Shark Foundation Annual Report for 2016

July 2017

Generall

Foundation

In 2016 the Foundation was actively involved in various activities for the protection of sharks and again received large and small donations from shark friends big and small who want to support our work.
Once again we wish to express our deepest gratitude to all our donors and benefactors. Without your generous help our work would not be possible!!

EEA Conference in Bristol, England

From October 27 to 30, 2016, Alexander Godknecht represented the Shark Foundation as representative of Switzerland at the 20th International Scientific Conference of the European Elasmobranch Association in Bristol (England).

Publications

In 2016 **four** scientific publications were published based on results achieved through projects supported by the Shark Foundation.
Since 1997 a total of **52** scientific publications, one book, various conference reports and posters, as well as a thesis were supported by the Shark Foundation.

US Shark Foundation

The U.S. Shark Foundation was again registered at its seat in Miami, Florida, as a charitable foundation in 2013. Gary and Brenda Adkison, as well as Professor Mahmood S. Shivji, continue in their function as directors of the U.S. Foundation, which was also self-supporting in 2013.

Total administrative costs to date: approx. CHF 58,000

Projects

Shark Exhibit

The Shark Exhibit was opened in the Seemuseum Kreuzlingen (Lake Constance) on October 21, 2015, where it remained until August 28, 2016. Alexander Godknecht gave the official opening speech on the exhibit. On October 28, 2015, and April 29, 2016, he also gave presentations at an advanced training event for teachers. Toni Bürgin was also invited to give a shark presentation in the Seemuseum.
In September 2016 the exhibit was put into storage as we again began to look for new exhibit locations.

Total expenditures/investments to date: approx. CHF 255,000

Global Populations of Oceanic Whitetip Sharks

Oceanic whitetip sharks (*Carcharhinus longimanus*) are being strongly overfished and are endangered worldwide. Although they can migrate over long distances, it must be assumed that they form individual local populations (Philopatry) which only sporadically exchange a minimum of genetic material among themselves. The genetic exchange between living populations that live in separate regions and hence the replenishment of gene pools is especially critical for the survival of strongly declining populations.

In this project initiated by Professor Mahmood Shivji from the Guy Harvey Research Institute, Daenia Beach, FL, global genetic connections between populations of oceanic whitetip sharks are being analyzed on a molecular-biological basis. Although this species of shark is strongly overfished, this marks the first time that this regionally endangered shark species, as defined by the IUCN, is being examined.
The collected field data was analyzed by Cassandra Ruck in the scope of her thesis. The data will be published at the end of 2017, together with the evaluation of additional field data.
In 2017 the project scope will be extended to include "genome sequencing and conservation genomics of large, migratory shark species."

Investments 2016: 12,100 CHF
Total investments to date: approx. CHF 12,100

Migrations of Mako Sharks

For many species of sharks migrations are vital, including for their food and reproduction needs, for protecting themselves from enemies and establishing new, favorable habitats. They are thus essential for the evolutionary health and preservation of species. Understanding migrations, their patterns and the environmental driving forces behind them is critical information that provides better understanding of population dynamics and the behavior of shark species.
Shortfin mako sharks (*Isurus oxyrinchus*) are among the world's most endangered shark species (IUCN Assessment 2009). In 2000 mako shark fins were the second most frequently traded on the international shark fin markets. Mako sharks travel enormous distances on their migrations and the danger of them crossing the paths of international fishery fleets is extremely high, especially since they are often found near the water surface.
Economically speaking, mako sharks are a strongly exploited shark species, yet biologically speaking, very little is known about their migrations, especially in the strongly fished Atlantic.
The Guy Harvey Research Institute (GHRI) financed/finances a long-term study to analyze the migrations of mako sharks. The primary methods used in this study are / were satellite transmitters (SPOT and PSAT Tags). Since this study began, probably the worldwide largest data collection on migrational movements of mako sharks has been compiled and is ready to be evaluated.
The interpretation of satellite data is highly complex and the Shark Foundation financed the services of a proven specialist in this field to analyze the data. Up until today 26 mako sharks were tagged with satellite transmitters (14 in the U.S., 12 in Mexico). Their horizontal and vertical migrations were registered in the Gulf of Mexico region and the North Atlantic Ocean for a period of 78 to 527 days. In the space of one year up to 10 sharks could be observed. The makos migrated through territorial waters of 17 nations which makes it necessary to establish a coordinated, international protection plan. In 2016 a scientific report was published on mako migrations. An additional one was accepted in December 2016 and will appear in 2017.

