

Society Archipelago IMMA

Description

The Society Archipelago is located within the National Marine Mammal Sanctuary of French Polynesia. A total of 15 species of odontocetes and only one mysticete, the humpback whale, have been recorded in the IMMA. The number of delphinids encountered per kilometer of effort is similar around the Leeward and Windwards Islands and decreases by one order of magnitude just slightly offshore (Fig. 1) (Gannier, 2000; 2009). The IMMA boundaries include the coastal and nearshore waters (up to 10 km offshore) that encompass known aggregations of at least three qualifying cetacean species encountered in the region and the corridors between the islands of the archipelago.

Criterion A: Species or Population Vulnerability

The Oceania subpopulation of humpback whales is assessed as Endangered on the IUCN Red List of threatened species. Models for the recovery of the Oceania subpopulations suggest stocks likely remain below 30% of K and are recovering at a slower rate than other humpback whale populations (Jackson et al., 2007).

Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

Combined demographic and genetic data were used to describe the isolation and interchange of resident spinner dolphins among island communities of the Society Archipelago (Oremus et al., 2007). Dorsal fin photographs for individual identification and biopsy samples for genetic analyses (n = 154) were collected from six island communities during 189 small-boat surveys over 3 years. Capture-recapture analyses at Moorea (the primary study site), based on long-term



Area Size

19,028 km²

Qualifying Species and Criteria

Humpback Whale – *Megaptera novaeangliae*

Criteria A, B2, C1

Spinner dolphin – *Stenella longirostris*

Criteria B1, B2, C1, D1

Rough-toothed dolphin – *Steno bredanensis*

Criteria B1, B2, D1

Marine Mammal Diversity (D2)

Kogia sima, *Mesoplodon densirostris*, *Ziphius cavirostris*, *Peponocephala electra*, *Lagenodelphis hosei*, *Orcinus orca*, *Globicephala macrorhynchus*, *Pseudorca crassidens*, *Feresa attenuata*, *Grampus griseus*, *Stenella attenuata*, *Physeter macrocephalus*, *Tursiops truncatus*, *Megaptera novaeangliae*, *Stenella longirostris*, *Steno bredanensis*

Summary

The IMMA includes coastal and nearshore waters of the main islands in the Society Archipelago (from Bora Bora in the north-west to Tahiti in the south-east) of French Polynesia. Three species form the basis of the IMMA designation: humpback whales, spinner dolphins and rough-toothed dolphins. High densities of humpback whales belonging to the Endangered Oceania subpopulation are seen in this area during Austral winter. Spinner and rough-toothed dolphins form small and resident populations across the archipelago and have been found to be genetically distinct from other populations in the region. The IMMA is included in the whale and dolphin national sanctuary under French Polynesian jurisdiction.

observations of distinctively marked individuals and microsatellite genotypes (12 loci), indicated a local community of about 150 spinner dolphins. This community appeared relatively closed on an intra-generational scale, as confirmed by resightings of individuals over 15 years. Surveys around neighbouring islands indicated the presence of similar distinct spinner dolphin communities with relatively low levels of interchange, likely to follow demographic patterns similar to Moorea. Overall, significant differentiation at both mitochondrial and nuclear levels indicated restricted gene flow among neighbouring communities, although some individual movement was documented.

At least two small resident populations of rough-toothed dolphins have been described in the IMMA on the basis of photo-ID and genetic data (Oremus et al., 2012; Albertson et al., 2016). Oremus et al. (2012) collected photographs for individual identification (n = 108 unique individuals) and biopsy samples (n = 64) to assess genetic diversity, population structure and abundance of rough-toothed dolphins around Moorea and Raiatea (170 km apart). Genotype (14 microsatellite loci) and photo-identification recaptures over 12 years indicated long-term site fidelity around Moorea and a high probability of demographic partitioning between Moorea and Raiatea. There was also a marked genetic differentiation between the two islands for both

control region mitochondrial haplotypes (450 base pairs, $F_{ST} = 0.58$, $p_{ST} = 0.07$, $p < 0.001$), a pattern confirmed by Bayesian clustering analysis. Around Moorea, estimates of abundance and current effective population size support a population size in the low hundreds. These results suggest a pattern of small, resident rough-toothed dolphin community structure.

