

# Rampion 2 Wind Farm

## Category 6: Environmental Statement

### Volume 3, Chapter 8: Fish and shellfish - Figures

**Date: August 2023**

**Revision A**

Document Reference: 6.3.8

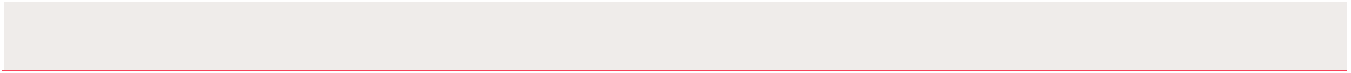
Pursuant to: APFP Regulation 5 (2) (a)

Ecodoc number: 004884743-01



## Document revisions

Revision	Date	Status/reason for issue	Author	Checked by	Approved by
A	04/08/2023	Final for DCO Application	WSP	RED	RED



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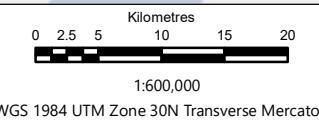
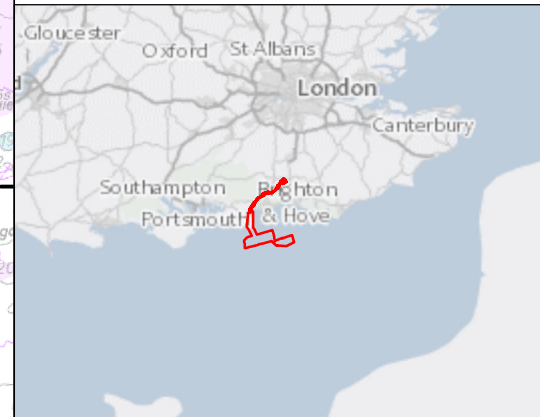
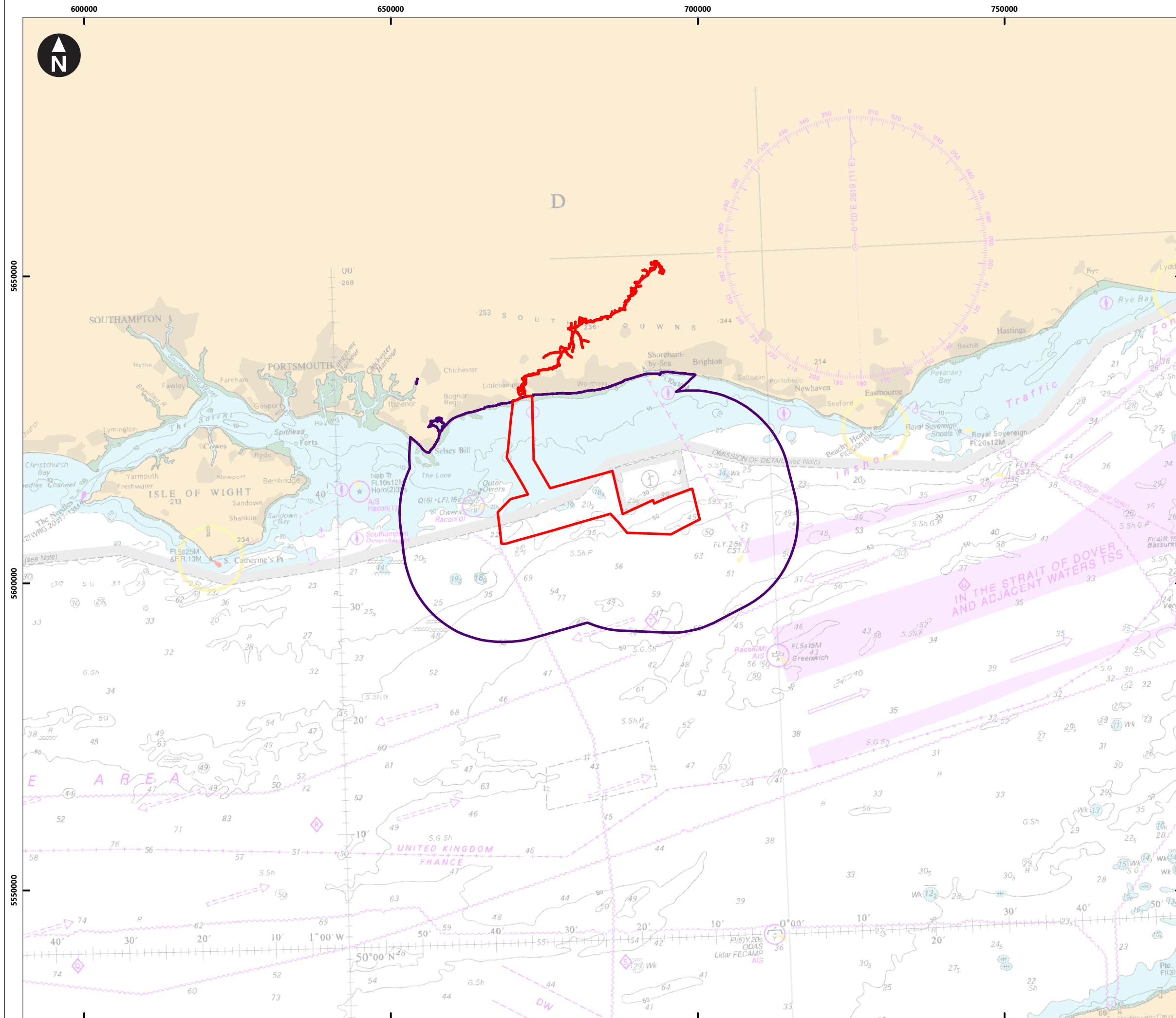
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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area



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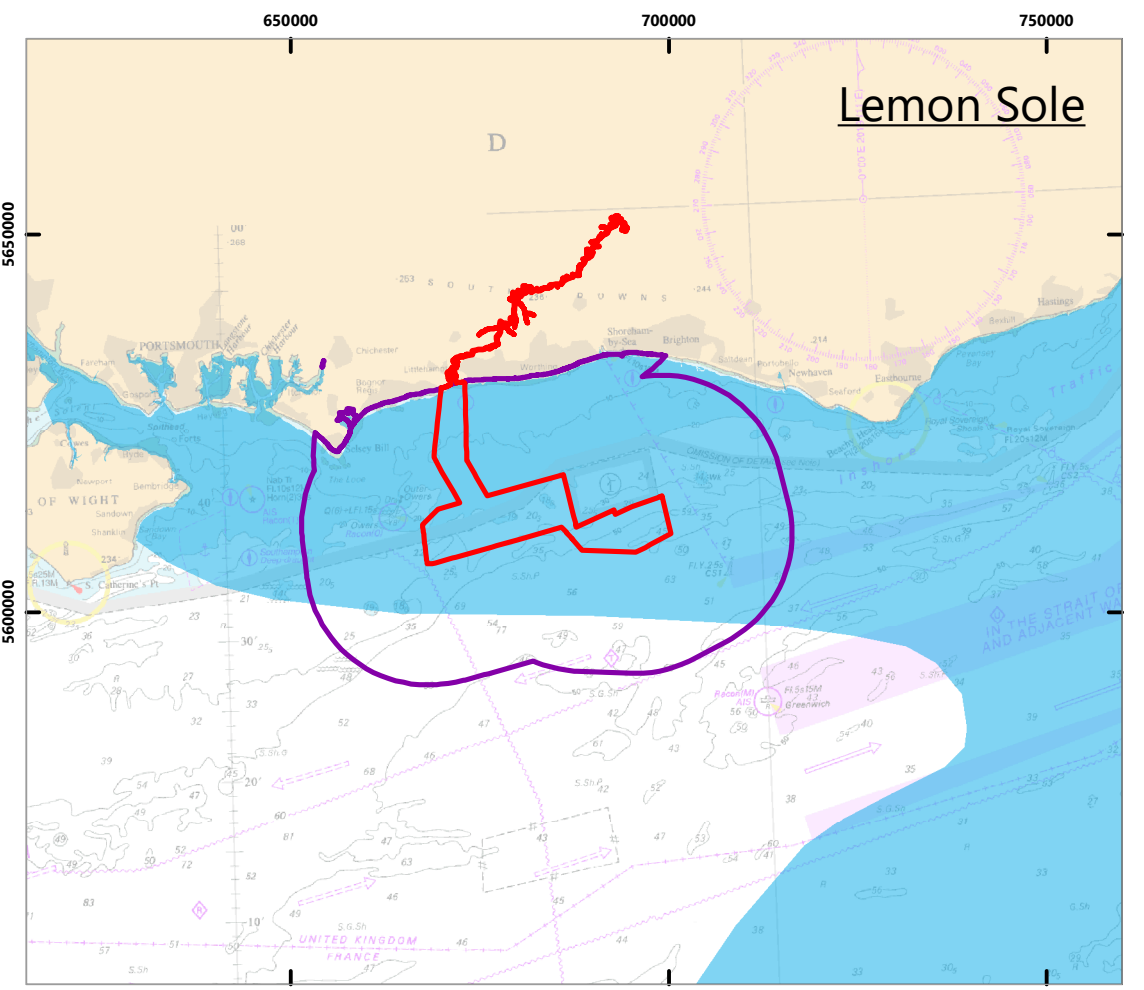
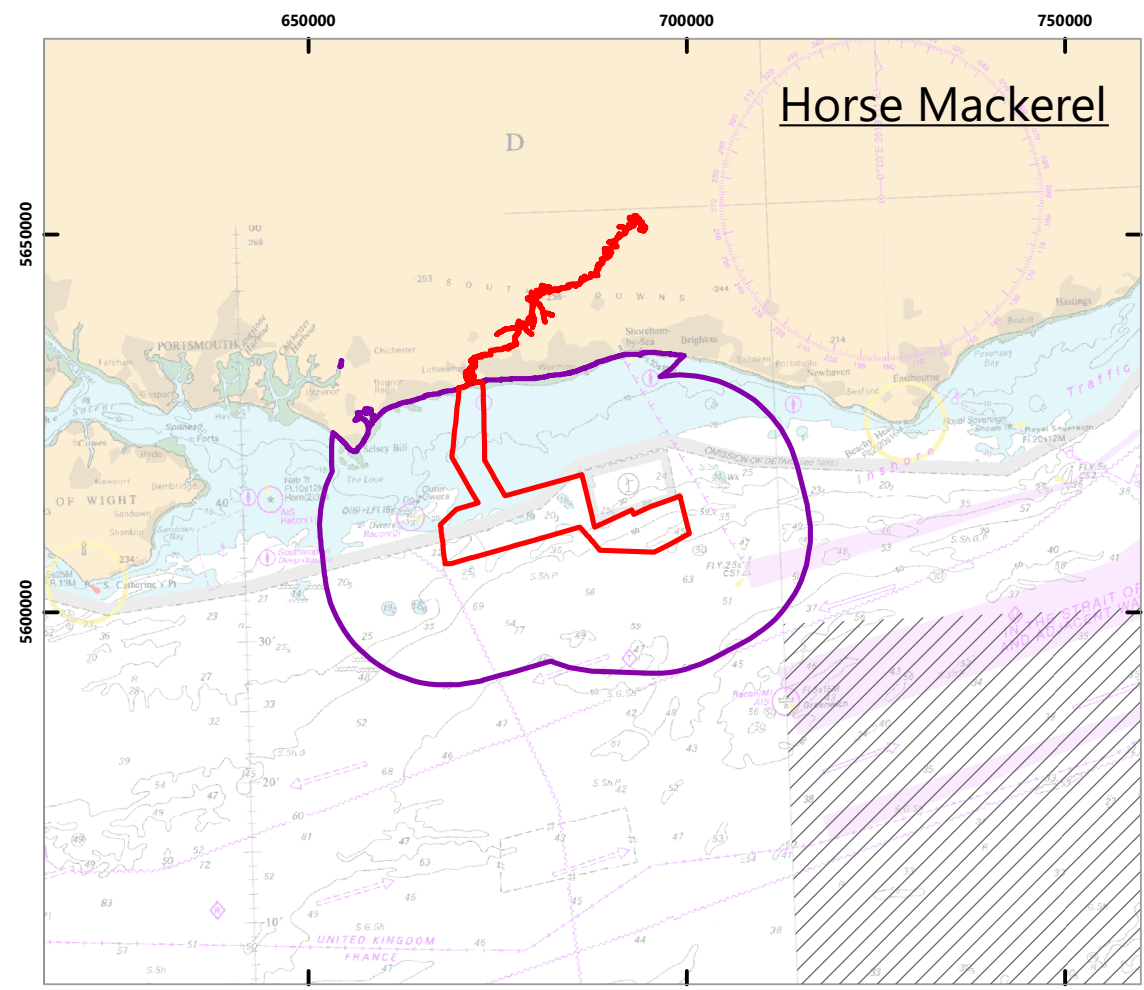
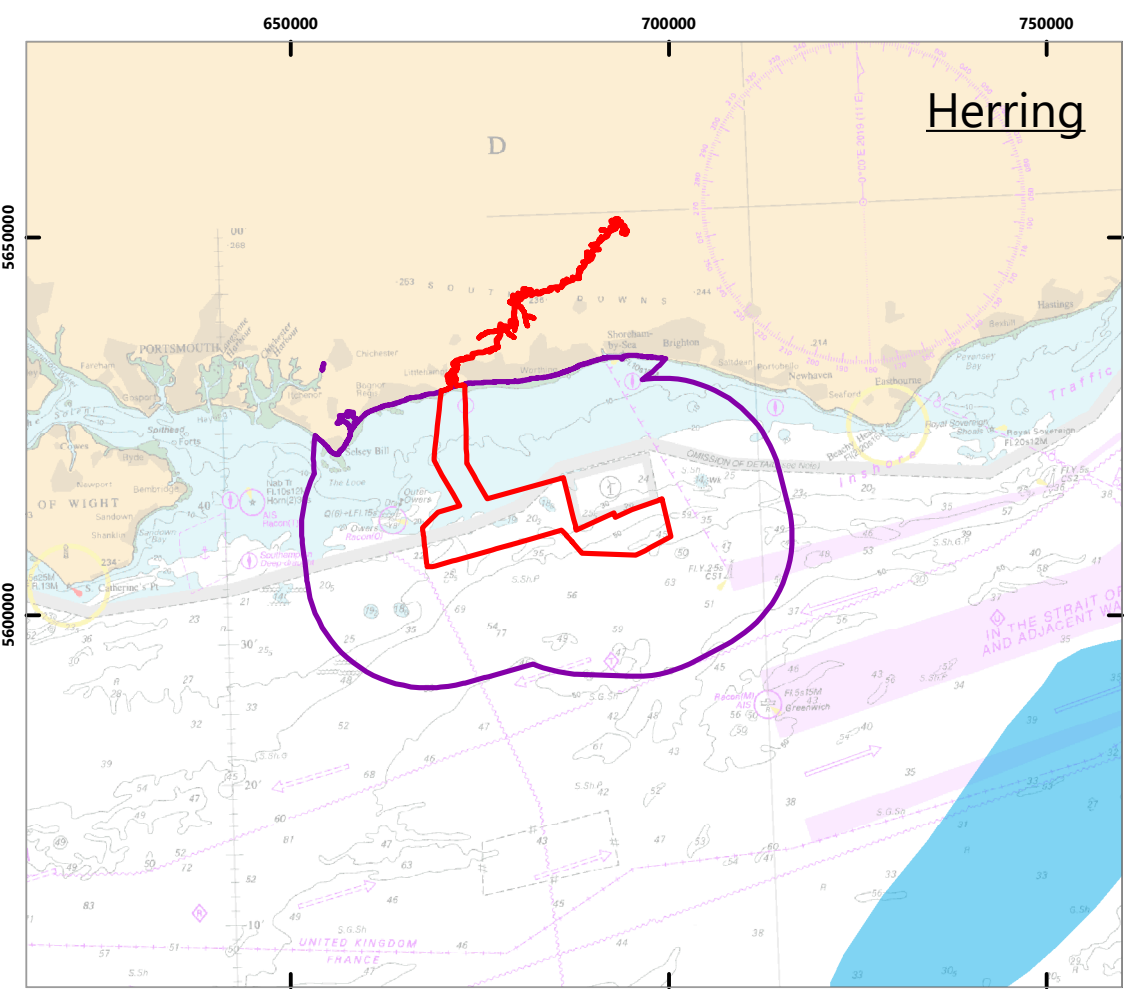
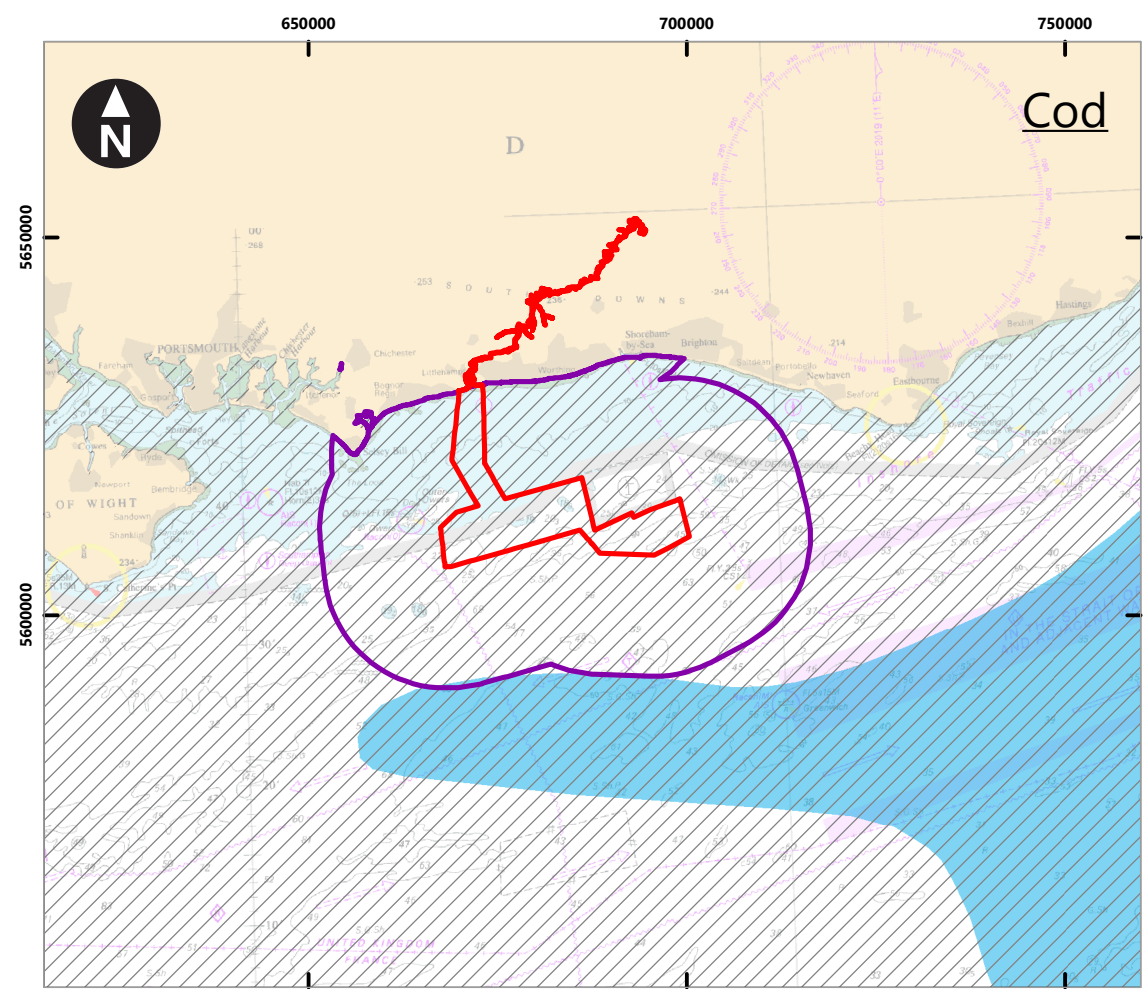
Rampion 2 Offshore Wind Farm

Figure 8.1 Rampion 2 fish and shellfish ecology Study Area

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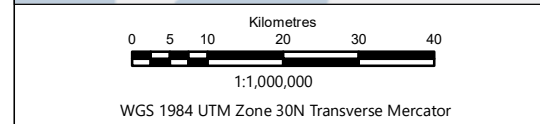
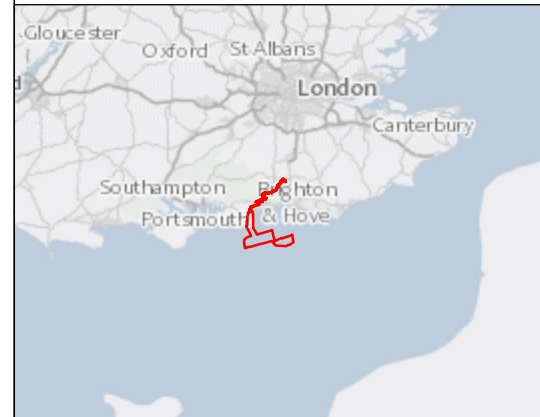
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**Key**

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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**Rampion 2 Offshore Wind Farm**

