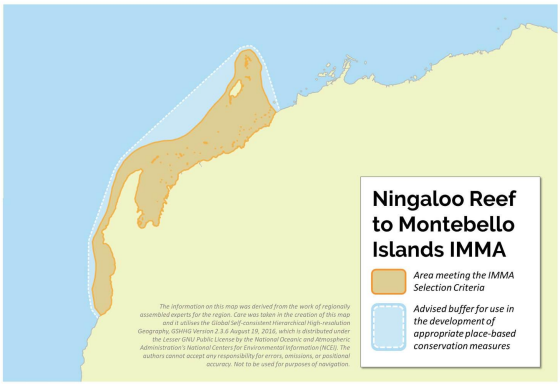
Ningaloo Reef to Montebello Islands IMMA



Area Size

19,938 km^2

Qualifying Species and Criteria

Dugong – *Dugong dugon*

Criterion A, B1, C2

Australian humpback dolphin – *Sousa sahulensis*

Criterion A, B1

Humpback whale – *Megaptera novaeangliae*

Criterion C1

Marine Mammal Diversity

Tursiops aduncus, Balaenoptera musculus, Orcaella heinsohni, Balaenoptera acutorostrata, Orcinus orca, Eubalaena australis, Balaenoptera omurai,, Balaenoptera physalus, Pseudorca crassidens

Description:

The Pilbara region of Western Australia encompasses a diverse array of marine habitats including coral reef, coastal islands, subterranean karst limestone waterways, extensive mangroves, seagrass beds, high intertidal cyanobacterial mats, macroalgae-dominated reef flats, intertidal sand flats, soft coral and sponge beds. This area has been recognized at a national and international level through designation of State and Commonwealth marine protected areas including Ningaloo Marine Park and Murion Islands Management Area, Barrow Island Marine Park and Montebello Islands Marine Park as well as the Ningaloo Coast World Heritage Area. Ningaloo reef is one of the world's longest fringing coral reefs and a biodiversity hotspot that includes resident populations of Australian humpback dolphins (*Sousa sahulensis*) (e.g. Hunt et al., 2017, Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) (e.g. Haughey et al., 2020, Hanf et al. 2022) and dugongs (*Dugong dugon*) (e.g. Bayliss et al., 2018, Sobztik et al., 2014; Cleguer et al., 2021) and seasonally present humpback whales *(Megaptera novaeangliae)* (e.g. Chittleborough 1953, Jenner et al., 2001, Irvine et al., 2018). The sheltered waters of Exmouth Gulf are an

Figure 1 – Australian humpback dolphin in the Exmouth Gulf. Photo credit: Alexandra D'Cruz. Taken with a scientific permit whilst on survey with CEBEL from Flinders University.

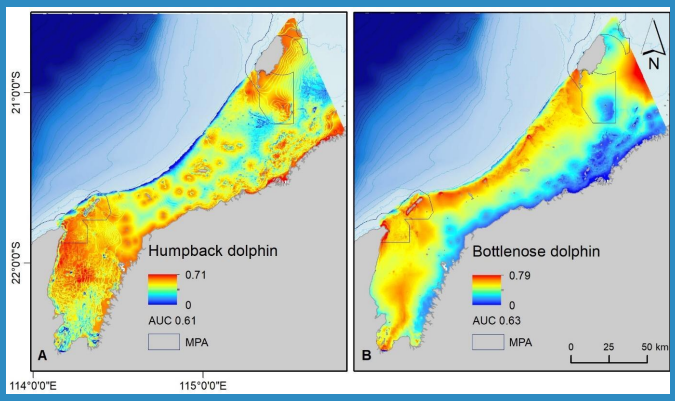


Figure 2 – Relative habitat suitability for Australian humpback and Indo-Pacific bottlenose dolphins across the western Pilbara, informed by aerial surveys conducted in 2012 (May, July, October and December), 2013, 2014 and 2015 (July and October each subsequent year) (Hanf et al., 2022).

important feeding and nursing/calving habitat for Australian humpback dolphin, dugongs, and Indo-Pacific bottlenose dolphins as well as an important nursery for humpback whales.

Key habitat prevalent throughout the region, from coastal waters out to nearshore islands, includes sand flats, seagrass beds, sponge gardens and coral communities. A large variety of marine mammal species have been recorded in this area, some seen regularly such as dolphins and dugongs while others are present seasonally such as minke whales, blue whales, false killer whales. Killer whales follow migrating humpback whales (Pitman et al., 2015), and southern right whales, present in very low numbers during their annual migration. Still others are sighted more opportunistically including Omura's whales (Ottewell et al., 2016, Cerchio et al., 2019) and snubfin dolphins (Allen et al., 2012).

