



FATHOM magazine

Summer 1996

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Saving Jaws

Protecting the Predators

by Jay Humphreys

It's a staple of late-night television, Roy Scheider and Richard Dreyfus in a life and death struggle to rid the waters around Amity Island of the monster shark Jaws. Twenty-two years after its release, the movie continues to creep into the consciousness of millions of people who tentatively wade out into the surf--and its impact continues to cause possibly irreparable harm to the survival of the oceans' top predators--sharks.

"I think we can really date the beginning of the decline of the U.S. Atlantic shark population to the release of the movie Jaws in 1975," said George Burgess, a senior biologist and the Director of the International Shark Attack File maintained at the Florida Museum of Natural History, University of Florida. "The movie got recreational anglers interested in catching sharks, which led to the creation of numerous shark fishing tournaments. Soon the shark population began to decline. This decline picked up pace in the early 1980's when commercial anglers got involved in a big way."

Burgess explained that commercial fishermen were looking for something else to catch because several species, most notably swordfish, had been overfished. The fact that consumers suddenly found shark meat acceptable table fare and the Far East offered a lucrative market for shark fins meant that entire fleets of shark boats seemed to appear almost overnight.

"If anyone had bothered to do a little research, they would have found that there had never been a successful long term, directed shark fishery anywhere," Burgess explained. "But that fact didn't prevent fishermen in some states from investing far more in their boats and equipment than they could ever hope to recover from shark fishing."

When it was discovered that too many sharks were being caught, the federal government developed a management plan that would help protect shark populations. Similar plans had been used by the federal fishery management councils and state agencies to restore populations such as redfish, which once were in trouble but have been brought back through proper management.

"There were numerous problems, however, that made managing shark populations a difficult task," Burgess said. "For one thing, managing a single species such as redfish is much easier than dealing with 20 or more different species of sharks. Each shark species has its own biological characteristics. Plus there wasn't enough biological data available to manage sharks. To make things worse, researchers who wanted to study sharks found it very difficult to get funds--these were sharks, after all, who cared about them?"

Current biological data indicate that the amount of sharks being caught has declined by up to 50 percent. So many sharks have been caught in the past 20 years that now, when it comes to fishing, there aren't enough sharks to go around. In response, the Federal Fishery Management Councils, with input from leading shark researchers, has developed a shark management plan that,

hopefully, will bring shark populations back to healthy levels.

Shark Management

Despite the fact that sharks occupy the top of the marine food chain and play a major role in maintaining the health of the ocean ecosystem, it wasn't until 1994 that steps were first taken to provide some measure of protection for shark populations. As a result of concerns from environmental and scientific groups, researchers looked at shark populations in the Atlantic and found that populations were declining dramatically. At the same time, commercial shark fishermen realized that it was getting more and more difficult to make a profit--they seemed to be running out of sharks to catch. It became apparent that the sharks were being "overfished." In other words, far more sharks were being caught than were reaching sexual maturity.

In response to these concerns, the Management Councils imposed a limit on the total amount of large, coastal sharks that could be caught by commercial fishermen in the Atlantic, Caribbean, and Gulf of Mexico. This annual quota has been scaled back periodically because of continued concerns that sharks are overfished. For example, the 1997 quota for large coastal sharks is 1,285 metric tons--one half the quota for 1996. In an effort to insure that this quota is not exceeded, the year is divided into two six-month long shark fishing 'seasons.' The first season ends when one-half of the total allowed catch is reached. The second season begins July 1 and the quota for the season is adjusted based on any "excess" catch during the first season. Here's how this approach is working this year with the National Marine Fishery Service (NMFS):

- April 2, 1997: NMFS announced that the 1997 quota would be 1,285 metric tons.
- April 2, 1997: NMFS announced that the first season quota (642 metric tons) had already been exceeded and that the fishery would close April 7.
- May 14, 1997: NMFS announced that the actual catch for the first season of the year was 958 metric tons--316 metric tons more than permitted. As a result, the allowable catch for the second season would be reduced accordingly.
- July 1, 1997: The second shark fishing season began with a 326 metric ton quota.
- July 21, 1997: The second season was closed.

