Title	**Outer Thames Estuary Special Protection Area Fisheries appropriate assessment type assessment**
Author	M Coyle
Approver	M Coyle/ L Stockdale
Owner	M Coyle

Revision History

Date	Author	Version	Status	Reason	Approver(s)
18/06/2015	M Coyle	1	Draft	Initial draft	M Coyle
15/10/2015	M Coyle	2	Draft	Further draft	M Coyle
25/11/2015	E Young	5	Draft	Incorporation of NE comments	L Stockdale
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This document has been distributed for information and comment to:

Title	Name	Date sent	Comments received
V1	Natural England (NE)	10/07/15	05/08/15
V2	Eastern, and Kent and Essex Inshore Fisheries Conservation Authority (IFCA)	15/10/15	26/10/15
V3	Natural England	16/11/15	L Abram added comments and sent back to I Chudleigh
V4	Natural England	24/11/15	Sent back to M Coyle and contains M Duffy, R Caldow, I Chudleigh, L Abram and B Korda’s comments.
V5	Natural England	22/12/15	15/1/16 – I Chudleigh provided comments following telecom meeting held on 8 January 2016.
V7	Eastern IFCA	13/05/2016	31/05/2016
V7	Kent and Essex IFCA	13/05/2016	09/06/2016
V8	Natural England	10/06/2016	22/07/2016

Fisheries in EMS appropriate assessment type assessment for Amber and Green risk categories

European Marine Site:	Outer Thames Estuary Special Protection Area
Interest feature:	Red-throated diver (*Gavia stellata*) non-breeding population
Site sub-feature(s):	Supporting habitat (subtidal sand, coarse sediments and subtidal mixed sediments)

Fishing activities assessed:

Phase 1: Likely significant effect (LSE) type test

Feature: Red-throated diver (and supporting habitat)

Activities: Beam trawl (whitefish, shrimp, pulse/wing), otter trawl (heavy, light), multi-rig, pair trawl, demersal seines (anchor seine, Scottish/fly seine), towed, mid-water trawl (single, pair, industrial), dredge (scallop, mussels, clams, oysters), pump-scoop dredge (cockles, clams), suction dredge (cockles), pots/creels, cuttle pots, fish traps, nets (gill nets, trammel nets, entangling nets, drift nets, (demersal/pelagic)), longlines (pelagic and demersal), tractor dredge, handlines (rod/gurdy), jigging/trolling, purse seine, beach seines/ring nets, shrimp push nets, fyke and stakenets, commercial diving, manual gathering

Phase 2: Apropriate assessment type assessment

Feature: Red-throated diver (and supporting habitat)

Activities: Beam trawl (whitefish, shrimp, pulse/wing), otter trawl (heavy, light), multi-rig, pair trawl, demersal seines (anchor seine, Scottish/fly seine), towed, mid-water trawl (single, pair, industrial), dredge (scallop, mussels, clams, oysters), pump-scoop dredge (cockles, clams), suction dredge (cockles), pots/creels, cuttle pots, fish traps, nets (gill nets, trammel nets, entangling nets, drift nets, (demersal/pelagic)), longlines (pelagic and demersal)

Summary of what this assessment covers:

This assessment covers the interaction of identified fishing gears with red-throated diver and supporting habitat for the whole site (0 – 200 nautical miles (nm)).

1. Introduction

1.1 The need for this assessment

In 2012, the Department for Environment, Food and Rural Affairs (Defra) announced a revised approach to the management of commercial fisheries in European marine sites (EMS)[1]. The objective of this revised approach is to ensure that all existing and potential commercial fishing activities are managed in accordance with the provisions of Article 6 of the Habitats Directive[2].

This approach is being implemented using an evidence based, risk-prioritised, and phased basis.

To achieve this, the assessments will be carried out in a manner consistent with the principles of Article 6(3) of the Habitats Directive and will determine whether, in light of the sites conservation objectives, fishing activities are having an adverse effect on the integrity of the site. Where an adverse effect is ascertained, appropriate steps will be taken to avoid deterioration.

The Marine Management Organisation (MMO) is implementing the site-level assessment process in two phases (Appendix 1):

1. likely significant effect (LSE) type test (scale or magnitude of effect not likely/likely to be significant)
2. appropriate assessment (AA) type test (ascertaining whether the activity will cause an adverse effect on site integrity)

Where both LSE and AA type assessments have been carried out, this is known as a full habitats regulation assessment (HRA) type assessment.

This document includes an LSE type test and an AA type assessment. The LSE type test will assess whether use of the specified fishing gears is likely to have a significant effect on the red-throated diver (RTD) population and supporting habitats of the Outer Thames Estuary Special Protection Area (SPA). On the basis of this assessment, the AA type assessment will assess whether or not it can be concluded that the specified fishing activities will not have an adverse effect on the integrity of this SPA. MMO will lead on the assessment for the whole site, 0–200 nautical miles (nm), with input from Eastern and Kent and Essex Inshore Fisheries and Conservation Authorities (IFCA). Any required management measures inside 0-6nm, will be discussed with Kent and Essex and Eastern IFCAs to agree the most appropriate regulatory lead.

An in-combination assessment will be included to account for pressures from non-fishery related activities.

[1] www.gov.uk/government/uploads/system/uploads/attachment_data/file/345970/REVISED_APPROACH_Policy_and_Delivery.pdf
[2] Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora

1.2 Key documents reviewed to inform this assessment

- Risk assessment matrix of fishing activities and European habitat features and protected species[3]
- Site maps: sub-feature/feature location and extent
- Natural England SPA Toolkit
- Aerial bird surveys in the Outer Thames Estuary SPA undertaken in 2013
- Fishing activity data
- Natural England's conservation advice[4]
- DECC Record of the appropriate assessment undertaken for projects consented under Section 36 of the Electricity Act 1989 and Section 66 of the MaCAA 2009
- MMO Record of Appropriate Assessment for Proposed Aggregate Dredging Activity in the Outer Thames Estuary

2. Information about the Special Protection Area

- **Outer Thames Estuary Special Protection Area (SPA)**

2.1 Site Description

The Outer Thames Estuary has been classified by the UK Government as an SPA and the European Commission has been notified. The site now forms part of the Natura 2000 network. The Outer Thames Estuary SPA lies across both English territorial waters and UK offshore waters (see Figure 1).

2.2 Qualifying features and conservation objectives[5]

2.2.1 Qualifying features – designated under the Birds Directive[6]

Annex I species: Red-throated diver (*Gavia stellata*)

Natural England's formal advice states that the RTD is listed in Annex I to the Birds Directive and is assessed against stage 1(1) of the SPA selection guidelines (Stroud et al, 2001). The wintering population of RTD in Great Britain had previously been estimated to be 17,116 individuals (O'Brien et al, 2008), representing between 10-19% (depending on the areas included) of the north west Europe non-breeding population. The Great Britain population estimate was derived from shore-based observations together with more specific aerial surveys. Surveys from aeroplanes (and boats) have been responsible for identifying much larger numbers wintering in British coastal waters than previously known (O'Brien et al, 2008; APEM, 2013). The bulk of the UK distribution of RTD is located in east England, between Kent and North Yorkshire. This area is known to support 59% of the UK total estimate, whilst 44% of the UK total has been identified in the Greater Thames alone (O'Brien et al, 2008), with variable distribution between surveyed sites (APEM, 2011; 2013). Knowledge of RTD distribution in the UK was transformed during the 2000's following the advent of aerial and boat surveys for offshore development, particularly renewables development (e.g. Percival et al, 2004; O'Brien et al, 2008; APEM, 2013).

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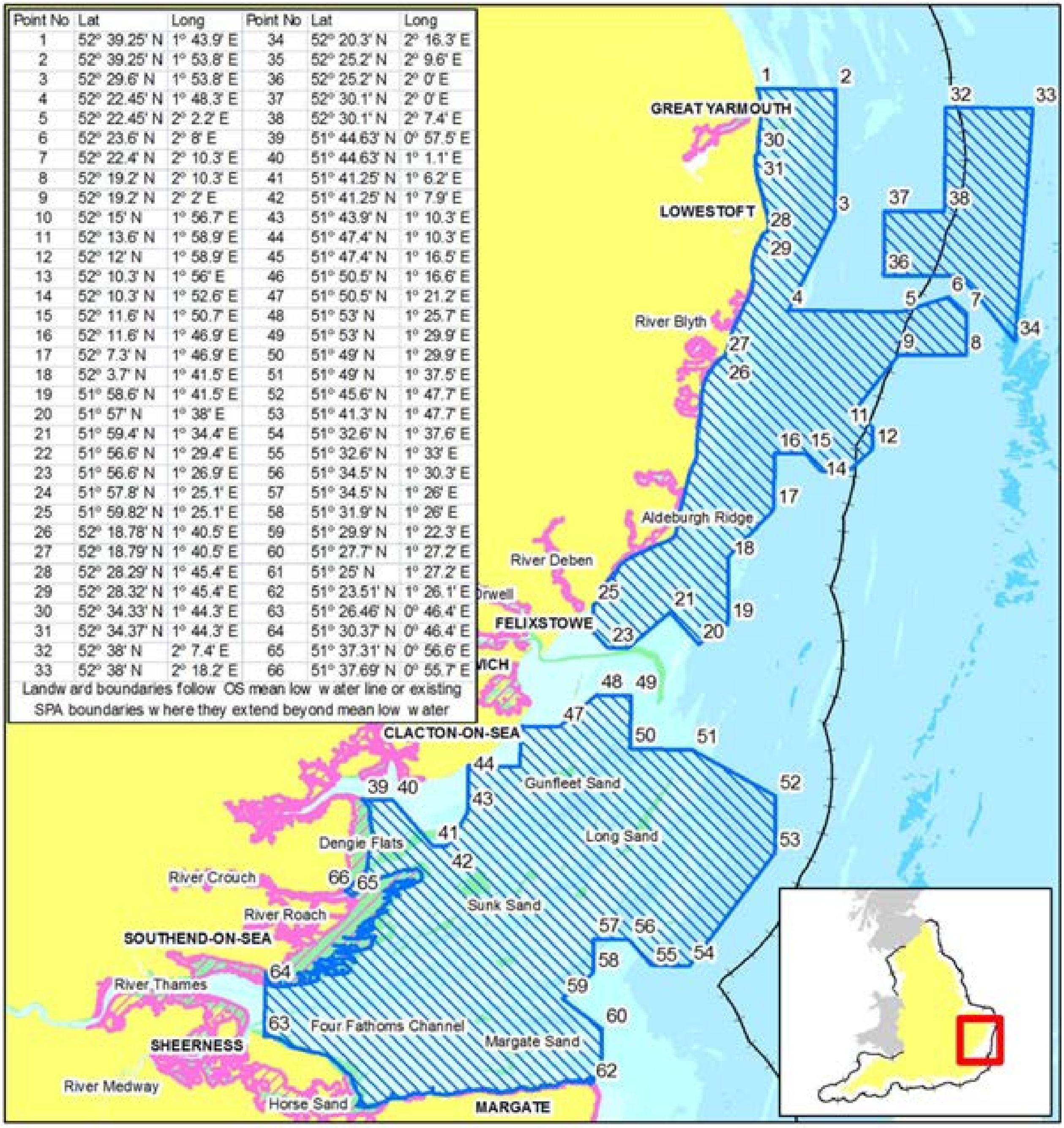
[3] www.gov.uk/government/publications/fisheries-in-european-marine-sites-matrix
[4] NE and JNCC formal site advice http://publications.naturalengland.org.uk/publication/3233957?category=3212324
[5] NE and JNCC formal site advice: http://publications.naturalengland.org.uk/publication/3233957
[6] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

In the UK, wintering RTD are associated with shallow inshore waters (between 0-20m deep and less frequently in depths of around 30m), often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov et al, 1995; Stone et al, 1995).

RTD use the Outer Thames Estuary SPA for overwintering in numbers of European importance (originally reported as 6,466 individuals, 38% of the GB population, 1989 – 2006/07). More recent aerial surveys were carried out in 2013 within the Outer Thames Estuary SPA with an estimated 13,605 individuals which represented 79% of the wintering Great British population (Goodship et al, 2015). Sightings between the two surveys indicated a migration of the individuals into the estuary within the site (Goodship et al, 2015). Divers were not evenly distributed across all areas, and high density patches were observed. The southern part of the site was found to be particularly heterogeneous. Several environmental and anthropogenic variables would explain the observations of RTD distributions, and these are considered in more detail below.

The RTD is considered to be an opportunistic feeder and dietary studies have revealed several different fish species are consumed depending upon the area studied, including members of the cod family, herring, gobies and sand eels (Guse et al, 2009 and references therein). The sandbanks of the Outer Thames Estuary support the nursery and feeding grounds for many fish species, including the small fish that RTD feed on.

Figure 1: Site Map of the Outer Thames Estuary SPA



Point No	Lat	Long	Point No	Lat	Long
1	52° 39.25' N	1° 43.9' E	34	52° 20.3' N	2° 16.3' E
2	52° 39.25' N	1° 53.8' E	35	52° 25.2' N	2° 9.6' E
3	52° 29.6' N	1° 53.8' E	36	52° 25.2' N	2° 0' E
4	52° 22.45' N	1° 48.3' E	37	52° 30.1' N	2° 0' E
5	52° 22.45' N	2° 2.2' E	38	52° 30.1' N	2° 7.4' E
6	52° 23.6' N	2° 8' E	39	51° 44.63' N	0° 57.5' E
7	52° 22.4' N	2° 10.3' E	40	51° 44.63' N	1° 1.1' E
8	52° 19.2' N	2° 10.3' E	41	51° 41.25' N	1° 6.2' E
9	52° 19.2' N	2° 2' E	42	51° 41.25' N	1° 7.9' E
10	52° 15' N	1° 56.7' E	43	51° 43.9' N	1° 10.3' E
11	52° 13.6' N	1° 58.9' E	44	51° 47.4' N	1° 10.3' E
12	52° 12' N	1° 58.9' E	45	51° 47.4' N	1° 16.5' E
13	52° 10.3' N	1° 56' E	46	51° 50.5' N	1° 16.6' E
14	52° 10.3' N	1° 52.6' E	47	51° 50.5' N	1° 21.2' E
15	52° 11.6' N	1° 50.7' E	48	51° 53' N	1° 25.7' E
16	52° 11.6' N	1° 46.9' E	49	51° 53' N	1° 29.9' E
17	52° 7.3' N	1° 46.9' E	50	51° 49' N	1° 29.9' E
18	52° 3.7' N	1° 41.5' E	51	51° 49' N	1° 37.5' E
19	51° 58.6' N	1° 41.5' E	52	51° 45.6' N	1° 47.7' E
20	51° 57' N	1° 38' E	53	51° 41.3' N	1° 47.7' E
21	51° 59.4' N	1° 34.4' E	54	51° 32.6' N	1° 37.6' E
22	51° 56.6' N	1° 29.4' E	55	51° 32.6' N	1° 33' E
23	51° 56.6' N	1° 26.9' E	56	51° 34.5' N	1° 30.3' E
24	51° 57.8' N	1° 25.1' E	57	51° 34.5' N	1° 26' E
25	51° 59.82' N	1° 25.1' E	58	51° 31.9' N	1° 26' E
26	52° 18.78' N	1° 40.5' E	59	51° 29.9' N	1° 22.3' E
27	52° 18.79' N	1° 40.5' E	60	51° 27.7' N	1° 27.2' E
28	52° 28.29' N	1° 45.4' E	61	51° 25' N	1° 27.2' E
29	52° 28.32' N	1° 45.4' E	62	51° 23.51' N	1° 26.1' E
30	52° 34.33' N	1° 44.3' E	63	51° 26.46' N	0° 46.4' E
31	52° 34.37' N	1° 44.3' E	64	51° 30.37' N	0° 46.4' E
32	52° 38' N	2° 7.4' E	65	51° 37.31' N	0° 56.6' E
33	52° 38' N	2° 18.2' E	66	51° 37.69' N	0° 55.7' E

Landw ard boundaries follow OS mean low w ater line or existing SPA boundaries w here they extend beyond mean low w ater

Special Protection Area (SPA)

Outer Thames Estuary SPA

- Outer Thames Estuary SPA boundary
- Special Protection Areas
- England 12nM Territorial Seas Limit
- Land

Depth Areas

- Drying
- <=10m
- <=20m
- <=50m
- <=100m

EU Site Code: UK9020309
Version number: 2.4
Longitude: 1° 32' 41" E
Latitude: 51° 54' 58" N
Projection: UTM 31N (WGS84)
Area of SPA: 3795.03 sq km 379502.61 ha
Theme ID: 1452174
Grid Ref: TM435297
Version: 2.4
Published: 30/04/2010
Plot ID: 4.5

Scale 1:750,000 Map 1 of 1

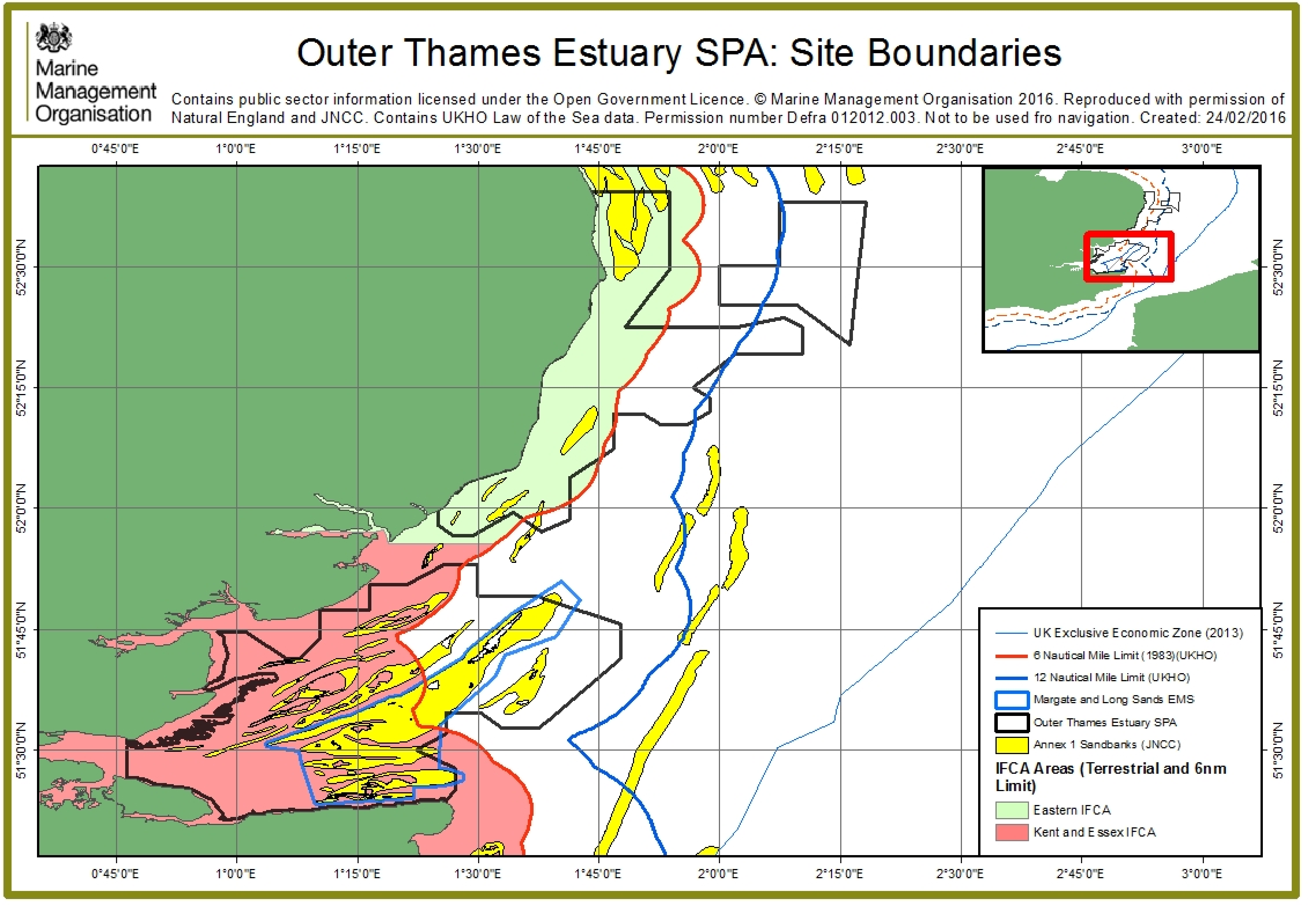
0 5 10 20 Kilometers

N

This product has been derived in part from material obtained from the UK Hydrographic Office (UKHO) with permission of the Controller of Her Majesty's Stationary Office and the UKHO.

NOT TO BE USED FOR NAVIGATION

Figure 2: Site Map of the Outer Thames Estuary SPA - including regulatory boundaries



2.2.2 Conservation objectives

The Outer Thames Estuary SPA provides protection to the internationally important population of the RTD (*Gavia stellata*). The conservation objectives for this species are as follows:

- Subject to natural change, maintain or enhance the RTD population (6,466 individuals) and its supporting habitats in favourable condition;

- Relevant habitats include shallow coastal waters and areas in the vicinity of sub-tidal sandbanks; and

- The interest feature RTD will be considered to be in favourable condition only when both of the following two conditions are met:

    - The size of the RTD population is at, or shows only non-significant fluctuation around the mean population at the time of designation of the SPA to account for natural change; and

    - The extent of the supporting habitat within the site is maintained.

2.3 Interest feature of the SPA categorised as 'Red' risk and overview of management measure(s) (if applicable)

No management measures where required as part of the revised approach to MPA management in 2013/14 however, there are measures in place which cover some parts of the Outer Thames Estuary SPA, these are detailed below:

- **0 – 6nm within Eastern IFC District[7] (See Figure 2):**

    - The Eastern IFCA byelaw 12: inshore trawling restriction of vessel size to 15.24m[8].
    - The Eastern IFCA byelaw 15: bivalve mollusc towed gear restriction of vessel size to 14m.
    - The Eastern IFCA byelaw 3: vessels targeting bivalve mollusc must also apply to IFCA for prior authorisation.

- **0 – 6nm within Kent and Essex IFC District[9] (See Figure 2):**

    - The Kent and Essex IFCA Vessel Size and Engine Power Byelaw prohibits fishing from vessels over 17m in length and restricts engine power to a max of 221kW (or for derated engines; 243kW before derating) for vessels using towed fishing gear.
    - The Kent and Essex IFCA Closure of Cockle Beds Byelaw currently prohibits the fishing for cockles outside the Thames Estuary cockle fishery order area (i.e. the southern part of the SPA).

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[7] Eastern IFCA byelaws: www.eastern ifca.gov.uk/index.php?option=com_content&view=article&id=83:byelaws&catid=23:regulations&Itemid=49
[8] This byelaw only applies in 0 - 3nm limit
[9] www.kentandessex-ifca.gov.uk/i-want-to-find-out-about/regulations/keifca-byelaws/

- The Kent and Essex IFCA Whelk Permit Byelaw restricts fishers to a pot limit of either 10 or 300 pots and requires permit holders to provide data on the intensity of whelk potting.
- The Kent and Essex IFCA ‘placing and use of fixed engines byelaw’ restricts net length, stating that 'no net or fleet of nets shall exceed 1000m in length', with vessels able to shoot up to 5000m of nets in separate locations.

- **0 – 12nm:**

  - The MMO and The Centre for Environment, Fisheries and Aquaculture Science (Cefas) manage the Thames Estuary and Blackwater Herring fishery, setting herring quota and minimum mesh size (54mm)[10].

