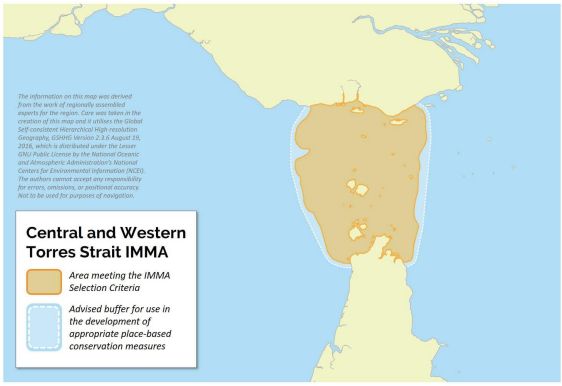

Area Size

27,062km^2

Qualifying Species and Criteria

Dugong– *Dugong dugon*

Criterion A, C1, C2, D1

Australian Humpback dolphin – *Sousa sahulensis*

Criterion A

Australian snubfin dolphin– *Orcaella heinsohni*

Criterion A

Marine Mammal Diversity

Tursiops aduncus

Summary

Central and Western Torres Strait (Zenadth Kes) is a tropical continental shelf habitat of islands, coral reefs and seagrass beds formed by the inundated land bridge between Cape York Peninsula, Australia, and Papua New Guinea. The area supports the world's largest dugong population, estimated at ~100,000 +/- 20,000 animals based on systematic aerial surveys conducted in 2013, and small populations of two dolphin species endemic to the waters of the Sahul shelf, the Australian humpback dolphin and the Australian snubfin dolphin.

Central and Western Torres Strait IMMA

Description:

The region contains hundreds of small continental islands and sandy cays, extensive reef complexes and very extensive seagrass meadows, likely the most extensive area of seagrass in the world with an estimated area of ~48,500 km^2.

The IMMA supports the world's largest population of the dugong, which is listed as Vulnerable by the IUCN. The current estimate of relative abundance is ~100,000 +/- 20,000 animals, based on a survey in 2013, which was the last in a series of systematic aerial surveys conducted since 1987 (Hagihara et al. 2016, 2018; Marsh et al. 2015, 2019). The relative abundance estimates for this region increased markedly in 2016 due to improvements in the correction factors used to compensate for availability bias related to the decreased availability resulting from the high proportion of dugongs feeding on 'deep-water' seagrass in this area (Hagihara et al. 2014, 2016, 2018).

Bottlenose dolphins (species unconfirmed but likely *T. aduncus*), Australian humpback dolphins (Sobtzick et al. 2014) and Australian snubfin dolphins (inshore waters, anecdotal observations, Penrose et al. 2015) have been observed in the area but have not been surveyed using established cetacean survey techniques.

Criterion A: Species or Population Vulnerability

The dugong is listed by IUCN as Vulnerable to extinction (Marsh and Sobtzick 2019). Systematic aerial surveys since 1987 indicate that the region supports a very significant proportion (likely >30%) of both the Australian and global dugong populations

