Red-throated Diver Implementation and Monitoring Plan (RTDIMP)

Prepared by:	Checked by:	Approved by:
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Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
1	16/08/2024	Chris Robinson	Rachel Devine	Peter Robson
2	08/11/2024	Chris Robinson	Peter Robson	Lisa Western
3	21/02/2025	Chris Robinson	Peter Robson	Lisa Western
4	03/04/2025	Chris Robinson	Peter Robson	Lisa Western

Description of Revisions			
Rev	**Page**	**Section**	**Description**
1			First draft for review by the RTDCSG
2	8-9; 14-25; 28-33	2; 4; 5; 6; & 8	Second draft following comments and feedback from RTDCSG
3	7; 16-20; 21-23; 28-29; & 30-31	2.3; 4.1.2.1; 4.1.4.1; 6.1 & 8	Third draft following comments and feedback from the RTDCSG
4	8-9 & 23	2.5 & 4.1.4.3	Fourth and final draft following final comments and feedback from the RTDCSG

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1. ABBREVIATIONS AND DEFINITIONS

1.1. Abbreviations

AIS	Automated Identification System
AOE	Alde-Ore Estuary
BEIS	Department for Business Energy and Industrial Strategy
BMP	By-catch Monitoring Programme
COD	Commercial Operation Date
COLREGS	Convention on International Regulations for Preventing Collisions at Sea
COWSC	Collaboration in Offshore wind Strategic Compensation
DAS	Digital Aerial Survey
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DEFRA	Department for Environment and Rural Affairs
DML	Deemed Marine Licence
ESC	East Suffolk Council
EIA	Environmental Impact Assessment
FFC	Flamborough and Filey Coast
GAM	Genarlised Additive Model
GSD	Ground Sampling Distance
JNCC	Joint Nature Conservation Committee
LBBCSG	Lesser Black-Backed Gull Compensation Steering Group
LBBIMP	Lesser Black Backed Gull Implementation and Monitoring Plan
MMO	Marine Management Organisation
MCC	Marine Co-ordination Centre
NE	Natural England
NtM	Notice to Mariners
NWT	Norfolk Wildlife Trust
O&M	Operations and Maintenance
OWEC	Offshore Wind Evidence and Change Programme
OTE	Outer Thames Estuary
PoW	Plan of Works
RSPB	Royal Society for the Protection of Birds
RTDCSG	Red-Throated Diver Conservation Steering Group
RTDIMP	Red-Throated Diver Implementation and Monitoring Plan
SoS	Secretary of State
SPA	Special Protection Areas
SWT	Suffolk Wildlife Trust
VTMS	Vessel Traffic Management System
EAH	East Anglia Hub Offshore Windfarms
EDMS	Electronic Document Management System
IBR	Scottish Power / Iberdrola Renewables Offshore

MDR	Master Document Register
PQMS	Project Quality Management System

NOTE: The agreement log and the comment log for the RTDIMP are defined as follows:

- **Agreement Log:** Where the projects have sort agreement with the RTDCSG on aspects of the projects DCO obligations.
- **Comment Log:** Addresses the specific comments made by RTDCSG members on the RTDIMP only.

2. OVERVIEW AND REQUIREMENTS

2.1. Introduction

East Anglia ONE North and TWO offshore windfarm projects are being developed by ScottishPower Renewables (SPR). Applications for development consent were submitted to the Planning Inspectorate in October 2019, with consents for both projects being awarded on 31 March 2022. East Anglia ONE North and TWO are discrete projects with individual Development Consent Orders (DCOs); however, the Projects share a portion of the offshore cable corridor, have the same landfall location, and share an onshore cable route. East Anglia ONE North will comprise of up to 67 wind turbines and East Anglia TWO will be comprised of up to 75 wind turbines, with both East Anglia ONE North and TWO Projects located in the Southern North Sea approximately 36 km and 32 km from the Suffolk coast (respectively).

East Anglia ONE North and East Anglia TWO both received consent on 31 March 2022. Consents were granted on the basis of the Projects delivering compensation for the following features of Special Protection Areas (SPA):

- Kittiwake associated with the Flamborough and Filey Coast (FFC) SPA;
- Lesser black-backed gull as a feature of the Alde-Ore Estuary (AOE) SPA; and
- Red-throated diver as a feature of the Outer Thames Estuary (OTE) SPA.

With respect to red-throated diver, in consenting both projects, the Secretary of State (SoS) concluded that an adverse effect on the integrity of the Outer Thames Estuary SPA (OTE SPA) cannot be excluded due to potential displacement and disturbance effects on red-throated divers alone and in-combination, and therefore both East Anglia ONE North and TWO are required to provide compensation. The development of compensation is to be based on proposals detailed in the Offshore Ornithology Without Prejudice Compensation Measures report[1,2] which is referred to as the "compensation plan" in the DCO conditions described in Section 1.2. In addition, the development of the OTE SPA monitoring requirement is based on the letter provided to the Department for Business Energy and Industrial Strategy (BEIS) (now the Department for Energy Security and Net Zero (DESNZ)) dated 11 March 2022[3,4] which sets out information on survey area, frequency, method and analysis.

This document sets out the Red-Throated Diver Compensation Implementation and Monitoring Plan (RTDIMP) for delivery of the East Anglia ONE North and TWO red-throated diver compensation measures.

2.2. Consent Requirements

This RTDIMP, has been prepared pursuant to paragraph 3 of Schedule 18, Part 3 of the East Anglia ONE North Offshore Wind Farm Order 2022 (the 'East Anglia ONE North DCO'[5]) and paragraph 3 of Schedule 18, Part 3 of the East Anglia TWO Offshore Wind Farm Order 2022 (the 'East Anglia TWO DCO'[6]). This document serves to discharge these provisions for both projects. The provisions stipulate:

> *Following consultation with the RTDCSG, the RTDIMP must be submitted to the Secretary of State for approval (in consultation with the MMO and the relevant statutory nature conservation body). The RTDCSG must be consulted further as required during the approval process. The RTDIMP must be based on the strategy for red-throated diver compensation set out in the red-throated diver compensation plan and include—*
> *(a) details of the location where compensation measures will be deployed, why the location is appropriate ecologically and likely to support successful compensation, and details of agreements*

[1] East Anglia ONE North ExA.AS-6.SoSQ2.V5 EA1N Offshore Ornithology Without Prejudice Compensation Measures (planninginspectorate.gov.uk)
[2] East Anglia TWO ExA.AS-6.SoSQ2.V5 EA2 Offshore Ornithology Without Prejudice Compensation Measures (planninginspectorate.gov.uk)
[3] East Anglia ONE North EN010077-009780-EA1N Cover Letter 11 March 2022 final.pdf (planninginspectorate.gov.uk)
[4] East Anglia TWO EN010078-010042-EA2 Cover Letter 11 March 2022 final.pdf (planninginspectorate.gov.uk)
[5] East Anglia ONE North The East Anglia ONE North Offshore Wind Farm Order 2022 (planninginspectorate.gov.uk)
[6] East Anglia TWO The East Anglia TWO Offshore Wind Farm Order 2022 (planninginspectorate.gov.uk)

demonstrating how the vessel route diversions and/or exclusions will or have been secured to deliver the ecology objectives of the RTDIMP;
(b) an implementation timetable for delivery of the vessel route diversion and/or exclusion compensation measures which ensures that the measures are in place prior to the installation of any tower comprised within a wind turbine generator forming part of the authorised development;
(c) details in relation to the monitoring of red-throated diver abundance and distribution using aerial digital surveys in the Outer Thames Estuary SPA and a 10km buffer over two winters. Three surveys should take place each winter (between 1st November and 31st March) with one batch to take place before the installation of the turbines forming part of the authorised development and the other batch to take place after;
(d) details of the proposed ongoing monitoring of the measures including: survey methods; survey programmes; success criteria; recording of RTDCSG consultations and project reviews; details of the factors used to trigger alternative compensation measures and/or adaptive management measures;
(e) details in relation to the convening of a partnership with relevant authorities and user representation to— (i) improve understanding of disturbance and displacement effects on red-throated diver within the Outer Thames Estuary SPA; (ii) identify and implement opportunities to reduce these effects; and (iii) ensure stakeholder engagement and liaison to raise awareness and communicate any proposed changes in usage; and
(f) details of the work in respect of ornithological by-catch measures as set out in Appendix 7 of the Offshore Ornithology Without Prejudice Compensation Measures, that could support practical management measures to reduce ornithological by-catch.

East Anglia ONE North and TWO will ratify this RTDIMP with all members of the Red-Throated Diver Compensation Steering Group (RTDCSG) prior to its submission to the SoS for approval in accordance with Schedule 18, Part 3 of the East Anglia ONE North DCO and East Anglia TWO DCO ('the Compensation Schedules'). Further details of the RTDCSG are provided in Section 1.4.

2.3. Approach and Consultation

Under the East Anglia ONE North and East Anglia TWO consents, and in order for East Anglia ONE North Ltd and East Anglia TWO Ltd to fully discharge their conditions, there is a requirement to set up a Red-Throated Diver Compensation Steering Group (RTDCSG) with the aim to consult upon and agree to the contents of the RTDIMP. The RTDCSG was set up in March 2024 by ScottishPower Renewables in consultation with Natural England, with the first meeting taking place in April 2024 where details of the RTDIMP were discussed. Terms of reference as agreed with the East Anglia ONE North and TWO RTDCSG members are detailed in the RTDCSG plan of work (PoW)

To finalise this RTDIMP ScottishPower Renewables has continued to liaise with the RTDCSG via email and subsequent group meetings in April and September 2024, thus allowing members to review and comment on the RTDIMP and supporting documents prior to final submission to the SoS (see Appendix 1 Comment Log). A third meeting was initially planned for November 2024 however, it was agreed with the RTDCSG members that further comments on the second draft version of the RTDIMP would be dealt with via email correspondence and written feedback. This RTDIMP has therefore been developed in consultation with the RTDCSG (see Appendix 1 Comment Log). A record of consultation and engagement with the RTDCSG has been provided in a separate Agreement Log with the intention being that this agreement log be maintained and updated as the project progresses and measures are implemented, monitored and reported on.

The development of the RTDIMP compensation measures are a requirement of the Projects DCO Conditions (as stated in Section 2.2), and they must be based on proposals set out in Appendices 6 and 7 of the Offshore Ornithology Without Prejudice Compensation Measures Reports. This RTDIMP sets out further details on each of the requirements outlined in the Without Prejudice Compensation Measures Reports, the mechanisms for delivery and the timescales involved. Members of the RTDCSG have fed into the development of the RTDIMP to ensure expert input is incorporated and that the proposed mechanisms for delivery are aligned with other similar works taking place around the UK.

Due to the technical nature of the red-throated diver by-catch compensation measure, and as advocated in the Offshore Ornithology Without Prejudice Compensation Measures Reports, a second technical subgroup, the by-catch reduction working group has been established. The working group consists of different technical

experts to that of the main RTDCSG, with the key objectives of group being to advise on the development and delivery of the ornithological by-catch compensation measures, which are primarily:

- The development of the ornithological by-catch monitoring plan;
- Implementation of a pilot gear study to reduce by-catch; and
- Develop appropriate adaptive management measures to ensure ornithology by-catch compensation are effective.

Throughout this process the by-catch reduction working group has liaised with the main RTDCSG, keeping the group informed on progress and development of the ornithological by-catch monitoring plan. All details of this process and the final by-catch monitoring plan are provided in Appendix 2 of this RTDIMP.

2.4. RTDCSG Members

The RTDCSG is comprised of representatives of East Anglia ONE North and TWO, Natural England (NE), the Marine Management Organisation (MMO), Joint Nature Conservation Committee (JNCC) and when applicable and invited by the core members of the group, representatives of East Anglia ONE and East Anglia THREE windfarms. In addition, the Royal Society for the Protection of Birds (the RSPB), East Suffolk Council (ESC), the Norfolk Wildlife Trust (NWT) and the Suffolk Wildlife Trust (SWT) were invited as “advisory members” of the group to input into the steering group and provide their experience/expertise where applicable.

Information on the core and advisory members of the ornithological by-catch reduction working group are provided in Appendix 2.

2.5. Document Development and Programme Delivery Timescales

As previously stated, the development of this RTDIMP has been a collaborative process with the RTDCSG. A summary of the key steps/group meetings that have taken place to date is provided in Table 1.

Date	Meeting/Correspondence	Attendees/Recipients	Context
01/03/2024	Provision of first draft of the RTDCSG PoW and invitation to Steering Group #1	NE, MMO and JNCC	First draft of PoW (including Terms of Reference) and invitation provided to all core members of the group for review and comment ahead of Steering Group meeting #1.
04/04/2024	Steering Group meeting #1	NE, MMO and JNCC	Overview and update provided to steering group members on red-throated diver compensation measures. Discussion on Plan of Works and Terms of reference. Provision of updates on measures made to date and identification of next steps for the RTDCSG.
16/08/2024	Provision of first draft of the RTDIMP	NE, MMO, JNCC and RSPB	First draft of the RTDIMP provided to core and advisory members for review and comment ahead of Steering Group meeting #2.
06/09/2024	Steering Group meeting #2	NE, MMO, JNCC and RSPB	Overview and update on actions from previous meeting including an update on progress from the ornithological by-catch reduction working group. Detailed discussion on the first draft of the RTDIMP with all members providing initial comments and feedback.
20/11/2024	Provision of second draft of the RTDIMP	NE, MMO, JNCC and RSPB	Second draft of the RTDIMP provided to core and advisory members addressing comments and feedback provided both during the second

Date	Meeting/Correspondence	Attendees/Recipients	Context
			steering group meeting and subsequent written responses.
17/12/2024	RTDCSG written responses	NE, MMO, JNCC and RSPB	RTDCSG members provided written responses to the second draft of the RTDIMP
03/03/2025	Provision of third draft of the RTDIMP	NE, MMO, JNCC and RSPB	Third draft of the RTDIMP provided to core and advisory members addressing comments and feedback from the written responses on the second draft of the RTDIMP.
25/03/2025	RTDCSG written responses	NE, MMO, JNCC and RSPB	RTDCSG members provided written responses to the third draft of the RTDIMP.
03/04/2025	RTDIMP finalised for submission to SoS	SoS	RTDIMP updated to incorporate third draft comments from the RTDCSG and finalised for submission to the SoS.

Table 1. Summarises the key meetings and discussion points in the development of the RTDIMP.

The programme for delivery of the red-throated diver compensation measures is outlined in Table 2. Please note that a separate delivery programme for the ornithological by-catch compensation measure is provided in Appendix 2. The timetable for the RTDCSG group meetings will be discussed with group members in 2025 following submission and agreement of the RTDIMP to the SoS. The schedule will take into consideration the timescales, input required and reporting on each of the requirements outlined within this document.

Actions	Approximate Proposed Timescales
First RTDCSG group meeting held	4th April 2024
Finalised Plan of Works/Terms of Reference for the RTDCSG circulated to the group	5th August 2024
Finalised Plan of Works/Terms of Reference submitted to SoS for signoff	5th August 2024
Provision of first draft of the RTDIMP circulated to working group for review and comment	16th August 2024
Second RTDCSG group meeting held	6th September 2024
Final Plan of Works/Terms of Reference resubmitted to SoS for signoff following updates based on feedback from SoS	3rd October 2024
SoS signoff on Plan of Works/Terms of Reference	10th October 2024
Provision of second draft of the RTDIMP circulated to working group for review and comment	20th November 2024
Provision of written responses on second draft of the RTDIMP from all RTDCSG members	17th December 2024
Provision of third draft of the RTDIMP circulated to working group for review and comment	3rd March 2025
Provision of written responses on third draft of the RTDIMP from all RTDCSG members	25th March 2025
Final version of the RTDIMP submitted to SoS for signoff	April 2025
East Anglia ONE North and East Anglia TWO commence vessel movements using defined transit corridors.	Commencement of offshore construction activity.
Implementation of vessel re-routing on East Anglia ONE and East Anglia THREE to commence	Prior to turbine installation (whichever project starts this phase first)
Pre-construction Digital Aerial Surveys (DAS) of the OTE SPA plus a 10km buffer	Three surveys between 1st November and 31st March (winter prior to construction commencing)

Reporting the outcomes of the compensation measures to the RTDCSG with a meeting held to discuss results, progress and next steps	April 2026
Post-construction DAS of the OTE SPA plus a 10km buffer	Three surveys between 1st November and 31st March (winter following Commercial Operation Date (COD)).

