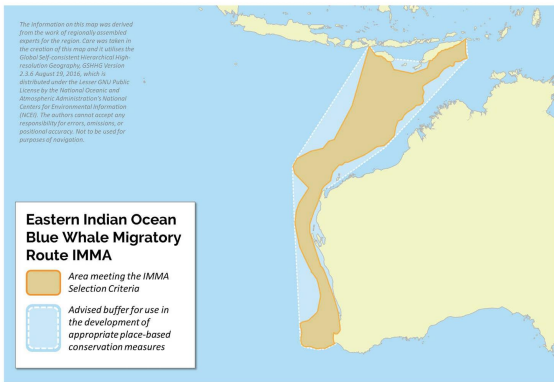


Eastern Indian Ocean Blue Whale Migratory Route IMMA

Description:

Within this pygmy blue whale migration IMMA, there is one known foraging ground reported in the published literature: the Perth Canyon and surrounds (from the Houtman Abrolhos Islands down to the very south of Western Australia) (Rennie et al., 2009). The Perth canyon promotes localised upwelling, enhancing productivity and allowing plankton to bloom and thus attracting the whales (Rennie et al., 2009). The Perth Canyon is thought to be used by both pygmy blue and Antarctic blue whales for feeding (Commonwealth of Australia, 2015), but published evidence of the latter is lacking. Evidence of feeding pygmy blue whales comes from the analysis of the movement behaviour from animals tagged at Perth Canyon. High levels of occupancy occurred in Perth Canyon/Naturalist Plateau and also Ningaloo Reef.



Area Size

1,101,394 km²

Qualifying Species and Criteria

Pygmy blue whale – *Balaenoptera musculus brevipinna*
 Criterion A, C2, C3

Marine Mammal Diversity

Balaenoptera musculus intermedia

Summary

The eastern Indian Ocean has a blue whale sub-species, the pygmy blue whale (*Balaenoptera musculus brevipinna*), which migrates between summer feeding grounds in the Perth Canyon and Naturaliste Plateau and winter breeding grounds in the Banda Sea in Indonesia. Across the entire coastline of western Australia, an area extending mostly from around the 100 depth contour (~25 m in southwestern Australia) to around the 1000 m contour (but including areas up to 4000 m) is an IMMA. The extent of this migratory route is supported by satellite tracking studies and surveys (visual and acoustic). Evidence exists for two main areas of foraging habitat for pygmy blue whales along this migration route – the area around the Perth Canyon/ Naturaliste Plateau and the area off Exmouth, Western Australia, both of which are included within this IMMA. There is also evidence to suggest they may feed at many points along their migratory path.

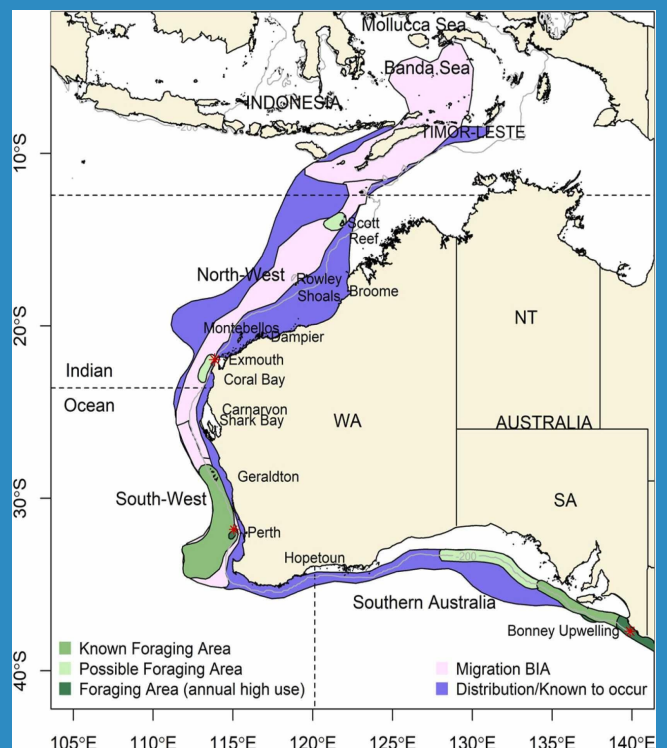


Figure 1 – Biologically Important Areas (BIA) identified by the Australian Government (Thums et al., 2022).

