

Sawfish Recovering?

Is a Mythical Fish Recovering?

BY EMILY SOHN

The green sawfish at the Georgia Aquarium in Atlanta, Ga., attracts plenty of admirers as it makes its way along the sandy bottom of a 6.3-million gallon tank. Related to sharks, sawfish are a family of ray (*Pristidae*) that look as if they were created by Dr. Seuss. With a body as long as 20 feet or more in some species, up to a quarter of a sawfish's length can be taken up by a giant, toothed sword that sticks out of its face.

"It's one of the most extraordinary adaptations in the animal kingdom, right up there with the narwhal's tusk and the elephant's trunk," said Dr. Alistair Dove, Georgia Aquarium's director of research and conservation. "It's an outstanding feature that you just can't ignore."

Sawfish sightings, however have become exceedingly rare, particularly in the wild. Once abundant in the waters of more than 90 countries around the world, the animals are now extinct from half of their former range and all five species are classified as endangered or critically endangered by the International Union for Conservation of Nature (IUCN) (www.iucnredlist.org).

The smalltooth sawfish (*Pristis pectinata*), which used to make seasonal appearances as far north as New York and throughout the Gulf of Mexico, has experienced an estimated 95 percent reduction in numbers from 1962 to the present, according to scientific surveys, fishery observations and landings data¹. African, Australian and Indonesian populations have faced similarly drastic declines, as has a once-thriving population in Lake Nicaragua, leaving experts in a race to save an animal that only recently became the subject of species assessments.

"Sawfish are arguably the most endangered marine fish in the world," said Sonja Fordham, president of Shark Advocates International in Washington, D.C. "The sad reality is that a lot of people think they're just a figment of people's imagination, like a cartoon character."

A Threatened Legend

For thousands of years, sawfish have been revered as symbols of strength and even spirituality. Dozens of sawfish noses, called rostra, were buried in tombs beneath the Aztec Great Temple in Mexico City, according to research compiled by the IUCN Shark Specialist Group. Ancient Mayans added rostral teeth to the graves of their dead.

