Area Size

3 373 km²

Qualifying Species and Criteria

Humpback whale – *Megaptera novaeangliae*

[North Pacific – *M. n. kuzira*]

Criterion A; C (1, 3)

[Southern – *M. n. australis*]

Criterion C (1, 3)

Marine Mammal Diversity

Balaenoptera edeni, Pseudorca crassidens, Steno bredanensis, Stenella attenuata graffmani, Tursiops truncatus

Summary

The San Juan del Sur – Papagayo IMMA ranges from Playa Gigante, Nicaragua to the Papagayo Gulf, Costa Rica. It includes continental waters extending up to 80km (43nm) from the coast. North Pacific humpback whales (*Megaptera novaeangliae kuzira*) from the Central America distinct population segment (DPS) use the area to mate, calve, and nurse their young during the boreal winter, while Southern Hemisphere humpback whales (*M. n. australis*) use the area for the same activities in the austral winter. The IMMA is a foraging area for common bottlenose dolphins (*Tursiops truncatus*), pantropical spotted

San Juan del Sur – Papagayo IMMA

Summary, continued.

dolphins (*Stenella attenuata*) and to some extent opportunistically to humpback whales of the Central America DPS. Additional marine mammal species occasionally observed in the IMMA area include Bryde's whales (*Balaenoptera edeni*), false killer whales (*Pseudorca crassidens*) and killer whales (*Orcinus orca*).

Description:

The San Juan del Sur-Papagayo IMMA includes waters in both southern Nicaragua and northern Costa Rica. The IMMA extends from Playa Gigante in the north to the Papagayo gulf in the south (Figure 1). The area is characterized by the presence of an irregular, mountainous coastline, with steep rocky cliffs occasionally interrupted by small pocket beaches and coral formations. The area extends up to 80 km from the coast.

Figure 1: Humpback whale displaying social behaviours in the IMMA. Nicaragua. Photo Credit: Joëlle De Weerdt.

Criterion A: Species or Population Vulnerability

Humpback whales (*Megaptera novaeangliae kuzira*) that use the IMMA are part of the Central America distinct population segment (DPS) that is classified as 'Endangered' under the United States Endangered Species Act (81 FR 62260, September 8, 2016). The Central America DPS is one of the 14 DPS of humpback whales around the world, and part of the four DPSs listed as endangered (Bettridge et al., 2015). A DPS is made up of whales that share the same latitude breeding area and migrate seasonally to specific mid-to high latitude feeding grounds that may differ among individuals (Bettridge, 2019). The Central America DPS is composed of whales that breed along the Pacific coast of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama (Bettridge et al., 2015; Curtis et al., 2022; Taylor et al., 2021). This DPS wintering area is understood to extend into southern Mexico (Wade, 2016; Curtis et al., 2022). The population estimate for the Central America DPS varies between 500-700 individuals depending on the mark-recapture method used (Calambokidis et al., 2008; Barlow et al., 2011; Wade, 2016). The population estimate of this IMMA, which includes the Southern Mexico-Central America region, is approximately 1,500 whales (Curtis et al., 2022).

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

Two humpback whale populations use the waters off southwest Nicaragua and northwest Costa Rica as a breeding ground (De Weerdt et al., 2021; De Weerdt et al., 2022a; Martinez-Fernandez et al., 2011; Martinez-Fernandez et al., 2014; May-Collado et al., 2017). Northern Hemisphere humpback whales are observed in Nicaraguan waters between January and April (De Weerdt et al., 2022a), while Southern Hemisphere whales are there between July and October (De Weerdt et al., 2019). Northern Hemisphere whales are observed in Guanacaste, Costa Rica between November and April, while Southern Hemisphere whales were present between July and November (Garita & Palacios, unpublished data).

The IMMA represents a calving ground for humpback whales during both the austral and boreal winter (Rasmussen, 2006; Martinez-Fernandez et al., 2011). Breeding grounds are characterized by the presence of mothers with newborn calves, mating-related behaviours, and singing activity by males (Clapham et al., 1992; Darling, 2001; Ransome et al., 2021). Out of the 282 humpback whale observations documented in the Nicaraguan portion of the IMMA between 2004-2008 and 2016-2020, 2% comprised singers, 7% comprised mothers and calves, and 3% comprised competitive groups (De Weerdt et al., 2022a). Of the Central American DPS humpback whales observed in the Gulf of Papagayo, Costa Rica, 39% were singers (n = 22), 7 % of groups had calves (n = 4), and 5% were competitive groups (n=3) (2022, SPLASH2; Garita, unpublished data).

Eighteen feeding events were documented for humpback whales of the Central American DPS during the 2017-2018 breeding seasons off the coastal areas of San Juan del Sur, Nicaragua (De Weerdt & Ramos, 2020). Feeding behaviours were observed in both Nicaraguan waters and in the Gulf of Papagayo and Santa Elena Gulf in three consecutive years 2020 – 2022 (Palacios & De Weerdt, unpublished data). Although the areas clearly does not constitute a regular feeding ground, these observations suggest that humpback whales opportunistically take advantage of local productivity during their migration and that the IMMA could represent a potential feeding stopover for some individual whales.