Investments 2016: 18,200 CHF
Total investments to date: approx. 18,200 CHF

Shark Nurseries

The "Shark Nurseries" project is centered in Rookery Bay, 10,000 Islands, and has been supervised by Pat O'Donnell since the year 2000 in collaboration with the Mote Marine Lab. Sharks frequent this region for use as their primary (pupping) and secondary nursing (juvenile sharks older than one year) grounds. The research area encompasses Fakahatchee, Faka Union and Pumpkin Bay.
Comparative studies showed that all shark species examined, with the exception of bull sharks, avoid Faka Union Bay during the rainy season when the salinity of the bay drops below 25 ppt (parts per thousand).
Despite efforts by the State of Florida to restore the natural balance of the marshlands, this freshwater outlet from the marshlands of the region still did not significantly change in 2015. The data on juvenile sharks collected by the project team can thus still be viewed as baseline data prior to restauration of the natural balance in the surrounding marshlands.
Ninety-nine sharks were caught during 2015: 87 of them were measured and tagged, 9 were recaptures and 3 sharks unfortunately did not survive.
Since the year 2000 the following number of juvenile sharks were captured, measured and marked: 740 bull sharks, 527 bonnet-head hammerhead sharks, 134 lemon sharks, 152

blacktip sharks, 13 nurse sharks, 2 Atlantic sharpnose sharks, 2 scalloped hammerheads and 1 great hammerhead.
The project works mainly together with enthusiastic volunteers which substantially reduces costs. The Foundation will continue to fund the project when needed.

Investments 2016: 0 CHF
Total investments to date: approx. 61,500 CHF

2016 successfully completed:

Basking Sharks

No research was performed in 2016 so that no financial support was requested. The project was completed in 2016 and if necessary a new project will be launched at a later time. A popular scientific summary of the basking shark project was compiled by its project manager, Colin Speedie, who wrote and published a very interesting book on his basking shark research that is worth reading. It was published under the title: A Sea Monster's Tale: In Search of the Basking Shark

Investments 2016: 0 CHF
Total investments to date: approx. 108,850 CHF

Shark Protection Zone Fiji

Today the Fiji Shark Protection Project is financially self-sustaining. The Foundation is prepared to support the project financially, if necessary. At the end of 2013 Mike Neumann requested continued support of the "Fiji Shark Count" project which since 2012 has aimed at establishing an inventory of all sharks in the region. The Fiji Shark Count continues and was co-financed by the Foundation in 2013/14.
In 2015 Christine Ward-Paige from Dalhousie University, Halifax, evaluated the data collected during the Fiji Shark Count.

Investments 2016: 0 CHF
Total investments to date: approx. 41,800 CHF

In 2016 the project focus was extended from lemon sharks in Jupiter to :

Migrations of large coastal sharks in Jupiter, FL, and the Bahamas.

Lemon Sharks Jupiter/Bimini
Jupiter: In 2016 data was consolidated and a scientific publication with this data was distributed. Based on this data, lemon sharks have already received a protected status in the waters off the Eastern Coast of the U.S.