Table 2. Outlines the programme for delivery of the key actions to be undertaken for the red-throated diver compensation measures.

2.6. Final Document Structure

The final version of the RTDIMP, for submission to the SOS, includes the following appendices:

- Agreement Log – reflects the topics of discussion between members of the RTDCSG and East Anglia ONE North and TWO. The Agreement Log outlines topic specific matters agreed, not agreed and any actions to resolve areas of disagreement. The Agreement Log has been provided to the RTDCSG members for review prior to formal submission to SoS;
- Ornithological By-catch Reduction Monitoring Plan – provides full details of the development and implementation of the ornithological by-catch reduction compensation measures plan; and
- Consultation Report – summarises the consultation undertaken to date specifically all the details of the RTDCSG meetings including details of the RTDCSG attendees, minutes, dates and other key meeting information etc.

3. OUTER THAMES ESTUARY SPA

The OTE SPA is located in the southern North Sea along the east coast of England, extending northward from the Thames Estuary to the marine area off Great Yarmouth on the East Norfolk Coast. The OTE SPA was designated in August 2010. It covers 3,294km^2 of marine habitat with part in English territorial waters (0-12 nautical miles) and part in UK offshore waters (12 to 200 nautical miles), with the Annex 1 species red-throated diver as the sole feature (Natural England and JNCC 2010). Extensions were proposed to the SPA in 2015 to include coastal and riverine areas used for foraging by breeding terns (the tern colonies are already designated at other locations). An estimated 6,466 red-throated divers wintered in the SPA from 1989-2006/07 (Natural England and JNCC 2013). However, the population appears to have increased substantially since this time. In February 2018, HiDef conducted two aerial surveys of the OTE SPA, with red-throated diver being the most abundant bird species within the SPA (Irwin et al., 2019). The population of red-throated diver was estimated to be 21,997 individuals within the 'original' OTE SPA and 22,280 individuals within the enlarged OTE SPA (i.e., approximately 3.5 times greater than the notified population of the original SPA designation of 6,466 individuals (2010) (Irwin et al., 2019). The density estimate for red-throated diver was 2.66 birds/km² during the first survey (equating to 10,136 birds) (Figure 1) and 5.78 birds/km² during the second survey (equating to 21,997 birds within the SPA) (Figure 2).

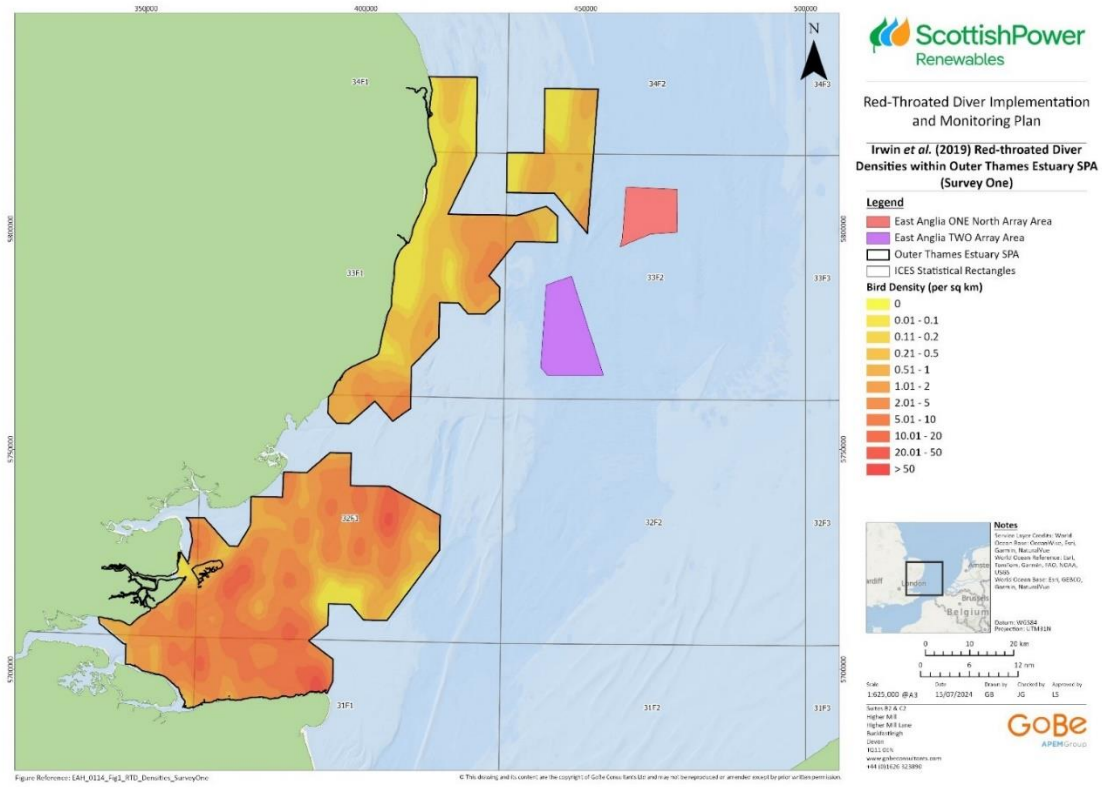

Figure 1. Red-throated diver densities within Outer Thames Estuary SPA during Survey One (4 February 2018). Data source: Irwin et al. (2019).

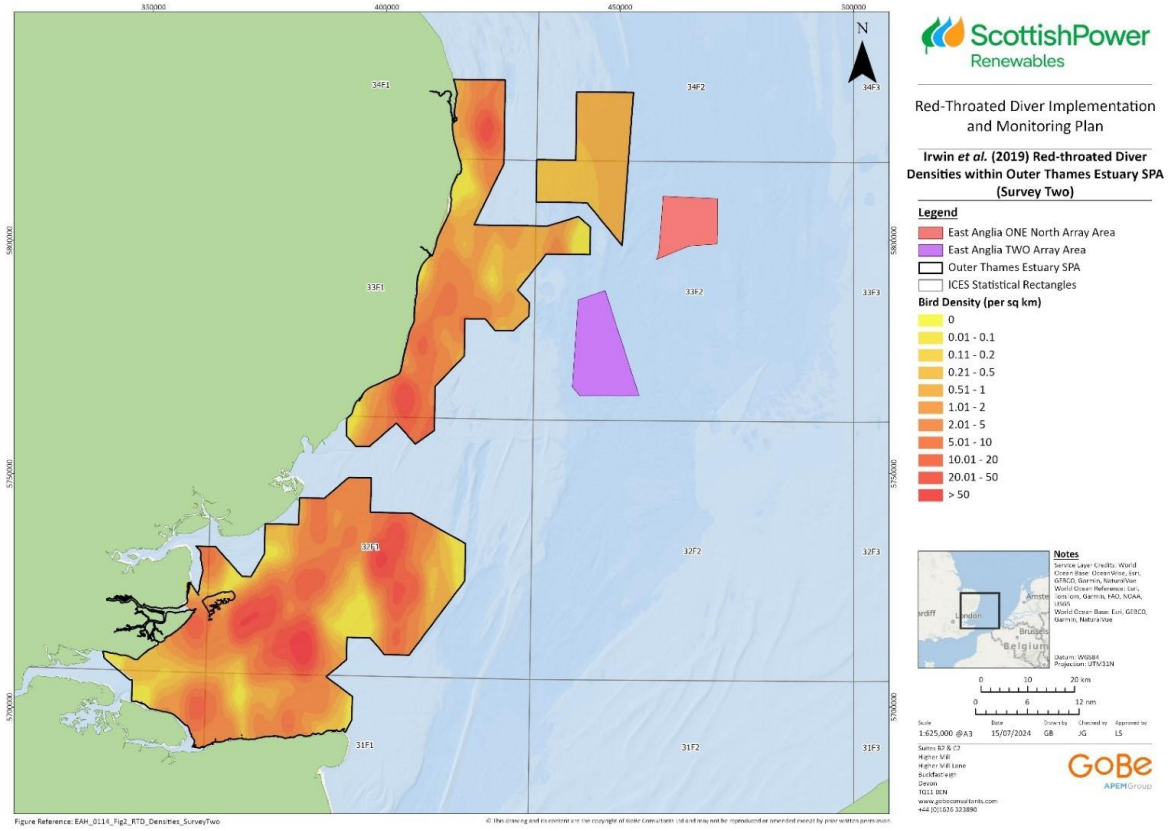

Figure 2. Red-throated diver densities within OTE SPA during Survey Two (17 February 2018). Data source: Irwin et al. (2019).

4. COMPENSATION MEASURES

4.1. Background to Vessel Navigation Management

The Offshore Ornithology Without Prejudice Compensation Measures Reports proposed that vessel navigation management (primary measure) and by-catch reduction (secondary measure) should be implemented as compensation measures for both Projects.

The selection of vessel navigation management was based on the growing body of evidence that has documented the impact that vessel disturbance can have on seabirds, including red-throated diver (Schwemmer et al., 2011; Wade et al., 2016; Burger et at al., 2019; and Fliessbach et al., 2019). APEM (2016), assessed displacement impacts of offshore wind farms and other human activities on red-throated divers and Alcids in the OTE. In reviewing the environmental variables for this modelling framework approach, APEM found that through use of Generalised Additive Models (GAM) that on the days when surveys for red-throated diver were carried out the distribution of red-throated divers was influenced by shipping activity and distance to shipping lanes. Burt et al., (2022) investigated the potential impacts of shipping on red-throated diver and common scoter in the Liverpool Bay SPA. Statistical models using DAS data from two winter surveys and shipping data (vessels fitted with Automated Identification System (AIS)) were produced which, for red-throated diver, examined three shipping metric variables: average length of vessel; the length of the nearest vessel; and distance to the nearest vessel. The analysis concluded that the distance to the nearest vessel, specifically a distance of 2km to the nearest vessel, appeared to be important with average predicted numbers of birds increasing as the distance increased from 0-2km.

Vessel navigation management was selected as the primary compensation measure for red-throated diver based on the potential benefits gained from reducing disturbance within the OTE SPA. The East Anglia ONE North and East Anglia TWO Projects are already committed to navigation management via vessel re-routing during construction, operation and maintenance and decommissioning of the windfarms, from November 1st to

March 31st (inclusive) as red-throated diver mitigation, and as part of the compensation measures this management will be extended to East Anglia ONE and East Anglia THREE windfarms.

East Anglia ONE North and TWO conducted the necessary re-routing studies during the examination process for the crew transfer vessels used for the current East Anglia ONE operations and the vessels for the future windfarm decommissioning activities. Future East Anglia THREE vessel activities from the port of Lowestoft over the core winter months from 1st November to 31st March (inclusive) were also included in this study. Further work has since been undertaken on establishing navigation routes from the port of Lowestoft to the East Anglia ONE and East Anglia THREE windfarm sites (as well as East Anglia ONE North and TWO) avoiding, as far as possible, the OTE SPA with a 2km buffer either side of the route to account for the range over which red-throated diver are known to flush from vessels in transit (Burt et al., 2022). The following sections provide details on the location of the vessel navigation measures, the scale of the compensation measures in respect of potential displacement effects of the windfarms on the abundance and distribution of red-throated divers, the legal agreements that are in place to ensure the vessel navigation management (via vessel re-routing for the Projects) are secured and can be delivered, and the monitoring, reporting and a delivery timetable for this compensation measure.

4.1.1. Location

Following consent of both Projects, further studies were undertaken to finalise the vessel navigation routes. Further consideration was given to the current understanding of the baseline environment, existing vessel navigation constraints, historic vessel traffic information, and how the Projects will be constructed and operated in compliance with current legislation and good practice. In addition, the ports of Lowestoft and Great Yarmouth are now planned as the main ports for vessel operations which would interact with the OTE SPA during the construction and operation and maintenance phases of East Anglia ONE North, East Anglia TWO and East Anglia THREE, and are currently the main ports used to support the operation and maintenance of East Anglia ONE.

The final compensation vessel transit routes for vessel navigation management for East Anglia ONE and East Anglia THREE are shown in Figure 3. The routes will come into effect annually between 1st November to 31st March according to the following schedule:

- East Anglia ONE – prior to commencement of wind turbine installation at either East Anglia ONE North or East Anglia TWO (whichever occurs first); and
- East Anglia THREE - prior to commencement of wind turbine installation at either East Anglia ONE North or East Anglia TWO (whichever occurs first).

The final mitigation vessel transit routes for vessel navigation management for East Anglia ONE North and TWO are also shown in Figure 3. The routes will come into effect annually between 1st November to 31st March according to the following schedule:

- East Anglia ONE North – commencement of offshore construction activities; and
- East Anglia TWO – commencement of offshore construction activities.

Once implemented for each project the vessel transit routes will be in effect for each subsequent core winter period (as previously defined) for all Projects and would continue until decommissioning was complete, unless evidence is collected that confirms these measures are no longer required.

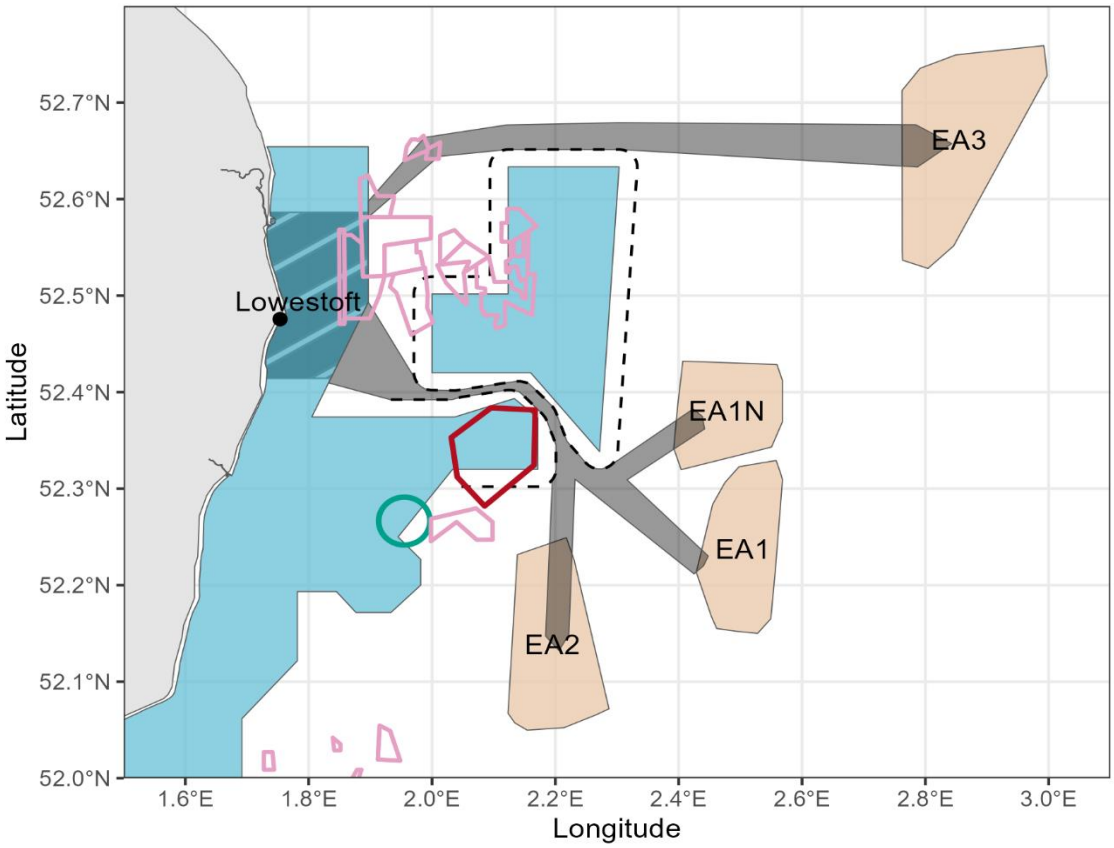

Figure 3. Vessel Navigation Management Indicative Transit Routes for East Anglia ONE, East Anglia THREE, East Anglia ONE North and East Anglia TWO. Blue shaded areas are the OTESPA, hatched area is the port approach area for vessels, grey shaded areas are indicative vessel routes, red outlined area denotes indicative anchoring activity, pink outlined areas are marine aggregate dredging activity and green outlined area is an oil transhipment area. The dashed black lines indicate the target geofences for vessel activity to maintain a 2km distance from the SPA where possible.

