

Introduction

The NSW Shark Meshing (Bather Protection) Program (SMP) operates in accordance with a Joint Management Agreement (JMA) and an associated Management Plan authorised by the *Fisheries Management Act 1994* (FM Act) and the *Biodiversity Conservation Act 2016*. The Management Plan contains a performance assessment and reporting framework to assess the performance of the Plan in achieving its objectives, and to communicate the results transparently. Achievement of those objectives is determined against performance indicators and trigger points and is communicated by annual performance reports and review reports.

The SMP annual performance report for 2022/23 (Dalton, Peddemors and Doak, 2023) identified that the trigger point for the objective of '*minimising the impact on non-target species and threatened species*' was tripped for seals. The other trigger points related to the objectives of Work Health and Safety (WHS); reducing the risk to humans from shark attacks at meshed beaches; and transparent monitoring and reporting were not tripped during the 2022/23 reporting period.

The trigger points are precautionary measures as they relate to the number of entanglements, not the number of animals that die as a result of entanglement.

Trigger Point Reviews

SEALS

Fur Seals (*Arctocephalus* spp.)

Trigger point description

The trigger point for the objective of '*minimising the impact on non-target species and threatened species*' was tripped for Fur Seals in 2022/23. Fur seals are listed as *Vulnerable* under the NSW *Biodiversity Conservation Act 2016*. The trigger point for this objective is that the catch in the current reporting year exceeds the ten-year annual average plus three standard deviations (SD).

The entanglement of two fur seals during the 2022/23 SMP season tripped this trigger point as it was preceded by 10 years of captures averaging 1.2 individuals per annum (1.5 seals per annum including 3x SD). One of the two (50%) seals caught was released alive (Table 1). Survivorship of animals in good health at the time of release is unknown.

Review findings

Fur seals hauling out in the NSW metropolitan region include two species: Australian fur seals (*Arctocephalus pusillus doriferus*) (AFS) and New Zealand fur seals (*Arctocephalus forsteri*) (NZFS). Fur seals were historically exploited (harvested by people for products such as oil) across their range, resulting in significant population declines. Though pressures from harvesting have ceased, both species are still threatened by human disturbance and conflict, climate change, disease, and fisheries interactions (e.g., bycatch), and entanglements.

In NSW, fur seals predominantly breed on Montague Island. This site is important as it currently represents the northern most accepted breeding colony for both species. There is anecdotal evidence of pups being born further north, which aligns with their historical breeding range. Though monitoring in 2002 and 2007 in SA, Vic, TAS, and NSW showed a general trend of species recovery, the most recent results from Montague Island in 2013 detected a decline in pup numbers. It is not clear whether this is related to a decline in the adult population, a temporal change in resources or conditions, or shifts in regional site usage related to some monitoring sites reaching carrying capacity (McIntosh et al 2018).

Currently there are no population estimates for the number of either species in NSW waters; however, aerial surveys over Martin Islet, Port Kembla, indicates seasonal variation in seals hauling out on this island (Esteban, 2019) only 1.35km offshore and 8km from the southern-most shark net off South Wollongong beach. Use of an unmanned aerial vehicle (UAV/drone) equipped with thermal imaging capability led to a maximum of 226 seals recorded hauled out on Martin Islet (Esteban, 2019). Anecdotal observations indicate that fur seals are expanding their range. For example, seals are now regularly seen within the Sydney harbour (a maximum of 8 individuals have been recorded hauled out in Chowder Bay and a dozen hauled out on Barrenjoey headland (Peddemors, pers. obs.). Whether this is due to a population increase after a history of exploitation, and leading to range expansion, or a result of changing ocean climate is currently unknown; however, an increase in fur seal numbers utilising waters within the SMP region will inevitably lead to increased potential for interactions with the shark nets.

The two fur seal captures recorded during the 2022/23 SMP season occurred within a fortnight of each other and within the same 1.3km Avoca embayment that includes two shark net installations (North Avoca and Avoca). One of these seals died as a result of the entanglement.

Table 1: Details of fur seals caught in the SMP in 2022/23

Beach	Date	Scientific Name	Common Name	Status	Samples taken (yes/no/whole)	Tagged	Size (m)	Sex
Avoca	27/10/2022	<i>Arctocephalus pusillus doriferus</i>	Australian Fur Seal	Alive & Released	No	No	1.00	unk
North Avoca	11/11/2022	<i>Arctocephalus forsteri</i>	New Zealand Fur Seal	Dead	No	No	1.87	unk

Conclusion

The NSW SMP nets have caught very few fur seals over the past decade and it is anticipated that catches for this species may continue to increase with an apparent changing range for fur seal populations off eastern Australia.

The capture of two fur seals in the SMP in 2022/23 is unlikely to negatively affect the viability of the Australian populations for these species; however, as a listed threatened species it is imperative that every effort is made to understand the factors affecting capture and to reduce these events.

The Environment and Heritage-led Seabirds to Seascapes project is looking to identify key fur seal haul out sites along the NSW coastline and monitor individual seal movements through satellite tracking. Understanding where potential new colonies and possible breeding sites are emerging and how seals are using the different sites will direct future monitoring and management.

Recommendation

Although it is unlikely that the current rate of SMP-induced fatality of any fur seal species will negatively affect the populations, ongoing efforts to reduce bycatch will be continually re-assessed. Identification of new and emerging fur seal haul out sites and data on species movement along the NSW coastline through the Seabirds to Seascapes project will help to fill key knowledge gaps and inform priorities for future management.

References

Esteban, L. (2019) The use of unmanned aerial vehicles to assess the spatial and temporal dynamics of seals at Martin Islet (NSW), B.Envi.Sci. Hons, School of Earth, Atmospheric & Life Sciences, University of Wollongong, 2019. <https://ro.uow.edu.au/thsci/175>

McIntosh RR, Kirkman SP, Thalmann S, Sutherland DR, Mitchell A, Arnould JPY, Salton M, Slip DJ, Dann P and Kirkwood R (2018) Understanding meta-population trends of the Australian fur seal, with insights for adaptive monitoring. PLoS ONE 13(9): e0200253. <https://doi.org/10.1371/journal.pone.0200253>

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