East Anglia
Offshore Wind

VATTENFALL

SCOTTISHPOWER RENEWABLES

East Anglia THREE

Appendix 12.3

UK Seal Telemetry

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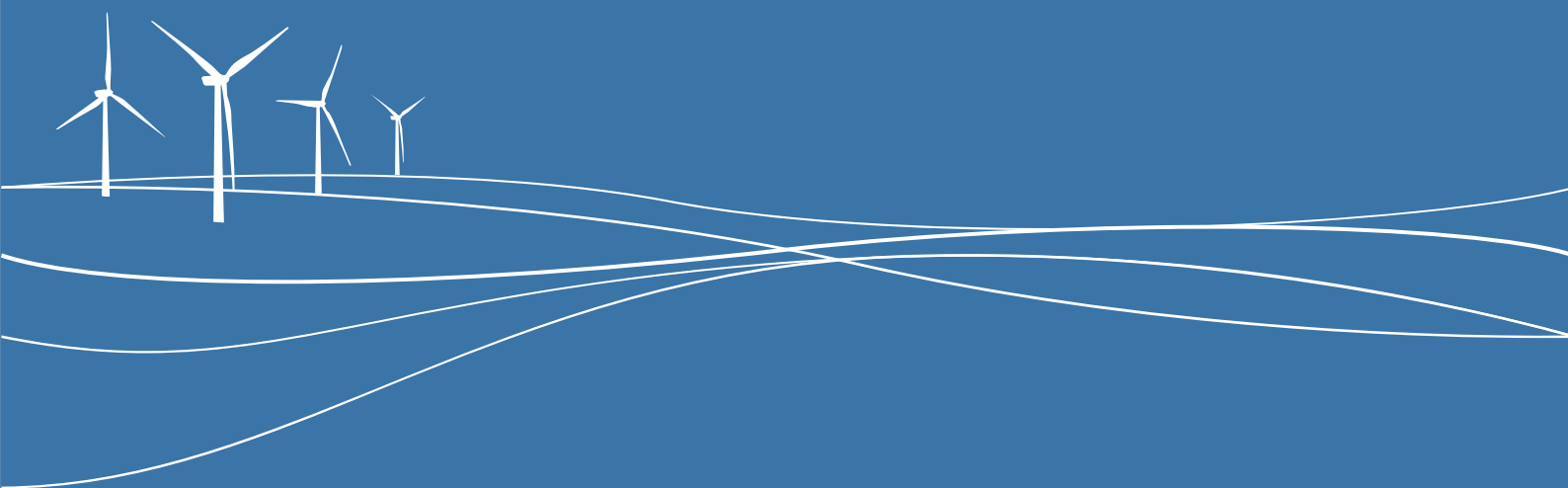

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12.3 UK SEAL TELEMETRY

12.3.1 Introduction

1. The aim of this study was to use existing seal telemetry data to quantify seal activity at the proposed East Anglia THREE Offshore Windfarm including a 20 kilometre (km) buffer around the site. The analysis provides a basic quantification of the level of connectivity in seal use between the area likely to be affected by wind farm construction and haulouts at designated Special Areas of Conservation (SACs) for seals.

12.3.2 Methods

12.3.2.1 Definition of areas for examining overlap

12.3.2.1.1 Wind farm boundary

2. For the purposes of this study, the boundaries of the areas of interest were supplied by Royal HaskoningDHV and consist of the proposed development East Anglia THREE plus a 20km buffer around the zone (see Figure 1).

12.3.2.2 Seal telemetry

3. The Sea Mammal Research Unit (SMRU) has deployed telemetry tags on grey seals (*Halichoerus grypus*) and harbour seals (*Phoca vitulina*) in the UK since 1988 and 2001, respectively. These tags transmit data on seal locations with the tag duration (number of days) varying between individual deployments. There are two types of telemetry tag which are associated with two types of data transmission. Data transmission can be through the Argos satellite system (Argos tags) or mobile phone network (phone tags). Both types of transmission result in location fixes, but data from phone tags comprise better quality and more frequent locations. All telemetry data used in this report have been cleaned according to SMRU protocol (Russell *et al.* 2011). Location data resulting from Argos tags were then corrected for positional error using a linear Gaussian state space Kalman filter (Royer & Lutcavage, 2008; Jones *et al*. 2011).