The boundary for the IMMA follows the 100m bathymetry contour and aligns with existing marine protected area boundaries for the Commonwealth Ningaloo and Montebello Islands Marine Parks and the Ningaloo World Heritage Area.

Criterion A – Species or Population Vulnerability

Dugongs and Australian humpback dolphins are both listed as Vulnerable by the IUCN and are resident in the IMMA (Hunt 2018, Hunt et al., 2017, Allen et al., 2012, Hodgson 2007, Sobtzick et al., 2014, Bayliss et al., 2018, Marsh and Sobtzick, 2019). Furthermore, this area has been recognized at a national and international level through designation of State and Commonwealth marine protected areas including Ningaloo Marine Park and Murion Islands Management Area, Barrow Island Marine Park and Montebello Islands Marine Park as well as the Ningaloo Coast World Heritage Area.

Criterion B: Distribution and Abundance Sub-Criterion B1: Small and Resident Populations

The coastal waters of the North West Cape and Exmouth Gulf support resident populations of Vulnerable Australian humpback dolphins and Near Threatened Indo-Pacific bottlenose dolphins (Raudino et al., 2022; Sprogis and Parra, 2022; Raudino et al.., 2023). Australian humpback dolphins inhabit the area with the highest density recorded for this species around North West Cape, with a population size estimated at 129 individuals within a 130 km^2 area (Hunt et al., 2017). Haughey et al. (2020) estimated a resident population of 141 (95% CI 121-161) Indo-Pacific bottlenose dolphins at the North West Cape, highlighting the importance of these coastal waters. Resident populations have also been recorded along the Pilbara coast and islands (Hanf et al., 2022, Raudino et al., 2018a) though no abundance

Figure 3 – Bottlenose dolphin with seaweed in mouth in the Exmouth Gulf. Photo credit: Alexandra D'Cruz. Taken with a scientific permit whilst on survey for CEBEL at Flinders University.

estimates have been made. There are early indications that the dolphins inhabiting island habitat may be geographically separate from the mainland coastal population (Raudino et al., 2018b). In particular, high levels of female residency of humpback dolphins (Hunt et al., 2019) suggest that these waters are important for breeding and nursing for this species and dolphin calves were sighted during this study (Hunt, 2017). Exmouth Gulf also contains a significant population of Vulnerable dugongs with estimates fluctuating over the years; 1062 (±321) individuals in 1989, 95 (±62) individuals in 2000, 1411 (±561) in 2007 and 4,599 (1,959) in 2018 (Preen et al., 1997, Prince 2001, Hodgson 2007, RPS 2010, Bayliss et al., 2019). Variation in dugong abundance and use of the Exmouth Gulf likely fluctuates in response to seagrass habitat with seagrass loss following tropical cyclones and marine heatwaves leading to movement of dugongs out of the Gulf and into areas where seagrass habitat is present (Bayliss et al., 2019, Gales et al., 2004). Aerial surveys of dugongs between 1989 and 2018 consistently identify the nearshore eastern waters of the Gulf as critical feeding and nursing habitat (Preen et al., 1997, Bayliss et al., 2019). Local-scale drone surveys coupled with in-situ assessments of the benthic habitat have shown that seagrass, particularly *Halophila* and *Halodule* species, are significant factors influencing dugong presence in south-eastern Exmouth Gulf (Christophe Cleguer pers comm).

Criterion C: Key Life Cycle Activities
Sub-criterion C1: Reproductive Areas

The sheltered waters of Exmouth Gulf have been suggested to have contributed to the recovery of the Breeding Stock D humpback whale population. The Gulf is the largest known resting area for this population, based on information initially from 1950's whaling data (Chittleborough, 1953) and more recently from boat-based and aerial surveys that report resting behaviour occurring during the southern migration (Jenner et al., 2001, Jenner and Jenner, 2005, Braithwaite et al., 2012, Irvine and Salgado Kent, 2019), where adult females and calves have been recorded in the Gulf from several days up to 3 weeks (Jenner & Jenner, 2005). In addition, the area represents a southward extension of the breeding grounds for calving and mating (Irvine et al., 2018).