- **12 – 200nm:** None currently occurring.

2.4 Fishing activities assessed

In the fisheries in European marine site Matrix[11], RTD have been interpreted to be “pursuit and plunge diving birds”. In comparing fishing activities against this sub-feature, many of the interactions are identified as being either green (the conservation objectives are highly unlikley to be affected by this activity alone) or blue (no feasible interaction between the activity and the specific feature).

The amber interactions are towed (pelagic), static and passive nets, and seine nets. However, all fishing activities have the potential to adversely effect RTDs through displacement. For information, we have detailed all possible fishing activites however, the assessment is focused on those fisheries of key significance (Table 2).

The scope of this assessment is also based on further advice contained with Natural England’s SPA toolkit which identifies potential pathways of harm to marine SPAs from fishing activities.

[10] www.gov.uk/government/uploads/system/uploads/attachment_data/file/459118/23con.pdf
[11] www.gov.uk/government/publications/fisheries-in-european-marine-sites-matrix

3. Phase 1: Likely significant effect (LSE) type test

Phase 1 of this assessment a coarse test of whether the use of specified gears is likely to cause a significant effect on the SPA[12].

For each fishing activity, a series of questions were asked[13]:

1. Does the activity take place, or is it likely to take place in the future?
2. What are the potential pressures exerted by the activity on the feature?
3. Are the effects/impacts of the pressures likely to be significant?

3.1 Activities not taking place

Table 1 shows activities which are excluded from further assessment as they do not take place and are not likely to take place in the future.

Table 1. Activities not taking place

Feature	Gear type	Justification
RTD	Bait dragging	Bait dragging does not place in the UK outside of Poole Harbour

3.2 Potential pressures exerted by the activites on the feature

For the remaining activities, potential pressures were identified using Natural England's draft conservation advice package and associated advice on operations tables.

The potential pressures identied were:

- Physical loss of the supporting habitat;
- Phyiscal damage of the supporting habitat;
- Non-physical disturbance of RTDs;
- Biological disturbance (selective extraction of prey);
- Biological disturbance (non-selective extraction of RTDs).

3.3 Significance of effects/impacts

To determine whether each potential effect or impact arising from the pressures identified is likely to be significant, the Natural England's advice on operations tables were used. Gears with similar potential pressures and effects/impacts were grouped for this section.

Table 2 shows the potential significance of the effects/impacts of identified pressures.

[12] Managing Natura 2000 sites: http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm
[13] The test for likely significant effect under article 6(3) of the Habitats Directive is not required for activities which are directly connected to or necessary to the management of the site. Fishing activities are considered to be not directly connected to or necessary to the management of the site unless otherwise indicated.

Table 2. Potential significance of effects/impacts of identified pressures

Potential pressures	Physical loss of the supporting habitat	Physical damage of the supporting habitat	Non-physical disturbance of RTD		Biological disturbance (selective extraction of prey)	Biological disturbance (non-selective extraction of RTD)
Potential effects of pressure	Loss of habitat extent	Reduction of prey items	Reduction in available habitat for foraging and displacement of birds from feeding or roosting grounds	Alteration of birds' behaviour and time/energy budgets as a result of reacting to disturbing stimuli	Reduction in prey availability/abundance	Mortality of birds
Trawls (Beam trawl (whitefish, shrimp, pulse/wing), Otter trawl (heavy, light), Multi-rig trawls, Pair trawls)	No LSE – not capable of causing habitat loss					No LSE – RTD actively avoid vessels
Demersal seines (Anchor seine, Scottish/fly seine)	No LSE – not capable of causing habitat loss					No LSE – RTD actively avoid vessels
Towed demersal/pelagic	No LSE – not capable of causing habitat loss					No LSE – RTD actively avoid vessels
Mid-water trawl (single, pair, industrial)	No LSE – no interaction with subtidal habitats					No LSE – RTD actively avoid vessels
Dredge (scallops, mussels, clams, oysters)	No LSE – not capable of causing habitat loss					No LSE – RTD actively avoid vessels
Pump scoop dredge (cockles, clams)	No LSE – not capable of					No LSE – RTD actively avoid

	causing habitat loss					vessels
Suction dredge (cockles)						No LSE – RTD actively avoid vessels
Tractor dredge	No LSE – no interaction with subtidal habitats					No LSE – RTD actively avoid vessels
Pots/creels (crustacea/gastropods)	No LSE – level of impact on mobile sediments from static gears is insignificant				No LSE – not prey items	No LSE – RTD actively avoid vessels and forage in water column therefore do not interact with set pots
Cuttle pots	No LSE – level of impact on mobile sediments from static gears is insignificant					No LSE – RTD actively avoid vessels and forage in water column therefore do not interact with set pots
Fish traps	No LSE – level of impact on mobile sediments from static gears is insignificant					No LSE – RTD actively avoid vessels and forage in water column therefore do not interact with set traps
Nets (Gill nets, trammel nets, entangling nets, drift nets (pelagic, demersal))	No LSE – level of impact on mobile sediments from static gears is insignificant					
Longlines (demersal)	No LSE – level of impact on mobile sediments from longlines is insignificant					

Longlines (pelagic)	No LSE – no interaction with subtidal habitats				
Handlines (rod/gurdy)	No LSE – no interaction with subtidal habitats				No LSE – RTD actively avoid vessels
Jigging/trolling	No LSE – no interaction with subtidal habitats				No LSE – RTD actively avoid vessels
Purse seine	No LSE – no interaction with subtidal habitats				
Beach seines/ring nets	No LSE – no interaction with subtidal habitats				
Shrimp push-nets	No LSE – no interaction with subtidal habitats			No LSE – does not occur in subtidal habitats	No LSE – RTD actively avoid human activities
Fyke and stakenets	No LSE – no interaction with subtidal habitats				No LSE – RTD actively avoid human activities
Commercial diving	No LSE – potential interaction with seabed but not sufficient to result in habitat loss			No LSE – scale of impact is insignificant	No LSE – RTD actively avoid vessels/human activities
Manual gathering (Handworking (access from vessel or land), crab tiling, digging with forks)	No LSE – no interaction with subtidal habitats			No LSE – does not occur in subtidal habitats	No LSE – RTD actively human activities

4. Appropriate assessment

4.1 Fishing activity within Outer Thames Estuary SPA

4.1.1 Fisheries access

The site including the proposed boundary extension lies across four regulatory fishery jurisdictions. These are the Eastern IFCA, Kent and Essex IFCA 0 – 6nm; MMO 6 – 12nm and Defra 12 – 200nm. UK vessels only can access areas between 0 and 6nm from the coast. Belgian (demersal species) and French (pelagic and demersal species) vessels have access rights between 6 - 12nm. The small section of the site lying offshore (beyond 12nm) is also fished by other Member States including the Netherlands, Denmark, and Germany.

4.1.2 Data sources

To determine the levels of fishing activity, the following data sources were used:

- Vessel monitoring system (VMS);
- Fisheries landings data;
- Fishermap data[14];
- Defra project MB0117: Understanding the distribution and trends in inshore fishing activities and the link to coastal communities[15];
- National Federation of Fishermen's Organisations (NFFO) project: Supporting risk-based fisheries assessments for MPAs - Assessment of Otter Trawling Activity in Margate and Long Sands Site of Community Importance (SCI)[16];
- Expert opinion (this consisted of NE regional teams, MMO, Kent and Essex and Eastern IFCA)

The fishing gears being considered in this assessment are beam trawl (whitefish, shrimp, pulse/wing), otter trawl (heavy, light), multi-rig, pair trawl, demersal seines (anchor seine, Scottish/fly seine), towed, mid-water trawl (single, pair, industrial), dredge (scallop, mussels, clams, oysters), pump-scoop dredge (cockles, clams), pots/creels, nets (gill nets, trammel nets, entangling nets, drift nets, (demersal/pelagic)), longlines (pelagic and demersal).

VMS data are available from 2005 for 15m and over vessels, and from 2015 for 12m and over vessels (see Appendix 1). The data used for this assessment are from 2009-2013, these represent 15m and over vessels only[17].

Landings data are recorded at an International Council for the Exploration of the Sea (ICES) rectangle[18] level. Outer Thames Estuary SPA sits within ICES rectangles **34F1, 34F2, 33F1, 33F2, 32F0, 32F1, 31F0 and 31F1.** The relevant ICES rectangles are shown in Figure 3.

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[14] Natural England 2012a
[15] Defra project MB0117: http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18126&FromSearch=Y&Publisher=1&SearchText=MB0117&SortString=ProjectCode&SortOrder=Asc&Paging=10
[16] http://www.abpmer.co.uk/media/1331/r2551c-mls-assessment_18dec15_final.pdf
[17] Standardised methods used to inform the EC and other Member States of offshore MPA measures stipulate the need to use 4 years worth of the most recent data. These assessments have taken the last 5 years. Due to the size of the areas being considered, this takes significant data processing, but is considered proportionate to understand risks.
[18] ICES statistical rectangles are part of a widely used grid system for North Eastern Atlantic waters. For more information see: www.ices.dk/marine-data/maps/Pages/ICES-statistical-rectangles.aspx

VMS data were used to estimate what proportion of fishing effort from within ICES rectangles **34F1, 34F2, 33F1, 33F2, 32F0, 32F1, 31F0 and 31F1** took place within the SPA. Landings data were then linked to vessel VMS activity to estimate what proportion of the landings recorded for these ICES rectangles were derived from within the site.

Confidence in VMS data in general is high, although in order to describe the low frequency of reporting, variable reporting rates, and the lack of information for vessels under 15m prior to 2015 can reduce confidence, particularly on small scales and in inshore sites.

Confidence for derived landings data set is medium at this site. Although confidence in the original data sources is high, the derived estimates are based on a number of underlying assumptions:

- Landings from all vessels were spatially attributed based on the patterns of fishing observed in vessels of 15m length or over. Therefore it was assumed that under 15m vessels show the same patterns of fishing as those 15m and over;
- Data processing takes account of variable reporting rates by using the time between reports to weight each individual report. However, it was assumed that each report (accounting for variable reporting rates) represents an equal amount of landings; and
- All reports under six knots were assumed to represent fishing activity, and no reports over six knots were assumed to be fishing.

In order to identify the potential gear activity from smaller vessels, Fishermap data were used as one of the tools to assess effort. The Fishermap project conducted interviews in 2012, with almost 1000 skippers of the under 15m fishing fleet, with the aim of mapping the activities of the commercial fishing fleet. Of those interviewed, 594 gave their permission for their data to be shared with third parties.

The data are presented as a year’s activity, collected from a series of monthly totals of vessel visits, per grid cell. Confidence for Fishermap data is low/medium for the following reasons:

- The data are self-reported estimates
- The number of skippers who allowed their data to be used represent just over one fifth of the number of licensed under 15m fishing vessels registered in England.

A project was commissioned by Defra in order to gain a better understanding of the inshore fishing fleet. Data were collected from the 10 IFCAs, Welsh Government and MMO in order to develop fishing sightings activity data covering 2010 – 2012 (measured as sightings per unit effort)[9]. Further work has been commissioned to extend years to 2014. Confidence in the data varies depending on surveillance effort. The data confidence within this area in particular is classed as moderate with small areas of low and high confidence.

The NFFO project to support risk-based assessments of disheries in MPAs, was undertaken by ABP Marine Environmental Research Ltd and Ichthys Marine Ecological Consulting Ltd on behalf of the NFFO. The project has developed and trialled methodologies which maximise the potential for evidence-based approaches to the assessment of fisheries in European marine sites. The data confidence used in the assessment of Otter Trawling Activity in Margate and Long Sands Site of Community Importance is detailed in Table 32 of the assessment.

Expert opinion from MMO coastal officers and IFCA officers has been incorporated into this assessment. This includes figures showing Eastern and Kent and Essex IFCA sightings data taken over six year periods.

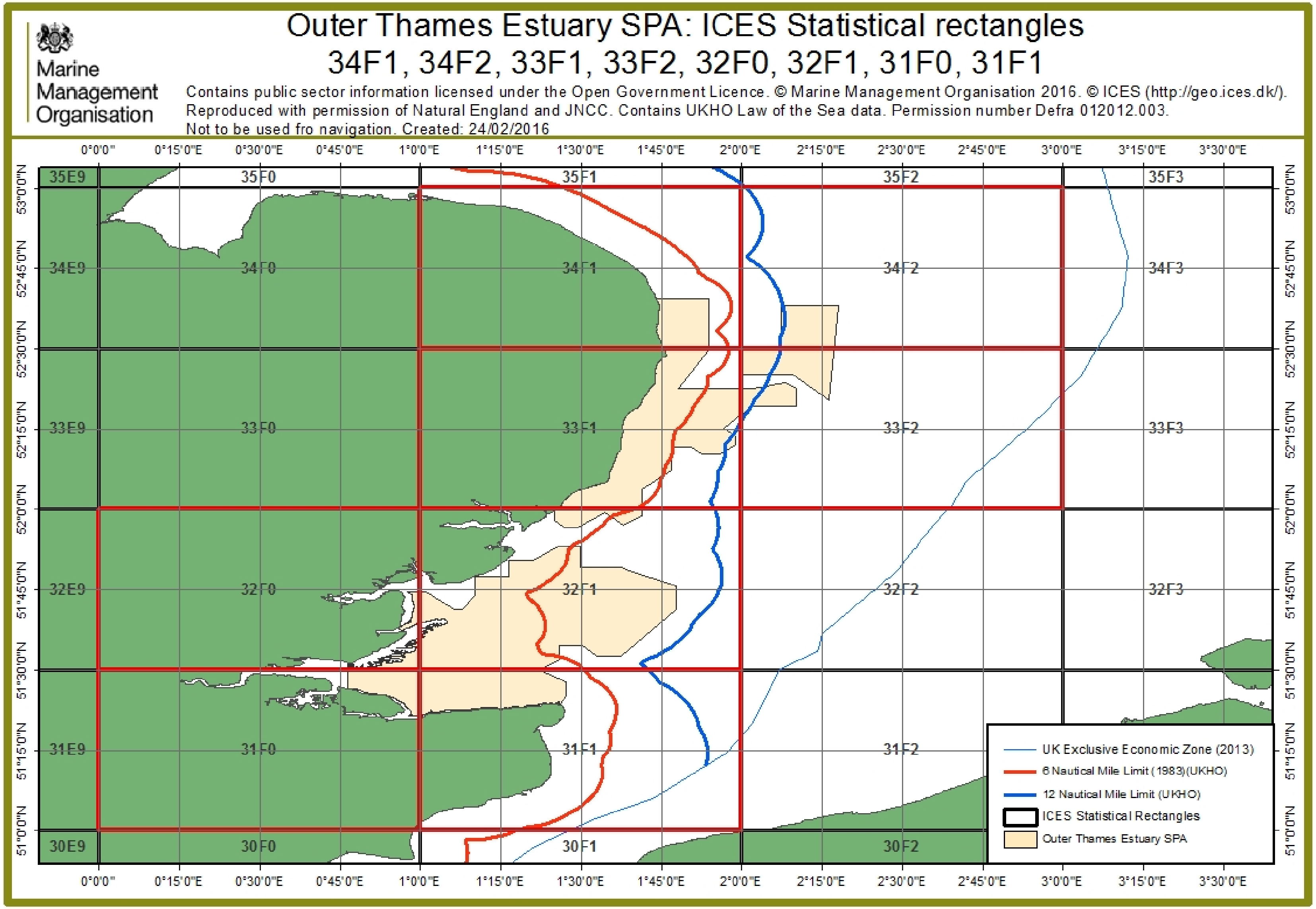
Table 3 provides a summary of the confidence associated with the various fishing activity data, which have been subject to an evidence quality assurance review following published procedures[19]. MMO has based its conclusions on the “weight of evidence” from assessing all of these sources of information.

Table 3. Summary of generic confidence associated with fishing activity evidence

Evidence source	Confidence	Description, strengths and limitation
VMS data	High / Moderate	• Confidence in VMS is high for describing activity relating to larger vessels (>15m). But VMS information was not developed specifically for management of MPAs, and does not describe activity in smaller vessels. • There are assumptions in the processing that speed of <6 knots is "fishing speed". • VMS records the location, date, time, speed and course of the a vessel. Fishing gear information has to be linked to the VMS data itself by either matching it's logbook information where possible, using the fleet register which may not be up to date or local marine officer knowledge of the said vessel.
Fishermap	Low	• The data is relatively dated. • A condition of the research was that only those interviewees who explicitly gave permission for their data to be shared would have their own mapping represented in the final product shared with third parties. This equated to approx 50% of responses.
Defra 2015 (MB0117)	Moderate	• Based on recent work to describe fishing activity, but is limited by raw data and other limitations highlighted in the report.
Expert judgement	Low / Moderate	• This depends on the area, and the knowledge of the area from MMO and IFCA staff.

[19] http://webarchive.nationalarchives.gov.uk/20140108121958/http:/www.marinemanagement.org.uk/evidence/documents/qa-evidenceprocess.pdf

Figure 3: ICES Statistical Rectangle Map 34F1, 34F2, 33F1, 33F2, 32F0, 32F1, 31F0 and 31F1



4.2 Fishing gears used in Outer Thames Estuary SPA and on supporting habitat (subfeature subtidal sand, subtidal coarse sediment and subtidal mixed sediments)

4.2.1 Types of fishing gear

The majority of the fishing activity within the site is suction dredging, although this is concentrated in a small, defined area of the site[20], and mobile demersal towed gears, potting and netting, which are distributed throughout the site[21]. These gears are described in more detail below.

4.2.1.1 Beam trawls

Beam trawl nets are kept open by a beam which varies in length from 4 – 12 m depending on the size of the vessel. Trawl heads support the beam and are fitted with sole plates which are constantly in touch with the seabed during fishing. Tickler chains or chain matrices are used depending on the ground; therefore the weight of the gear varies (Grieve et al, 2014). The main beam trawling fishery that occurs in this area is for shrimp *Crangon crangon*. The gear used tends to be lighter than other beam trawlers with light rollers and no tickler chains with a variety of single and twin beamed vessels.

4.2.1.2 Pair trawls

Pair trawls use two boats to tow one trawl. Each vessel only tows one warp, and it is the distance between the two boats which holds the net open, usually negating the need for otter boards. This allows vessels of moderate engine power to tow a comparatively large trawl (Grieve et al, 2014). The addition of a heavy wire sweep between the warps and bridles ensures good bottom contact, with the remainder of the gear set up very similar to that of an otter trawl.

4.2.1.3 Otter Trawls and multi-rig trawls

Demersal otter trawls feature a variety of designs and riggings depending on the nature of the ground to be fished and the target species (Grieve et al, 2014).

Otter trawl rigs consist of netting divided into wings, belly and cod-end. To the sides of the net wings, a pair of otter boards, or trawl doors, open the net horizontally and depress the trawl to the seabed (Grieve et al, 2014). They also stimulate the fish to swim into the path of the trawl, sometime through the creation of a sediment cloud. Cables known as bridles and sweeps connect the otter boards to the net wings and these can be from a few meters up to a few hundred meters long. The front of the trawl is framed on the top by a head line, which frequently has floats attached to keep the mouth of the net open, and a ground rope usually constructed of wire. The ground rope will often have associated ground gear attached to it to protect the net from damage and prevent entanglement with the bottom. Ground gear can vary from rock hoppers to bobbins of various dimensions. Tickler chains may also be attached to the net opening, and mechanically stimulate fish through contact with the bottom. When multiple otter trawls are towed side by side, this is know as a multi-rig trawl.

The ‘managing fisheries in MPA gear glossary’ defines heavy otter trawl gear as;

[20] EIFCA comms
[21] EIFCA comms

Any otter trawl that uses any of the following:
- sheet netting of greater than 4mm twine thickness;
- rockhoppers or discs of 200mm or above diameter;
- a chain for the foot/ground line (instead of wire);
- multiple tickler chains.

Light otter trawl is defined as a gear which is anything less than the definition of a heavy otter trawl.

4.2.1.4 Suction dredging (hydraulic dredges)

Hydraulic dredges use suction to bring burrowing bivalves (cockles, mussels) to the surface.

4.2.1.5 Pots

The main pots used in this area are parlour pots, used to target crabs, lobsters and whelks . An anchor is fixed to each end of a string of pots to ensure contact with the seabed. The back rope connects the pots (Grieve et al, 2014).

4.2.1.6 Nets: gillnets, entangling nets, demersal drift nets and trammel nets

These nets are set on the seabed by either weights or anchors and are generally heavier than those set on longlines. The gill net has a leadline in order to hold it on the seabed and is held vertical by a floatline. These nets are generally set up to 2 kilometres wide (Grieve et al, 2014); within the Kent and Essex IFC district the 'placing and use of fixed engines byelaw'[22], restricts net length, stating that 'no net or fleet of nets shall exceed 1000m in length', with vessels able to shoot up to 5000m of nets in separate locations. Trammel nets are similar to a gill net but are made up of three layers of netting. They are made up of two outer layers of large mesh with a sheet of fine small mesh sandwiched between them.

4.2.1.7 Demersal longlines

The mainlines of demersal longlines are attached to two buoys and can be up to a few miles long (Grieve et al, 2014). Attached to the mainline are anchors at each end and snood lines every few metres or so, with a baited hook.

4.3 Fishing activities within the Outer Thames Estuary SPA

4.3.1 VMS and Fisheries Landings Data

Fishing activities occur throughout the site. VMS data (see Figures 4 and 5) suggests that most activity from vessels >15m are beam and otter trawlers. The most active fishing is from UK, Dutch, and Belgium vessels.

UK >15m beam trawling is mostly occurring within the middle section of the site, and non-UK demersal >15m trawling mostly in the easternmost (offshore) section. Dutch and Belgium beam trawlers are the most active other Member State (OMS) fishing within the site; predominantly in the northern section of the site, targeting sole. There are occasional French trawlers in the area, and potting for whelks. Cockle dredging occurs inside 6nm and is limited to a defined part of the

[22] http://www.kentandessex-ifca.gov.uk/i-want-to-find-out-about/regulations/keifca-byelaws/byelaws-a/

Essex coast[23]. This fishery peaks in the southern portion of the site from April to June, outside of when the birds are present in the site.

UK vessels fishing in this northern area of the site predominantly land into ports: Grimsby, Boston, Kings Lynn and Wells-next-the-Sea and in the south are Leigh–on–Sea (24%), Ramsgate (16%), Scheveningen (10%), Folkstone, West Mersea and Whitstable (7%).

The majority of the estimated annual UK landings over five years (between 2009-2013) within the Outer Thames Estuary SPA are for molluscs (3,484t, £2.86m), demersal (1,503t, £4.92m), pelagic (661t, £0.18m) and crustaceans (156t, £0.67m) (annex 3). The majority of gear landings from the ICES rectangles were from harvesting machines, trawls, traps and nets. Harvesting machines (suction dredgers) landed an annual average of 2,266 tonnes (t) with a value of £2.03m, trawls landed 1,399t with a value of £3m, traps landed 814t with a value of £1m and nets 654t with a value of £1.82m.

Annual average landings, from VMS based estimate of annual activity in the site, for relevant species groups are:

- mollusc: 138.2t, £140,000
- demersal fish: 168.7t, £580,000
- pelagic: 41.9t, £10,000
- crustacean: 6.6t, £60,000

Landings data indicate that the majority of fishing effort within these ICES rectangles is from suction dredging and demersal trawls however these data relate to the whole of the ICES rectangles. VMS data indicate that this is not a true indication of the activity on site features therefore confidence in this data is low (Appendix 1).