As shown in Figure 3, the final vessel transit routes between the Projects, Lowestoft and Great Yarmouth ports only covers the open sea area, i.e., outside the nearshore areas in the approaches to Great Yarmouth and Lowestoft. Figure 3 shows the proposed vessel transit corridor, including the corridor that passes between the two separate parts of the OTE SPA, for vessels travelling to East Anglia ONE (as well as East Anglia ONE North and TWO). In the Offshore Ornithology Without Prejudice Compensation Measures Reports the proposed transit routes were provided as a direct point to point line through this corridor, to ensure that vessels were at least 2km away, where possible, from both parts of the OTE SPA. However, on taking further advice from our maritime consultants as well as undertaking further detailed studies, it is evident that it is not possible or safe for vessels to operate in this way, particularly in an area where other vessels will be navigating freely including traveling north and south through the OTE SPA. Therefore, as shown in Figure 3 we have defined a corridor between the two parts of the SPA which creates a channel circa. 1000m in width, in which vessels can operate. The corridor has been designed to minimise as far as possible the impact of vessel disturbance on red-throated divers within the OTE SPA, whilst also allowing vessels to operate in compliance with the Convention on International Regulations for Preventing Collisions at Sea (COLREGs) and deviate within the corridor if required to do so. Compliance of the vessel transit routes within this corridor will be monitored and this is discussed further in Section 4.1.4.3. This approach also has implications for the scale of the compensation ratio, and this is discussed further in Sections 4.1.2 and 4.1.2.1.

Navigation within the nearshore areas (marked as the Port Approach Area on Figure 3), which is within the OTE SPA, is complex and heavily constrained due to the shallow water depths, tidal conditions and port services, and compliance with the COLREGs or port direction (where relevant) is expected by all vessels at all times. Therefore, vessel navigation management transit routes within this area, for all projects, is not possible.

The vessel navigation management transit routes have also taken into consideration other constraints which are noted on Figure 3, these constraints include:

- The OTE SPA boundary;
- Licensed marine aggregate dredging areas;
- Areas of known third party anchoring activity;
- Sandbanks and areas with low depths; and
- Existing routing preferences.

Additionally, all vessels shall passage plan as per the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974). Observance of the objective of avoiding the OTE SPA will be expected from all project vessels however, key navigational priority for project vessels remains to comply with the COLREGs (IMO, 1972/77) and ensure the safety of the vessel at all times. It is therefore recognised that decisions on vessel routing remain at the discretion of the vessel's Master.

Reasonable extenuating circumstances for deviation from the vessel navigation management transit routes may include, but not be limited to:

- Compliance with COLREGs as required;
- Prevailing weather, tidal, or sea state conditions;
- Navigational hazards as indicated on charts or notified through Notice to Mariners (NtM) or other such sources;
- Instructions from the Marine Coordination Centre (MCC) or other responsible persons in charge of coordinating and managing vessel traffic; and
- Any other reason the Master of a vessel may deem relevant for the purpose of ensuring the safety of theirs or another vessel.

Project vessels originating from other ports, including non-UK ports must also observe the objective to avoid the OTE SPA during the core wintering period, as specified. However, there is no requirement for these vessels to follow the transit routes if their normally planned route does not enter the OTE SPA area.

4.1.2. Scale of Compensation

The scale of the compensation should be proportional to the magnitude of the predicted effect, as a result of East Anglia ONE North and East Anglia TWO.

The Offshore Ornithology Without Prejudice Compensation Measures for both East Anglia ONE North and East Anglia TWO[1] projects provided detailed calculations on the scale of compensation that would be provided by implementing vessel navigation management through re-routing of vessels for East Anglia ONE and East Anglia THREE. It should be noted that at the time at which the without prejudice documents were finalised, East Anglia ONE North's project boundary was 2km from the OTE SPA and East Anglia TWO's project boundary was 8.3km from the OTE SPA. The compensation scale details provided in both without prejudice documents illustrated a number of different combinations of alternative project boundaries (distance between OTE SPA and project boundary) alternate modelling approaches used to calculate the effected displacement area (Applicants model and straight-line approach, see REP11-026[7]), and the compensation ratio, which is simply the factor by which the area of compensation exceeds the effective area of displacement. There is no

[7] ExA.AS-2.D11.V5 EA1N&EA2 Displacement of red-throated divers in the Outer Thames Estuary (planninginspectorate.gov.uk)

published guidance for a minimum ratio of compensation to effect other than the general rule that it must be greater than 1:1 depending on the level of confidence that the measure would be successful[8].

In granting consent for East Anglia ONE North and East Anglia TWO, the SoS decision letter and statement of reasons (March 31st 2022), states the following:

> *"The Secretary of State notes the advice of Natural England that the updated package of compensation measures provides a reasonable prospect of coherence of the national site network being maintained. The Secretary of State notes that this advice is provided in the specific scenario of a reduction in the impacts of the Proposed Development via a 8km buffer and an avoidance of the impacts of East Anglia TWO Offshore Wind Farm via a 10km buffer and should not be taken as Natural England's advice on other permutations. However, the Secretary of State considers that, given the compensation ratio of 9:1 the shared package of compensatory measures would adequately compensate for the residual adverse effects on the red-throated diver feature of the SPA with a buffer distance of 8 km between the Proposed Development and the Outer Thames Estuary SPA as well as the full adverse effects of East Anglia TWO Offshore Wind Farm at 8.3km. The Secretary of State acknowledges that whilst such a project layout does not constitute an alternative solution (given the loss in generating capacity), it is nevertheless the only project layout where he can have confidence that the package of compensatory measures will be effective."*

Based on the consented project boundaries for East Anglia ONE North and TWO i.e., 8kms and 8.3kms from the OTE SPA boundary respectively and using the precautionary straight line model approach advocated by NE, the without prejudice documents stated that the compensation ratios shown in Table 3 could be achieved for each project alone and in combination.

Project(s)	**Effective Area of Displacement (km2) – East Anglia ONE North and East Anglia TWO combined**	**Compensation Area (km2)**	**Compensation Ratio**
East Anglia ONE	10.36	38.2	3.7:1
East Anglia THREE	10.36	59.0	5.7:1
East Anglia ONE and East Anglia THREE	10.36	97.20	**9:1**

Table 3: Summary of the scale of compensation (compensation ratio) that vessel navigation management will provide by re-routing vessels for East Anglia ONE and East Anglia THREE, to avoid the OTE SPA

The method used in the without prejudice documents to calculate these compensation ratio's was to firstly calculate the effective area of displacement by calculating the area of OTE SPA overlap from the wind turbines, then apply a proportional displacement factor which varied with distance. The result of this method concluded that an effective area of 10.36km^2 of the OTE SPA would be impacted by displacement from both projects.

The second step was to then calculate the area of the SPA that would be affected if vessels for East Anglia ONE and East Anglia THREE did not avoid transiting the OTE SPA. In calculating the areas potentially affected an assumption was made that vessels travelling to and from East Anglia ONE and East Anglia THREE would generally take the most direct route to the part of the windfarm for which activities are planned. Therefore, the calculated area affected assumed three direct routes from the port of Lowestoft to the centre-north, centre and

[8] From Natural England's Deadline 17 response to Norfolk Boreas - Response to the Applicant's responses to the Examining Authority's Sixth round of Written Questions and Deadline 16 Response. "We note that in the UK compensatory measures have generally been provided with a 'multiplier' that expresses the likelihood of success of the measure in question. 1:1 compensation rates have only been accepted where there is a high degree of confidence in the measure e.g. creation of a readily-created habitat. Elsewhere ratios for habitat creation have been e.g. 2:1 or 3:1." https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002544-DL17%20-%20Natural%20England%20-%20Deadline%20Submission.pdf

centre-south of East Anglia ONE and East Anglia THREE. A 2km[9] buffer (i.e. 4km in total) was then applied to each plotted route to establish the area of displacement that each route would have and the average of the three direct route areas was then calculated to ascertain the area of displacement within the OTE SPA that would be avoided through vessel navigation management i.e., the compensation area. This allowed a compensation ratio to be calculated and it was concluded that by implementing vessel navigation management by re-routing vessels from East Anglia ONE and East Anglia THREE, to avoid the OTE SPA during the core winter period of November 1st to March 31st (inclusive), would compensate the potential effect of disturbance to red-throated divers by East Anglia ONE North and East Anglia TWO by a ratio of 9:1.

4.1.2.1. Recalculation of the Scale of Compensation

Feedback from the RTDCSG during the second group meeting on 6th September 2024 and in subsequent feedback following the meeting, core members of the group requested that an updated evaluation of the compensation achieved from vessel re-routing taking into account two elements:

1. Reduction of vessel movements was recalculated as a proportion of total vessel activity, so that vessel monitoring data can be used to validate the actual magnitude of reduced vessel disturbance achieved;
2. The residual disturbance effects on the OTE SPA from vessels travelling to and from East Anglia ONE not being able to maintain a 2km buffer from the SPA boundary, due to the narrowness of the channel between the two parts of the SPA, are included in the compensation calculations.

To maintain alignment with the without prejudice reports as required by the DCO conditions, the effective area of compensation has been recalculated incorporating these two elements. The percentage difference between vessel traffic without vessel re-routing and with vessel re-routing has been calculated for the portion of the OTE SPA within 2km of vessel traffic associated with East Anglia ONE and East Anglia THREE. AIS data for the period 15th Nov 2022 – 15th April 2023 was used to obtain accurate vessel tracks for East Anglia ONE, which total 531 routes during this period. Since East Anglia THREE was not constructed, vessel data was simulated using Lowestoft as the origin and selecting random values for bearings between the maximum and minimum limits of the East Anglia THREE array as a straight line from Lowestoft. The number of vessel routes for this simulation was the same as the real AIS East Anglia ONE data over the winter period i.e.,531 routes. This combination of vessel routes was used to describe the baseline “without compensation” scenario and is shown in Figure 4 below.

[9] The basis for assuming a 4km wide displacement area centred on the vessel transit route (i.e. 2 km either side of the vessel transit route) is based on Natural England advice that red-throated diver are displaced up to 2km from vessels and was the agreed basis of the EIA and HRA vessel disturbance assessments (as presented in APP-060 and APP-043),and the findings of Burt et al., 2022.

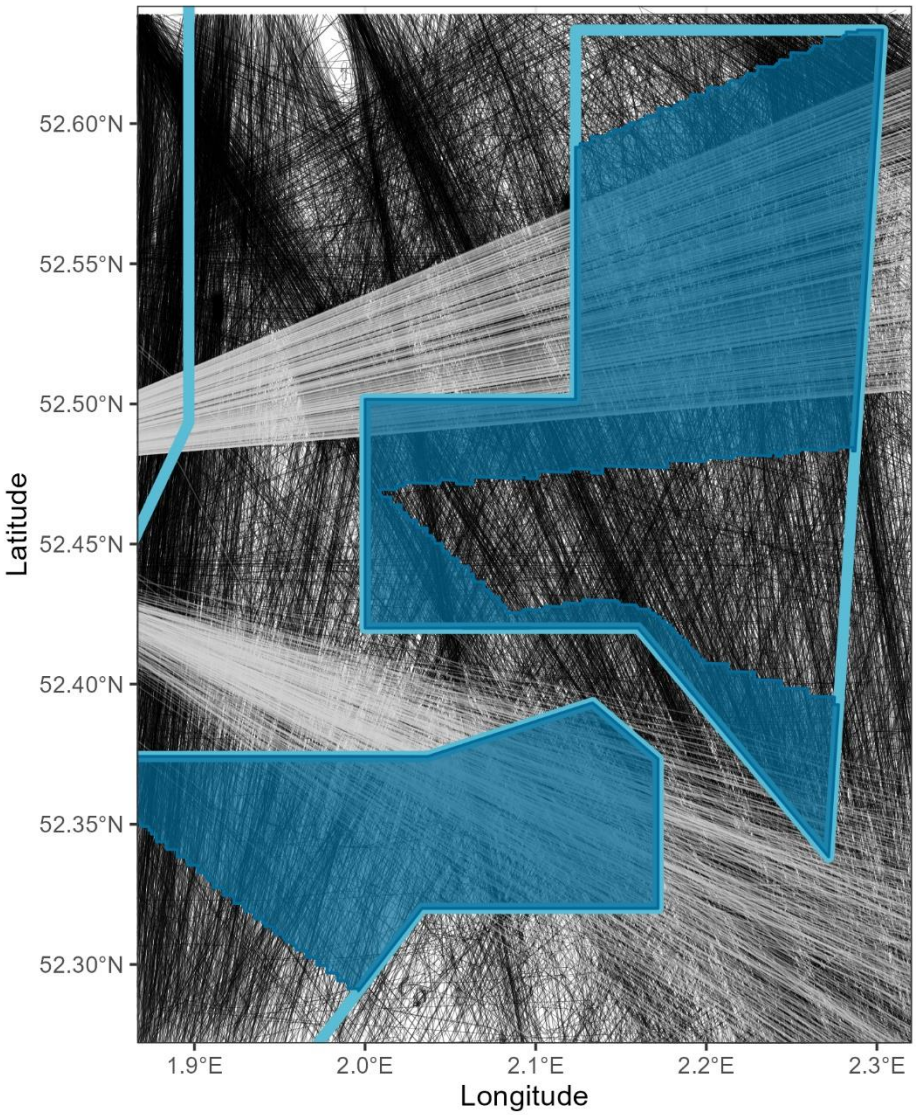

Figure 4: "Without compensation" scenario. Black lines indicate non-windfarm traffic, upper grey lines are simulated traffic for East Anglia THREE and lower grey lines are actual traffic for East Anglia ONE. The pale blue boundary is part of the OTE SPA, and the darker blue shading is the portion of the SPA within 2km of windfarm traffic i.e. subject to compensation.

The "with compensation" scenario excludes East Anglia THREE traffic, which avoids the OTE SPA to the north, and routes East Anglia ONE along an alternative corridor between the two sections of the OTE SPA. East Anglia ONE vessel data (531 routes) using this alternative corridor was simulated by finding the centre line of the corridor and then defining limits between 500m northeast and 500m southeast of this centre line to create a representative channel circa. 1000m in width. The limits for vessel proximity to the OTE SPA described for this scenario were drawn as a set of "geofences". The combination of vessel routes and geofences comprising the future "with compensation" scenario is shown in Figure 5.

