

Area Size

18,758 km²

Qualifying Species and Criteria

Humpback whale – *Megaptera novaeangliae*

Criteria A, B2, C1, D1

Marine Mammal Diversity

Stenella longirostris, *Tursiops aduncus*, *Tursiops truncatus*, *Globicephala macrorhynchus*, *Balaenoptera omurai*, *Balaenoptera acutorostrata* spp, *Physeter macrocephalus*, *Kogia sima*, *Kogia breviceps*, *Mesoplodon densirostris*, *Ziphius cavirostris*, *Indopacetus pacificus*, *Megaptera novaeangliae*

Summary

The New Caledonian Southern Seamounts and Banks IMMA includes some of the primary reproductive areas of the breeding sub-stock of humpback whales designated by IWC as E2 and considered as Endangered by IUCN. Whales specifically concentrate around these offshore shallow features where they come for breeding and nursing during the austral winter. High densities of humpback whales have been recorded in the vicinity of the seamounts, especially near Torche bank, Orme Bank, and Antigoniam Seamount. Both residence time and behaviour suggest the seamounts are critical habitat for this endangered population.

New Caledonian Southern Seamounts and Banks IMMA

Description

This IMMA is entirely located in the oceanic waters of the New Caledonian EEZ. It encompasses part of the Norfolk ridge, located south of the southern lagoon and part of the Loyalty ridge located south of the Loyalty Islands. South of the New Caledonian mainland, the coastal waters of the southern lagoon are opened to the oceanic environment, allowing the lagoon and pelagic environments to merge. The IMMA includes several seabed features, such as shallow banks and offshore seamounts, that provide important, yet under-studied, habitat for humpback whales. A cluster of seamounts occurs in southern New Caledonian EEZ waters (e.g. Antigoniam, Jumeau East and West, Stylaster), but only the most shallow seamounts seem to be intensively used by humpback whales.

The IMMA is also known to provide habitat for fishes, marine birds, marine turtles, and other species of cetaceans, the most common ones being: *Stenella longirostris*, *Tursiops aduncus*, *Tursiops truncatus*, *Globicephala macrorhynchus*, *Balaenoptera omurai*, *Balaenoptera acutorostrata* spp, *Physeter macrocephalus*, *Kogia sima*, *Kogia breviceps*, *Mesoplodon densirostris*, *Ziphius cavirostris*, and *Indopacetus pacificus*.

Criterion A: Species or Population Vulnerability

The group of humpback whales that migrate to New Caledonia belong to the Oceania subpopulation, which is classified as Endangered by IUCN (Childerhouse et al 2009). Humpback whales show a high fidelity to the area, and photo-ID and genetics demonstrate that there are also strong connections between this IMMA and the "New Caledonia Main Island Lagoons IMMA". Humpback whales were

observed in high numbers during the four surveys undertaken on the southern seamounts with an encounter rate ranging between 0.11 to 0.39 whales/km (Garrigue et al., 2017). At least 400 individual whales were identified through photo-ID surveys over a three-year period (233 from the southern lagoon IMMA, 126 from southern seamounts IMMA, 41 matched from both areas) and analysis showed that humpback whales were almost equally likely to return to either the southern seamounts or main islands lagoons in successive years. Indices of intra-annual exchanges indicates that whales were more likely to travel between the areas in the same year than to return to the same area in a different year (Garrigue et al 2013).

Criterion B: Distribution and Abundance

Sub-criterion B2: Aggregations

The IMMA constitutes aggregation spots for humpback whales within the reproductive breeding grounds of New Caledonia (Fig. 1) (Garrigue et al.,

2015; 2017). They were observed in high number on the Southern (Garrigue et al., 2017b). A switching state-space model showed that whales demonstrate a behaviour qualified as "area-restricted search" on Antigonie and La Torche which could be indicative of foraging but also of resting or breeding (Garrigue et al., 2015). Modeled tracks and occupancy time indicate significant use of the IMMA by whales (Fig. 2) (Garrigue et al., 2015). Behavioural observations during surveys suggest that whales are aggregating within the IMMA for reproduction.

