the sharks). Cost is \$1400 per person (double occupancy). Two spaces are left.

SARDINE RUN — South Africa

June & July 2014

The Sardine Run along the eastern coast of South Africa is one of the ocean's great spectacles! Huge humpback and Brydes whales, hundreds of sharks, great pods of dolphins, and clouds of ocean birds follow and feed on the massive shoals of sardines as they migrate through the warm waters of the Indian Ocean! Spaces are filling up. If you are interested in witnessing and/or diving this incredible marine event, contact us for space availability. Cost for 5 days/6 nights double occupancy is ZAR17,500 (currently US\$1,882) or ZAR19,250 (US\$2,070) single supplement.

If you'd like to come along on either expedition, call SRI HQ at 609-921-3522 as soon as possible.



Hundreds of whale sharks gather at the surface in the Afuera



Caribbean Reef Sharks Prefer to Approach from the Blind Side

Erich K. Ritter, Raid Amin. Are Caribbean reef sharks, *Carcharhinus perezi*, able to perceive human body orientation? *Animal Cognition*, 2013; DOI: 10.1007/s10071-013-0706-z

"Don't turn your back on a shark" is the message of an article published in *Animal Cognition*. Erich Ritter of the Shark Research Institute and Raid Amin of the University of West Florida found that sharks can comprehend body orientation and know whether humans are facing them or not. This ability helps sharks to approach and possibly attack their prey from the blind side – a technique they prefer.

A successful predator needs to correctly perceive the body form, size and movement of its potential prey. Studies confirm this is also true when sharks hunt. To understand how sharks select an approach pattern when interacting with humans, a test was designed to evaluate if sharks show a measurable preference based on body orientation when approaching a person, and if they choose a certain swim pattern when close to a human being.

To ensure the safety of the test subjects, the preferences of the Caribbean reef shark, *Carcharhinus perezi*, were studied. The species is frequently encountered by divers in the Bahamas, and is not considered to be dangerous to humans. To test the sharks' approach preferences a diver in full scuba gear was positioned on the sea floor in a kneeling position, looking forward. In a second scenario two divers kneeled back-to-back to eliminate the blind area. The researchers found that when approaching a single test-subject, significantly more sharks preferred to swim outside the person's field of vision. The results suggest that sharks can identify human body orientation, but the mechanisms used and factors affecting the nearest distance of approach remain unclear.

White Sharks May Live More Than 70 Years

Hamady LL, Natanson LJ, Skomal GB, Thorrold SR. Vertebral Bomb Radiocarbon Suggests Extreme Longevity in White Sharks. *PLoS ONE*. Published online January 08, 2014. DOI: 10.1371/journal.pone.008400

It has long been known that some species of sharks live up to 150 years, but it was thought the lifespan of white sharks was 20 to 24 years. This new study reports – like humans – they may live 70 or more years. In sharks, age is determined by analyzing increments in mineralized cartilage, such as vertebrae, which can be seen as light and dark bands. As the shark ages, growth rings are added, similar to growth rings in trees. "Traditionally, ageing sharks has relied on the assumption that band pairs are annual," said co-author Lisa Natanson of NOAA's Northeast Fisheries Science Center. "In many cases this has been proven correct for part or all of a species' life, however, in more and more cases this is being disproven." Among white sharks, the banding patterns may be narrow and less distinct than in other species. As the sharks get older and larger, they either stop laying down material or the layers become so thin they're really difficult to discern even under the microscope.

A known radioactive marker, an isotope of carbon atom produced in the fallout from the atmospheric nuclear bomb tests in the 1950s and 1960s, was incorporated into the tissues of marine animals living during that period. The scientists used the radioactive carbon – easy to detect – as a kind of date stamp to help them count the growth layers and thus determine the age of their test samples. Using the radiocarbon time stamp proved to give a far better estimation of a shark's age. In the study, the largest female was determined to be 40 years of age, while the largest male was 73! All the sharks in the study came from the Atlantic, but the researchers do not think there are any significant differences between the lifespans of white sharks in other areas of the ocean

The findings are especially relevant to conservation efforts. Since white sharks grow slowly, and mature later, they may be more sensitive to environmental and fishing pressures than other species.