

# Cetacean Diversity in South-east Portugal: A review of 5 years of data collection in Faro, Algarve

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## Introduction

The coastal waters of Portugal are subject to intense human activity (e.g., fishing, shipping), posing threats to marine life [6]. Understanding cetacean abundance and distribution is key for conservation planning.

Faro area has a complex geomorphology, with a narrow continental shelf and steep slope descending quickly to the abyssal plain [5].

Despite being a popular dolphin-watching region, data on cetacean diversity in Algarve remain limited, as most tour operators are seasonal and do not collect scientific data.

This study aimed to assess live cetacean diversity and its seasonal variation in Eastern Algarve, based on boat-based surveys conducted in Faro region using two alpha diversity indices.

## Methodology

**Location:** Faro, Portugal.  
 36.735°N – 37.085°N  
 -8.091°W – -7.541°W  
 Area covered: ≈ 2 000 km<sup>2</sup>

**Data collection period:**  
 July 2019 to December 2024

**Survey Effort:**  
 1 643 surveys  
 29 602 nautical miles  
 178 924 minutes

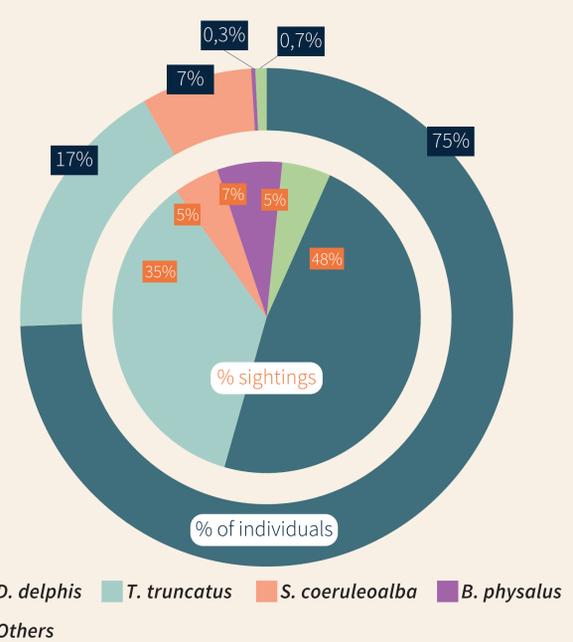
**15 cetaceans species**  
 2 430 sightings  
 117 732 individuals

**Biodiversity indices:**  
 Shannon-Wiener (H);  
 Simpson's (D);  
 Evenness (J)

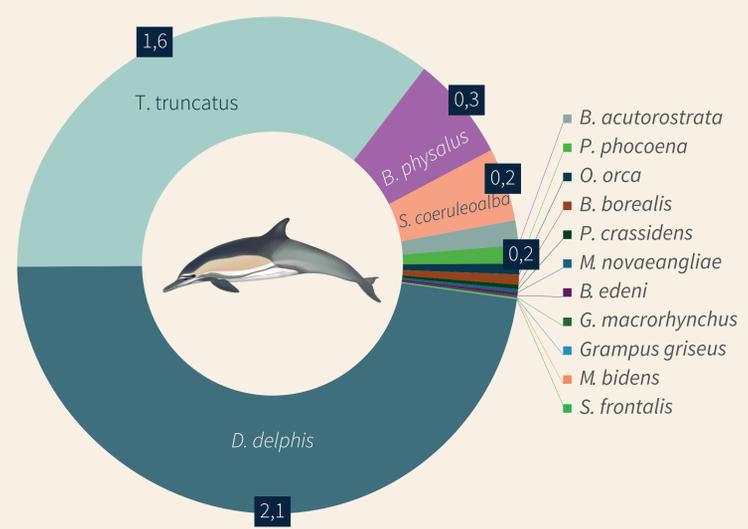
Data from all study period +  
 Data by season from all available years

**Spatial grid was generated in QGIS, covering the entire study area**  
 Divided into equal-sized cells 5/5km  
 For each grid cell, the same biodiversity indices were computed  
 Data from all available years

## Results



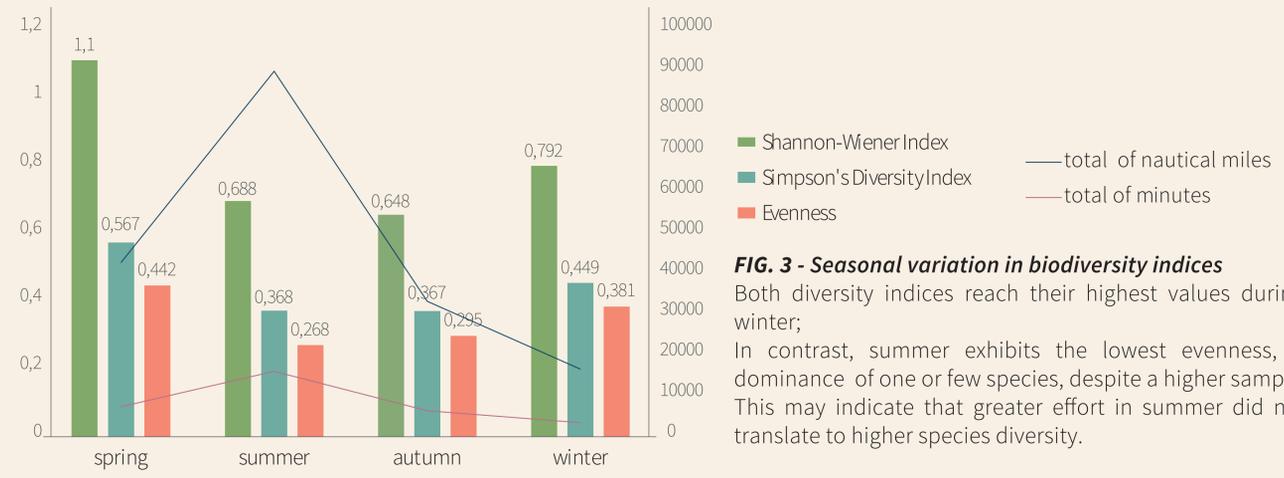
**FIG. 1 - Percentage of sightings vs Percentage of number of individuals.**  
 Four species accounted for the majority of sightings (*D. delphis*, *T. truncatus*, *S. coeruleoalba* and *B. physalus*).  
*D. delphis*, *T. truncatus* and *S. coeruleoalba* were particularly dominant in terms of number of individuals recorded.