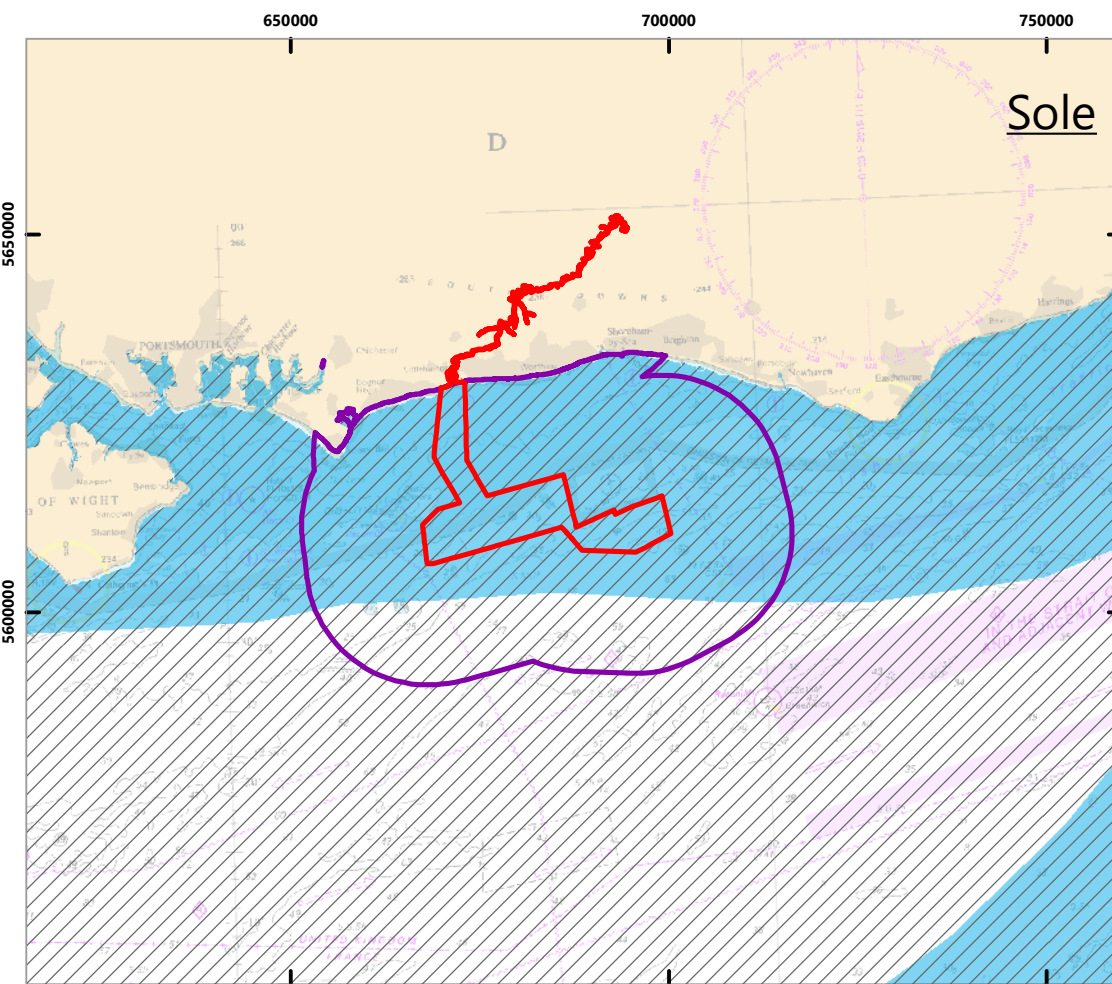
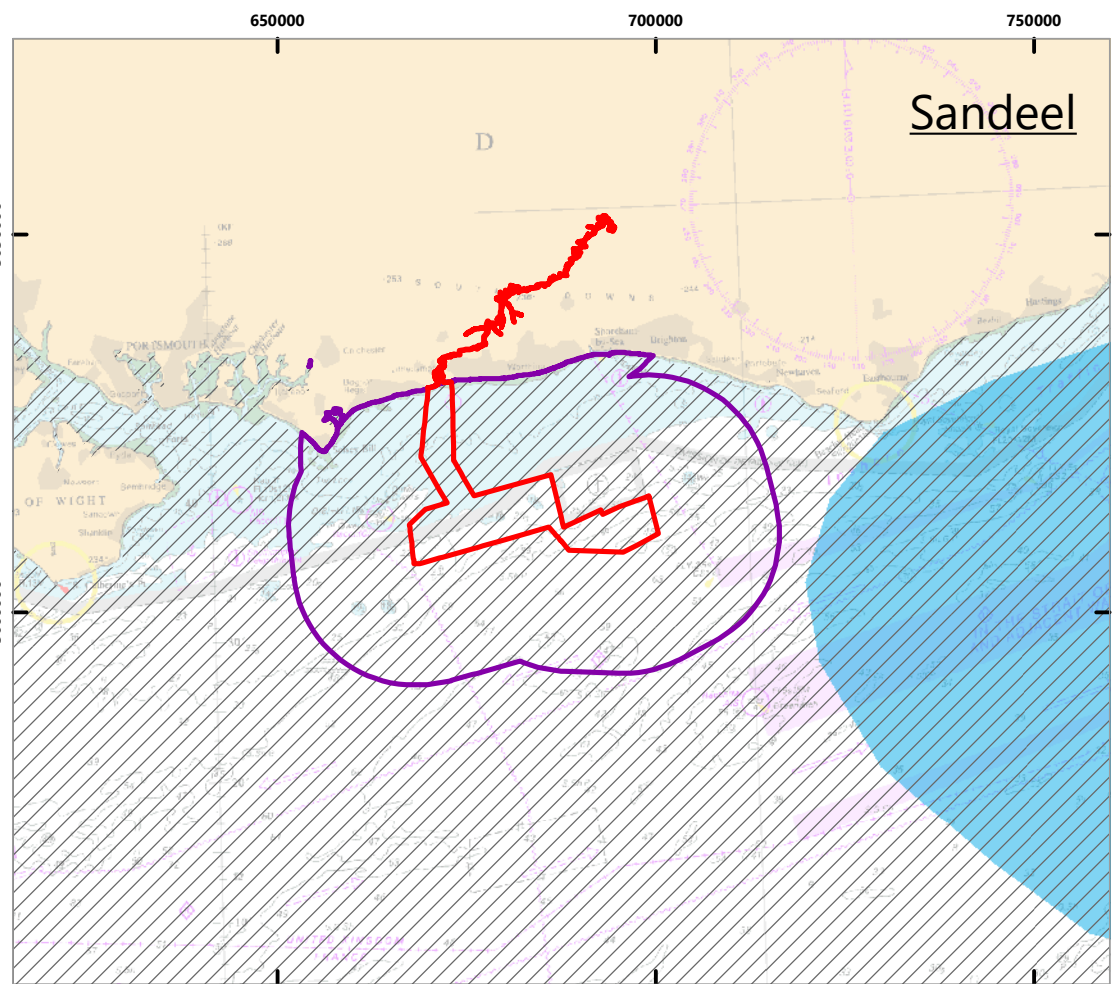
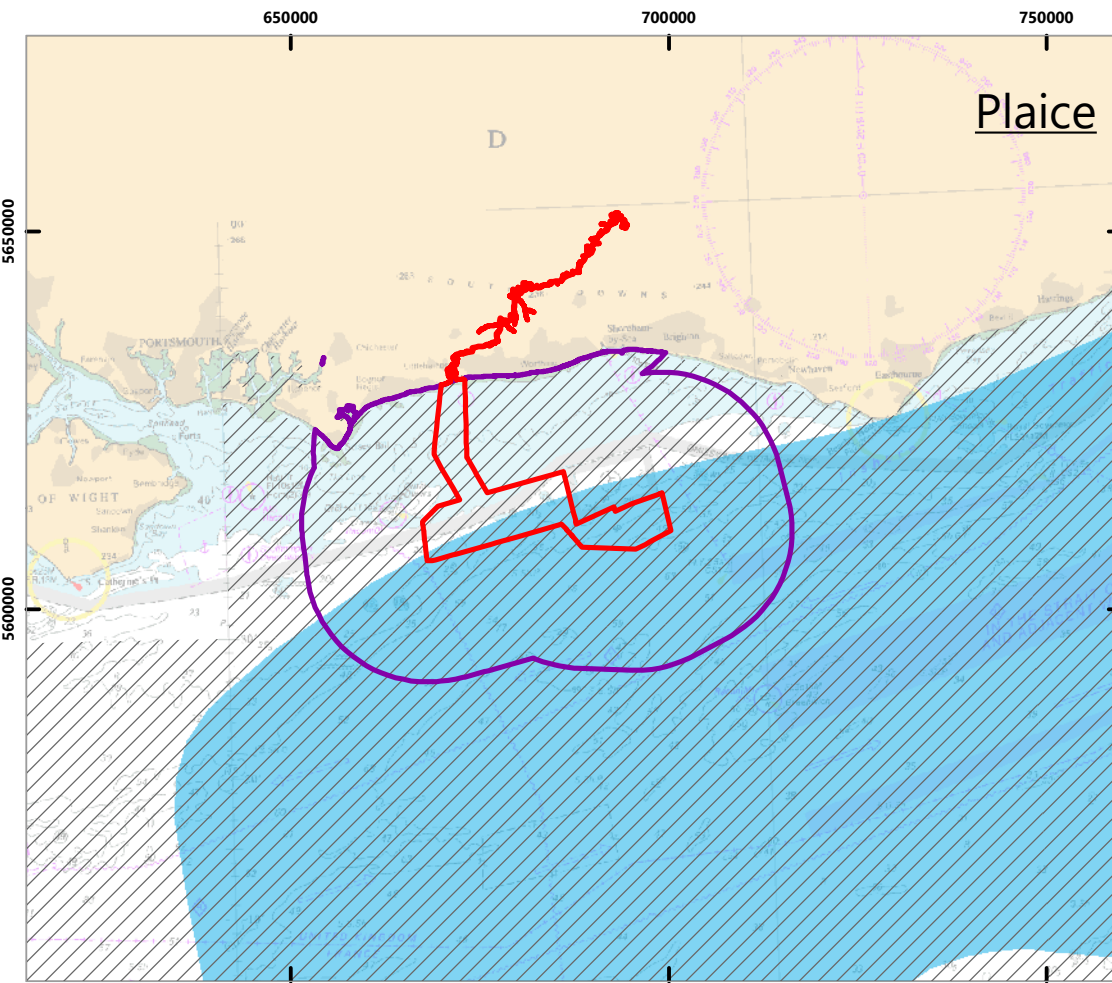
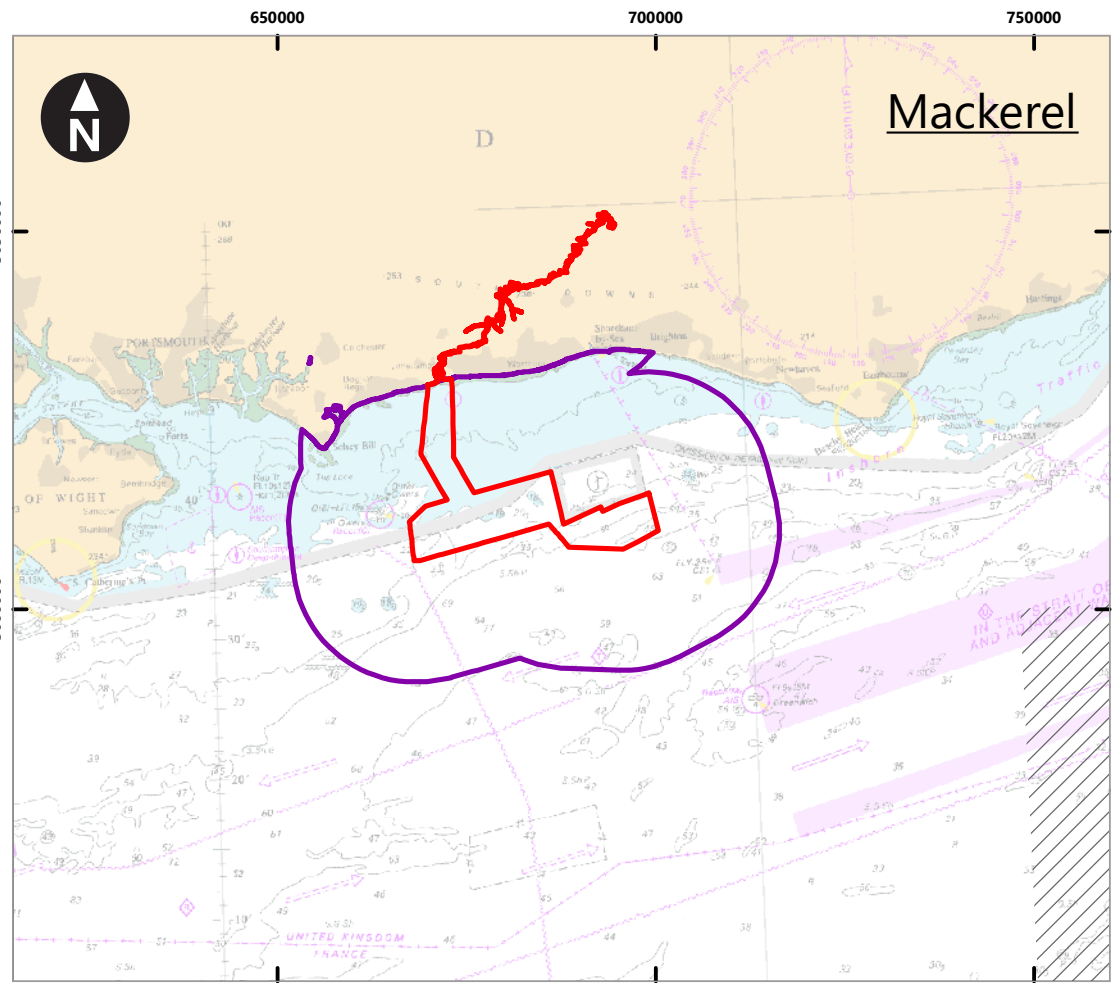
Figure 8.2 Spawning grounds in relation to Rampion 2: cod, herring, horse mackerel and lemon sole

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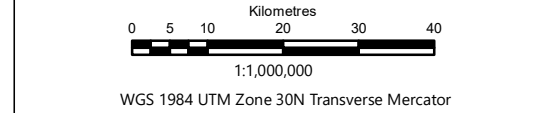
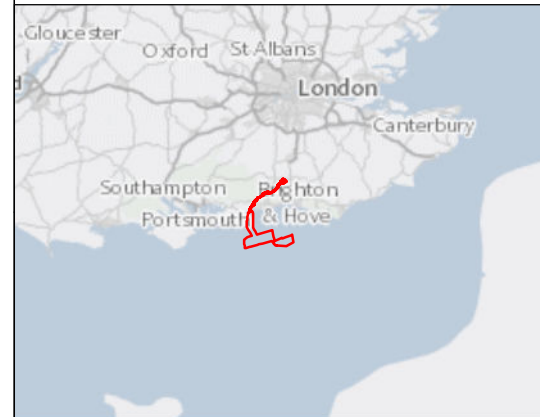
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**Key**

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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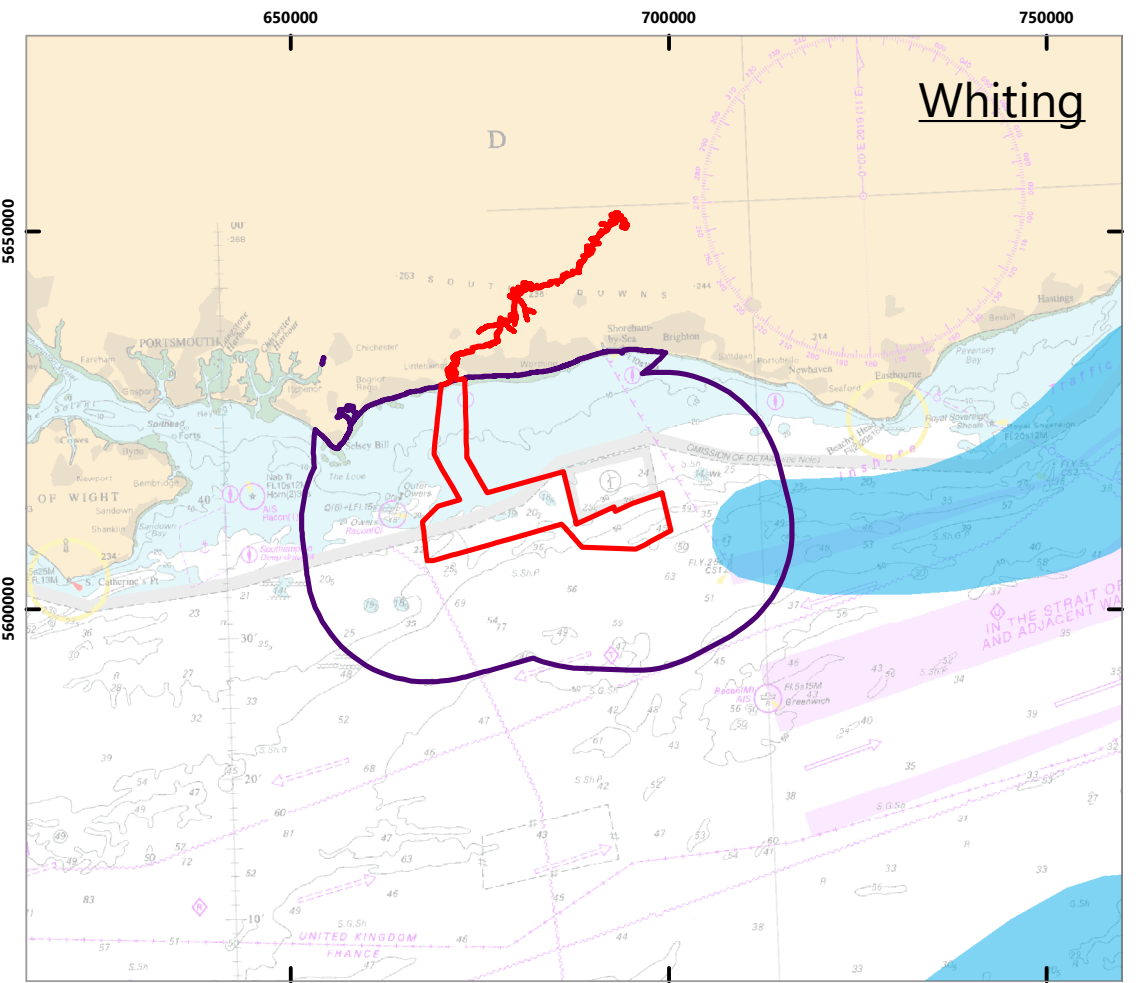
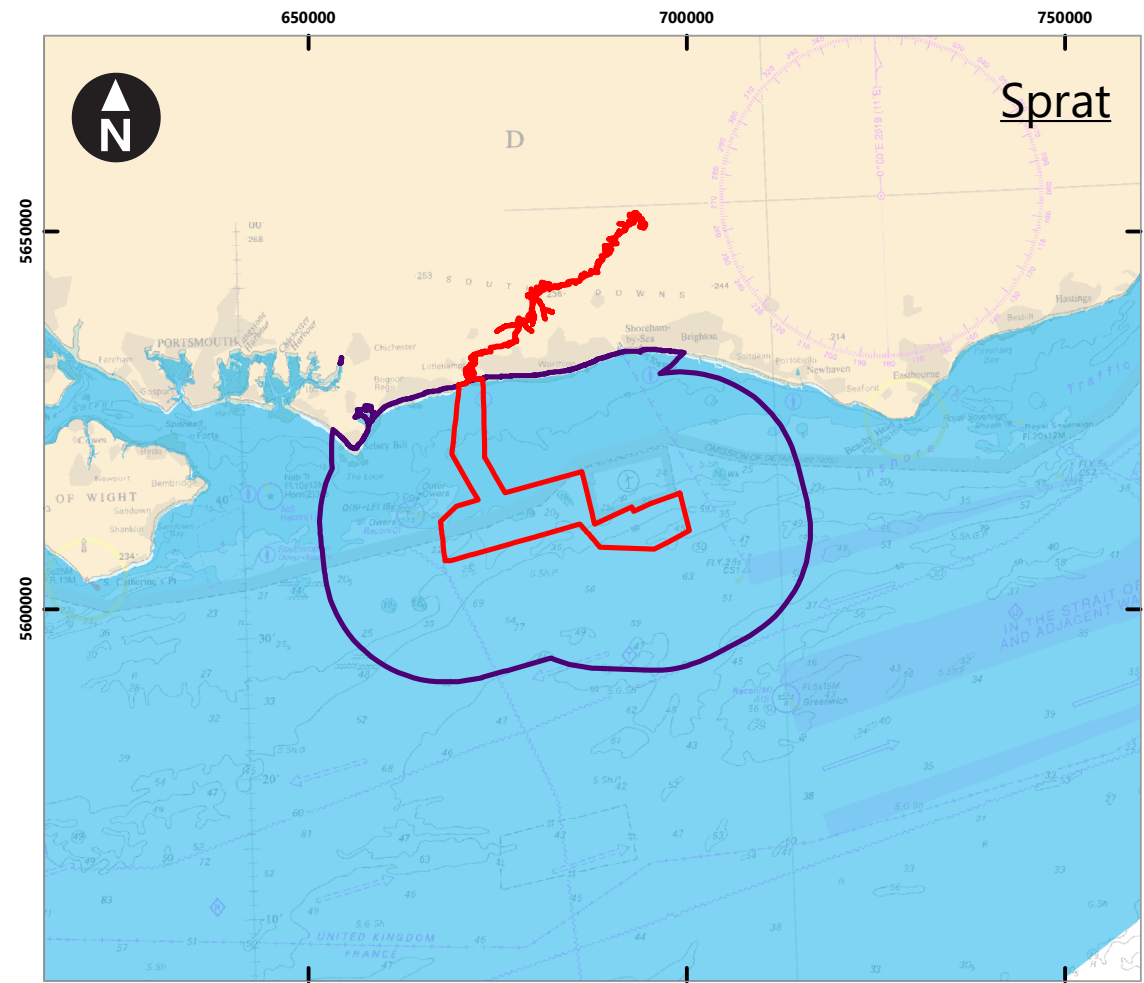
Rampion 2 Offshore Wind Farm

Figure 8.3 Spawning grounds in relation to Rampion 2: Mackerel, Plaice, Sandeel, Sole