Great Hammerhead Sharks Jupiter/Bimini/Bahamas
The hammerhead shark species are strongly overfished in many regions. In March 2014 the great hammerheads were designated as endangered and taken up in both Appendix II of the CITES Convention and the Red List of the IUCN. They migrate over extensive distances through the territorial waters of various nations. For this reason they are also in Annex I of the UN Convention for intensive migrating species (Highly Migratory Species) which calls for close cooperation of all involved countries in the management of these species. Hammerheads are frequently found in bycatch, but they are also fished actively because their fins score high market prices. Regulating bycatch and demanding that hammerheads be thrown back into the ocean makes little sense since the mortality rate of the hammerheads in bycatch is approximately 90%, the highest of all species. For this reason more information on the habitats, seasonal spatial utilization and behavior of these hammerhead species must be known in order to provide them with more effective protection.
In the 2015-2016 season a team from the Bimini Biological Field Station was able to tag 13 additional large hammerheads (*Sphyma mokarran*) with acoustic and conventional transmitters and to analyze their migrations for a period of 82 days. Since 2012, a total of 31 sharks were tagged with acoustic transmitters and their movements analyzed.
First results show that both around Florida and Bimini, as well as the Bahamas large hammerheads are found seasonally and show a high degree of territorial loyalty. In Bimini and the Bahamas they are found between October and April, and in Jupiter/Florida they stay from

October to March. On their migrations from one observation area to another, they can travel up to 3,000 km. The data was published in three scientific articles and presented to the American Elasmobranch Association at their annual meeting in 2016.
Based on this scientific data concerning the migrations and habitats of the lemon sharks and great hammerheads, an extension of the protection zones and dates for these sharks was requested from the U.S. National Marine Fisheries Service (NOAA-NMES) with the result that the region between Cape Canaveral and Palm Beach (the protected EFH Zone = Essential Fish Habitat) where the sharks are not allowed to be caught, shall now be extended to 245 km. Unfortunately, only a compromise was reached with the NMES with respect to the starting date of shark fishing in the other regions in January – July was the original date requested. Should the first 20% of the lemon shark catch quotas be reached earlier than expected, then the remaining 80% will not be unblocked before July.

Investments 2016: 26,100 CHF
Total investments to date: approx. 186,100 CHF

Angel Sharks in Gran Canaria

This project examines the strongly threatened angel shark population in the Gran Canaria region and aims to improve protection of their last remaining habitats and nurseries off the Canary Islands. Molecular-biological relationship analysis is carried out in the laboratory of Professor Mahmood S. Shivji.
Initial, not yet verified (but expected) results point to a strongly isolated angel shark population around Gran Canaria so that hardly any genetic exchange with other populations occurs. This means that when populations are overfished, no replacement can come from other populations, thus making them strongly endangered.
In 2016 the complete mitochondrial genome of *Squatina squatina* was published for the first time in a scientific article. Part of this study was presented by Drs. Krupskaya Narváez and Filip Osaer at a meeting of the European Elasmobranch Association and at the Colombian Elasmobranch Conference 2016.
Meanwhile in Professor Shivji's laboratory, Cristin Fitzpatrick is currently completing her thesis on this subject. All results will be presented at the annual meeting of the American Elasmobranch Association in 2017 and we expect the scientific publication of these results in 2018.

Investments 2016: 7,800 CHF
Total investments to date: approx. 49,700 CHF

Whale Sharks

Whale sharks are found on the IUCN Red List and on CITES Appendix II where they are designated a globally endangered species. In addition to work being performed in Mozambique to establish a marine protection area for whale sharks, the team under the direction of Simon Pierce, together with local and international scientists, is studying various ecological, genetic and biochemical aspects of whale shark populations around Mafia Island (Tanzania), the Red Sea, the Persian Gulf, the Philippines, Mexico (Yukatan), the Galapagos, and a recently found whale shark hotspot around Madagascar. The Shark Foundation has supported Simon Pierce's research since 2009.
Projects in various locations include:

- *Galapagos*: the Galapagos Island Darwin is the only worldwide location known today where fully mature, pregnant whale shark females are sighted. Small tissue samples taken from these females should provide information on their population genetics as well as their feeding habits (stable isotopes and fatty acid analysis). The sharks were also tagged with satellite transmitters (not financed by the Foundation) in order to study their migration routes.

- *Madagascar*: A significant reduction of individuals in all larger whale shark aggregations in the western Indian Ocean, especially in Mozambique and the Seychelles, has been noticed. The newly found whale shark aggregation in Madagascar thus becomes all the more important. The whale sharks found there are to be studied in ways similar to those applied to whale shark females on the Galapagos (see "Galapagos" above).