Criterion C: Key Life Cycle Activities

Sub-criterion C1: Reproductive Areas

The southern seamounts of New Caledonia have been identified as a reproductive area for humpback whales based on field-based observation (Garrigue et al., 2011; Derville et al., 2018). The area is used for mating and nursing, and also likely for calving, and it constitutes one of the major breeding grounds for this sub-stock. Boat-based data collected between

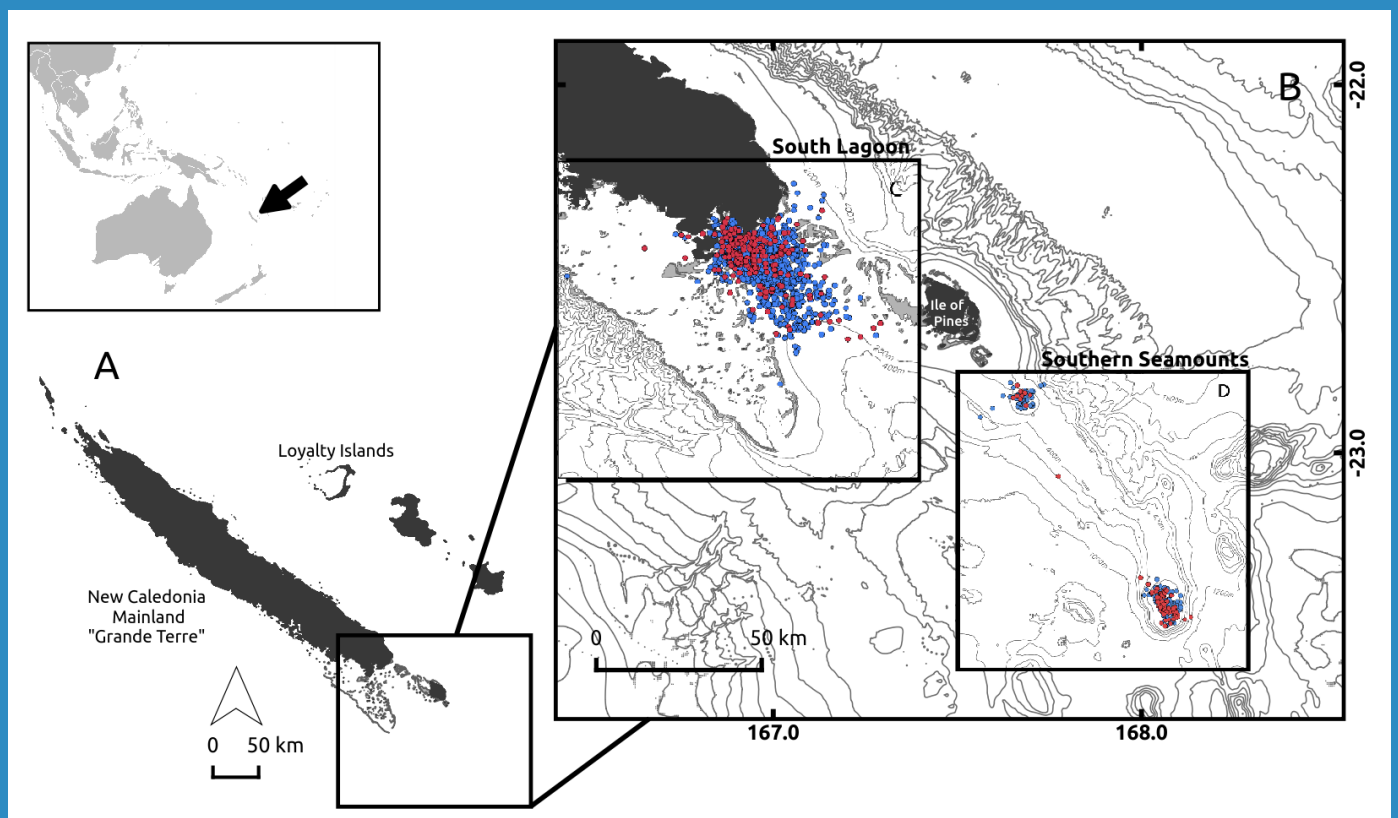


Figure 1. Map of New Caledonia (A), study areas (B), and positions of humpback whale (*Megaptera novaeangliae*) encounters in the South Lagoon (C) and Southern Seamounts (D) between 1995 and 2015. Groups with a calf are shown in red and groups without a calf are shown in blue. Light gray lines represent 200-m isobaths. Land is shown in black and reefs in gray. Modified from Derville et al. 2018

1996 and 2017 showed that the proportion of groups with calves was higher in the southern seamounts (27%) than in the south lagoon (16%).

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