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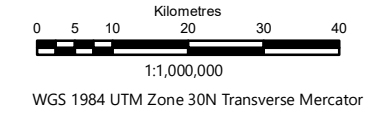
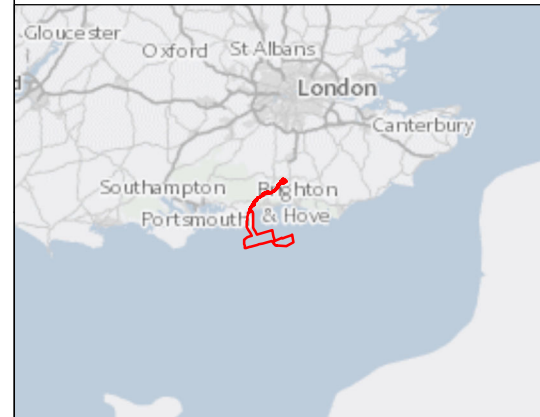
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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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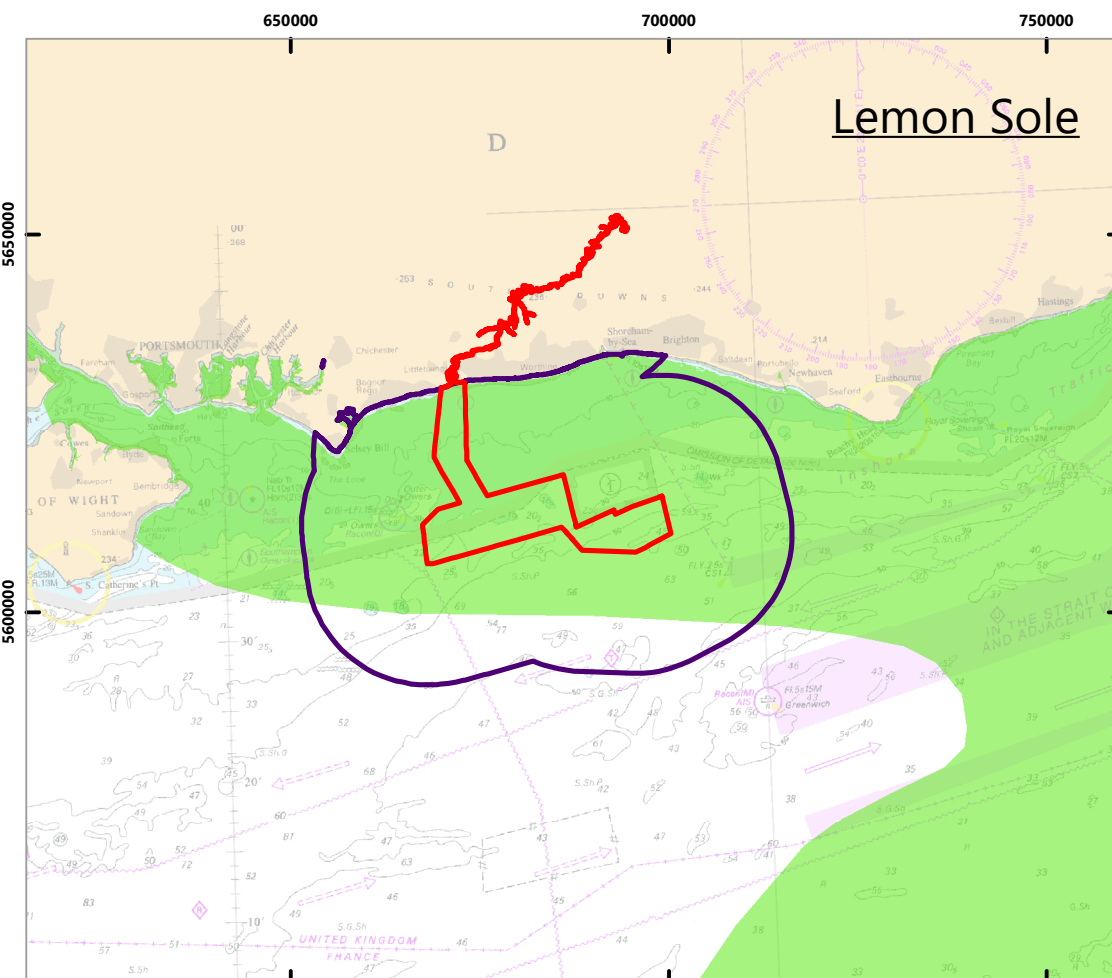
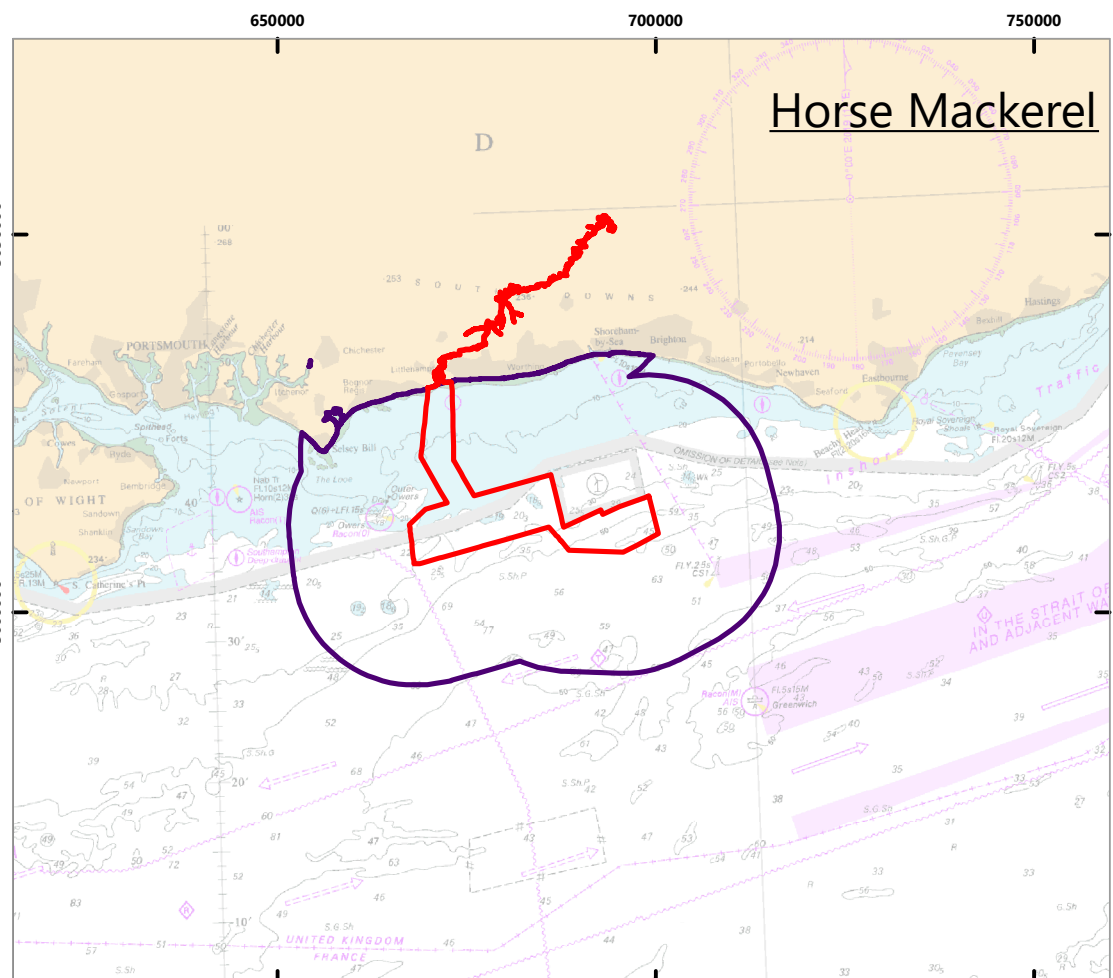
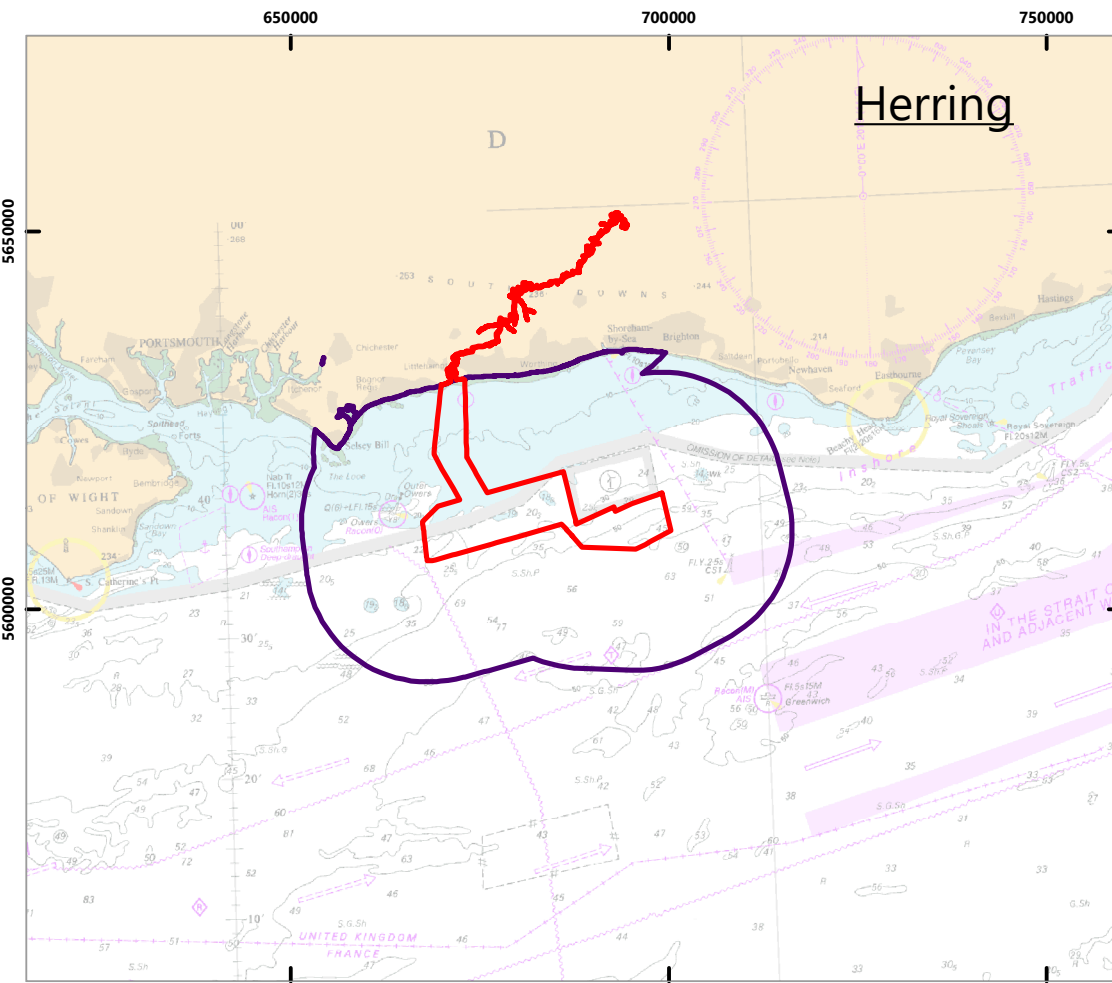
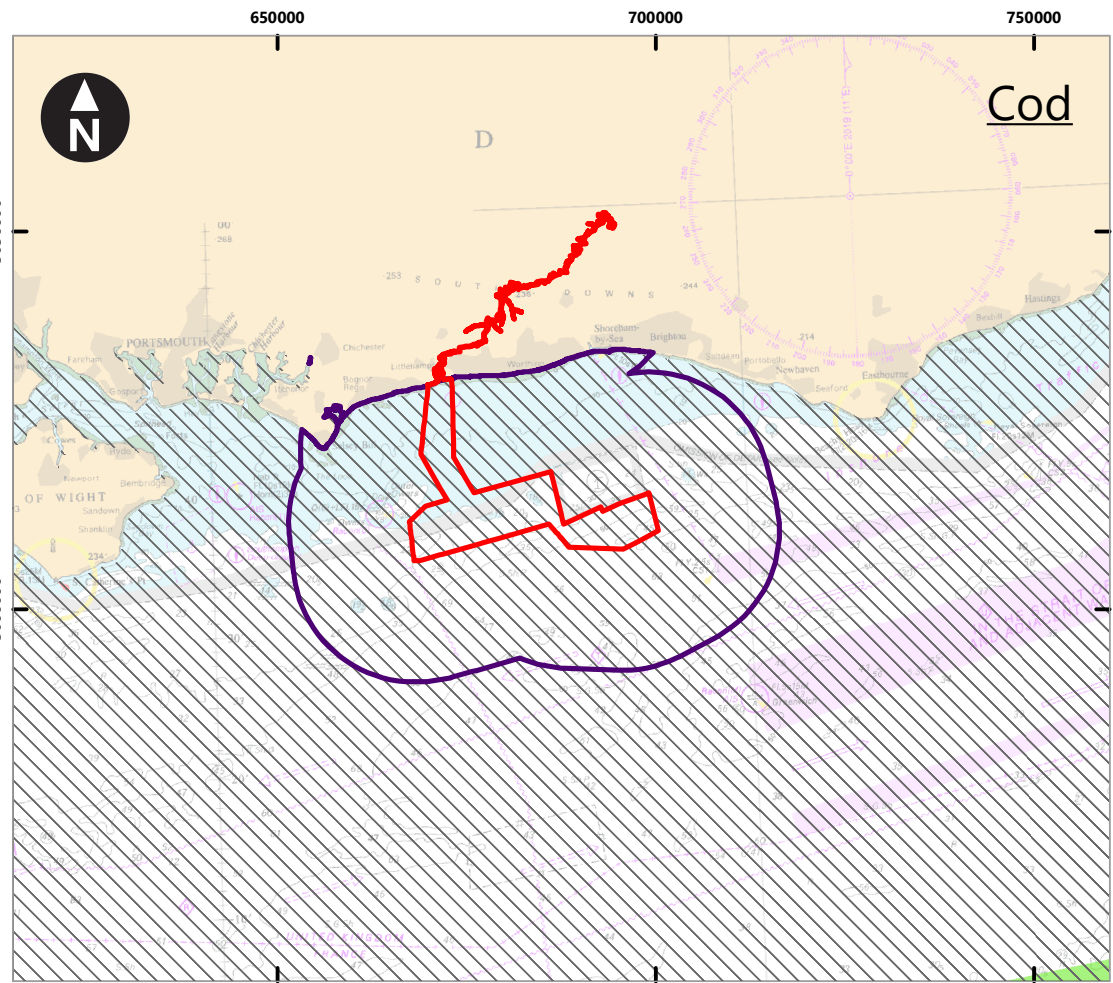
**Rampion 2 Offshore Wind Farm**

Figure 8.4 Spawning grounds in relation to the Rampion 2 fish and shellfish ecology Study Area: sprat and whiting

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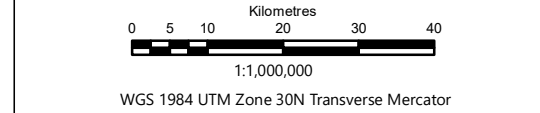
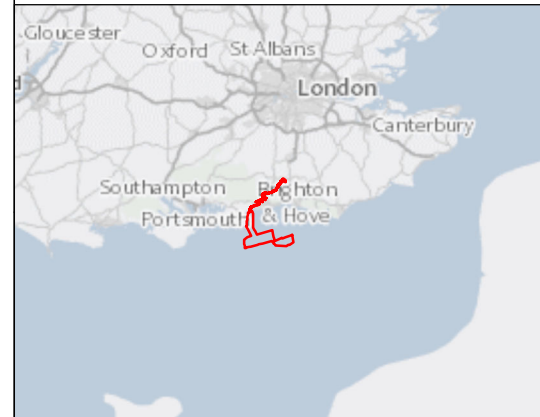
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**Key**

**Legend**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Nursery grounds Coull et al. 1998
- Nursery grounds Ellis et al. 2010