At the time the annual quota for the year was announced, the NMFS also imposed for the first time a quota on the commercial catch of small coastal sharks and prohibited direct fishing for five species of shark that were determined to be especially threatened by overfishing (whale, basking, sand tiger, bigeye sand tiger, and white sharks). In recognition of the role that recreational anglers play in reducing shark populations, the NMFS also limited them to two sharks per boat per trip, plus two Atlantic sharpnose sharks per person per trip.

The rules announced April 2 remain in effect throughout 1997 but are really temporary rules adopted until a more comprehensive program for restoring

shark populations can be developed and put into place. This long-term management plan will not only regulate catches, it will help protect essential shark nursing and pupping areas in inshore waters managed by Atlantic coastal states. A key element of this plan will be to set up a new shark fishing permit system that would limit the number of shark fishermen. Currently, only about five percent of the boats with permits are actively fishing for sharks. But if management plans are successful and shark populations begin to recover, there are concerns that these "inactive" boats would suddenly begin fishing. That could easily set back all the work done to increase the number of sharks.

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Sharks Transformed from Trash to Valued Species

Economics Create Responsible Shark Management

by Jay Humphreys

Twenty years ago, the prevailing opinion of commercial and recreational anglers was simple: "The only good shark is a dead shark." To them, the shark was a competitor for valuable fish...unwanted garbage that fouled nets...or an annoying threat to recreationists. Today, those attitudes have been replaced with a new respect and appreciation for sharks. And like so many other changes in attitude that have come about in society, the anglers' view of sharks was dramatically altered by one simple factor--money!

"In the late-70's, when Florida Sea Grant first looked at the shark situation in the state, what we saw was a tremendous waste of a resources," said Frank Lawlor, Sea Grant's marine extension agent in West Palm Beach. "The sharks were being killed and discarded like some sort of nuisance species. Then, when anglers found out they could sell shark fins to dealers in the Orient, the situation became even worse as sharks were caught, their fins removed and the carcasses discarded."

Working with the National Marine Fisheries Service and the South Atlantic Fisheries Management Council, Sea Grant began to educate anglers about the economic value of sharks while working to get consumers to accept shark meat as a healthy, tasty seafood product. It was quickly discovered that the key to turning sharks into a marketable product was proper handling of the catch at sea and at the market. Sea Grant's educational programs, including a shark fishing manual, provided the training needed to help shark anglers, processors, and retailers create and maintain a market for shark.

"We helped create an excitement about shark fishing that, in turn, increased the number of people pursuing sharks," Lawlor said. "Because of a decline in the swordfish and tuna fisheries at that time, lots of anglers switched to shark fishing--maybe too many!"

Concerns about increased pressure on a limited shark resource led to the development of management plans designed to insure the sustainability of shark fishing. A quota system went into effect that limits the amount of sharks that can be caught, special protection was instituted for some species, and sharks were given the same respect that was formerly reserved for only the most valuable fish species. Today, the shark-fishing frenzy of the 1980's has been replaced by a managed, well-organized and increasingly limited fishery that meets the demands of consumers, supports a commercial and recreational fishery, and offers long term protection for shark populations.

"I think our work was instrumental in protecting sharks," Lawlor said. "We changed attitudes by transforming sharks from a trash fish to a fishery worth \$10 million each year and helped create a management system that has ended harmful shark fishing practices and which has increasingly brought the science

of marine biology into the management process."

But from a personal perspective, Lawlor says the biggest change brought about by Sea Grant's efforts has been the transformation of attitudes among recreational anglers.

"After the movie JAWS became a hit, anglers seemed obsessed with killing sharks," Lawlor said. "Today, anglers actually practice catch and release for many sharks. To me, seeing someone going through the trouble of releasing a shark shows a remarkable change in attitude."

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The Healing Power of Sharks

by **Kelly Marie Sokol**

Would people look more kindly on sharks if they knew that the sleek killers of the deep may be carrying within them the cure for some of humankind's most serious health problems? In the near future, we may all get a chance to thank the sharks for their contribution to our good health.