4. The telemetry database was queried to determine whether any seals had any degree of overlap with the East Anglia THREE and/or the 20km buffer zone (SMRU's tagging database of 265 grey seals and 292 harbour seals). Grey seals have been tagged at haul-outs at a total of three SAC's on the east coast of the UK with potential connectivity with the East Anglia THREE site (see Figure 1); the Berwickshire and North Northumberland Coast (Farnes Island haul out and breeding colony), the Humber Estuary (Donna Nook haul out and breeding colony), and the Isle of May (haul out and breeding colony). Grey seals have also been tagged within the Firth of

Tay and Eden Estuary SAC (Abertay haul out region) although this site is designated for its breeding population of harbour seals, large numbers of grey seals also haul out there.

5. Harbour seals have been tagged at two sites on the east coast of the UK with potential connectivity with the East Anglia THREE site: the Wash and North Norfolk SAC, and at the Firth of Tay and Eden Estuary SAC. Harbour seals have also been tagged in the Thames Estuary and due to the proximity of this site to the East Anglia THREE these were also included in the assessment (Figure 1).

6. No tagged seals from any deployments entered the East Anglia THREE and/or the 20km buffer zone. The tracks are presented below in relation to the site.

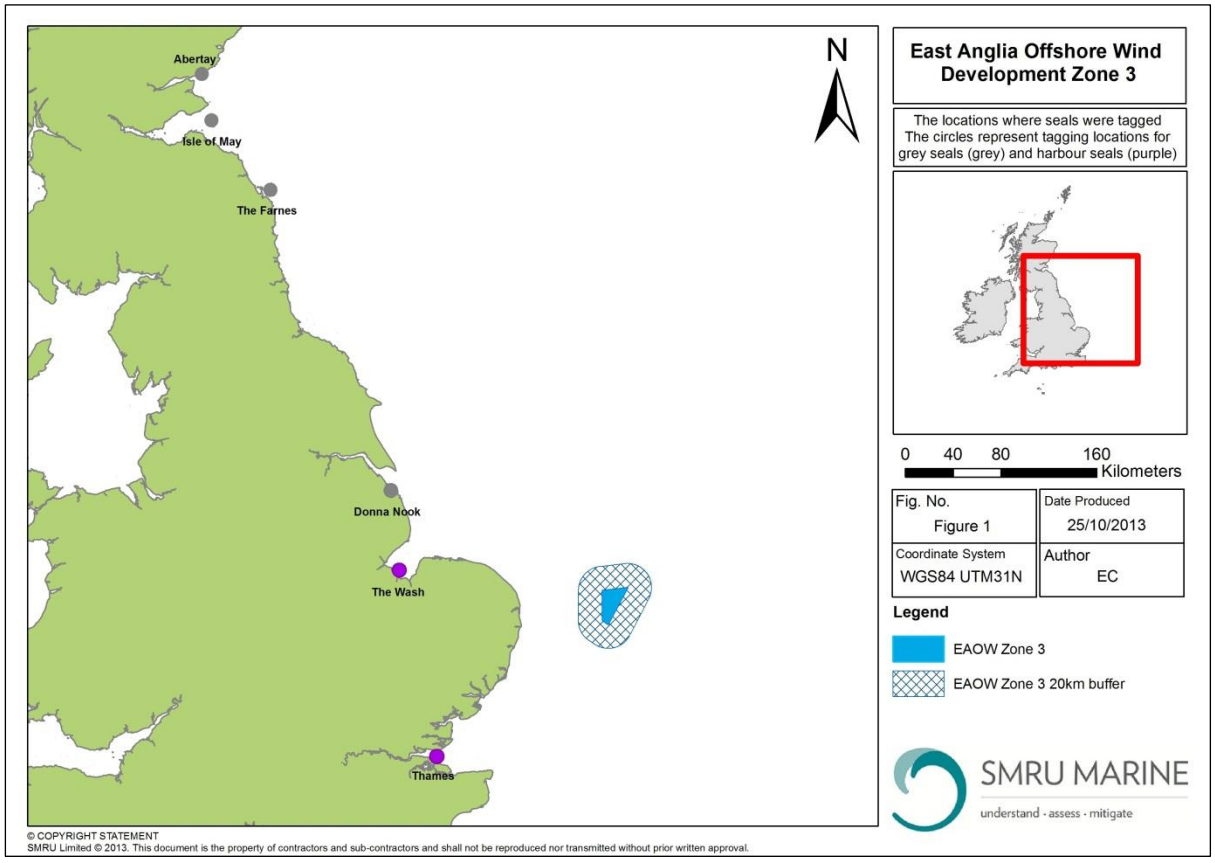


Figure 1 The locations where seals were tagged, by species (grey circle = grey seals, blue circle = harbour seals). The East Anglia THREE boundary plus 20km buffer is also shown.

12.3.3 Results

12.3.3.1 Grey Seals

12.3.3.1.1 Pups

7. A total of nine pups have been tagged (Argos) on the Farne Islands in 1993 (n = 5) and 1994 (n = 4). A total of 21 pups have been tagged (Argos) at the Isle of May in 2001 (n=11) and 2002 (n=10). None of these pups entered the East Anglia THREE plus buffer (Figure 2).

12.3.3.1.2 Adults

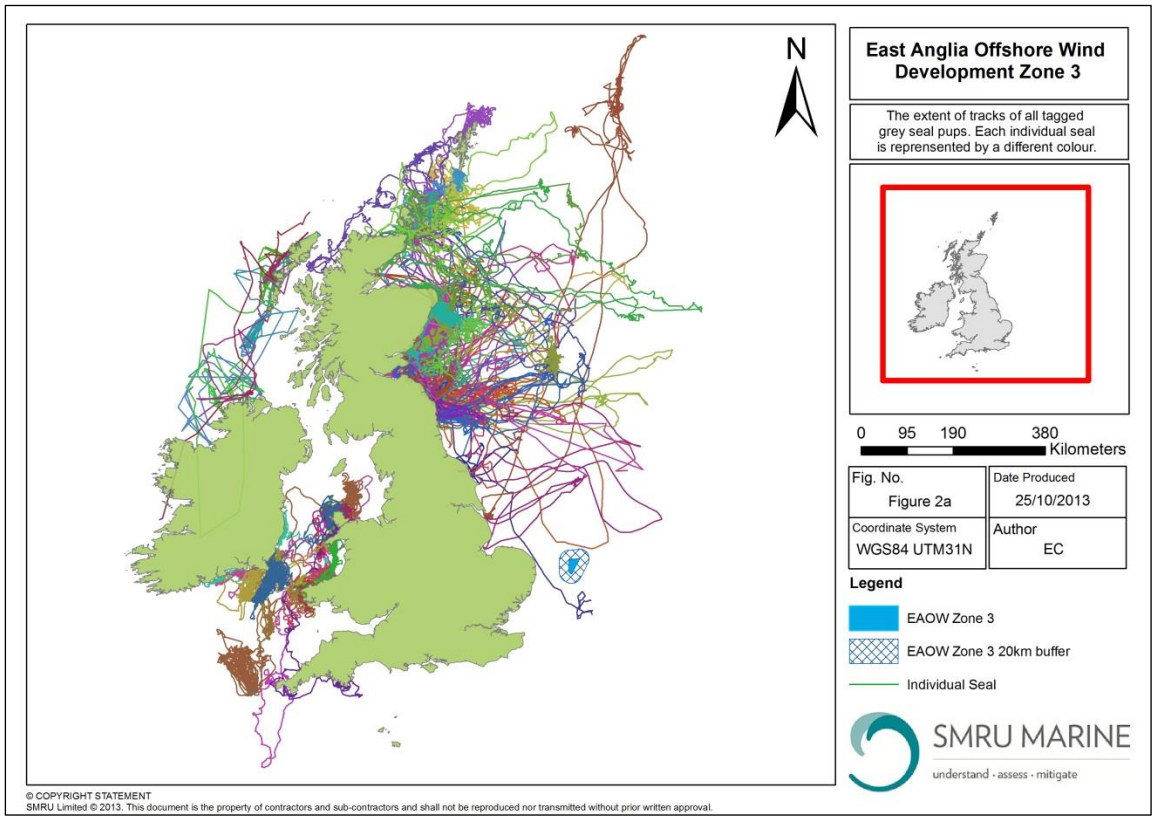
8. There have been 29 Argos tags deployed on grey seals aged one year and over on the Farne islands. These animals were tagged in 1991 (n = 6), 1992 (n = 7), 1997 (n = 2), 2000 (n = 4) and 2008 (n = 10).

