kid space

SHARK TRACKERS

INDEX STOCK/JULY 2001, OFF THE COAST OF SOUTH AFRICA

CLOSE ENCOUNTER: The movie 'Jaws' (1975) made many think that great white sharks were monsters. Today they are studied and protected.

THERE IS JUST A RIPPLE AT THE SURFACE, nothing more. But Scott Anderson knows what lies below.

"It's a 15-footer," he says.

From a larger boat, I watch the outline of the submerged shark. The great white slides silently alongside the small boat with Mr. Anderson and his colleague, Peter Pyle, aboard. Anderson follows the shark's movements with a small underwater videocamera mounted on a stick.

Later, he and Mr. Pyle will use the video to identify the shark. They'll look for scars and nicks on its fins and body. Is it Tipfin, Cuttail, Bitehead, Whiteslash, Trailtail, or (my personal favorite) Cal Ripfin?

Naming white sharks and watching them year after year would be impossible almost anywhere else. Every fall, however, the Farallon Islands become "shark central."

This pile of barren rocks 30 miles west of San Francisco hosts thousands of elephant seals and sea lions from September through November. The seals and sea lions come here to eat fish and lounge on the rocks. The sharks come, too – for seal meals.

"This is the only place in the world where we can observe white sharks without needing to put chum (cut-up raw fish) in the water," Pyle says. "We have so many sharks and prey at the Farallones, plus we have this lighthouse we can sit in and see shark attacks as soon as they happen."

Besides being a favorite resting place for seals and sea lions, the Farallones host the largest seabird nesting colony in the continental United States. While studying seabirds from an old lighthouse, Pyle, Anderson, and other biologists saw the sharks attacking their prey.

In 1989, they switched from studying birds to studying sharks. At first, when they spotted a shark they would "race out – and race right back in," Anderson says. He glances at Pyle, and they both laugh. Now they're used to being around sharks bigger than their 15-foot research boat.

When the shark research at the Farallones began, scientists knew less about white sharks than about any other large predator on earth. What little they knew came from examining dead sharks. White sharks have patrolled the seas for 11 million years, but they are regularly seen in only a few places: southern Australia, South Africa, Baja California (Mexico), and northern California.

Over the past 13 years, Pyle, Anderson, and other researchers have identified more than 30 sharks in the Farallones. "We know about 15 quite well," Pyle says.

Anderson and Pyle wait for the telltale signs of a shark attack: explosive thrashing in the water, a red stain, and flocks of seabirds looking for leftovers. When feeding is over, Pyle and Anderson move in with their camera. They can tell a shark's sex by videotaping its underside – males have an extra set of fins called "claspers."

"When the sharks see our boat floating above, they come up and swim pretty close," Pyle says. "Sometimes they put their mouth on the motor, but they don't harm themselves. They can feel things with their teeth, and once they know it is not food, they let go."

Camouflage hides them from prey

The white sharks cruise the shallow waters just offshore, waiting for seals and sea lions traveling between resting spots and feeding grounds. The shark's coloring camouflages them. They're called white sharks, but only their bellies are white. A white shark's upper half is dark gray, so a seal looking down won't see the shark against the dark bottom.

Pyle and Anderson are sitting in their research boat when the head of a sea lion pops out of the water about 50 yards away. "We may see an attack right here," Anderson says quietly. "Seals that sit at the surface don't live very long."

White sharks usually ambush their prey by shooting up beneath a seal or sea lion near the surface. White sharks have good vision and a good sense of smell. They don't attack small objects (good news for floating seabirds) or large objects

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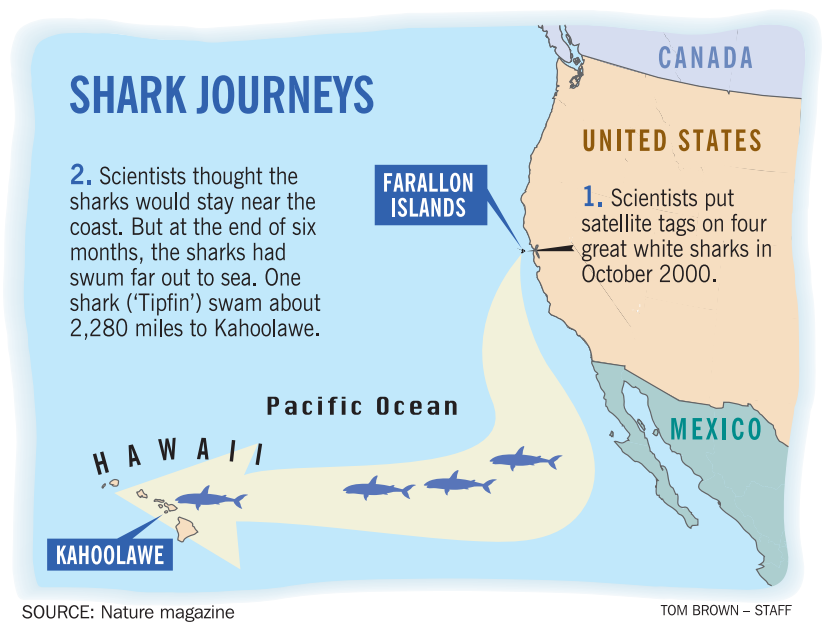