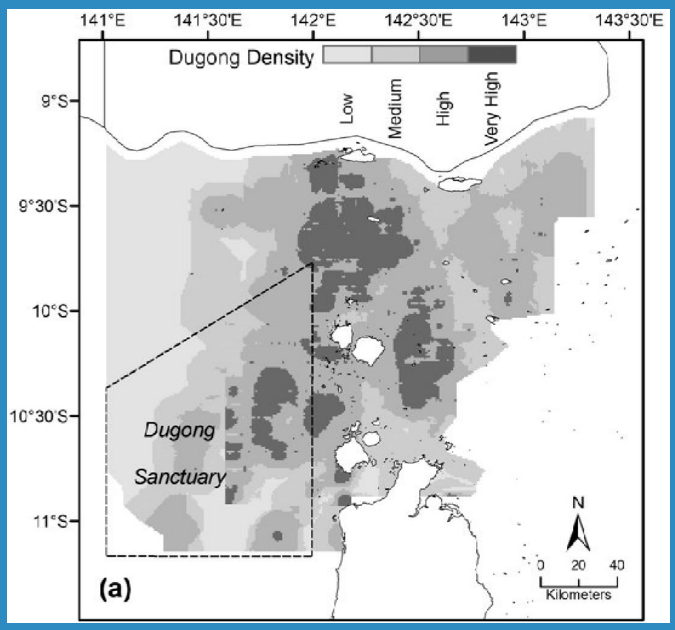

Figure 1 – Corrected dugong data (Marsh and Sinclair, 1989) from the 2001, 2006, 2011 and 2013 aerial surveys were used to develop a spatially explicit model of dugong relative density and distribution using the interpolation technique outlined in Grech et al. (2011). Dugong relative density and distribution were interpolated at the scale of 1 km × 1 km grid cells and with a search radius of 32 km (Gredzens et al., 2014). Grid cells were classified into four categories: Very High (>1.0 dugongs/km^2), High (0.5–1.0 dugongs/km^2), Medium (0–0.5 dugongs/km^2) and Low (0 dugongs/km^2) dugong relative density.

but the exact proportions cannot be quantified due to incomplete surveys of some of the dugong's range in Australia and most of the dugong's range outside Australia and/or inconsistent survey methods (Marsh et al. 2011). Nonetheless, the global significance of the population is unquestionable despite these uncertainties. For comparison, one of the justifications for the listing of the Great Barrier Reef as a World Heritage Area was the importance of the region for dugongs. The latest estimates of the dugong population of that area using the same aerial survey technique gave a total of ~10,500 +/- 1700 individuals (Marsh et al. 2019, 2020). In addition, the genetic diversity of dugongs in this IMMA is the highest recorded for any dugong population in Australia (Blair et al. 2014) and likely the world. Thus, the region is essential to the continued survival and recovery of the Vulnerable dugong. Australian humpback dolphins (Parra et al. 2017a) and Australian snubfin dolphins (Parra et al. 2017b) are also listed as Vulnerable by IUCN.

Criterion C: Key Life Cycle Activities

Sub-Criterion C21: Reproductive Areas

Across the 1987 to 2013 survey period, the proportion of dugongs classified as calves averaged 13.9% (range 9.9%–17.6%), higher than for any another aerial survey region in Queensland (Marsh et al. 2015) therefore providing strong evidence that this is an important reproductive area for dugongs.

Sub-criterion C2: Feeding Areas

The dugong is a seagrass community specialist (Marsh et al. 2011, 2018), and as a herbivore, it must spend much of its time feeding (Marsh et al. 2011). In Torres Strait, dugongs principally feed by cropping the leaves of dense seagrass meadows dominated by *Thallasia*, *Cymodocea* and *Syringodium spp*., which represent a high proportion of the stomach contents analysed from dugongs in this region (André et al. 2005). Dugong fecundity was adversely affected by seagrass dieback in Torres Strait in the 1970s and this recruitment failure was still evident in the age profile of the dugong population 25 years later, demonstrating the importance of the area as a feeding ground (Marsh and Kwan 2008).

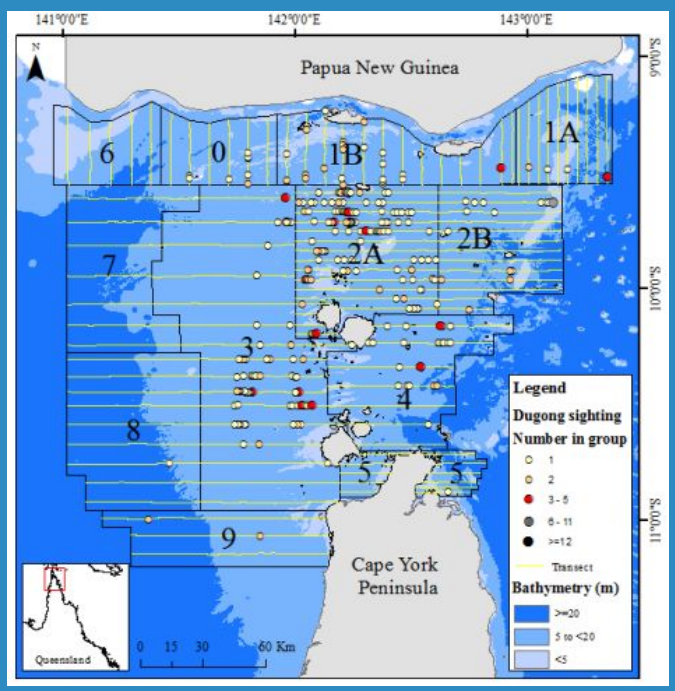

Figure 2 - 2013 aerial survey transects and dugong sightings. Source: Hagihara et al., 2016