9. There have been 12 grey seals, aged one and over, tagged (Argos) at Donna Nook. Most of these animals (n = 10) were tagged in 2005 with the remainder tagged in 1988 (n = 1) and 1989 (n = 1).

10. There have been 40 grey seals, aged one and over, tagged at Abertay (27 Argos tags and 13 GPS phone tags). Argos tagged animals were tagged in 1993 (n=2), 1997 (n=8), 1998 (n=10), 2001 (n=1), 2003 (n=4) and 2006 (n=1). GPS phone tag deployments took place in 2005 (n=3) and 2008 (n=10).

11. There have been 11 adult grey seals tagged (Argos) at the Isle of May SAC (grey seal breeding site), these animals were tagged in 1990 (n=3), 1996 (n=7) and 1997 (n=1).

12. None of the tagged grey seals aged one and over entered the East Anglia THREE plus buffer (Figure 3).



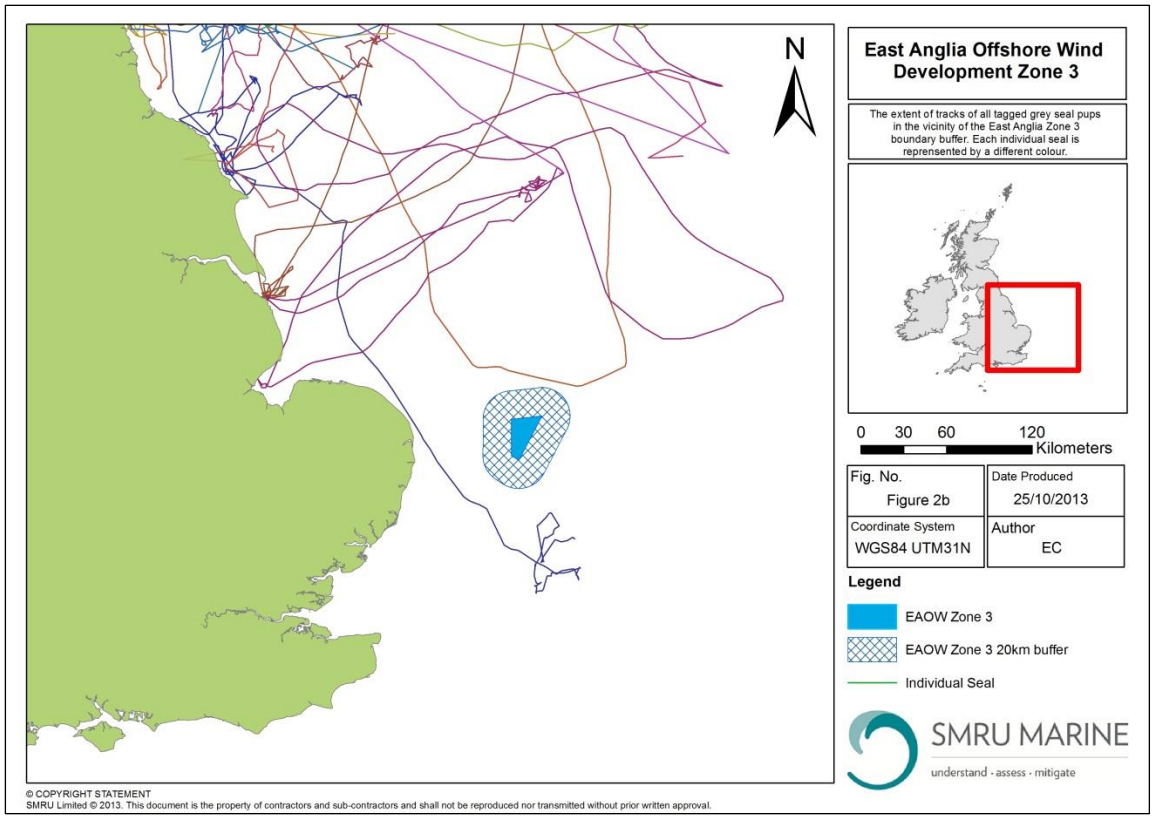
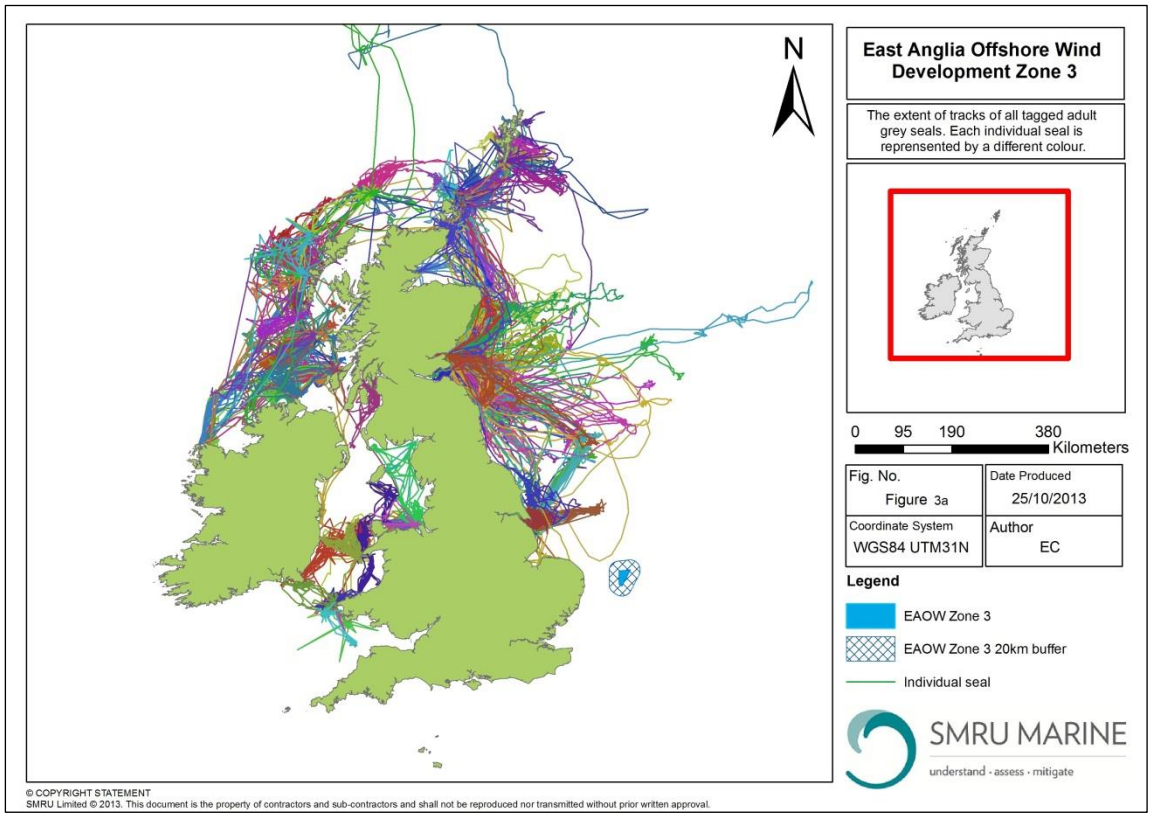