Perhaps it's not surprising that sharks may have the answer to many of our most perplexing health questions. After all, sharks have been swimming in the earth's seas for more than 400 million years--and for the past 100 million years, sharks have looked and acted exactly as they do today. This unchanged existence over such a long period is extremely unusual in the animal kingdom. Most animals mutate in order to adapt to environmental changes. But sharks are and have been quite content within their surroundings for untold eons. Their apparent lack of interest in changing may have to do with their amazing ability to resist disease.

For example, the Smithsonian Institution in Washington, D.C. maintains an enormous database called the Registry of Tumors in Lower Animals. The registry serves as a catalog of cancerous tissues collected from animals worldwide. There are thousands of tissues in the registry from fishes--but there are less than 25 from sharks or rays. Prompted by this low incidence of tumors in sharks, biochemists and immunologists decided to explore possible explanations of sharks' unusual resistance to disease. Much of this research goes on at Mote Marine Laboratory in Sarasota.

"The main reason researchers are investigating sharks is for answers concerning cancer-- not cures to cancer, but to understand how sharks' immune system resists cancer," said Dr. Robert Hueter, senior scientist and director of Mote's Center for Shark Research. "Knowing how sharks fight cancer might one day lead to understanding how to fight environmentally caused cancer in humans."

At Mote, sharks and skates are maintained in controlled conditions and used much like mice and rats in biomedical research. Early in the program, experiments were conducted to see if tumors could be induced in sharks and skates by exposing them to carcinogenic (cancer-causing) chemicals. These chemicals were placed in their food, in their water, and even injected into their muscles. Amazingly, no cancerous tumors formed in the sharks or skates.

As a result of these experiments, researchers began to take a closer look at sharks' immune systems. What they found was that although the immune system in sharks is very primitive, it also very effective. This is how it works. Sharks possess immune cells that are essentially the same as those in other animals...but the sharks' cells seem to be produced and stimulated differently. For example, mammals produce various immunoglobulins in response to health threats. But sharks have only one class of immunoglobulins referred to as IgM that are constantly circulating in very high levels in shark blood as if ready to attack invading systems at any time. This immediate availability of IgM seems to be a key factor in the shark's success in fighting disease.

While studies of sharks' immunity to cancer continue, sharks also serve as sources of important therapeutic materials. For instance, shark cartilage and skin are used as graft material to repair damaged human flesh and shark corneas can be used as substitutes for human corneas. In recent years, shark cartilage pills have become popular. However, Dr. Hueter and many medical doctors believe these pills have no curative effect at all.

Hueter says he does not think sharks hold the cure to cancer or other diseases, but quite possibly sharks could serve as a source of new medicines. For instance, one might be squalamine which is found in sharks and appears to be one of many anti-bacterial and anti-fungal compounds produced by sharks. Studying sharks also helps scientists better understand human anatomy and physiology. For example, the function of human kidneys has been better understood because of studies of shark kidneys.

Shark meat is also a great source of protein--it's very healthy for people and it does not have the bones commonly found in fish. And as Hueter says, people shouldn't be concerned about reducing the shark population by eating them. "It's only the unregulated destruction of shark populations that is a concern," he said. With proper regulation, sharks will always be available to improve human health and as a source of important nutrition.

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Shark!

by Jay Humphreys

OK, you've seen all the JAWS movies, you've heard about some surfers being bitten recently, and you're standing in waist deep surf just off one of Florida's magnificent beaches. So...just what are the chances that a passing shark is going to ruin your day (not to mention those stylish, new swim trunks you're wearing)? Well, if you believe the statistics, the chances are so small, they can barely be measured. But if you're concerned about the very real chance that you'll be hit by lightning...well, that's a different story.