[23] EIFCA comms

Figure 4: UK VMS all gears ping data (below 6 knots) 2013

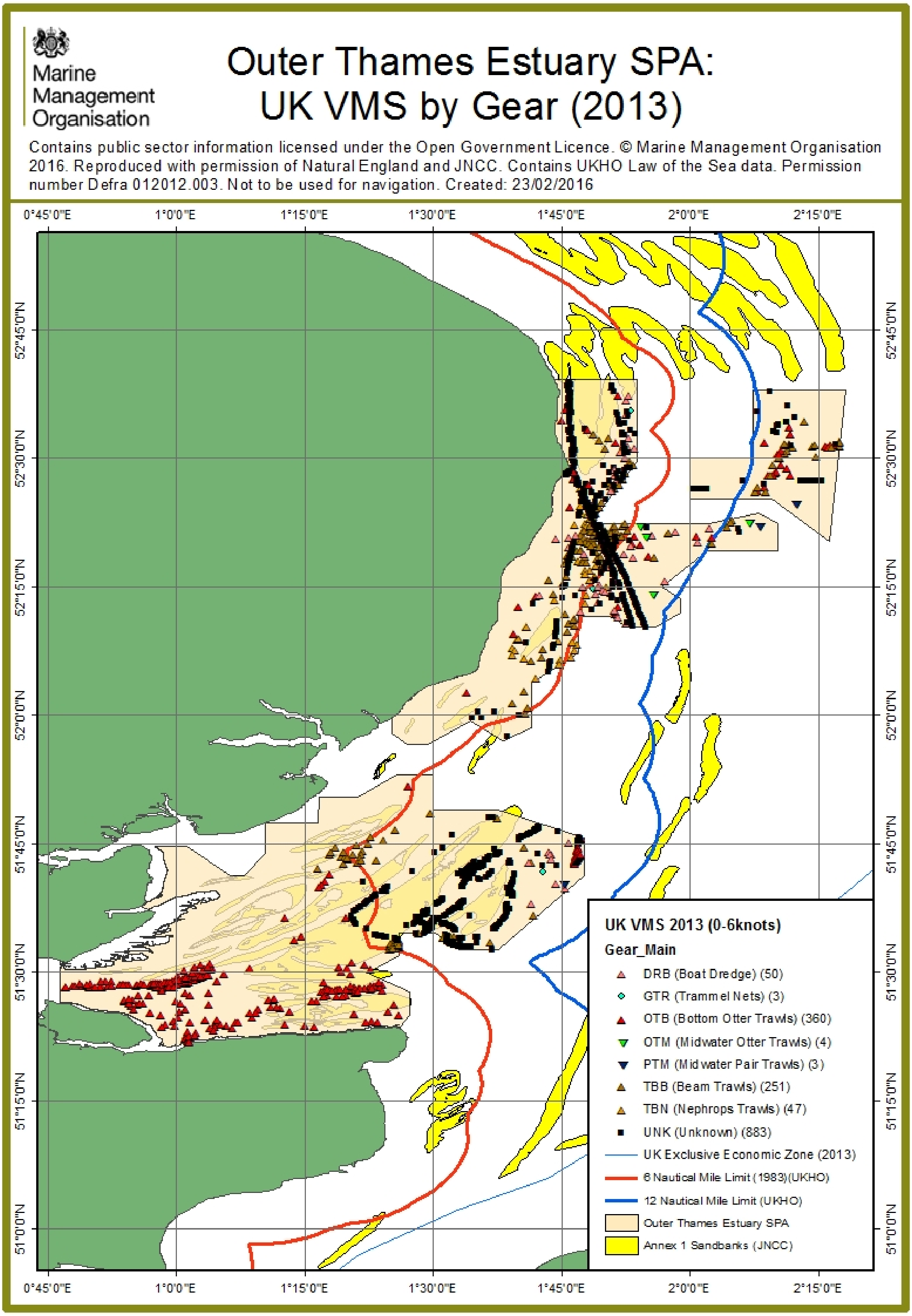
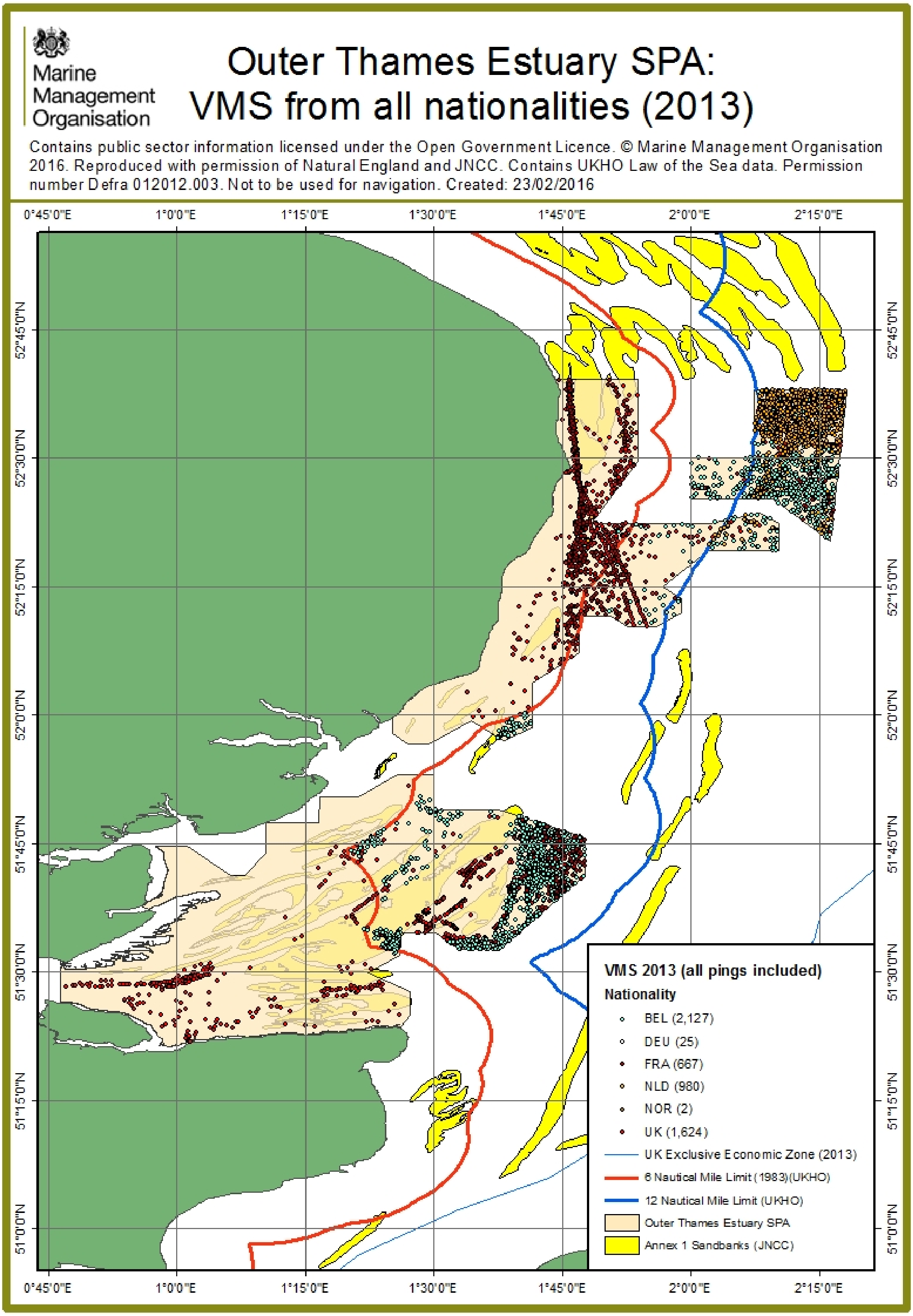


Figure 5: Other Member State (OMS) and UK VMS all gears ping data (below 6 knots) 2013



4.3.2 Fishermap

In order to identify the potential activity from smaller vessels, Fishermap data have been used as an additional tool to assess effort. The data are presented as a year's activity, collected from a series of monthly totals of vessel visits, per grid cell (Table 4).

Table 4: Number of fishing vessel visits per year over each of SPA areas by gear type[24]

SPA Area	Number of fishing vessel visits per year by gear type				
	Bottom towed	Dredges	Pots	Nets	Lines
Area 1 (outermost area)	11 - 40	0	11 - 40	0 - 100	101 – 150
Area 2 (Eastern IFC District)	11 - 150	0	0 - 80	11 - 200	71 – 200
Area 3 (Eastern and Kent and Essex IFC District)	0 - 80	0 - 20	0 - 20	0 - 90	0 -90

Fishermap data indicate that the majority of the non-VMS bottom towed gear activity (See Figure 6, Annex 1) operates in the northern inshore section within Eastern IFC District. Dredging (Figure 7, Annex 1) is mostly confined to the southern inshore section. Lining (Figure 8, Annex 1) predominantly occurs in the northern part of the site with netting and potting (Figure 9 and 10, Annex 1) being widespread with specific areas of increased potting effort.

4.3.3 MB0117: Understanding the distribution and trends in inshore fishing activities and the link to coastal communities

This project was commissioned by Defra in order to gain a better understanding of the inshore fishing fleet. Data were collected from the 10 IFCAs, Welsh Government and MMO in order to develop fishing sightings activity data covering 2010 – 2012 (measured as sightings per unit effort or SPUE). Further work has been commissioned to extend years to 2014.

SPUE calculated from a range of sightings data (See Figures 11 and 12, Annex 2) further confirms that the fishing activity occurs throughout the site with more effort occurring in specific patches especially in the offshore portion in the north and inshore within the channel. In this site confidence in these data is classed as moderate with high confidence within parts of the Kent and Essex IFC District (Vanstaen and Breen, 2014). SPUE was lower in the Eastern IFC District in comparison to the Kent and Essex IFC District.

4.3.4 NFFO Assessment of otter trawling activity in Margate and Long Sands EMS

[24] The number of visits are based on worst case scenario.

The NFFO assessment calculated biotope exposure to otter trawling using two methods:

- Vessels over 15m vessels, with VMS - swept area over each of the biotopes, seasonality of activity and footprint of gear components were all used to analysis the frequency of impact across the site;
- Vessels under 15m - swept area compared to the area of each biotope, and seasonality were considered. 12 interviews with skippers of this fleet gathered information on vessel size, gear, and levels of effort, including distribution and intensity of fishing activity within the site. This was used to analyse swept area on individual biotopes, and scaled up to reflect the whole under-15m fleet.

This assessment covers only a proportion of the Outer Thames Estuary SPA, however, consultations of this assessment, including how VMS analysis indicates that large parts of the site are not fished at all, and that there are small areas where fishing activity appears to be more concentrated are consistent with the finding of the MMO. For the under 15m fleet, the NFFO report supports the Kent and Essex IFCA sightings data, when compared to the Marine Conservation Zone (MCZ) fisheries model, with a portion of the sight seemingly used more than other parts falling in 0-6nm limit.

4.3.5 Expert opinion

Expert opinion from MMO, Eastern and Kent and Essex IFCA officers has also been incorporated into this assessment.

Trawling occurs within Eastern IFC District. The main fishery is shrimp otter trawling (light and heavy) and one vessel beam trawls inshore (Figure 13, Annex 2). The activity patterns correspond with those seen in the Fishermap charts (Figure 6, Annex 1).

Potting by inshore vessels (<10m) occurs off the coast of Suffolk (from Felixstowe northwards to Great Yarmouth) within the 6nm limit. From data available from the Eastern IFC District, between 2009-2014 there were 30 records in the site, with 21 unique vessels active between 2009 and 2014. The highest number of annual sightings was 11 in 2009, with a mean of six sightings between 2009 and 2013. No vessels were recorded in any year during January, June, July or December, with the most active months March and September. The smallest vessel recorded was 7m, the largest 11.6m and the mean 9.2m.

Netting and lining occurs throughout the year targeting cod, sole and skates but this fishery is highly weather dependant.

Kent and Essex IFCA sightings data (Figure 14, Annex 2). indicates that fishing activity is varied and is mainly closer to shore within their district and within the channels; however, it should be noted that the boat patrols are limited by weather and tides and therefore surveillance sightings are not a comprehensive picture of all fishing activity within the site, as indicatcated in the confidence assessment of this data. Again, this information also aligns with that presented from Fishermap charts.

4.4 Assessment of risk from fishing gears

The following assessment considers the sensitivities and exposure of the features to those fishing pressures identified in Table 2. The assessment considers impacts alone, and in-combination with other activities.

4.4.1 Physical loss (alone)

Natural England advises that loss of supporting habitat (such as sandbanks) by removal or smothering, may result in the loss of foraging sites and therefore the reduction of the food resource for the overwintering population. Thus the overwintering population is considered to be highly sensitive to physical removal of habitat and moderately sensitive to smothering.

The main pressure from towed fishing activity within the site to physical loss is from suction dredging. Suction dredging can physically remove sediment and has the potential to change the makeup of the sediment. This fishery is currently managed by Kent and Essex IFCA, via the Cockle Fishery Flexible Byelaw and is limited to some parts of the site[25] (section 3).

Due to the limited nature of this specific fishery, (low exposure), fishing activities alone will not lead to any significant physical loss of supporting habitat.

4.4.2 Physical loss (in-combination)

Physical loss in this context is more likely to be realised by large infrastructure projects (such as wind farm developments) than fishing activities.

There are a number of consented and ongoing activities taking place within the SPA which are resulting in physical loss. These include wind farm developments (Kentish Flats, Gunfleet Sands, Scroby Sands, London Array and the Round 3 zone off Suffolk). An approximate calculation of turbine base diameter relative to the entire extent of the SPA, indicates that direct physical loss of habitat due to the footprint of wind farm turbines would be substantially less than 0.01% of the total SPA area. Whilst this figure does not take into account habitat loss due to scour protection around the turbines or over inter-array and grid connection cables, in the context of the SPA area the total figure for direct habitat loss due to turbine footprints and scour protection is still likely to fall below 1% of the total SPA area.

The MMO considers that fishing activities in combination with other plans and projects would not have an adverse effect on the RTD due to physical loss of the supporting habitat.

4.4.3 Assessment of the risk from physical damage to supporting habitat (alone)

Natural England advises that ongoing fishing activity especially, bottom towed gear, can repeatedly damage the habitats (through changes in suspended sediment or physical abrasion) which could adversely affect the ability of the habitats to recover, leading to permanent damage and ultimately to loss of prey species. This may result in a reduction in the value of sandbank habitats as foraging sites for the overwintering population of RTD. Therefore, the overall sensitivity of the RTD to damage to their supporting habitat is considered to be moderate. Key supporting habitats include shallow coastal waters and subtidal sandbanks.

Annex I sandbanks are located throughout the Outer Thames Estuary SPA, which mostly envelops the Margate and Long Sands EMS[26] (See Figure 2). The MMO has conducted a separate assessment for the Margate and Long Sands EMS, and given its importance to also supporting the SPA, key points from this are included below.

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[25] http://www.kentandessex-ifca.gov.uk/i-want-to-find-out-about/regulations/keifca-byelaws/keifca-district-byelaws/

[26] Margate and Long Sands Site of Community Importance (SCI). SCIs are sites that have been adopted by the European Commission but not yet formally designated by the government of each country The umbrella term European marine site is used in this document to avoid confusion.

Sandbank features are sensitive to physical damage through changes in suspended sediment, surface abrasion (<25mm), shallow abrasion (>25mm), surface and sub-surface penetration. These pressures would mosty be exerted from bottom-towed gear.

The sensitivity of sandbanks to abrasion varies depending on the substrate. Mixed sediments are more susceptible to surface and sub-surface penetration than subtidal sand and subtidal coarse sediments (Tillin et al, 2010). Gravelly muddy sands are more stable than dynamic sand communities and are therefore more sensitive to physical damage and recoverability/resilience tends to take longer/be lower.

Tidal currents are also strong within the Margate and Long Sands EMS, and sediment mobility around the crests of sandbanks is high. The dynamic crests of the sandbanks are characterised by polychaete-amphipod communities of low biodiversity. The effects of physical abrasion on seabed gravel communities can vary depending on how dynamic the environment is (wave action/tidal streams) with more mobile sand being less sensitive than the more stable sediments due to the more developed epifauna and infauna (Hall et al, 2008; Lambet et al, 2014). The infaunal communities are adapted to this environment by being able to rapidly re-bury themselves into this dynamic environment. Areas of reduced sediment movement support communities of attached bryozoans, hydroids and sea anemones. Sand mason worms and keel worms along with bivalves and crustaceans are also associated with this subfeature (Natural England, 2012). The recoverability of the sandbanks from physical damage depends on tidal current speed and the closeness of areas with high abundance of species that can re-colonise from high wave movement (Lambert et al, 2014).

Due to potential deterioration from the use of bottom towed gears within the Margate and Long Sands EMS, MMO propose to introduce zoned management in more stable sensitive areas, which also have relatively higher levels of fishing taking place. Current and historical fishing activity indicate that there are substantial areas of Annex I sandbank not currently fished (See Figures 15 and 16) therefore, there are sufficient undisturbed areas of supporting habitat to support RTD which will also be extended to those more stable areas that are currently being fished from 2016.

Figure 15: VMS data overlaid with Margate and Long Sands EMS

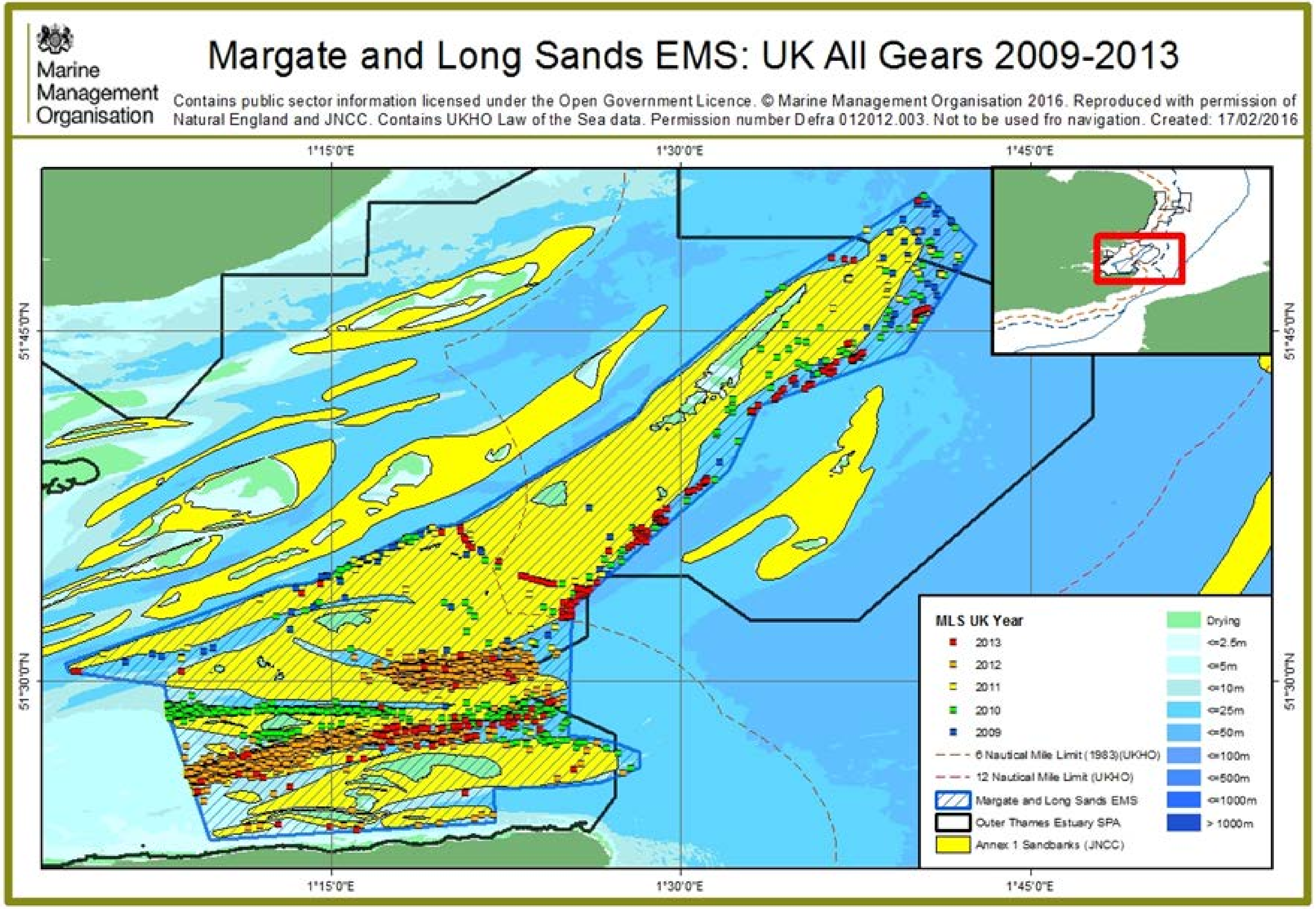
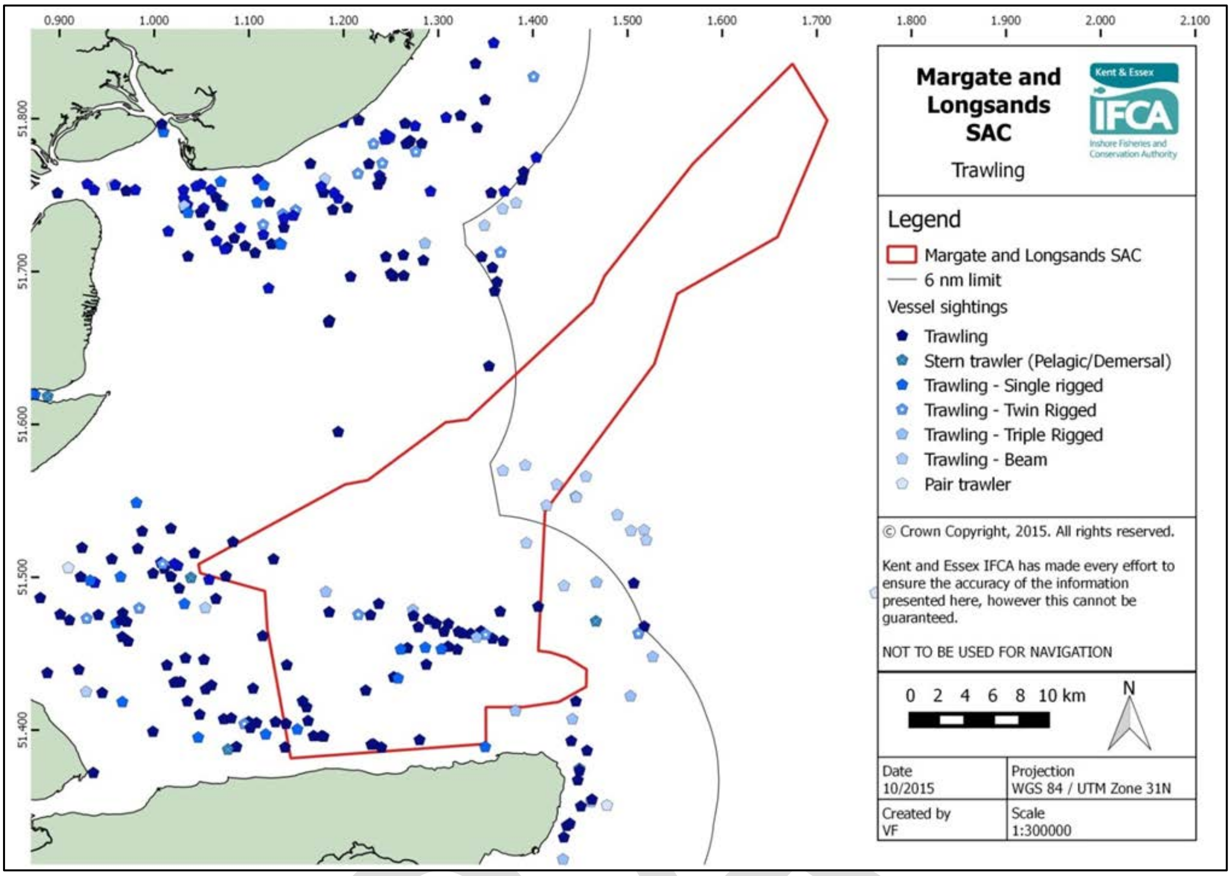


Figure 16: Kent and Essex IFCA trawling gear sightings data (2010 – 30/07/2015)



As highlighted above, fishing that would most likely cause damage to the wider Outer Thames Estuary SPA supporting habitat is through use of bottom-towed gear.