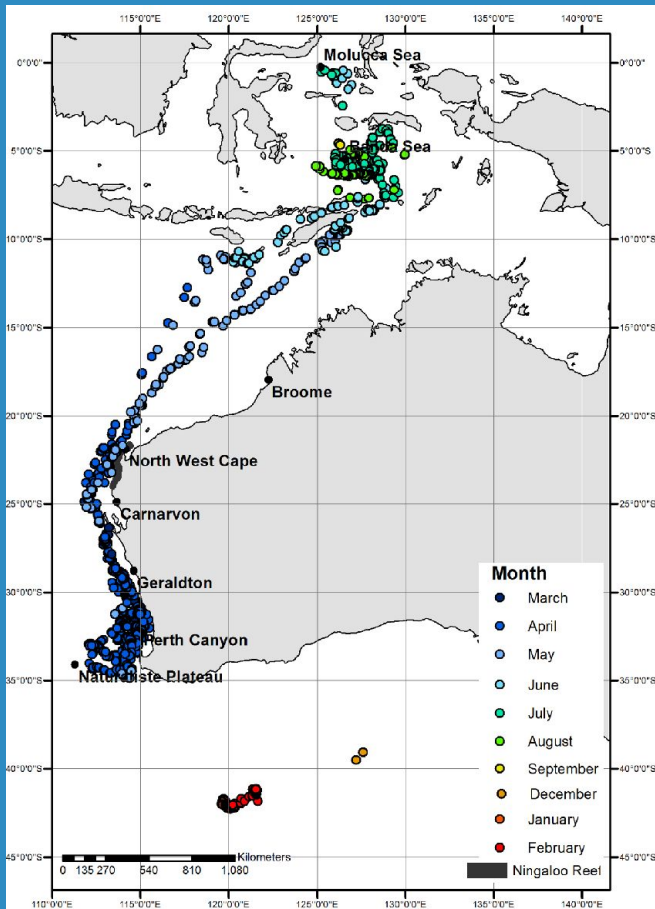


Figure 2 – Satellite tag derived location of pygmy blue whales (n=11) from Double et al.(2014)

Pygmy blue whales are “income breeders” and are thus adapted to exploit widely dispersed and ephemeral food sources. Given this, they likely feed at many points along their migratory path and that is why we combine the migration and foraging of pygmy blue whales in this IMMA. This area is based on the [Australian Biologically Important Area \(BIA\) for migration](#) designated by the Australian Government’s Conservation Values Atlas (CVA) for the pygmy blue whale migration and adds an area to the west and north-west based on the migratory movements of tagged whales (Double et al., 2014; Thums et al., 2021; Thums et al., 2022) (Figure 2). This is also supported by McCauley (2011), who found that only 6–40% of pygmy blue whales that pass by the northern end of the Monte Bello Islands were estimated to pass by Scott Reef, suggesting many pygmy blue whales may also migrate further west of the shelf edge. In addition, it also includes the Exmouth Plateau as acoustic data collected in this area found that pygmy blue whales travel up to 400 km from shore (Gavrilov et al., 2018).

The IMMA also includes Geographe Bay, in southern Western Australia, as relatively large numbers (~450 in ~25 d survey) of pygmy blue whales with calves (and potentially Antarctic blue whales) use Geographe Bay and the Naturaliste Plateau as a narrow transit corridor (Figure 3) (Recalde-Salas et al., 2014, Salgado-Kent et al., 2014). Historical records also show the use of this area (Double et al., 2014).