- *Mafia Island:* The whale sharks around Mafia Island are probably the best studied population from a genetic and biochemical view. These studies continued in 2016, among other things with a focus on differences in female and male whale sharks.

- *Philippines:* These studies focus on the small-scale and international migrations of whale sharks as well as their population structure. Do the Philippine marine reserves protect the whale sharks on their migrations, or must they be adapted to the migration routes of the sharks? A special study should also examine the possibility of whether or not the intensive whale shark catch in Southern China has any influence on the whale sharks around the Philippines.

- *Mozambique:* The whale shark population along the Inhambane Province is declining. Since 2005 sightings of whale sharks have gone down more than 80%. This critical development is due to overfishing in the region. More and more local fishermen use long gill nets, placing them vertically to the coastline in order to catch enough fish to secure their income. These nets are not only extremely dangerous for whale sharks but also for other endangered species who get themselves entangled in them and die, including white sharks, mantas, sea turtles and dugongs. As a member of CITES and the Convention on Migratory Species, Mozambique is aware of the problem. The Ministry for Conservation and the Department for Nature Reserves have invited Simon Pierce and his team as advisors in the scope of this partnership to help improve the protection of whale sharks and other endangered species through corresponding legislation. In cooperation with the National Fishery Research Institute (IIP) and the Bazaruto National Park Authority practical technical recommendations are to be made for the sustainable management of fish populations in Mozambique. An important aspect to be considered in this are any suggestions made by local fishermen. In 2016 a grant from the Shark Foundation made it possible to publish a scientific paper (see Publications) on the connection of whale shark aggregations in the Indian Ocean. More publications are in progress for 2017.

  Investments 2016: 12,500 CHF
  Total investments to date: approx. 92,300 CHF

2016 completed:

Thermoregulation Nurse Sharks

For thousands of years nurse sharks (*Ginglymostoma cirratum*) have been gathering between June and July to mate in the very warm waters of the Dry Tortuga Islands off Florida. Over the past 21 years, the project team has marked and studied more than one hundred of these two to three meter long animals. In order to minimize any disturbance to the nurse sharks, only kayaks and nets were used during this process.
The project team is currently working on the publication of the respective data. No funding was requested for 2016.

Investments 2016: 0 CHF
Total investments to date: approx. 27,000 CHF

New Project 2016:

Bull shark populations in Fiji

With the constant ever increasing rise in overusage of the oceans, the conservation of single key species, their populations and their habitats becomes increasingly more important. As a large top hunter with a large distribution area, bull sharks are one of those key species because they significantly regulate the ecosystem in which they live. In order to manage and maintain their populations sustainably, obtaining reliable information on their distribution, reproduction, diet and behavior is essential. Bull shark populations in Fiji have already been examined intensively over several years. Nevertheless many questions are still open. In the framework of her doctoral thesis at the University of the South Pacific, Fiji, Kerstin Glaus (University Basel) will address several of these questions:

- Do bull shark populations in Fiji form separate reproduction communities which must also be managed separately?

- Do bull shark populations in Fiji mix with other populations in the Indo-Pacific region or

are they extremely isolated?

- How do bull sharks fit into the concept of metapopulations in which individual populations can show very specific behavioral patterns but which can be influenced by exchanging individuals between the different populations? Dynamic metapopulation models start out from a set of populations that are connected through genetic exchange with each other, but who are outweighed by their individual adaptations.

For this study, genetic population studies will be carried out in the bull shark nurseries around Viti Levu and Vanua Levu. Furthermore, the number of bull shark females who use the different nurseries as well as the survival rate of their male offspring shall be determined. Cohort studies of young male bull sharks in rivers should provide insight on the behavior of the young sharks. Altogether these studies should then make it possible to estimate population sizes and to establish effective management plans.