Sub-criterion C2: Feeding Areas

The seagrass habitat of Exmouth Gulf is an important feeding ground for dugongs. Aerial surveys of dugongs between 1989 and 2018 consistently identify the nearshore eastern waters of the Gulf, Pilbara coastal waters and nearshore Pilbara islands as critical feeding and nursing habitat (Sobztick et al., 2014, RPS 2010).

Local-scale drone surveys coupled with in-situ assessments of the benthic habitat have shown that seagrass species such as *Halophila* and *Halodule* are good predictors of dugong presence and abundance in the south-east Gulf (Christophe Cleguer pers. comm.). Variation in dugong abundance and use of Exmouth Gulf and the broader Pilbara Region is likely a result of the seagrass loss following tropical cyclones and marine heatwaves and movement of dugongs to areas supporting seagrass (Gales et al., 2004, Sobztick et al., 2014). Safeguarding the seagrass in the Gulf will protect a feeding ground and allow dugongs to migrate from alternative feeding grounds when required.

Supporting Information

Allen, S.J., 2012. Tropical inshore dolphins of north-western Australia: Unknown populations in a rapidly changing region. Pacific Conservation Biology **18**: 56-63.

Bayliss, P., H. Raudino, and M. Hutton, Dugong (*Dugong dugon*) population and habitat survey of Shark Bay Marine Park and Ningaloo Reef Marine Park, and Exmouth Gulf. 2018.Report to the National

Environmental Science Program prepared by CSIRO and Department of Biodiversity, Conservation and Attractions. p. 51.

Bayliss, P., et al. 2019. Modelling the spatial relationship between dugong (*Dugong dugon*) and their seagrass habitat in Shark Bay Marine Park before and after the marine heatwave of 2010/11. Final Report to the National Environmental Science Program prepared by CSIRO and Department of Biodiversity, Conservation and Attractions. p. 55.

Bejder, L., et al., 2019. Low energy expenditure and resting behaviour of humpback whale mother-calf pairs highlights conservation importance of sheltered breeding areas. Scientific Reports, 2019. **9**(1).

Braithwaite, JE, Meeuwig, JJ, Jenner, KCS (2012) Estimating Cetacean Carrying Capacity Based on Spacing Behaviour. PLoS ONE 7, e51347.

Chittleborough, R.G. 1953. 'Aerial observations on the humpback Chittleborough, R.G. 1953. 'Aerial observations on the humpback whale *Megaptera nodosa* (Bonnaterre), with notes on other species'. Australian Journal of Marine and Freshwater Research, **4**:219-226.

Cleguer, C., Kelly, N., Tyne, J., Wieser, M., Peel, D., and Hodgson, A. (2021). A Novel Method for Using Small Unoccupied Aerial Vehicles to Survey Wildlife Species and Model Their Density Distribution. Front Mar Sci 8, 1-17.

Fitzpatrick, B., et al. 2019. Exmouth Gulf, north Western Australia: A review of environmental and economic values and baseline scientific survey of the south western region. 2019, Report to the Jock Clough Marine Foundation. p. 192pp.

Gales, N., et al. 2004. Change in abundance of dugongs in Shark Bay, Ningaloo and Exmouth Gulf, Western Australia: evidence for large-scale migration. Wildlife Research, 2004. **31**(3): p. 283-290.

Hanf, D., Hodgson, A.J., Kobryn, H., Bejder, L., and Smith, J.N. (2022). Dolphin Distribution and Habitat Suitability in North Western Australia: Applications and Implications of a Broad-Scale, Non-targeted Dataset. Frontiers in Marine Science 8.

Haughey, R., et al., *Photographic capture-recapture* analysis reveals a large population of Indo-Pacific bottlenose dolphins (Tursiops aduncus) with low site fidelity off the North West Cape, Western Australia. Frontiers in Marine Science, 2020.

Hodgson, A. 2007. The distribution, abundance andconservation of dugongs and other marine megafauna in Shark Bay Marine Park, Ningaloo Reef Marine Park and Exmouth Gulf. James Cook University, Townsville.

Hunt, T. N., Allen, S. J., Bejder, L., & Parra, G. J. (2020). Identifying priority habitat for conservation and management of Australian humpback dolphins within a marine protected area. Scientific reports, 10(1), 1-14.

Hunt, T., et al., 2017. Demographic characteristics of Australian humpback dolphins reveal important habitat toward the southwestern limit of their range. Endangered Species Research. **32**: p. 71-88.