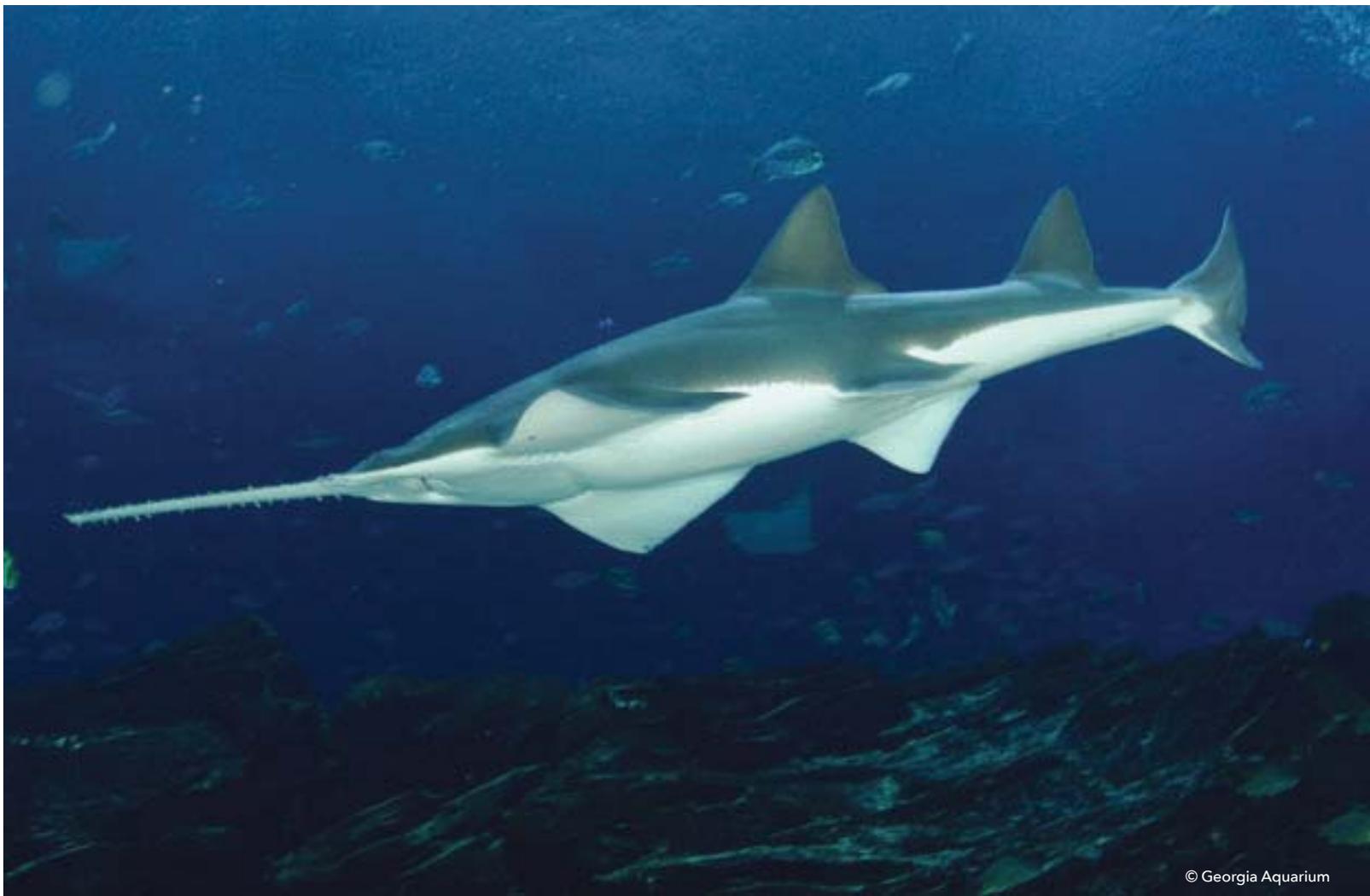
Images of the animals show up on the walls of Thai Buddhist temples, and the fish have played extensive roles in tribal mythologies of people living in tropical and subtropical zones around the world.

But the body part that makes the sawfish so compelling is also what has made it so vulnerable to decline. A proboscis lined with dozens of teeth is easily snagged in nets and other fishing gear, and those accidental entanglements can be annoying to fishermen, who have often killed the animals to save their gear. Even when anglers mean well, many find it impossible to resist the urge to drag a snared sawfish out of the water for a photo shoot. That's dangerous for people, who can get speared by a thrashing fish, and for the fish, whose gills need to stay wet to survive.

"The rostrum is their Achilles heel," said Dr. John Carlson, a research biologist with the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service in Panama City, Fla. "It's a double-edged sword."

There is a long history of intentional harvest, too. Sawfish fins are among the highest priced in the shark-fin trade, with a set of fins selling for up to \$3,896². Their ova, gall bladder, liver and other parts are used in traditional medicines in China³. Sawfish rostra continue to be sold as curios in the souvenir trade, both in shops and online auctions. The average price paid was \$119, with the highest bid at \$1,242². The spiked teeth may be sold as spurs in Peruvian-style cockfighting in Peru and Ecuador, with each pair priced between \$80 and 220².

Sawfish spend a lot of time in fragile environments such as mangroves and coastal areas where human activities are highly concentrated, making them vulnerable to habitat loss, alteration and destruction. It can take several years for a sawfish to reach



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A green sawfish at the Georgia Aquarium.

sexual maturity, and many reproduce only every other year. Some species give birth to just a few live young at a time. This makes sawfish slow to recover from declines, especially when habitat availability and quality are declining as well².

Amidst plummeting numbers, there is still a shortage of information regarding basic ecology and biology of sawfish. It was not until 2012, for example, that one study demonstrated the full utility of the rostra in the ability to detect, dig up and obtain prey⁴. Previously, seven species of sawfish were considered taxonomically distinct. But a recent reassessment found that all sawfish belong to only five species⁵.