Investments 2016: 15,000 CHF
Total investments to date: approx. 15,000 CHF

Short Projects

New 2016: **Photo Documentation Mafia Island (Tanzania)**

In 2016 the professional photographer, Steve de Neef, documented the Foundation's whale shark project with videos and photos. This documentation – which will go online and will appear in large national and international media – aims at furthering public awareness about the importance of protecting whale sharks.

Project Manager: Steve De Neef
Investments 2016: 1,900 CHF
Total investments to date: approx. 1,900 CHF

Bull Shark Tagging Program Fiji

In 2016 the Foundation supported the long-term tagging program using acoustic transmitters initiated by Dr. Jürg Brunnschweiler on Fiji. Purpose of the project is to follow the life cycle of bull sharks off Fiji and to study the effects of diving tourism on the behavior of bull sharks. A broad spectrum of scientific examination methods – from direct observations, movement analyses using acoustic and satellite transmitters, up to and including population genetic analyses and the evaluation of information received from local fishermen - is used for this purpose. The main goal of this program is to optimize the protection of bull sharks off Fiji based on the information gained.

Project Manager: Dr. Jürg Brunnschweiler
Investments 2016: 5,000 CHF
Total investments to date: approx. 5,000 CHF

2016 successfully completed:

Behavior of juvenile lemon sharks

For his doctoral thesis, Joffrey Baeyaert from the Universidade do Algarve, Portugal, examined the question of whether juvenile lemon sharks demonstrate individual behavioral patterns. If yes, which factors characterize/shape these personal characteristics and are there differences between young lemon sharks living in the wild with those held in captivity. Do individual personality traits influence social status?
The first step taken in these studies was to look at the individual personality traits of juvenile lemon sharks held in captivity. After freeing the young sharks, their movement patterns were tracked. First results compiled at the Bimini Biological Field Station, Bahamas, indicate that the movement patterns of the lemon sharks and the usage of the region correlate with the personality traits that were determined in captivity. The project was successfully completed with the Conference Paper "Wild Spatial Behaviour & Personality Traits. A comparison study for juvenile lemon sharks" in Rapp. Comm. Int. Mer Médit,41, 2016.
Project Managers: Professor S. Gruber / Bimini Biological Field Station, Joffrey Baeyaert
Project Managers: Professor S. Gruber / Bimini Biological Field Station, Joffrey Baeyaert

Investments 2016: 1,600 CHF
Total investments to date: approx. 1,600 CHF

Public Relations Activities of the Shark Foundation and Shark Info

Media / Public Relations

The Foundation gave several interviews, e.g. to the Focus and the Sauerländer local media, provided its expertise and advice revolving around the subject of sharks and shark protection.

Web Server

In 2016 the Shark Foundation's German web site (www.hai.ch) recorded approx. 341,425 visits, the English web site (www.shark.ch) roughly 214,298. Clearly leading in popularity in the sides frequented on both servers was the Shark Database. Compared to 2015, an slight increase in the number of visitors to the German web-pages and a slight decrease in shark.ch was registered.

Administration

Financial Policy of the Shark Foundation

Established on August 29, 1997, the Shark Foundation is an internationally active organization that falls under the supervision of the Federal Department of Home Affairs (FDHA) / Swiss Federal Supervisory Authority in Bern. The Foundation can accept tax-deductible donations and once a year it submits its annual report and financial statement to the supervisory authority for approval.

The Foundation finances all its activities through donations, presentations or the sale of products such as T-shirts or plush toy sharks. The Board of Trustees works on a voluntary basis and its members receive neither attendance fees nor salaries. The Foundation runs a "Shark Shop" on its Internet website (T-shirts, cuddly plush toy sharks, tear-off notebooks, postcards, shark sponsorships). Sales revenues flow directly into the Foundation account, and once a year all interested parties are sent a mailing requesting donations and including a pay-in slip.

In its first meeting of the respective year, the Board of Trustees of the Shark Foundation decides on the usage of any accumulated income and donation money from the previous year. Up until then no reserves are set aside; instead all funds are released to cover ongoing projects, investments and administrative costs. The annual accounts for both the Foundation and Shark Info are checked by Revisal, an auditing company located in Gossau.