New Caledonian humpback whales are designated as reproductive sub-stock E2 by IWC and are genetically different from the other sub-stocks identified in the South Pacific Ocean (Olavarria et al., 2007). The southern seamounts include one of the only known breeding areas for humpback whales located in a purely offshore, unsheltered oceanic environment (i.e. no emerged reef structures or land) Garrigue and Derville, 2017). Mitochondrial DNA analysis of 1,112 samples collected throughout the south Pacific (New Caledonia, Tonga, Cook Islands, French Polynesia, Colombia) and Western Australia revealed 115 unique haplotypes. Significant differentiation, at both the haplotype and nucleotide level ($F_{ST} = 0.033$; $\Phi_{ST} = 0.022$), were found among the 6 breeding grounds and for most pair-wise comparisons (Olavarria et al., 2007).

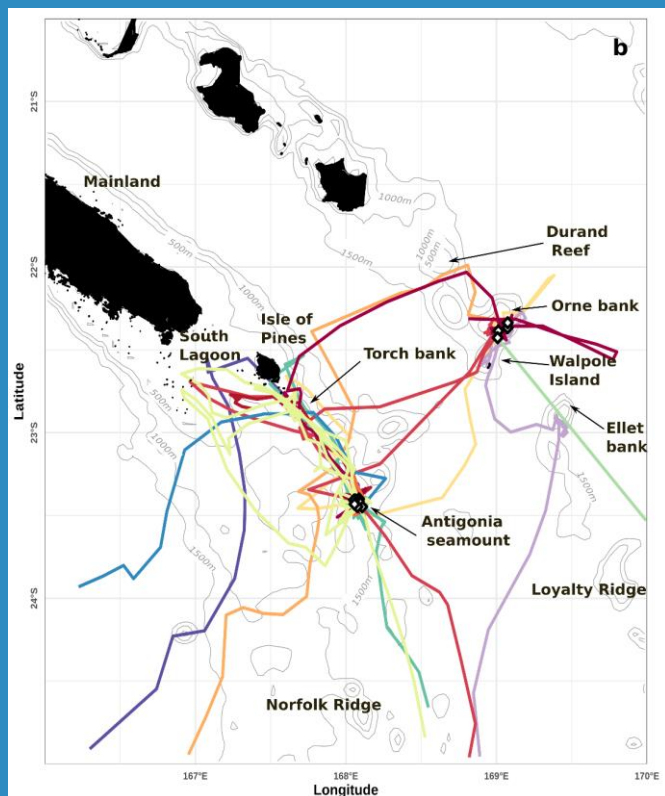


Figure 2. Satellite tracks deployed on humpback whales in Southeastern New Caledonia (Norfolk and Loyalty ridges). Grey lines represent 500 m isobaths up to 2000 m deep. Land is shown in black. The locations of tag deployments are shown with white diamonds. From Derville et al 2020

Supporting Information

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