

Tagging sharks to determine post-release mortality – the Pacific Shark Tagging Project



A New Caledonian fisheries observer about to place a satellite tag on a shortfin mako shark. Image: Charles Cuewapuru

Sharks are often caught incidentally by vessels fishing for tuna. Because sharks are top predators of oceanic ecosystems, evaluating the status of their stocks is important in the management of tuna fisheries. The Western and Central Pacific Fisheries Commission (WCPFC) assesses the status of shark populations, but data limitations often hold the Commission back making firm conclusions. There is considerable uncertainty about the number of sharks killed through fishing activities and this uncertainty leads to a lack of clarity in defining and refining shark conservation and management. Mitigation measures have been tested but results vary, and there is little information on the effectiveness of some of these measures. To reduce some of these uncertainties, and to provide confirmation that the condition of a shark at release is a reliable predictor of future survival, a regional shark tagging programme has been designed and implemented in the Pacific Islands region to measure post-release mortality in sharks.

Since 2010, several shark conservation and mitigation measures for the longline fisheries have been adopted by WCPFC. To reduce the practice of de-finning sharks, fishers were first required to fully utilise any retained catches of sharks and to guarantee retention by the fishing vessel of all parts of the shark. Oceanic white tip and silky sharks fishers (in 2013 and 2014, respectively) were asked to release these species as soon as possible after the shark is brought alongside the vessel. The number of releases and status upon release was to be monitored by observers. In 2015, wire leaders and shark lines (branch lines running directly off the longline floats to catch sharks) were banned. It is more difficult for sharks to bite through wire leaders than monofilament leaders, and this generally results in higher shark catch rates.

There is little information on the effectiveness of no-retention measures, and the Areas Beyond National Jurisdiction (ABNJ, or Common Oceans) Tuna Project, funded by the

Global Environment Facility, has identified that tagging studies designed to quantify the survival rate of discarded and or released sharks are required to provide critical new inputs for assessment and mitigation studies. In addition to implementing the ABNJ Tuna Project by the Food and Agriculture Organization of the United Nations, the WCPFC also received a grant from the European Union for post-mortality studies on sharks. In January 2017, the initial phase of the tagging project was to design the study and a workshop with global experts was organised in New Zealand to review best practices and to develop a survey methodology for estimating shark post-release mortality (PRM).¹ The New Zealand National Institute of Water and Atmospheric Research (NIWA) was subsequently contracted by WCPFC to coordinate PRM tagging studies across the region with input from the Pacific Community (SPC). The output of the workshop provided the basis for an experimental protocol, and NIWA's expertise in shark

¹ See: Anon. 2017. Report of the Expert Workshop on Shark Post-Release Mortality Tagging Studies. Review of best practice and survey design 24–27 January 2017, Wellington, New Zealand. WCPFC and SPC. 43 p.

Tag attached to the telescopic pole.
Image: Caroline Sanchez, SPC



tagging allowed the development of a training module for fisheries observers and fishers.

NIWA senior technician, Warrick Lyon, alongside SPC senior technician, Caroline Sanchez, delivered shark tagging training workshops to New Zealand, Fiji, New Caledonia and Marshall Islands National Observer Programs and associated fishing industries. The course was developed to allow

observers and fishing captains to gain an understanding of the project, and the type of information required of them, as well as to gain confidence in the use of the tagging equipment and data recording.

Shark taggers are equipped with a tagging case that includes several satellite tags, a telescopic tagging pole, data sheets, a protocol, and a GoPro camera to film the tagging action. Collaboration from the fishing industry is critical because the vessel needs to slow down while the crew brings a shark alongside the vessel. The tagger grabs the pre-equipped tagging pole, puts on and starts narrating the tag event as well as observations of the shark's condition before and after release. To tag a shark, the tagger leans over the gunwale of the fishing vessel, and using the telescopic pole while the shark is still in the water, tags the shark close to its dorsal fin. Before the release of the tag, the tagger needs to assess the size and life status of the shark. If the shark measures less than 90 cm and presents obvious signs of potential death after release, the shark is not tagged (and the tagger waits for another opportunity). The tags used in this study record the shark's depth, and water temperature and light intensity. After 60 days, the tag automatically detaches from the shark and pops up to the surface where it transmits its data via satellite. The data



Training in the Marshall Islands onboard a Taiwanese longliner belonging to the Luen Thai Fishing Venture, July 2018. Image: SPC

are then used to determine whether the shark is alive or dead (e.g. a live shark will move in the water column whereas a dead shark will sink to the seabed). As a precaution, after two days of no vertical movement, the tag will prematurely release itself. If the tag remains attached for the entire period, the shark has most likely survived the fishing capture-and-release process.

The practical training for the tagging was undertaken onboard local longline vessels alongside the wharf, and trainees had the opportunity to tag different training objects. A dead shark in Fiji, a costumed polyester fake-shark in New Caledonia, and a watermelon in the Marshall Islands. The watermelon was shown to be a realistic alternative to a real shark and is relatively easily procured around the Pacific!

The project targets two shark species: shortfin mako and silky sharks. Shortfin sharks are found in New Zealand, New Caledonia and Fiji, and silky sharks are found in Fiji and the Marshall Islands. At this stage of the project, 43 shortfin makos and 23 silky sharks have been tagged. The tagging experiment is ongoing and the target is 100 shortfin makos and 100 silky sharks. After the tagging is completed, a review will synthesise and interpret the PRM shark tagging results in conjunction with similar studies in different fisheries. The review will be undertaken in early 2019.

For more information:

Caroline Sanchez

Senior Fisheries Technician (Tag Recovery and Biological Sampling), SPC
CarolineS@spc.int

Neville Smith

Principal Fisheries Scientist (Fisheries and Ecosystem Monitoring and Analysis), SPC
NevilleS@spc.int

Warrick Lyon

Marine Biology Technician, NIWA
Warrick.Lyon@niwa.co.nz

How to tag a watermelon from a Taiwanese longliner. Training in the Marshall Islands with the Luen Thai Fishing Venture, July 2018.
Image: Caroline Sanchez, SPC