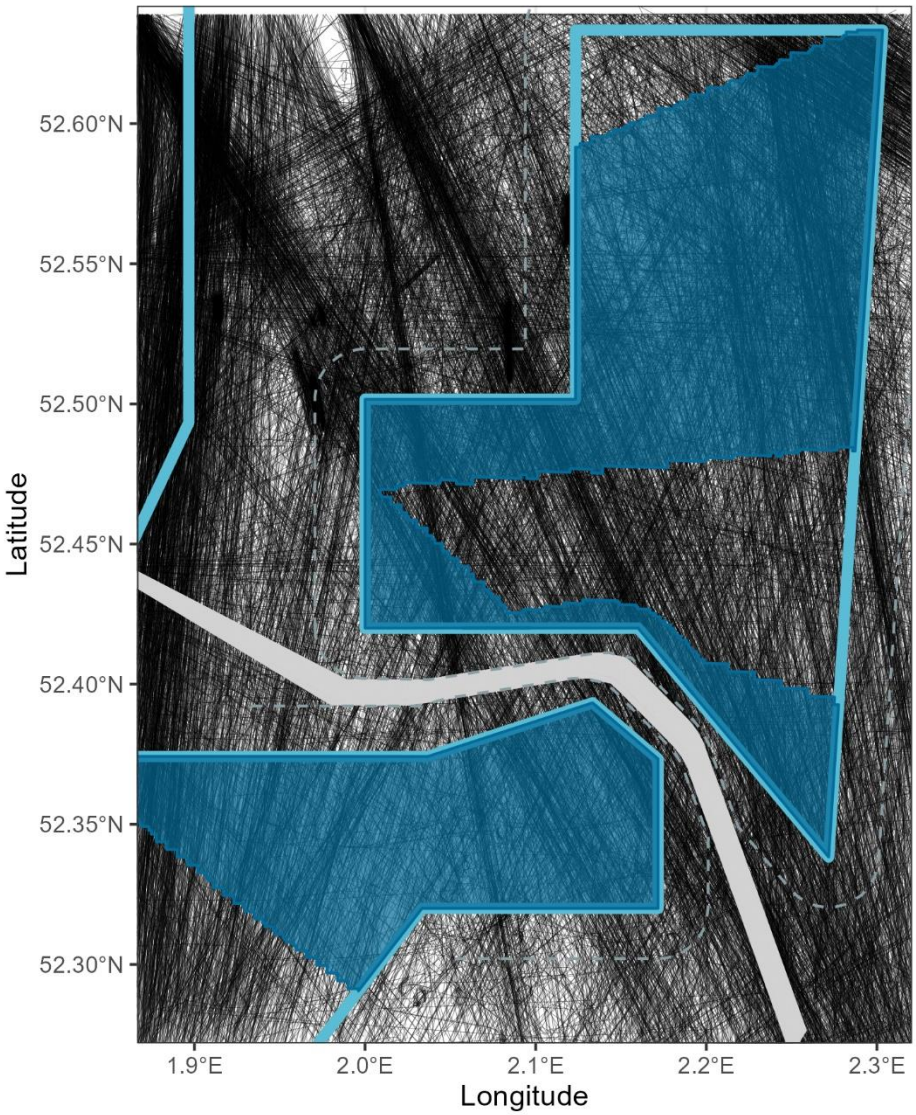

Figure 5: "With compensation" scenario. Black lines indicate non-windfarm traffic, grey lines (which appear as a single thick shaded line due to overlaps) are simulated traffic for EA1 using the channel between parts of the SPA. The pale blue boundary is part of the OTE SPA, and the darker blue shading is the portion of the SPA within 2km of windfarm traffic i.e. subject to compensation. Grey dashed lines indicate the position of geofences which vessels would aim to avoid.

The vessel tracks for each scenario were buffered by 2km and summed over a 0.005 degree resolution grid to calculate the number of times a vessel came within 2km of each grid cell over the winter period. Given the narrow width of this corridor used in this simulation for East Anglia ONE vessels some of the OTE SPA would remain within 2km of vessel traffic and this contribution to vessel disturbance was included in the calculations. The difference in total vessel traffic between the "with compensation" and "without compensation" was calculated as a percentage and shown in Figure 6.

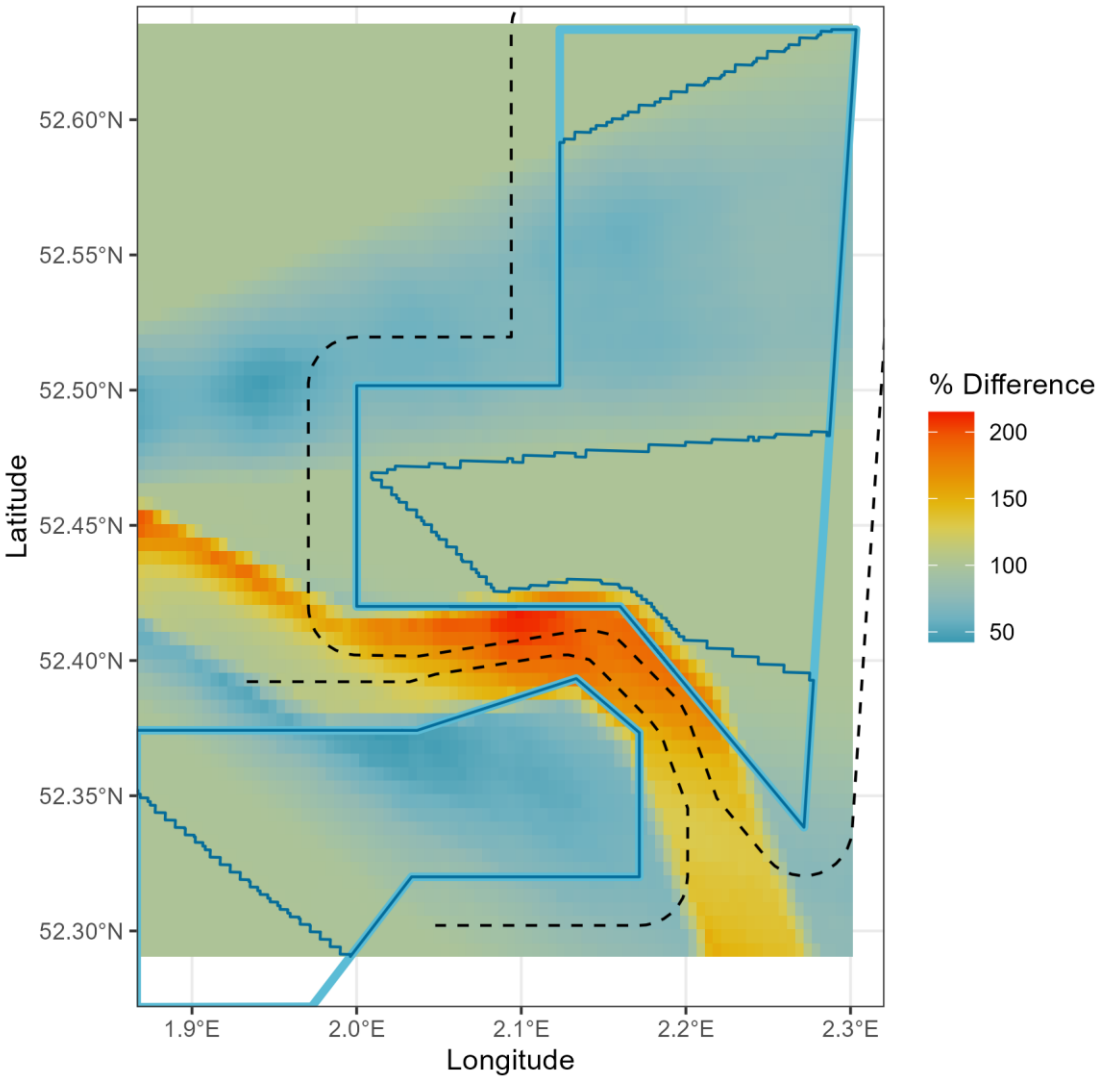

Figure 6: Percentage difference between "with compensation" and "without compensation" scenario as a change in total vessel traffic. Values above and below 100 indicate an increase or reduction in vessel traffic respectively for the "with compensation" scenario. The pale blue boundary is part of the OTE SPA, and the darker blue boundary is the portion of the SPA within 2km of windfarm traffic i.e. subject to compensation. Grey dashed lines indicate the position of geofences which vessels would aim to avoid.

The total difference between the scenarios was calculated to quantify the overall compensation ratio within the part of the SPA affected by windfarm vessels (shown on Figures 4, 5 and 6 in dark blue). A breakdown of this calculation is shown in Table 4.

Scenario	**Mean vessel activity Nov – April**
(a) "Without compensation"	235.3
(b) "With compensation"	196.1
(c) Difference	39.2
Metric	**Value**

(d) Reduction in vessel activity (c) / (a)	16.7%
(e) OTE SPA affected area	386.7km^2
(f) Effective area of compensation (d) * (e)	64.5km^2
(g) Effective area of windfarm displacement	10.36km^2
(h) Compensation ratio (f) / (g)	**6.2:1**

Table 4: Calculation of overall reduction in vessel disturbance within the affected part of the OTESPA

In summary, by implementing vessel navigation management by re-routing vessels from East Anglia ONE and East Anglia THREE, to avoid the OTE SPA during the core winter period of November 1st to March 31st (inclusive), would compensate the potential effect of disturbance to red-throated divers by East Anglia ONE North and East Anglia TWO by a ratio of 6.2:1.

4.1.3. Project Agreements for the Delivery of Compensation

To ensure delivery of the vessel navigation management compensation measure, East Anglia ONE North Ltd. and East Anglia TWO Ltd., have each entered into legal agreements with East Anglia ONE and East Anglia THREE to secure the vessel navigation measures. Details of the measures secured within the agreements and a copy of each legal agreement are provided in Appendix 3.

4.1.4. Monitoring

4.1.4.1. Monitoring feasibility

Schedule 18 Part 3 (d) requires the project to provide details of monitoring the compensation measures including: survey methods; survey programme and success criteria. The Without Prejudice Compensation Measures report referred to in the DCO states the following in paragraph 303 in relation to monitoring of red throated divers and vessel re-routing:

> *"Regular reporting would be undertaken to demonstrate compliance with the vessel routing. In addition, the red throated diver displacement monitoring committed to outside of the compensation measures (see the In-principal Monitoring Plan (REP8-028[10])) would be reported on. If feasible, this monitoring would be designed to incorporate consideration of the vessel management measures and their effects. Results would be discussed with the statutory nature conservation body."*

The purpose of this section is to examine the feasibility of monitoring the effect of vessel re-routing within the context of red-throated divers. It was originally considered that these effects could be integrated into surveys designed to estimate changes in diver abundance around the windfarm project. These surveys were commenced in December 2023 following extensive study design and a power analysis of the ability of the surveys to detect change. Statistical power, the likelihood of a significance test detecting an effect when an effect exists, is governed by the variation between samples and the expected magnitude of effect.

The ongoing DAS to detect windfarm effects were estimated to have a circa. 80% likelihood to detect a 70% reduction in abundance[11]. The likelihood of detecting reductions <70% is primarily limited by the inherent variability in red-throated diver abundance. The ability to detect changes due to vessels is further reduced due to the inherently smaller area where effect could occur (2km from existing vessels as advised by Natural England (Burt et al, 2022, Burger et al, 2019 and Mendel et al, 2019)). This reduces the number of birds

[10] East Anglia One North Offshore Windfarm: Offshore In-Principle Monitoring Plan. Title (planninginspectorate.gov.uk) and East Anglia Two Offshore Windfarm: Offshore In-principle Monitoring Plan. EN010078-004457-8.13 EA2 Offshore In-principle Monitoring Plan (Tracked).pdf (planninginspectorate.gov.uk)

[11] Red-Throated Diver Monitoring Plan: East Anglia ONE North and TWO Ornithology Monitoring. EA2-GEN-CNS-PLN-IBR-000105. (May 2023). SPR report to MMO.

present from which to draw samples and make comparisons which is particularly problematic when densities exhibit large variability. From previous surveys conducted for both the project Environmental Impact Assessment (EIAs) and the ongoing DAS surveys red-throated diver densities were calculated within this part of the OTE SPA (Table 5) and extrapolated to estimate counts. Out of the 24 monthly surveys available, 12 surveys yielded zero counts with a maximum estimate of 726.

Project	Month-yr	Count in SPA <2km from EAONE vessels	Survey area within SPA <2km from EAONE vessels (km^2)	Density within SPA <2km from EAONE vessels (km^2)	No. in SPA <2km from EAONE vessels
EA1N	Jan-17	3	7.7	0.39	71
EA1N	Feb-17	2	7.7	0.26	47
EA1N	Mar-17	15	7.7	1.96	355
EA1N	Apr-17	0	7.7	0.00	0
EA1N	Nov-17	1	4.1	0.24	44
EA1N	Dec-17	4	4.1	0.97	175
EA1N	Jan-18	0	4.1	0.00	0
EA1N	Feb-18	11	4.1	2.66	482
EA1N	Mar-18	0	4.1	0.00	0
EA1N	Apr-18	0	4.1	0.00	0
EA2	Dec-16	1	3.8	0.27	48
EA2	Jan-17	0	3.8	0.00	0
EA2	Feb-17	1	3.8	0.27	48
EA2	Mar-17	15	3.8	4.00	726
EA2	Apr-17	0	3.8	0.00	0
EA2	Nov-17	0	3.8	0.00	0
EA2	Dec-17	0	3.8	0.00	0
EA2	Jan-18	0	3.8	0.00	0
EA2	Feb-18	0	3.8	0.00	0
EA2	Mar-18	0	3.8	0.00	0
EA2	Apr-18	0	3.8	0.00	0
EA1N/2	Dec-23	5	15.3	0.33	59
EA1N/2	Dec-23	5	15.3	0.33	59
EA1N/2	Jan-24	3	15.3	0.20	36

Table 5. Number of red throated divers within the SPA counted by previous surveys and estimated number within the OTESPA within 2km of EAONE vessel traffic (shown in dark blue in Figure 7 covering an area of 181.5km^2) based on extrapolated density calculations.

Using the same approach to power analysis as used for the DAS study design with the abundance estimates in Table 5 the probability to correctly detect increases of 50%, 70% and 90% were calculated and summarised in Table 6 to emphasise the difficulty in detecting changes in abundance due to vessel re-routing. The power to detect even a 90% increase in density is <25% even with a sample size of n=30 (which equates to 3 winters of survey, each with n=10 surveys).

No. samples	50% increase	70% increase	90% increase
10	9.7%	11.4%	10.8%
20	14.7%	18.5%	18.4%
30	18.8%	20.7%	22.2%

Table 6: Results of a power analysis showing the probability of correctly detecting different increases in red throated diver abundance based on the counts in Table 5.

A further consideration is the mechanism of the potential effects on red-throated divers which contrast between wind turbine and vessel related sources. The presence of wind turbines is constant, so any changes in abundance are presumed also to be constant. Conversely, vessel movements are temporary and the flushing of birds causes localised movement which would temporarily change abundance within an area around the vessel. DAS only provides a single data point for a given day and provides limited information about temporal covariates such as the preceding vessel activity, prey distribution or other potential factors and stochastic processes which would be required to understand diver abundance at fine spatial scales.