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

The Torres Strait dugong population is distinctive for multiple reasons including its size which is far higher than any other region globally (Hagihara et al. 2016, 2018, Marsh et al. 2019, 2011); its genetic diversity, which is the highest recorded for any dugong population in Australia (Blair et al. 2014), and likely the world; the exceptionally large proportion of the population recorded as feeding on 'deep-water' seagrass (Hagihara et al. 2016, 2018), and its status as a 'cultural keystone species', which is known to Torres Strait Islanders as Zenadth Kes (Butler et al. 2012, Delisle et al., 2017) and where it has sustained a hunting culture for more than 4000 years (McNiven and Bedingfield 2008).

Supporting Information

André, J., Gyuris, E. and Lawler, I.R. 2005. 'Comparison of the diets of sympatric dugongs and green turtles on the Orman Reefs, Torres Strait, Australia'. Wildlife Research, 32: 53-62.

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.

Butler, J.R.A., Tawake, A., Skewes, T., Tawake, L. and McGrath, V. 2012. 'Integrating traditional ecological knowledge and fisheries management in the Torres Strait, Australia: the catalytic role of turtles and dugong as cultural keystone species'. Ecology and Society, 17 :34. [on-line]. Available at: http://dx.doi.org/10.5751/ES-05165-170434. (Accessed: 27 June 2020)

Carter, A.B., Taylor, H.A. and Rasheed, M.A. 2014. 'Torres Strait mapping: seagrass consolidation, 2002-2014'. Centre for Tropical Water and Aquatic Ecosystem Research: James Cook University, Cairns, 2014.

Delisle A., Kiatkoski Kim M., Stoeckl N., Watkin Lui F. and Marsh H. 2017. 'The socio-cultural benefits and costs of the traditional hunting of dugongs *Dugong dugon* and green turtles Chelonia mydas in Torres Strait, Australia'. Oryx,52: 250-61.

Grech, A., Sheppard, J. and Marsh, H. 2011. 'Informing species conservation at multiple scales using data collected for marine mammal stock assessments'. PLoS ONE E 6 (3), e17993 [online]. Available at: https://doi.org/10.1371/journal.pone.0017993 (Accessed: 27 June 2020).

Gredzens, C., Marsh, H., Fuentes, M.M.P.B., Limpus, C.J., Shimada, T., et al. 2014. 'Satellite tracking of sympatric marine megafauna can inform the biological basis for species co-management'. PLoS ONE 9(6): e98944 [online]. Available at: doi:10.1371/journal.pone.0098944 (Accessed: 27 June 2020).

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., Cleguer, C., Preston, S., Sobtzick, S., Hamann, M., Shimada, T. and Marsh, H. 2016. 'Improving the estimates of abundance of dugongs and large immature and adult-sized green turtles in Western and Central Torres Strait'. Report to the National Environmental Science Programme. Reef and Rainforest Research Centre Limited, Cairns.

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 Kwan, D. 2008. 'Temporal variability in the life history and reproductive biology of female dugongs in Torres Strait: the likely role of sea grass dieback'. Continental Shelf Research, 28: 2152-2159.

Marsh, H. and Sinclair, D.F. 1989. 'Correcting for visibility bias in strip transect aerial surveys of aquatic fauna.' Journal of Wildlife Management, 53: 1017–1024.

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., Grayson, J., Grech, A., Hagihara, R. and Sobtzick, S. 2015. 'Re-evaluation of the sustainability of a marine mammal harvest by indigenous people using several lines of evidence'. Biological Conservation, 192: 324-330.

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.

McNiven, I.J, Bedingfield, A. 2008. 'Past and present marine mammal hunting rates and abundances: dugong (*Dugong dugon*) evidence from Dabangai Bone Mound, Torres Strait'. Journal of Archaeological Science, 35: 505–515.

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.

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

Taylor, H.A. and Rasheed M.A. 2011. 'Deepwater seagrass dynamics in the Torres Strait Dugong Sanctuary Cairns'. Fisheries Queensland, 2011.

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). Central and Western Torres Strait 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/central-western-torres-strait/