Criterion B: Distribution and Abundance

Sub-criterion B2: Aggregations

Megaptera novaeangliae – The nearshore waters of the IMMA in the Society Archipelago are critical places where humpback whales aggregate for breeding during the winter months. This habitat is important for all sex- and age-class groups of whales (Poole, 2002; Gannier, 2004). Gannier (2004) reported that although his survey effort included offshore waters, humpback whales in French Polynesia were mostly (83%) found less than 2 km from the shoreline. Furthermore, the sighting rate for individuals were estimated for inshore waters of different archipelagos from visual data; although the density of humpback whales in the IMMA is not homogenous (different rates between Windward and Leeward Islands), it does include the area of highest relative density in French Polynesia. Toothed whale sightings in the Society Archipelago show an aggregation pattern for these species in nearshore waters (Gannier, 2000; Laran et al., 2012).

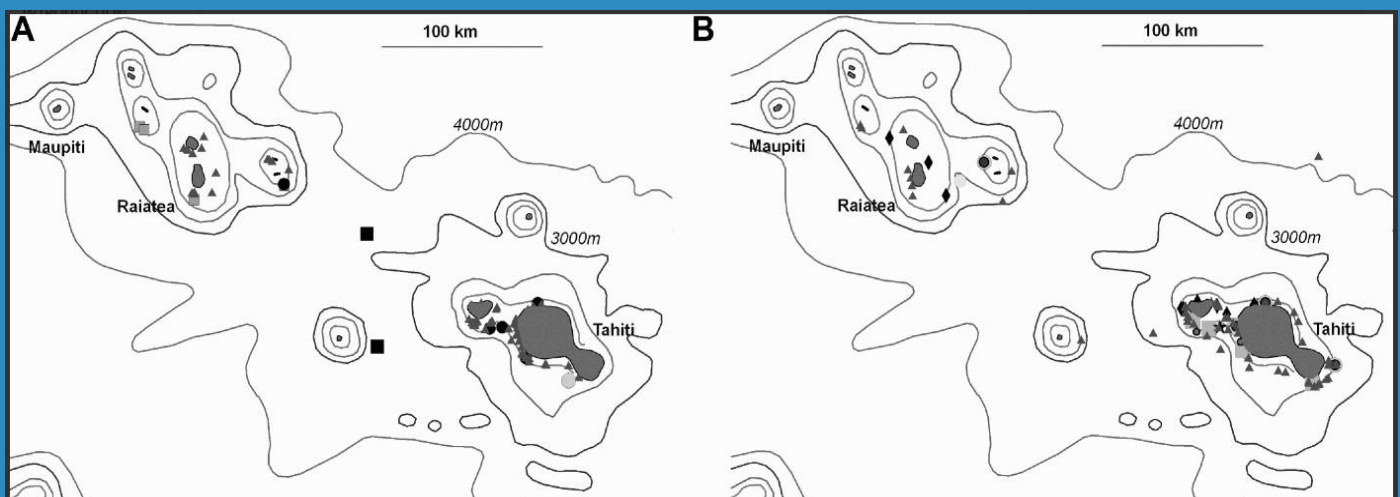


Figure 1: Vessel-based cetacean sightings in the Society Archipelago (A) Dark triangle, spinner dolphin; grey square, bottlenose dolphin; grey circle, Risso's dolphin; dark circle, short-finned pilot whale; black square, sperm whale. (B) Dark triangle, rough-toothed dolphin; grey circle, Fraser's dolphin; dark circle, melon-headed whale; grey square, dwarf sperm whale; blue circle, Cuvier's beaked whales; diamond, Blainville's beaked whales, dark star, pygmy killer whale. (1000, 2000, 3000 and 4000 m isobaths are drawn). From: Gannier, 2009.

Criterion C: Key Life Cycle Activities

Sub-criterion C1: Reproductive Areas

Megaptera novaeangliae – The Society Islands form critical winter calving and mating habitat for humpback whales (Poole, 2002; Gannier, 2004). The evidence supporting this sub-criterion is undisputed and, given the social and behavioural tendency for humpback whales to aggregate, these findings are consistent with other populations globally.

