

SCIENTISTS STEP IN TO SEPARATE SNAKES AND DECKHANDS

Highly venomous sea snakes may seem fundamentally unlovable, but the desire to protect them is catching on in prawn trawl fisheries

For a venomous sea snake caught up in a net brimming with prawns, the trip on board a commercial trawler can prove as traumatic for it as for the deckhands charged with manually returning it to the sea alive. Adding to the challenge of these unwanted encounters, sea snakes are a protected species, susceptible to overfishing and, although bites are rare, most incidents occur on fishing vessels.

With Australian waters home to a uniquely rich array of species, sea snakes present a particularly Australian twist on the bycatch problem that affects prawn trawl fisheries around the world. Given the nature of the problem, it is not surprising it took local ingenuity, funds from the FRDC, seasoned snake handlers and considerable collaboration to find ways to reduce interactions between sea snakes and trawlers.

The prime targets of the FRDC-funded research efforts (project 2005/051) are the Northern Prawn Fishery (NPF) and the Queensland East Coast Trawl Fishery (project 2005/053). Although sea snake bycatch is common to both, the fisheries are sufficiently different that two research projects were mounted. In the Gulf of Carpentaria, CSIRO's David Milton was at the helm; in Queensland, Tony Courtney leads a team of researchers from the Department of Primary Industries and Fisheries.

There are 32 species present in Australian waters, roughly two-thirds of all sea-snake species on the planet.

Tony Courtney says they are air-breathing reptiles, usually highly venomous, but not too aggressive. "They tend to eat small fish and are themselves likely to be eaten by sharks. Few species are able to make their way on land – they are very much part of Australia's marine heritage."



PHOTO: ODP/EF

The olive sea snake (*Aipysurus laevis*).

About a dozen species have been identified in Queensland's bycatch, based on digital photos from vessel crews.

About 470 licensed otter trawl vessels* operate in Queensland – the largest trawl fishery in Australia – and about 70 of these participated in the observer program. When their figures were extrapolated to the whole fleet, preliminary estimates indicated that about 50,000 sea snakes are caught annually.

Observations made on the snakes caught in trawl nets in Queensland suggest that about 20 per cent die as a result of being caught. "That figure has two components," Tony Courtney says. "Between five and 10 per cent of snakes come up dead in the nets. A further 10 to 15 per cent die in the following two to four days after being trawled, based on holding the snakes in tanks after being caught."

That figure is lower than in the NPF, where CSIRO estimated mortality in 2001 at more than 40 per cent. David Milton explains that the difference is likely due to trawl times that are twice as long, on average, as on the east coast.

CSIRO has also extensively surveyed catches to help ensure industry sustainability, given that the NPF is one of Australia's most valuable Commonwealth fisheries. Researchers identified a total of 390 non-target species in northern bycatches – 73 per cent involved fish species. About a dozen sea-snake species turned up and there is concern for two in particular – the large headed sea snake and the spectacled sea snake.

“Sea snakes are relatively slow growing and produce a few live young each year,” David Milton says. “So their populations will decline if a high proportion of females are caught before they breed, or their young do not survive.”

At both sites, researchers opted to explore the effectiveness of using bycatch reduction devices (BRDs) – including turtle exclusion devices (TEDs) – in prawn-trawl nets to reduce the sea snake catch rates.

TEDs are hard grids placed in trawl nets that guide turtles towards an opening in the net, through which they can escape. Prawns are small enough to pass through the grid and so are still caught. BRDs are changes to the trawl net itself. They are openings designed to enable animals smaller than turtles to actively swim out of the net. Both devices were made compulsory in 2000.

By 2003, David Milton found that devices in use in the NPF – TEDs and Bigeye BRD – were not reducing sea snake catches. However, continuous improvement in design saw Tony Courtney identify a different device – the Fisheye BRD – that proved capable of reducing sea snake bycatch by 65 per cent in Queensland.

More recently, David Milton found that most BRDs in use in the NPF are capable of reducing sea snake and other bycatch if they are moved closer to the net's codend: “BRDs closer than 80 meshes from the codend can reduce sea snake bycatch by between 50 and 80 per cent. However, that can drop off considerably as the BRD is pushed back towards the maximum limit of 120 meshes.”

Overall, the scientific work has indicated that the means exist for trawlers to play a proactive role in allowing a majority of sea snakes to escape the nets.

Should the sea snakes start to pull off an industry-abetted great escape, it would amount to a further gain for an industry that has already notched up sustainability gains. ●

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* *Otter trawlers are named for the trawl doors, or 'otters', used to keep the mouth of the net open.*



The grey reef shark has been the most commonly seen shark in the Great Australian Shark Count.

DIVER ENTHUSIASM BOOSTS SHARK COUNT

The Great Australian Shark Count has begun and after just a few months organisers are overwhelmed by the response. By mid-January, 130 people had registered more than 1200 shark sightings of 19 species from all around Australia.

Australian Underwater Federation chairman and project coordinator Adam Smith says he was pleasantly shocked by the results. “I am absolutely surprised that the Great Australian Shark Count is now the largest community monitoring database for counting sharks in the world. I thought we might be lucky to get 500 reports.”

Some of the results have been surprising too. The recordings include sightings from an expedition to the Coral Sea – thought to be the last stronghold of reef sharks. About 400 sharks were sighted there, including a large number of grey reef, whitetip, silvertip and tiger sharks up to 3.5 metres, which Adam Smith says was unexpected.

Only two great white sharks have been reported in the survey so far, which indicates that encounters with these large, protected sharks is still rare.

Analysis of data from the Coral Sea and reports from the Great Barrier Reef show the most common shark in the Coral Sea is the grey reef shark, whereas in the Great Barrier Reef, the whitetip reef shark is the most widely seen.

Adam Smith says this difference may be because whitetips prefer lagoonal habitats, while grey reef sharks prefer more oceanic environments.

Most of the divers carrying out the monitoring are members of the more than 1000-strong Australian Underwater Federation and are well experienced at recognising sharks. As well, to make identification simpler, only 10 species have been included for monitoring from the possible 160 species found in Australian waters. Recreational fishers, SCUBA divers, conservation groups and researchers are also participating in field monitoring.

In 2008, four dedicated shark-spotting weekends will be held, the first on 28 to 30 March, with a major event in Sydney or Woolgoolga, NSW. On these occasions divers will be encouraged to dedicate the weekend to counting sharks, providing a very focused count to complement the opportunistic sightings already being made. Over the course of the year other events will be held in Melbourne, Townsville and Perth.

The two main objectives of the shark count are education – to tell people more about sharks – and monitoring, to learn more about the species and their abundance in Australian waters. The project will provide the community, managers and decision-makers with valuable data.

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