

Deep-sea sharks wired for sound

April 9 2008



An acoustic tag attached to a gulper shark. Image credit – CSIRO

Deep-sea sharks have been tagged and tracked and their habitats precisely mapped in world-first research to test the conservation value of areas closed to commercial fishing.

Last month scientists from the CSIRO Wealth from Oceans National Research Flagship fitted acoustic tags to 50 gulper sharks, swellsharks and green eye dogfish near Port Lincoln, South Australia.

They will track the shark's movements in a closed area designed to protect the gulper shark – a species which is severely depleted over much of its range and is nominated for protection under the Environment Protection and Biodiversity Conservation Act 1999.

“Half of the fish harvested in Australia’s south-east fishery come from a thin belt of water along the south-eastern continental shelf at depths of 200-700 metres,” says CSIRO Wealth from Oceans Flagship scientist, Dr Alan Williams.

“This rich belt yields prime table fish such as blue eye trevalla and pink ling, but is also home to several shark species vulnerable to over-fishing.

“The fishery has taken steps to reduce its impact on sharks by putting in place a network of three closed areas located off South Australia, Tasmania and New South Wales.

“To assess the optimum size and location of such areas, we need to know how much time the sharks spend there, what the seabed habitats are like, and what role they play in the ecology of the sharks. For example, the sharks may rely on shelter in rough habitats, and these are scarce.”

The research applied tagging techniques never before tested at such depths and developed new handling practices to minimise stress caused by the tag and release process.

The closed area, which covers approximately 1200-square-kilometres and is mostly in 200 to 1000m depths, was mapped from the Marine National Facility Research Vessel Southern Surveyor. Multi-beam sonar was used to draw the contours of steep rocky banks, narrow muddy terraces and submarine canyons on a previously blank area of seabed.

A towed underwater camera system was used for fine-scale observations of seabed habitats and communities, fish behaviour and habitat use, and to estimate fish distribution and abundance. In collaboration with the University of Western Australia, baited video cameras were also used to estimate fish abundance.

The sharks were caught and tagged from the South Australian Research and Development Institute (SARDI) Marine Research Vessel Ngerin, with fishing assistance provided by scientists from the Australian Maritime College National Centre for Marine Conservation and Resource Sustainability. Some sharks were released at the surface while others were lowered to the seabed in large cages fitted with video surveillance systems to monitor their recovery.

The sharks will be tracked for the next three years by a network of 24 acoustic listening stations moored 100 metres off the complex and steep seabed. These listening stations were deployed with pinpoint accuracy using the precise positioning capabilities of the Marine National Facility. Four listening stations raised for an early preview have detected a flurry of activity, receiving 5700 acoustic ‘pings’ in five days from 42 of the sharks moving in all directions.

“This large scale experiment, the deepest of its kind in the world, will be important to understand the balance between maintaining fisheries, and protecting the marine ecosystem,” Dr Williams says.

Source: CSIRO

Citation: Deep-sea sharks wired for sound (2008, April 9) retrieved 12 May 2024 from <https://phys.org/news/2008-04-deep-sea-sharks-wired.html>

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