Florida is undoubtedly the world's leader when it comes to unprovoked shark attacks on people. In fact, nearly one-third of the shark attacks that occurred worldwide during 1990-1996 took place in Florida's coastal waters. According to the International Shark Attack File maintained at the University of Florida's Museum of Natural History, there were 106 shark attacks in Florida during that period. Fortunately, not one resulted in a fatality. On the other hand, of the 238 attacks outside of Florida, 42 resulted in fatalities. The second most likely spot for shark attacks on humans during 90-96 was Australia with 45; Brazil had 34; South Africa 29; and Hawaii and California with 22 each. But even the dubious "We're Number 1!" honor for shark attacks doesn't mean you're likely to be shark bait. With millions of people splashing in Florida's surf each year, the fact that only about 100 were bitten by sharks is quite remarkable and reassuring.

So the next time you're enjoying Florida's warm Atlantic or Gulf waters and you get that creepy feeling that some shark's black eyes are focusing on your ankle... relax! Odds are you're perfectly safe... unless, of course, that dark cloud seems to be getting closer.

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Florida's Sharks

The shark's illustrated on the following two pages are not the only species found in Florida's waters--but they are by far the most common. Although they vary in appearance, they all possess a skeleton made of cartilage instead of bone and a skin that has a rough, sandpaper-like texture. They are also slow-growing fish that can live long lives. From a management standpoint, one of the problems in maintaining a healthy shark population is the fact that sharks produce small numbers of young. Sharks are born alive, but some hatch from a leathery egg case laid on the bottom. These sharks also share the ability to detect their prey by smell, motion detection, eyesight, and by sensing electrical currents created by the nervous systems of living creatures.

SILKY SHARK

Called "silky" because its skin is smoother than that of other sharks. A medium-sized shark, it can grow to nearly 11 feet in length. Its favorite foods include fishes, crabs and squid.

DUSKY SHARK

Most often caught during the cooler months, this shark can be as much as 12 feet in length. Young are sometimes 3 feet long at birth.

SANDBAR SHARK

Also called the brown shark, it migrates south in schools to Florida waters during the winter. Some remain throughout the year. Reaching a maximum length of nearly 8 feet, this shark accounts for about 60 percent of the state's commercial catch.

TIGER SHARK

Young have large spots that become "tiger" stripes. Stripes tend to fade as they grow older. The "pups" are 18-19 inches in length at birth. One of the largest Florida sharks, it can be 18 feet long and weigh more than 1000 pounds. Known to attack humans.

GREAT HAMMERHEAD SHARK

Distinctive "hammer"-shaped head makes it easy to recognize. Young are found near shore, especially in the spring. Sometimes forms large schools. Often basks quietly near the surface on calm days. Can reach 18 feet in length and weigh 1000 pounds. Slightly smaller SCALLOPED HAMMERHEAD is more common in Florida. This species has a head with a curved backside instead of the straight edge found on the GREAT HAMMERHEAD.

BONNETHEAD SHARK

A small shark with a shovel-shaped head, it is sometimes called the shovelnose shark. Often found along Florida's coast, it feeds on shrimp and crabs. It grows to a maximum length of 3 feet 7 inches.

BLACKTIP SHARK

Has distinctive black tip on most fins (except anal fin). Often caught in Florida bays during the summer. Thought to be the culprit in most "hit and run" attacks on humans. It can grow to 8 feet in length.

SPINNER SHARK

Similar to BLACKTIP in appearance, but has black tip on anal fin and a longer, more pointed snout than does the BLACKTIP. This shark got its name from the spinning leaps it sometimes makes. Largest are just over 9 feet in length.

BLACKNOSE SHARK

A small shark commonly found in Florida bays, it has a very noticeable black moustache on the tip of its snout. Not more than 5 feet in length, it may also be involved in "hit and run" attacks on humans.

BULL SHARK

A stout-bodied fish with a broad snout, it can withstand a wide range of salinities and is sometime found far up river. Often follows spring tarpon runs. Can grow up to 11 feet in length. This is a dangerous shark.

LEMON SHARK

This yellow-gray shark is most commonly found in Florida's southern coastal waters, especially around wrecks and ledges. It reaches a maximum size of 11 feet, but most do not exceed nine feet.

