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.

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.
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 *Thalassia*, *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).

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.

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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/km²), High (0.5–1.0 dugongs/km²), Medium (0–0.5 dugongs/km²) and Low (0 dugongs/km²) dugong relative density.

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

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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


