

APPLYING DISTANCE SAMPLING TECHNIQUES TO ESTIMATE BOTTLENOSE DOLPHIN ABUNDANCE IN MADEIRA ISLAND WATERS: FIRST APPROACH

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INTRODUCTION

Little is known about cetacean communities in the Madeira archipelago. The information was limited to species, temporal occurrence and encounter rates. Assessing the conservation status of the bottlenose dolphin (*Tursiops truncatus*) in Madeira waters requires reliable estimates of abundance. This has a particular importance in the context of the establishment of marine Natura 2000 sites and the application of the EU Habitats Directive in Portugal.

METHODS

The Madeira Whale Museum (MWM) carried out visual surveys between 2007-09 and 2010-12, along zigzag line transects, with equal coverage probability using single platform observations (Figure 1). Sighting radial distance was measured using 7x50 reticle binoculars or estimated by eye and together with angles value were used to calculate the perpendicular distances using simple trigonometry. Here, bottlenose sightings were analyzed with Multiple Covariate Distance Sampling (MCDS) to estimate detection probability; data from 2012 surveys were not included.

RESULTS

- A total of 318 (150 on EME, 168 CMII) cetacean sightings were recorded on effort during the two survey periods, of which 52 were bottlenose dolphins (figure 2).

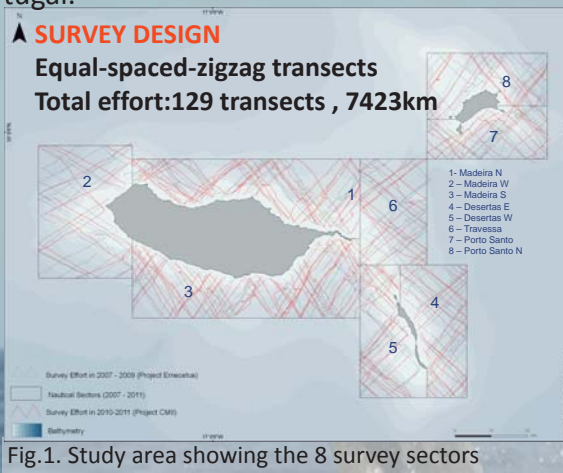


Fig.1. Study area showing the 8 survey sectors

Sector	K	L	n	D(%CV)	N	95%CI
1	16	1332.7	13	0.198(33)	149	78-284
2	10	722.47	2	0.560E-01(67)	41	11-158
3	20	1495.4	13	0.176(35)	149	75-299
4	17	834.29	1	0.243E-01(102)	11	2-65,0
5	18	778.76	7	0.182(61)	77	24-249
6	17	759.85	4	0.106(59)	47	15-149
7	17	768.84	8	0.211(33)	75	38-144
8	14	678.68	4	0.119(46)	48	19-121

K – no of Transects, L- Km surveyed on effort, n- no of primary sightings used in the analysis, D- density (animal per Km²) N- estimated abundance

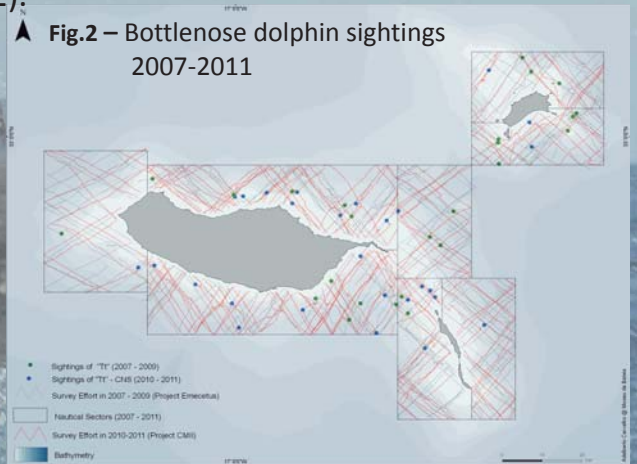


Fig.2 – Bottlenose dolphin sightings 2007-2011

- The detection function was estimated using data from all sectors (Table). The best-fitting model was a Half- Normal function with cosine adjustment term.
- Detection probability was estimated as 0.67 (CV=12%, 95%CI=0.529-0.850).
- Population size in the study area was estimated as 597 individuals (CV=24.3%, 95%CI=372-958)

CONCLUSIONS

- This study has produced for the first time an estimate of abundance for the bottlenose dolphin, a species with regional importance and of conservation concern in Madeira archipelago.
- Results point for higher density in sectors Madeira North (1) and South (3).
- Together with information from photo-id mark-recapture and spatial modeling analysis, these results will allow a better assessment of bottlenose conservation status in the Madeira archipelago.

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