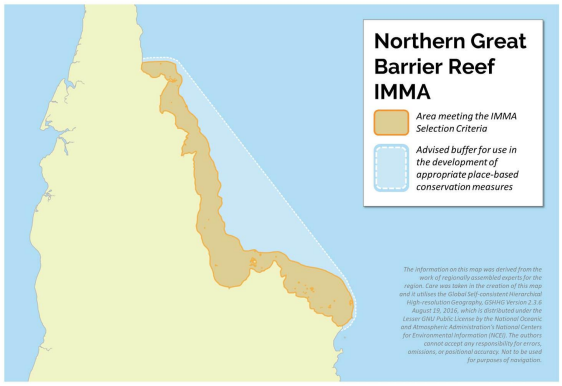
Northern Great Barrier Reef IMMA



Area Size

16,450 km^2

Qualifying Species and Criteria

Dugong – *Dugong dugon*

Criterion A, C1, C2

Australian snubfin dolphin – *Orcaella heinsohni*

Criterion A

Australian humpback dolphin – *Sousa sahulensis*

Criterion A

Marine Mammal Diversity

Balaenoptera acutorostrata, Megaptera novaeangliae, Pseudorca crassidens , Stenella longirostris, Tursiops aduncus

Summary

The Northern Great Barrier Reef Network IMMA is a tropical continental shelf habitat of islands, coral reefs and seagrass beds protected by the Great Barrier Reef. Dugongs are the most frequently-observed marine mammal in the IMMA, which supports a globally significant dugong population, one of the reasons for the Great Barrier Reef region's World Heritage listing. Dugongs are mainly sighted close to the coast, especially in the shallow

The

Summary cont....

protected bays. In some parts of the IMMA, particularly from Princess Charlotte Bay south, dugongs are sighted further offshore in the Great Barrier Reef lagoon, reflecting the widespread distribution of seagrass. The area qualifies as an IMMA based on: (1) the IUCN VU status of the dugong, Australian Humpback dolphin and Australian Snubfin dolphin; and (2) the globally significant (estimated >2%) population of dugongs that breed and feed in the area.

Description

Northern Great Barrier Reef Network IMMA is between the latitudes of 110 45' S and -15 ° S and the 30 m depth contour. The region is protected by the Great Barrier Reef, which is closer to the coast than further south. Dugongs are the most frequently-observed marine mammal in the IMMA. They are mainly sighted in shallow waters close to the coast, especially in the shallow protected bays (Figure 2). In some parts of the IMMA, particularly from Princess Charlotte Bay south, dugongs are also seen further offshore in the Great Barrier Reef lagoon, reflecting the distribution of seagrass. Dugong densities are low in the areas immediately north (-110 45' S to -11°S) and south (-15°S to -18° S) of the IMMA. Bottlenose dolphins (species unknown but likely to be theIndo-Pacific bottlenose dolphin, Tursiops aduncus, Sobtzick et al. 2014), spinner dolphins (likely Stenella longirostris, Sobtzick et al. 2014), Australian humpback dolphins, Sousa sahulensis (Parra et al. 2006; Sobtzick et al. 2014), and Australian snubfin dolphins Orcaella heinsohni (Parra et al. 2005, Sobztick et al. 2014, Isabel Beasley unpublished observations, anecdotal observations reported by Penrose et al. 2015) have been observed in the area but have not been surveyed using established

