

# Population Abundance Trends of Long-Finned Pilot Whales and Bottlenose Dolphins at the Special Area of Conservation "Underwater valleys of the Mazarrón scarp"

Eduardo J. Belda<sup>1,5</sup>, Ramón Miralles<sup>2,5</sup>, Carles Gallardo<sup>2</sup>, Victor Espinosa<sup>1,5</sup>, Gal·la Serrano<sup>1</sup>, Blanca Feliu-Tena<sup>3,5</sup>, Victor Gallego<sup>4</sup>

<sup>1</sup> Instituto de Investigación para la Gestión Integrada de Zonas Costeras (IGIC), Universitat Politècnica de València (UPV), C/Paranimf 1, Grau de Gandia, 46730 Valencia, Spain; <sup>2</sup> Institute of Telecommunications and Multimedia Applications (ITEAM), Universitat Politècnica de València (UPV), Camino de Vera S/N, 46022 Valencia, Spain; <sup>3</sup> Instituto Español de Oceanografía (IEO-CSIC), C.O. Murcia, C/el Varadero 1, Lo Pagan, 30740 Murcia, Spain; <sup>4</sup> Instituto de Ciencia y Tecnología Animal, Universitat Politècnica de València (UPV), Camino de Vera S/N, 46022 Valencia, Spain; <sup>5</sup> Unidad Mixta de Investigación IEO-UPV, Tinglados Muelle Frutero, Grau de Gandia, 46370 Valencia, Spain

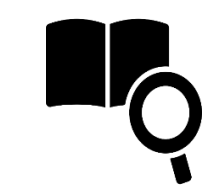
edbelpe@upv.es



## BACKGROUND



**Increase in maritime and recreational navigation** is a potential threat to marine megafauna. Specially in protected areas, there is a need to



**Distance sampling** is commonly used to monitor the population abundance of cetaceans. Nonetheless, these surveys usually are biased due to their diving behaviour, i.e.  $g(0)$  is not 1, and the associated bias when recording cluster size.



**Lack of information about population trends and difficulty to obtain accurate estimates of population abundance.** This information is crucial for managing and conserving