The effects of other vessel movements would need to be considered for any monitoring study design. East Anglia ONE North and East Anglia TWO have obtained AIS data tracks of all vessels between Nov 2022 – April 2023 within the same OTE SPA area as the existing East Anglia ONE Operations & Maintenance (O&M) vessels currently transit (Figure 7). The area is highly trafficked by marine vessels, and although there exist some corridors of higher use almost the entire area is utilised by vessels over the winter.

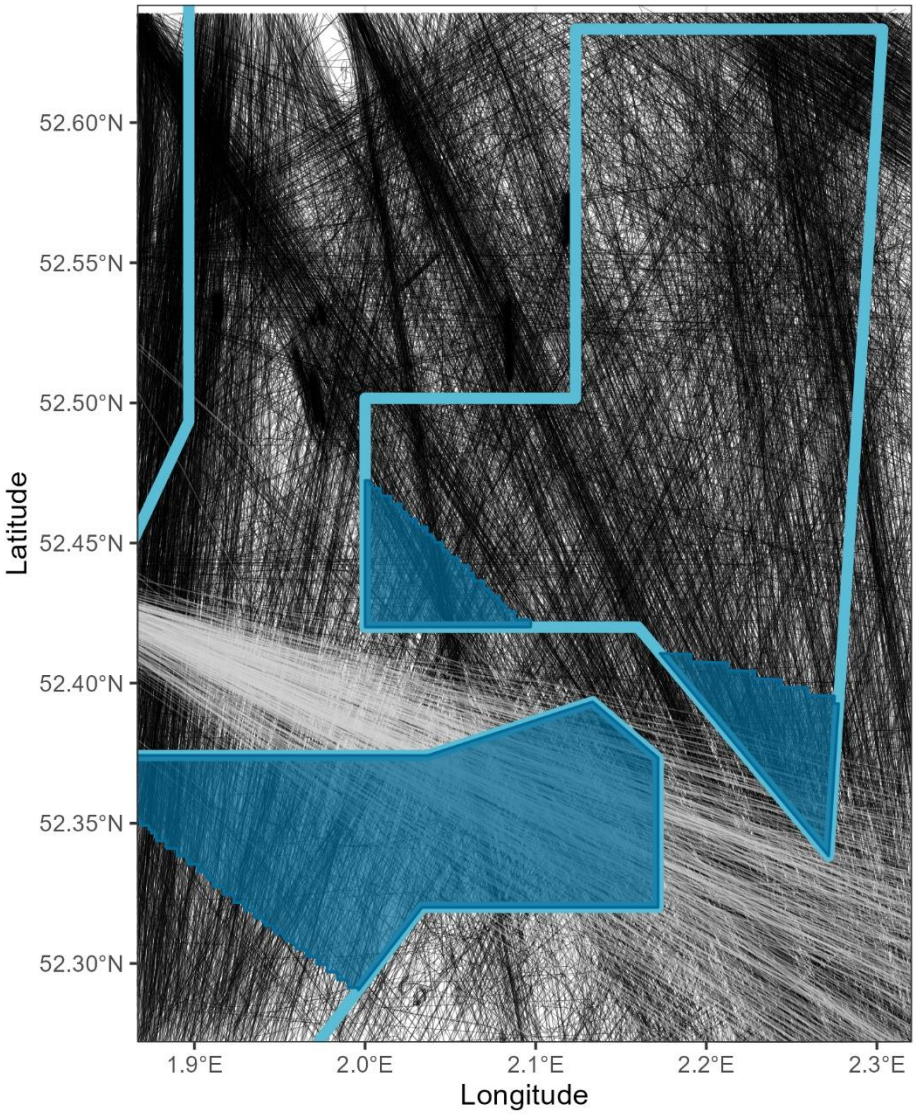

Figure 7: Map of vessel activity between 15th Nov 2022 and 15th April 2023 within part of the OTE SPA covered by vessel re-routing measures. Black lines indicate non-windfarm traffic and grey lines are actual traffic for EAONE. The pale blue boundary is part of the OTE SPA, and the darker blue shading is the portion of the SPA within 2km of EAONE windfarm traffic.

Table 7 shows the number and distance travelled by vessels during this winter period within the parts of the OTE SPA within 2km of East Anglia ONE O&M vessel routes.

Source	Distance (km)	Distance (%)
EAONE O&M vessels	5,085	22
Other vessels	18,277	78

Table 7: Quantity of vessel activity within the area of OTESPA within 2km of EAONE vessel traffic 15th Nov 2022 – 15th April 2023 (151 days).

4.1.4.2. Monitoring vessel reduction in the OTE SPA

Given the combined challenges of effect characteristics, small spatial area of effect, high variability in red-throated diver abundance and interaction with other vessel traffic it is deemed not feasible to monitor the vessel re-routing compensation using DAS to estimate changes in abundance. This conclusion was already raised during the inaugural RTDCSG meeting of the 4th April 2024 where none of the core members raised an objection.

The alternative proposed here is to reconsider how effects are monitored, and rather than attempting to measure an inestimable degree of positive effect we instead measure the reduction in negative effect, by monitoring and validating vessel compliance with the vessel re-routing management measure. In this case the Without Prejudice Compensation Measures reports stated that "Regular reporting would be undertaken to demonstrate compliance with the vessel routing". Given that several studies have established that vessels disturb red-throated divers (e.g. APEM 2016; Burger et al 2016; Burger et al, 2019; and Mendel et al., 2019) up to a distance of 5km in some cases then the reduction of vessel traffic within the SPA must have a positive effect on red-throated diver. Natural England provided advice that a distance of 2km should be used as the displacement distance from vessels.

The recalculated compensation ratio (6.2:1) will be used to evaluate, on an annual basis, the vessel re-routing compensatory measure by comparing the calculated percentage reduction in vessel activity against the actual vessel monitoring data (see Section 4.1.4.3) to validate the actual magnitude of reduced vessel disturbance achieved. This approach will also allow appropriate triggers/thresholds for adaptive management to be set with respect to overall actual reduction achieved, based on vessel monitoring data each year (see Section 8).

4.1.4.3. Vessel compliance monitoring

East Anglia THREE has contracted Vissim AS to provide a Vessel Traffic Management System (VTMS), for the East Anglia THREE Project. Under this system, vessel movements can be tracked, monitored, and reported on. All vessels associated with the Project will have AIS and will therefore be tracked by the VTMS. In addition, a specific georeferenced zone (geofence"), which is a 2km buffer from the OTE SPA boundary (except where this is not possible in the channel between the two parts of the OTE SPA) as shown in Figures 3 and 5, has been created. The geofence will be monitored by the Projects Marine Coordination Centre (MCC), to ensure vessels comply with the vessel navigation transit routes/corridors. If and when required, the VTMS via the MCC will be able to:

- Highlight any vessels which are close to or encroaching on the geofence boundary. The MCC will then be able to contact the vessel and remind them of the boundary and that it is a restricted zone which must be avoided; and
- Sound an alarm when a vessel enters the restricted zone. In this event, the MCC will contact the vessel and inform them they must leave the zone immediately, as long as there are no justifiable reasons, as set out in Section 4.1.1, as to why they have entered the restricted zone.

It is proposed that this system will be rolled out for East Anglia ONE, East Anglia ONE North and East Anglia TWO. The data obtained from this system will be used to validate the vessel re-routing compensation measure, as stated in Section 4.1.4.2 above.

Detailed records will be kept of each vessel deviation that occurs. The information that will be recorded, which is included in the AIS data, includes but is not restricted to, date, time, duration, location, speed and reason for deviation.

4.2. Timescales

The vessel navigation management compensation measures and monitoring, as set out in Sections 4.1.1 to 4.1.4 above, will be implemented prior to wind turbine installation starting on either East Anglia ONE North or East Anglia TWO, whichever occurs first. Exact dates for this will be refined as construction programmes for both projects are being finalised. Updates will be provided as and when these dates are confirmed, and this document will be updated accordingly.

4.3. By-catch Reduction Monitoring

Seabird by-catch from commercial fishing activity is recognised as a global concern (Žydelis et al., 2013; Anderson et al., 2011; Miles et al., 2020) with approximately 100 species impacted worldwide (Dias et al., 2019 As such, by-catch is considered one of the top three threats to global seabird populations (Dais et al., 2019). Within the UK, Northridge et al. (2020) identified static net (set gillnet) fisheries as an important fishery with regards to guillemot, razorbill and gannet by-catch, and longline fisheries as an important fishery with regards to gannet and gull by-catch. Whilst recent UK-based studies (Northridge et al.,2020 and Miles et al.,2020) did not record red-throated diver by-catch, it has been widely recorded in other countries, as was highlighted by Miles et al. (2020), and Natural England (2023) stated entanglement in fishing gear is one of the primary causes of red-throated diver mortality.

A by-catch reduction programme was selected as a secondary compensation measure based on the potential benefits gained from building better knowledge and solutions to reduce by-catch for lesser black-backed gull and red-throated diver. All details of the by-catch reduction compensation programme including actions, delivery programme, location, monitoring and reporting schedules are provided in Appendix 2 of this document.

5. OTE SPA MONITORING

5.1. Location

In accordance with Part 3 Schedule 18 of the project DCO's, DAS monitoring of red-throated diver abundance and distribution within the OTE SPA plus a 10km buffer (marine area) over two winter periods, with each period comprising three surveys (1st November to 31st March), will be undertaken. Figure 8 shows the survey area for the monitoring which includes the OTE SPA plus a marine 10km buffer area.

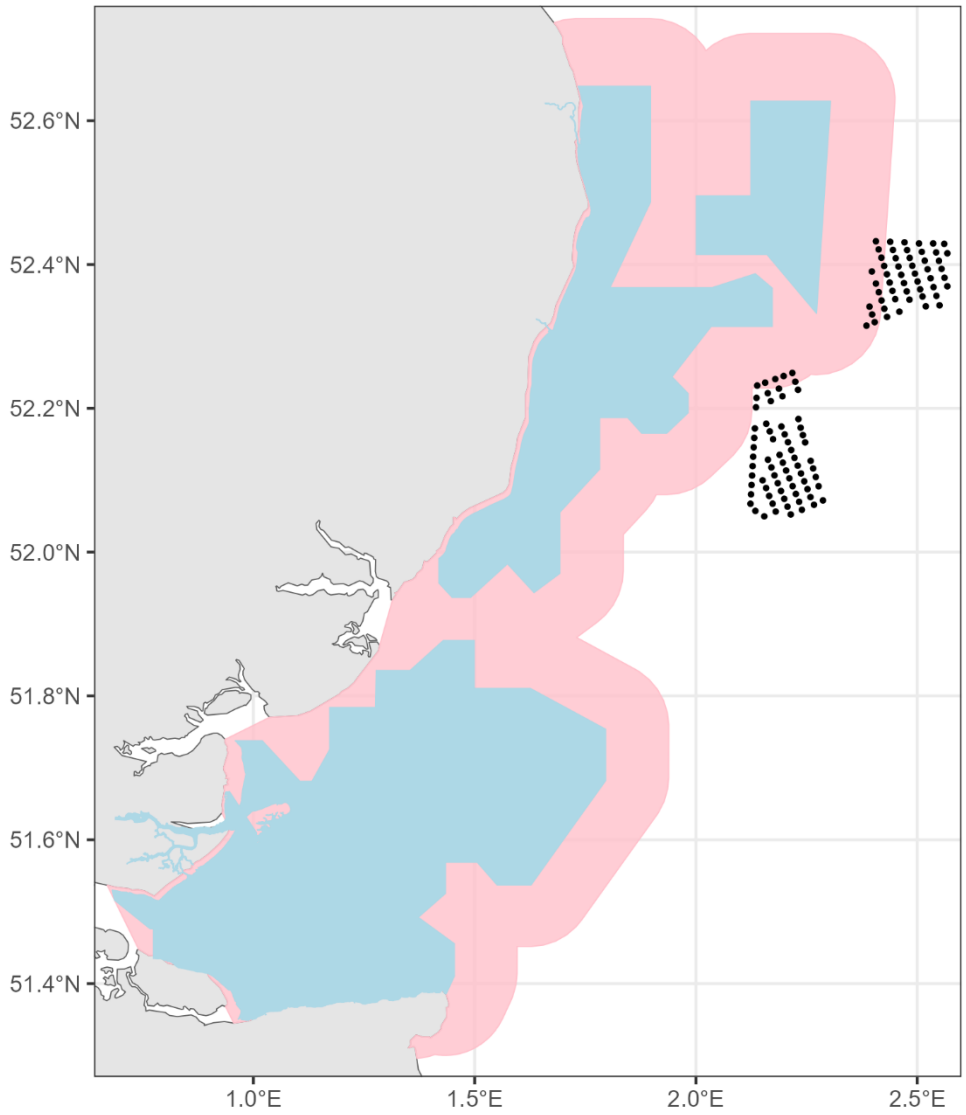

Figure 8: DAS survey area of the OTE SPA plus a 10km buffer. The blue shaded area is the OTE SPA; the pink shaded area is the 10km marine buffer area; the two clusters of black dots are the turbines for East Anglia ONE North (upper) and East Anglia TWO (lower). Inner estuarine areas of the OTE SPA have been excluded in the 10km buffer area due to the challenges this would present for transect-based DAS surveys.

It should be noted that a programme of DAS pre and post construction surveys, as part of the Projects Deemed Marine License (DMLs), are being undertaken to determine whether there is a change in abundance and distribution within the windfarm site and appropriate buffer zones following construction of the windfarm. The aims and objectives of the DML monitoring study are to:

- Identify whether there is at least a 70% reduction in red-throated diver abundance and/or distribution from East Anglia ONE North and East Anglia TWO; and
- If there is a reduction, assess the distance over which those changes are apparent.

To test these objectives, the following data are being collected via DAS:

- Red-throated diver abundance pre- and post-construction within the windfarm array and buffer areas; and
- Red-throated diver distribution pre- and post-construction within the windfarm array and buffer areas.

Following data collection, a comparison will be completed for both the abundance (density) and distribution of red-throated diver between pre- and post-construction. Any detectable effect i.e. reduction in abundance or change in distribution will be calculated including the distances to which they are reduced to.

Full details of the survey programme and objectives of the DML monitoring study are provided in the Red-throated Diver Monitoring Plan (SPR, 2023).

5.2. Methods

The methodology for DAS for offshore bird surveys typically involves the use of high-resolution cameras and remote sensing techniques to capture detailed images of birds in their natural habitat. These surveys are conducted using aircraft flying transect lines at altitudes that minimize disturbance to wildlife, while still allowing for the identification and counting of individual birds, typically 400-500m asl. Advanced image processing software is then used to analyse the photographs or video footage, with the help of machine learning algorithms to automate the detection and classification of species. This method provides a non-intrusive means to monitor bird populations and their behaviour over large areas. The data collected can help in understanding migration patterns, population sizes, and the potential effects of climate change or human activities on bird populations. The DAS will be undertaken across the OTE SPA plus a marine 10km buffer, as shown in Figure 8.

Survey transects will be parallel and will likely be aligned east to west. The alignment has been chosen due to the importance that transects evenly sample along environmental gradients. As per the DCO requirements two winter periods, one of pre-construction surveys and one of post-construction surveys, will be completed. In each winter period (1st November to 31st March inclusive), three surveys will be completed, resulting in six surveys spread over two wintering periods. During each DAS the camera technician will collect digital imagery and contextual observations to a standard which (following processing and analysis) will enable the following details to be recorded:

- Identification to species level and species grouping;
- Identification of age and sex where possible;
- Location / coordinates (to two (2) metre accuracy);
- Behaviour (e.g. flying, sitting, feeding, preening etc);
- Flight direction / orientation (on 16-point compass);
- Georeferenced location (date and time) and footprint of image; and
- Contextual information of any relevant observations that may affect the survey results, e.g., shipping, types of vessels and direction.