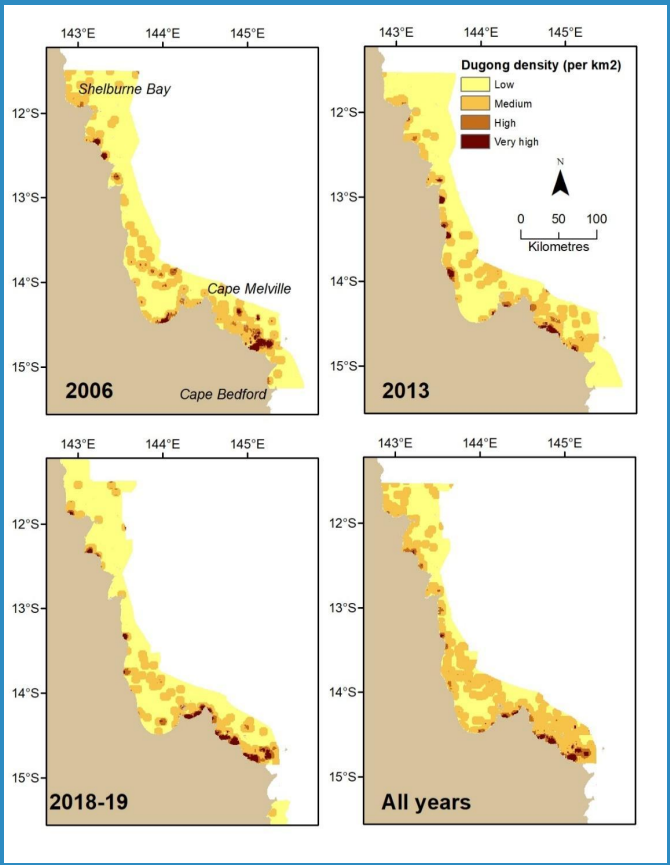


Figure 2 - Maps of the relative densities of dugongs from the spatially-explicit models developed from data collected during the 2006, 2013 and 2018-2019 aerial surveys of the IMMA. Dugong relative densities were calculated at a grid size of 1 km^2 for both species. Dugong densities per grid cell were classified as Low (0 dugongs per km^2); Medium (0-0.5 dugongs per km^2); High (0.5-1 dugongs per km^2), and Very High (>1 dugongs per km^2).

cetacean survey techniques apart from a limited area in southern Princess Charlotte Bay (Parra et al. 2006). Dwarf minke whales (*Balaenoptera acutorostrata ssp.*, Birtles et al. 2015), humpback whales (*Megaptera novaeangliae*, Simmons and Marsh 1986) and false killer whales (*Pseudorca crassidens*) have also been recorded in this IMMA.

Criterion A: Species or Population Vulnerability

The dugong is listed by IUCN as Vulnerable to Extinction (Marsh and Sobtzick 2019). Systematic aerial surveys since 1985 indicate that the IMMA supports a significant dugong population. The 2018-19 population estimate was ~7000 +/- SE1600 using the Hagihara et al. method (Marsh et al. 2020), >2% of the Australian and global dugong populations. The exact proportions cannot be quantified due to incomplete surveys of some of the dugong's range in Australia and most of the species' range outside Australia and/or inconsistent survey methodologies (Marsh et al. 2011). Nonetheless, the global significance of the population is unquestionable, despite these uncertainties. The importance of the Great Barrier Reef (GBR) Region for the dugong was a reason for the Region's World Heritage Listing (GBRMPA 1981) and two-thirds of the GBR population occurs in this IMMA. The IMMA population has been stable since at least 2006 (Marsh et al. 2020), while the population of the southern Great Barrier Reef region is decreasing (Marsh et al. 2019). Thus, this IMMA is very important for the survival and recovery of the dugong both in the remainder of the Great Barrier Reef World Heritage Area and globally. Several dugongs have been tracked making large scale movements between this IMMA and the Hinchinbrook-Cleveland Bay area in the Hinchinbrook to Round Hill Network IMMA (Shepherd et al. 2006). No movements have been recorded between this IMMA and the Central and Western Torres Strait