Hydraulic dredging (suction dredging) can potentially occur for cockles within the 6nm limit and has the potential to cause physical damage. The impacts of non-mechanical dredges in a number of publications considered this type of fishing as one of the most damaging of the bottom towed gears due to the deep penetration and potential to physically remove the top layers of seabed (Collie et al, 2000; Roberts et al, 2010; Grieve et al, 2011). The level of impact depends on the type of gear, effort, footprint and conditions of the site.

As discussed above, The Kent and Essex IFCA Closure of Cockle Beds Byelaw[27] currently prohibits the fishing for cockles outside the Thames Estuary cockle Fishery Order[28] area (i.e. the southern part of the EMS). Other parts of the site are open to cockle suction dredging under the Thames Cockle Fishery Order however there haven't been sufficient cockles here in many years for any suction dredging of these to occur.

The impacts of trawling vary depending on the weight of the gear used (Tilin et al, 2010; Grieve et al, 2011). For example, the shoes of a "flatfish" beam trawl can penetrate the seabed up to 6cm, and the tickler chain/ground gear from 2 to 2.2cm. The gear used within the SPA varies as documented in section 4.3 with a number of trawlers using tickler chains and chain mats. There is

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[27] www.kentandessex-ifca.gov.uk/i-want-to-find-out-about/regulations/keifca-byelaws/

[28] SI 1994/2329

also the potential for larger vessels (over 17m length) with grandfather rights to fish within the 6nm limit and larger UK and non-UK vessels which have the potential to use heavier gear outside the 6nm area. The main physical impact by beam trawls is penetration of the upper few centimetres of the sediment by the chains which will impact on the surface dwelling biotopes within the sediment (Grieve et al, 2014).

Evidence suggests that there is no detectable impact from otter trawling on sand and gravel communities (Kaiser et al, 2006), however earlier evidence (Collie et al, 2000; Kaiser et al, 2006) suggests that there may be some detectable impacts but the magnitude impact increases depending on the size of gear, area fished and depth of fishing. The main physical impacts from otter trawls are mainly from the penetration of the otter boards/doors which can penetrate the sediment between 0.7 – 1.9cm depending on the width of gear (Grieve et al, 2011).

Bridles and sweeps may also have contact with the seafloor with longer bridles coming into contact more frequently than shorter bridles which are mainly used in rougher ground. These can therefore impact on species close to the surface (Grieve et al, 2014). The ground ropes of an otter trawl may also have contact with the seabed (to varying degrees) and can have similar impacts than bridles (Grieve et al, 2014).

Pair trawling and anchor seining occurs at low levels (Annex 3) within the site and have similar impacts as light demersal trawls (Hall et al, 2008). As these fisheries are bottom contacting they will cumulatively impact the more stable areas within the site with other fishing activities.

Beam trawling for shrimp potentially occurs within the site. The gear used tends to be lighter than other beam trawlers with light rollers and no tickler chains with a variety of single and twin beamed vessels. The main pressure from this activity is surface abrasion.

Five percent of a Member State’s beam trawl fleet can register to use a pulse gear, a semi-pelagic beam trawl which uses electric currents to flush target species out of the benthos. Only vessels that operate in ICES rectangles IVb and IVc of the North Sea can apply to use pulse gear. The pulse fishery can potentially occur in the Outer Thames Estuary SPA, however there are currently no vessels able to use pulse gear within 6nm due to access rights and size limitations.

The evidence on the impacts of pulse trawling is limited but as a result of the lighter gear, limited contact with the seabed and lower trawl speed of the gear the risk of physical damage of the seabed through abrasion is lower than beam trawling with tickler chains.

Beam trawling is the most common >15m fishing activity taking place within the site. Taking the average of the last four years (2010-13), the number of >15m vessels identified in the Outer Thames Estuary SPA annually is as follows:

UK	31
Belgium	42
Netherlands	20
France	20
Germany	3
Denmark	2

However, further analysis displayed in Tables 5, and 6 show that the majority of these vessels are on passage, and that relatively few have reported in a way that suggest vessels are fishing for any significant length of time. There are few discernible seasonal patterns, with activity taking place for most of the year. Although there are no thresholds commonly used which determine intensity of activity, VMS patterns do show that whilst there is some fishing with bottom towed gear, considering the area of the site, the activity from larger vessels is not intensive.

Table 5. Number of UK vessels (>15m) reporting VMS in the Outer Thames Estuary SPA

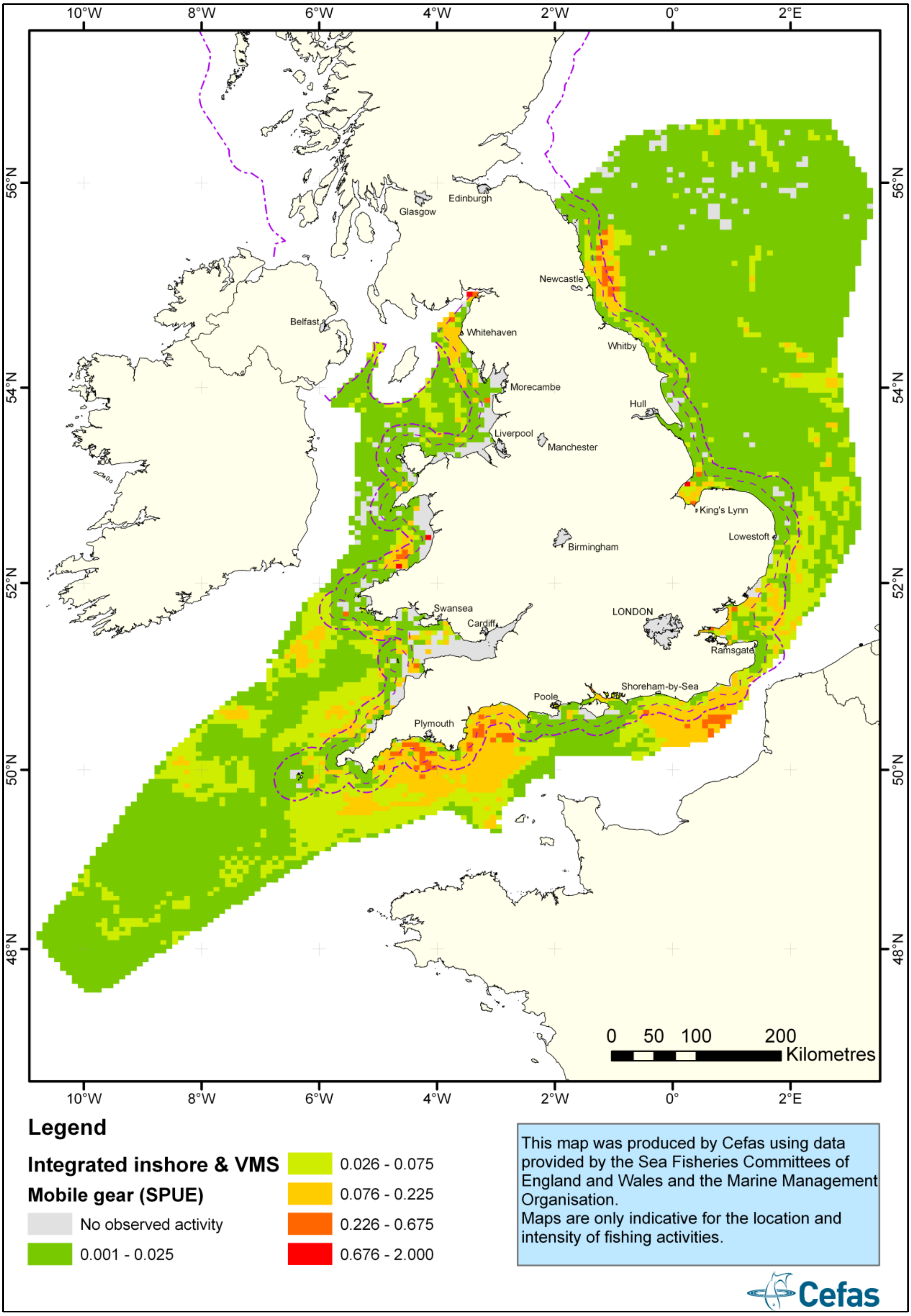
UK VMS	2011	2012	2013
VMS Vessels	60	54	53
VMS Pings	3024	4559	1612
Number of vessels that reported 1 to 10 pings	42	44	45
Number of vessels that reported 11 to 50 pings	8	3	3
Number of vessels that reported 51 to 100 pings	1	2	1
Number of vessels that reported 101 to 200 pings	1	1	2
Number of vessels that reported 200+ pings	8	4	2

Table 6. Number of Belgian and Dutch vessels (>15m) reporting in the Outer Thames Estuary SPA

Belgium VMS (April 2015 data)	2011	2012	2013
VMS Vessels	46	35	30
VMS Pings	3677	1793	1904
Number of vessels that reported 1 to 10 pings	11	13	14
Number of vessels that reported 11 to 50 pings	15	14	6
Number of vessels that reported 51 to 100 pings	8	4	4
Number of vessels that reported 101 to 200 pings	8	3	3
Number of vessels that reported 200+ pings	4	1	1
Netherlands VMS			
VMS Vessels	29	16	16
VMS Pings	1196	384	876
Number of vessels that reported 1 to 10 pings	13	8	4
Number of vessels that reported 11 to 50 pings	6	6	5
Number of vessels that reported 51 to 100 pings	7	3	5
Number of vessels that reported 101 to 200 pings	3	0	1
Number of vessels that reported 200+ pings	0	0	1

Information on smaller vessels from Fishermap and sightings data is subject to lower confidence, but suggests relatively low levels of trawling activity across much of the site. To put the intensity of trawling into context with other parts of the English Coast, Vanstaen and Breen (2014) mapped an integrated VMS/sightings data layer (See Figure 17). This shows that in relative terms, the majority of the site is not subject to intense activity from bottom-towed gear.

Figure 17: Map showing integrated VMS and inshore activity for mobile gear (dredging and trawling)



The sensitivity of the sandbank features to physical damage from static gears is through surface abrasion through deployment, movement of gear on the benthos due to tide, current and storm activity; and as the gear is dragged along the seafloor on retrieval. It is generally thought that potting in subtidal mixed sediments with long lived bivalves has low sensitivity at low to moderate fishing intensity and moderate sensitivity at high levels of activity (Hall et al, 2008). There is potential however, for more fragile epifauna to be damaged through snagging and entanglement especially at high levels of fishing (Hall et al, 2008; Roberts et al, 2010).

Secondary evidence suggests that static gears have a relatively low impact on benthic communities in comparison to towed gears, as a result of the small footprint of the seabed affected and an even smaller impact if the area is actively trawled (Roberts et al, 2010).

The MMO concludes that there is no adverse effect on the integrity of the SPA from physical changes resulting from physical damage to the supporting habitat as a result of bottom towed gear alone, due to:

- the variable, but mostly low levels of activity from bottom towed gear;
- the range of sensitivity associated with the supporting habitats;
- the relatively low and temporary increase in turbidity caused by bottom-towed gear; and
- the proposed zoned management in the more sensitive parts of the supporting sandbanks within Margate and Long Sands EMS.

4.4.4 Assessment of the risk from physical damage to supporting habitat (in-combination)

Other activities potentially causing physical damage of the seabed include aggregate extraction, maintenance dredging and anchoring.

Marine aggregate extraction activities are mostly in the northern extent of the SPA with some new licence areas in the northerly part of the southern section. The MMO recently produced an HRA drawing on the Marine Aggregate Regional Environmental Assessment (MAREA) of the Outer Thames Estuary SPA (ERM, 2010), and Reach et al (2013). The assessment concluded that there is not likely to be a significant effect caused by turbidity either alone or in-combination with other plans/projects as the localised turbidity predicted to be associated with aggregate extraction was within natural fluctuations, these were also temporary events and would not pose a large degree of risk to RTD ability to forage. This assessment considered that physical damage to supporting habitats did not pose a risk to RTD, in relation to any alterations to sandbank size or location (which is the key supporting habitat). This was in part due to the recoverability of red-throated divers to changes in sandbanks as they will rapidly return to suitable habitats following the cessation of dredging.

Activities associated with maintenance dredging and ship anchoring will also lead to physical change of the supporting habitat. However both of these activities have taken place over a long period in well established locations and are only likely to lead to localised and temporary changes.

On this basis, the MMO concludes no adverse effect either alone or in-combination with other activities which have potential to cause physical damage to supporting habitat.

4.4.5 Non-physical disturbance of RTD (alone)

Natural England advises that RTD are highly sensitive to non-physical disturbance by noise and visual presence during the winter. Disturbance can cause birds to reduce or cease feeding in a given area or to fly away from an area (i.e. be displaced). Therefore, the sensitivity to disturbance is high. Fishing activity could therefore pose a risk to the displacement of these features.

APEM (2013) reports on the most recent aerial bird surveys commissioned by Natural England. The study highlights the spatial distribution of the birds and the current estimated populations. Although on designation, bird numbers were estimated to be at approximately 6,500 birds, current estimates are around 11,000 – 14,000 individuals. Given the total area of the SPA is relatively large (3793km^2), this means that (assuming a homogenous distribution), there are approximately 3 birds per km^2.

The APEM study involved two high resolution digital aerial surveys being conducted during January and February 2013. Each survey was flown on a series of transects separated by 1.8km, collecting abutting 3cm resolution imagery. The first survey was undertaken on the 26 and 27 January 2013. The images were analysed and quality assured. Data presented below consist of both raw counts of animals recorded, and modelled densities based on the survey results.

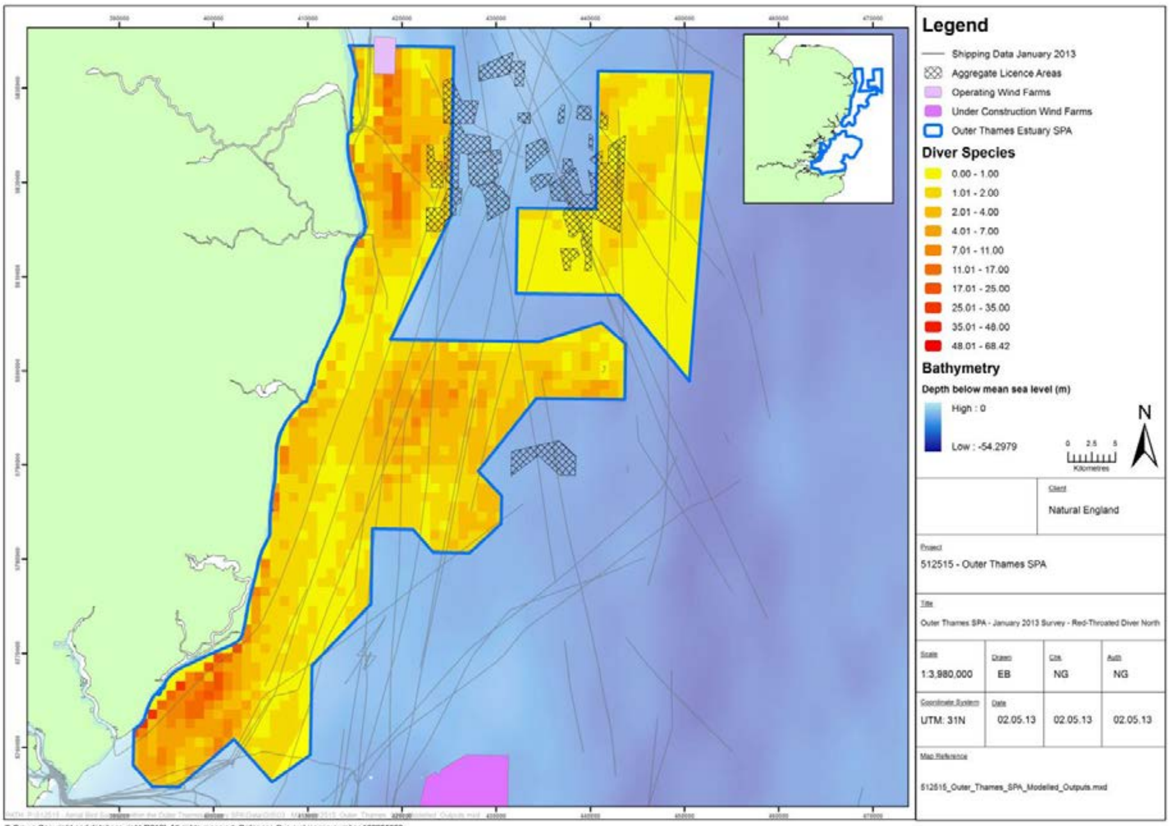
APEM (2013) highlighted that RTD are known to be highly mobile over large areas with some large scale movements over short timescales during the winter (DTI, 2006). There are a range of factors which could explain variation of RTD abundance and distribution in the Outer Thames Estuary SPA including: environmental variables, diurnal movement, possible effects of anthropogenic disturbance in the area or a probable combination of all of these factors (Skov 2011). The environmental variables potentially influencing distributions include changes in weather patterns at their wintering grounds and summer nesting sites; habitat preferences of shallow water areas around sandbank regions (Skov and Prins, 2001) which is also affected by the diurnal movement of the tide (e.g. at lowest tides, divers can be distributed around the edges of exposed sandbank areas); and hydrographic variables (such as eddies and current speed).

The presence of fishing vessels is likely to contribute to the overall disturbance, and therefore distribution of birds within the site. However, there is very little published information on the distance of which RTD show signs of being disturbed by vessel movements. RPS (2006) studied the response of RTD to approaching survey vessels (i.e. a small boat). Of over 500 individual birds recorded, all sightings but one were of birds already in flight when first seen or of birds which took flight on approach of the boat. About 60% of individuals seen could be approached to within 200m before they flew, but 20% of those seen took flight at more than 600m. Furthermore, this study recorded more than 500 individuals already in flight when the boat was still more than 1km away. They made no attempt to assess the behaviour of these birds in detail or attribute their behaviour to the boat. However, it is likely that birds reacting to the presence of the vessel at a great distance were under-recorded and so it may be inferred that at least half of all birds may have taken flight while the vessel was more than 1km away. Furthermore, this study noted that once birds had taken flight, the majority of birds flew to a distance considerably greater than 1000m (with many continuing to fly until lost to sight). Percival (2009) noted that 38% of divers observed flushed more than 500m ahead of the survey vessel. Of these birds, the mean flushing distance was 1120m with some number of birds (probably under-estimated) flushing at distances in excess of 2km from the boat. Topping (2011) reported that birds flush from a ship approaching at approximately 1km, while 2km has been reported by others (Percival, 2009).

Others have reported that birds would be displaced up to 4km beyond a wind farm (permanent footprint) (Maclean et al, 2006). It is suggested that displacement from permanent structures (wind farms) or constant passage (shipping lanes) could have more of a permanent displacement than other mobile vessels (ERM, 2010). APEM (2013) was able to demonstrate associations between low densities of birds with established shipping lanes and sizeable infrastructure.

The modelled spatial distributions of RTD within the site during January and February 2013 are shown in Figures 17 and 18 below. RTD were recorded in all parts of the SPA; higher numbers were recorded in the southern half and relatively few divers were recorded to the far north-eastern part of the SPA. RTD were not evenly distributed across all areas, and high density patches were recorded in the south and north-east of the southern part of the SPA as well as some high densities towards the north of the northern part of the SPA. The majority of these areas correlate with the Annex I sandbank features which are shown in Figure1. Whilst there are similarities between months, there is variability which needs to be considered before confidently predicting “hot spots”.