Criterion A: Species or Population Vulnerability

The total eastern Indian Ocean blue whale population was estimated at 662-1559 in 2010 (McCauley and Jenner, 2010). Blue whales are Red Listed by the IUCN as Endangered (EN) though the pygmy blue whale (*Balaenoptera musculus brevicauda* subspecies) has not yet been evaluated.

Criterion C: Key Life Cycle Activities Sub-Criterion C2: Feeding Areas

The application of time in area spatial analysis of satellite tracking data from pygmy blue whales from the Perth Canyon (Double et al., 2014) show areas of high occupancy along and within the migratory path. Lunge feeding behaviour was recorded by a lander tag which recorded dive data as well as location data (Owen et al., 2016). Double et al. (2014) identify Perth Canyon/Naturalist Plateau and also Ningaloo Reef as the main regions of high occupancy. Areas where animals have high occupancy are usually considered important and are often indicative of foraging behaviour (Kareiva and Odell, 1987) but also resting and breeding (Bailey et al., 2009). It was suggested that the high occupancy reported at Ningaloo Reef may be attributed to the fact that the whales were following the shelf as it narrows around the North-West Cape area (Double et al., 2014), however the fact that milling was also reported (Double et al., 2014) and that lunge feeding behaviour is commonly observed in this area (Michele Thums, Curt Jenner, Tiffany Klein pers comm), suggests that Ningaloo is in fact a feeding area. The Australian Government’s

Conservation Management Plan for Blue Whales identifies the Perth Canyon/Naturaliste Plateau as “known foraging” and the area off Exmouth (Ningaloo) and Scott Reef as “possible foraging” areas which are protected under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*, (Commonwealth of Australia, 2015). All these areas are considered “known foraging” in the Australian Government’s CVA, although not defined under the *EPBC Act*. Although there are anecdotal reports of pygmy blue whales feeding at Scott Reef, no published evidence could be found. But note that the IMMA encompasses all the known and possible foraging areas identified by the Australian Government and CVA and others that might be used by pygmy blue whales along their migration. The identified foraging areas can be considered important to the survival of blue whales as they seasonally support highly productive ecosystem processes on which significant aggregations of whales rely (Commonwealth of Australia, 2015). Antarctic blue whale calls have also been recorded in the Perth Canyon (Balcazar et al., 2015) but use of the Canyon by the species is not well documented.

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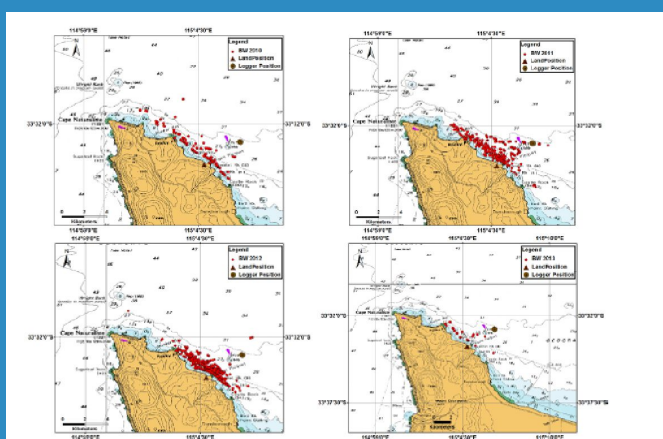


Figure 3 - Distribution of blue whale sightings in Geographe Bay between 2010 and 2013 (Salgado-Kent et al., 2014)

Supporting Information

Bailey, H., Mate, B., Palacios, D. M., Irvine, L., Bograd, S. J. & Costa, D. P. 2009. Behavioural Estimation Of Blue Whale Movements In The Northeast Pacific From State-Space Model Analysis Of Satellite Tracks. *Endangered Species Research*, 10, 93-106.

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