ATLANTIC SHARPNOSE SHARK

This small shark grows to no more than 4 feet in length. It is commonly found along the Florida shoreline and can sometimes be seen swimming in the surf. It is brown or olive on its upper surfaces, has white spots on its flanks and is white below. Feeds on small fish, crabs, and shrimp. Along with the BONNETHEAD, it is the shark most often caught by Florida Anglers.

CARIBBEAN REEF SHARK

Commonly found in the Florida Keys, this gray shark is associated with coral reef habitats. It reaches a maximum length of 9-1/2 feet.

NURSE SHARK

Rusty or yellow-brown in color, this is one of the few sharks that can be found lying on the bottom. Sometimes hides under ledges and wrecks. It has a small mouth and is primarily a bottom feeder. Can grow to 14 feet in length, but most often is 6-9 feet in length.

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Entering the Sharks' Environment

by **Susan Grantham**

Since 1981, millions of visitors to Sea World in Orlando, Florida, have had the chance to get up close and personal with one of mankind's most feared species -- the shark. The carefully maintained 75-78 degree water, in the 660,000 gallon aquarium, is home to sharks with names like lemon, brown, bull and nurse shark.

"We currently have 31 sharks and three sawfish in the exhibit," explained Paula Brooks, an Assistant Supervisor in the Aquarium Department, "But anywhere between 30 to 40 sharks is normal. The 40,000 gallon tank in the front of the exhibit contains bonnethead, whitetip, blacktip, spotted bamboo, brownbanded bamboo, wobbiegong, and epaulet sharks. In the main aquarium, we have lemon, brown, bull, nurse and sandtiger sharks along with the three sawfish and several species of bony fish."

"Tuesday and Thursdays are very popular days around here, at least to the sharks," explained Brooks. "These are our feeding days."

Each group has their own special place that they gather on feeding days. The aquarists can identify the individual sharks through markings on their pectoral fins or sometimes just by a freckle. The sharks are fed a variety of salmon, mackerel, blue runner and crevalle jack using tongs. It is the job of one of the aquarists to keep track of who ate what.

"Once they've had their fill, they are cut off," explained Brooks. "We have more control over the feeding situation using this method than we would if we just threw the food in the aquarium. This type of controlled feeding also prevents aggressive behavior from the sharks. Each shark is fed 3 to 5 percent of its body weight each week and the sharks are weighed every six months during a physical."

In addition to being weighed, the sharks are measured and have blood drawn during their physicals. If a pregnancy is suspected due some noted changes in behavior, a sonogram at that time.

"About three years ago we were pretty sure that one of our brown sharks was pregnant so we did a sonogram during her physical," said Brooks. "The sonogram showed eight pups."

The breeding had occurred in the aquarium which is unusual. explained Brooks. Often times when sharks are born in an aquarium, it is because the mother was pregnant before she was introduced into the aquarium.

"We were able to estimate the arrival time of the pups from the sonogram," said Brooks. "The gestation period for a brown shark is about 11 months. About 30 days before the pups were due to arrive we began round-the-clock observations. When she exhibited behaviors consistent to giving birth we would allow her half of the tank. One night she began to have the pups and one of the aquarists helped her to deliver. Of the eight pups born, one was stillborn but the other seven have done very well."

One of the interesting facts about this particular exhibit is its shape. The tank is shaped in a half figure eight which not only allows the visitors to walk under the

exhibit but also allows the sharks to change their swimming patterns. "Circular aquariums promote consistent swimming patterns," said Brooks. "This aquarium makes them change their swimming patterns and that in turns utilizes more of their muscles."

"We spend a lot of time maintaining a quality environment for our sharks," explained Brooks. "Twice a week, divers enter the aquarium to siphon off debris, scrub the algae from the rocks, and clean the tunnel windows. Every day we sample the ph, temperature, ammonia level and salinity. We have our own formula to maintain the correct salinity in the tanks."

"We've certainly learned a lot over the past 16 years," stated Brooks. We started with fewer than 15 sharks in the exhibit. Everyday we learn something new."