Rampion Extension Development



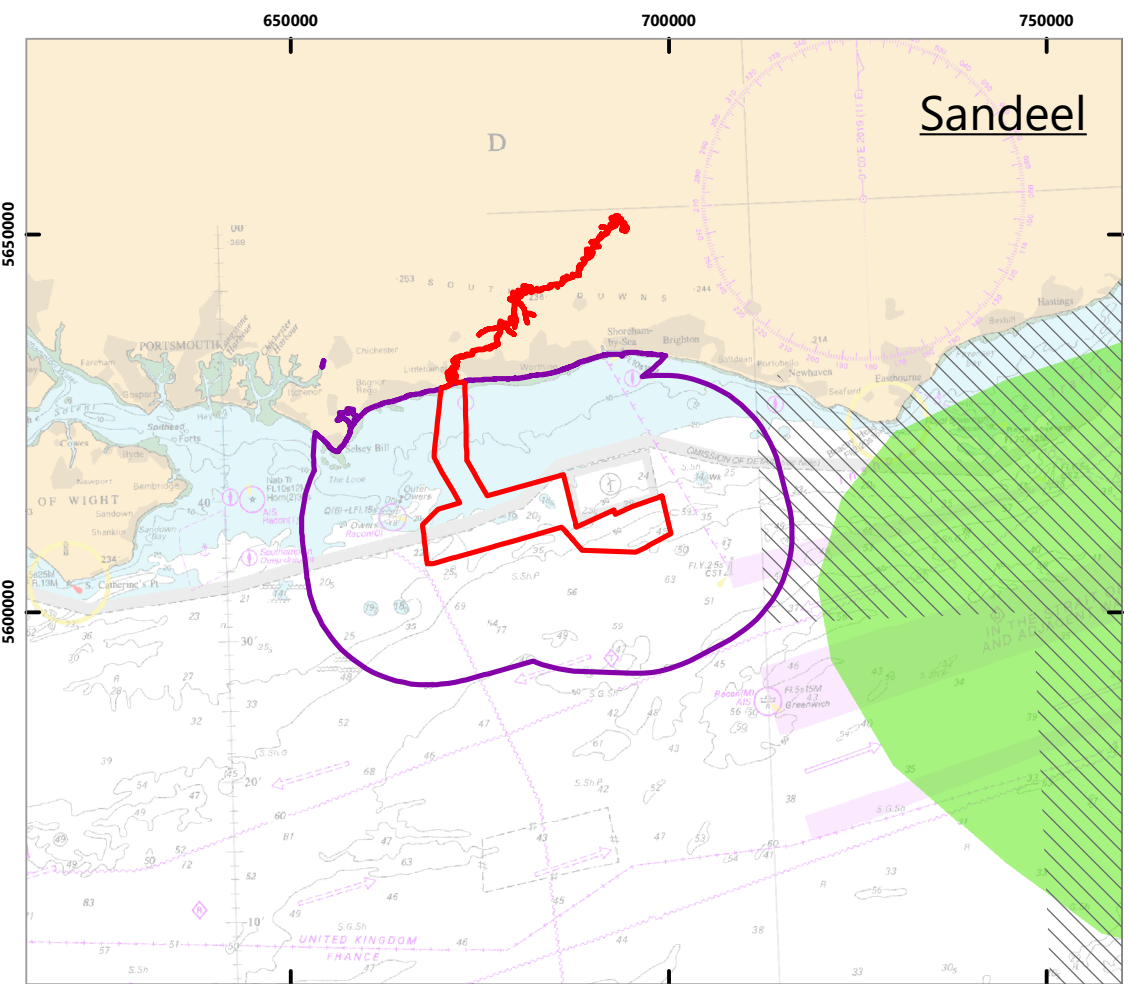
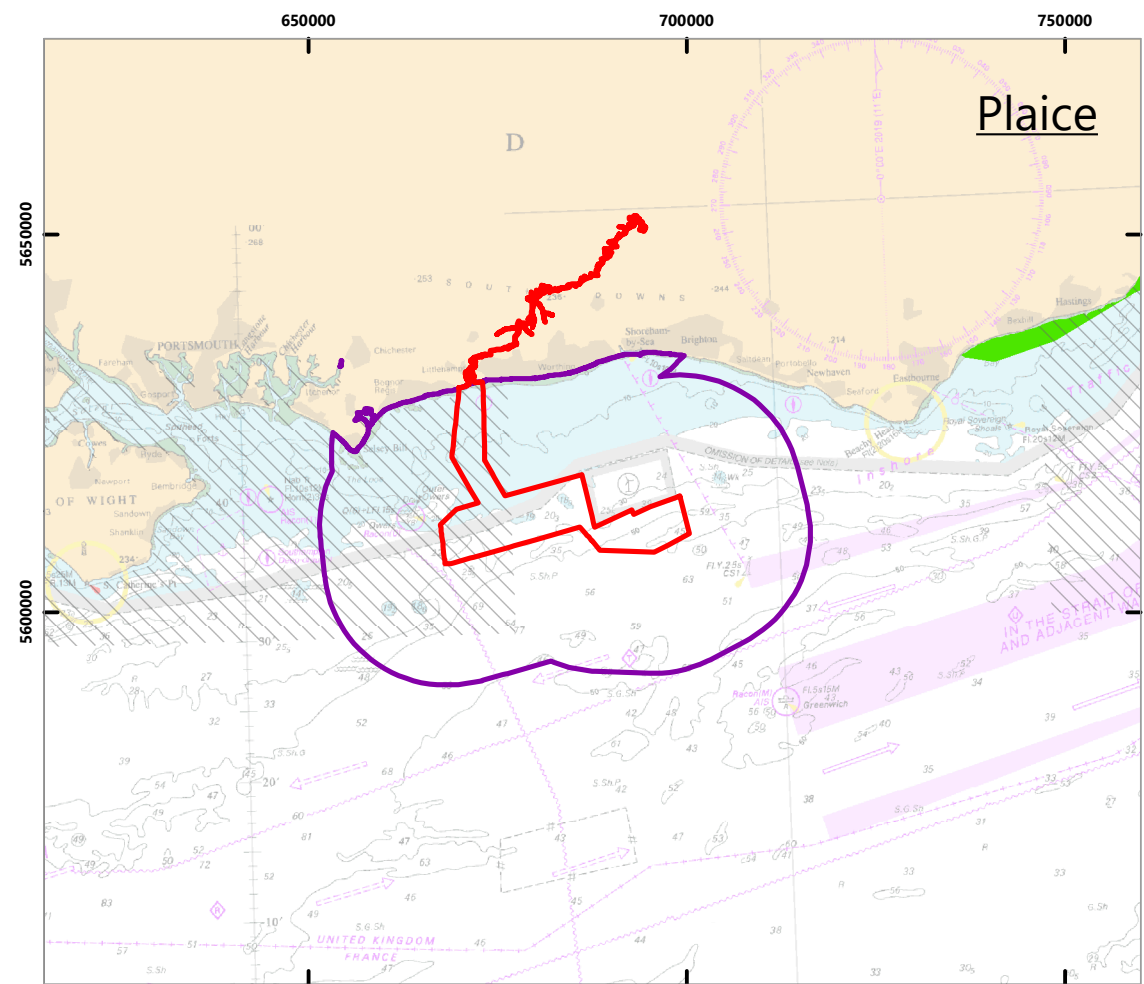
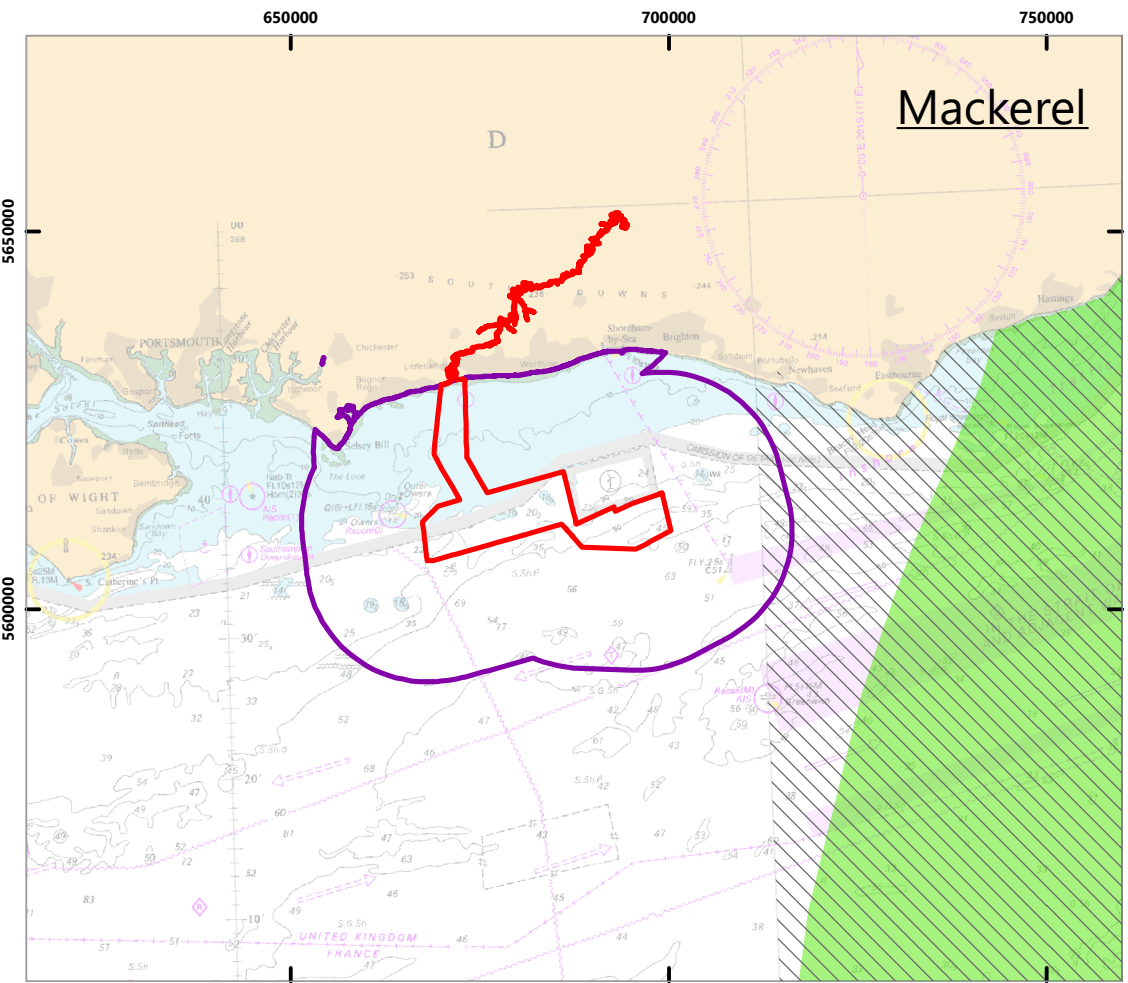
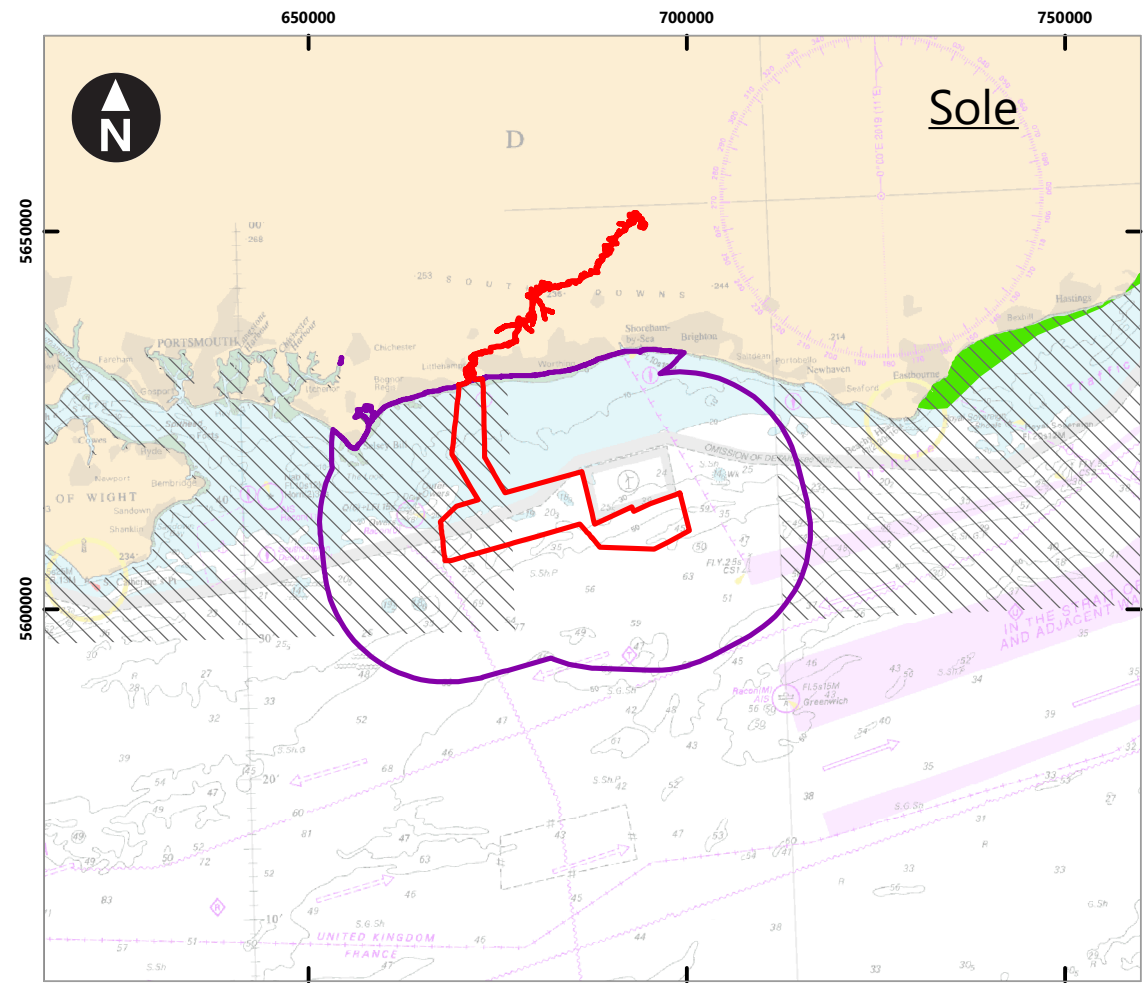
**Rampion 2 Offshore Wind Farm**

Figure 8.5 Nursery grounds in relation to Rampion 2: cod, herring, horse mackerel and lemon sole

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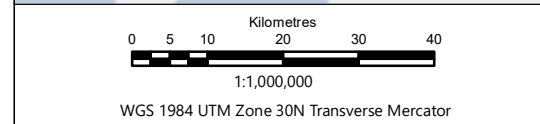
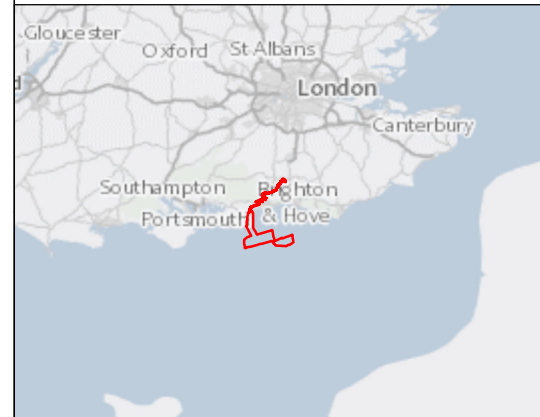
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**Key**

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Nursery grounds Ellis et al. 2010
- Nursery grounds Coull et al. 1998



Rampion Extension Development

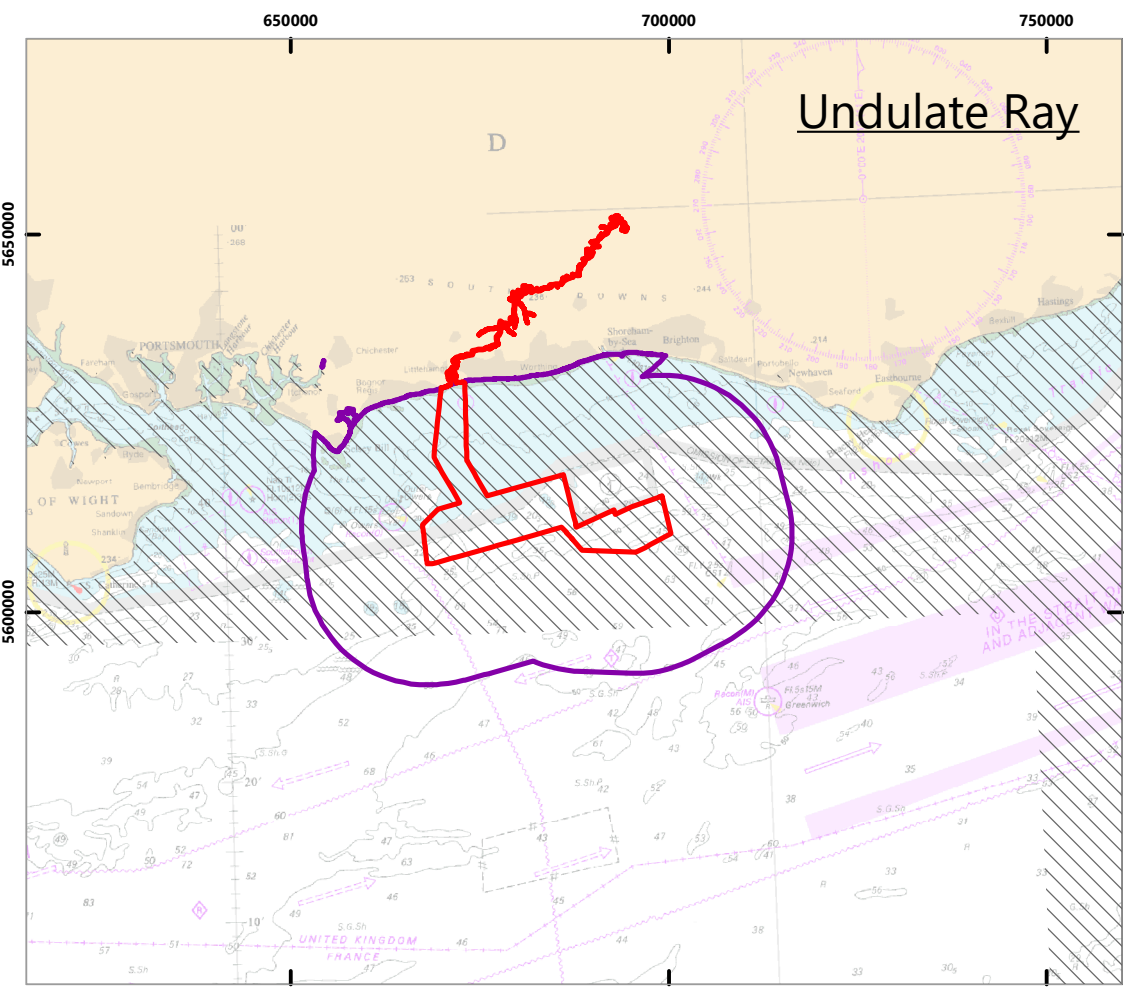
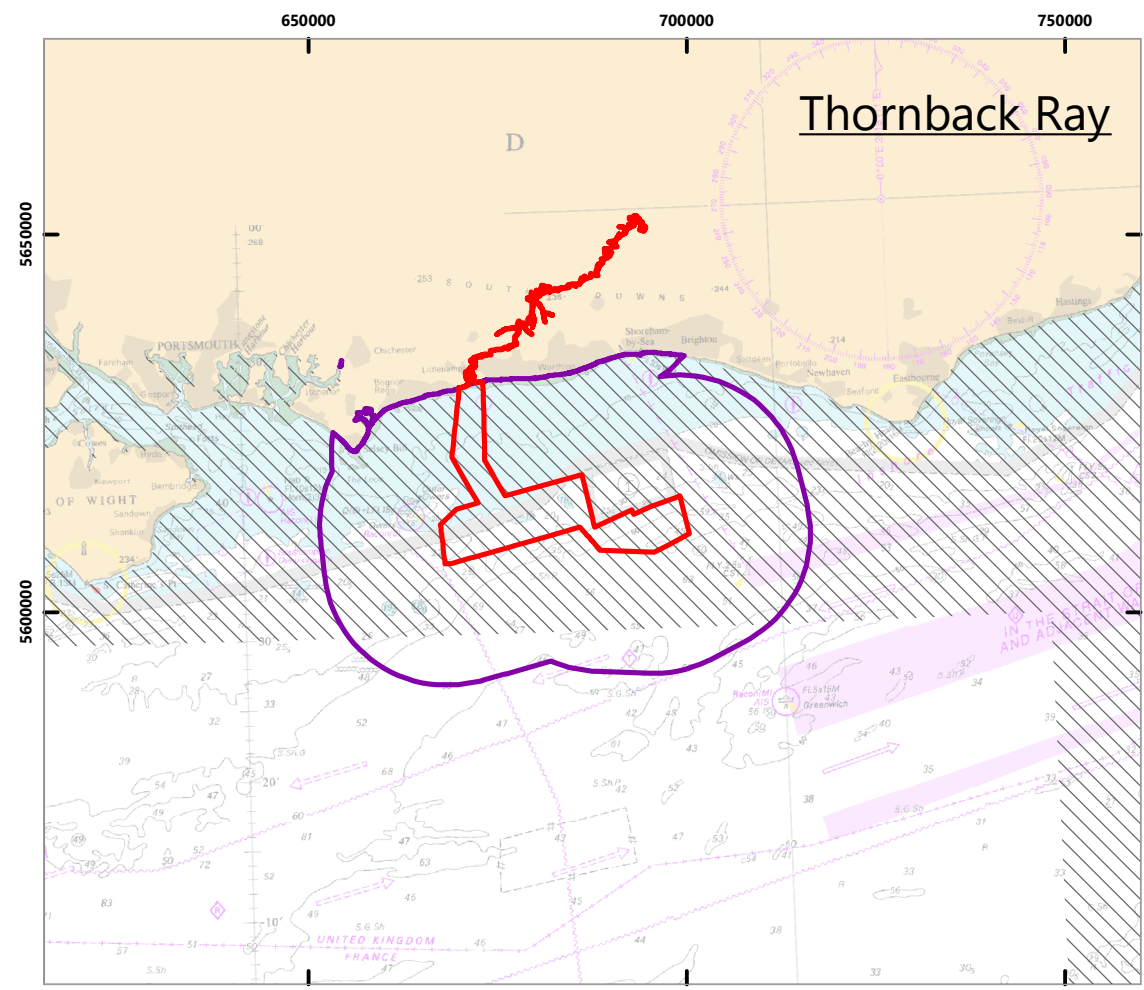
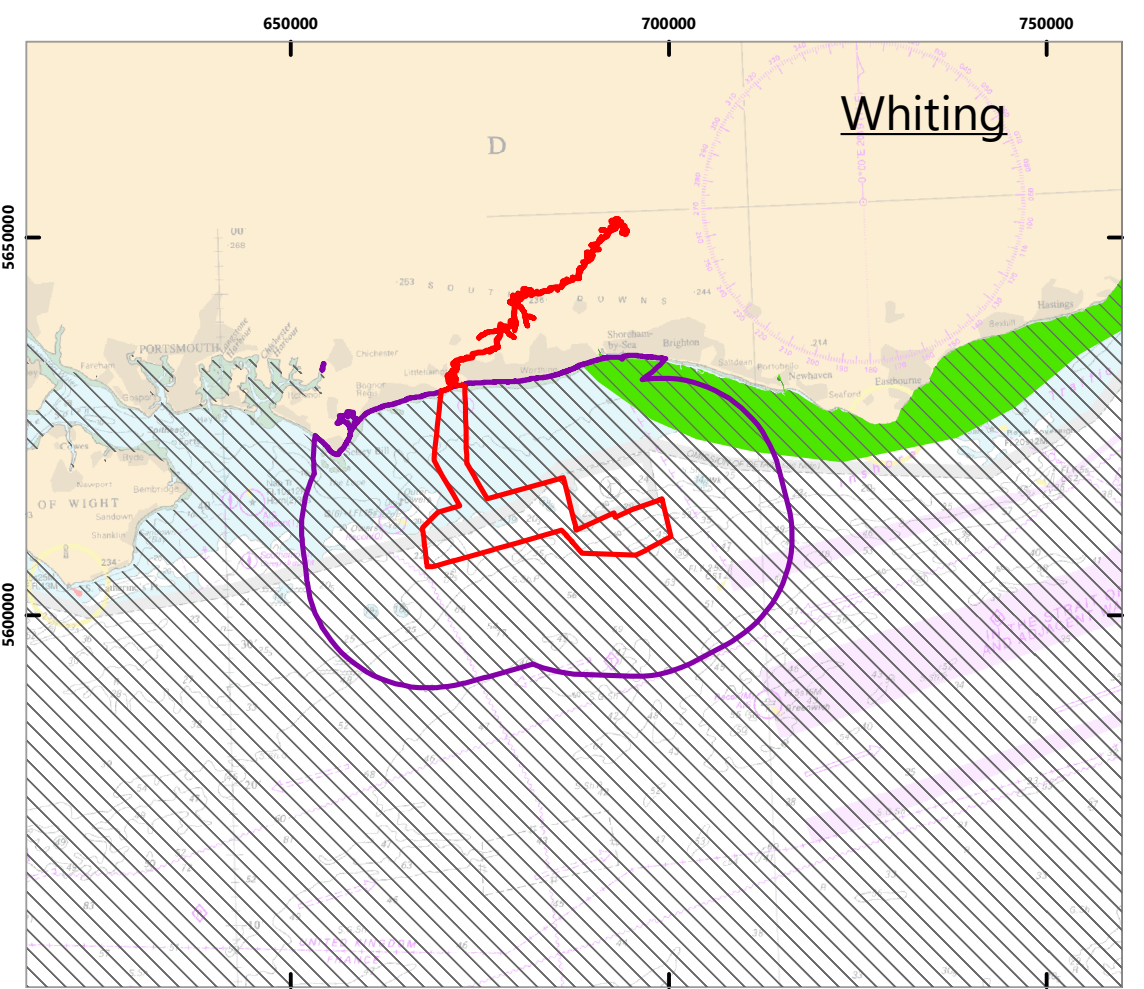
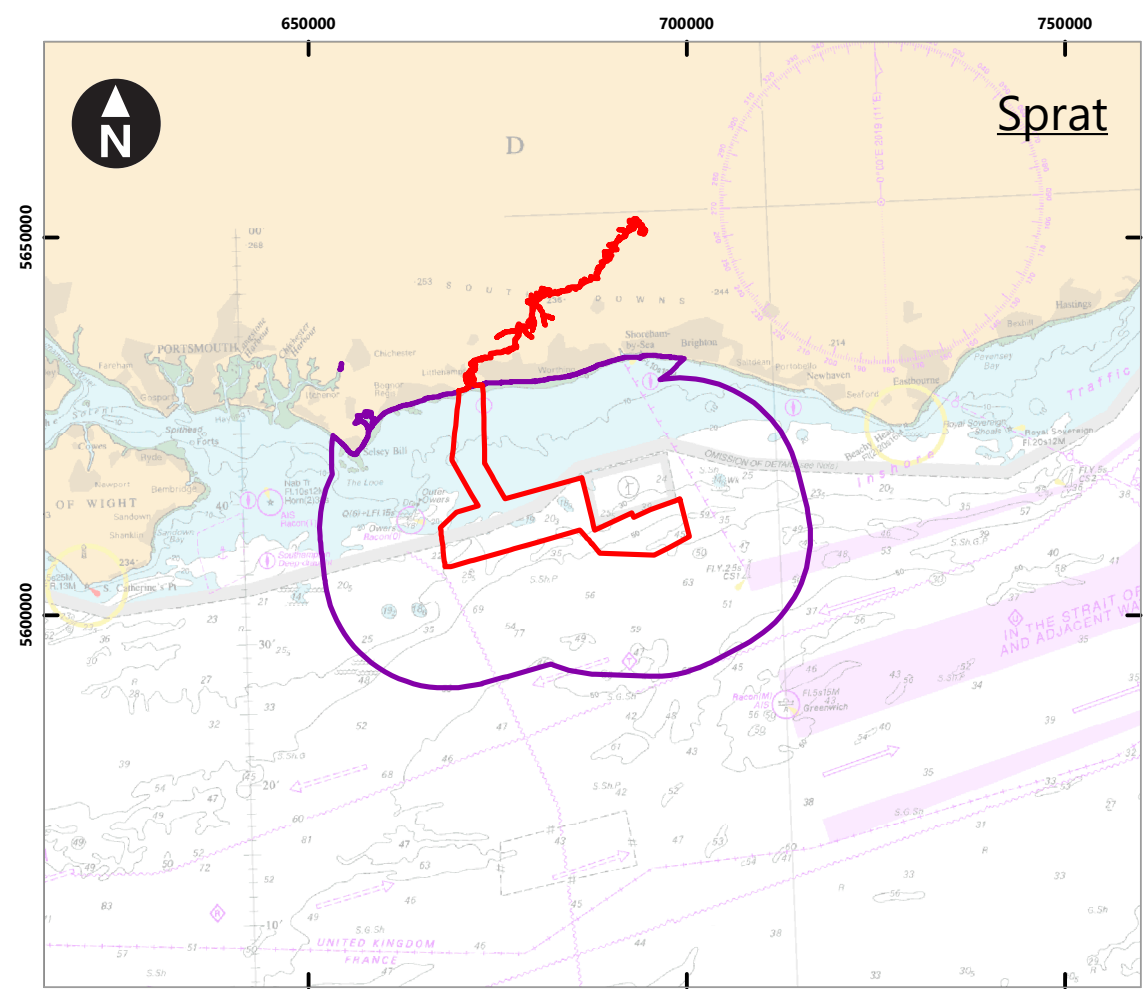
Rampion 2 Offshore Wind Farm