Figure 2 The tracks of all tagged grey seal pups. The figures show (a) the extent of all tracks in the SMRU database, regardless of tagging location, and (b) tracks in the vicinity of the East Anglia THREE plus buffer.



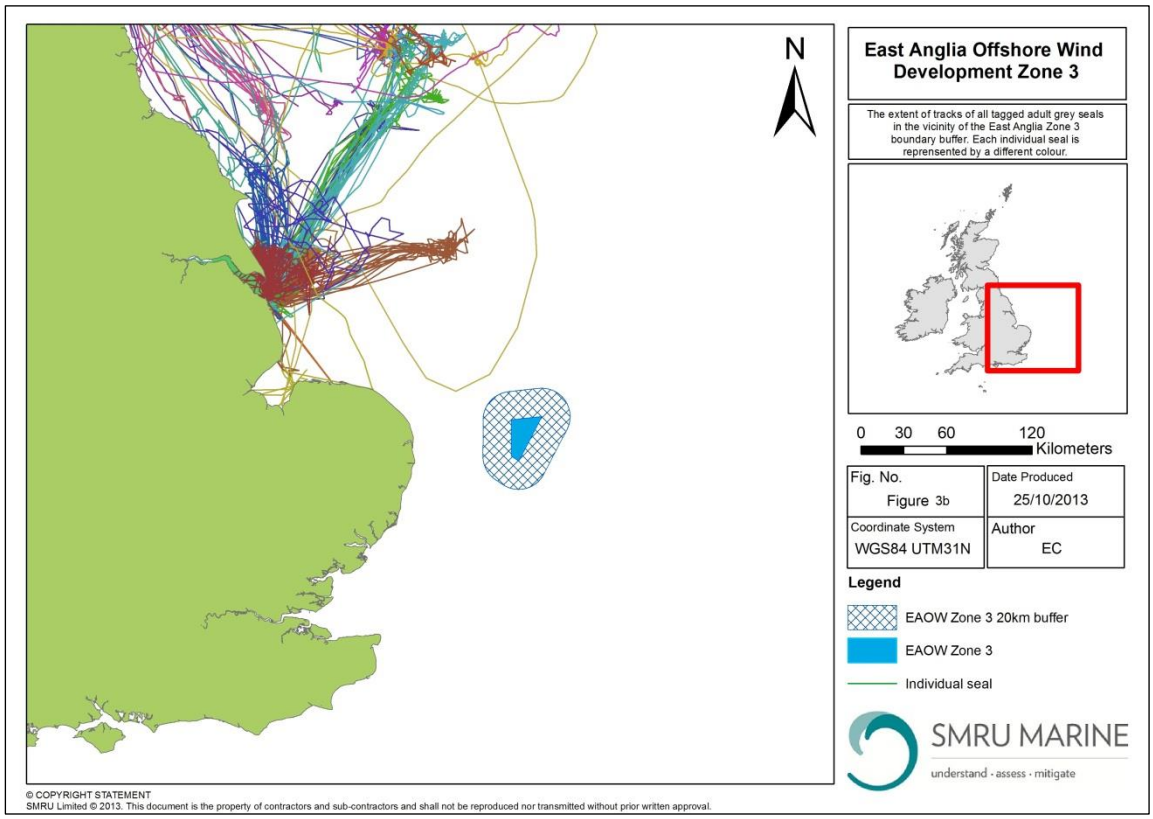


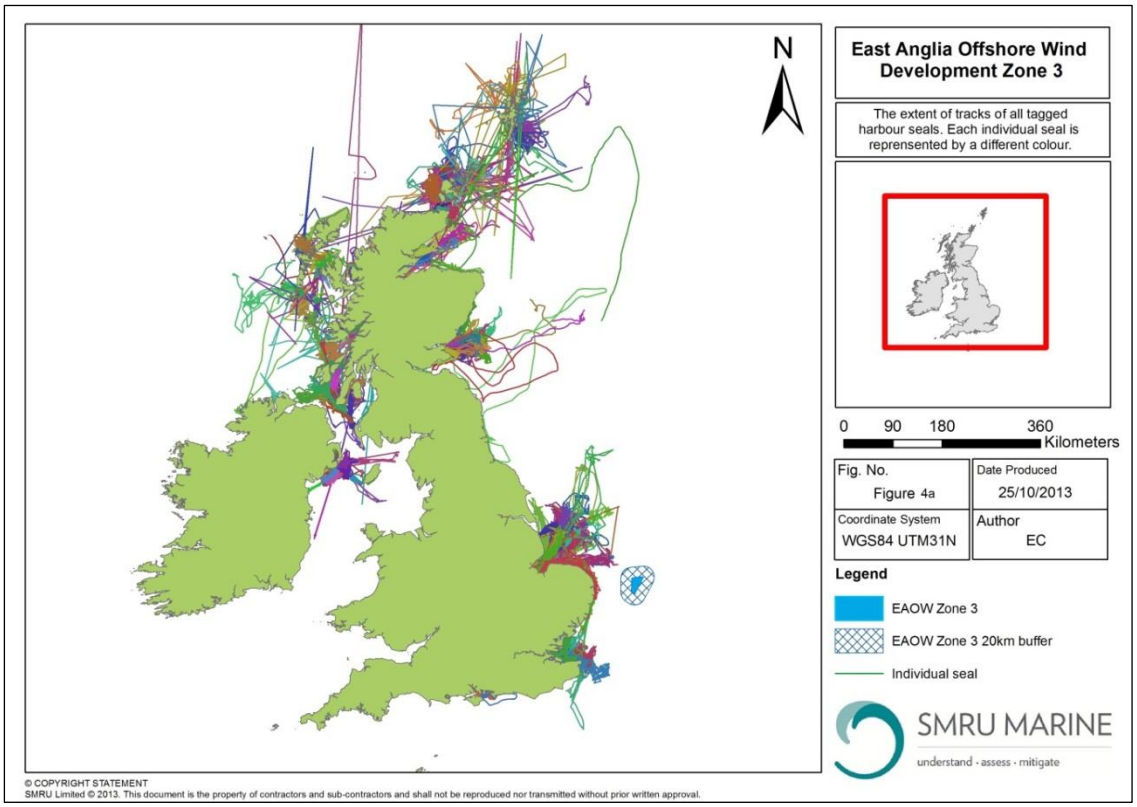
Figure 3 The tracks of all tagged adult grey seals. The figures show (a) the extent of all tracks in the SMRU database, regardless of tagging location, and (b) tracks in the vicinity of the East Anglia THREE plus buffer.

12.3.3.2 Harbour seals

13. There were 24 harbour seals, aged one year and above, tagged (Argos) in the Wash between 2003 and 2005.

14. There have been 19 harbour seals, aged one year and above tagged in the Thames Estuary (Margate Sands and Hadley Sands). Eight animals were tagged with Argos tags and one with a GPS tag in 2006 ; ten animals were tagged with GPS phone tags in 2012. Tag deployment in 2012 was commissioned by The *Zoological Society of London* (*ZSL*).