## METHODS

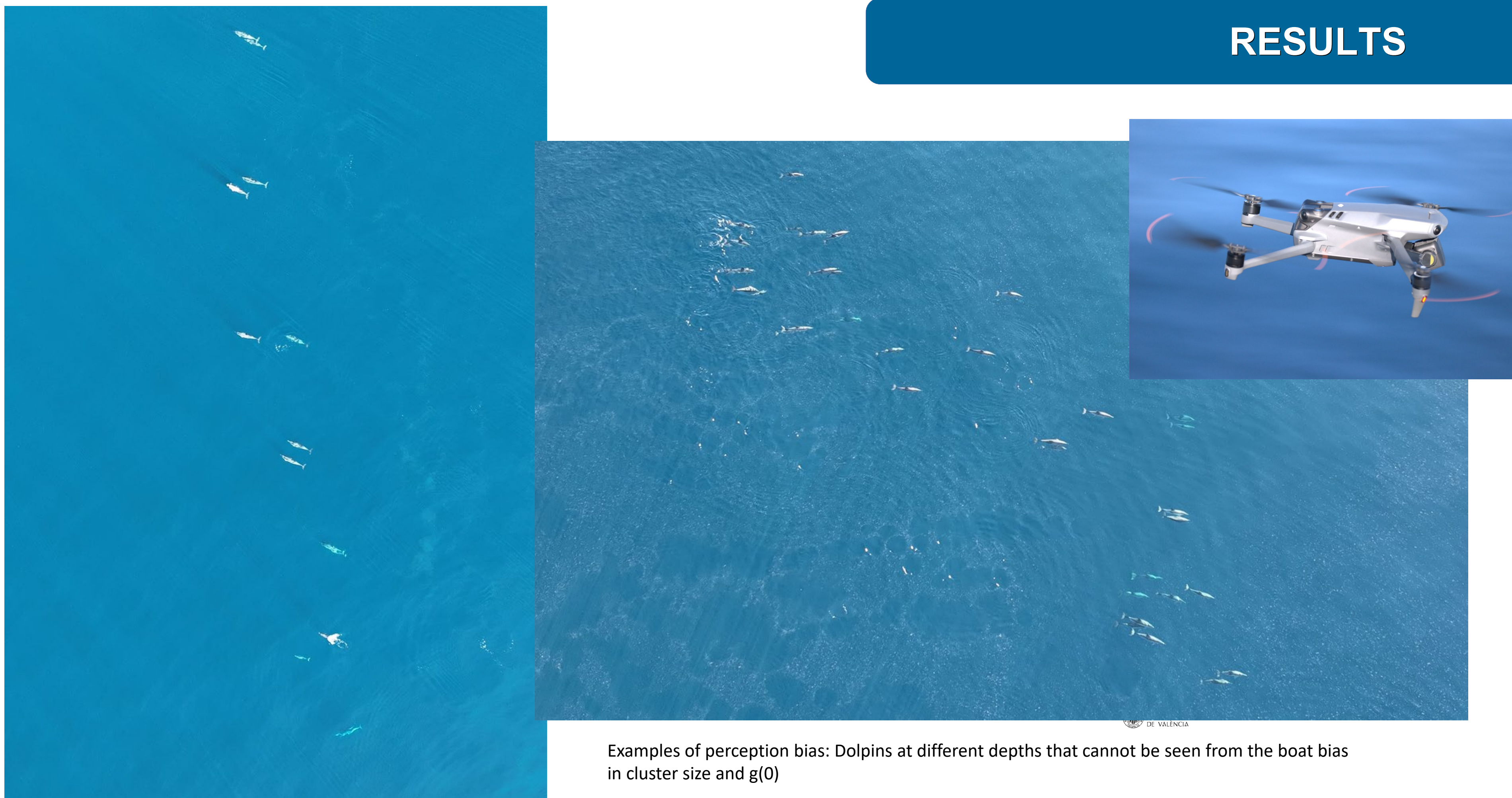
Employing an integrated methodological approach, we combined traditional distance sampling with boat and aerial surveys, enhancing these with drone imagery and acoustic monitoring.

Data collected 2018-2020; 2022 – 2023. Total effort = 4001 km; SAC area = 1542 km<sup>2</sup>; Total number of sightings = 154

