



HABITAT USE & EFFECTS OF BOAT TRAFFIC ON BOTTLENOSE DOLPHINS AT NEW QUAY HARBOUR, CARDIGAN BAY



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Introduction

New Quay harbour in West Wales is known to be a hotspot for the Cardigan Bay bottlenose dolphin population. Land-based surveys were used to monitor the species at this site since 2005. Here, we investigate the presence of dolphins in the harbour over the 6-year period in relation to boat traffic. In addition, animal behaviour at the site and their reactions to boat encounters were investigated.

Methods

Land-based surveys from New Quay pier were conducted during May-October from 0700-2100 h, or when suitable weather and light conditions allowed. Watches consisted of two hour shifts, each split into eight 15 minute scans.

Results

The presence of bottlenose dolphins (number of positive 15 minute scans) in the area has significantly increased ($\chi^2=734.1937$, $df=5$, $p<0.0001$) since 2005 reaching a peak in 2008 with dolphins present in 45% of scans. Presence of the species has remained relatively stable since then.

Boat traffic at the site has fluctuated between years, showing no clear trend.

There is no significant correlation between dolphin presence and numbers of boats (Mann Whitney U Test, $U=21150$, $p=0.7211$).

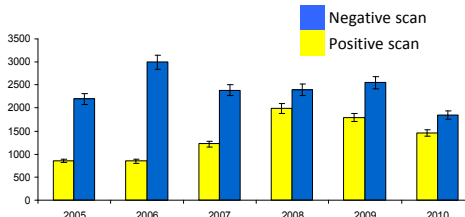


Figure 1: Numbers of positive (dolphins present) and negative 15 minute scan samples per year

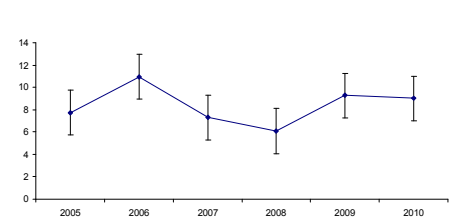


Figure 2: Number of boats present per hour

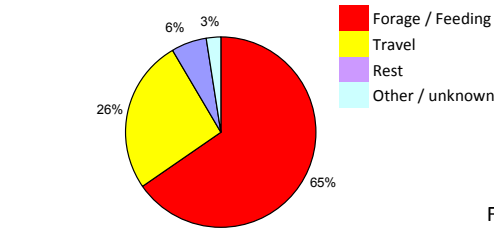


Figure 3: Behavioural budget

In total, 2977 boat encounters were recorded between 2005 and 2010. Of these, only 19% resulted in a change in dolphin behaviour. Within these encounters, reactions were divided into positive responses (dolphins approach vessel), negative (dolphins move away from vessel) and neutral (no change in behaviour). Other types of behaviour were not included in this analysis.

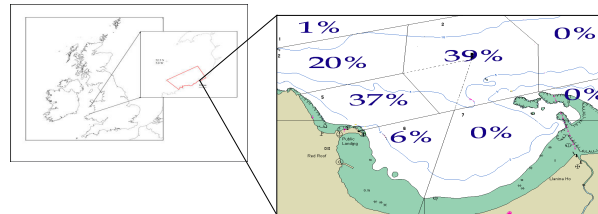


Figure 4: Distribution of sightings where animals were foraging or feeding within the sample site

Records of behaviour confirm that bottlenose dolphins visit the site primarily for feeding. There seems to be a preference to feed at certain sites within the area.



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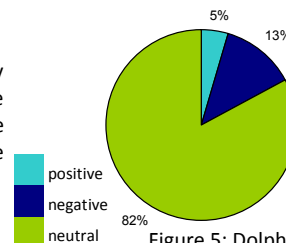
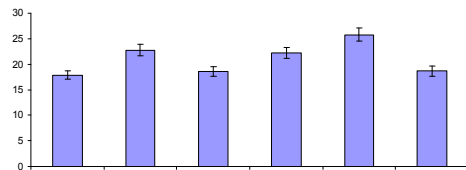
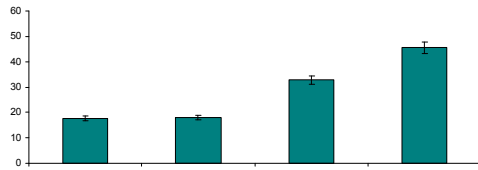


Figure 5: Dolphin responses to boat encounters

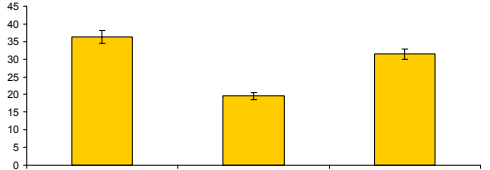
% encounters that resulted in a change in behaviour



Boat type: C, canoe; CF, commercial fishing boat; MB, motorboat; SAIL, sail boat; SB, speedboat; VPB, visitor passenger boat



Boat behaviour: Y1, no wake speed/no erratic change in course; Y2, slowed down gradually & stopped; N1, bow/wake speed, white-water visible; N2, Erratic course to approach



Dolphin activity preceding encounter

Figure 6: Percentage of boat encounters that results in a change in behaviour, in comparison with 3 variables: boat type, boat behaviour & dolphin activity

Boat type has a significant effect on dolphin reaction ($\chi^2=13.3840$, $df=5$, $p=0.02$). Reactions were greatest with speed boats and least with motor boats (mainly regular trip boats)

Boat behaviour significantly influences dolphin reaction ($\chi^2=89.5175$, $df=3$, $p<0.0001$). When boats do not approach erratically or slow down or stop there is little reaction. Changing course in an unpredictable manner leads to the greatest reactions.

Dolphin activity significantly affects reaction to vessels ($\chi^2=43.0646$, $df=2$, $p<0.0001$). Animals that are resting are most likely to be disturbed. Those foraging are the least likely to change their behaviour.

Conclusions

- Presence of bottlenose dolphins in New Quay harbour has increased since 2005 despite fluctuating levels of boat activity
- There is no correlation between levels of boat traffic and presence of dolphins
- Dolphins use the site primarily for feeding
- 19% of boat encounters resulted in a change in behaviour. Boat type, boat behaviour and dolphin activity significantly influence dolphin reactions to boat encounters.

These conclusions suggest that dolphins are relatively undisturbed by boat activity in New Quay harbour and continue to use the site as a feeding ground despite the high levels of traffic.

Acknowledgements

Many thanks to all the SWF volunteers & staff that took part in the data collection, and to Pia Anderwald for statistical advice.