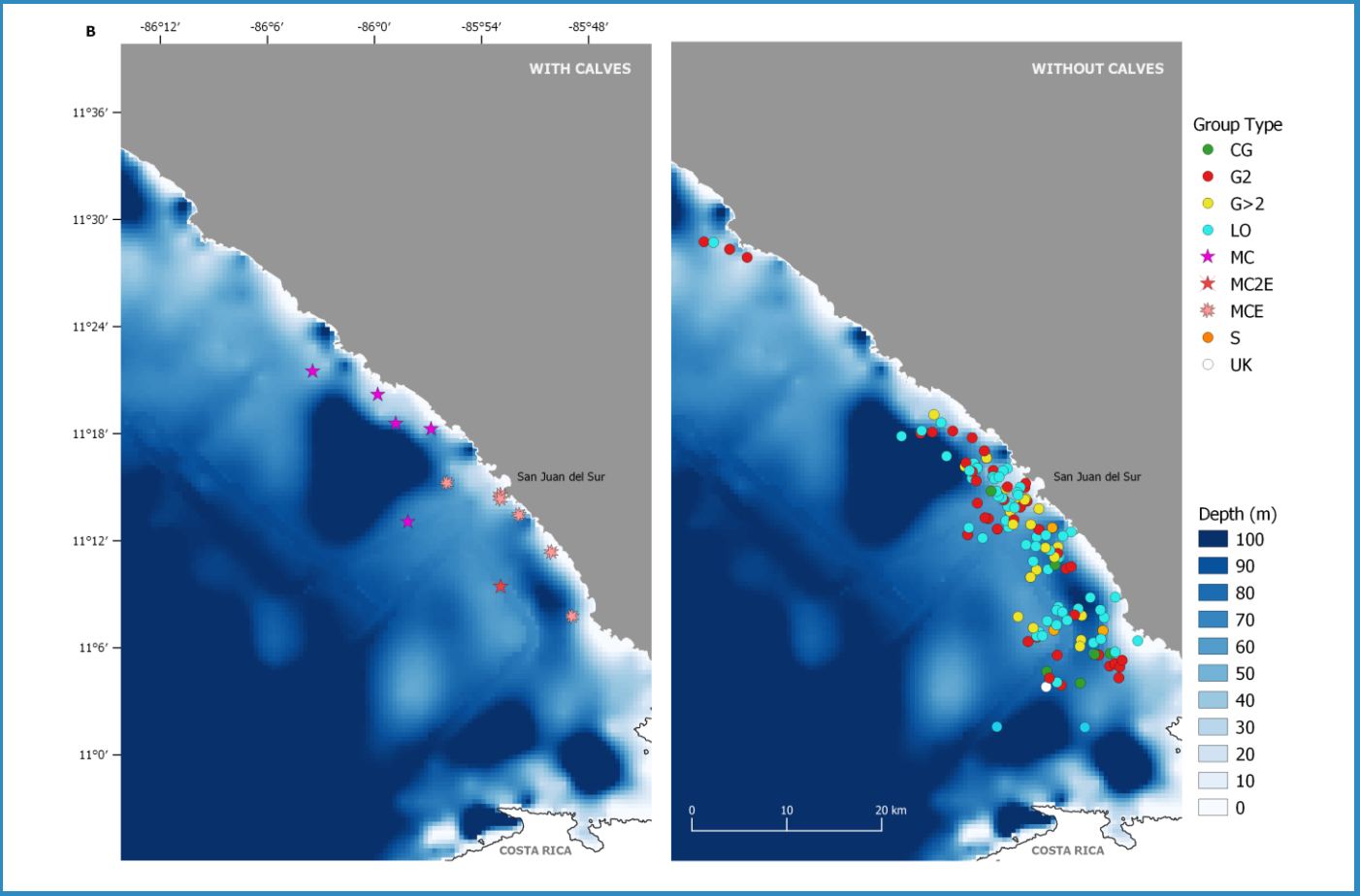

Figure 2: Spatial distribution of different Humpback whale group types in function of depth in southwestern Nicaragua. Reproduced from De Weerdt et al., 2022.

Figure 3: Feeding humpback whale in front of Maderas beach, Nicaragua. Photo credit: Joëlle De Weerdt.

Figure 4: Humpback whale mother calf-pair traveling in the IMMA. Costa Rica. Photo Credit: Frank Garita.

Sub-criterion C3: Migration Routes

Humpback whales' migratory connections are revealed through photo-identification. Northern hemisphere humpbacks photographed in the IMMA have also been photographed off the US West Coast (De Weerdt et al., in prep). In 26% of the cases, humpback whales were seen traveling in the IMMA (De Weerdt et al., 2022a). Together with the relatively low number of observations of competitive groups and mothers and calves, this indicates that the IMMA hosts whales that are passing through as part of their northward or southward migrations as well as whales engaged in reproductive behaviour.

Supporting Information

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