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Friday, 3 March 2017

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Committee Secretary
The Senate Environment and Communications References Committee
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Parliament House
Canberra, ACT 2600

Submission to the Senate Inquiry into the efficacy and regulation of shark mitigation and deterrent measures

We are a group of researchers at the University of Wollongong working in the fields of human geography, marine biology and fisheries governance. Between us we have experience researching social, cultural and biophysical aspects of nature, environmental management and governance in marine environments.

We address the efficacy and regulation of shark mitigation and deterrent measures, with particular reference to the following terms of reference:

- (c) the range of mitigation and deterrent measures currently in use;**
- (e) bycatch from mitigation and deterrent measures;**
- (f) alternatives to currently employed mitigation and deterrent measures, including education;**
- (h) any other relevant matters.**

Acceptability of approaches

Research in Western Australia (Gibbs & Warren 2015) found that among ocean-users who participate in a wide range of activities, the most strongly opposed strategies for managing shark-related risks were, in order: (i) wider use of baited drumlines; (ii) culling species identified as posing a threat to humans; and (iii) wider use of shark nets. In contrast, the most strongly supported strategies were, in order: (i) improving public education about sharks; (ii) encouraging ocean-users to accept risks of ocean use; and (iii) increase warning systems for ocean-users and beach goers.

Following the drumlines trial in Western Australia in 2014, a record number of 12,000 submissions was received by the Environmental Protection Authority opposing the technique. In January and February 2014, two public protests against the drumline trial attracted 4,000 and 6,000 people respectively to Perth's Cottesloe Beach. A National Day of Action on

1 February drew a further 2,000 people to Manly (Sydney), and saw protests at 11 other sites around the country (Gibbs & Warren 2014).

These findings together indicate that lethal strategies are widely opposed in Australia. Instead, education- and information-based strategies receive strong support from ocean-users.

Negative effects of lethal strategies

The negative ecological effects of lethal strategies are well-documented, including consequences for target species, non-target species, and coastal and marine ecosystems.

Notably, three key species targeted by shark hazard mitigation programs—white shark (*Carcharodon carcharias*), tiger shark (*Galeocerdo cuvier*) and bull shark (*Carcharhinus leucas*)—are also listed as threatened species on the *IUCN Red List of Threatened Species*. In NSW the *Shark Meshing (Bather Protection) Program* was listed in 2003 as a ‘Key Threatening Process’ under the *Threatened Species Conservation Act 1995*.

The NSW *Shark Meshing (Bather Protection) Program Annual Performance Reports* illustrate the significant bycatch associated with the program. Data shows a large increase in entanglements by the program from the 2014/15 season to the 2015/16 season. Consistently across all nets there were substantially greater numbers of entanglements of cownose ray, eagle ray and hammerhead sharks, none of which are implicated in dangerous encounters with people. For most species, the number of entanglements increased. Of particular concern, entanglements of grey nurse shark (*Carcharias taurus*)—the east coast population of which is critically endangered—increased almost fivefold over the time period. Most individuals were released alive. These increases in bycatch highlight how little is known about the temporal variability and general ecology of these species along our coast, and the drivers of these patterns.

Of the targeted species caught in the meshing program most individuals are too small to pose a risk to humans. Further, the list of targeted species includes some species that have not been implicated in dangerous encounters with people, such as the broadnose sevengill shark.

Efficacy of existing lethal strategies

There is no conclusive evidence that the existing lethal strategies in place in Australia prevent dangerous shark encounters. Rather, declines and spikes in recorded shark incidents are related to a large number of complex, interacting biophysical and human factors. Notably, beach surveillance and medical response in the case of injury have greatly improved over the time period since the introduction of lethal strategies.

Non-lethal strategies

Innovative strategies for protecting people and marine life and environments are in use and under development elsewhere around the world. In Australia, we should be drawing upon this expertise in order to develop a sustainable shark hazard mitigation program appropriate to our unique social and biophysical environment.

Safe human-shark interactions

Research in Western Australia (Gibbs & Warren 2015) found that approximately 69% of ocean-users surveyed ($n=557$) had encountered a shark at some point. Human-shark encounter occurs regularly without harm. These findings demonstrate that the presence of sharks does not equate to danger for humans. Education and promotion of fuller information about sharks and human-shark interactions, such as this data, will contribute to enabling people to make more informed decisions about their ocean activities, and will go some way to preventing the spread of fear and misinformation about sharks and associated risks.

Thank you for the invitation and opportunity to comment.

Regards

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References

Gibbs L and Warren A 2015 Transforming shark hazard policy: learning from ocean-users and shark encounter in Western Australia. *Marine Policy* 58, 116-124. DOI:10.1016/j.marpol.2015.04.014 (Open Access version: <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=2858&context=sspapers>)

Gibbs L and Warren A 2014 Killing sharks: cultures and politics of encounter and the sea. *Australian Geographer* 45(2) 101-107. DOI:10.1080/00049182.2014.899023 (Open Access version: <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1922&context=sspapers>)