Shark Facts

- Sharks give birth in three different ways - to a live pup(s) (viviparous) - they lay eggs (oviparous) - they keep the egg sack inside their bodies until the eggs hatch (ova viviparous).
- Sharks take a long time to mature. Some range in age from 8 to 18 before they can reproduce.
- Sharks have no mammary gland, because they are fish, so the pups must be ready to fend for themselves from birth without the benefit of any parental care.
- Not all sharks swim continuously. Some sharks have the ability to pump water through their mouth over their gills to get oxygen for breathing.
- Sharks have low blood pressure. Swimming allows their muscles to contract which in turn circulates their blood.

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Regulations Affect the Commercial Shark Fishing Industry

by Susan Grantham

Nothing sends up a squall of protest more quickly than fishermen being told about new fishery regulations. In recent years, commercial fishing regulations have been viewed by these fishermen as being unfair. Some fishermen feel that these regulations were based on public perceptions instead of realistic stock assessment. To head-off those same perceptions within the commercial shark industry, George Burgess, a professor at the University of Florida and Steve Branstetter, Program Director for the Gulf and South Atlantic Fishery Development Foundation, developed a 'Commercial Shark Fishery Observer Program.'

"It is obvious that shark mortality from both commercial and recreational fishing has exceeded the stock's reproductive capability," stated Branstetter. "Sharks do not reproduce as frequently or as prolifically as other marine species do. Over the past twenty years, shark landings have declined by 60 to 70-percent for both the recreational and commercial fisherman."

"Some type of management was inevitable," explained Burgess. "What we hoped to do with this project was to collect data that would help the National Marine Fisheries Service (NMFS) to establish realistic guidelines. With the voluntary cooperation of the commercial shark longline fishery, an observer program could collect information that would otherwise be unavailable."

"The fishermen were definitely taking a risk," said Burgess. "The data we collected might have indicated that a good portion of the shark fishery should be closed. On the other hand, the commercial fishermen felt that the regulations would be based on accurate data, and that the information we collected could work to their benefit."

Supported by an award from NMFS, three observers logged 501 sea days monitoring 468 longline sets during 139 fishing trips during the 1994, 1995 and 1996 shark fishing seasons. The area of observation ranged from North Carolina in the Atlantic to the Florida Panhandle in the eastern Gulf of Mexico. The 4.1 million hook-hours of effort produced nearly 16,500 sharks of 26 different species which translates into 158 metric tons of landings or 2.0 percent of the U. S. commercial shark landings for the three-year period.

Two species, blacktip sharks (*Carcharhinus limbatus*), and sandbar sharks (*Carcharhinus plumbeus*), constituted 60-75 percent of the number caught and 75-95 percent of the volume landed. Small sandbar sharks were more common inshore of the 10-15 fathom depth range and almost all black tip sharks were taken in these shallower waters.

"Interestingly enough, within a region, overall and depth-specific catch rates between years and seasons were not statistically different," explained Branstetter. "For all regions combined, approximately 50 percent of the documented catch of sandbar and blacktip sharks were immature. Over the course of a calendar year, only about 20-30 percent of the mature female

sandbar sharks were documented as pregnant, but about 50 percent of the adult female blacktip sharks were pregnant."

"No conclusive trends can be determined concerning the health of the shark stock based on only three years of data," stated Burgess. "However, based on the facts that much of the catch inside 10-15 fathoms is immature fish or pregnant females, continued fishing pressure in nearshore waters (under 10 fathoms) may have a substantial impact on the stock."

"Although a nearshore closure to fishing might be beneficial, we recommended that when considering regulating the sandbar shark stock, that a minimum landing size be established, rather than closing certain waters," explained Branstetter. "A size limit would accomplish the same biological goal, it would be easier to enforce and wouldn't have as much of an economic impact on the industry. Additionally, closing certain waters would be disadvantageous to some fishermen."

A size limit would eliminate the pressure on the younger age classes which could then have a potentially very positive impact on the stock's recovery through increased and more rapid recruitment and an overall decrease in mortality. Without the size limit, the fishermen will get their quota by catching large and small sharks.