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

Population structure analysis of spinner dolphins across the Pacific shows that samples from the Society Archipelago IMMA are genetically different from other regions (Baker, unpublished report). Albertson et al. (2016) assessed the isolation and interchange of rough-toothed dolphins at the regional and oceanic scale within the central Pacific Ocean. Using mtDNA and microsatellite genotyping (nDNA), they analyzed samples of insular communities from the main Hawaiian (Kaua'i n = 93, O'ahu n = 9, Hawai'i n = 57), French Polynesian (n = 70) and Samoan (n = 16) archipelagos, and pelagic samples off the Northwestern Hawaiian Islands (n = 18). Results indicate strong genetic differentiation among islands (mtDNA $F_{ST} = 0.265$; $p < 0.001$; nDNA $F_{ST} = 0.038$; $p < 0.001$), as well as among archipelagos (mtDNA $F_{ST} = 0.299$; $p < 0.001$; nDNA $F_{ST} = 0.055$; $p < 0.001$).

Criterion D: Special Attributes

Sub-criterion D2: Diversity

A total of 16 cetacean species have been identified in the IMMA indicating a high level of species diversity (Poole, 1993; Gannier, 2000; Laran et al., 2012). Species confirmed in the area include dwarf sperm whale, Blainville's and Cuvier's beaked whale, melon-headed whale, Fraser's dolphin, killer whale, short-finned pilot whale, false killer whale, pygmy killer whale, Risso's dolphin, pantropical spotted dolphin, sperm whale, and bottlenose dolphins.

Supporting Information

Albertson, G.R., Baird, R.W., Oremus, M., Poole, M.M., Martien, K.K., Baker, C.S., 2017. Staying close to home? Genetic differentiation of rough-toothed dolphins near oceanic islands in the central Pacific Ocean. *Conservation Genetics* 18 (1), 33-51.

Olavarria, C., Baker, C.S., Garrigue, C., Poole, M., Hauser, N., Caballero, S., Florez-Gonzalez, L., et al. 2007. Population structure of South Pacific humpback whales and the origin of the eastern Polynesian breeding grounds. *Marine Ecology Progress Series* 330, 257-268.

Kiszka J., Oremus M., Richard P., Poole P. and Ridoux V. 2010. The use of stable isotope analyses from skin biopsy samples to assess trophic relationships of sympatric delphinids off Moorea (French Polynesia). *Journal of Experimental Marine Biology and Ecology*, 395, 48-54.

Gannier, A. 2000. Distribution of cetaceans off the Society Islands (French Polynesia) as obtained from dedicated surveys. *Aquatic Mammals* 26, 111-126.

Gannier, A. 2004. The large-scale distribution of Humpback Whales (*Megaptera novaeangliae*) wintering in French Polynesia during 1997-2002. *Aquatic Mammals* 30(2), 227-236.

Gannier, A. 2009. Comparison of odontocete populations of the Marquesas and Society Islands (French Polynesia). *Journal of the Marine Biological Association of the United Kingdom* 89, 931-941.

Gannier, A., and West, K.L. 2005. Distribution of the rough-toothed dolphin (*Steno bredanensis*) around the Windward Islands (French Polynesia). *Pacific Science* 59, 17-24.

Laran, S., Van Canneyt, O., Dorémus, G., Massart, W., Ridoux, V., and Watremez, P. 2012. Distribution et abondance de la mégafaune marine en Polynésie française. REMMOA- Polynésie. Rapport final pour l'Agence des Aires Marines Protégées. 185pp.

Oremus, M., Poole, M.M., Albertson, R.G., and Baker, C.S. 2012. Pelagic or insular? Genetic differentiation of rough-toothed dolphins in the Society Islands, French Polynesia. *Journal of Experimental Marine Biology and Ecology* 432-433, 37-46.

Oremus, M., Poole, M.M., Steel, D., and Baker, C.S. 2007. Isolation and interchange among insular spinner dolphin communities in the South Pacific revealed by individual identification and genetic diversity. *Marine Ecology Progress Series* 336, 275-289.

Poole, M.M. 2002. "Occurrence of Humpback Whales (*Megaptera novaeangliae*) in French Polynesia 1988-2001", in: Report SC/54/H14 to the Scientific Committee of the International Whaling Commission. (Cambridge).

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