Figure 18: Modelled distributions of RTD in the Outer Thames Estuary SPA January 2013 (APEM 2013)



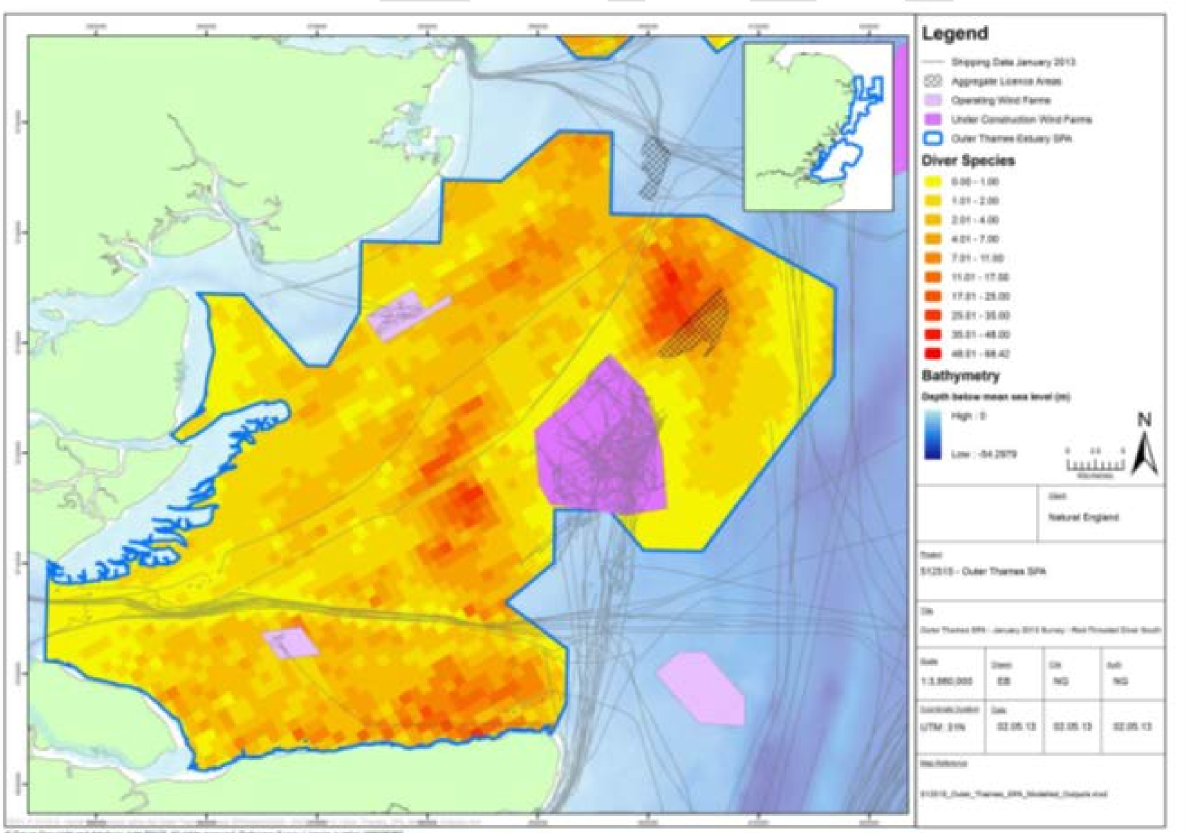
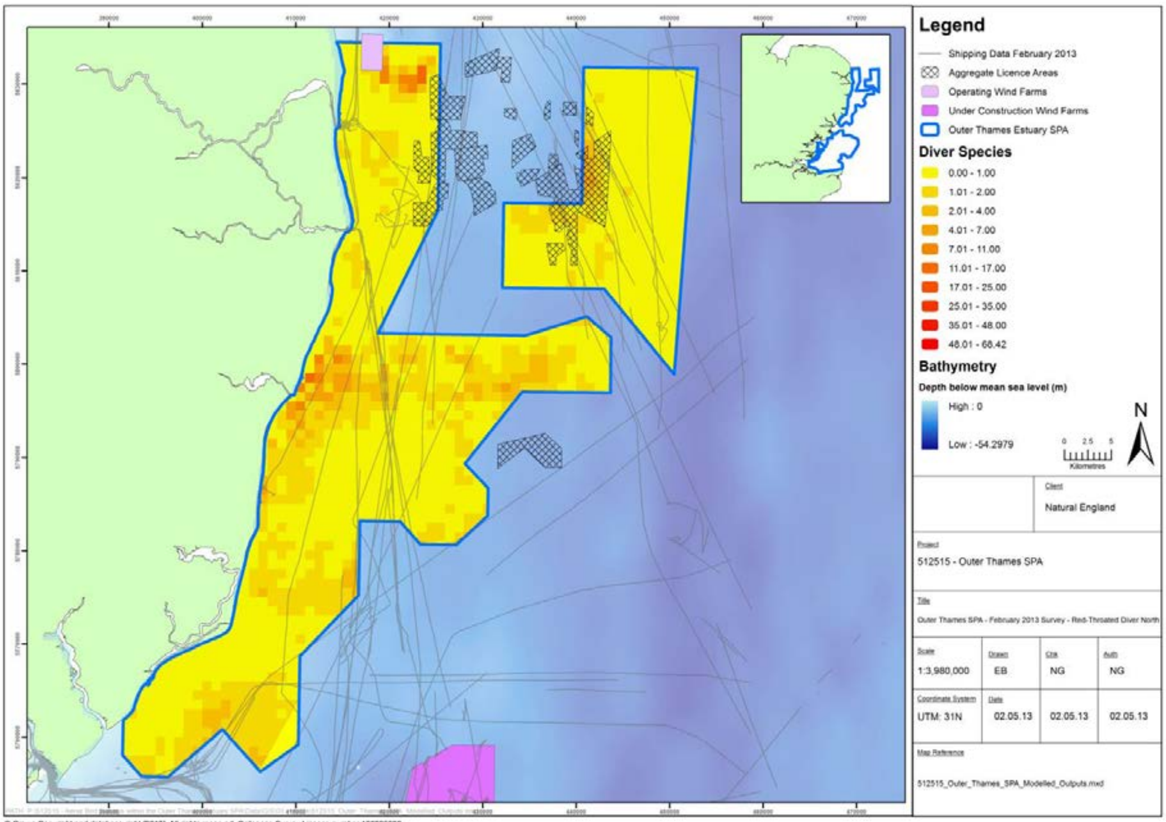
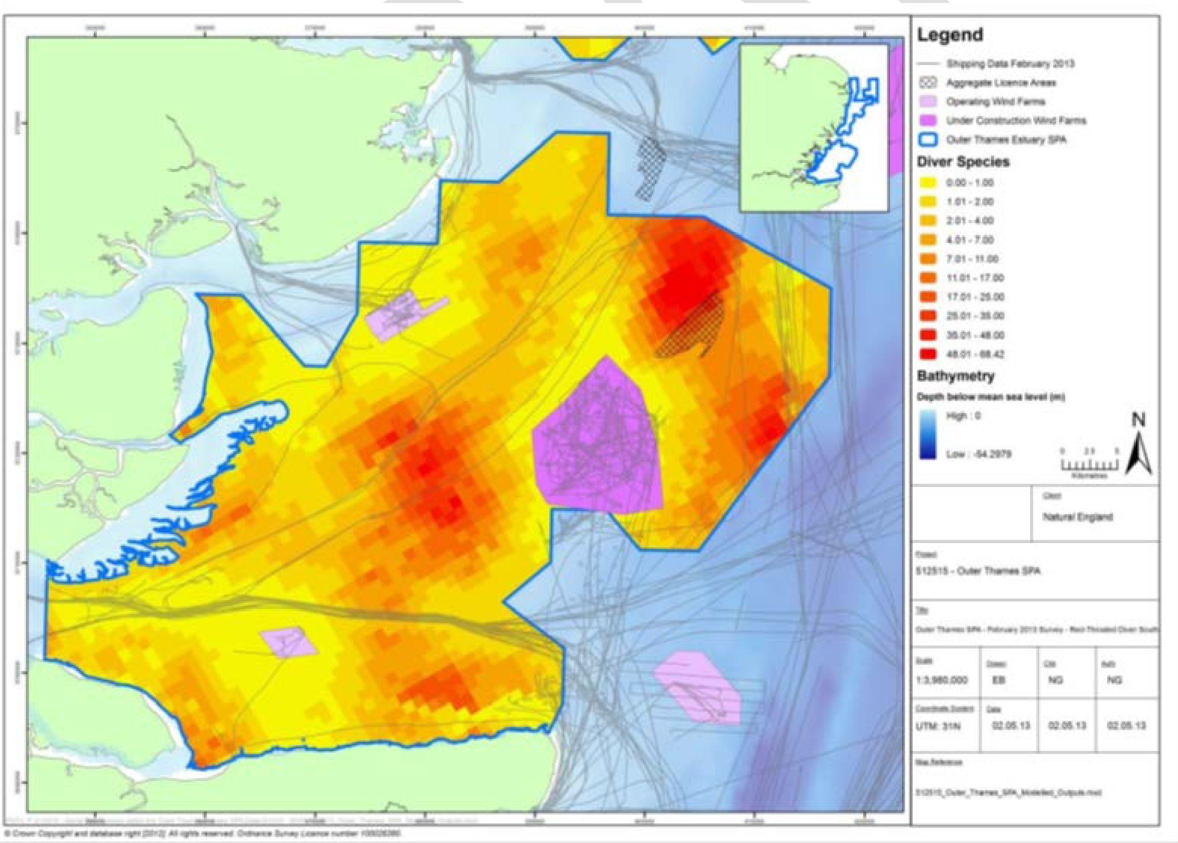


Figure 19: Modelled distributions of RTD in the Outer Thames Estuary SPA February 2013 (APEM 2013)





4.4.6 Bird densities and VMS

Fishing activity intensity varies across the SPA, and can be compared against bird density maps to ascertain whether there is evidence of clear avoidance or disturbance patterns.

Figure 20 belows overlays all VMS activity from all (>15m) vessels at all speeds during times when the RTD are likely to be present (October 2012 to March 2013) against modelled RTD densities from January 2013.

Note 1: VMS charts previously provided have included only vessels operating at “fishing speeds” (<6 knots), however, in the context of disturbance the following charts provide a full picture of VMS for the year at all speeds.
Note 2: The five months VMS activity was chosen to reflect winter activity which could be compared against the modelled assemblage.

The majority of the fishing vessels reporting are operating outside of the SPA. There are distinct patterns of fishing consistent with those described earlier. There are few distinct relationships between bird density and VMS which can be identified. In some areas there are relatively few RTD present in the eastermost part of the SPA which co-incides with the relatively high density of vessel activity. However, other parts of the site show high bird densities co-existing with fishing vessel precence. The VMS pings mask the bird density information at the scale shown in some of the chart. As an alternative way of presenting the data, Figures 21 and 22 overlays the same “winter VMS activity” with the raw sightings of RTD during the January 13 and February 13 surveys respectively.

Figures 23 and 24 focus on the actual survey days and compare the (>15m) fishing vessels operating VMS on those days that the surveys were conducted. This gives a snapshot picture of what activity was taking place during the survey.

Further analysis of these data shows that on 26 and 27 January survey dates, only **3 vessels >15m** were operating in the entire SPA. On 9, 10, 11, and 12^{th} February survey dates, **only 4 vessels >15m** were operating and very few VMS pings were recorded, suggesting passage.
It is noted that the VMS charts show vessels >15m. Since 2015, vessels >12m were required to report. In 2015, there were 38 additional vessels, between 12 and 15m in length, which reported in the Outer Thames Esutary SPA. However, 14 of these vessels relate to cockle fishing activity inshore, which are subject to increased (10 minute) reporting, rather than the statutory 2 hours required under European legislation. These vessels would therefore form part of the inshore sightings data. The remaining vessels had few pings associated with them, and were mostly on passage.

4.4.6.1 Bird densities and inshore fishing patterns

Maps previously presented on inshore sightings can also be compared with the inshore RTD distributions. Again, there are no patterns identified, and there are a few areas where high bird densities appear to co-incide with sightings.

Figure 20: VMS activity from all (>15m) vessels, at all speeds during October 2012 to March 2013, against modelled RTD densities from the January 2013

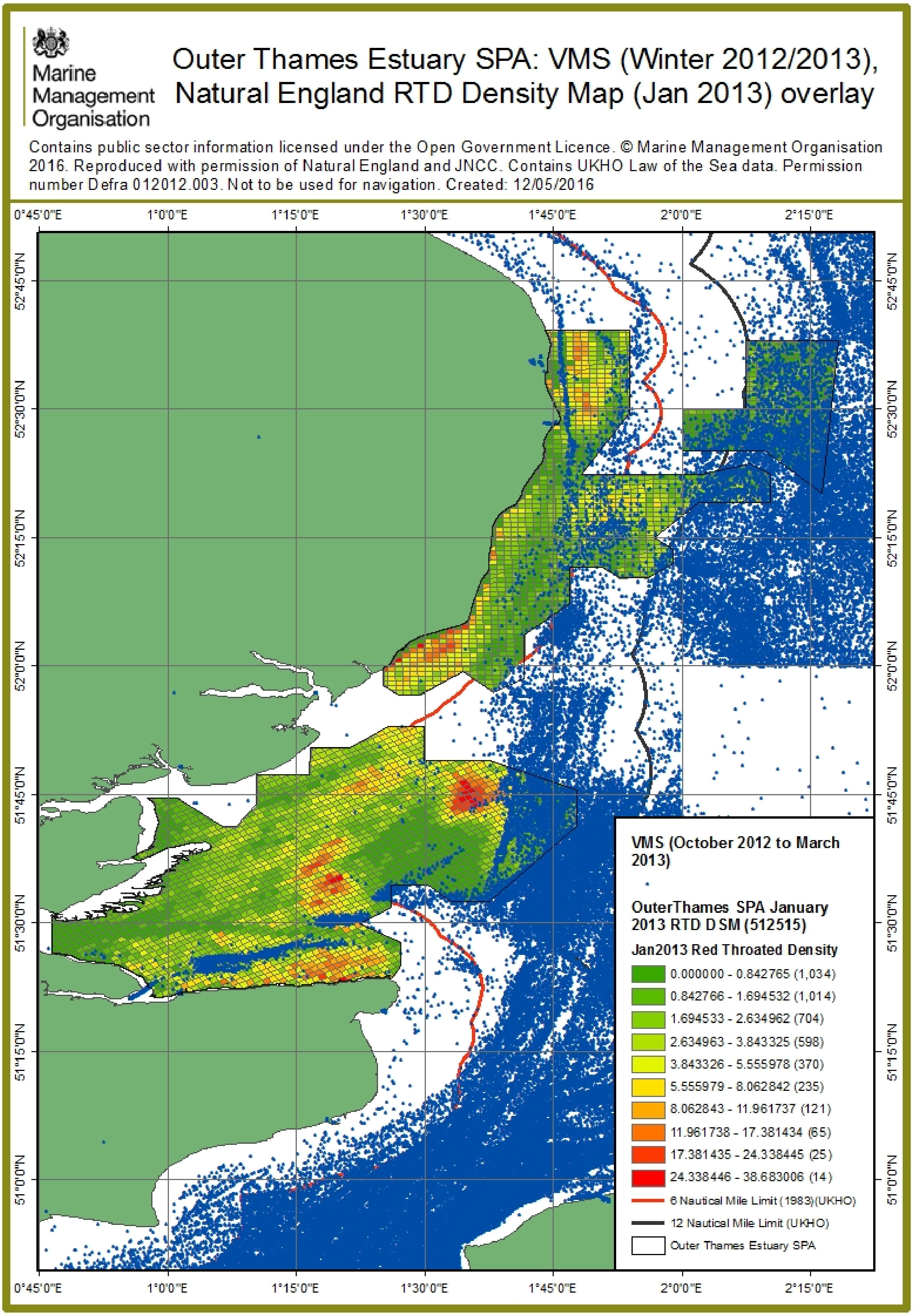


Figure 21: **VMS activity from all (>15m) vessels, at all speeds during October 2012 to March 2013, with the RTD January 2013 surveys**

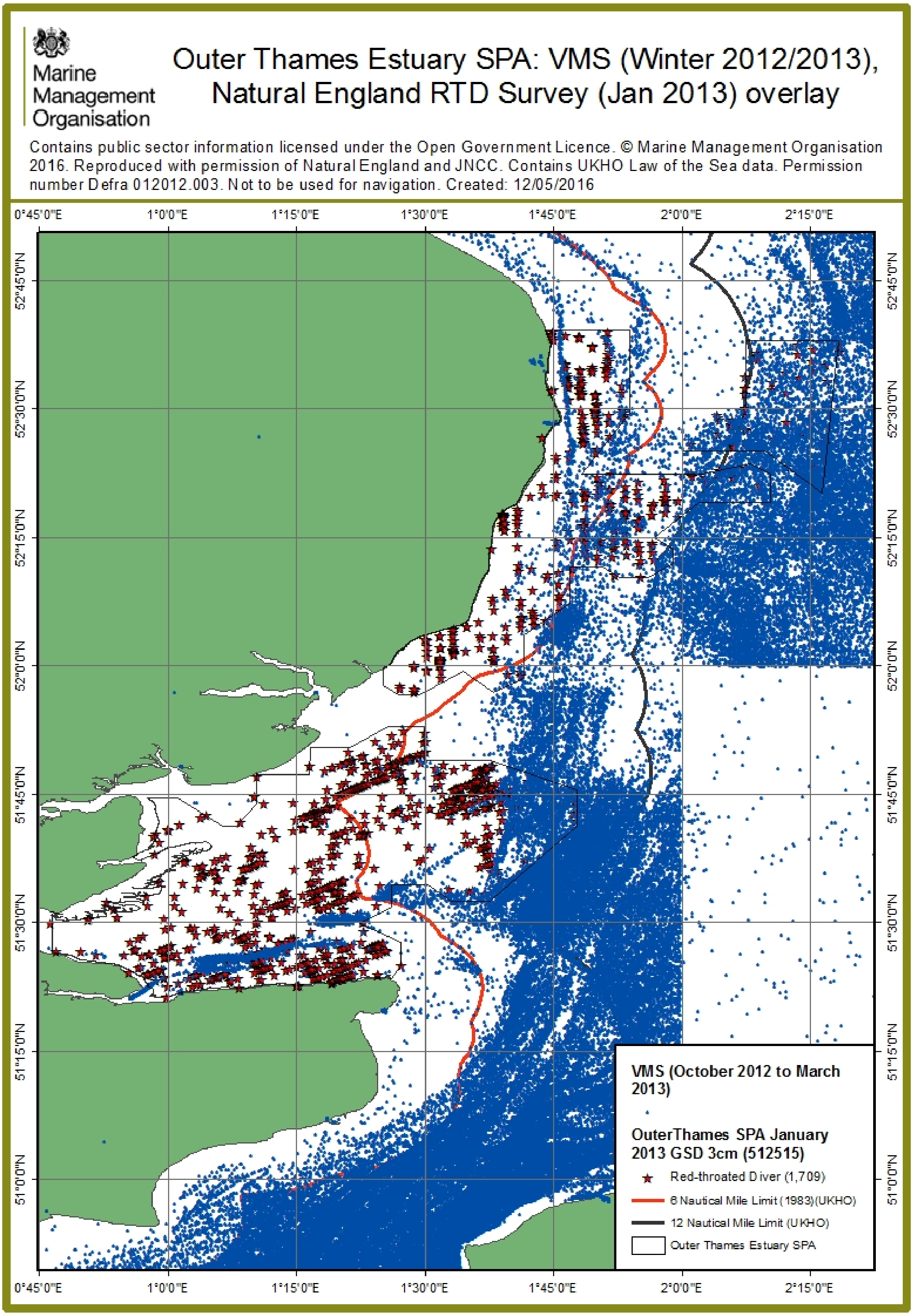


Figure 22: VMS activity from all (>15m) vessels, at all speeds during October 2012 to March 2013, with the RTD February 2013 surveys

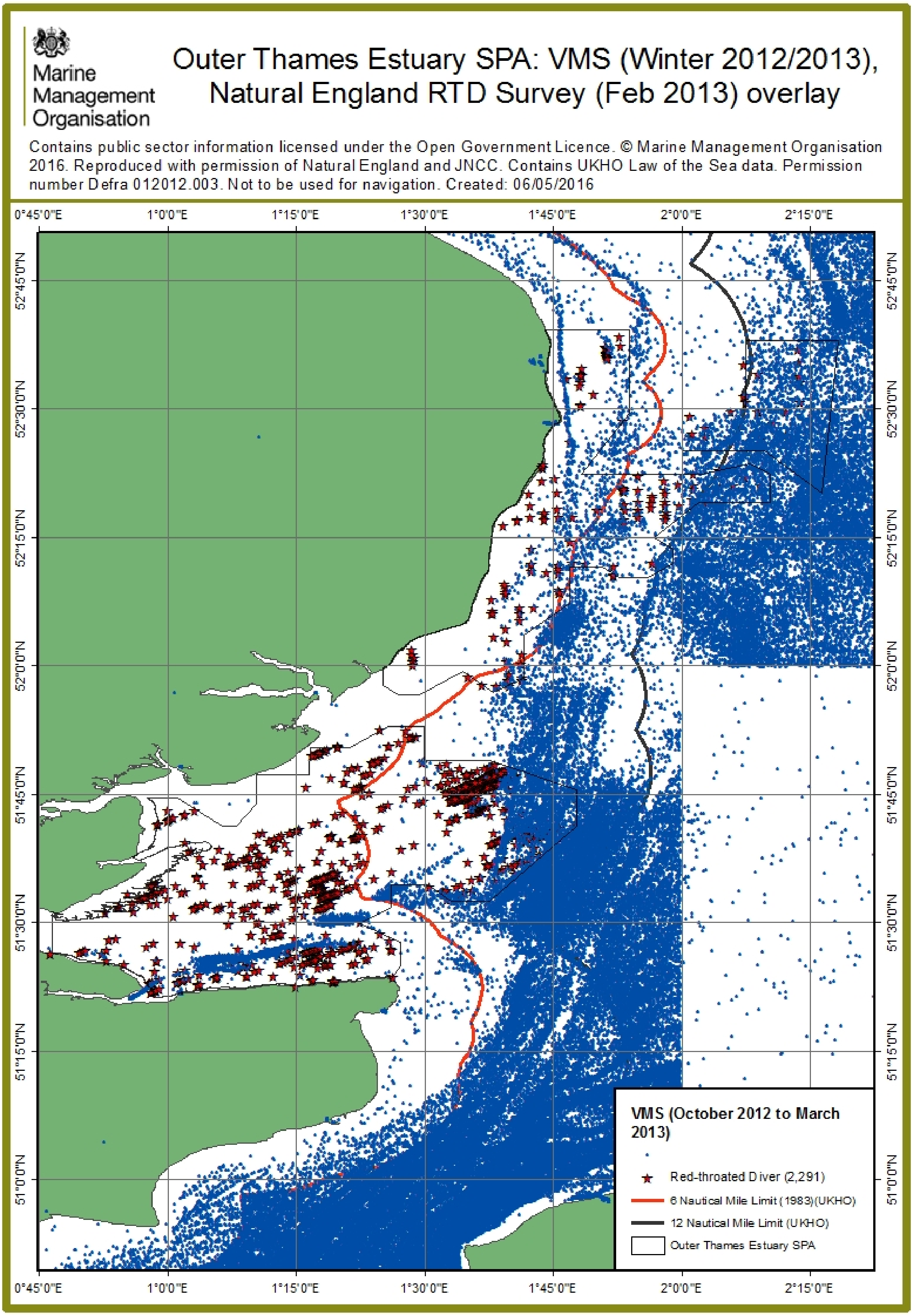


Figure 23: **VMS activity from all (>15m) vessels operating VMS on those days the surveys were conducted in January 2013**

