

Nova scientist helps feds build case for poaching of great white sharks

By David Fleshler

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The victims: 21 great white sharks.

The evidence: A bag of dried fins confiscated in New York.

The investigator: A South Florida scientist who developed a technique for rapidly identifying shark species from their DNA.

Mahmood Shivji, a conservation biologist at Nova Southeastern University, is helping federal fishing enforcement agents make their case against a New York seafood exporter accused of illegally possessing the fins of protected great white sharks.

Despite their sharp teeth and fierce reputation, sharks have sustained significant declines around the world, largely because of the market in East Asia for their fins. In China, Malaysia and other countries, shark fin soup is a delicacy that can command prices of \$100 a bowl. With China's economic rise, demand for fins has soared, supporting fisheries in the United States and other countries.

The great white case began in late 2003, when investigators from the National Oceanic and Atmospheric Administration confiscated about a ton of dried shark fins from a New York seafood exporter, according to an account recently published in the journal *Conservation Genetics*. In one bag of fins labeled "porbeagle," a shark species that's legal to catch, they found a hidden label that said "blanco," Spanish for white.

Possession of great whites is illegal in the United States, with violators facing maximum fines of \$100,000 per count. This case involves only possession of a protected species, not the illegal practice of finning, in which the fins are cut off a live shark, which is tossed back, said Mark Oswell, spokesman for NOAA law enforcement.

Unable to determine the species of the fins, investigators turned to Shivji, director of Nova's Guy Harvey Research Institute, who had already helped make about a dozen shark-violation cases against fishermen.



Photo: J. Valetta



Biologist Mahmood Shivji near a pile of frozen shark fins (left) at Nova Southeastern University's laboratory near Port Everglades.

(Photo/Rhonda Vanover)

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Shivji, whose original training was in plant genetics, flew to New York and went to NOAA's office, where they pulled bags of fins out of a storage room. The bags contained 84 fins belonging to 21 sharks.

"Once the shark has been caught and cut up into small body parts, like fins or meat, it's very difficult to tell what species those body parts came from, unless you use some kind of genetic test," Shivji said. "And we had developed that kind of genetic test, to actually identify a white shark's body parts."

Using separate, clean disposable razors, Shivji took fingernail-sized samples of each right pectoral fin. He brought the samples to Nova's laboratories near the inlet to Port Everglades. Using a technique that replicates particular sections of DNA millions of times,

he and his graduate students matched it to the great white's unique genetic code. And for the record, he ran the porbeagle's genetic code and found it didn't match.

"There are differences in the DNA sequence between a white shark, a shortfin mako, a porbeagle, a sandbar, a dusky shark etc." Shivji said. "It's just like there would be DNA sequence differences between a human and a chimpanzee and a baboon and an orangutan."

Paul Raymond, special agent with the National Oceanic and Atmospheric Administration Office of Law Enforcement, who co-authored the paper in Conservation Genetics, said he couldn't release the name of the exporter because the a formal notice of violation has not yet been filed. He described the exporter as a "major dealer."

He said Shivji and his graduate students provide "great reports" that have not been challenged in court.

Wildlife enforcement officers have used DNA analysis to convict people for poaching deer, selling the eggs of endangered sea turtles and smuggling caviar. Shivji adapted the technique to sharks, and has figured out how to test for up to 14 species at once.

"It holds real promise for enforcing shark-protection regulations," said Sonja Fordham, international conservation manager for The Ocean Conservancy. "You have 19 species of sharks that are prohibited species. You have a big pile of fins, and it's not always possible to tell which species they are. I think it's really exciting technology that would really help conservation."

Great whites live all over the world, including off the Florida coast, although they're found in largest numbers off California, South Africa and Australia. The World Conservation Union, which administers an internationally recognized list of endangered species, classifies great whites as "vulnerable."

The species matures late and produces few young, according to a World Conservation Union report. In addition to being caught for meat, the great white pays a price for its notoriety as a predator, being targeted for its jaws and teeth.

The case is particularly important because some people have questioned whether the fin trade was a threat to great whites. During the 2004 debate over whether to add the great white to an international treaty on endangered species, some countries' representatives argued that the species was caught only to meet the small trophy demand for its jaws and teeth, not its fins.

Fordham said the discovery of fins from 21 sharks was "surprising and alarming," given the law against catching them and the species' natural rarity.

"I don't think we knew it was going on at that level," she said.

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