Figure 8.6 Nursery grounds in relation to Rampion 2: mackerel, plaice, sandeel and sole

Environmental Statement

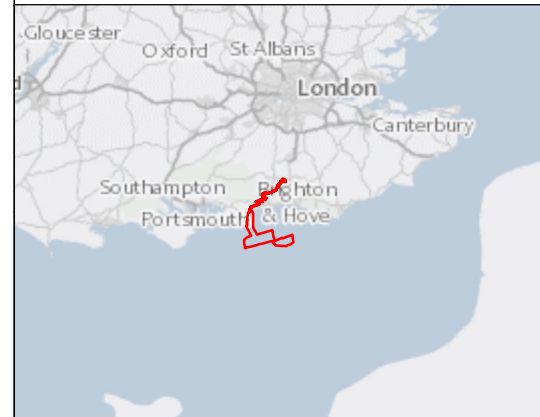
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**Key**

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Nursery grounds Coull et al. 1998
- Nursery grounds Ellis et al. 2010



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Rampion Extension Development

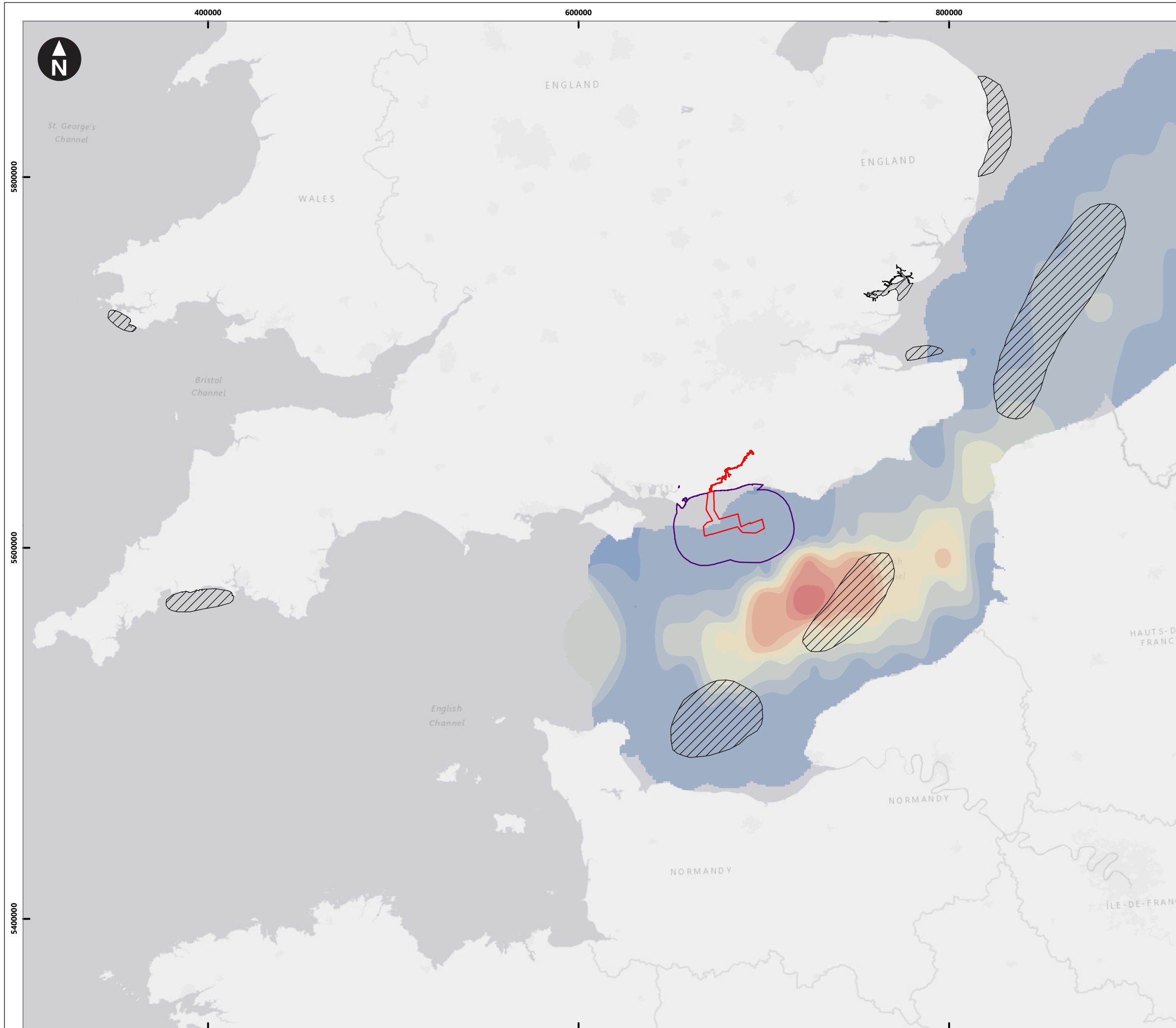
**Rampion 2 Offshore Wind Farm**

Figure 8.7 Nursery grounds in relation to Rampion 2: sprat, whiting, thornback ray and undulate ray

Environmental Statement

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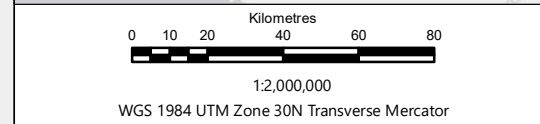
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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Herring spawning (Coul et al. 1998)

IHLS 2007/2020 downs data  
 Herring larval abundance per m<sup>2</sup>

	0
	0.1 - 2,500
	2,500 - 7,000
	7,000 - 14,000
	14,000 - 23,000
	23,000 - 35,000
	35,000 - 48,000
	48,000 - 63,000
	63,000 - 80,000
	80,000 - 98,500



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Figure 8.8 Location of herring spawning grounds and IHLS comparison (2007-2020) in relation to Rampion 2

Environmental Statement

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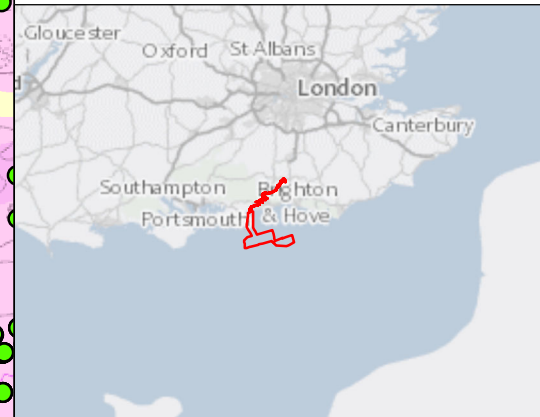
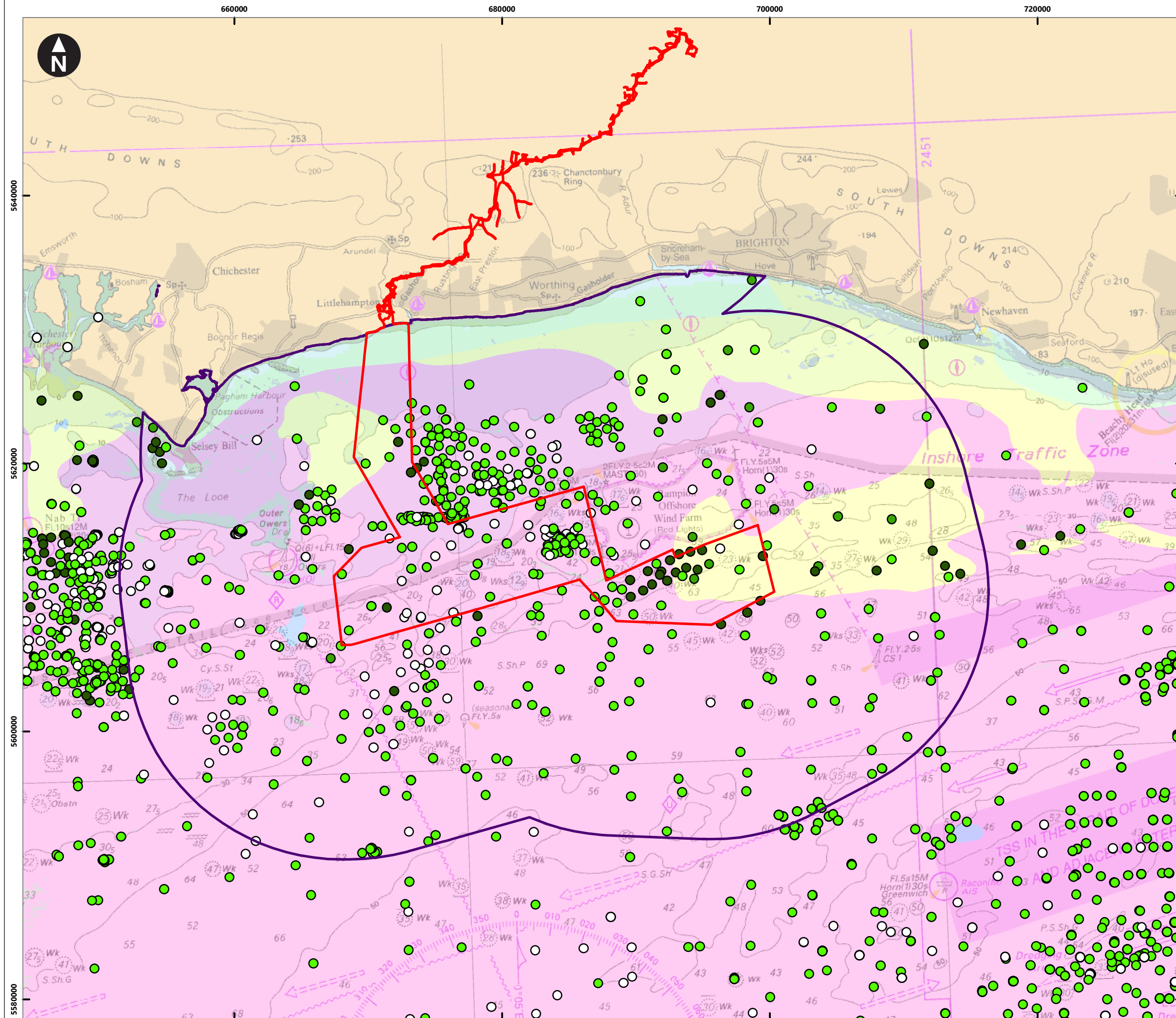
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- Fish and Shellfish Study Area

Sandeel Habitat Suitability (Latto *et al.*, 2013)

- Prime, Preferred
- Sub-Prime, Preferred
- Suitable, Marginal
- Unsuitable

UK Sea Map 2021 (EUNIS)

- Hard substrata
- Coarse substrate
- Sand
- Mixed sediment
- Undefined



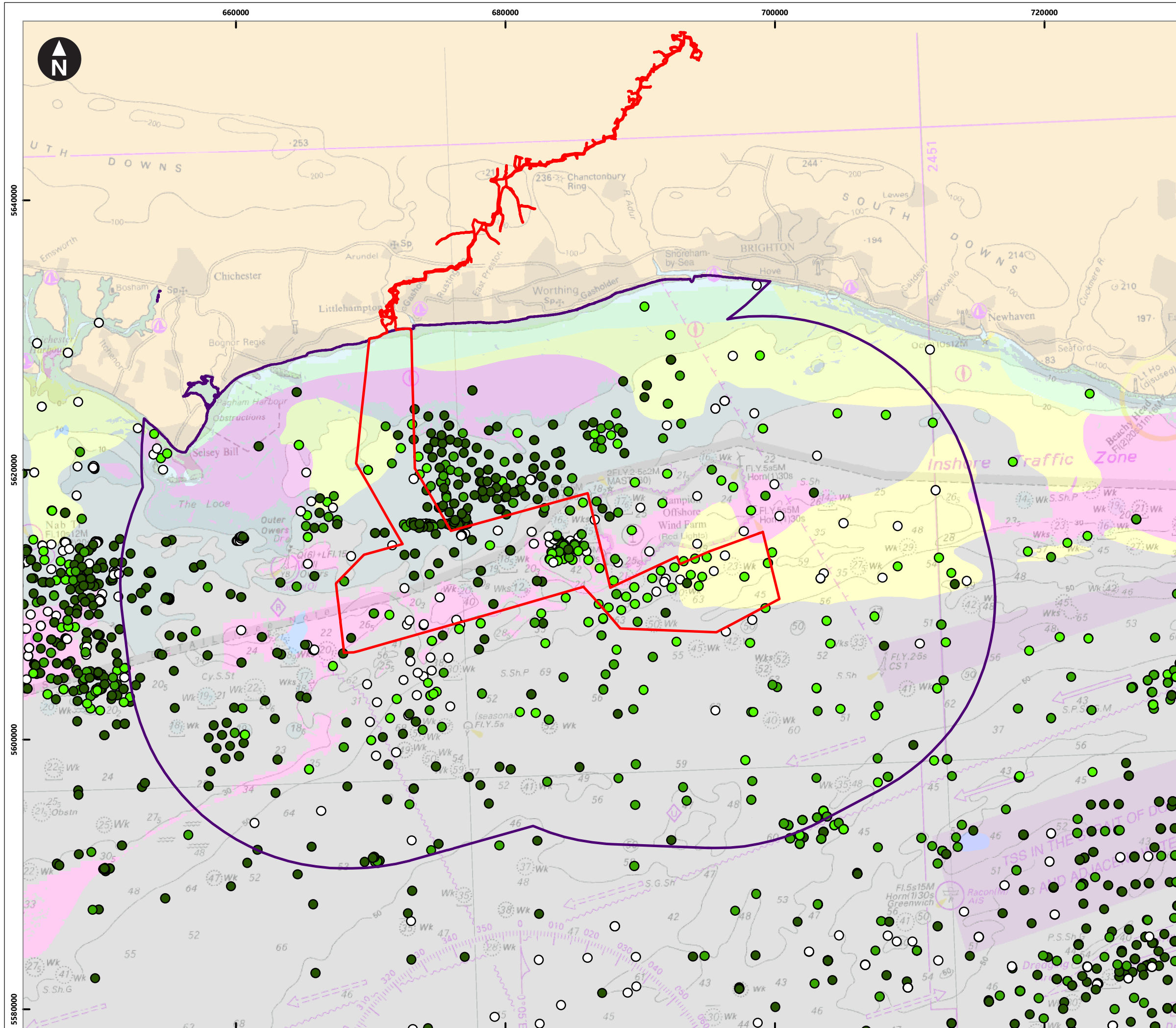
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**Rampion 2 Offshore Wind Farm**

Figure 8.9 Potential sandeel habitat sediment classifications within the Rampion 2 fish and shellfish ecology Study Area following methods in Latto *et al.* (2013). Also presented are the predicted broadscale seabed habitat map, using the EUNIS habitat classification (OEL, 2020b; UKSeaMap, 2021)

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GOBE	SWM	NH	04/08/2023	FINAL



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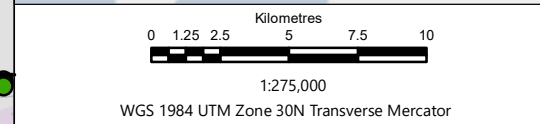
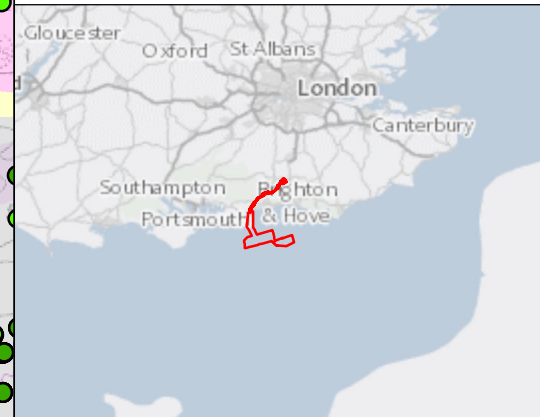
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- Fish and Shellfish Study Area

Herring Habitat Suitability (Reach *et al.*, 2013)

- Prime, Preferred
- Sub-Prime, Preferred
- Suitable, Marginal
- Unsuitable

UK Sea Map 2021 (EUNIS)

- Hard substrata
- Coarse substrate
- Sand
- Mixed sediment
- Undefined



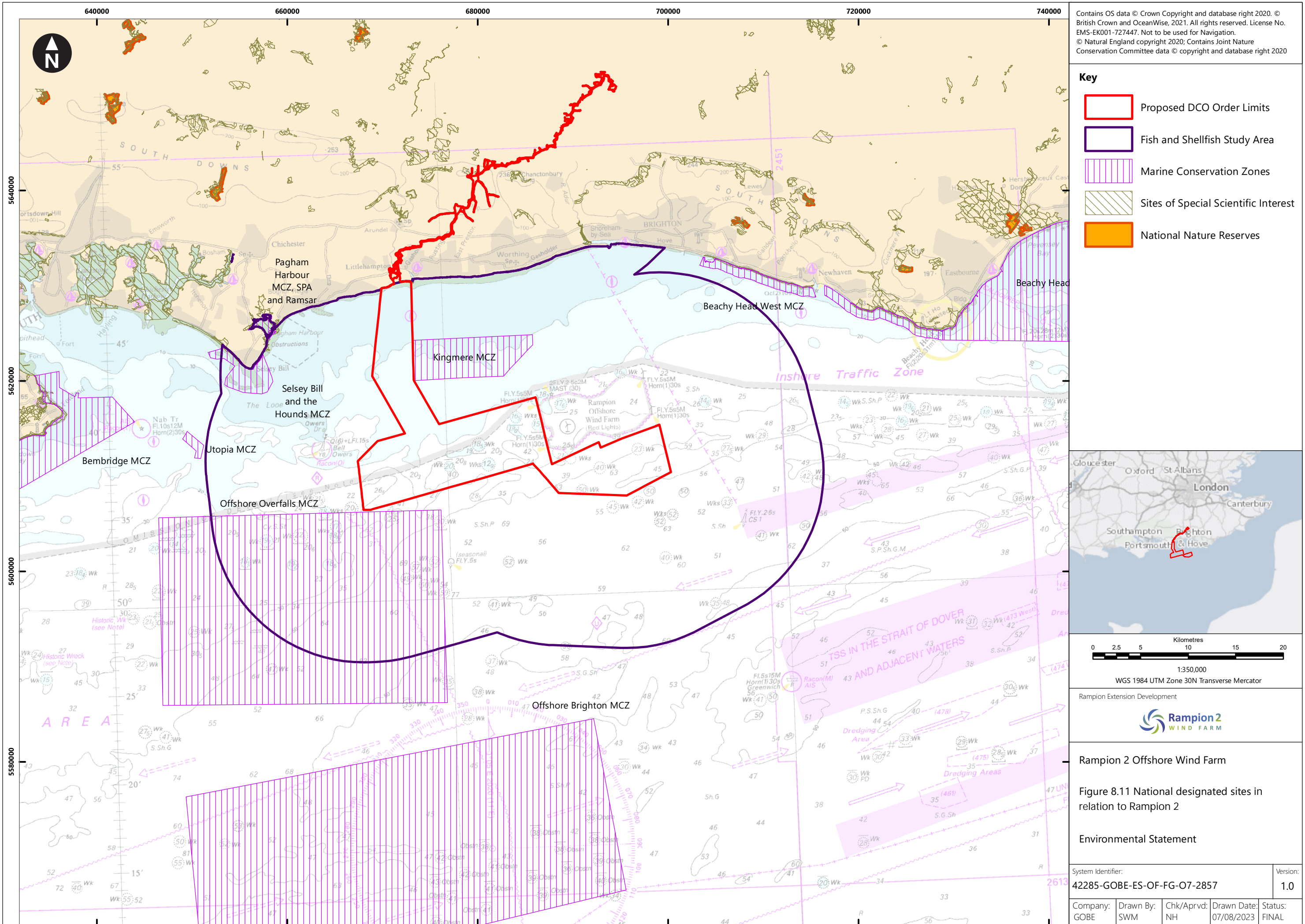
Rampion Extension Development

**Rampion 2 Offshore Wind Farm**  
 Figure 8.10 Potential herring habitat sediment classifications within the Rampion 2 fish and shellfish ecology Study Area following methods in Reach *et al.* (2013). Also presented are the predicted broadscale seabed habitat map, using the EUNIS habitat classification (OEL, 2020b; UKSeaMap, 2021)