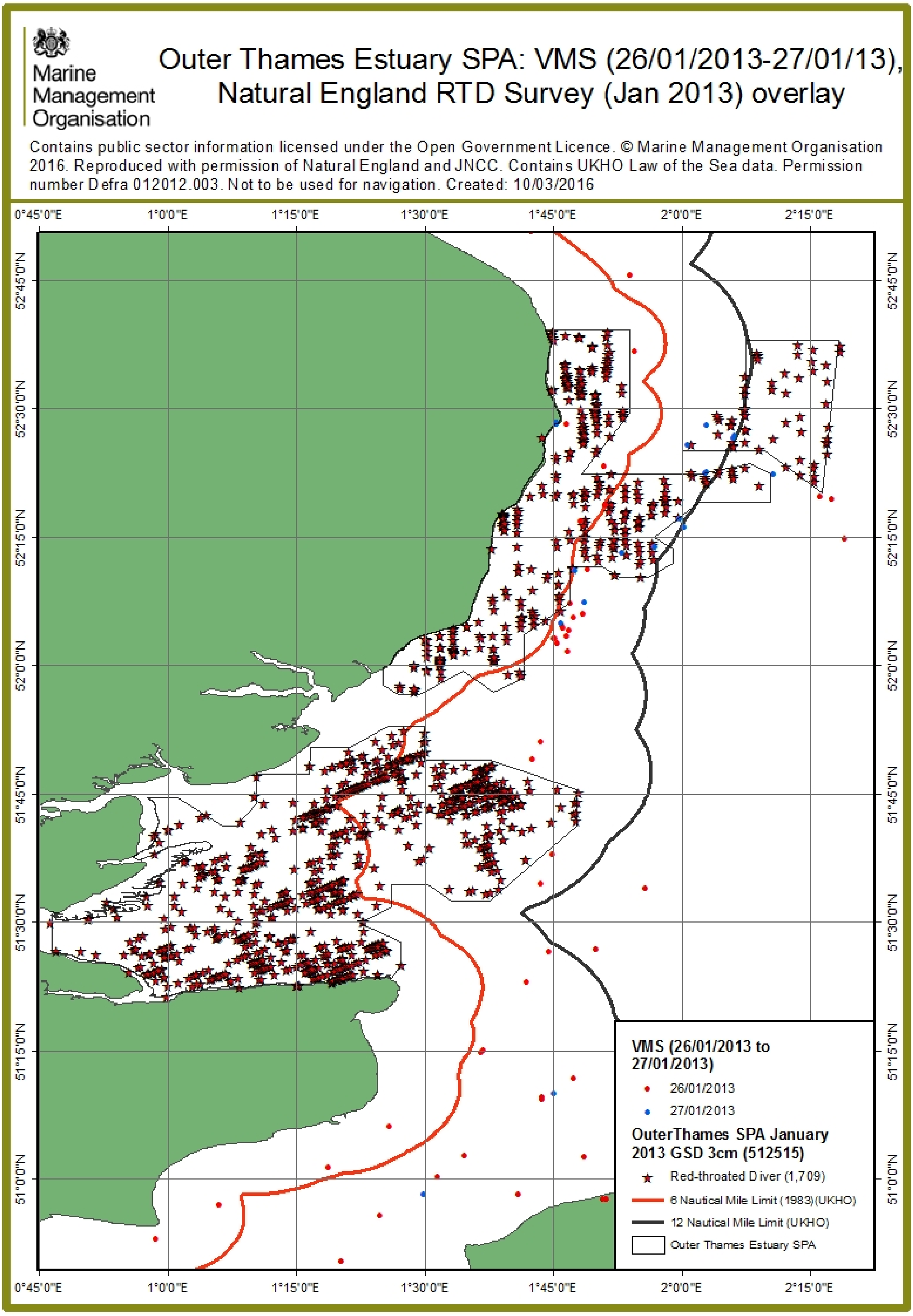
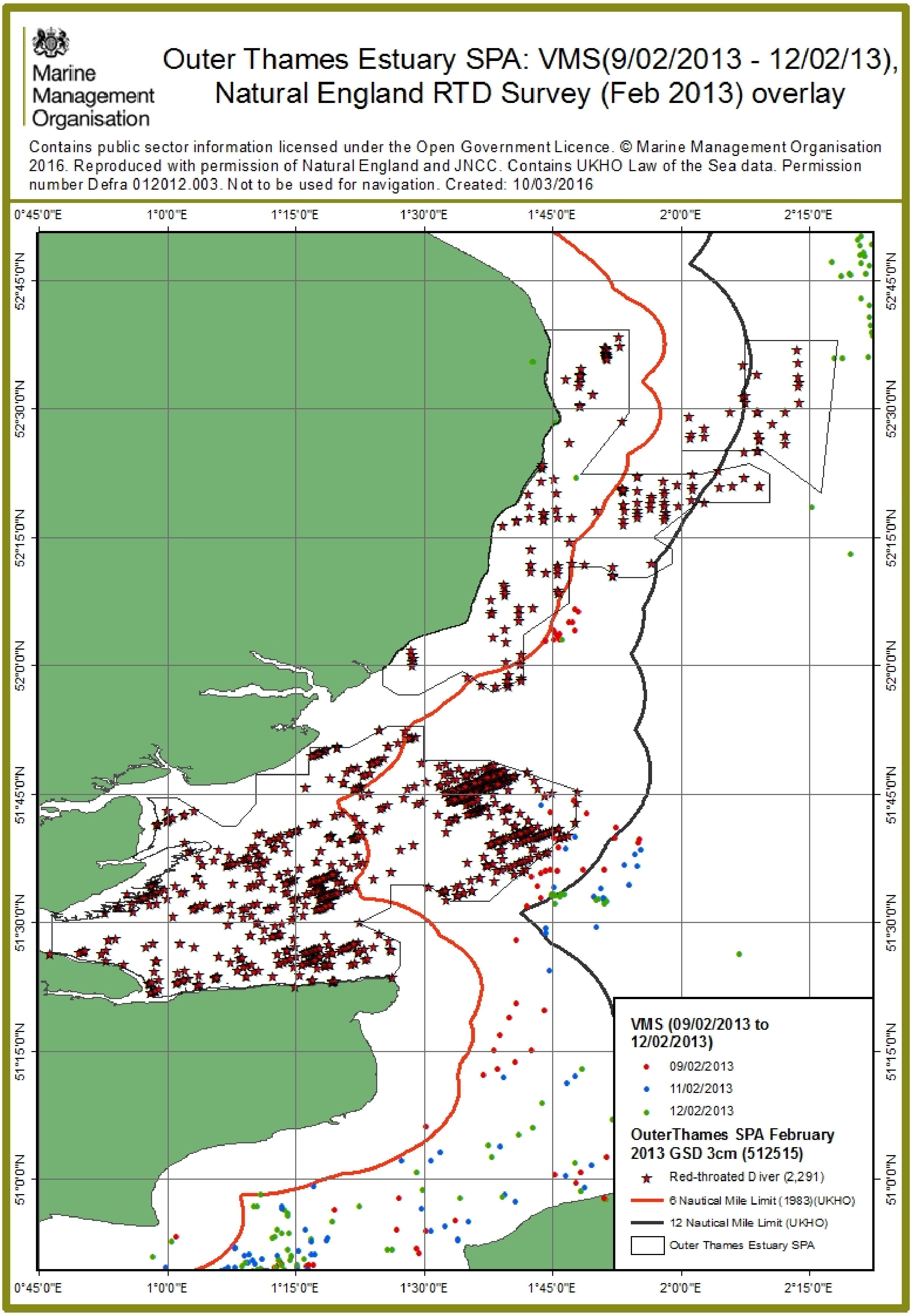


Figure 24: VMS activity from all (>15m) vessels operating VMS on those days the surveys were conducted in February 2013



The peak winter number of birds recently estimated to occur in the site (11,000 – 14,000 (APEM 2013) are safely above the targets set to determine favourable condition i.e. c 6,500. However, it must be borne in mind that the original population estimate of c 6,500 birds, which is the notified feature population size, was derived from visual aerial survey rather than digital aerial surveys. As such, the original estimate may well be an underestimate which will be updated in due course if the results of APEM (2013) are confirmed by a subsequent digital aerial survey programme. However, there is no evidence to suggest that currently, the favoutable conservation target relating to the RTD population in the site, is not being achieved. Additionally, reviewing bird density information and spatial activity of fishing, there is no clear evidence suggesting that significant displacement is occurring. In fact on the actual survey days, very few vessels were seen to be operating within the site.

The MMO concludes that disturbance from fishing activity alone is not having an adverse effect on the SPA, based on the relatively high numbers of birds recorded in the site; the relatively low levels of fishing; and the lack of any significant correlation between bird distributions and fishing.

4.4.7 Non-physical disturbance of RTD (in-combination)

As highlighted above, other activities likely to disturb and displace RTD include those associated with other vessel movements, (such as aggregate dredging and shipping) and large infrastructure developments such as wind farms.

The MMO provided an HRA on aggregate dredging activities (MMO, 2013), which was informed by the MAREA (ERM, 2010).

There were 13 specific aggregate areas that were considered to have a likely significant effect on the SPA, through displacement. This amounted to 3080 dredging "events" which equated to approximately 70 "dredging days" which were found to be insignificant as an impact "alone" in consideration of "birds days lost" as a percentage over the six month foraging season.

ERM (2010) highlighted that that vessel movement associated with the aggregate sector (70 days) accounted for 3% of the total shipping activity in the Outer Thames Estuary SPA.

APEM (2013) suggested that it was possible for numbers of RTD to be lower in areas of wind farm construction due to the very active boat traffic in these areas, and such traffic may also help explain why RTD numbers were lower in some operating wind farms. DECC (2013) also identified that vessel activity (service boats) associated with wind farm development had the potential to cause disturbance to RTD, and referred to a previous study (DTI, 2006) which calculated that if six service vessels were present at any one time within the wind farm and if RTD re-inhabited the wind farm following construction (which is an assumption, rather than a fact), the area of displacement would be 19km2, which is 0.6-0.7% of the SPA area. However, DECC (2013) continue to state that the effect of service boats is much smaller than assuming total displacement from the wind farm and were assessed as having no adverse effect. The DECC (2013) assessment suggested that the displacement of birds from the construction of consented offshore wind farms equated to 9.1% of the RTD within the Outer Thames Estuary SPA. If all consented and planned offshore wind farms were considered then the level of impact increases to 16.4%. This level of impact is significantly higher than those predicted to occur within the assessment undertaken on the shadow London Array Offshore Wind Farm (DTI, 2006). It is also higher than the 9.3% level of displacement considered by the Secretary of State not to cause an adverse effect from the Kentish Flats Extension offshore wind farm in-combination with other plans or projects (DECC, 2013). The assessment highlighted the fact that there is no set threshold at which displacement impacts can be considered adverse and that displacement effects are not the same as direct mortality, although it is recognised that it can lead to a density-dependent increase in mortality.

APEM (2013) specifically identifies heavy shipping traffic and the presence of operational and in-construction wind farms as having an observed impact.

As DECC (2013) had highlighted, impacts from shipping could cause a displacement of RTD, though shipping activity has been undertaken in the Thames Estuary for many hundreds of years. The impacts from historical shipping on the RTD population are unknown, although shipping activities are largely confined to existing shipping lanes, which are already known to be avoided by divers (JNCC, 2011). APEM (2013) identified that the major shipping lanes in the southern part of the Outer Thames Estuary SPA had a particularly clear effect on the RTD distributions observed. This relationship matches the findings of Schwemmer et al (2011) who found that RTD avoided the vicinity of heavily used shipping channels.

MMO (2014) commissioned a report to provide information on the UK shipping activity and routes from Automatic Identification System (AIS) data. AIS is a maritime navigation safety communications system adopted by the International Maritime Organization (IMO) to provide vessel information, primarily for the purposes of maritime safety. AIS data provide a source of information which can be used to spatially represent vessel movements within the receiving range of transmissions. The project showed UK “vessels density grids” and reviewed specific transects to determine the most frequent vessel type (being reported by AIS). For the transect in the Channel (adjacent to the Thames Estuary), fishing vessels accounted for 8.6% of the transits of all vessels, with the vast majority relating to cargo and tankers.

Information sourced from 2012 AIS data specifically in the Outer Thames Estuary SPA shows the average number of vessels per year per grid square. Figure 25a shows all vessels excluding fishing vessels, and Figure 25b shows all vessels. Clear hot spots of traffic can be seen from major ports including the Port of Felixstowe, which is the UK’s largest container port which receives over 3000 vessels a year (including the largest container vessels afloat today); Medway and the London Gateway Ports. Overall, vessel activity again shows some correlation with bird density levels especially within the Long Sands Head area within the southern portion and in some areas in the north.

The area has historically been subject to a large amount of vessel movement, associated with major ports, aggregate extraction, and wind farm build. There are also areas of housing built infrastructure. There is evidence to suggest that birds are not being displaced due to vessel activity (fishing, aggregate, wind farms etc.) although it can be seen from the RTD distribution maps that there is some displacement from the wind farm areas (Figure 18 and19).

On this basis, the MMO concludes no adverse effect on integrity to the SPA either alone or in-combination.

Figure 25a Shipping density 2012 (not including fishing vessels)

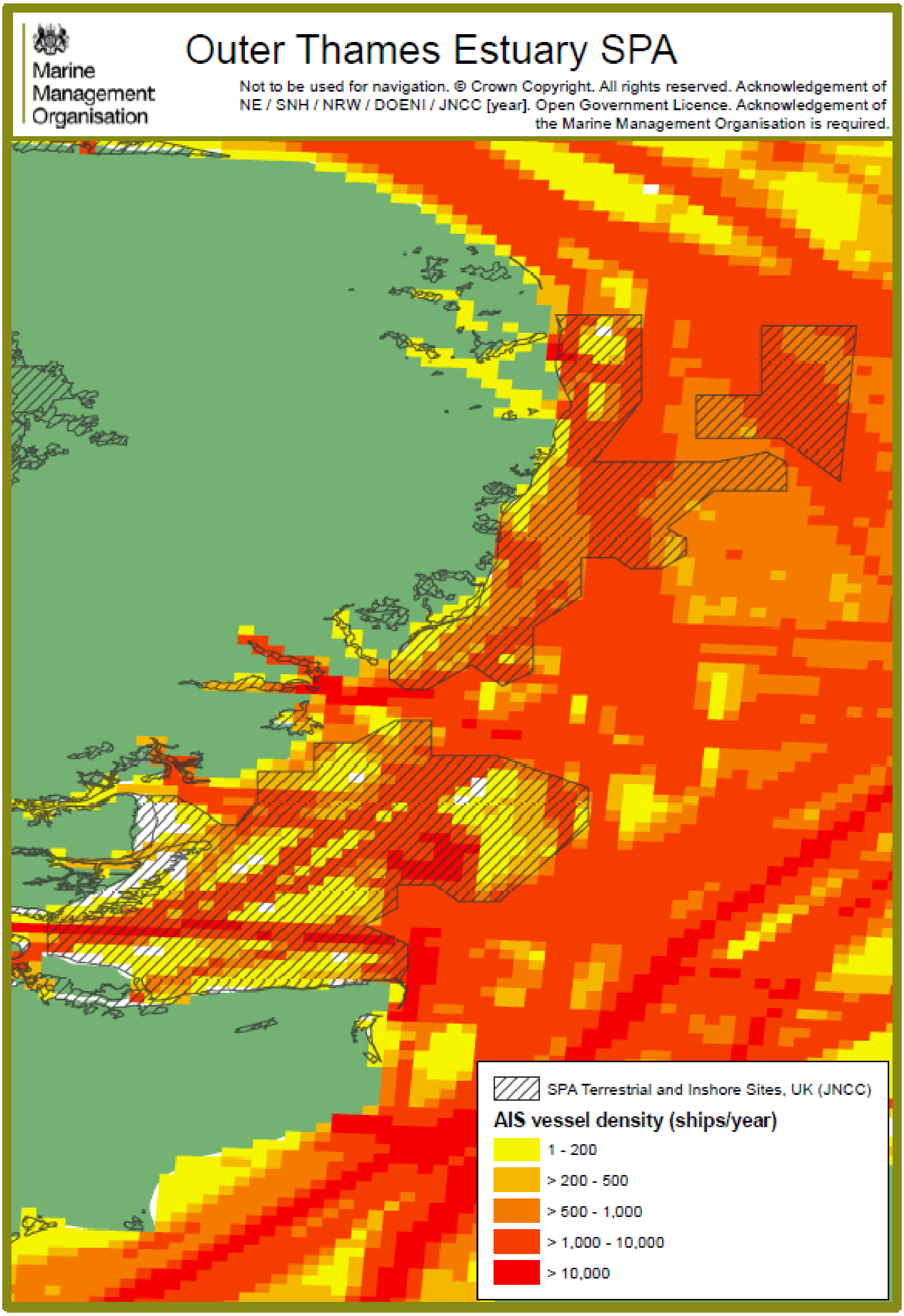
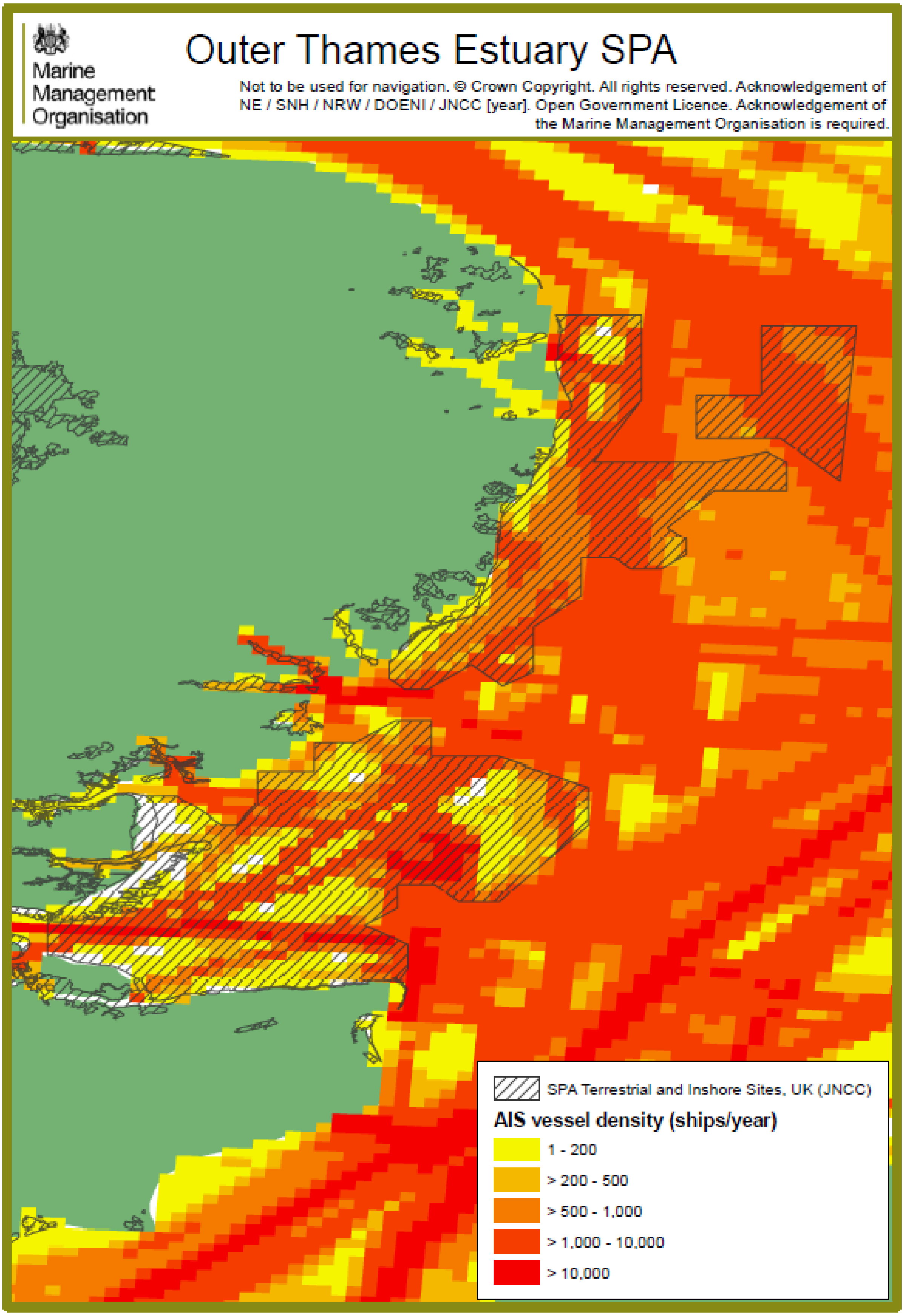


Figure 25b Shipping density 2012 (including fishing vessels)



4.4.8 Assessment of risk from biological disturbance (selective extraction of prey species) (alone)

Natural England advises that the removal of fish species and larger molluscs can have significant impacts on the structure and functioning of benthic communities over and above the physical effects of fishing methods on the seabed, particularly as some fish species fill upper roles in the trophic web (Jennings and Kaiser, 1998; Kaiser et al, 2006). Specifically, fishing has the potential to remove key prey species. Natural England advises that RTD are moderately sensitive to selective extraction of prey species, but there is a low vulnerability at this site.

During the breeding season, seabirds feed predominantly close to their colonies (Monaghan et al, 1994). After the breeding season, the seabirds are no longer tied to a particular area by nesting sites and are therefore less constrained in terms of feeding locations. Consequently, potential issues with competition for food are considered to be seasonal, being more sensitive during the breeding season. RTD mainly forage for fish that live near the surface or in the main water column; although in the winter they will sometimes take bottom dwelling fish. In winter, RTD are found in sheltered inshore waters and sandy bays including shallow sandbanks further offshore, and at tidal rips and fronts. They show a preference for foraging where water depth is less than 20m.

RTD are largely piscivorous and considered to be opportunistic feeders (Skov and Prins, 2001; Guse et al, 2009) eating both pelagic and bottom-dwelling species although most dives are no deeper than 9m. They are almost entirely diurnal. They have low flight manoeuvrability, and most flights will be between five and ten metres above the water (Garthe and Hüppop, 2004).

Herring are key prey species for the RTD (Guse et al, 2009), and fishing for this species is subject to targetted management in the Thames Estuary. The MMO and Cefas manage the Thames Estuary and Blackwater Herring (TEBWH) fishery, with separate licences issued for this fishery, and conditions set that the minimum mesh size required is 54mm. The TEBWH fishery is Marine Stewardship Coucil certified, and is a drift net only fishery, which typically involves upwards of 10 under 10m vessels each winter[29]. The uptake for this fishery varies each year dependent on the market demand. During the 2014-15 season the total uptake was nearly 12 tonnes from an overall total allowable catch (TAC) of 33 tonnes. TAC is set each year based on scientific advice from Cefas on stock levels.

Further south and outside of the TEBWH fishery, there is a pelagic trawl fishery within the river Thames, subject to a Kent and Essex IFCA byelaw. Typically upwards of five vessel under 10m and one over 10m use this fishery, and will achieve substantial landings dependent on the monthly allocation[30]. Fishermen often lease up to 20 tonnes of herring quota per vessel. The larger herring are typically seen at the start of the winter, with the TEBWH stock spawning locally around March-April. Typical fishing grounds for herring during the winter are River Blackwater, Wallet, Middle Deeps, Burrow Deeps, Warp, Knock John channel and Princes Channel.

In addition to this the Kent and Essex IFCA have a byelaw in the rest of the Thames Estuary south of the MMO fishery, with measures in place for 54mm drift nets and pelagic trawls of no less than 50mm. There are additional byelaws in place to protect the Eagle Bank (a main spawning area) from trawling and length of drift nets, which are inspected prior to fishing.

[29] https://www.msc.org/documents/fisheries-factsheets/net-benefits-report/Thames-Blackwater-herring.pdf
[30] MMO comms

The amount of key RTD prey species removed by commercial fishing activities (either targeted or as bycatch) is not clearly understood. In general, it is considered low due to differences in the average size composition of the fish eaten by RTD and caught in commercial quantities by fishers, making vulnerability to selective extraction low.

The Thames Estuary supports an important cockle fishery, and the commercial harvesting of the cockles is controlled by Kent and Essex IFCA in order to ensure the fishery remains sustainable. The harvesting of the cockles does not take place over the wintering months when RTD are present at the site and a separate HRA is conducted to ensure that this fishery does not adversely effect the SPA.

The effects of commercial fishing on fish populations and distributions can be difficult to separate from natural changes in species abundance due to environmental changes in, for example, temperature and currents, or from man-made changes, such as increases in nutrients. Additionally, it is possible that active fisheries reducing stocks of large fish can reduce competition for prey. For example, Sherman et al (1981) considered that sandeel stocks had increased both in the North Sea and in the Western Atlantic shelf seas as a response to reduced competition with herring and mackerel.

MMO does have information on the annual landings of fish at ICES rectangle areas, which can be equated to the SPA. It is estimated that between 2009 and 2013, a total of 355 tonnes of fish was landed from within the SPA, with harvesting machines being the most important method of collection (of shellfish), then trawls and lining (Annex 3). However this information is of limited use without some knowledge of the total resource.

Eastern IFCA carry out annual cockle, mussel and crustacean stock assessments[31]. Finfish landings vary across Eastern IFC District with the majority of landings in the southern portion of the district. Overall, landings of finfish (Table 7) and all species have decreased over time.

Table 7: Eastern IFC District landings data 2008 – 2013 (tonnes)

All areas combined	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Crustaceans	2188.2	1452.6	1215.2	568.0	916.7	874.2
Finfish	443.0	311.1	230.4	204.6	347.3	253.2
Molluscs*	10598.2	11592.9	5108.8	4543.8	5755.0	4750.1
Grand Total	**13229.5**	**13356.6**	**6554.4**	**5316.4**	**7019.0**	**5877.5**

* Molluscs are not generally targeted in the EIFCA section of the Outer Thames Estuary SPA[32].

