

The largemouth sawfish, the largest freshwater fish in the world, is at risk of extinction. Research Fellow PETER KYNE is working to understand this species before it is too late.

Search for secrets of river sharks and sawfish

The waterways of Northern Australia are famous for their extraordinary wildlife: crocodiles, iconic migratory birds and unique amphibians, but the region is also the world's last remaining stronghold for some threatened sharks and rays that live in both fresh and salt water.

The largemouth sawfish is the world's largest freshwater fish, reaching up to seven metres in length. Of the 321 sharks and rays in Australia, it is one of only five species that venture upstream from the coast into fresh water.

Charles Darwin University Research Fellow Dr Peter Kyne is one of several hundred researchers funded by the Australian Government's National

"Juvenile speartooth sharks seem to be relatively common in protected areas like the rivers of Kakadu National Park, but we know nothing about the adults including where they occur and the threats they face. There is no record of anyone having ever caught or seen an adult speartooth shark."

Fishing practices incorporating gill nets might hold some clues to the apparent absence of adults. Gill nets hang like a mesh fence in the water, and range in length and mesh size. They are commonly used by commercial fishers because of their effectiveness in snaring commercial fish such as barramundi, usually by the gills once they have passed part way through the mesh. The introduction of gill nets by fishers in the 1960s and 1970s has had a significant impact on sawfishes around the world. The populations of all five sawfish species have crashed globally, and they have become extinct in many countries where they were once described as "common" or "abundant".

"The toothed edges of sawfish rostrums [snouts] are easily tangled in nets and because they can be difficult to handle, they were often killed instead of released," Dr Kyne said. "Their fins are also popular in shark fin soup."

Environmental Research Program, which aims to improve Australia's understanding, management and conservation of the country's unique biodiversity and ecosystems.

Very little is known about the population size and status of sawfish and speartooth sharks, which makes their effective management and conservation problematic. "Both these species are at risk of extinction, and their threatened status requires recovery plans for their protection under the federal Environmental Protection and Biodiversity Conservation Act," Dr Kyne said.

Largetooth (or freshwater) sawfish (*Pristis pristis*).

TEXT

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IMAGES

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The research team, led by Dr Peter Kyne, searches the South Alligator River for sawfish.



The northern river shark (*Glyphis garricki*).



The speartooth shark (*Glyphis glyphis*). The main feature that distinguishes it from the similar northern river shark is that the waterline (where the colour of the shark abruptly turns from grey to white) runs across or just below the eyes of the shark. In contrast, the waterline of the northern river shark runs well below the eyes.



A PIT (passive inductive transponder) tag being loaded into a tagging device. The microchip in the tag sends out a unique code when activated.

PIT tags are inserted under the skin of the shark below the first dorsal fin, allowing each fish to be identified individually if it is recaptured. Each tag has a unique code, which is read by a scanner. Genetic samples are collected in vials to help develop a "family tree" of river sharks.

Despite the largetooth sawfish being fully protected in Australia, it is still at risk from fishers.

Kakadu National Park has one of the best remaining populations of sawfish and river sharks in Australia. Oliver Scheibe, Chief Ranger for the Park's South Alligator region, said he has seen sawfish as far inland as Yellow Waters, more than 100 km from the coast.

"People sometimes cut the rostrum off and take it home as a trophy," Mr Scheibe said. "Some time ago I found a sawfish that still measured six to seven feet without its rostrum." Rangers and Fisheries Police work together to ensure people are complying with fishing regulations in the park, with penalties for killing, injuring or trading in threatened species ranging up to two years' jail and \$110,000 in fines.

Venturing on to the South Alligator River in Kakadu each month, Dr Kyne's research team uses a gill net 58 metres long and almost three metres deep in the shallows of river bends where sawfish feed. The net is stretched across the river at various sites upstream of the river mouth for at least four hours at a time. It is set around the incoming and outgoing tides, and checked for catches every half hour.

"When we catch a sawfish or shark, we take a number of measurements,

a tissue sample for DNA analysis and we implant a tag, which allows each fish to be individually identified if it is recaptured," Dr Kyne said. "These recaptures can give us information about the animals' movements and how they are using the river. The sawfish and sharks are released once we have collected the data."

Because adult sawfish and speartooth sharks are difficult to capture, the team is taking tissue samples from juvenile species to start to develop a "family tree", using a technique known as "close-kin" genetics. It is the first time in the world this technique has been used without any data about the adults.

This approach will allow the researchers to predict the size of sawfish and speartooth shark populations across Northern Australia. Very little research has been undertaken on freshwater sharks in Northern Australia, and while sawfish have received more attention, there are still many knowledge gaps. A group of Japanese scientists undertook the first intensive study of freshwater sharks and rays in the north as recently as 1989.

For a long time, all sharks in North Australian rivers were thought to be bull sharks until a closer investigation revealed the presence of two other river shark species. Both were given scientific names just four years ago.

"This really serves to underline how poorly we understand the extent of biodiversity in these northern river systems," Dr Kyne said. "Largetooth sawfish and speartooth sharks are more susceptible to changes in land use than marine species. If they can't migrate upstream due to reduced river flows, or run-off affects water quality, this could have an impact on their populations."

The monthly sampling program will help to determine whether existing management strategies are effective and what other management might be needed to ensure the survival of these species. For more information on this project, visit W:nerpmarine.edu.au/sawfish. 🌸

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