"We recommended a minimum landing size of approximately 5 1/2-feet for the sandbar shark which would help to ensure that those fish taken would have at least reached a minimum size for reproduction," Brantstetter said.

Although NMFS considered the data from the observation program, it did not base the revised quotas on this information.

"They basically decreased the commercial quota a flat 50 percent," explained Burgess. "Our data indicated that a species-specific management approach could allow certain shark populations to rebuild and yet maintain a limited fishery. A year ago, the commercial fishermen were not pleased with our recommendations, but in light of the quotas imposed by NMFS, these same fishermen would like to see some of the size limit management practices implemented."

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Fishing for Information

by **Susan Grantham**

It may be unusual for the avid sport fisherman to brag about 'the one that got away' but that is exactly what the participants of the Annual Gulf Coast Shark Census do. This tournament, billed as, the world's only 100% catch-and-release shark tournament for research, "where only the information is landed," has just completed its ninth year.

"The tournament began in 1988," said Dr. Robert Hueter of Mote Marine Laboratory, and the tournament's director. "Originally, a group of recreational shark fishermen from southwest Florida approached the scientists at Mote with the idea of staging a large 'kill' tournament for sharks, and donating the proceeds for shark research projects. It would have been inconsistent with Mote's commitment to marine resource conservation to sanction this event on its behalf, but Mote shark biologists saw an opportunity to turn the idea around at a time when concern was building over depleted shark populations."

The idea of a 'kill' tournament has an historical basis. While it has yielded important samples for scientific research, the shark is basically discarded after being entered into the competition.

"Working with a tournament committee consisting of sportfishermen, local businessmen and conservationists, the Mote scientists designed an innovative approach to the problem," said Hueter. The tournament would be 100% catch-and-release and the scientists retained control over the tournament design and rules.

"There were several goals we wanted to achieve for this program," said Hueter. "First, not a single shark should be needlessly killed. Instead, all sharks would be identified and measured, tagged when possible, and released. The collected data would be used to track local shark populations, leading to the census concept. The returned tags would serve to gauge catch-and-release mortality as well as provide migratory and age/growth information. The event is used to publicize the state of the shark resource and important management measures, to preserve the viability of both the resource and the fishery. But most importantly, the tournament serves as a proof-of-concept program for catch-and-release fishing for sharks."

In the tournament's nine-year history:

- there have been nearly 1,000 registered anglers;
- scientific data collected on over 5,000 sharks;
- scientists aboard tournament boats have tagged 600 sharks;
- successful testing of dehooking devices and scientific assessment of shark survival after hook-and-release procedures have been performed;
- important nursery areas for several species of sharks have been discovered;
- a long term database to track shark populations for scientists and

- fishery managers has been created; and,
- the conservation message has been spread world-wide through international media sources.

This tournament has produced some unusual fishing stories as well. Mick Gast, a charter boat captain from Bradenton, Florida, looks forward to this tournament all year. "Sharks are a great game fish," said Gast. "They never stop fighting."

When asked about his most exciting shark fishing expedition, Gast didn't hesitate.

"It was the newborn hammerhead I caught during the tournament last year," Gast said. "It was just incredible to see this perfectly formed baby shark. It was so delicate, but in 10 years, it will be extremely powerful. I even kissed it goodbye before I released it, and I've never done that before!"

Gast went on to explain that, "over the years I've been nipped a few times and slapped by their tails as well. When you have a 4-5 foot shark on your hands, you have your hands full! But I believe in this tournament because it promotes shark conservation. It just sickens me when I see someone tote away dozens of baby sharks in the back of a pick-up truck. What is the point? Those fishermen just don't understand what they are doing to the fishery. I think that this tournament helps to educate all fishermen about the importance of sharks."

"Over the tournament's history, we have seen a gradual shift in the mind-set of the recreational fishermen," said Hueter. "With the advent of federal and state shark management measures that included bag limits and closed seasons, the fishermen's participation in the tournament rewards them for conservation and research-oriented practices instead of just disallowing them from utilizing the resource."