The camera system will be operated by a trained aerial survey technician to ensure successful data collection. Adjustments will be made to the angle of the camera system to avoid glare from the sea surface. The technician will also keep a record of the order in which the transects are flown, the time which the first node of each transect is captured, transect orientation and ground speed.

Survey flights will take place at a height in accordance with minimum safe altitude regulations which will also avoid disturbance to birds (and marine megafauna) whilst optimising ground resolution (minimum 2cm Ground Sampling Distance (GSD)). DAS surveys will achieve a 15% coverage and will only take place during suitable weather conditions. Where possible and weather conditions allow, one survey will be completed in December, January and February for both pre- and post-construction surveys with approximately a four-week gap between each survey. As far as is practically possible, the pre- and post-construction surveys will follow a comparative methodology to ensure consistency and accuracy of analysis.

5.3. Timescales

The first winter survey will occur prior to commencement of offshore construction of East Anglia ONE North offshore windfarm or East Anglia TWO Offshore windfarm (whichever is the first to commence construction) and the second survey during the first winter following the COD of East Anglia ONE North offshore windfarm or East Anglia TWO offshore windfarm (whichever is the later to enter operation).

5.4. Analysis and Reporting

The objective of these DAS OTE SPA surveys is to obtain data that can assist in better understanding the abundance and distribution of the red-throated divers in the OTE SPA and surrounding area, and to consider how anthropogenic sources of activity such as offshore windfarms and vessels, influence this. There have been several previous studies which have looked at the abundance and distribution of red-throated diver in the OTE SPA (APEM 2013, and Irwin et al 2019), some studies have assessed the potential displacement impact of anthropogenic activities and the presence of offshore windfarms on red-throated diver (APEM 2013 and APEM, 2016).

It is proposed that the data obtained from OTE SPA DAS surveys will be used to create abundance and distribution estimates using both a design based and model-based approach, similar to that which was undertaken in the APEM (2013) study. Such a study would also incorporate other appropriate sources of data including but not limited to, the data been collected for the DML (array and 15km buffer area, APEM 2013 data and HiDef Ltd 2018 data, to increase sample size. Example candidate environmental covariates which would be considered for the models would include, but not be limited to:

- Bathymetry;
- X and Y coordinates;
- Distance to coastline;
- Seabed slope;
- Seabed aspect;
- Chlorophyll a;
- Tidal base;
- Wave base;
- Average se surface temperature;
- Distance from human activities such as dredging;
- Distance from operational windfarms;
- Distance from windfarms under construction; and
- Distance from shipping activity.

Both approaches would explore which covariates have the strongest correlation as predictors of abundance and distribution i.e., anthropogenic variables such as shipping and distance to windfarm, to better understand how they influence and impact (displacement) the red-throated diver distribution within the OTE SPA plus 10km buffer, similar to studies undertaken by Burger et al., (2019).

All data will be uploaded on the marine data exchange. The data and models would be shared with NE in order for it to be used in other studies such as sensitivity tool mapping, identification of sanctuary zones and wider analyse to understand what impacts offshore windfarms have had on the OTE and surrounding area over the past 20 years. The data could be used and augment or integrate with these other studies and modelling approaches, to increase the knowledge and understanding of anthropogenic impacts i.e., disturbance, on the abundance and distribution of red-throated divers in the OTE SPA. Furthermore, the results of the survey monitoring including data and modelling analysis will be included in the RTDIMP annual reports to the RTDCSG, in the years when surveys works are undertaken.

6. PARTNERSHIPS

Schedule 18 Part 3, paragraph 3(e) of the DCO consent for both projects states the following:

e) details in relation to the convening of a partnership with relevant authorities and user representation to:

- *(i) improve understanding of disturbance and displacement effects on red-throated diver within the Outer Thames Estuary SPA;*
- *(ii) identify and implement opportunities to reduce these effects; and*
- *(iii) ensure stakeholder engagement and liaison to raise awareness and communicate any proposed changes in usage*

At the time of the DCO consent, East Anglia ONE North and TWO committed to creating and hosting a partnership of the relevant authorities and other representatives, which would identify and implement opportunities to reduce the disturbance effects on red-throated diver at a strategic level[3]. The DCO and project

commitments preceded the formation of the Collaboration on Offshore Wind Strategic Compensation (COWSC) group, which sits under the Offshore Wind Industry Council (OWIC) programme of research projects.

6.1. The Collaboration on Offshore Wind Strategic Compensation (COWSC)

The purpose of the COWSC group is to improve the shared understanding of environmental compensation options relating to the offshore wind industries interface with nature, and better coordinate the consenting process for offshore wind projects. As the pipeline of offshore wind development grows, there is an increasing need for developers, Government, and stakeholders to be able to take a more coordinated and strategic approach to identifying and delivering any required environmental compensation measures. There are currently uncertainties around how to assess the effectiveness of these environmental compensation measures, which has led to delays in consenting decisions and therefore COWSC is aiming to establish a comprehensive bank of data and evidence of efficacy in a library of suitable measures that can be used and delivered in a more strategic manner by the industry that delivers solutions as well as ecological coherence of the designated sites network.

COWSC is made up of representatives of key stakeholders including offshore wind developers, statutory nature conservation bodies, The Crown Estate, UK Government, Devolved Governments and environmental non-governmental organisations. At present COWSC is focused on delivering a shared body of evidence and research (including practical pilot studies) in four target areas which are:

- Artificial nests for seabirds;
- Habitat restoration and creation;
- Predation reduction; and
- Removal of defunct infrastructure.

Within COWSC there are several expert groups which are researching specific measures and/or species particularly where data gaps are prevalent. One species which has a dedicated expert group is red-throated diver.. An initial red-throated diver group was setup by DEFRA, Natural England, the MMO and DESNZ in 2023. It was outwith the COWSC group and offshore wind developers including SPR were invited to join. SPR attended the first two group meetings in 2023 and a brief summary of the discussions which took place during those meetings is as follows:

- Preliminary discussions with stakeholders regarding expert topic group for red-throated diver as part of the COWSC; and
- Second expert topic group meeting discussion with red-throated diver group to discuss potential feasibility study to assess all anthropogenic impacts on red-throated diver in the OTE SPA and consideration of designation of quiet zones and how developers could contribute to this.

This initial group was paused whilst the MMO explored if there was a mechanism to include existing offshore wind farms. However, in parallel to this after the first year of the COWSC programme an exercise was carried out to identify priority strategic compensation measures including red-throated diver, which then subsequently became part of the COWSC workstream with industry represented by OWIC. The principal purpose of the expert group is to provide a recommendations on the potential ecological efficacy, delivery feasibility, and strategic value of “Sanctuary Zones” for red-throated diver within the OTE SPA. Alongside “Sanctuary Zones”. The group is also considering whether there are wider suitable strategic compensation options for red-throated diver in need of further review.

Following the second RTDCSG meeting on 6th September 2024, JNCC (email dated 18th September 2024) provided the following COWSC red-throated diver expert group update:

> *“The COWSC red-throated diver subgroup has been collating evidence of red-throated diver disturbance and displacement and working on a delivery plan. Department for Environment and Rural Affairs (Defra) have asked for any research needs for the group. Several ideas have been submitted around the need for better data on red-throated diver distribution outside of the OTE SPA, on the basis that “Sanctuary Zones” may need to be consider in areas outside of existing SPA. This could include DAS, but there is a caveat that DAS is not quick to carry out and produce outputs in the current timescales. NE have completed a project risk-mapping the OTE SPA, taking red-throated diver density distribution, existing levels of activity, and information about habitat preferences to generate maps of risk and opportunity. This could be used to identify suitable habitat and where there*

are areas of activity that could be suppressed. The group are also progressing the definition of a "Sanctuary Zone" to aid discussion on their effectiveness and eventually their feasibility."

6.2. Developer Group

There is currently significant overlap between the aims of the COWSC expert group and the DCO Condition for East Anglia ONE North and TWO stated above. Therefore, in order to convene a partnership which is complimentary to the scope of COWSC, the Projects propose to convene discussions with other developers / users that have the potential to impact red-throated diver within the OTE SPA, through forming a developer group to share lessons learned, experience and monitoring/modelling results of the measures implemented by East Anglia ONE North and TWO.

The Projects will also encourage other developers / users to share their results and experience of any measures which they have implemented, in respect of red-throated divers. The objective of this approach will be to raise awareness, improve understanding of disturbance and displacement effects and share good practice of operating offshore windfarm developments where red-throated diver are present and encourage all users to adopt good practice measures where results have shown such measures to be beneficial/positive. As was discussed and agreed during the second RTDCSG meeting on 6th September with all core members, the Projects have no regulatory powers and are therefore restricted in their ability to compel other users to implement changes which would only be adopted on a voluntary basis.

In forming this developer group and sharing results of monitoring programmes and measures that have been implemented, East Anglia ONE North and TWO would raise awareness of improved working practices/changes in usage that have a positive effect on the red-throated diver population and OTE SPA as a whole.

The Projects believe that this developer group would compliment the work being undertaken by the COWSC red-throated diver expert group and would seek to implement an exchange of knowledge and information between the two groups either through representation on the group or sharing of documents such as minutes or results of monitoring programmes.

It is proposed that the developer group would meet every six months and would be chaired by SPR with representatives from projects <10km from the OTE SPA invited to join this group, as well as other users including the following:

- North Falls;
- Scroby Sands:
- London Array;
- Kentish Flats;
- Gunfleet Sands;
- Thanet;
- Greater Gabbard;
- Applicable port authorities;
- Applicable local planning authorities; and
- The MMO.

The first meeting of the group will take place after the first pre-construction OTE SPA DAS surveys have been completed and analysed, and every six months thereafter until the final post-construction OTE SPA DAS surveys have been completed and analysed. The requirement for continuation of the group and further meetings will be reviewed at that stage.

7. REPORTING

Paragraphs 6 and 7 of Part 3 of Schedule 18 of the DCO establish the reporting requirements that will be adhered to by East Anglia ONE North and East Anglia TWO. These are as follows:

"6. The undertaker shall notify the Secretary of State of completion of implementation of the measures set out in the RTDIMP. Once implemented, the measures should remain in place throughout the operational lifetime of the authorised development.
7. Results from the monitoring scheme and aerial digital surveys must be submitted at least annually to the Secretary of State and the relevant statutory nature conservation body. This must

include details of any finding that the measures have been ineffective in securing the maintenance of the SPA's conservation objectives and, in such case, proposals to address this. Any proposals to address effectiveness must thereafter be implemented by the undertaker as approved in writing by the Secretary of State in consultation with the relevant statutory nature conservation body."

Annual reports documenting the implementation and monitoring of the RTDIMP requirements will be produced and submitted to the SoS and RTDCSG. Each annual report will detail the monitoring, survey work (when applicable) and partnership work undertaken in the previous year and the results/findings. Discussions and agreements made within the RTDCSG will also be provided, particularly details on implementation and monitoring of actions and any subsequent actions which have been agreed. The annual reports will also include implementation, progress and actions completed in relation to the ornithological by-catch programme of work.

8. ADAPTIVE MANAGEMENT

The RTDIMP compensation measures will be evaluated for their efficacy on an annual basis. It is proposed that the process shown in Figure 9 will be followed:

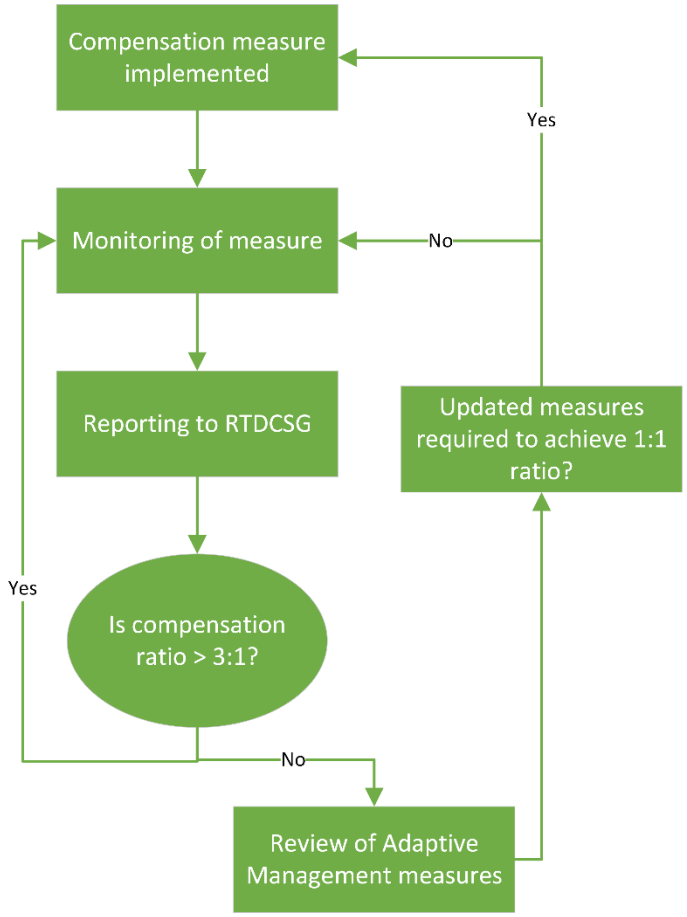

Figure 9: Flowchart showing process to be followed for review of compensation measure efficacy and requirement for adaptive management, if applicable.

Whilst at this time it is not possible to determine which adaptive management measures would be considered, because this will depend on specific circumstances, it is possible to define the triggers that would lead to adaptive management and provide examples of what adaptive management measures could be considered. As stated in Section 4.1.4 the Projects propose to validate data against the predicted compensation ratio based on the calculated estimated magnitude of reduced vessel disturbance verses the actual data which will be obtained via vessel compliance monitoring (Section 4.1.4.3). The Projects propose that if the compensation ratio drops to below a 3:1 ratio this would trigger a review of the of the compensation measures. If the review finds that a change is required, the revised measures will be implemented as shown in Figure 9. For example, if the data analysis shows that certain vessels have violated the geofences then the projects could implement a targeted communication campaign with the relevant vessel crews (toolbox talks etc.) further detailing the importance of the corridors and why they need to be adhered to, where safe to do so.

However, if the review concludes that no changes to the measures are required to achieve a 1:1 compensation ratio then the Projects will continue to monitor and review.

Example options of adaptive management measures that could be considered include:

- Further optimisation of vessel routes to allow further flexibility for vessels within the vessel management corridors whist limiting additional disturbance to the OTE SPA and compensation ratio. For example, if the data logs show that deviations due to regular known vessel movement shipping lanes has occurred, then the timing of crew transfer vessels could, where practicably possible, be scheduled to avoid these regular movements;
- Reduction of vessel speeds, particularly in the vessel management route between the two parts of the OTE SPA, as this has been shown to reduce disturbance from vessels on red-throated divers (Burger et al, 2019);
- In circumstances where more than one vessel is due to travel to the same project, an evaluation could be made to see if it is plausible for the vessels to travel at the same/similar time to reduce disturbance effects; and
- Other measures that are identified through the developer group or identified by consultation with other stakeholders/regulators, which may be deemed appropriate to implement.

All adaptive management proposals and actions will be discussed and agreed collaboratively with the RTDCSG prior to being submitted to and approved by the SoS.