Hunt, T.N., Demography, habitat use and social structure of Australian humpback dolphins (*Sousa sahulensis*) around the North West Cape, Western Australia: Implications for conservation and management. 2018, Flinders University: Adelaide, Australia.

Irvine, L.G., Thums, M., Hanson, C.E., McMahon, C.R. and Hindell, M.A. 2018. 'Evidence for a widely expanded humpback whale calving range along the Western Australian coast'. Marine Mammal Science, 34(2): 294-310.

Irvine, L. and C. Salgado-Kent, 2019. The distribution and relative abundance of marine-megafauna, with a focus on humpback whales (*Megaptera novaeangliae*), in Exmouth Gulf, Western Australia, 2018. Report to the Department of Biodiversity Conservation and Attractions.

Jenner, K.C.S., M.N.M. Jenner, and K.A. McCabe. 2001. Geographical and temporal movements of humpback whales in Western Australian waters. APPEA Journal, p. 749-765.

Jenner, C. and Jenner, M.N. 2005. 'Distribution and abundance of humpback whales and other mega-fauna in Exmouth Gulf, Western Australia, during 2004/2005'. Final Report prepared for Straits Salt Pty. Ltd.

Kiszka, J., Méndez-Fernandez, P., Heithaus, M. R., Ridoux, V. 2014. "The foraging ecology of coastal bottlenose dolphins based on stable isotope mixing models and behavioural sampling." Marine Biology **161**(4): 953-961.

Marsh, H. & Sobtzick, S. 2019. *Dugong dugon* (amended version of 2015 assessment). *The IUCN Red List of Threatened Species* 2019: e.T6909A160756767. https://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T6909A160756767.en.

Ottewell, K., et al. 2016. A recent stranding of Omura's whale (*Balaenoptera omurai*) in Western Australia. Aquatic Mammals, 2016. **42**(2): p. 193-197.

Pitman, R.L., et al. 2015. Whale killers: Prevalence and ecological implications of killer whale predation on humpback whale calves off Western Australia. Marine Mammal Science, **31**(2): p. 629-657.

Preen, A.R., 1997. Distribution and Abundance of Dugongs, Turtles, Dolphins and other Megafauna in Shark Bay, Ningaloo Reef and Exmouth Gulf, Western Australia. Wildlife Research, **24**(2): p. 185-208.

Prince, R.I.T., 2001. Aerial survey of the distribution and abundance of dugongs and associated macrovertebrate fauna–Pilbara coastal and offshore region, WA. Completion Report to Environment Australia. Department of Conservation and Land Management, Perth.

Raudino H, Douglas C, Waples K. 2018a. How many dolphins live near a coastal development? *Regional Studies in Marine Science*. 19:25-32.

Raudino H., Hunt T., Waples, K. 2018b. 'Records of Australian humpback dolphins (*Sousa sahulensis*) from an offshore island group in Western Australia'. *Marine Biodiversity Records*, 11:14-20.

Raudino, H.C., Cleguer, C., Hamel, M., Swaine, M., and Waples, K. (2022). Species identification of morphologically similar tropical dolphins and estimating group size using aerial imagery in coastal waters. Mammalian Biology.

Raudino H., B., Phil, J., Douglas, C., Douglas R., Waples K. (Accepted). 2023. Contrasting aerial abundance estimates for two sympatric dolphin species at a regional scale using distance sampling and density surface modelling. Frontiers in Ecology and Evolution.

RPS. 2010. Nearshore Regional Survey Dugong Report, in Browse Liquefied Natural Gas Precinct Strategic Assessment Report.

Salgado-Kent, C., et al. 2012. Southern hemisphere breeding stock 'D' humpback whale population estimates from North West Cape, Western Australia. Journal of Cetacean Research and Management, **12**: p. 29-38.

Salgado Kent, C. 2019. Distribution, abundance and residency of humpback whales in Bateman Bay in Ningaloo Marine Park, Western Australia. Report prepared for DBCA. pp 63.

Sobtzick, S., Hodgson, A.J., Campbell, R., Smith, J.N. and Loneragan, N. 2014. Chevron Wheatstone Project Dugong Research Program: Phase 2, 2013 Final Report. A report prepared by Murdoch University Cetacean Research Unit and James Cook University, for Chevron Pty Ltd.

Sprogis, K.R., and Parra, G.J. (2022). Coastal dolphins and marine megafauna in Exmouth Gulf, Western Australia: informing conservation management actions in an area under increasing human pressure. Wildlife Research

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