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White shark research report Q and A - based on Fisheries Research Report 273: Evaluation of passive acoustic telemetry approaches for monitoring and mitigating shark hazards off the coast of Western Australia

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White shark research report Q & A

What did the research program do to gather knowledge of white shark behaviour off the WA coast?

The lasting public benefit of this Department of Fisheries' research program is the valuable information gained on shark movements from a network of infrastructure that includes more than 309 data-recording receivers deployed from Esperance to Ningaloo, including the 25 satellite-linked receivers deployed along the Perth, South West and South coasts. The 25 satellite-linked receivers are the part of the Shark Monitoring Network that can detect and report the presence of tagged sharks in near real time. This infrastructure enables these detections to be automatically posted for the public on the SharkSmart website and the SLSWA Twitter Feed and also sent by SMS to lifeguards and beach managers to assist with awareness and safety strategies. The entire project, including the pilot phase, extended over 7 years, cost \$3 million dollars and was funded by the WA State Government.

How has this project assisted with the understanding of white shark behaviour?

The information generated from this research program has provided the first detailed data on the locations and periods of shark activity and movement patterns off the Western Australian coast. The results show that white sharks can exhibit rapid, extensive movements around the Western Australian coast with some seasonality in their detection levels off the metropolitan coast. While they are mostly too far offshore to pose a significant risk to many water users, at times, some may come close to shore but generally only for periods of a few hours to a few weeks. As their movements are mostly uncoordinated, this impedes general predictions of when human encounters with this species will be likely.

How many white sharks were tagged during the project?

At the conclusion of the research program on 30 June 2015, 50 white sharks had been tagged in Western Australia between Perth and Cape Arid (east of Esperance) and further 151 had been tagged in South Australian waters by project collaborators. Since the research project was completed, tagging by collaborators has continued in both SA and in WA with 223 white sharks having now been tagged.

How many sharks were detected on the acoustic receiver network?

Up to 30 June, 2015, the 25 satellite-linked Shark Monitoring Network receivers and associated acoustic receiver arrays recorded more than 22,000 detections of 64 white sharks.

In addition, there were more than 150,000 detections of 46 tagged bronze whaler sharks and 7,000 detections of 21 tagged tiger sharks.

Where and when was the greatest level of white shark detections by the Shark Monitoring Network?

The most frequent detections along the Perth metropolitan coast were at receivers at the northern end of Garden Island and across Gage Roads. These detected white sharks at rates nearly 10 times those of beachside receivers. More than one third of the 36 tagged white sharks detected off the Perth coast were only recorded for very brief periods by receivers west of Rottnest Island, suggesting that a large proportion of white sharks travelling past Perth do so too far offshore to pose a threat to beach users, but they may still pose a risk to water users in those offshore areas.

Greater numbers of white sharks were detected off Perth during spring and early summer and, on average, those sharks spent longer in the region during that period than any other times of the year. This is

consistent with previous analyses that found a significant decline in the rate of attacks with increasing water temperature and a relatively higher incidence of white shark attacks off the metropolitan coast during winter and to late spring.

Off the South and South West coast, 88 percent of tagged white sharks were detected in deeper offshore water in depths of 50 metres and 94 percent were more than 10 kilometres off the coast. Relatively more white sharks were detected during late summer and autumn off the South West and South coasts, with fewer detected in early winter.

Movements in the southern waters show rapid movement between receiver arrays and there was almost no evidence of white sharks spending extended periods in particular areas of the South West.

Where was the greatest level of all tagged shark activity for satellite-linked receivers?

The most active satellite-linked receivers in the Shark Monitoring Network were at Warnbro Sound, Garden Island, Middleton Beach (Albany) and Meelup. 73 different acoustically-tagged white, bronze whaler and tiger sharks were detected 3,139 times. An automated SMS and email system rapidly notifies more than 100 public safety officials about tagged shark detections at key locations, enabling hundreds of public safety responses.

How often do individual white sharks return to the Perth coastline?

There was only limited evidence that white sharks regularly returned to the same location(s). Only five white sharks have been re-detected in the metropolitan region more than one year after their pot-tagging release or initial detections, suggesting that regular long-term returns to Perth by individual sharks may be uncommon. Of those triggering receivers closer to shore, only five white sharks were detected for more than seven consecutive days.

The high abundance of tagged-sharks detected by Cockburn Sound/Garden Island receivers during spring coincides with the seasonal formation of spawning aggregations of snapper close to these particular locations.

How far and how fast did the research show some white sharks had travelled?

51 individual white sharks were tracked moving over distances of up to 6,542 kilometres at minimum average speeds of up to 5.6 kilometres per hour.

Will the Shark Monitoring Network remain and will tagging continue in WA waters?

The ongoing operation and maintenance of the 25 satellite-linked receivers is covered under the Department of Fisheries' budget.

There are currently no known breeding grounds or nursery areas for white sharks in WA; so tagging work is undertaken on an opportunistic basis. There are some anecdotal reports associated with the western Bight region which other research groups are currently examining. For now, the best tagging success in WA is obtained when sharks are naturally attracted to whale carcasses or schooling fish.

Since 2009, more than 860 sharks (including 223 white sharks) have been tagged by the department and our project partners (including 19 white sharks tagged during 2015).

Further information

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