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10. APPENDIX 1 – COMMENT LOG

Consultee Reference	Section/paragraph	Consultee Comment	Response / Update	Status (open/closed)
RTDIMP Draft 1: RTDCSG Comments				
NE 1	1.1	The draft RTDIMP states that it will be in accordance with the Offshore Ornithology Without Prejudice Compensation Measures, however this document does not provide details of the proposed SPA-wide monitoring. This was clarified in a letter from SPR to BEIS (now DESNZ) dated 11 March 2022, which sets out information on the area of surveys, survey frequency, survey method and analysis. The statement on the analysis is that 'The survey results will be used to create a new OTE SPA RTD displacement effect model which also considers environmental and anthropogenic covariates, including offshore windfarms.'. Natural England advises that this objective should be included within the RTDIMP.	Reference to the letter dated 11th March 2022 to BEIS (now DEZNZ), has been included in Section 2.1 of the second revision of the RTDIMP. The objectives of the OTE SPA DAS surveys and applicable modelling are now included in a revised Section 5 of the OTE SPA DAS monitoring and Section 5.4 Analysis and Reporting.	CLOSED
NE 2	1.2	Below, we highlight in bold the following areas of the compensation schedule that need further detail in the RTDIMP: *d) details of the proposed ongoing monitoring of the measures including: survey methods; survey programmes; success criteria; recording of RTDCSG consultations and project reviews;* ***details of the factors used to trigger alternative compensation measures and/or adaptive management measures;***	Further details regarding triggers to alternative compensation measures and adaptive management measures; and convening of partnerships, has been added to the following sections of the RTDIMP: • Section 6 has been updated with further information on the convening of partnerships. Section 6. 1 provides detailed information on the work being carried out by COWSC and how this dovetails with the	CLOSED

		*(e) details in relation to the **convening of a partnership with relevant authorities and user representation** to— (i) improve understanding of disturbance and displacement effects on red-throated diver within the Outer Thames Estuary SPA; (ii) identify and implement opportunities to reduce these effects; and (iii) ensure stakeholder engagement and liaison to raise awareness and communicate any proposed changes in usage;* We are concerned that there is no clear statement regarding either triggers/adaptive management nor the convening of a partnership, and request these are incorporated in an updated RTDIMP.	requirements of East Anglia ONE North and TWO's DCO. Section 6.2 provides details on a proposed developer group that the Projects will convene to fulfil their DCO requirements as well as complementing the work undertaken by COWSC; and • Section 8 provides updated details on adaptive management including triggers, which relate directly to the compensation ratio for vessel management/monitoring and includes examples of the types of adaptive management measures which would be considered if required.	
NE 3	Figure 3	As noted in our meeting of 06 September 2024, the without prejudice material showed vessel routes as lines, whereas in the draft RTDIMP broad corridors have been used. Unless clarified, the risk here is that vessel movements could occur within 2km of the SPA and therefore cause disturbance to RTD within the SPA, undermining the purpose of the re-routing. We advise that the vessel corridor to the north should be set a minimum distance of 2km from the SPA boundary. Whilst we recognise that it is not possible to stay 2km	Figure 3 in Section 4.1.1. has been updated to show the proposed vessel re-routing that will be used for the compensation measure. The new route to the north of the OTE SPA is 2km from the SPA boundary. The route which passes between the two parts of the SPA has been optimised to reduce the residual impacts of vessel disturbance on the SPA as far as is practically possible by maintaining the maximum distance possible from the boundary, whilst also ensuring safety and adherence to COLREGs.	Natural England accepts that a consistent area-based approach is important, but it would also be useful to see not only the number of vessels that have deviated, but also the associated details, including the date, time and duration of such deviations, since RTD abundance and distribution shows temporal

		from the SPA when passing between the two parts of the SPA, a route that maintains the maximum distance possible between the two parts should be identified up to the point at which it is possible to avoid both by 2km. We recommend that this specific area of the SPA potentially impacted along the route plus 2 km buffer is quantified spatially and presented both in km2 and as a proportion (%) of the total area of the OTE SPA. Additionally, we suggest that an alternative temporal appraisal of impact is conducted by calculating the number of days (or more specifically periods of daylight) between November 1st and March 31st inclusive that the area identified above will be impacted, bearing in mind red-throated divers may be displaced for up to 7 hours (almost the entire daylight period at that time of year) by fast-moving vessels associated with OWFs (Burger et al, 2019). Finally, we recognise that navigation priority for project vessels remains to comply with the COLREGs (IMO, 1972/77) to ensure the safety of the vessel at all times, and the unavoidable impacts on the port-approach area as indicated in Figure 3. It would be extremely informative to have an annual summary provided, giving details of the frequency of deviation from the proposed vessel routes on every occasion the	The residual effects of the disturbance which will still occur from vessels, where it is no possible to maintain a distance of 2km from the SPA boundaries, has also been accounted for in the updated Scale of Compensation (Section 4.1.2) and subsequent compensation ratio. The basis for the compensation regarding vessel re-routing in the Without Prejudice documents for both projects, took an area-based approach and we want to ensure that we are consistent with this. We have updated the area-based approach methodology in Section 4.1.2 taking account of the additional vessel disturbance in the area effected and subsequent compensation ratio which has been recalculated in Section 4.1.2.1 including % reduction in vessel activity based on the real data that we obtained for winter traffic in winter 22/23; and Section 4.1.4.2 now describes how the new calculated metrics of % vessel reduction in activity will be used through monitoring to validate the compensation measures. This will be the basis for providing an annual report summary of how effective the measure has been and how it compares to the predicted compensation ratio, highlighting the number of vessels which have deviated from the proposed routes	variation and more birds may be affected at certain times within the peak winter period. SPR: Details on vessel deviations, as stated in this comment, have been added in to the RTDIMP.

		resulting route came within 2 km of the SPA and the reasons for such deviations.	and the reasons for this, as now described In Sections 4.1.4.2 and 4.1.4.3.	
NE 4	3.1.2	Natural England maintains its position that the transitory effects of vessel movements are not equivalent to the perpetual presence of an offshore windfarm, and therefore we consider that a 'like-for-like' compensation ratio of 9:1 is based on a flawed premise. We also note that the compensatory ratios are based on the 'effective area of displacement' values, which we do not consider adequately reflect the extent of the impacts, compared to the area over which displacement effects could arise (92.58km2). However, we do recognise that the Secretary of State adopted both of the above approaches in their Appropriate Assessment.	This is acknowledged by SPR, and we also acknowledge the final decision by the Secretary of State. At this time, we are looking to ensure that what is being delivered in this updated RTDIMP is acceptable for discharging the DCO obligations.	CLOSED
NE 5	3.1.4	This section is rather long and, for ease of future reference, could be broken into sub-headings.	This Section, which is now Section 4.1.4 has been broken down into sub sections for ease of reference.	CLOSED
NE 6	Figure 4	This Figure usefully highlights that there are multiple vessel movements through the area in question, only a proportion of which are (or will be) a result of SPR vessels. This means that if successful the rerouting will result in a reduction in the number of vessel movements but that it is far from clear whether the removal of these will make a meaningful difference to the level of disturbance that occurs, given the lengthy diver return time following vessel disturbance. Given the requirement to test the effectiveness of the measure in order to inform adaptive management, Natural England	See response to NE 3 regarding % vessel removal, monitoring and validation. Section 8 Adaptive Management of the updated version of the RTDIMP describes triggers/ thresholds for adaptive management based on monitoring and validating the vessel re-routing data.	CLOSED

		considers there is a need to evaluate the compensatory measure in terms of the likely % reduction in overall vessel movements within 2km of the SPA, as well as simply the vessel movements from EA1 and EA3. In our view, given there will be no empirical monitoring, it would be appropriate for any triggers/thresholds to be set with respect to the overall reduction achieved.		
NE 7	3.1.4, page 20, penultimate paragraph	*'Natural England maintain that this effect is evidenced to extend to 2km (Burt et al, 2022)'* – Natural England's advice is evidenced through Burger et al (2019) and Mendel et al (2019), both cited in the plan. We note that the former identified the potential for effects extending out to 3km and the latter out to 5km.	This paragraph of the report, which is now in Section 4.1.4.1 has been updated to reflect this comment.	CLOSED
NE 8	3.1.4, page 21, first paragraph	As noted on 06 September 2024, this section is unclear regarding which vessels will have the VTMS, so we welcome the intention to clarify this.	This paragraph, which is now in Section 4.1.4.3 has been updated to clarify this point. The VTMS is the system which will be used to track all Project vessels and all vessels will be fitted with AIS.	CLOSED
NE 9	4	Natural England suggests that the pre- and post-construction surveys of the OTE SPA and 10km buffer are conducted by the same contractor using the same methodology. Where possible, and weather permitting, one survey each in December, January and February would be preferred, ideally at 4-week intervals. As discussed at the Compensation Steering Group meeting (06/09/2024), the APEM 2013 OTE DAS report has been provided to	Section 5.2 OTE SPA methods have been updated to take account of these comments. Methods now state that where possible surveys will be conducted in December, January and February ideally 4 weeks apart, and where appropriate reference has been made to the APEM 2013 study.	CLOSED

		yourselves separately for further information and advice.		
NE 10	4.2	*'The results of the survey monitoring specifically abundance and distribution will be included in the RTDIMP annual reports to the RTDCSG'* – we consider this falls well short of the disturbance model creation committed to in the letter of 11 March 2022. We would be pleased to explore how the data collected might augment or be integrated into other modelling approaches that have been conducted (or are being considered), to see whether that might be an acceptable alternative option, but do not consider it acceptable for the RTDIMP to propose no modelling whatsoever.	A new section, Section 5.4 has been added to the document to address this comment. The document (as stated in response to comment NE 1) now makes refence to the 11th March 2022 letter, and Section 5.4 provide information on methods of analysis of DAS survey data including modelling. As per email correspondence with NE over the past two months, we are also awaiting further comment on this to see how/if the data could also be used to augment or be integrated into other work either being conducted or considered.	CLOSED
NE 11	5	SPR's engagement with the strategic initiatives is welcomed. However, we do not consider this absolves EA1N/EA2 from the requirement to convene a partnership, particularly given the importance of user representation, which none of the strategic initiatives currently do. We highlight the following roles of the partnership: *(i) improve understanding of disturbance and displacement effects on redthroated diver within the Outer Thames Estuary SPA; (ii) identify and implement opportunities to reduce these effects; and (iii) ensure stakeholder engagement and liaison to raise awareness and communicate any proposed changes in usage*	The partnership section of the RTDIMP, based on discussions during the last RTDCSG meeting (held 6trh September 2024) as well as the comment that has been raised here, has led to the partnership section of the RTDIMP being re-written. The updated RTDIMP now outlines in detail in Section 6 (6.1 and 6.2), the partnership approach the projects will take and the group, which will be a developer group, that will be convened by the projects. Section 6 also outlines what the objectives of the group will be, a list of proposed invites and a proposed timeframe of when the partnership meetings will commence and how frequently meetings will be.	CLOSED

		We recommend that an updated RTDIMP includes a timetable for when the partnership will be set up e.g. prior to the collection of the first winter of SPA-wide surveys, a list of candidate invitees and an indication of meeting frequency.		
NE 12	7	The adaptive management process is logical and we agree that the particular measures to be used cannot be confirmed at this stage. However, we consider that a short list of potential options is included, to give DESNZ confidence that adaptive management options are available. At one end of the scale, this could include additional vessel management measures (routes, speeds, convoying) or stakeholder engagement/liaison, and at the other, contributions to the creation and management of sanctuary areas within the SPA.	Adaptive Management, now Section 8 of the RTDIMP has been updated. This update includes an outline of options which will be considered for adaptive management. The update is based on the comment raised here as well as discussions during the last RTDCSG meeting on 6th September 2024.	CLOSED
JNCC 1	3	JNCC recommend that vessels transiting outside of the Outer Thames Estuary SPA should maintain a 2km buffer between vessels and the SPA boundary to prevent any disturbance to the SPA. We recognise that where vessels are routed between parts of the SPA, the distance between SPA regions is less than the 4km required to keep a distance of 2km from the SPA boundary, and that this is largely unavoidable without having to route around the north of the SPA.	Section 3, which is now Section 4 (specifically Section 4.1.1 and 4.1.2) has been updated based on the comment raised here as well as discussions during the last RTDCSG meeting on 6th September 2024. Figure 3 in Section 4.1.1. has been updated to show the proposed vessel routes that will be used for the compensation measure. The new route to the north of the OTE SPA is 2km from the SPA boundary. The route which passes between the two parts of the	CLOSED

		That being said, it will result in some residual disturbance to the SPA, which needs to be accounted for. This includes in the calculation of the compensation area, and in the calculation involving the monitoring of vessel transits to validate that the compensation measure has been successfully implemented.	SPA has been optimised to reduce the residual impacts of vessel disturbance on the SPA as far as is practically possible by maintaining the maximum distance possible form the boundary, whilst also ensuring safety and adherence to COLREGs. The residual effects of the disturbance which will still occur from vessels where it is no possible to maintain a distance of 2km from the SPA boundaries has also been accounted for in the updated Scale of Compensation (Section 4.1.2) and subsequent compensation ratio.	
RTDIMP Draft 2: RTDCSG Comments				
NE 13	General	Natural England advises that the inclusion of numbered paragraphs would be helpful to aid in review.	Whilst we recognise this would assist with review, unfortunately we are restricted with our current template and we are unable to add paragraph numbers in.	CLOSED
NE 14	2.1, Third Para	Natural England welcomes the development of the Outer Thames Estuary Special Protection Area (OTE SPA) monitoring requirements being based upon the letter to DEZNS (dated 11 March 2022) as detailed in the RTDIMP.	N/A	CLOSED
NE 15	2.3, Second Para	We advise that the second paragraph in this section should be updated to detail that the meeting in November 2024 did not go ahead.	The text has been updated and now details that the November meeting did not go ahead and that the second RTDIMP review cycle was dealt with via email and written responses.	CLOSED

NE 16	Table 1	We advise that the placeholder for the meeting on the 29th of November should be removed, as this meeting did not go ahead.	Table 1 has been updated to reflect that written comments on the second version of the RTDIMP were addressed via written correspondence rather than a third steering group meeting.	CLOSED
NE 17	Table 2	As above, we advise that the placeholder for the meeting on the 29th of November should be removed, as this meeting did not go ahead.	Table 2 has been updated to reflect that written comments on the second version of the RTDIMP were addressed via written correspondence rather than a third steering group meeting.	CLOSED
NE 18	Figure 3	We welcome the clarification and additional detail included in the description of Figure 3.	N/A	CLOSED
NE 19	4.1.2, Fourth Para	We note that the ratio of 9:1 detailed in the SoS Decision Letter (31 March 2022) has now been recalculated to 4:9:1.	Note the ratio has been updated to 1:6.2. This is due to the recalculation of EA1 vessel movements (see Annex A in this comment log for further details), the expansion of the AIS data area to fully include EA1 vessel movements in the west, and the correct inclusion of all SPA areas within 2km of current AND future vessel movements as identified by JNCC.	CLOSED
NE 20	4.1.2.1	We welcome Scottish Power Renewables (SPR)'s efforts to incorporate the feedback regarding the recalculation of the scale of compensation.	Note the ratio has been updated to 1:6.2. This is due to the recalculation of EA1 vessel movements (see Annex A in this comment log for further details), the expansion of the AIS data area to fully include EA1 vessel movements in the west, and the correct inclusion of all SPA areas within 2km of current AND future vessel movements as identified by JNCC.	CLOSED

NE 21	4.1.2.1, Second Para	We advise that the simulated vessel movements matching the East Anglia ONE AIS data is an acceptable approach.	Note the number of vessel movements has been updated from 367 to 531. This was due to identification of the AIS data "Section" attribute, which identified individual fixes to the same track, was erroneous in some cases (see Annex A in this comment log for further details).	CLOSED
NE 22	4.1.2.1, Sixth Para	Natural England advises that the permanent displacement effects of arrays and the transitionary impacts of vessels are not comparable or equivalent, particularly in that the measure only results in a 14.9% reduction in traffic.	We acknowledge that this advice has been NE's position throughout the development of the compensation measures for red-throated diver. However, the DCO conditions for compensation (Paragraph 3 of Schedule 18, Part 3 of the East Anglia ONE North Offshore Wind Farm Order 2022 (the 'East Anglia ONE North DCO'[1]) and paragraph 3 of Schedule 18, Part 3 of the East Anglia TWO Offshore Wind Farm Order 2022 (the 'East Anglia TWO DCO'[2])), require the Projects to deliver the measures as specified. As such, we consider this advice does not indicate that the RTDIMP is incorrect or deficient with regards to the compensation measures required to be discharged by the Projects.	CLOSED
NE 23	Table 5	Natural England seeks clarification on which part of the SPA the data are referring to within Table 5, as well as how the data in the 'No. in SPA <2km from vessels' column were calculated.	Additional information has been added into Table 5, to provide context on what data are being referred to as well as how the data within the No. in SPA have been derived.	We require further clarification on Table 5, namely if it is an actual spatial and temporal analysis of East Anglia 1 vessel traffic and RTDs, or if it just theoretical.

