



LONG-TERM ABUNDANCE ESTIMATES OF BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*) IN THE GULF OF CÁDIZ



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INTRODUCTION

The Gulf of Cádiz, located in the SW Iberian Peninsula, is a high-productive and overexploited marine area. There, bottlenose dolphins are widely distributed in coastal waters holding a top-down role effect on the marine food web¹. The species is classified as vulnerable in the Spanish Catalogue of Endangered Species. Monitoring of this Ecological Management Unit (EMU) is required to assess Good Environmental Status under Descriptor 1 of the EU Marine Strategy Framework Directive².

OBJECTIVE: Estimate the abundance dynamics of the bottlenose dolphin EMU from the Gulf of Cádiz (Fig. 1) along three periods by using mark-recapture techniques based on photo-identification.

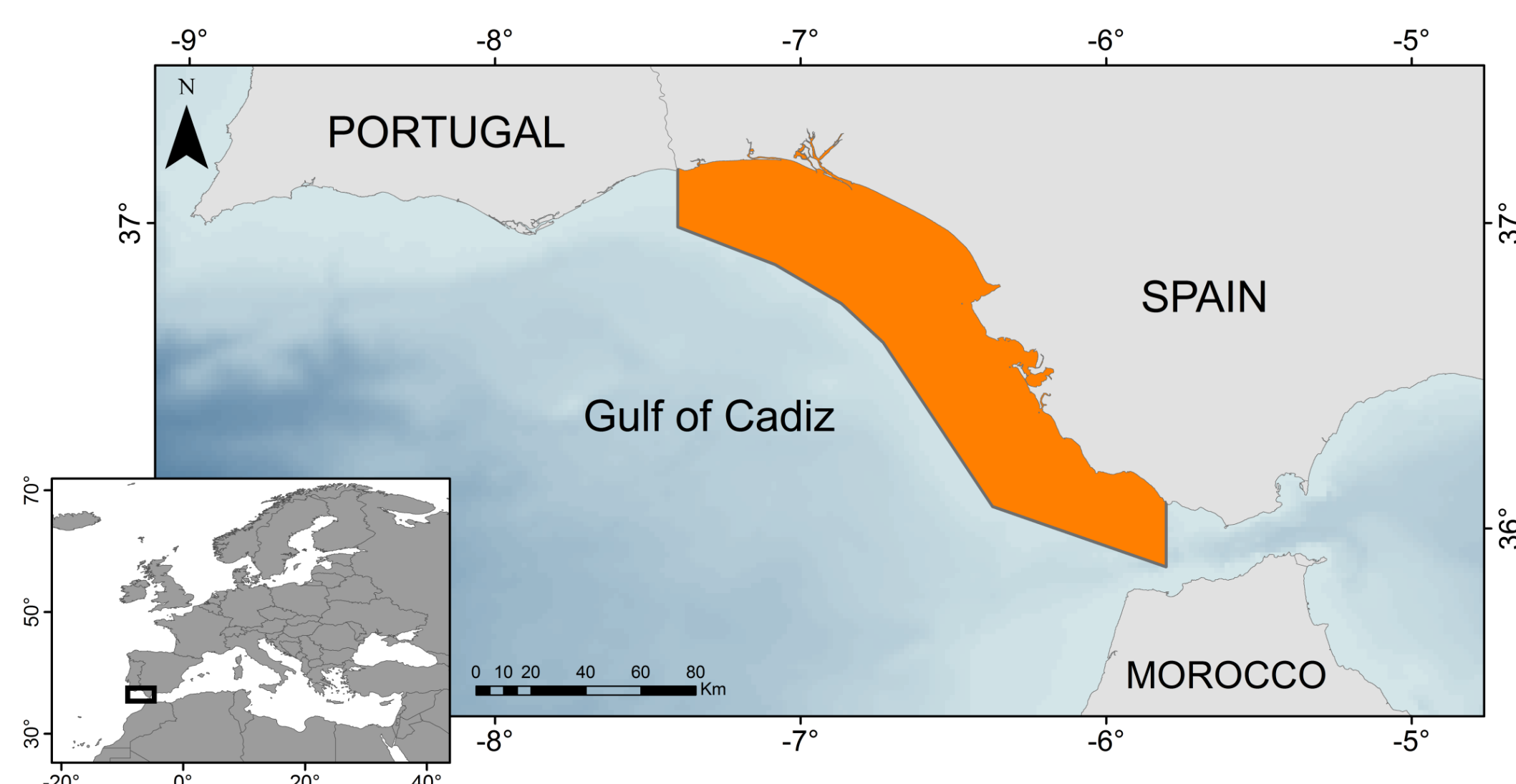


Fig. 1. Map of the study area

METHODS

Photo-identification:

- ✓ Surveys were carried out in 2005-2006, 2009-2010, and 2012-2013 from the research vessel Elsa (9m motorboat) in the Gulf of Cádiz.
- ✓ High quality photographs of the left part of the dorsal fin of all encountered individuals were taken irrespective of their level of marking.