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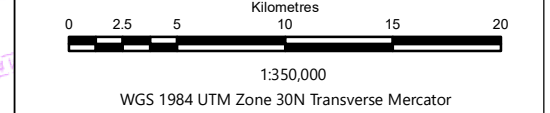




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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Marine Conservation Zones
- Sites of Special Scientific Interest
- National Nature Reserves



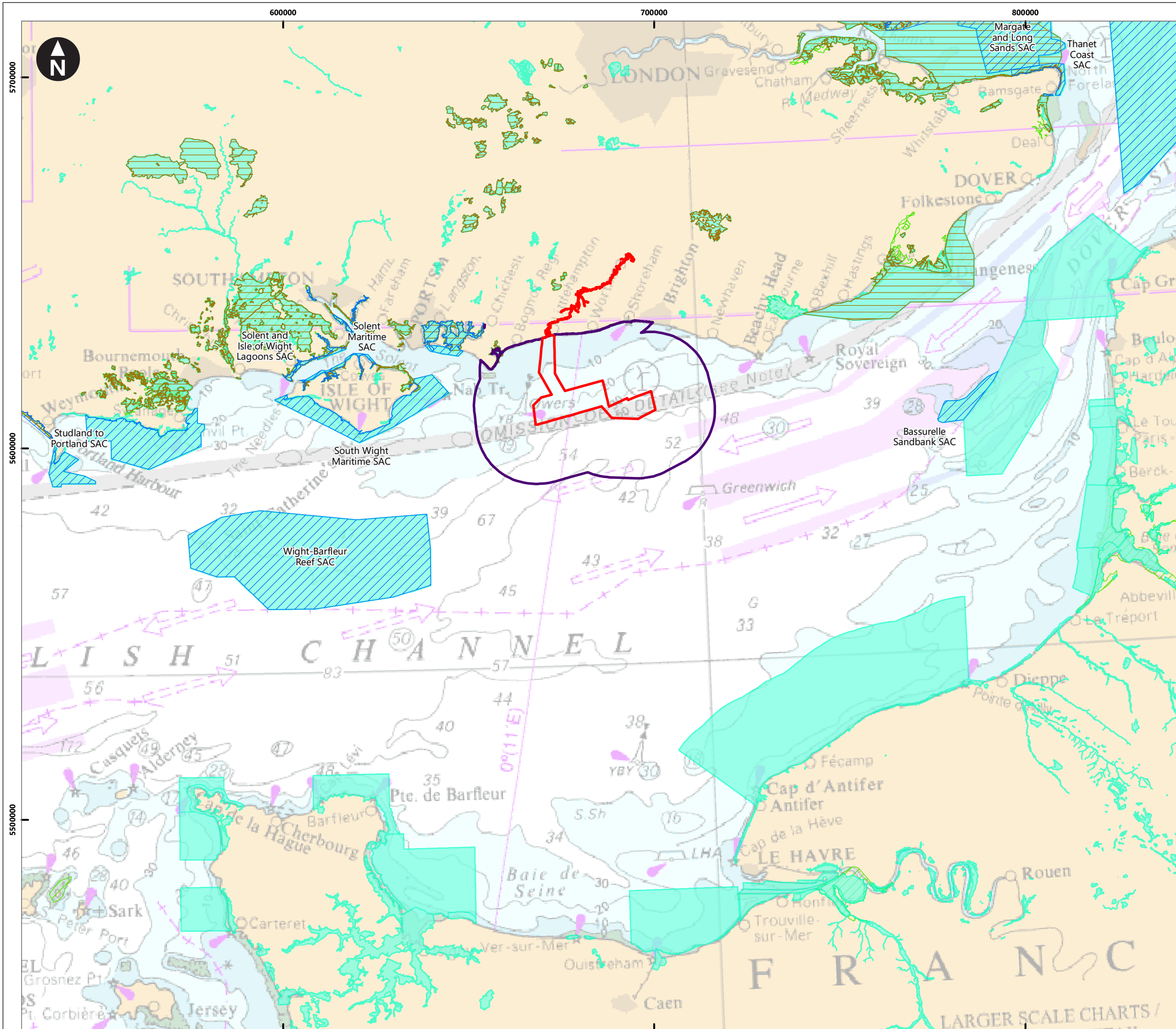
Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 8.11 National designated sites in relation to Rampion 2

Environmental Statement

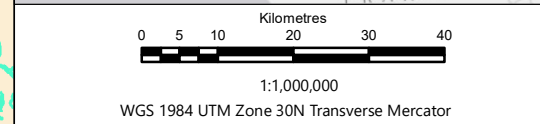
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Company:	Drawn By:	Chk/Prvrd:	Drawn Date:
GOBE	SWM	NH	07/08/2023
Status:	FINAL		



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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Special Areas of Conservation with marine components
- Special Protection Areas
- Europe Natura 2000 sites
- Ramsar Sites



Rampion Extension Development

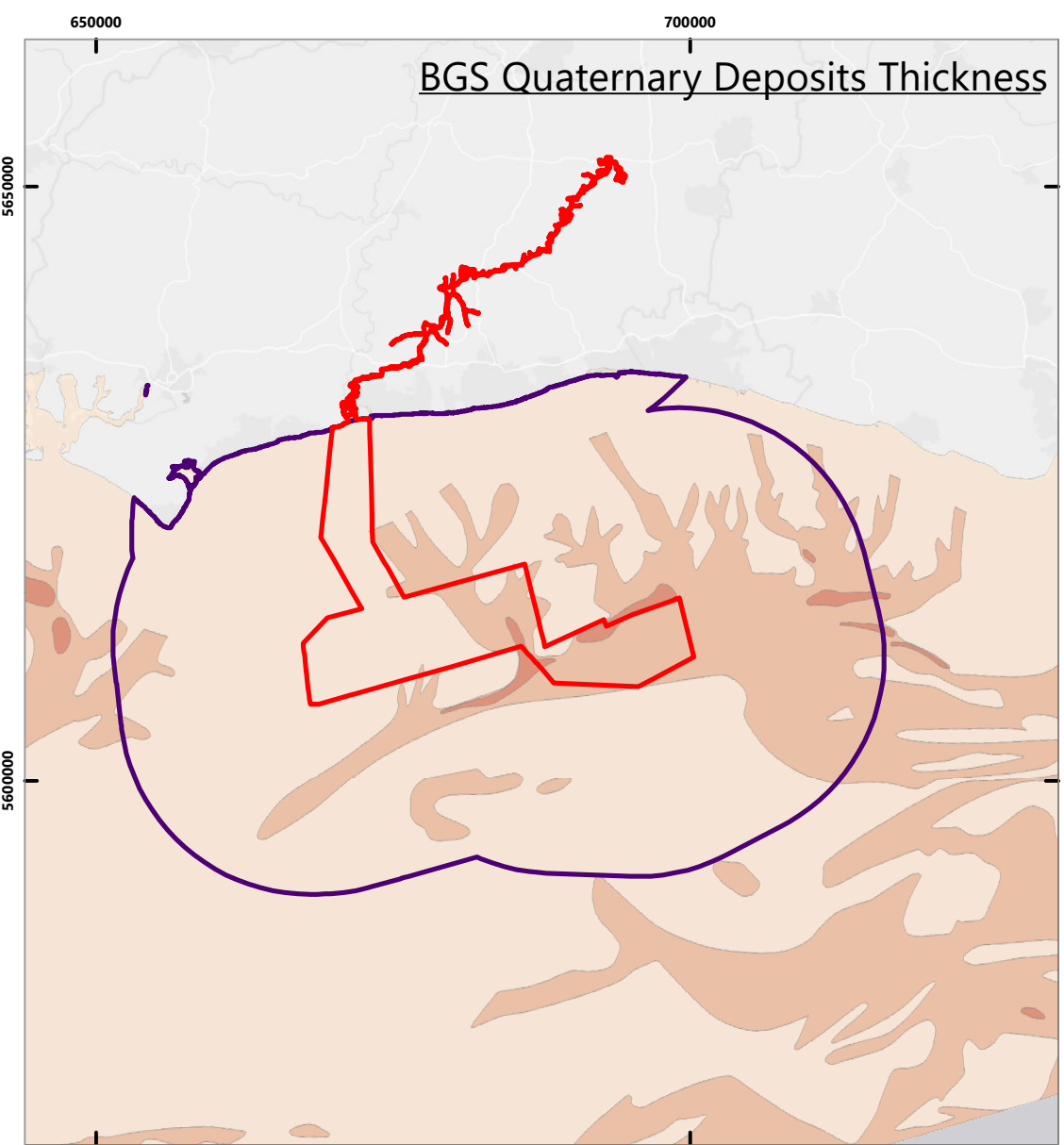
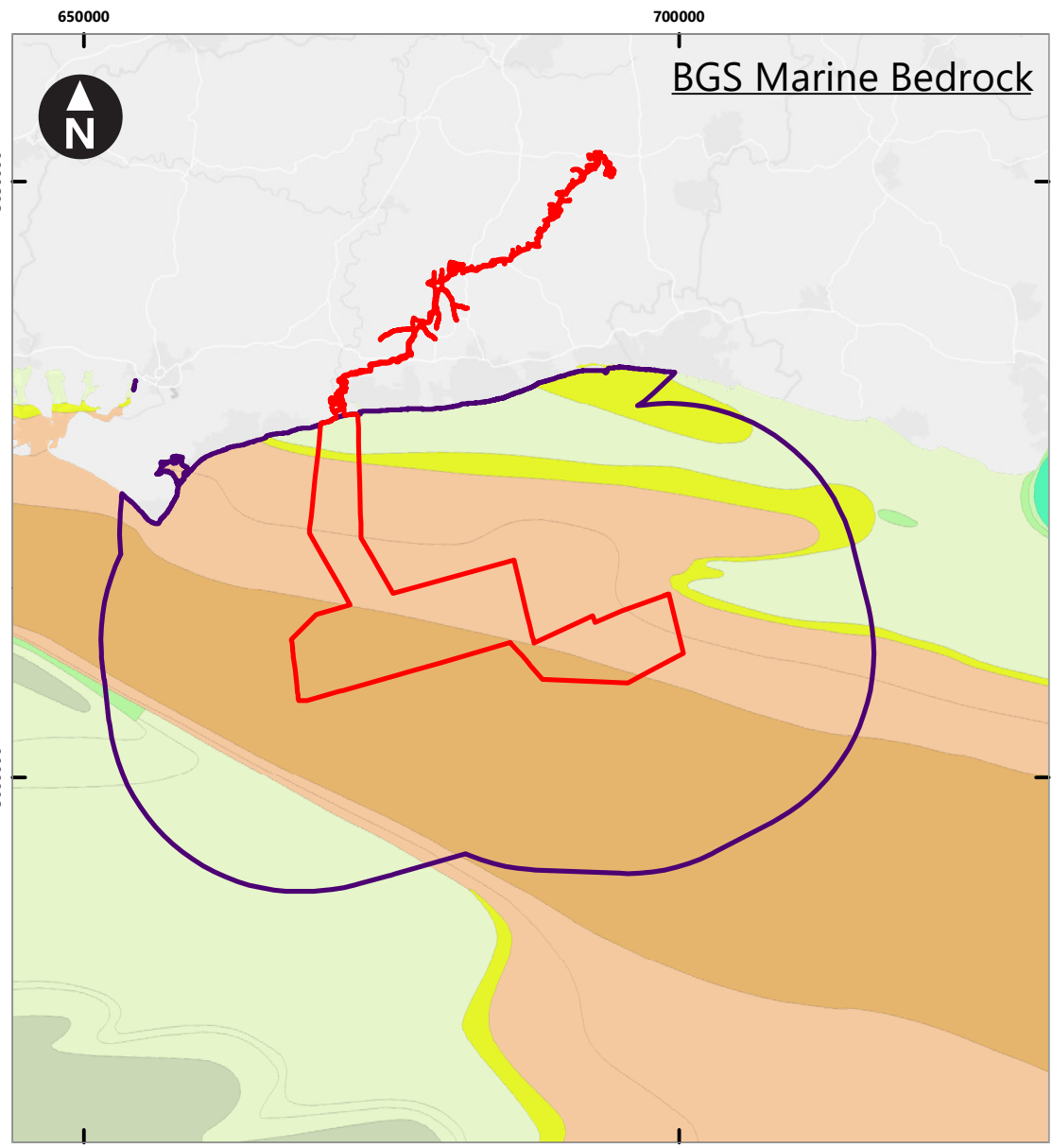


Rampion 2 Offshore Wind Farm

Figure 8.12 International designated sites in relation to Rampion 2

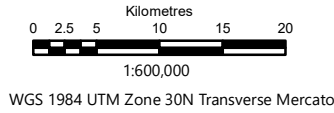
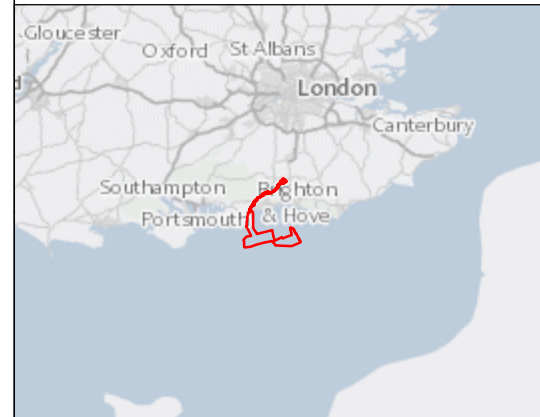
Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-4444				Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH	Drawn Date: 04/08/2023	Status: FINAL



**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area



Rampion Extension Development

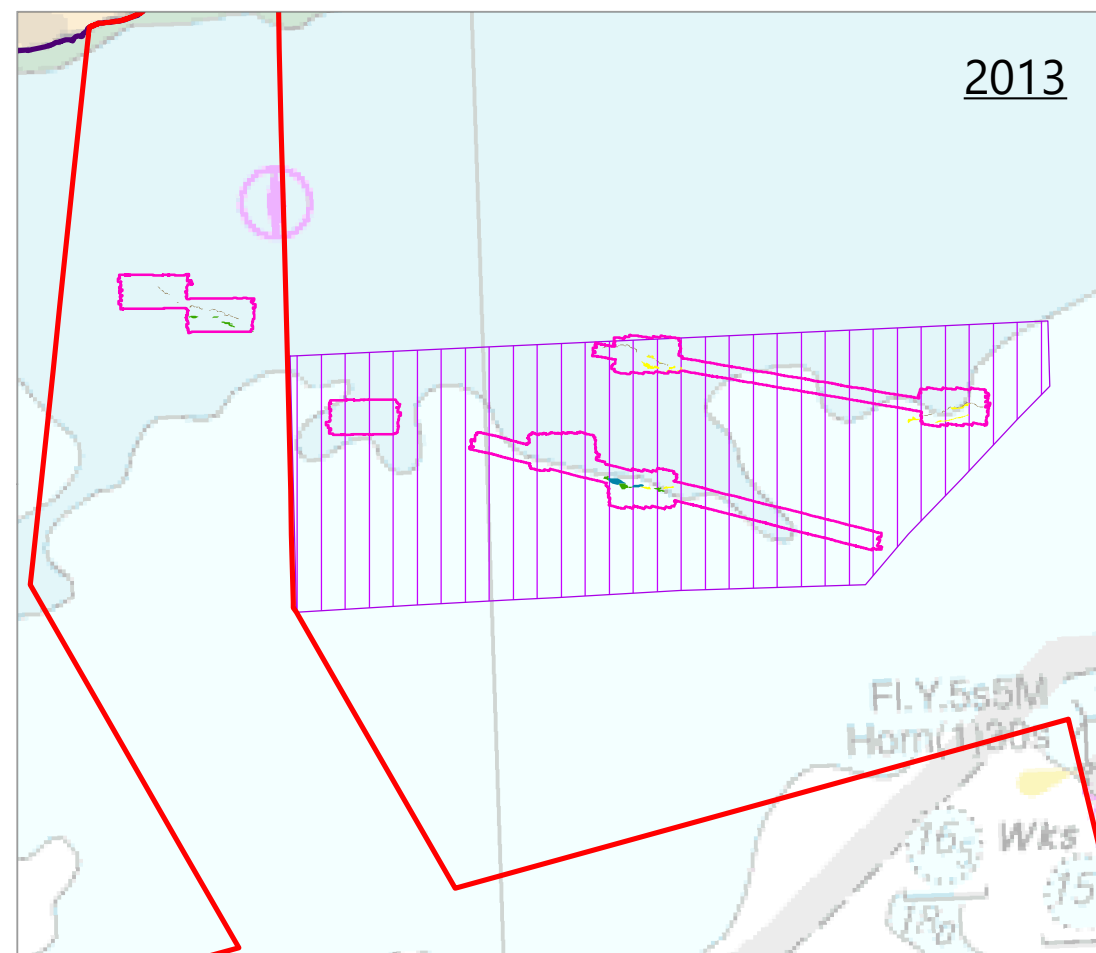
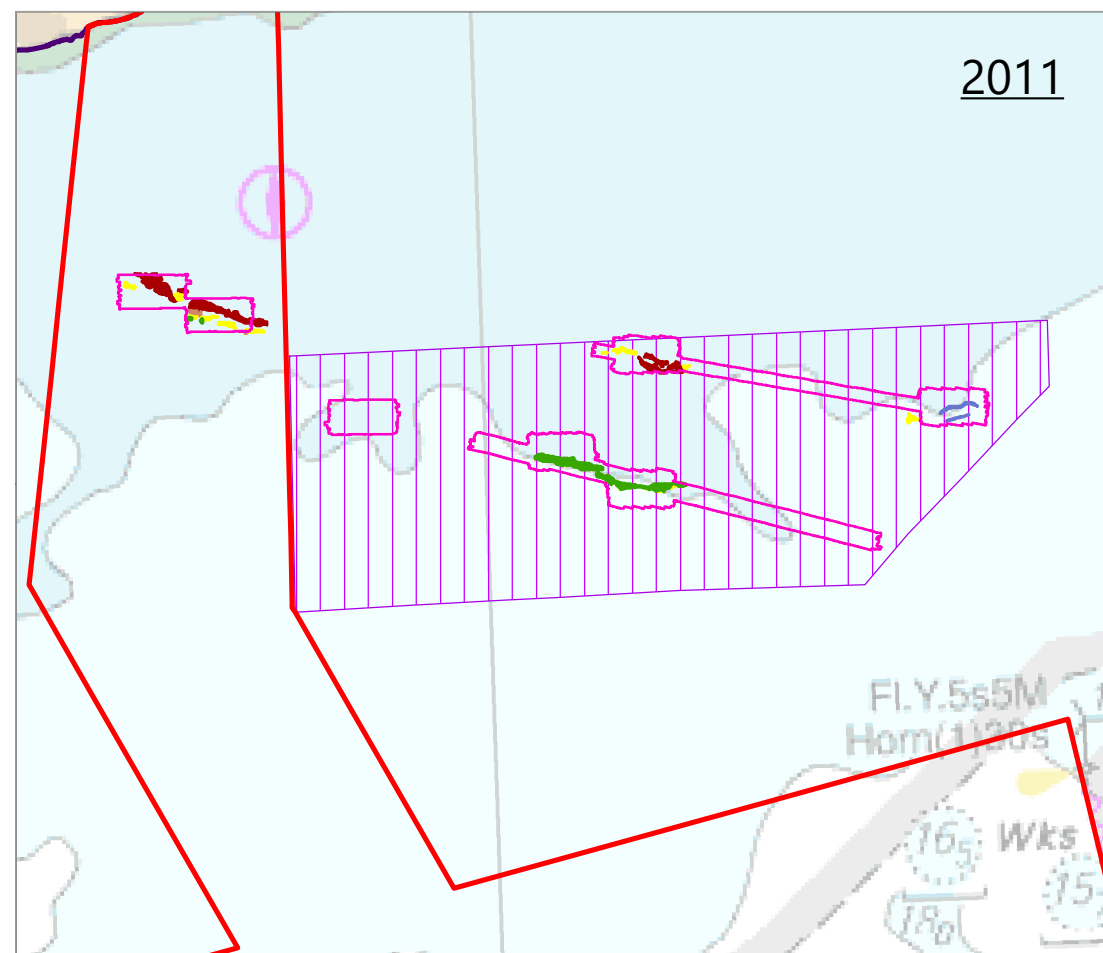
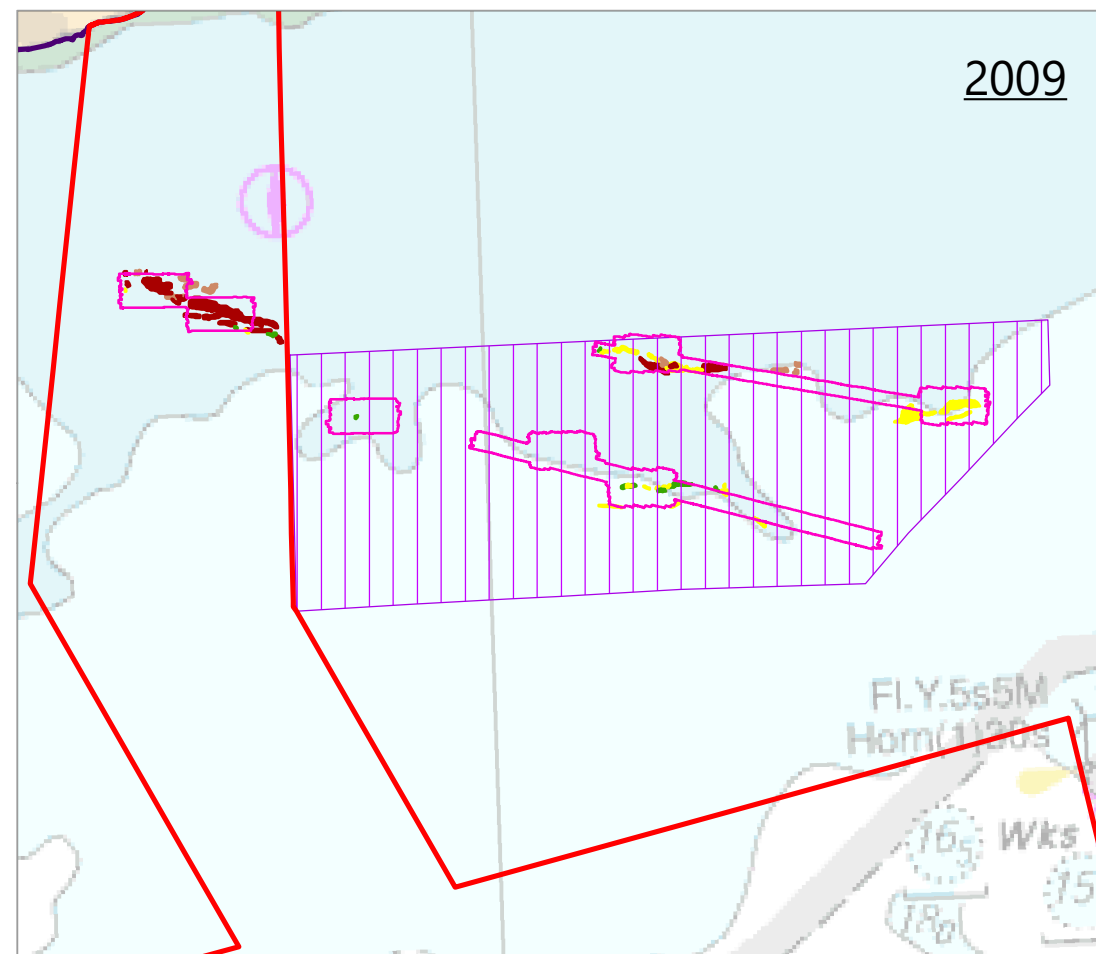
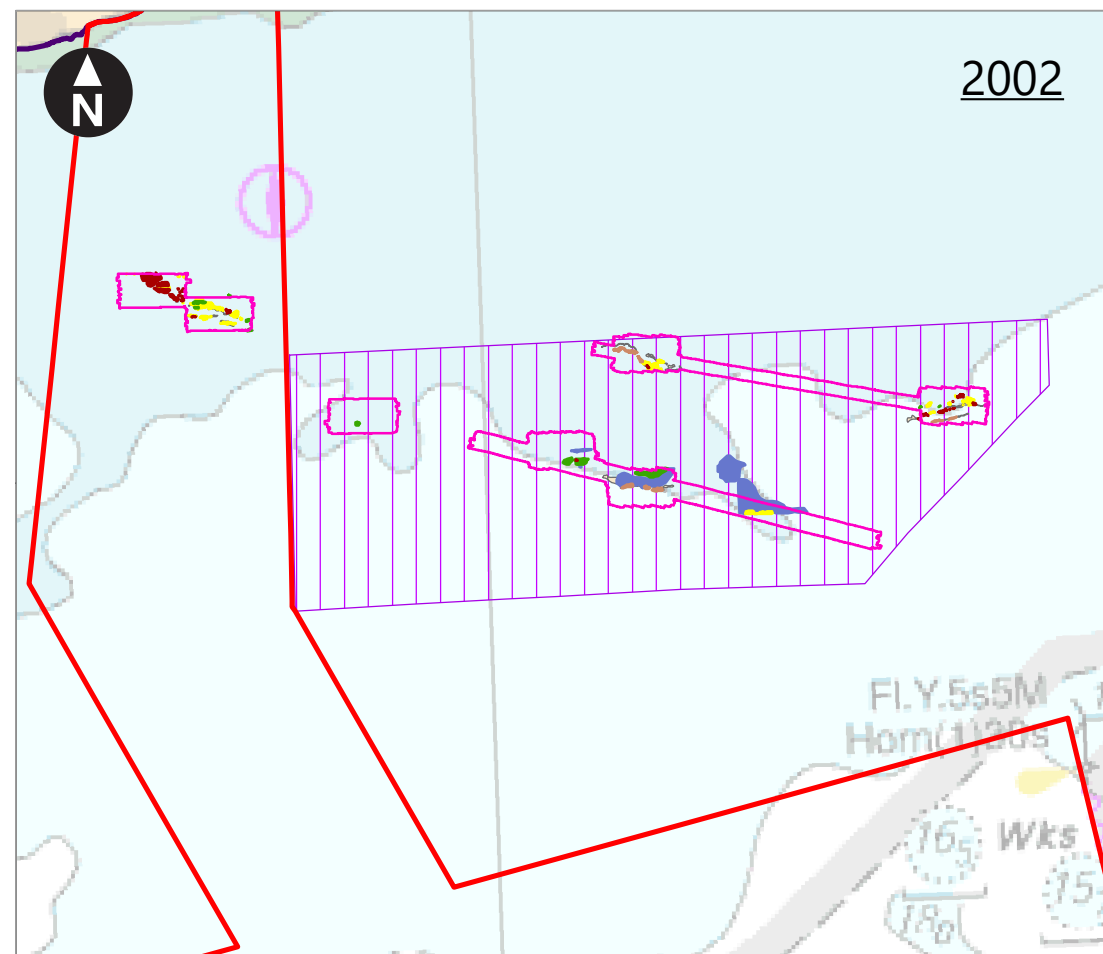
**Rampion 2 Offshore Wind Farm**