				SPR: Table 5 shows historical data from EA1N and EA2 surveys which overlap the area within 2km of the EA1 vessel traffic, so it is a subset of actual data. The purpose of this is show the variation in diver densities as is explained in the text which accompanies the table in the RTDIMP.
NE 24	4.1.4.1, Fifth Para	Natural England notes that Digital Aerial Surveys (DAS) surveys record anthropogenic structures within the survey area, including vessels down to type. These are time-stamped on the DAS. We advise that with this, combined with concurrent time stamped Automated Identification Systems (AIS) data a study could be attempted similar to Burger et al. (2019), who used AIS data to plot vessels tracks by calculating speed and direction between data points (section 2.5.1 of the paper). This allowed them to investigate densities and distribution of red-throated diver (RTD) in relation to vessels, within a specific time and distance window. We advise that prey distribution and other covariates would be irrelevant in a study of this nature.	We understand that DAS surveys can detect structures/vessels, and that AIS data are time-stamped, however neither of these aspects address the limitations to the use of DAS as a method to monitor compliance with the compensation measures which are explained in the RTDIMP. A key difference between the Burger et al. (2019) study and using DAS for monitoring vessel re-routing is that their study analysed data from all vessel movements whereas the vessel re-routing only comprises circa. twice daily O&M vessel movements. The use of DAS for monitoring the vessel re-routing compensation measure was previously acknowledged by all steering group members, including representatives of NE during RTDCSG meeting 1 (EA1N-DWF-ENV-PRG-IBR-000001 and EA2-DWF-ENV-PRG-IBR-	Natural England agrees that it is not considered feasible to monitor the vessel re-routing compensation measure using DAS to estimate changes in RTD abundance along vessels routes and highlight that we have not changed our position on this since it was first agreed in RTDCSG meeting 1 (EA1N-DWF-ENV-PRG-IBR-000001 and EA2-DWF-ENV-PRG-IBR-000001). However, the 6 digital aerial surveys pre- and post-construction for the OTE SPA + buffer, which will provide geo-referenced and

			000001). This approach had not changed in the latest draft and therefore we provide no changes to the document. It should be noted that the relationship between all vessel movements and RTD disturbance will be explored within the OTESPA plus 10km survey and subsequent analysis, similar to the Burger et al., (2019), as per requirements stated in DCO's paragraph 3 of Schedule 18, Part 3 bullet point (e).	timestamped records of both RTD and vessels across the SPA, give an opportunity for a more detailed analyses of the spatial and temporal relationship between RTD and all vessel proximity, as undertaken in the southern North Sea (German Bight) by Burger et al (2019) and Mendel et al (2019). We therefore welcome the Applicant's undertaking in the Comments and Responses Log that this is their intention and request that this intention is stated specifically in the RTDIMP. We suggest that to increase the size of the dataset of RTD and vessel observations and improve the robustness of any findings, the analysis is based on all the pre- and post-construction surveys, which will be conducted 3 times over the winter period (in December, January and February) for 2 years pre- and 2 years post-construction).

				SPR: The intention to analyse the relationship between all vessel movements and RTD disturbance within the OTESPA plus 10km survey and subsequent analysis, similar to Burger et al., (2019), is stated in the third paragraph of Section 5.4 of the RTDIMP. Paragraph 3 of Schedule 18 , Part 3 bullet point C of the DCO for both projects, requires that the projects should undertake two winters of DAS surveys (3 surveys pre-construction and 3 surveys post-construction) over the OTESPA plus a 10km buffer. This is what the projects are committed to carrying out. This level of survey work i.e. 6 surveys in total, would be greater than the number of surveys completed for previous SPA wide surveys (APEM, 2013 & Irwin, 2019), and would also be greater than the number of surveys

				completed by Burger et al, 2019.
NE 25	4.1.4.2, Penultimate Para	We advise that the last paragraph of this section should be edited to detail that Mendel et al.'s regression models revealed that ships within 5km had a strong impact on diver abundance, suggesting that ships may affect divers most strongly at a distance of ≤5 km, and that Burt et al (2022) found that the important distance to the nearest ship was also about 2km. We note the line that 'Natural England maintain that this effect is evidenced to extend to 2km'. We would also note that the two papers sited in this paragraph provide evidence to this effect and also that effects may arise over a greater distance. We advise that SPR may wish to re-word this paragraph.	As advised this paragraph has been reworded to reflect the points raised.	CLOSED
NE 26	4.1.4.2, Final Para	Natural England advises that the approach using the recalculated compensation ratio of 4:9:1 is agreeable.	Note the ratio has been updated to 1:6.2. This is due to the recalculation of EA1 vessel movements (see Annex A in this comment log for further details), the expansion of the AIS data area to fully include EA1 vessel movements in the west, and the correct inclusion of all SPA areas within 2km of current AND future vessel movements as identified for JNCC.	CLOSED
NE 27	4.1.4.3, Final Para	Natural England recommends that East Anglia ONE OWF is listed here as a project that has a Vessel Traffic Management System (VTMS) proposed, for completeness.	East Anglia ONE has been added to the text.	CLOSED

NE 28	5.2, Second Para	Natural England questions whether the 'Location / coordinates (to one (1) metre accuracy)' pint refers to individual birds; if this is the case, we advise that this method may not be attainable.	This has been updated to 2 metres but is variable depending on differential GPS at the time of survey.	CLOSED
NE 29	5.2, Final Para	Natural England agrees with the approach to conduct one survey in December, January and February.	N/A	CLOSED
NE 30	5.4, Second Para	We advise that several studies have shown chlorophyll-a correlates with SST (and salinity), and we are therefore unsure as to how this collinearity will be addressed if modelling both together. Salinity may also be a useful co-variable to include in the absence of any other consideration of prey, i.e. fish spawning and nursery grounds (stratification of waters of differing salinities thought to concentrate prey; Dorsch et al., 2019; Skov and Prins, 2011).	The list of the co-variates was provided as an example and was from the APEM 2013 paper, which NE previously asked us to reference as a model for the OTE SPA surveys during RTDCSG meeting 2 (Doc: IBR-MM-000447). Model selection will be completed at the time of modelling depending upon best fit criteria.	CLOSED
NE 31	5.4, Second Para (Bullet Points)	Natural England advises that the use of generic datasets risks drawing overly broad conclusions about what influences RTD distribution/density, and a more specific investigation of conditions at the time of each survey (e.g. tidal state and consequent water depth during image collection) may be more revealing, assuming those data are available. The front between the North Sea and the estuarine river outflow is highly dynamic (Becker et al, 1992) and favourable conditions may change at meso-and even micro-scale resolutions.	We will use the finest resolution datasets available at the time of survey. Regarding vessels our intention is to use AIS data to enable accurate calculation of distances to RTD, which will be incorporated into the model. We are unclear what Project Speed is, but SPR participate in all offshore wind industry groups and forums and actively engage with all key regulators and stakeholders.	CLOSED - noting our comments that the intention to use the 'finest resolution datasets available' should be specifically referenced in Section 5.4 of the RTDIMP

		We question how 'distance from shipping activity' will be measured. Generic datasets for shipping routes and/or traffic separation schemes will likely give little insight into the influence of vessel presence on RTD densities and distribution, and this has been used for Project Speed already. We strongly recommend the use of AIS data contemporaneous with the DAS data, as this would yield more specific results, and it is currently not clear how SPR will factor in vessels into the modelling. In addition, we seek clarification regarding if SPR will know what the Project Speed outputs are.		
NE 32	6.1, Third Para	Natural England advises that there are some inaccuracies within this paragraph. The initial group was set up by Defra, Natural England, the MMO, and DESNZ, but not under the Collaboration in Offshore wind Strategic Compensation (COWSC) banner. This was paused following MMO needing to explore whether there is a mechanism to include existing OWF projects in the scope of the work (specifically London Array). The MMO have indicated this exploration is ongoing. In the meantime, after Year 1 of COWSC there was an exercise to identify priority strategic compensation measures including RTD, which then became a formal workstream with the Offshore Wind Industry Council (OWIC) as the representative.	The text in this section has been updated based on the information provided in this comment from NE.	CLOSED

NE 33	6.2, First Para	Natural England welcomes this idea, but to meet the e) i) and e) iii) requirements of the Development Consent Order (DCO), the group membership needs to include users/regulators other than OWFs, i.e. relevant ports, councils, the MMO, user groups etc. We appreciate that SPR cannot compel other parties to attend, but we advise that they should be invited. Furthermore, we would also recommend SPR to share the results of the monitoring/modelling, as per e) i) of the DCO.	Additional text has been added to this section in order to address this comment.	CLOSED
NE 34	8, Second Para	Natural England advises that given the difference between the displacement effects of the OWF and the disturbance caused by vessels, a 3:1 ratio may be more appropriate to trigger a review.	The text in this section has been updated to address this comment. The text now describes the steps that would be taken at a ratio of 3:1, in terms of a review process, implementation of changes, data monitoring and adaptive management.	CLOSED
NE 35	8, Third Para	Natural England requires clarification on how 'the data would be analysed further to understand why a disproportionally high number of vessels have increased disturbance on the OTE SPA and if these could realistically be reduced, particularly if there are common themes such as deviation from the vessel management corridor due to uncertainty around how binding the corridor is or due to weather/tidal conditions'.	The AIS data from the VTMS would be analysed to look at the frequency of deviations and reasons for them, as the reasons will be recorded in the VTMS by the MCC.	CLOSED
NE 36	8, Fourth Para	We recommend that SPR includes examples of optimisation of vessel routes to allow for flexibility while limiting disturbance to the OTE SPA.	Additional text including an example has been added to this section.	CLOSED

JNCC 2	Table 4	What is in included in the calculation of (e) OTE SPA affected area = 338.1km2? Is it just the area of the darker blue boundary in Figure 6, where the compensation is applied, or does it also account for those parts of the SPA where EA vessels will inevitably still impact the SPA, between the north and south sections? I.e. removing a bit of area where disturbance will still occur? In order to calculate the actual compensation ratio, will the same calculation be used as in Table 4, i.e. (d) Reduction in vessel activity * (e) OTE SPA affected area? It would be worth clarifying these in the RTDIMP.	JNCC identified an error in the original calculation where the area within the SPA affected by vessel traffic was based only on the existing traffic, and did not include a small area which would be within 2km of the re-routed traffic for EAOne. The analysis was revised to ensure this area was included and is now visible on the relevant figures and all numbers were recalculated. At the same time, it was evident that a small number of AIS vessel tracks to the west were clipped from the AIS data area, therefore additional AIS data was obtained to fill this area. The revised calculations take into account changes from both the original error and the additional AIS data. In the future, the actual compensation ratio will use the same calculation as in Table 4 based on actual AIS data.	CLOSED
JNCC 3	4.1.2.1. Recalculation of the Scale of Compensation	Whilst we may not agree with the use of effective displacement area to calculate the impact of displacement due to offshore wind farms, we do agree with the method employed to calculate the effective area of compensation given that there will be remaining vessel movements within the SPA and 2km buffer. It is also helpful that these are both quantified using the same metrics. Therefore, in this instance, we are content with these methods being used for this specific purpose.	Note the ratio has been updated to 1:6.2. This is due to the recalculation of EA1 vessel movements (see Annex A in this comment log for further details), the expansion of the AIS data area to fully include EA1 vessel movements in the west, and the correct inclusion of all SPA areas within 2km of current AND future vessel movements as identified by JNCC.	CLOSED

JNCC 4	8. Adaptive management	We agree with the proposal to, in the first instance, analyse data to understand why a disproportionally high number of vessels have increased disturbance on the OTE SPA. However, we recommend that this is carried out before the compensation ratio drops below 1:1. This would enable adaptive management measures to be considered, and enacted, before the compensation ratio drops below 1:1, and before a compensation deficit is encountered. The compensation ratio will be used on an annual basis to evaluate the vessel re-routing compensatory measure. Should the compensation ratio gradually or suddenly decline, there may be a significant amount of time before it is known whether the compensation ratio drops below 1:1. The reporting would ideally look for trends in the compensation ratio in order to understand whether there is an indication that there is a drop in the compensation ratio. We recommend that the trigger for adaptive management is revisited in light of these comments.	The text in this section has been updated to address this comment. The text now describes the steps that would be taken at a ratio of 3:1, in terms of a review process, implementation of changes, data monitoring and adaptive management.	CLOSED
RTDIMP Draft 3: RTDCSG Comments				
NE 37	Section 4.1.4.3	Natural England would like to see more detail in the reporting of each vessel deviation (including date, time and duration), because red-throated diver (RTD) distribution and abundance appears to show temporal variation	We acknowledge this comment from NE and will update the RTDIMP to include the information that will be collected for each vessel deviation such as date, time, duration etc. as suggested.	

		within the Outer Thames Estuary Special Protection Area (OTE SPA). For example, one deviation later in the season may cause more disturbance than several earlier on. We advise that you should use these data to calculate percentage reduction proposed vs. actual.		
NE 38	Table 5 Section 4.1.4.1	We require further clarification on Table 5, namely if it is an actual spatial and temporal analysis of East Anglia 1 vessel traffic and RTDs, or if it just theoretical.	The table shows historical data from EA1N and EA2 surveys which overlap the area within 2km of the EA1 vessel traffic so it is a subset of actual data. The purpose of this is show the variation in diver densities as is explained in the text which accompanies the table in the RTDIMP.	
JNCC 5	Table 4 Section 4.1.2.1	One of the values in Table 4. Scenario (a) "Without compensation" mean vessel activity has reduced, but you appear to have found additional vessel movements due to splitting of tracks and some tracks previously being clipped from the AIS data. The number of routes has gone up to 531, but the mean vessel activity has gone down. I may be missing something here but I'm not sure I understand how that works?	The reason for the reduction identified in mean vessel activity in Table 4 is due to the increased area of AIS data analysed for this revision. The AIS data is binned into a raster where each cell is 0.005 degrees (equivalent projected size of circa. 338m x 555m), and the number of vessel movements within 2km of each cell is summed to give a total value for each cell in the raster. In the first version, the AIS raster had 4680 cells with a cell sum of 1,242,807 vessels, which gave a mean cell value of 265.6 vessels/cell. The revised version has an AIS raster of 6003 cells with a cell sum of 1,412,805 vessels, which gave a mean cell value of 235.3 vessels/cell. Therefore, the revised AIS area was larger but included areas with lower vessel traffic, therefore diluting the mean. Since the same	CLOSED

			calculation was undertaken for the proposed "with compensation" scenario the mean value was also lower, and it is the ratio between the two which calculates the compensation provision.	