TRENDS OF ABUNDANCE OF BOTTLENOSE DOLPHINS AND HARBOUR PORPOISES IN THE CARDIGAN BAY SPECIAL AREA OF CONSERVATION, WALES (2001-2006)

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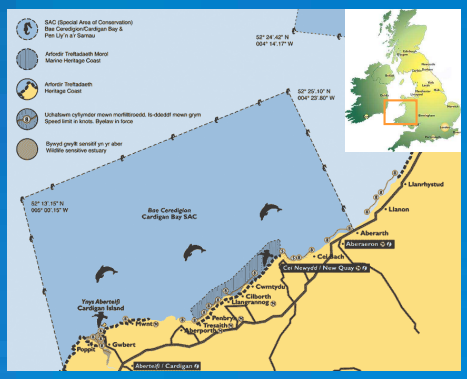

Fig.1. The Cardigan Bay SAC boundaries.

Years	2001	2003	2004	2005	2006	Total
# of LT/non LT trips	30/0	17/50	21/43	25/13	25/2	**118/108**
Km travelled LT mode	2180	665	696	1597	1163	**6301**
BND sightings in LT mode/non LT mode	109/29	160*/272	52/111	114/43	88/2	**523/457**
BND sightings used for DISTANCE anal.	109	21	15	45	30	**220**
HP sightings in LT mode/non LT mode	174/11	102*/50	94/39	144/45	133/4	**647/149**
HP sightings used for DISTANCE anal.	174	60	52	73	53	**412**

BND bottlenose dolphins; HP=harbour porpoises; LT=line transect
* Primary and independent observer sightings included

Table 1. Line-transect surveys effort and sightings during the study period

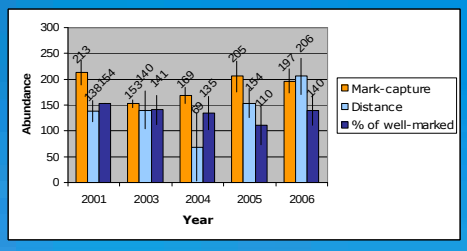

Fig. 2. Abundance estimates for bottlenose dolphins obtained using Mark-Capture, Distance, and the proportion of well-marked animals. The number of observations for 2004 Distance analysis was insufficient to give a reliable estimate and so was not considered for the statistic.

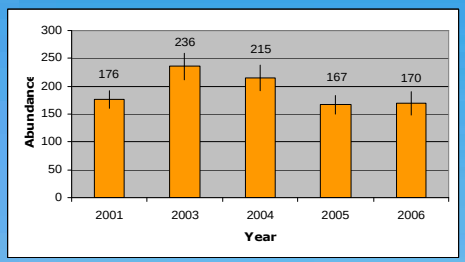

Fig. 3. Abundance estimates for harbour porpoises obtained using Distance.

INTRODUCTION

The Cardigan Bay Special Area of Conservation (SAC) was established in 2004, following the 1992 EU Habitats and Species Directive, in order to protect its bottlenose dolphin (*Tursiops truncatus*) population (Fig.1). The achievement of "favourable conservation status" for the species, the aim of the SAC, depends on reliable estimates of the number of dolphins in the region of concern. Since 2001, the Sea Watch Foundation has been running a monitoring programme within the SAC for both bottlenose dolphins and harbour porpoises (*Phocoena phocoena*).

MATERIALS AND METHODS

Our research was carried out in 2001 (when the study area was still a candidate SAC), and between 2003-06.

118 distance-sampling line-transect trips were undertaken following a double platform method (Buckland *et al.,* 2001), plus 108 non line-transect surveys for photo-identification purposes (Table 1).

Bottlenose dolphin and harbour porpoise sightings have been analyzed with the software DISTANCE. For bottlenose dolphins we also analysed photo-identification data using the MARK-CAPTURE programme and the Chao(mth) model for closed populations (Chao *et al*., 1992), and we calculated abundance based on the proportion of well-marked individuals per encounter (Felce *et al.,* 2006*)*.

A Kruskal-Wallis test was used to test for significant differences in population size between the years of study.

RESULTS

Fig. 2 shows the abundance estimates for bottlenose dolphins obtained with the three techniques for the study period; Fig. 3 shows the estimates for harbour porpoises derived with distance.

• No statistically significant trends for the two species were found;

• an increase was observed for bottlenose dolphins in the years 2005-06 from mark-recapture and distance techniques; harbour porpoise numbers showed an increase in 2003 and 2004 (though not statistically significant;

DISCUSSION

• The annual population size estimates, derived from the proportion of well-marked individuals per encounter, and the discovery rate for bottlenose dolphins (Fig. 4) suggest that an open population model might be more appropriate to describe the dynamics of this population, when analysed over more than one year.

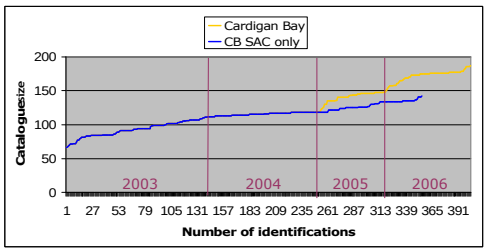

Fig. 4. Discovery rate for the SAC bottlenose dolphins (blue) and for the whole Cardigan Bay (excluding Pembrokeshire, orange). The curve starts from 66 because of the dolphins identified before 2003.

• The results suggest that our study area is probably quite small relative to the range of the population, which likely encompasses not only the West and North Welsh coasts but also other parts of the Irish Sea. Further research is needed to test this hypothesis.

• More years of data collection are needed to produce statistically significant abundance trends, if present.

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