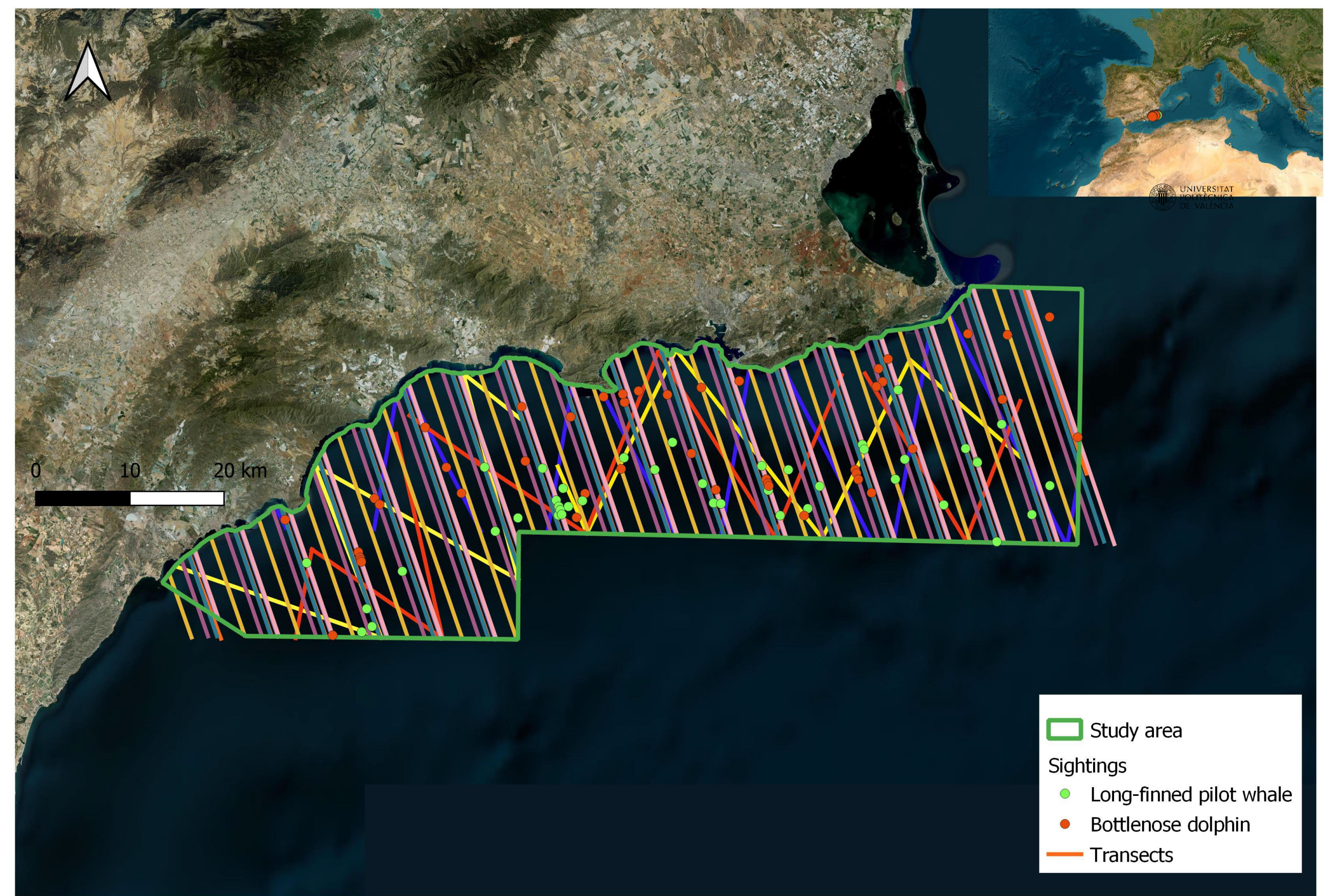
Abundance was estimated using distance sampling methods. Analyses were conducted with software R using package "distance"

Perception bias: We used the ratio of acoustic detections vs visual detections ; In 2023 we used AUV video recordings of sightings to estimate bias in estimate group size from visual data