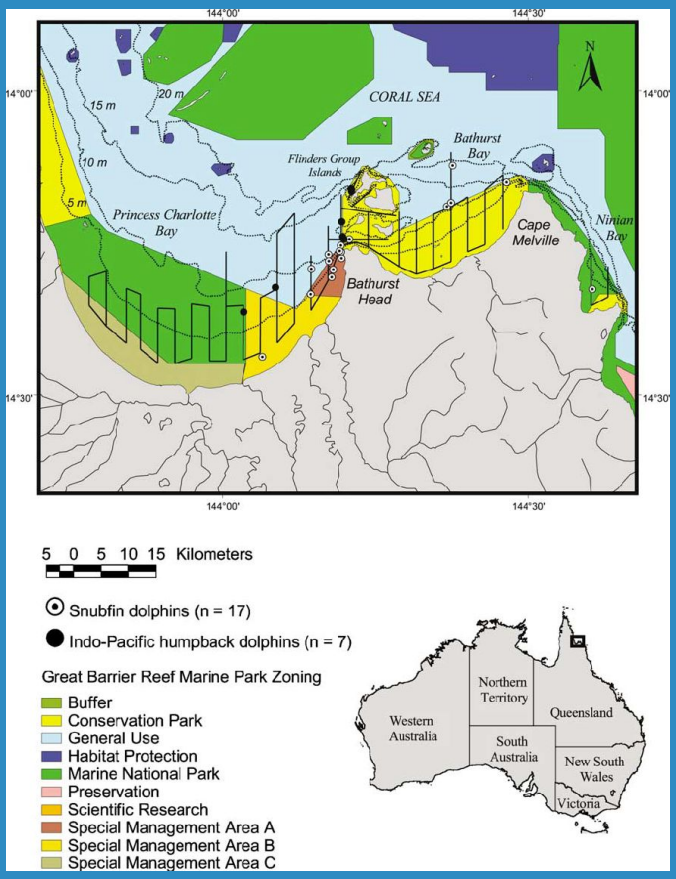


Figure 2 - Vessel transects and dolphins sighted in southern Princess Charlotte Bay (Parra et al. 2005).

IMMA, but the sample size of satellite-tracked dugongs is very small. The Australian Humpback dolphin and the Australian Snubfin dolphin are both listed as Vulnerable by IUCN (Parra et al. 2017 a and b). Both species are endemic to the waters of the Sahul shelf, with this area supporting small, apparently resident populations of both species where observations have been made for both breeding and feeding (Parra et al. 2006; Sobtzick et al. 2014, Penrose et al. 2015).

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

During the 1985 to 2018-19 survey period, the proportion of dugongs classified as calves ranged from 6-13% (Marsh et al. 2020). At least one dugong mating herd has been sighted in the IMMA during aerial surveys (Marsh unpublished). As such while the population of the southern Great Barrier Reef region is decreasing (Marsh et al. 2019) this IMMA is very important for the survival and recovery of the dugong both in the remainder of the Great Barrier Reef World Heritage Area and globally.

Sub-Criterion C2: Feeding Areas

The dugong is a seagrass community specialist (Marsh et al. 2011, 2018) and as a herbivore must spend much of its time feeding (Marsh et al. 2011). Dugong feeding plumes are consistently seen in the area during aerial surveys and dugong feeding trails have also been sighted. This percentage of dugongs classified as calves was significantly higher for the surveys of this region conducted between 1984 and 2000 than subsequently, suggesting seagrass loss likely due to tropical cyclones (Marsh et al. 2020). However, the data on the distribution and status of seagrass in the Northern Great Barrier Reef (Coles et al. 2018; see interactive map here) are not adequate to further evaluate this inference.

Supporting Information

Birtles, A., Andrews, R., Jenner, C. 2015. 'Spatial ecology, migratory paths and critical areas of habitat use of Australia's dwarf minke whales'. In Australian Marine Mammal Centre: Preliminary Final Report. Minke Whale Project, James Cook University.

Blair, D., McMahon A., McDonald, B., Tikel, D. and Waycott, M.H., 2014. 'Pleistocene sea level fluctuations and the phylogeography of the dugong in Australian waters'. Marine Mammal Science, 30: 104–121.

Coles R.G., Rasheed M.A., Grech A. and McKenzie L.J. 2018. 'Seagrass meadows of northeastern Australia'. In: C. Finlayson, G. Milton, R. Prentice, N. Davidson (eds) The Wetland Book. Springer, Dordrecht.

Corkeron, P.J., Morisette, N.M., Porter, L. and Marsh, H. 1997. Distribution and status of Humpback dolphins, *Sousa chinensis* in Australian waters. Asian Marine Biology 14: 49-59.

GBRMPA, 1981. 'Nomination of the Great Barrier Reef by the Commonwealth of Australia for inclusion on the World Heritage List'. UNESCO, 37 pp.

Hagihara, R., Jones, R.E., Grech, A., Lanyon, J.M,, Sheppard, J.K,, and Marsh, H. 2014. 'Improving population estimates by quantifying diving and surfacing patterns: A dugong example'. Marine Mammal Science, 30: 348-366.

Hagihara, R., Jones, R., Sobtzick, S., Cleguer, C., Garrigue, C., and Marsh, H. 2018. 'Compensating for geographic variation in detection probability with water depth improves abundance estimates of coastal marine megafauna'. PLoS ONE, 13 (1) e0191476. [on-line] Available at: https://doi.org/10.1371/journal.pone.0191476 (Accessed: 27 June 2020).