SOURCE: Nature magazine

TOM BROWN – STAFF

Today's shark tags can 'phone home'

For years, scientists have used simple metal and plastic tags to find out where fish go. But a scientist can only obtain data if a tagged fish is caught and the tag returned. Today's high-tech tags are submersible computers that can 'phone home' on their own. Here's how they work:

1. A pop-up satellite tag is attached to a shark by a scientist in a boat using a long pole.
2. Every two minutes, the tag records data on the shark's swimming depth, the water temperature, and (indirectly) its location.
3. After a specified amount of time, the tag releases automatically and floats to the surface.
4. The tag radios data to a satellite orbiting 500 miles above Earth.
5. The satellite sends the data to a scientist's computer.

In October 2000, scientists used the high-tech tags on four great white sharks. (Scientists call them just 'white sharks,' but most people call them 'great white sharks.') The scientists tagged the sharks near the Farallon Islands. They thought the rare creatures swam south along the coast for the next six months. But they discovered that the sharks swam far out to sea! (See map above.) One of them, a 15-foot male named Tipfin, swam 43 miles a day to reach the small Hawaiian island of Kahoolawe in less than two months. He stayed there through spring. Tipfin was tagged again last fall – and swam straight for Hawaii again.

P.S.T.

Scientists use satellites to solve the great white shark mystery

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(good news for shark biologists in small boats). They attack only objects about the size and shape of a seal (sometimes bad news for surfers and swimmers).

Biologist Burney LeBoeuf studies elephant seals at Point Año Nuevo, just south of the Farallones. By strapping underwater "critter cams" on seals, he discovered that experienced seals avoid white sharks by swimming fast and deep through the shallow "danger zone" near shore. They spend little or no time at the surface.

The sea lion we're watching disappears – but not into a shark. "Yesterday we had three shark attacks right here," Pyle says.

Shark mamas the size of minivans

White sharks don't start out eating seals and sea lions, but they are good-sized predators from the start. No one has ever seen white sharks giving birth, but scientists have been able to examine a few pregnant sharks caught by fishermen. Female white sharks give birth to five to 10 babies, each about four-feet long.

The babies are on their own from the moment they are born. They come fully equipped with lots of sharp teeth. Young white sharks eat fish. When they are about 10- to 12-feet long, white sharks begin hunting seals and sea lions. Adult white sharks may also feed on large fish and dolphins, and even scavenge dead whales.

"We've seen Cuttail, a 15-foot male, regularly for 13 years," Pyle says. "Nobody knows how long white sharks live, but it could be decades." Male white sharks can reach 18 feet. Female white sharks are even larger than males, possibly reaching 23 feet. Some of the Farallones' female sharks are the size of minivans.

Tipfin's surprising journey

By getting to know individual sharks, Pyle and Anderson discovered that males return to the Farallones every fall. Females return every other fall. But where do the sharks go in the off-season?

In October 2000, Pyle and Anderson carefully pulled their boat alongside Tipfin, a 15-foot male. They used a pole with a barb on it to attach a small cylinder to Tipfin's back.

Scientists have tagged fish for years, but the tags are usually simple metal or plastic tags. Tipfin's tag was a miniature computer. It recorded his swimming depth, location, and the water temperature every two minutes. After six months, the tag automatically detached itself from the shark and floated to the surface. There it transmitted its data to an orbiting satellite.

The results were a surprise. Scientists thought white sharks hugged the coast, traveling south to Mexico from the Farallones. Tipfin swam about 2,280 miles in a completely different direction – to Hawaii! Three other tagged sharks swam far into the Pacific. **(See map on facing page.)**

Pyle thinks the travels are part of a breeding cycle. "We're starting to think that maybe the females go all the way to Japan to give birth," Pyle says. Perhaps the sharks breed somewhere in mid-ocean, then the females travel on across the Pacific. That would explain why females visit the Farallones only every other year.

These tagging studies could help save white sharks. Scientists worry that the already rare white shark is becoming even rarer. Like whales, white sharks probably live a long time and reproduce slowly. This makes them vulnerable to overfishing. After the movie "Jaws" was released in 1975, many white sharks were killed because people thought they were monsters. Even today, white shark teeth, jaws, and fins sell for high prices.

Today, people are beginning to see great white sharks not as villains, but as animals that deserve respect and protection. In recent years, Australia, South Africa, and California have made it illegal to harm white sharks.

"We've come a long way," says Pyle with satisfaction. "Fifteen years ago, the only good shark was a dead shark."

Pamela S. Turner

She's warm-hearted – really!

Most fish are coldblooded. That means their body temperatures vary according to the temperature of their environment. But great white sharks are warmblooded, like you and me. Their body temperature stays relatively constant. Being warmblooded means the sharks are fast and vigorous, even in very cold water. The white shark's special adaptation allows it to catch quick, warmblooded prey – seals and sea lions.

How do scientists know that white sharks are warmblooded? They fed a shark a piece of seal blubber with a transmitting thermometer inside.

REUTERS/FILE

MY, WHAT NICE TEETH... Unlike other fish, great whites are warmblooded.