The MMO concludes that the extraction of prey items by commercial fishing is not having an adverse effect on the integrity of the SPA on the basis of relatively high numbers of birds present in the site; the varied (opportunistic) diet of RTD; the controls already in place for key species such as herring and cockles; and the likely difference in preference between commercially landed fish and prey for RTD.

4.4.9 Assessment of risk from biological disturbance (non-selective extraction of RTD)

[31] http://www.eastern-ifca.gov.uk/research-environment-plans-strategies-reports/
[32] EIFCA comms

Natural England advise that the primary potential causes of non-selective extraction of RTD are entanglement in static fishing gear or wind turbine strike and that the species is highly sensitive (though moderately vulnerable) to mortality from either source. Entanglement in static nets, fishing lines and general marine litter (of a wide variety) is a major cause of known mortality of RTD (Okill, 2002; Schirmeister, 2003; Erdmann et al, 2005; Camphuysen, 2008).

Due to the potential risk posed to RTD, Kent and Essex IFCA in partnership with Natural England have carried out observations on RTD bycatch within the Outer Thames Estuary SPA. Results from the two winter survey programmes over 2011/12 and 2012/13 showed that drift netting in the area was not a significant source of mortality for RTD; zero bycatch of the species was recorded. IFCA observations showed that fishing effort for drift netting was low over the winters and that fixed netting was not common practice in the area (Laverick and Knollys, 2012; Laverick, 2014).

Netting and lining is more widespread in Eastern IFC District (annex 2) in the northern section of the site, however demersal drift netting is seasonal, with a higher level of effort in summer, outside the peak RTD overwintering period (JNCC, 2011; [33]). Gill/trammel and entangling netting does occur all year round targeting cod in winter and sole in summer. There is no direct evidence of RTD mortality in this area although there have been reports previously (Weston and Caldow, 2010) however, the small, inshore vessels that conduct netting in this area do not leave nets unattended so it is likely that entanglement risks are reduced because of the avoidance of fishing vessels by RTD[34].

VMS data highlight that use of netting and lining by larger vessels is limited.

The MMO concludes that the non-selective extraction of RTD by commercial fishing operations is not having an adverse effect on the integrity of the SPA, on the basis of relatively high numbers of birds present in the site; the lack of evidence for any by-catch records following specific studies by Kent and Essex IFCA; and the low levels of fishing offshore or in Eastern IFC District.

5. Overall Conclusion

The MMO concludes that commercial fishing is not having an adverse effect on the integrity of the SPA, either directly (posing a risk to the RTD populations) or indirectly (posing a risk to the supporting habitats, the key habitats being shallow coastal waters and sandbanks).

Other activities in-combination have already been assessed at the pressure level. In addition, other plans and projects within a 5km^2 buffer of the site boundary have been considered in Table 7. Due to the mitigation and conditions in place to ensure minimal impacts from these, the MMO concludes no adverse effect to the SPA from commercial fishing in-combination with other plans and projects.

[33] EIFCA comms
[34] EIFCA comms

Table 8: Other activities occurring in or adjacent to the site.

Plans and Projects		
Activity	**Description**	**Potential Pressure**
Blue Transmission London Array Limited	Marine licence variation for Inter Array cable repair	Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts. Low risk of physical loss, damage or biological disturbance.
Tarmac Marine Dredging LTD	Aggregates dredge around Long Sands Head	A licence condition requires the applicants to ensure There will be no extraction of material which could represent Annex 1 sandbank habitat; - All changes in hydrodynamics or physical processes will be of a negligible value over the Annex 1 sandbank feature itself meaning there will be no significant change in the seabed character or morphology of the sandbank; and - Any induced sediment plumes will not be of a magnitude, either spatially or in terms of suspended sediment concentration, where they could change the physical or biological properties of the sandbank to an extent where they could change the functioning of its constituent sub features and habitats.
London Array Limited	For Inter Array cable repair	Appropriate EIA/HRA will be consulted on to ensure that any licence issued will not have an impact on the site.
Other activities being considered		
Activity	**Description**	**Potential Pressure**
Recreational angling	Activity levels unknown	Low risk of physical loss, damage or biological disturbance.

Yachting, sailing, motor cruises, bird watching, scuba diving	Activity levels unknown	Low risk of physical loss, damage or biological disturbance.

6. Summary of consultation with Natural England

TO BE INPUT

7. Conclusion

Based on the evidence on the impacts of current effort levels of fishing activities as well as current mitigation implemented for other activities within the site (including plans and projects), the proposed zoned management of some of the supporting habitat in Margate and Long Sands EMS, MMO ascertains that although fishing contributes to overall disturbance, the use of these gears alone and in-combination does not cause an adverse effect on the integrity of the site.

MMO will continue to monitor current fishing activities/potential activities within the site, in line with the MMO's Marine Protected Area Monitoring and Control Plan.

Receipt of significant new information about current and potential activities or features at this site will initiate a review of this assessment.

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Annex 1. Fishermap charts showing fishing activity

Figure 6. Fishermap: bottom towed gears

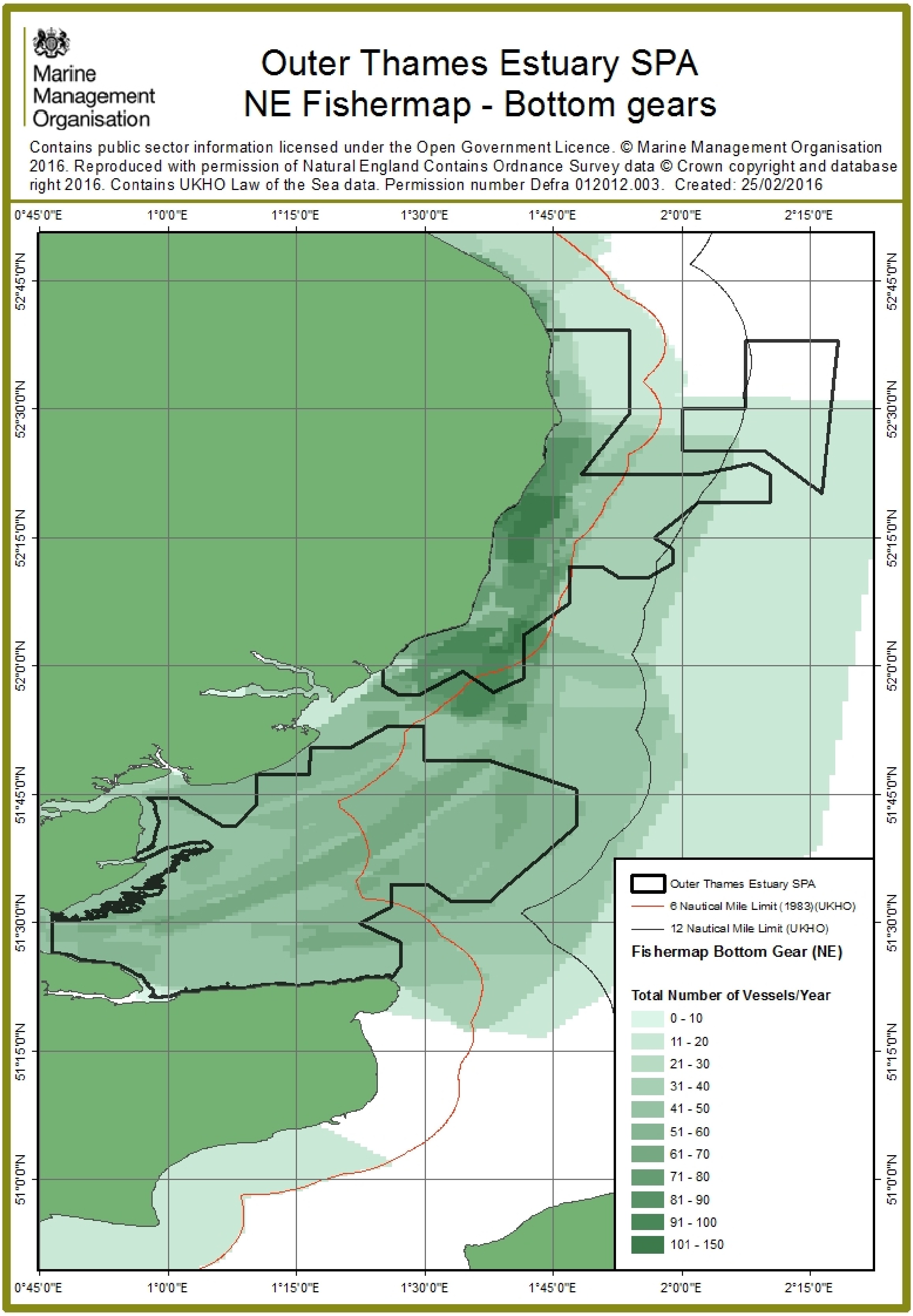


Figure 7: Fishermap: dredges

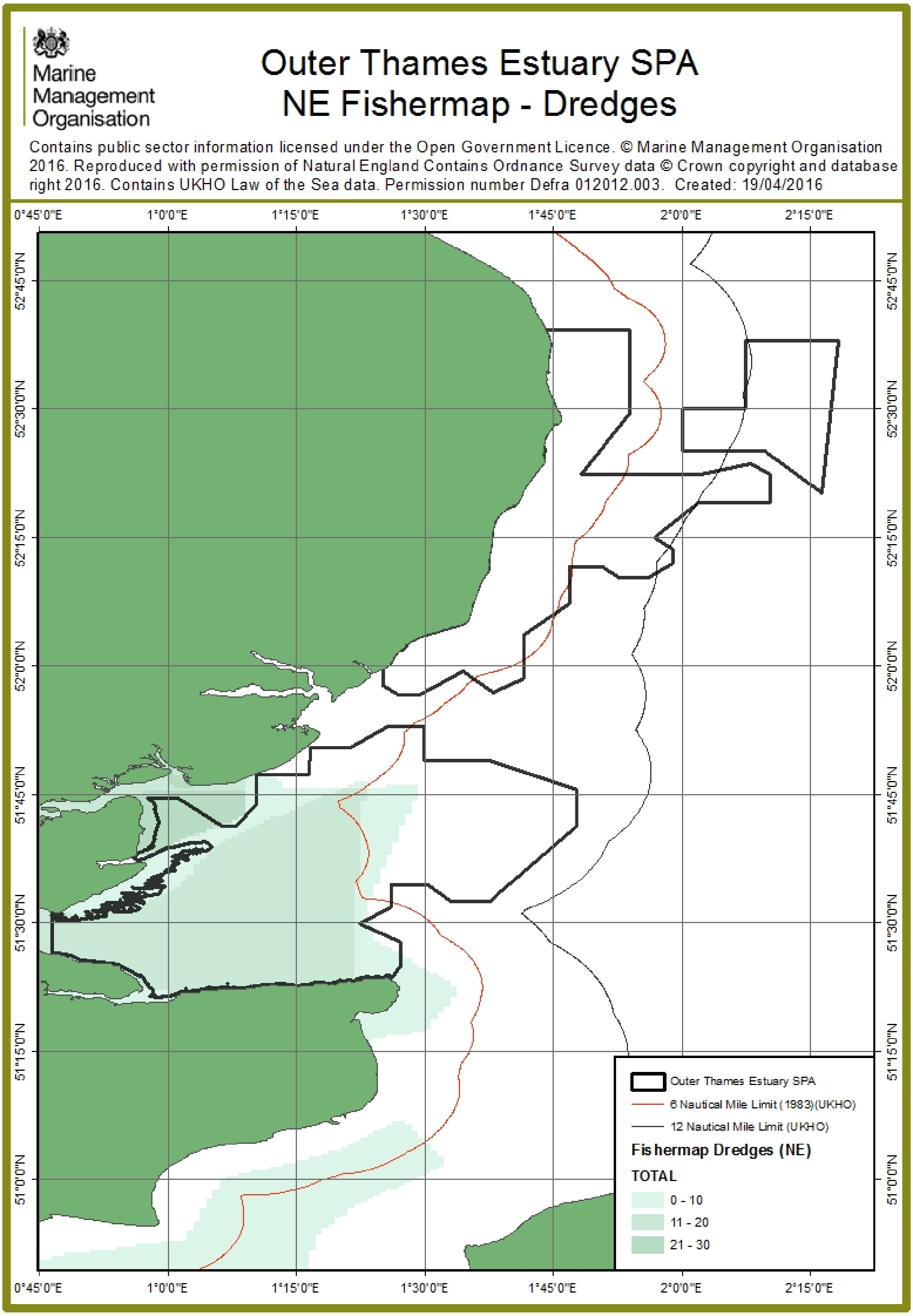


Figure 8: Fishermap: lines

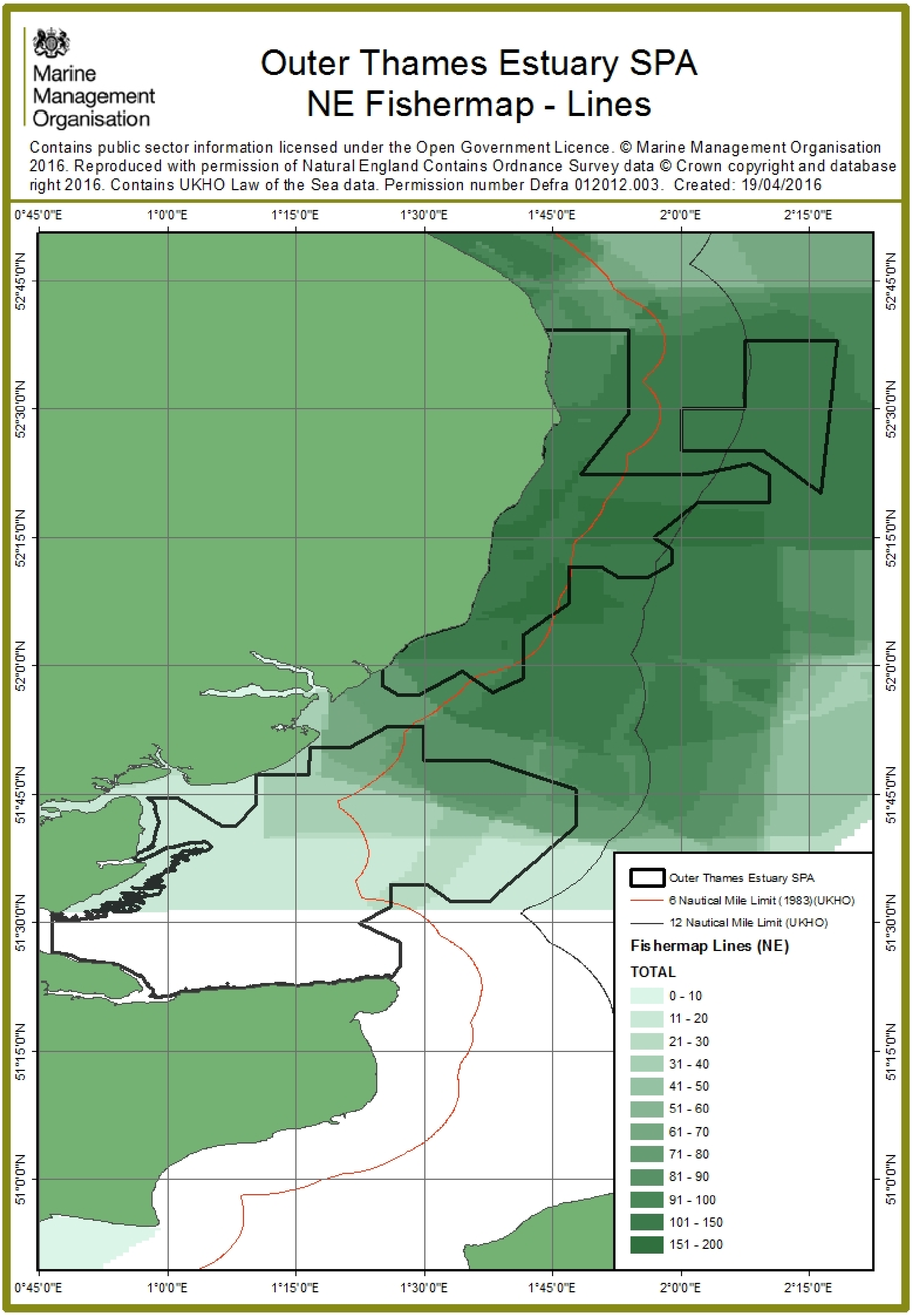


Figure 9: Fishermap: nets

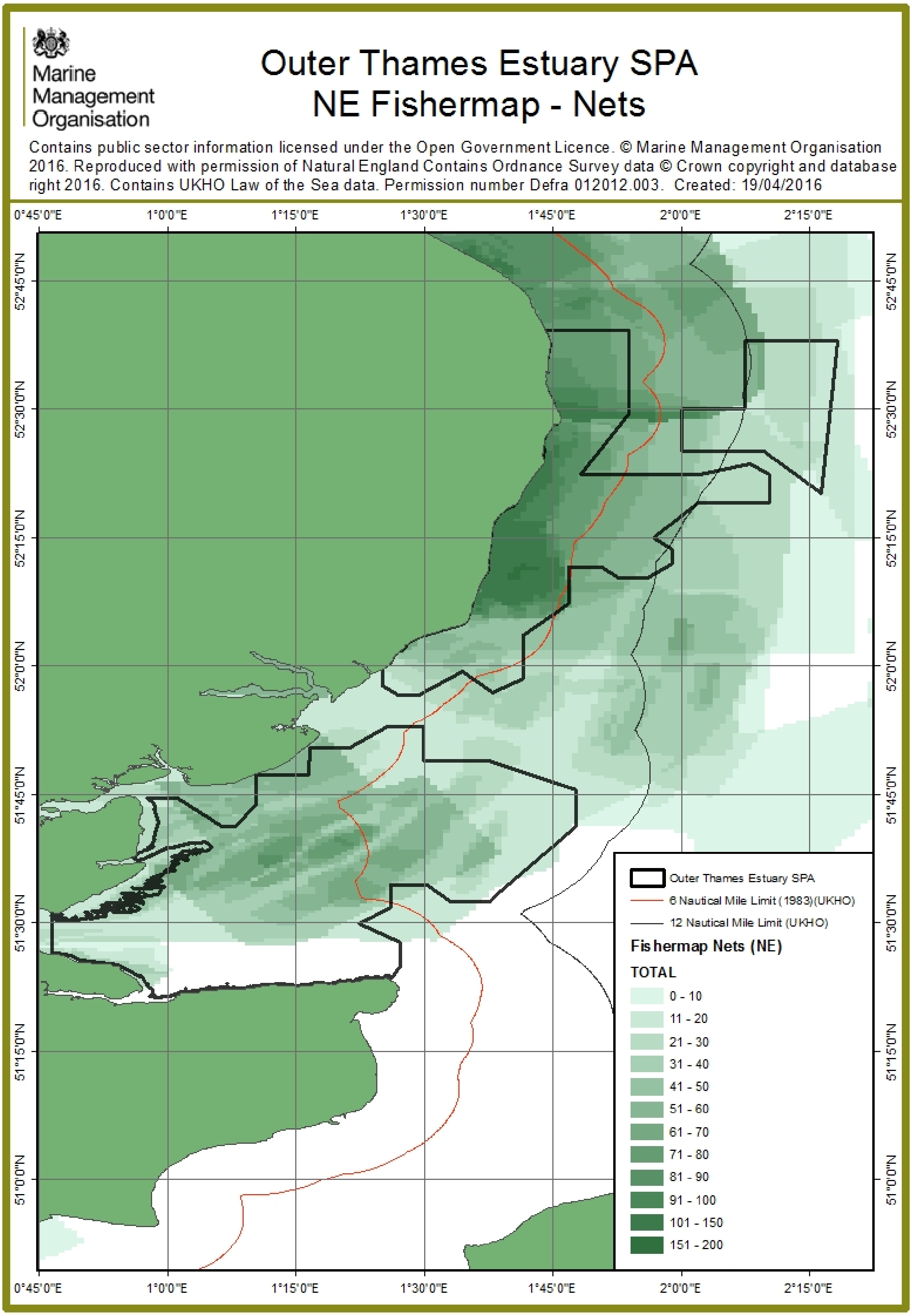
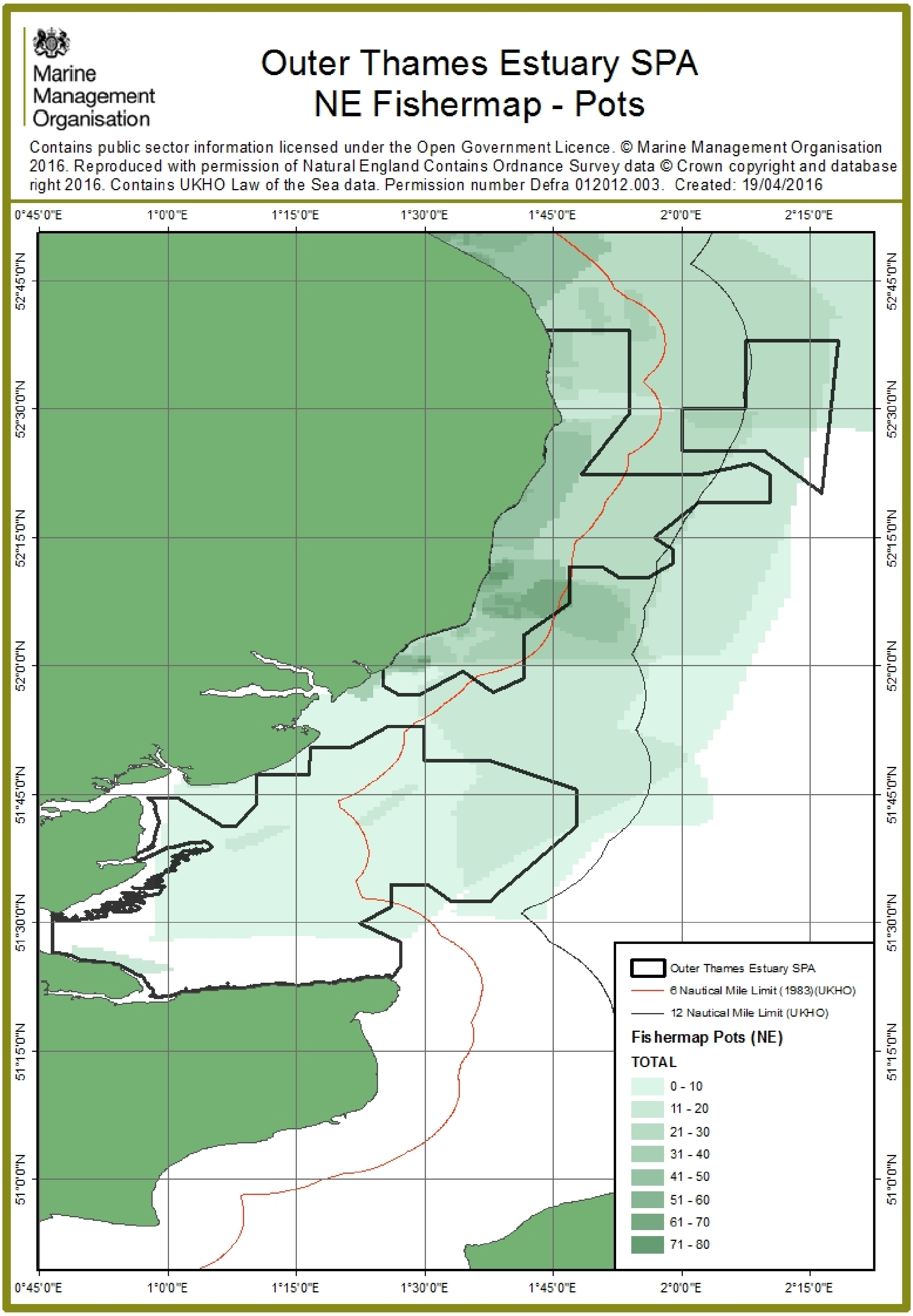