Marsh, H. and Saalfeld, W. K. 1989. ,Distribution and abundance of dugongs in the northern Great Barrier Reef Marine Park'. Australian Wildlife Research 16: 429-40

Marsh, H., and Sobtzick, S. 2019. '*Dugong dugon* (amended version of 2015 assessment)'. The IUCN Red List of Threatened Species 2019: e.T6909A160756767. [online] Available at: https://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T6909A160756767.en. (Accessed: 12 February 2020).

Marsh, H., O'Shea, T.J. and Reynolds, J.E. III. 2011. The ecology and conservation of Sirenia: dugongs and manatees. Cambridge University Press, Cambridge, UK. 521pp.

Marsh H., Grech A., McMahon K. 2018. 'Dugongs: seagrass community specialists'. In: A. Larkum, G. Kendrick, P., Ralph. (eds) Seagrasses of Australia. Springer International . Available at: DOIhttps://doi.org/10.1007/978-3-319-71354-0_19. (Accessed: 27 June 2020)

Marsh, H., Hagihara, R., Hodgson, A., Rankin, R., and Sobtzick, S. 2019. 'Monitoring dugongs within the Reef 2050 Integrated Monitoring and Reporting Program: final report of the Dugong Team in the Megafauna Expert Group'. Great Barrier Reef Marine Park Authority, Townsville. Available at: http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/3583/4/RIMReP%20Dugong%20report.pdf. (Accessed: 27 June 2020)

Marsh, H., Collins, K., Grech, A., Miller, R. and Rankin, R. 2020. 'An assessment of the distribution and abundance of dugongs and in-water, large marine turtles along the Queensland coast from Cape York to Hinchinbrook Island'. A report to the Great Barrier Reef Marine Park Authority, May 2020.

Marsh, H., Heatwole, H., Lukoschek, V. 2019. Marine mammals and reptiles. In: P. Hutchings, M. Kingsford, O. Hoegh-Guldberg (eds) The Great Barrier Reef Biology, Environment and Management Second Edition. CSIRO Publishing. ISBN: 9781486308200

Parra, G.J., Schick, R. and Corkeron, P.K. 2006. 'Spatial distribution and environmental correlates of Australian snubfin and Indo-Pacific humpback dolphin's. Ecography, 29: 396-406.

Parra, G., Cagnazzi, D., Perrin, W. and Braulik, G T. 2017a. '*Sousa sahulensis*'. The IUCN Red List of Threatened Species 2017. Available at: e.T82031667A82031671. (Accessed: 7 December 2017).

Parra, G., Cagnazzi, D. and Beasley, I. 2017b. '*Orcaella heinsohni*'. The IUCN Red List of Threatened Species 2017: Available at: e.T136315A50385982. (Accessed: 6 March 2018).

Penrose, H., Hamann, M., Girringun Aboriginal Corporation, Apudthama Land and Sea Rangers, Yintjingga Aboriginal corporation and Marsh, H. 2015. Indigenous Knowledge informs the distribution and habitat associations of inshore dolphins, dugongs and elasmobranchs within the northern Great Barrier Reef World Heritage Area and Cape York Peninsula region. A report for the Department of the Environment, National Environmental Research Program (NERP) Tropical Ecosystems Hub, March 2015.

Sheppard, J. K., Preen, A. R., Marsh, H., Lawler, I. R., Whiting, S. D. and Jones, R. E. 2006. 'Movement heterogeneity of dugongs, *Dugong dugon* (Müller), over large spatial scales'. Journal of Experimental Marine Biology and Ecology, 334: 64-83.
Simmons, M., and Marsh, H. 1986. 'Sightings of humpback whales in Great Barrier Reef waters'. Scientific Reports of the Whales Research Institute, 37: 31-46.

Sobtzick, S., Hagihara, R., Penrose, H., Grech, A., Cleguer, C. and Marsh, H. 2014. 'An assessment of the distribution and abundance of dugongs in the Northern Great Barrier Reef and Torres Strait'. Report for the Department of the Environment, National Environmental Research Program (NERP). June 2014]

We would like to thank the participants of the 2020 IMMA Regional Expert Workshop for the identification of IMMAs in the Australia, New Zealand and South East Indian Ocean seas region. Funding for the identification of this IMMA was provided by the Global Ocean Biodiversity Initiative funded by the German government's International Climate Initiative (IKI). Support was also provided by Whale and Dolphin Conservation and the Tethys Research Institute.

Suggested Citation: IUCN-MMPATF (2022). Northern Great Barrier Reef IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2022.

PDF made available for download at: https://www.marinemammalhabitat.org/portfolio-item/northern-great-barrier-reef/