“It was one of those animals that slipped through the cracks,” Carlson said. “We didn’t really know anything about them until we found out they were disappearing. From a basic biological perspective, we didn’t have a handle

on anything. Since then, we have been trying to get as much information as we can.”

For the last few years, researchers from NOAA, the Florida Museum of Natural History and Florida State University have been counting, tagging and collecting blood samples from smalltooth sawfish in Everglades National Park and Florida Bay to get a better understanding of how the animals move and interact. Another team from the Florida Fish and Wildlife Conservation Commission is doing work in areas that are more developed, which will help scientists quantify threats from human activities.

Results from these projects have revealed that juveniles return to the same habitat year after year and that they stick to small home ranges that expand as they grow. Researchers are also finding that juvenile sawfish grow quickly in the first couple of years, reaching sexual maturity within two to three years². Preliminary data also suggest that adult sawfish segregate into groups of males and females within the Florida Bay and demonstrate tidal and seasonal movements. Studies like these can help focus conservation efforts on the locations and times when sawfish need protection the most.

Action Plan

Political action and public education remain essential for saving sawfish from extinction, says Fordham, who co-wrote the petition to list smalltooth sawfish under the U.S. Endangered Species Act. The petition was



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implemented in 2003 and the smalltooth sawfish was listed as endangered in 2005, with the largetooth sawfish (*Pristis perotteti*) added in 2014. In 2013, all five species of sawfish were listed under Appendix I of the Convention on International Trade in Endangered Species (CITES). That listing bans international and commercial trade of the animals and their parts.

There is hope that legally binding protections can make a difference. Already, populations seem to be stabilizing and even recovering in some places, including the Everglades, Carlson said, where surveys of fishermen suggest a 5 percent increase per year in the number of sawfish in the area since the 1970s.

Still, sawfish have a long way to go for complete recovery to historical levels. In Florida, ongoing conservation efforts include billboards and social media campaigns that try to teach anglers how best to release sawfish from their fishing lines and nets. Even people who live far from the coast can make a difference, Fordham adds. One way to help is to urge Congress to fully fund the sawfish recovery plan and enforcement efforts. Another is to report any sawfish sightings to the IUCN Shark Specialist Group or the Florida Museum of Natural History (www.flmnh.ufl.edu/fish/sharks/sawfish). Whether divers see sawfish swimming underwater, travelers spot rostra in tourist shops, online shoppers notice auctions on eBay or historians stumble across mentions of sawfish in old newspaper clippings, all information is helpful.

“Sawfish are so rare,” Fordham said, “and every data point matters.”

Aquariums play an important role, too. Because sawfish are so imperiled, the only chance most people will ever get to see them—or even learn of their existence—is to visit them in aquariums.

“The ability to come to an aquarium and make a connection with an animal people would otherwise never see and marvel at its extraordinary adaptations and learn about its biology—that alone is a big step towards addressing its conservation plight,” Dove said. “It’s hard not to be impressed.”

Aquariums may also help seed sawfish populations of the future. In 2012, the largest female smalltooth sawfish at the AZA-accredited Atlantis Paradise Island Resort Aquarium in Nassau, Bahamas, gave birth to four pups—the first example in the world of successful



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Sawfish are so rare, that aquariums offer the best chance for the public to see these remarkable fish.

breeding in an aquarium for any kind of sawfish. Now sub-adults, those sawfish are approaching their third birthday, and Atlantis biologists regularly conduct ultrasound exams and blood work to monitor and study sawfish physiology and reproductive biology.

With little known about how sawfish reproduce, Atlantis is hoping to add to our understanding about critical periods for mating, growth rates, productivity rates, environmental requirements and more. These details and others might help scientists assess the ability of the entire species to recover. For an animal that faces such an uphill battle towards population recovery and stability, every viable birth is reason to celebrate.

Emily Sohn is a freelance writer based in Minneapolis, Minn. For full list of references, visit www.aza.org/connectmarch2015

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