Abundance estimation:

- ✓ Absolute abundance was estimated separately for each period using closed population models in MARK v.10.1 (Huggins' p and c with Random Effects)³.
- ✓ Each sighting was considered a different sampling occasion.
- ✓ Total abundance estimates were then obtained by correcting for the proportion of unmarked individuals⁴.

RESULTS

The best model based on lowest AIC values was Mt with Random Effects.

The total abundances for the Gulf of Cádiz Management Unit were (Fig. 2):

- ✓ 2005-2006:
400 individuals
(95% CI: 284-764)
- ✓ 2009-2010:
369 individuals
(95% CI: 225-664)
- ✓ 2012-2013:
799 individuals
(95% CI: 634-1096)

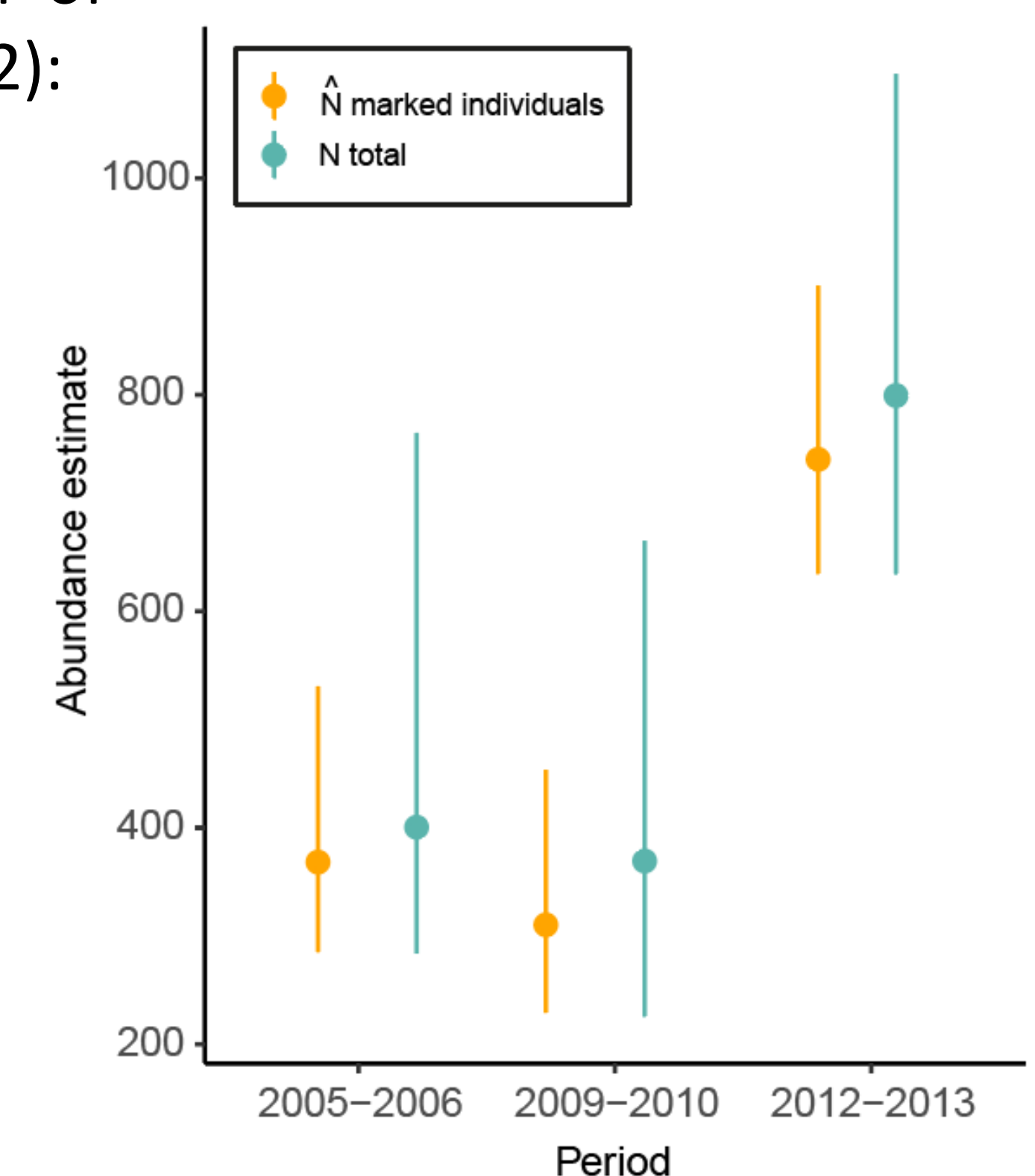


Fig. 2. Abundance estimates

DISCUSSION AND CONCLUSION

- Abundance in the last period (2012-2013) was estimated as about twice larger than the two previous periods (2005-2006 and 2009-2010), albeit with large confidence intervals.
- Further research is needed to assess if effort and study design might have played some bias in this difference, so that we can provide robust estimates useful to the monitoring of this ecological management unit under Descriptor 1 of the EU MSFD² and for the future Spanish conservation plans.
- Updated abundance estimates are required as the ones presented in this study already date back to over 10 years ago.

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