Seasonal cyclicity of associations, calving and distribution of adult female bottlenose dolphins: Management implications

Conservation management typically focuses on protecting wildlife habitat that is linked to important behaviours, such as resting, breeding or caring for young. Understanding the timing of these behaviours, and where they take place, is critical to determining appropriate management measures to protect key life processes of wildlife populations.

In this recently published study (Smith et al. 2016), we combined the study of dolphin sociality, distribution and calving to identify spatio-temporal sensitivities of Indo-Pacific bottlenose dolphins to inform management. The study population, occurring off Bunbury, Western Australia, has been forecast to decline in abundance given current rates of female reproduction (Manlik et al., 2016). As such, identifying and protecting vulnerable times and habitats is necessary to promote the long-term viability of this population.

Methods

Over three consecutive years, 231 boat-based photo-identification and behavioural surveys were conducted to identify individual adult female bottlenose dolphins in 120km² of coastal and estuarine waters. Recording the appearance of neonatal calves provided information on the timing of calving, while the distribution of dolphins was modelled from sighting location data. Analyses of group composition allowed the estimation of association indices as a measure of sociality between individuals, the temporal stability of which were investigated by modelling lagged association rates. Year-round monitoring facilitated the investigation of spatio-temporal patterns in abundance, distribution and behaviour.

Results and discussion

The density distribution of female dolphins was highest in the inner waters during December-February (summer) and March (early autumn) (Figure 1), which also coincided in time with the majority of calving (Figure 2). The temporal stability of social bonds between adult females was measured and remained stable over multiple years. We found that dolphin...
distribution, sociality and calving are predictable in time and space. The seasonal cyclicity in social bonds (Figure 3) between adult female dolphins is the first time it has been documented for any dolphin species.

Conclusions and recommendations
We demonstrate that studies on socially complex species should incorporate social dynamics when evaluating possible impacts of anthropogenic activities. In addition to traditional approaches of protecting important habitat and breeding periods, our study of dolphin sociality provides a new approach to consider in conservation efforts. We identify an area of high conservation value to female bottlenose dolphins that can be protected by restricting boat speed and access. Our results informed the implementation of a legislative no-go area and vessel speed restriction areas where the density of females with calves was greatest (Figure 4).

For more information
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References

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