Figure 8.13 Location of potential black seabream spawning grounds in relation to Rampion 2

**Environmental Statement**

System Identifier: <b>42285-GOBE-ES-OF-FG-07-1809</b>	Version: <b>1.0</b>
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 04/08/2023	Status: FINAL
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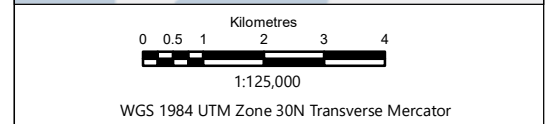
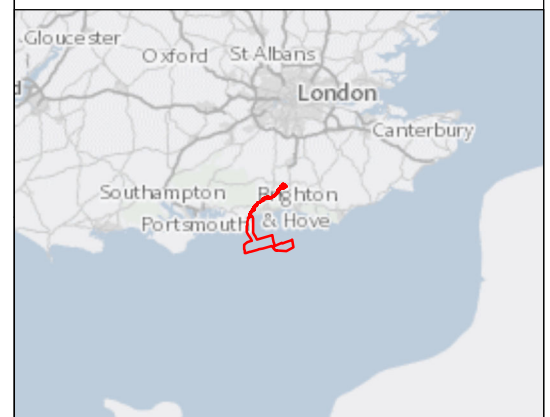


**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Black Seabream Survey Extents
- Kingmere Marine Conservation Zone

**Black Seabream Nest Density**

- Dense nests
- Faint dense nests
- Less dense / patchy nests
- Small patches of nests
- Sparse single nests



Rampion Extension Development



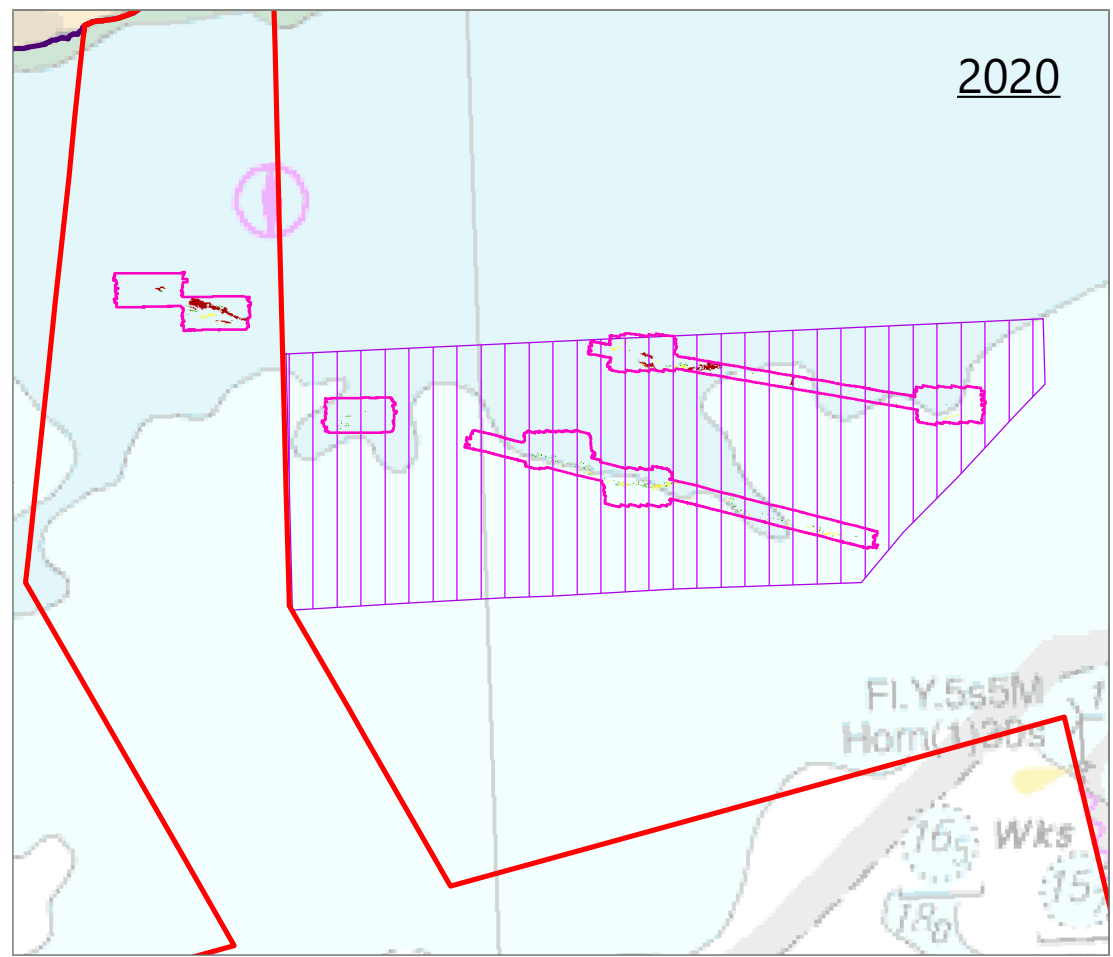
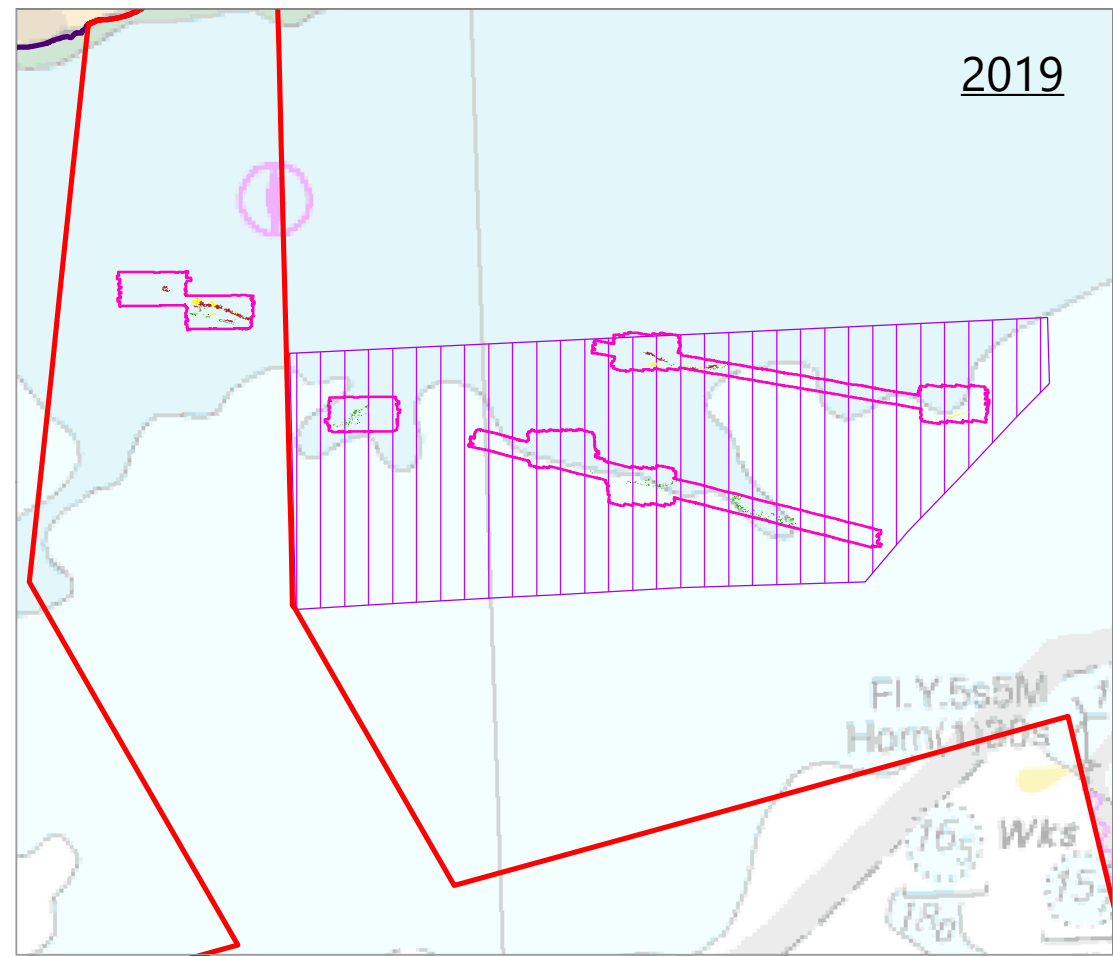
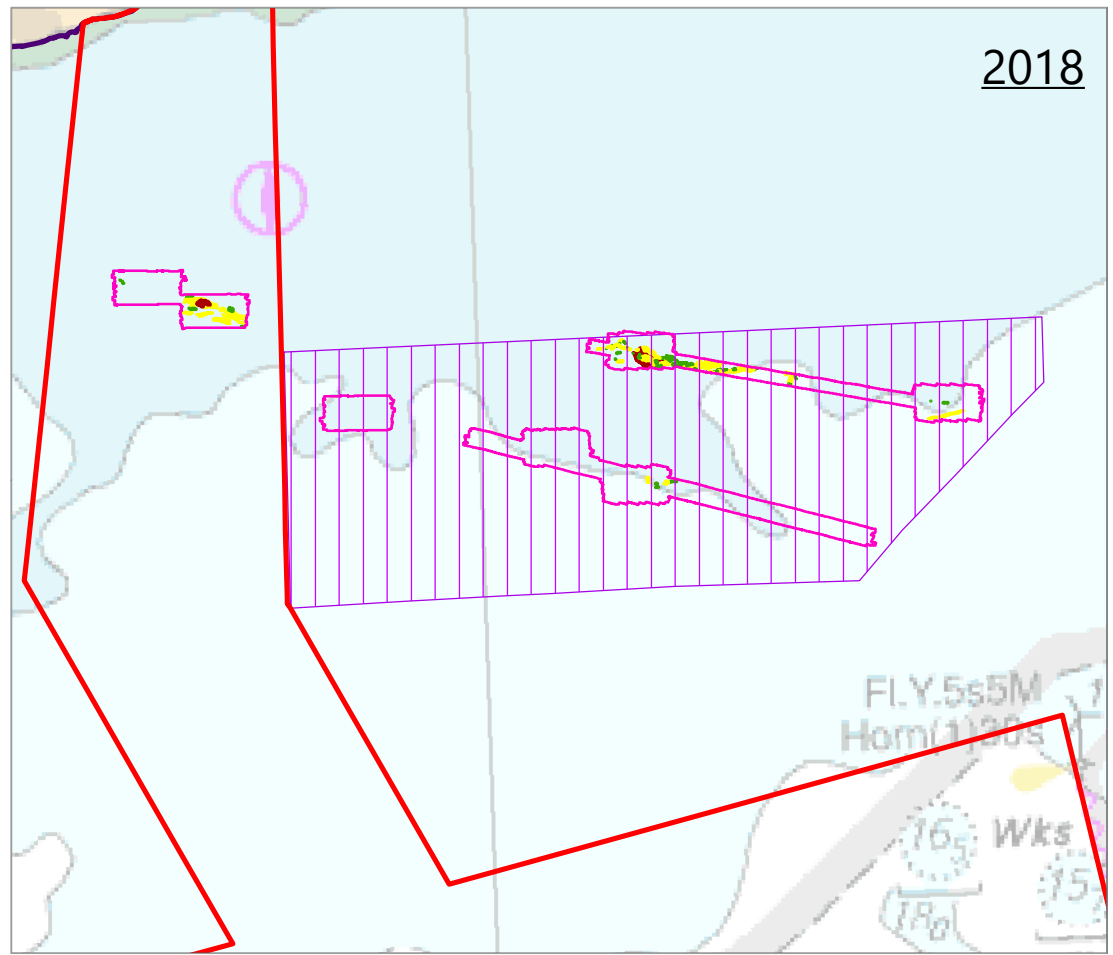
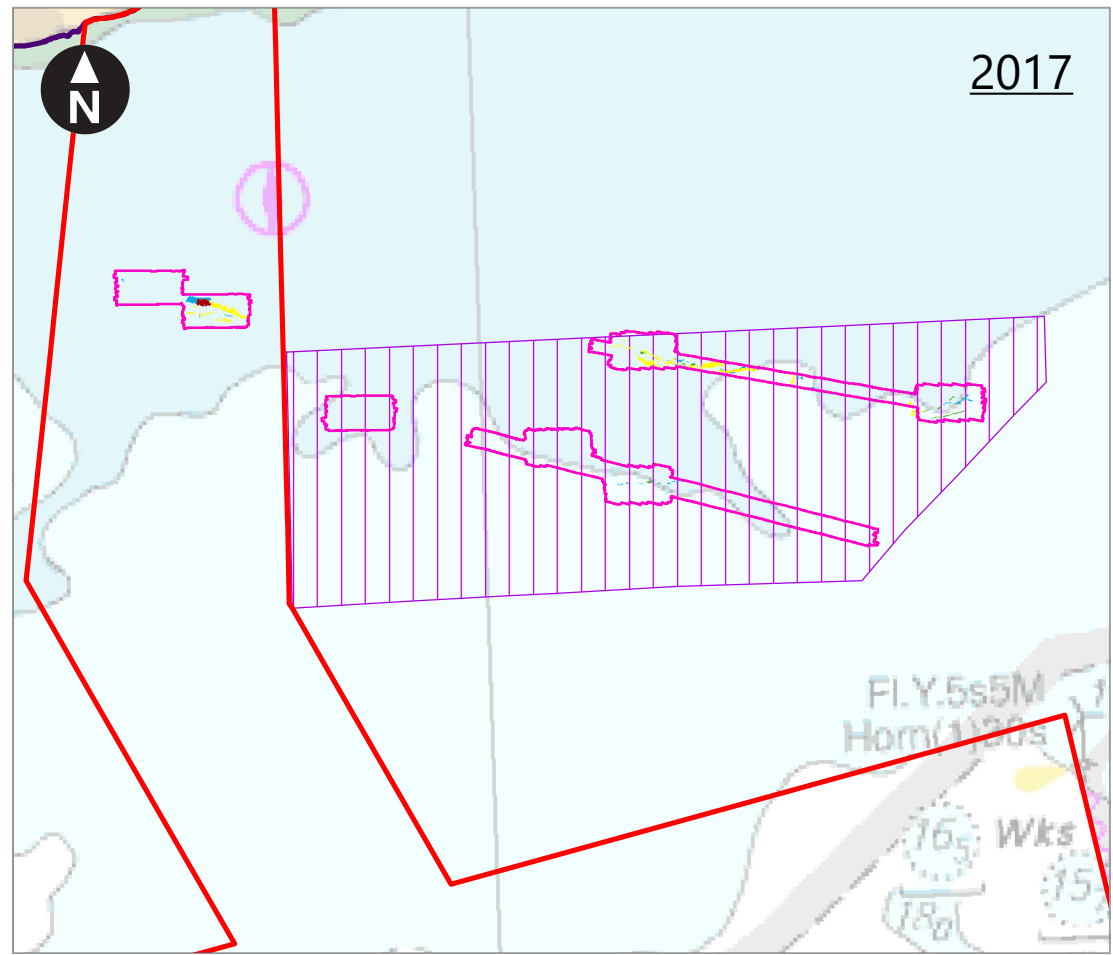
**Rampion 2 Offshore Wind Farm**

Figure 8.14a Location of black seabream nests within the Rampion 2 fish and shellfish Study Area

Environmental Statement

System Identifier:	Version:
42285-GOBE-ES-OF-FG-07-1521	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	SWM	NH	04/08/2023	FINAL

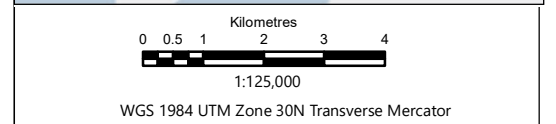
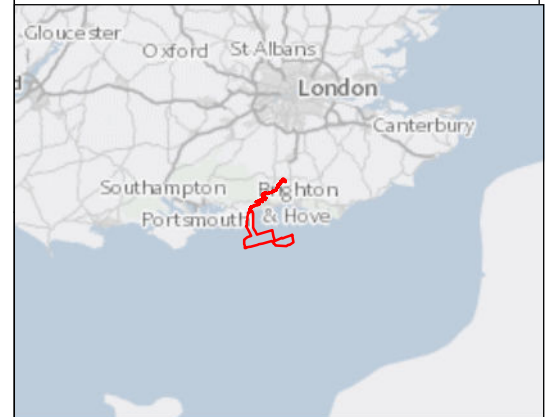


**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Black Bream Survey Extents
- Kingmere Marine Conservation Zone

**Black bream nest density**

- Dense nests
- Faint dense nests
- Less dense / patchy nests
- Small patches of nests
- Sparse single nests