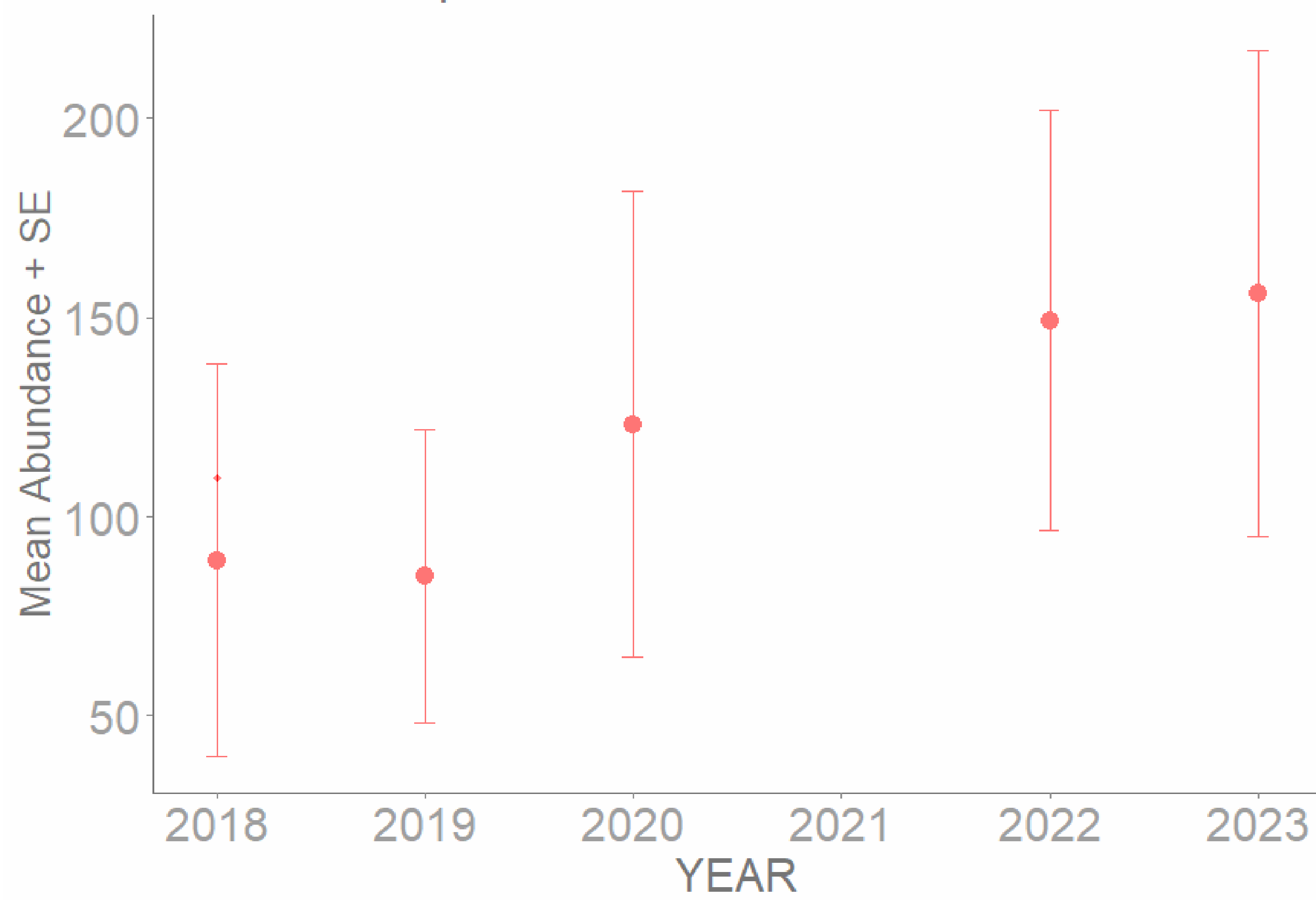
## RESULTS



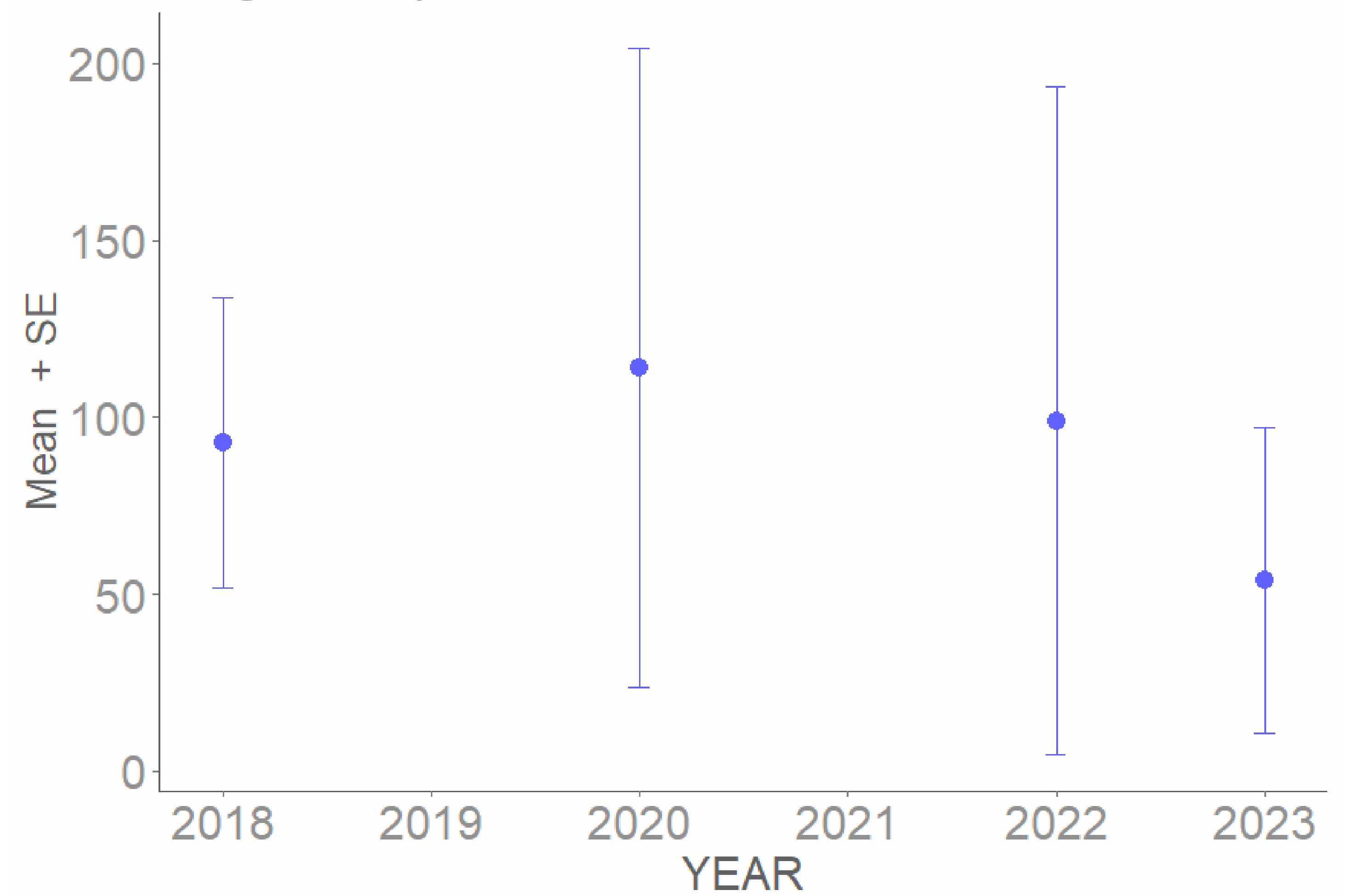
Examples of perception bias: Dolphins at different depths that cannot be seen from the boat bias in cluster size and  $g(0)$



### Bottlenose dolphin abundance



### Long-finned pilot whale abundance



**Population trends:** no clear trend in any of the two species due to low precision of the estimates

## DISCUSSION

**Use of AUVs and acoustic detections:** Cluster size was usually underestimated. Compared with AUV images, visual cluster size used to be 14% (range 0-50%) smaller. Clear standardised protocols for the use of AUVs are needed.

**Bottlenose dolphin:** The bottlenose dolphin population remained stable or increased over the five-year period, suggesting resilience to the prevailing environmental conditions and human activities.

**Long-finned pilot whale:** The results may suggest a decline, though lack of precision of the estimates prevents obtaining a clear result. Nonetheless, the results raise concerns and underscore the need for improved population estimates.

NOTE: It's important to consider that these trends, if they exist, might reflect changes in distribution rather than actual shifts in population abundance.

## ACKNOWLEDGEMENTS

This study, co-funded by the European Union in the project LIFE PortSounds (LIFE20 ENV/ES/000387). Surveys were conducted under permit from MITECO ref SGBTM/BDM/AUTSP/20/2022 and permit

## References:

Miller D.L., E. Rexstad, L. Thomas, L. Marshall and J.L. Laake. 2019. Distance Sampling in R. Journal of Statistical Software, 89(1), 1-28. [doi:10.18637/jss.v089.i01](https://doi.org/10.18637/jss.v089.i01)  
Icons: [www.freepik.es](https://www.freepik.es)