

# Schooling up for shark science

If you were looking for an easy research subject, large coastal sharks probably wouldn't be your first choice.

by NADINE SLIMAK

After all, they aren't the easiest predators to find, the easiest to catch, or the easiest to handle.

"They're not like goldfish that you can grab and put in a bowl and take to a lab to study," says Dr. Robert E. Hueter, director of Mote's Center for Shark Research. "They're long-lived, they travel long distances, and they are a large elusive animal that doesn't travel on the surface. Plus, once you find them, they're not easily handled."

To get a better handle on sharks, and all elasmobranchs, Mote has spearheaded a drive to combine the efforts of leading national shark research organizations. The group, called the National Shark Research Consortium, pools resources so scientists can better gather data on the biology, ecology and behavior of sharks, and their relatives, the skates and rays. The consortium will also educate the public and policy

**HOLDING ON:** One researcher holds on to a shark fin as a second prepares it for the tag.

makers about their findings.

One thing researchers' data will do is create a bigger knowledge base for fisheries managers. It will also help the United States take a lead role in the worldwide conservation and management of shark populations.

Consortium members include Mote, the University of Florida in Gainesville, Moss Landing Marine Laboratories in California and the Virginia Institute of Marine Science at Gloucester Point, Virginia. The studies are supported by federal funding from Congress through the National Marine Fisheries Service, which has funded consortium activities since 2002.

"We're basically focusing our studies to determine the status of fisheries-relevant sharks," Hueter says. That means studying sharks such as sandbar, blacktip and bull, as well as other interesting species such as whale and bonnethead sharks, to promote wise use of a limited resource.

The National Shark Research Consortium is collecting information on:

- Sharks' life history — where sharks spend each part of their lives
- Migration patterns of large coastal sharks on the East and West coasts of the U.S.
- Size and distribution of shark populations
- Shark taxonomy
- Shark genetics
- Shark attacks

## The need for the science

To manage shark fisheries and conserve shark populations, policy makers need to know as much as they can about the lives of sharks; you can't make good policy without good science, Hueter and others say.

That means a birth-to-death record of each species of shark — there are 375 described species already, with new species still being discovered.

That also means finding essential shark habitats.

"We need to know where sharks are spending their lives and what are the



**TAGGED:** Researchers pull a shark into the boat during a trip to catch and tag large coastal sharks. The goal is to collect data on the places large coastal sharks spend their lives.

vulnerable stages of their life history," Hueter says.

Shark tagging plays a large part in those studies.

Mote researchers conduct quarterly tagging surveys to determine the composition and abundance of shark species in the Gulf of Mexico.

Moss Landing's Pacific Shark Research Center in California is tagging and tracking leopard sharks (*Triakis semifasciata*) in Elkhorn Slough in Monterey Bay and is doing research into the age and growth of many different species of sharks. They're also studying the reproductive biology of skates and rays.

The Virginia Institute of Marine Science's Shark Research Program is catching and tagging sharks in coastal Virginia and Chesapeake Bay waters, and in the seaside bays of Virginia's Eastern Shore.

And the University of Florida's Program for Shark Research is sampling bull sharks in the Indian River Lagoon. Researchers there also keep the International Shark Attack File, a

compilation of shark attacks worldwide, and try to educate the public about the realities of shark and human interactions.

"The real advantage of the consortium is in collaboration rather than competition among shark researchers, and in the high technology we can develop and use together," Hueter says.

## High-tech tags

In traditional tagging, researchers capture a shark, measure its size and attach a 60-cent orange tag to a shark's fin.

Typically it contains information about where to send the tag or whom the finder can call with information on where the shark was caught and when, should a fisherman ever see that same shark again.

In that instance, researchers might get data on beginning and ending locations and possibly how much the shark grew, but that's about it.

Now shark tagging is going high-tech.

Pop-up archival tags (PAT), which cost about \$4,000 apiece, can be attached to larger sharks and help researchers gain a wealth of knowledge, Hueter says.



**TEAM EFFORT:** Because sharks are large, powerful animals, it takes lots of hands to collect data.

It's supposed to work like this:

A scientist catches a shark, collects basic data on its species, size and sex, and then attaches a 6-inch-long PAT, which looks similar to a microphone and has an antenna on the end of it.

Then the shark is released to resume its normal routine — albeit sporting a new electronic device that collects information on depths the shark swims in, light levels (which help indicate the shark's location) and water temperatures.

At a pre-programmed time, the device shoots an electrical current through the metal pin that holds the tag onto the shark's dorsal fin. The connection breaks and the tag floats to the surface to

transmit its data to a satellite.

"It can tell us everywhere a shark has been since it was released," Hueter says.

But the PATs haven't always been successful.

"In some cases, the tags have not been staying on the animal," Hueter says. Tags that release too early don't collect enough data to be very useful for research.

That's where the National Shark Research Consortium comes in.

### Collaboration is key

In December, Mote and the consortium hosted an international workshop in Sarasota that brought together researchers and manufacturers to discuss the problems and find ways to help solve them.

"We want to find ways to make the tags work better," says Dr. Michelle Heupel, Mote staff scientist, who organized the workshop. "The tags were originally designed for tunas and other pelagic teleosts (bony fishes), so we're wondering if a different shape might be better."

The long, streamlined shape of the tags may work for tunas because their backs stay rigid as those fish swim. Sharks

undulate as they swim and that may make it harder for the tags to stay in place, Heupel says. "Would a different shape be better? We don't know."

Collaboration is key to finding the answers.

"The power of the consortium is to combine our efforts," Hueter said.

"The result is that this consortium has stimulated a new level of activity in basic and applied shark research to find solutions."

To help find a solution to the PAT questions, Mote and the Hawaii Institute of Marine Biology will test the tags on sharks in captivity this year, Heupel said.

At Mote, the sharks will be placed in new research tanks that will allow researchers to study how the tags work in a controlled setting.

Paid for by grants from the National Science Foundation and the Georgia Aquarium, the new research area includes a whopper of a tank that is 55 feet long, 30 feet wide and 6 feet deep and holds 66,000 gallons of seawater.

Now that's some fishbowl.



**HIGH-TECH TRANSMITTER:** This pop-up archival tag is designed to collect information about how deep a fish swims, light levels and temperatures in the water where the fish is swimming. The transmitter detaches itself at a pre-programmed time then beams its data to researchers via satellite.