"The concept was a success from that first year," Hueter emphasized. "Year by year, the consensus of support has steadily increased. The educational opportunities for the tournament grow each year as national media provide broader coverage of the story. The tournament has emerged as a truly unique demonstration project to test the feasibility of catch-and-release fishing for sharks."

Note: Next year will be the tournament's tenth anniversary and the organizers are planning some special things.

- Dates for next year's tournament - June 1998
- Area of fishing - Southwest Florida coast from Tarpon Springs to Cape Sable out to 100-fathom curve.
- 100% payback of registration fees in prize money to the anglers in addition to the thousands of dollars in merchandise.

For more information on entry fees, rules, etc., contact:

Center for Shark Research
Mote Marine Laboratory
1600 Thompson Parkway

Sarasota, FL 34236
941-388-4441 or 1-800-691-MOTE.

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Tagging, not Bagging

by **Robert Hueter**, Mote Marine Laboratory

More and more, sport fishermen around the world are choosing to practice catch-and-release of sharks, often tagging their catch for science. There are many pluses to this situation, but there can be minuses as well, and both should be considered when assessing the value of angler shark tagging programs. Below is an overview. For a more in depth look at this topic, you can look up the [Mote Marine Laboratory Shark Tagging page](#).

The pluses

- Decrease of recreational fishing mortality on shark stocks due to a more conservationist approach to shark fishing.
- A more enlightened public about the resource value of sharks.
- Tagging, when done properly, can maximize the value of catch-and-release by providing basic biological information on shark migrations, age and growth, natural mortality, behavior and habitats, as well as applied information for shark fishery managers (Casey and Taniuchi, 1990).
- Volunteer taggers can cover a much broader geographic range, at a greatly reduced cost, than can fishery-independent scientific tagging programs.
- The fishermen become active partners in the search for scientific information rather than being only the recipients of the information.

The minuses

- The stress of capture can be mortally damaging to the sharks. In general, sharks caught-and-released on recreational tackle have a much better chance of surviving than on most commercial gear.
- If the allure of tagging is attracting significant numbers of new anglers rather than simply altering the behavior of those already in the fishery, then post-release mortality becomes more important.
- Closely related, but subtly different, is tagging mortality and other, sublethal effects of tagging on the sharks. Tags improperly applied or placed in the wrong types of sharks can fall out, kill the animals, or affect their growth. Bad tagging technique or poor choice of tag type, then, can be far worse for the shark than simple release.

Finally, the quality of the data -- shark species, sex, size, and so on -- is lower in a cooperative angler program. The data collected in an angler tagging program must always be weighted differently than the data collected by the biologists themselves.

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Shark Sites of Interest on the Internet

Here are just a few of the shark home pages that can be found on the internet. When searching for more information, use specific terminology such as elasmobranch, shark biology, shark cartilage, etc. Otherwise, you'll get a list of links to the San Jose Sharks, a hockey team in California.

- [General Reference on Sharks](#) - a list of printed material.
- [Dr. Gruber's Shark Page](#) - Home page of the Bimini Biological Field Station.
- [Fiona's Shark Links Galore](#) - just what it says.
- [The Pelagic Shark Research Foundation](#) - The mission of PSRF is to develop and assist projects that contribute to a better understanding of elasmobranchs, with an emphasis on those which contribute to their conservation and management.
- [Sea World/Busch Gardens Shark Cam](#) - Sea World, Orlando, Florida.
- [Shark Biology](#) - Good background information.
- [Shark Facts and Stats at Mote Marine Laboratory](#) - a shark page (done in frames) with the following entries: About Sharks - General Characteristics - Distribution and Diversity - Sharks and Cancer - Shark Tagging - Shark Attacks - Shark Myths - The Center for Shark Research - Shark Biology Course.
- [Shark Research Home Page](#) - featuring International Shark Attack File, IUCN/SSC Shark Specialist Group, The Commercial Shark Fishery Observer Program and more.
- [Wicked Cool Shark Links](#) - more links.

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