



Small Sharks - Deep Water: Understanding Behavior of Overexploited Sharks in The Bahamas

Edd Brooks (Program Manager, Shark Research and Conservation Program, Cape Eleuthera Institute) and Sean Williams (Field Manager for the Deep Water Shark Project, Cape Eleuthera Institute)

The Shark Research and Conservation Program at the Cape Eleuthera Institute in collaboration with Dr. Dean Grubbs of Florida State University, Dr. Demian Chapman of Stony Brook University, and Lucy Howey-Jordan of Microwave Telemetry, Inc. initiated a new research program aimed at investigating the diversity and abundance of deep ocean sharks living in The Bahamas. This project is also providing a unique educational experience for fall semester students from The Island School who, alongside staff from the Shark Research and Conservation Program, will continue to gather data on deep ocean sharks.



Photo by Annabelle Oronzi

A gulper shark fitted with a X-Tag is about to be released back into the North Exuma Sound near Eleuthera, The Bahamas.

Humans know virtually nothing about the species that inhabit the deep ocean realm and this is especially true of deep ocean sharks. Of all the currently described shark species, 56% live their entire lives below 200 m of water. Of these species, basic information about life history is available for only a few species, and information relating to movement patterns is available for fewer still. Until recently deepwater

environments acted as refuge from human exploitation. However, as stocks of fish closer to the ocean surface are subjected to overfishing, commercial interests have turned their attention to the deep. Many deepwater sharks are being exploited without any understanding of their biology and ecology on which to base management decisions.

In addition to monitoring the diversity and abundance of the animals encountered, our research team will be utilizing some of newest electronic tracking technology available to monitor these animals' movements. So far three pop-up satellite archival transmitters (PSATs) have been deployed on bluntnose sixgill sharks, *Hexanchus griseus*, to compliment the 10 already deployed on this species by Dr. Grubbs in Hawaii, the eastern United States and the Gulf of Mexico.

Perhaps the most exciting news has been the deployment of PSATs on gulper shark *Centrophorus granulosus* and Taiwan gulper shark *Centrophorus niaukang* providing the first movement and habitat-use data for these animals. Until the recent development of the X-Tag by Microwave Telemetry no PSAT was small enough to deploy on these smaller species.

C. granulosus is relatively widespread in the Gulf of Mexico, western and eastern Atlantic, west Indian, west and central Pacific Oceans. It is a small species with a maximum size just over 100 cm. The gulper shark is taken as bycatch in many deep ocean fisheries as well as a limited directed fishery mainly for its large livers which are high in oil content. The IUCN lists the gulper shark as "Vulnerable". *C. niaukang* reaches a maximum size of 170 cm and is found in the Atlantic and Indo-Pacific. The IUCN

lists the Taiwan gulper shark as "Near Threatened".

To date, 22 surveys have resulted in 61 animals from eight different species. This includes 17 individual gulper sharks, ranging from 52-105 cm and four Taiwan gulper sharks ranging in size from 130-156 cm in total length. Fourteen X-Tags are planned for deployment on the gulper sharks throughout the duration of this project.

This is an incredibly exciting project for the Shark Research and Conservation Program. We have been working on the more easily accessible sharks such as the Caribbean reef, tiger and nurse sharks for over three years, yet we had no idea of the treasure trove of new species that were right on our door step. The first phase of this project has been a huge success and we cannot wait to see the rest of the data that are gathered over the course of the fall semester with the Island School students. These students are incredibly lucky as there are very few people who have ever seen most of the species they will be working with this semester - it's a truly unique opportunity for them.

The Island School is a three-month semester leadership program for high school students from the US and The Bahamas. Participants have come from over 300 schools to study the tropical marine environment and take place-based courses in math, history, English, and art. www.islandschool.org

Cape Eleuthera Institute is a marine field station situated on Cape Eleuthera, Eleuthera, The Bahamas. It undertakes research on local environmental issues as well as acting as a host facility for marine and terrestrial scientists and visiting education groups of all ages. Cape Eleuthera Institute has especially focussed on developing new methods of resource use and management applicable to the Caribbean, such as effective use of solar energy and local recycling of waste organic and other materials. The Cape Eleuthera Institute also provides hands-on research experience for the students of The Island School through their in-house research programs. These programs include shark research, flats ecology and conservation, patch reef ecology and sustainable offshore aquaculture. www.ceibahamas.org



Photo by Lance Jordan

The team attaches an X-Tag to a bluntnose sixgill shark.



Photo by Lance Jordan

As part of the shark ecology course, students survey the juvenile lemon shark population in nearby mangrove habitat.