Figure 10: Fishermap: pots



Annex 2. Fishing data derived from sightings

Figure 11 : Sighting data per unit effort for mobile gears within Outer Thames Estuary SPA

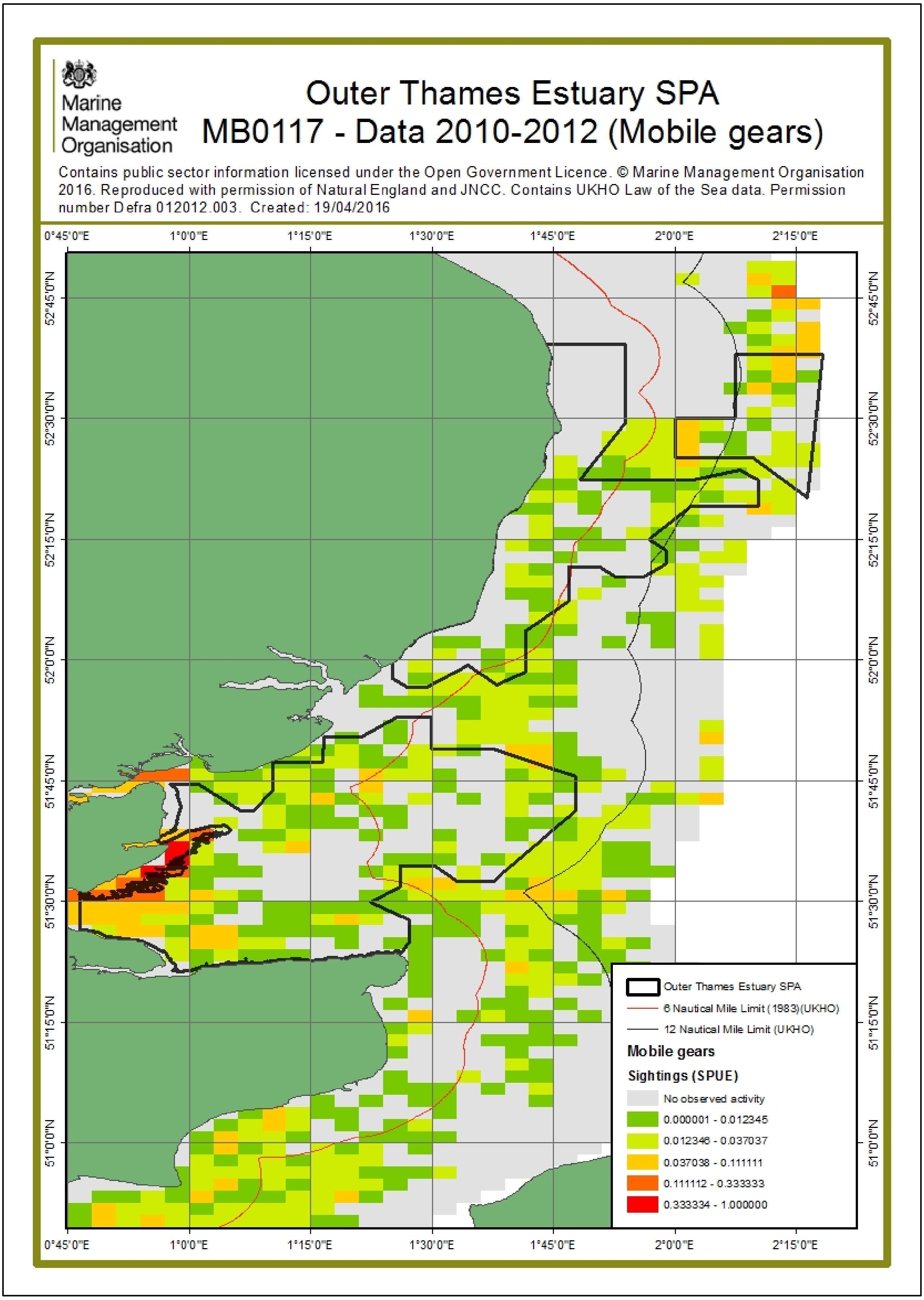


Figure 12: Sighting data per unit effort for static gears within Outer Thames Estuary SPA

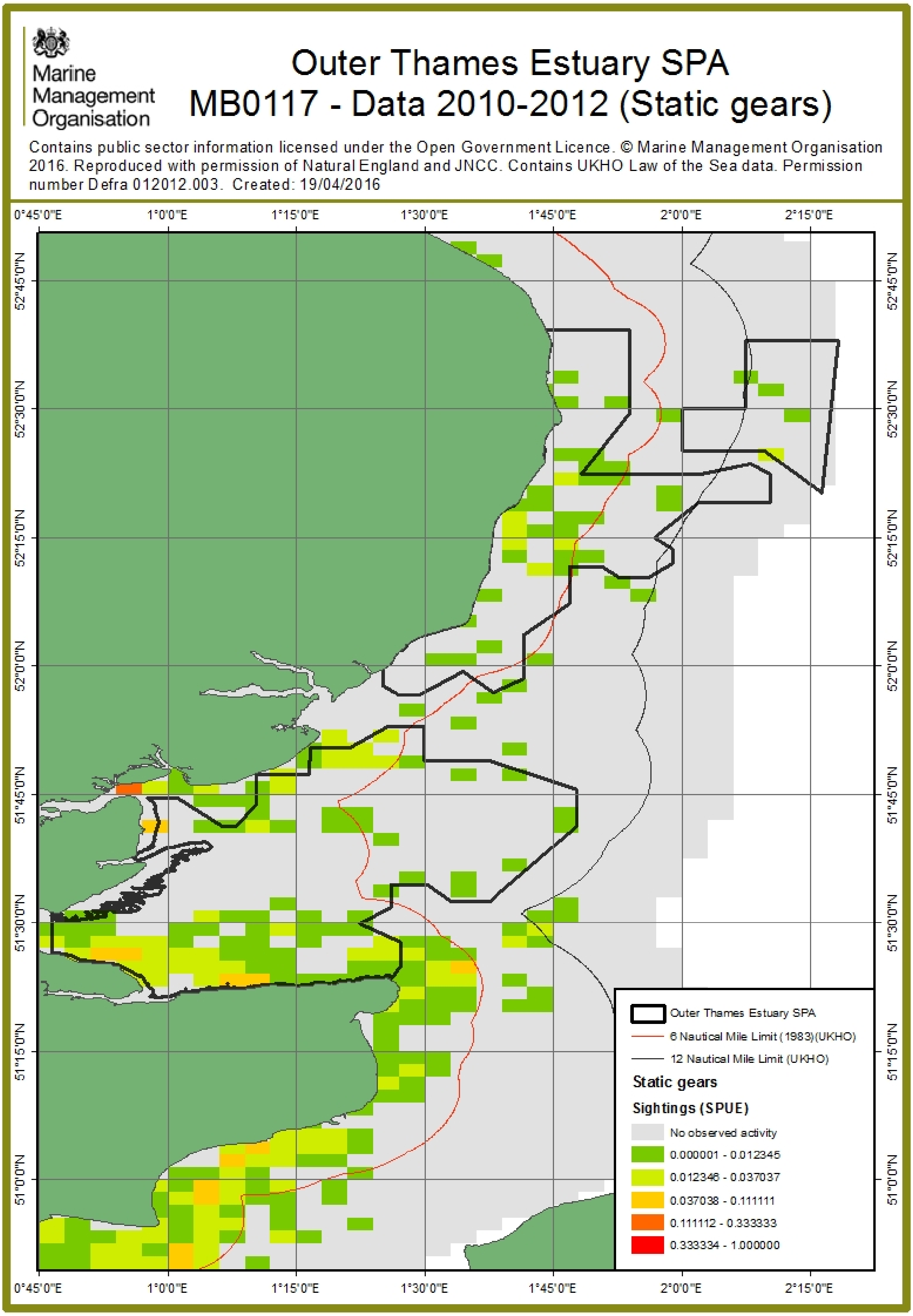
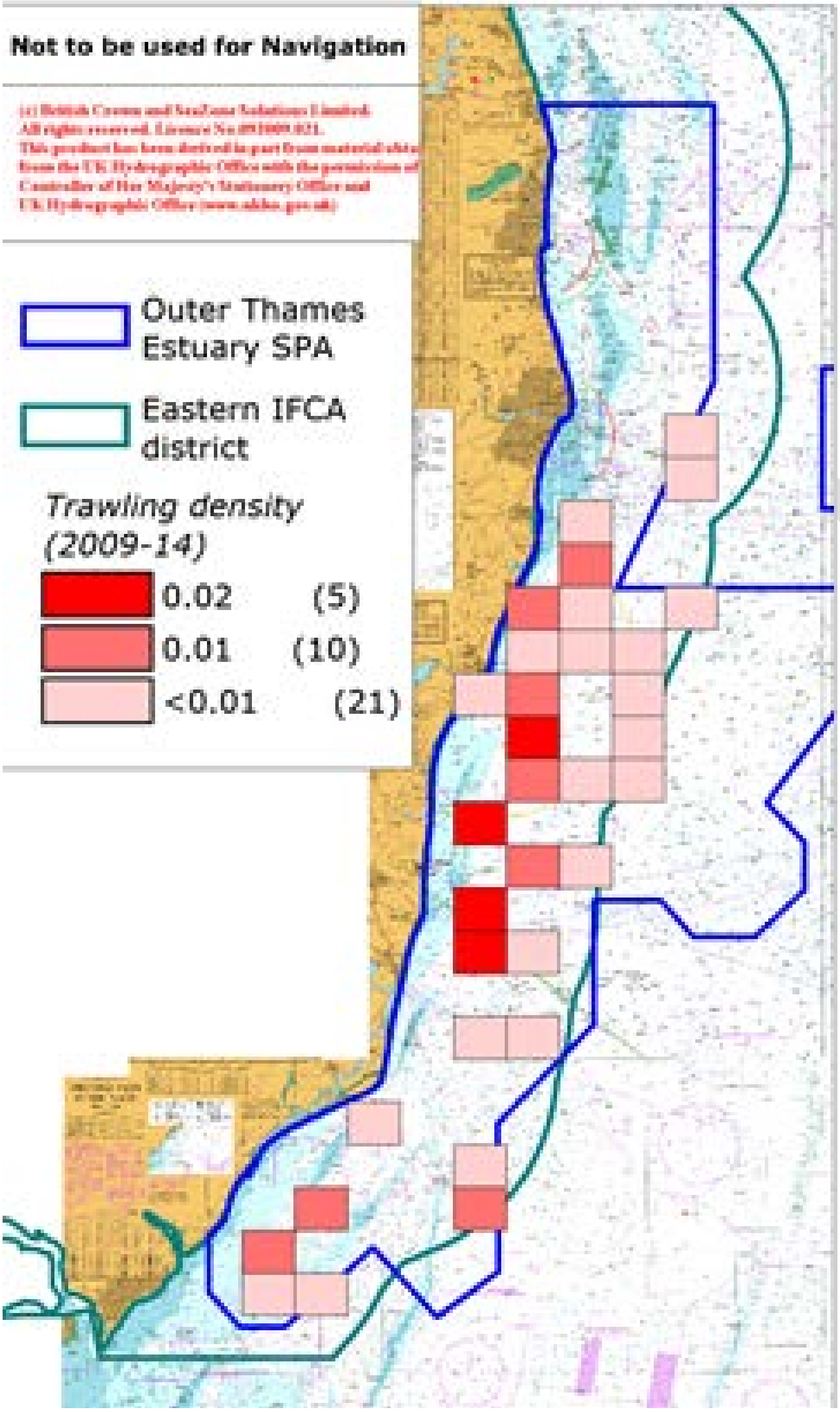
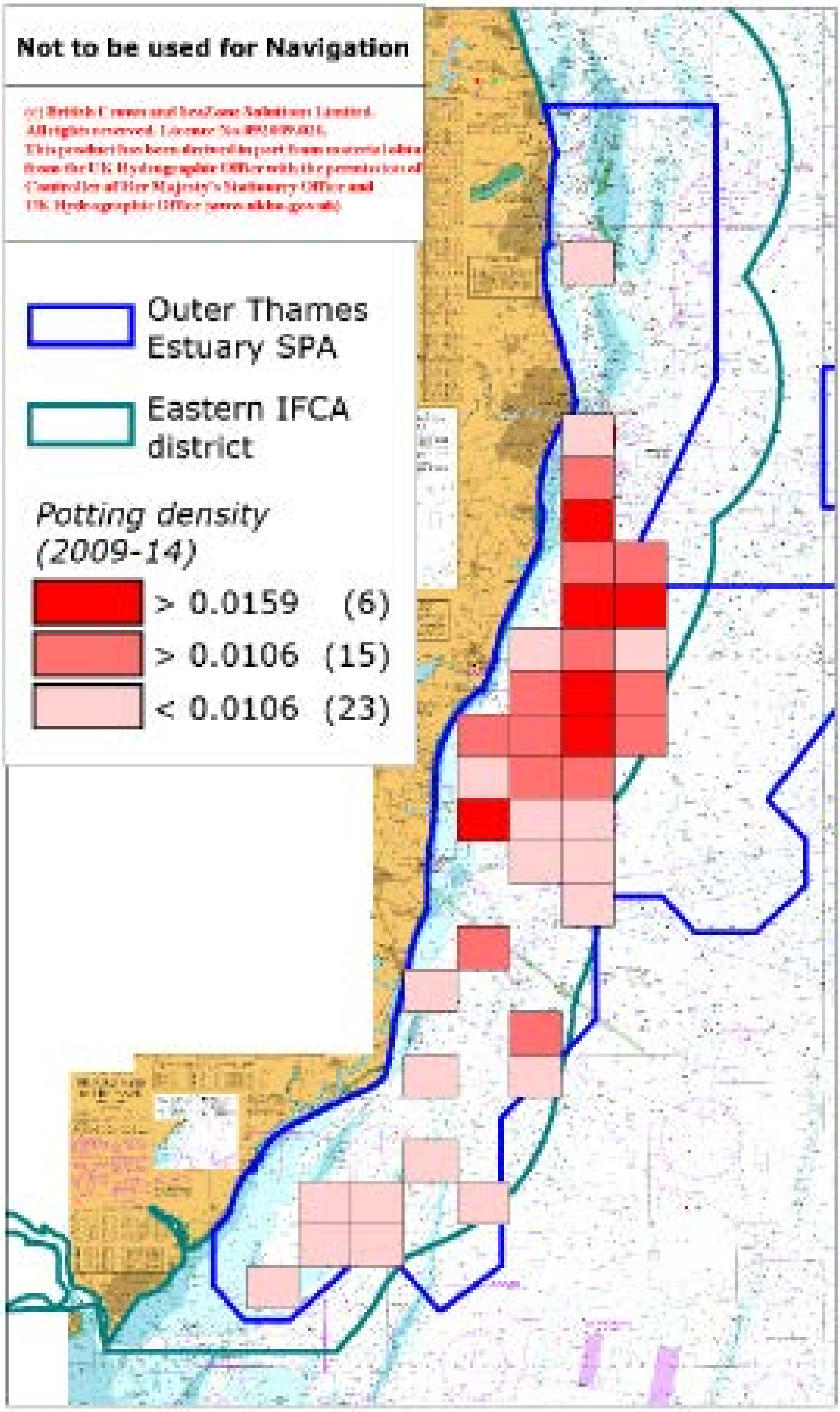


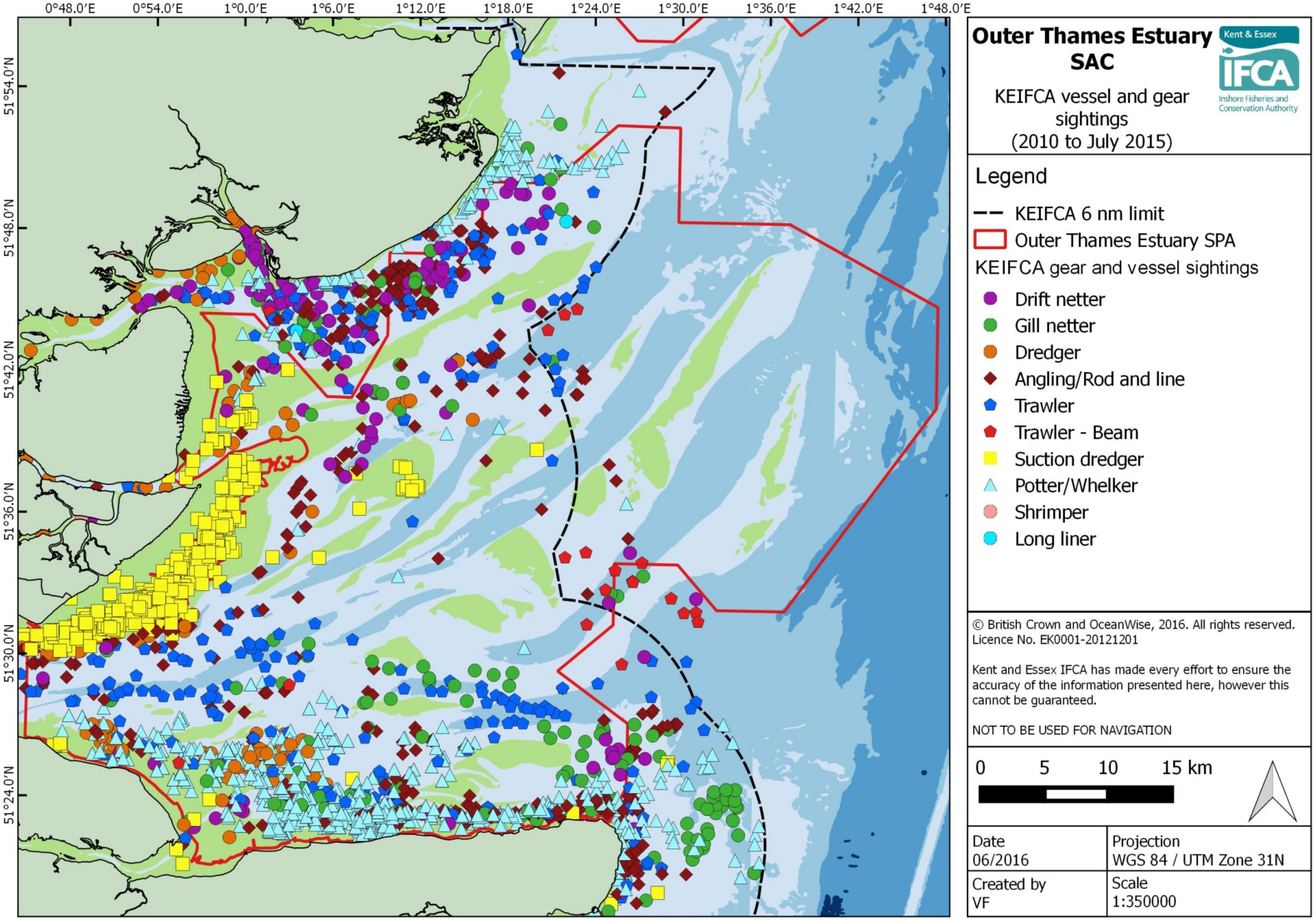
Figure 13: EIFCA trawling and potting effort





Not to be used for Navigation
Outer Thames Estuary SPA
Eastern IFCA district
Potting density (2009-14)
> 0.0159 (6)
> 0.0106 (15)
< 0.0106 (23)

Figure 14: Kent and Essex I FCA vessel sightings data 01/01/2010 to 30/07/2015



Annex 3: UK Landings Data for ICES rectangles 31F0,31F1,32F0,32F1,33F1,33F2,34F1,34F2

Values	Species Group	2009	2010	2011	2012	2013	Grand Total	Annual average (over 5 years)	VMS based estimate of annual activity in detailed site
Qty landed (tonnes)	Crustacean	107	132	159	189	193	781	156	6.8
	Demersal	1,620	1,696	1,481	1,186	1,532	7,514	1,503	168.7
	Mollusc	1,322	1,317	4,420	2,327	8,034	17,420	3,484	138.2
	Pelagic	589	771	853	680	412	3,305	661	41.9
	Total	**3,638**	**3,917**	**6,912**	**4,382**	**10,171**	**29,020**	**5,804**	**355.6**
Value landed	Crustacean	£469,958	£514,018	£887,107	£770,332	£725,810	£3,367,226	£0.67mn	£0.06mn
	Demersal	£5,219,519	£5,765,455	£5,450,580	£3,832,207	£4,353,539	£24,621,300	£4.92mn	£0.58mn
	Mollusc	£4,949,756	£1,503,509	£1,478,355	£1,691,780	£4,655,686	£14,279,085	£2.86mn	£0.14mn
	Pelagic	£238,568	£225,464	£162,170	£125,773	£128,005	£879,980	£0.18mn	£0.01mn
	Total	**£10,877,799**	**£8,008,446**	**£7,978,212**	**£6,420,092**	**£9,863,040**	**£43,147,590**	**£8.63mn**	**£0.80mn**

Values	Gear group	2009	2010	2011	2012	2013	Grand Total	Average over 5 years (tonnes/ £m pa)	VMS based estimate of annual activity in detailed site
Quantity landed (tonnes)	Gill nets and entangling nets	670	632	703	652	615	3,271	654	0.0
	Harvesting machines	1,182	976	2,801	120	6,251	11,332	2,266	252.3
	Hooks and lines	205	327	106	148	110	895	179	21.9
	Lift Nets	-	0	-	1	-	1	0	0.0
	Miscellaneous gear		33	1,062	1,010	281	2,386	477	0.0
	Seine nets	17	13	4	12	30	75	15	0.0
	Traps	190	370	646	1,303	1,559	4,068	814	8.8
	Trawls	1,375	1,566	1,590	1,135	1,326	6,993	1,399	72.7
	TOTAL	**3,638**	**3,917**	**6,912**	**4,382**	**10,171**	**29,020**	**5804**	**355.6**
Value landed	Gill nets and entangling nets	£1,894,948	£1,945,959	£2,234,331	£1,568,371	£1,433,932	£9,077,542	£1.82mn	£0.00mn
	Harvesting	£4,859,606	£1,310,149	£367,963	£181,307	£3,419,629	£10,138,654	£2.03mn	£0.40mn

	machines								
	Hooks and lines	£353,930	£729,424	£258,370	£336,777	£241,094	£1,919,595	£0.38mn	£0.06mn
	Lift Nets	-	£118	-	£253	-	£371	£0.00mn	£0.00mn
	Miscellaneous gear		£3,218	£777,397	£708,514	£169,155	£1,658,284	£0.33mn	£0.00mn
	Seine nets	£68,795	£38,734	£7,111	£40,261	£59,384	£214,284	£0.04mn	£0.00mn
	Traps	£459,590	£576,229	£1,132,887	£1,413,622	£1,561,523	£5,143,851	£1.03mn	£0.02mn
	Trawls	£3,240,931	£3,404,614	£3,200,154	£2,170,987	£2,978,324	£14,995,010	£3.00mn	£0.32mn
	TOTAL	**£10,877,799**	**£8,008,446**	**£7,978,212**	**£6,420,092**	**£9,863,040**	**£43,147,590**	**£8.63mn**	**£0.80mn**