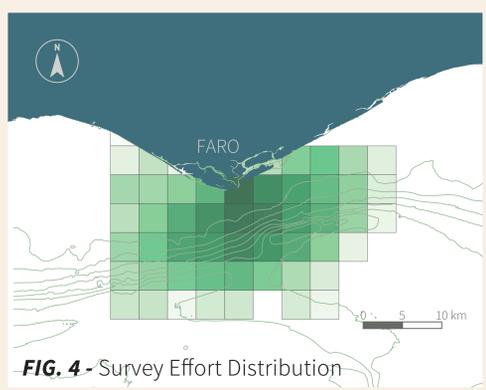
**FIG. 2 - Encounter rate per 100Km of survey effort for the study period.**

**TABLE 1 - Results of biodiversity indices for the study period**

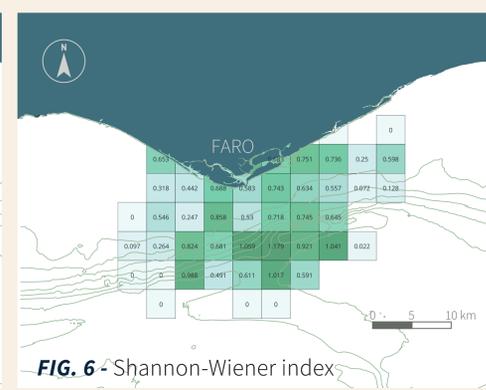
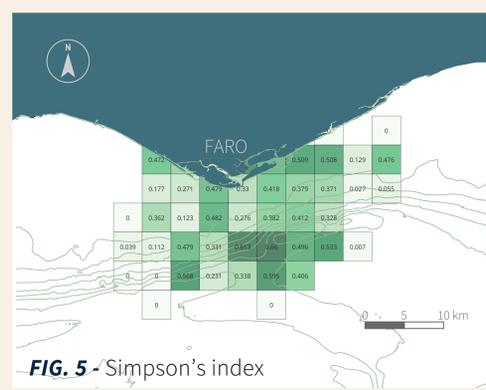
Simpson's Index	Shannon-Wiener Index	Evenness	Richness
0,41	0,78	0,29	15



**FIG. 3 - Seasonal variation in biodiversity indices**  
 Both diversity indices reach their highest values during spring and winter; In contrast, summer exhibits the lowest evenness, suggesting a dominance of one or few species, despite a higher sampling effort; This may indicate that greater effort in summer did not necessarily translate to higher species diversity.



**FIG. 4 to 6 - Spatial variation in cetacean biodiversity during the study period.**



The maps reveal a clear pattern of higher biodiversity approximately 10 km south of Faro, coinciding with the continental slope area. These zones showed elevated diversity values in both indices, suggesting the presence of a more heterogeneous cetacean community in this offshore sector.

## Discussion

**The highest diversity was recorded near the shelf edge, despite survey effort being concentrated in nearshore.**

- This supports findings that shelf breaks and slope regions are biodiversity hotspots for marine mammals [1][2].

**The encounter rate was relatively high, confirming the importance of this area for cetaceans [2].**

**Biodiversity indices were strongly influenced by seasonal productivity and habitat heterogeneity, with distance to the shelf edge a strong predictor of diversity [2] [3].**

- Seasonal upwellings and mesoscale features can also drive temporary aggregations, explaining higher diversity in spring and winter compared to summer, despite greater effort in summer [4].
- This discrepancy likely reflects seasonal shifts in habitat use or migratory behavior among less dominant species.

***D. delphis* and *T. truncatus*, dominated, accounting for over 83% of sightings and 93% of individuals, reducing community evenness and influencing diversity metrics.**

- Although other species such as *S. coeruleoalba* and *B. physalus* were recorded, *D. delphis* dominance matches patterns seen in other areas of the Northeast Atlantic [3].

The present study contributes to the growing body of knowledge regarding cetacean diversity along the South-eastern coast of Portugal, providing crucial insight into spatial and temporal variation in cetacean diversity, reinforcing the importance of slope habitats and seasonal monitoring that are critical for future conservation efforts.

## References:

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