
ELMS

The effect of season, annual variation and bathymetry on bottlenose dolphin *(Tursiops truncatus)* occurrence and abundance in Sussex, U.K. with the use of citizen science sightings data.

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INTRODUCTION

Research of bottlenose dolphins (*Tursiops truncatus*) visiting Sussex is limited. Anecdotal observations of the species have been recorded as far back as the 1900s. Understanding the spatial temporal patterns associated with species presence and abundance in Sussex is vital for their continued conservation. [1, 2a, 2b, 3] Studies have found that bottlenose dolphins demonstrate site fidelity during specific seasons[4,5], this is not conclusive for all sites within their global distribution.[6,7] Depth of water is an environmental variable that is recognised as a predictor of bottlenose dolphin presence in an area. [8, 9,10] Considered the least elusive species of cetacean makes them advantageous to be monitored as part of citizen science programmes. [1,12]

RESEARCH AIMS

The aim of this research was to develop a baseline understanding of what variables affect bottlenose dolphin occurrence in Sussex waters.

- Is the presence of bottlenose dolphins greater during a particular season?
- Have there been temporal changes in dolphin presence?
- Does depth of water influence the presence of the species?

METHODS

- Two citizen science datasets were obtained and organised ready for analysis and mapping.
- Sussex Dolphin Project (SDP) – sightings submitted through social media platforms with accompanying photo or video for verification.
- Sussex Biodiversity Records Centre (SxBRC) – verification through iRecord platform.
- Bathymetry data downloaded via digimap and each sighting assigned a sea depth.

RESULTS

- Annual total sightings differed between both datasets where years overlapped.

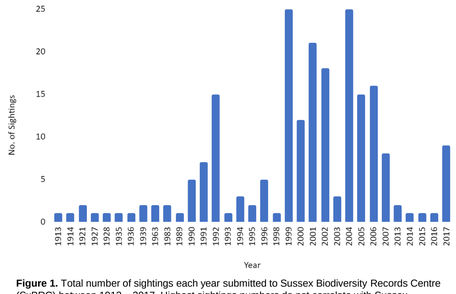

Figure 1. Total number of sightings each year submitted to Sussex Biodiversity Records Centre (SxBRC) between 1913 – 2017. Highest sightings numbers do not correlate with Sussex Dolphin Project and up to 2017

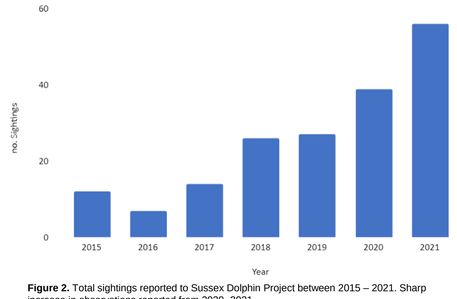

Figure 2. Total sightings reported to Sussex Dolphin Project between 2015 – 2021. Sharp increase in observations reported from 2020- 2021.

RESULTS (CONTINUED)

For both datasets presence peaked in the Summer season (June – August), SxBRC: ($F_{(4, 391)} = 11.4$ p=<.001) SDP: ($F_{(4,79)} = 13.03$ p=<.001). Total mean sea depth recorded for SDP was - 7.7m. The total mean sea depth recorded for SxBRC was -98.1m. Hotspot' locations were identified and comparable for both datasets.

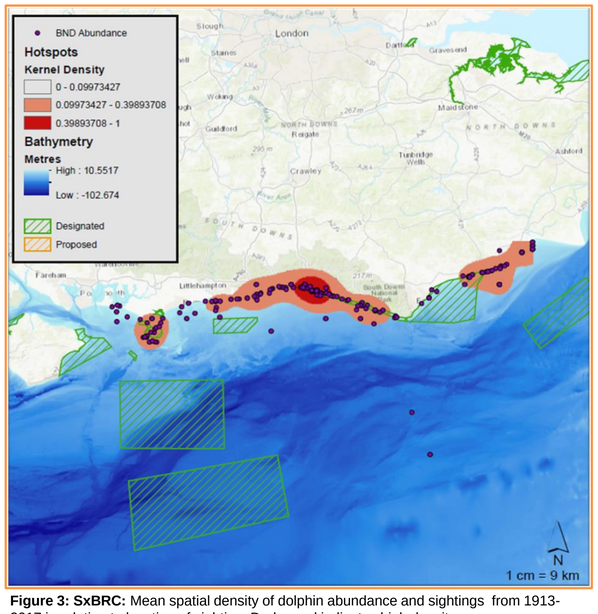

Figure 3: SxBRC: Mean spatial density of dolphin abundance and sightings from 1913-2017 in relation to location of sighting. Darker red indicates high density.

SxBRC: 'Hotspot' Outputs

- Identified hotspots located in Brighton and Hove.
- Designated MCZs overlap with 'hotspots' and high density of sightings and abundance.

SDP: 'Hotspot' Outputs

- Identified hotspots located in Brighton and Hove, Worthing and Selsey Point areas of Sussex.
- Dark red areas = High density.
- Designated MCZs overlap with 'hotspots' and high density of sightings and abundance.

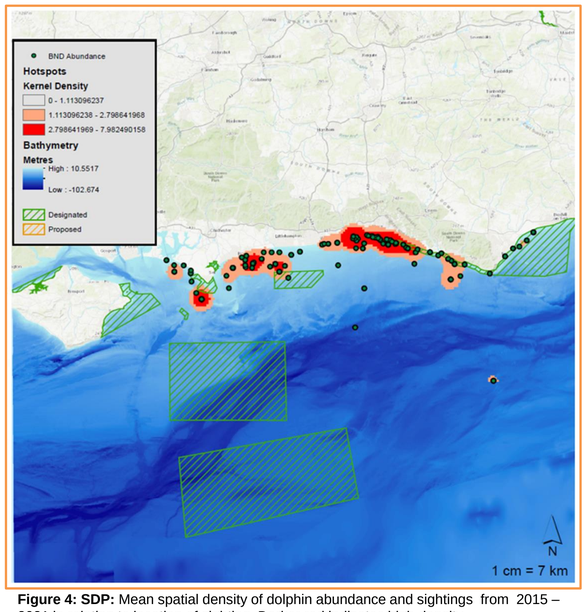

Figure 4: SDP: Mean spatial density of dolphin abundance and sightings from 2015 – 2021 in relation to location of sighting. Darker red indicates high density.

CONCLUSIONS

- Citizen science provides cost effective data collection, increased volume. [1, 3]
- Annual increase attributed to growth of Sussex Dolphin Project, as increased effort and possible effect of pandemic.
- Bathymetry was not found to be a significant variable - hotspots indicate that bottlenose dolphin sightings occurred in shallower waters. [5]
- Foraging behaviour in shallower waters during summer months increases sightings and is not solely correlated with high human population density at the hotspot locations. [11,12]

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