15. None of the tagged harbour seals aged one and over entered the East Anglia THREE plus buffer area (Figure 4).



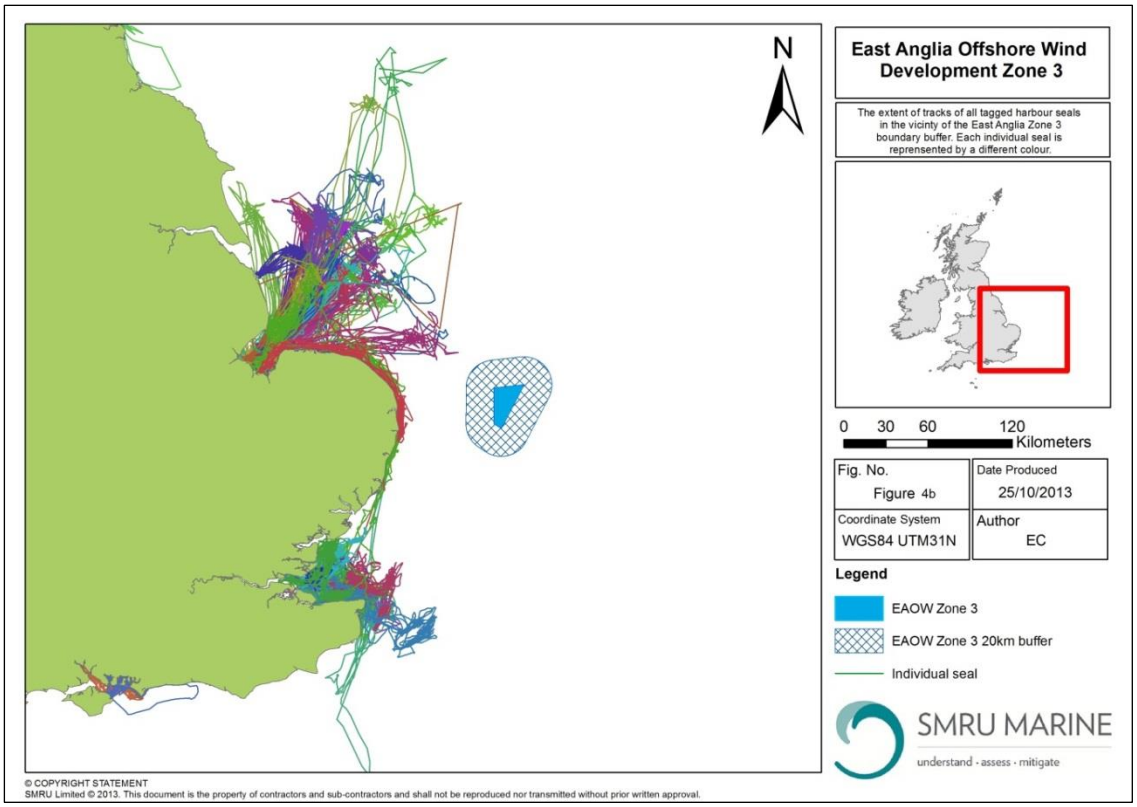


Figure 4 The tracks of all tagged adult harbour seals. The figures show (a) the extent of all tracks in the SMRU database, regardless of tagging location, and (b) tracks in the vicinity of the East Anglia THREE plus buffer.

12.3.4 Software

16. All data filtering and analyses were carried out using the statistical software R (R Development Core Team, 2008). A number of packages were used within R and are listed below. The maps were generated using ArcGIS 9.3.

12.3.5 Projection

17. All figures are in the projection Universal Transverse Mercator (UTM) - zone 31 North. Datum WGS 1984.

12.3.6 References

Jones E.L., McConnell B.J., Duck C., Morris C., Matthiopoulos, J. (2011). Special Committee on Seals (SCOS). Briefing paper.

R Development Core Team (2008). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0. http://www.R-project.org

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