Rampion Extension Development



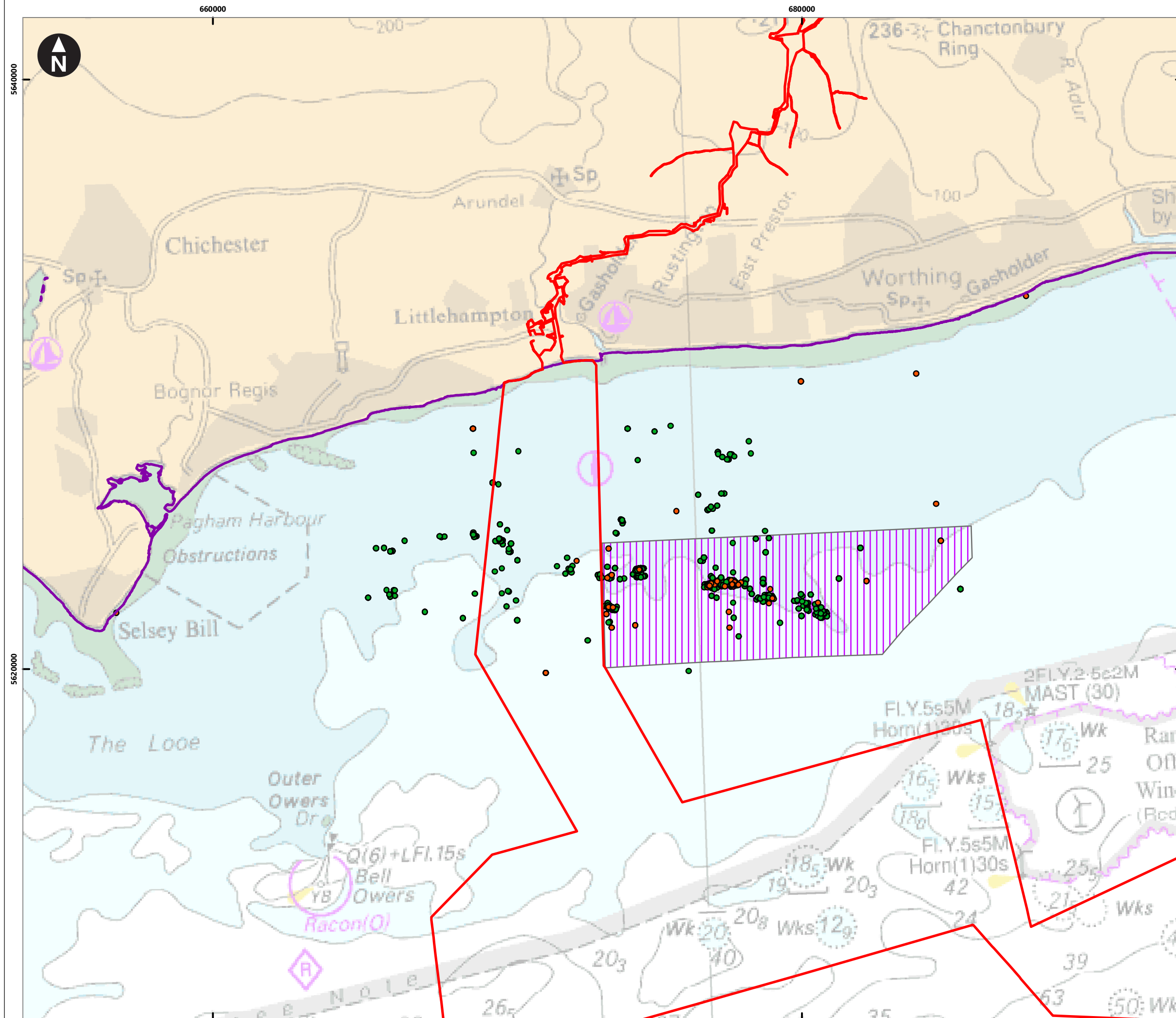
**Rampion 2 Offshore Wind Farm**

Figure 8.14b Locations and densities of black bream nests within the Rampion 2 fish and shellfish Study Area

Environmental Statement

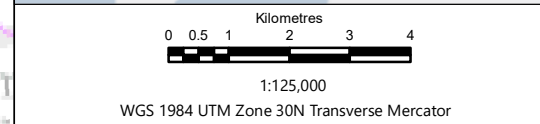
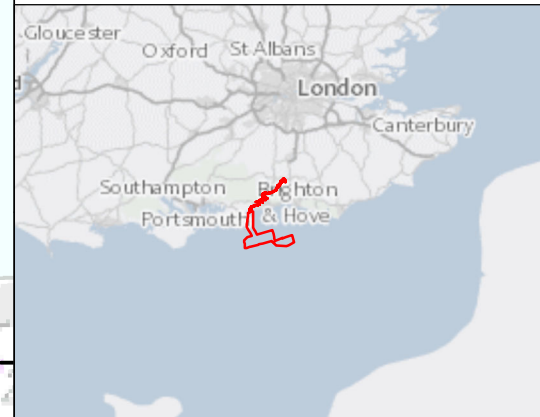
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42285-GOBE-ES-OF-FG-07-5313	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	SWM	NH	05/06/2023	FINAL



**Key**

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Kingmere Marine Conservation Zone
- Black seabream recapture (2014-2016)
- Black seabream release (2014-2016)



Rampion Extension Development

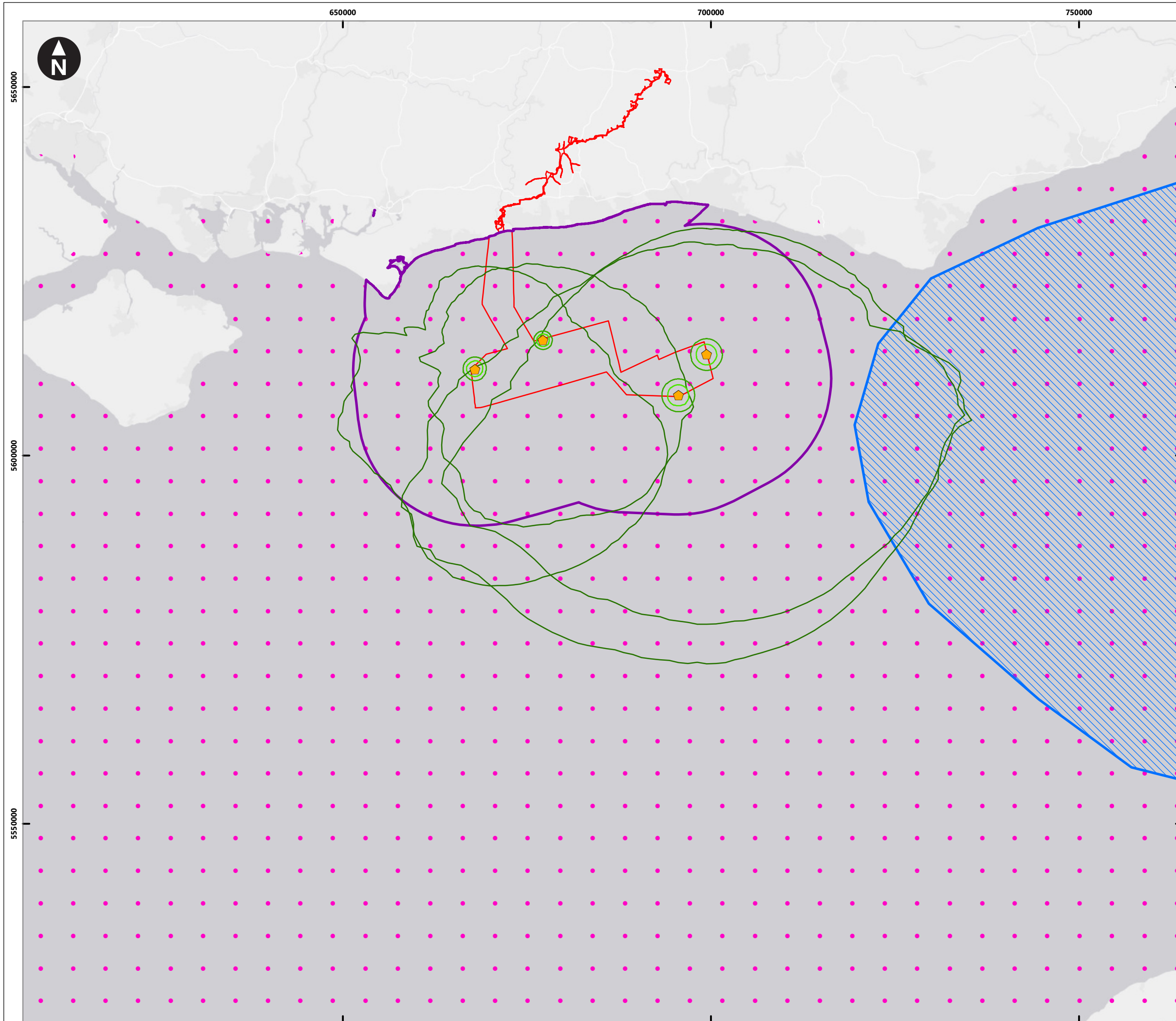
**Rampion 2 Offshore Wind Farm**

Figure 8.15 Black seabream catch and release locations (Sussex IFCA) within Rampion 2 fish and shellfish Study Area

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-6265	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 04/08/2023	Status: FINAL
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 Contains data sourced from Coull et al. 1998; and data derived from ICES 2021

**Key**

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- ◆ Noise Modelling Locations
- MDS Monopile Contours 4,400 kJ dB SELcum:
  - 219dB
  - 216dB
  - 186dB
- Spawning Grounds, Coull-1998 (Species):
  - Sandeel,
- Spawning Grounds, Ellis-2010 (Species, Intensity):
  - Sandeel, Lower



0 2.5 5 10 15 20  
 Kilometres  
 1:500,000  
 WGS 1984 UTM Zone 30N Transverse Mercator

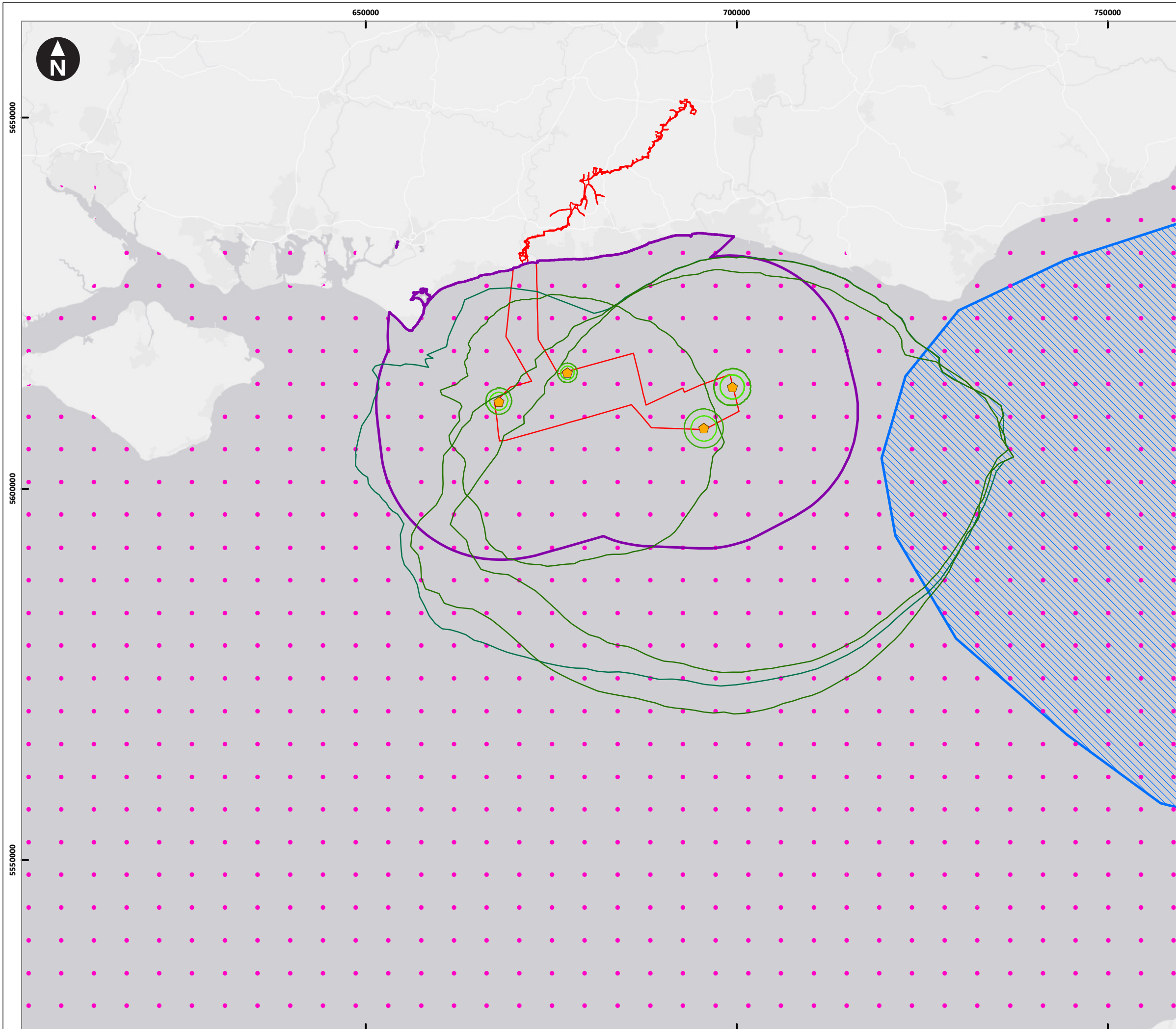
Rampion Extension Development  


**Rampion 2 Offshore Wind Farm**  
 Figure 8.16 Predicted worst case impact ranges for spawning sandeel from the sequential piling of monopile foundations (SELCum)

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-9457	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 05/06/2023	Status: FINAL
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 Contains data sourced from Coull et al. 1998; and data derived from ICES 2021

**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- ⬠ Noise Modelling Locations

MDS Multileg Contours 2,500 kJ dB SELcum:

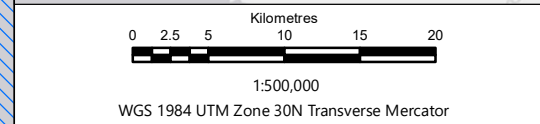
- 219dB
- 216dB
- 186dB

Spawning Grounds, Coull-1998 (Species):

- Sandeel,

Spawning Grounds, Ellis-2010 (Species, Intensity):

- Sandeel, Lower



Rampion Extension Development



**Rampion 2 Offshore Wind Farm**

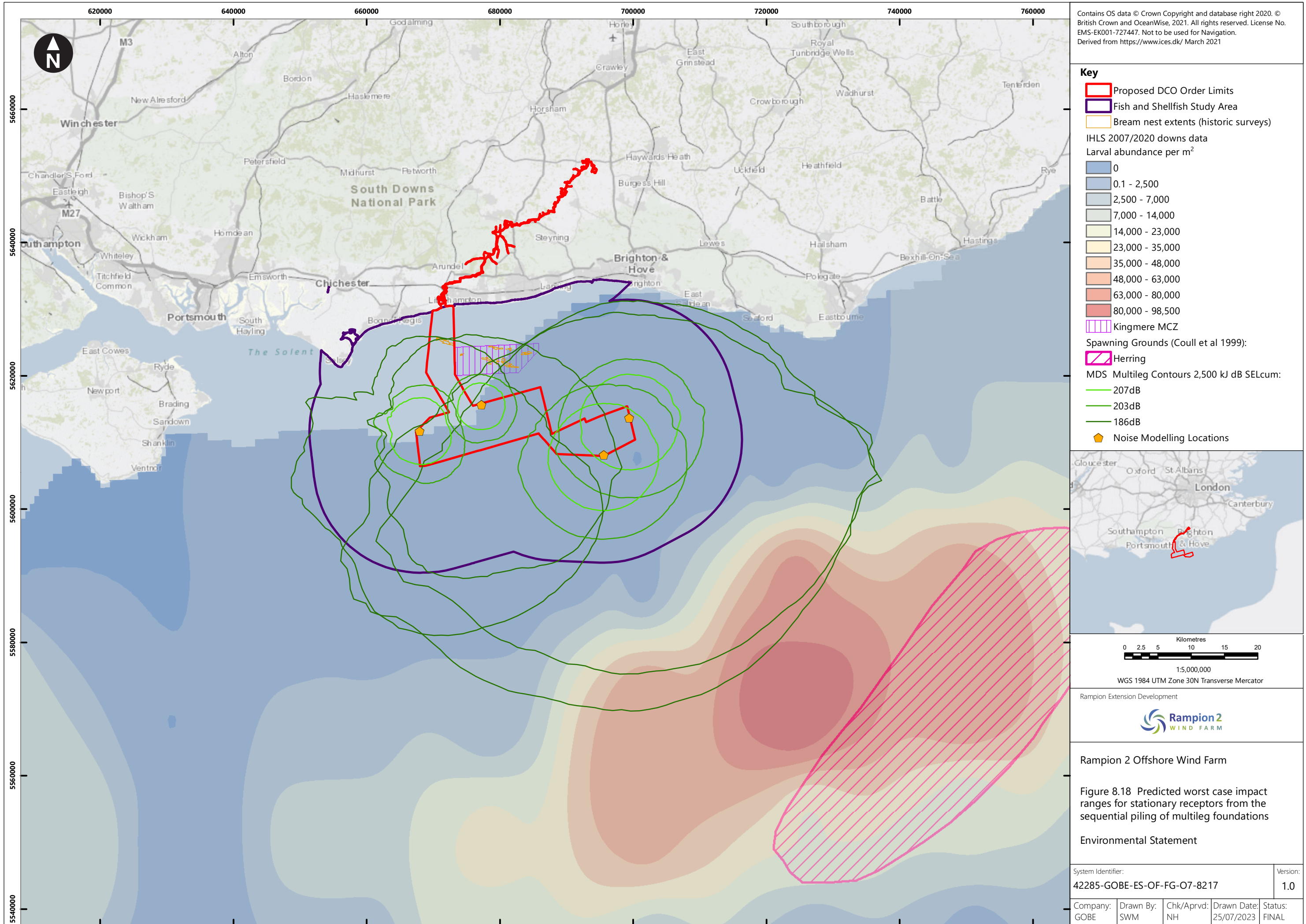
Figure 8.17 Predicted worst case impact ranges for spawning sandeel from the sequential piling of multileg foundations (SELCum)

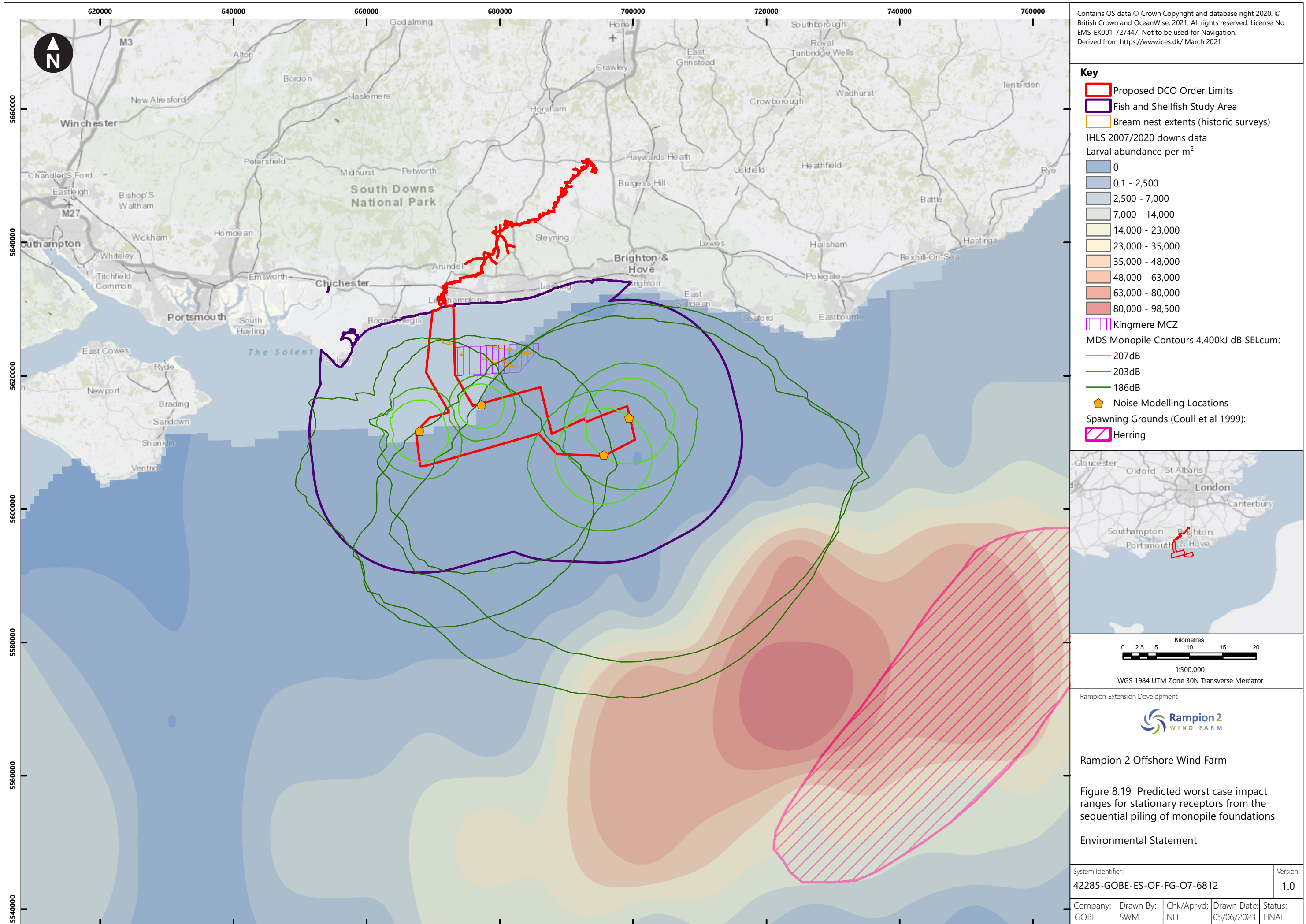
Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-1039	Version: 1.0
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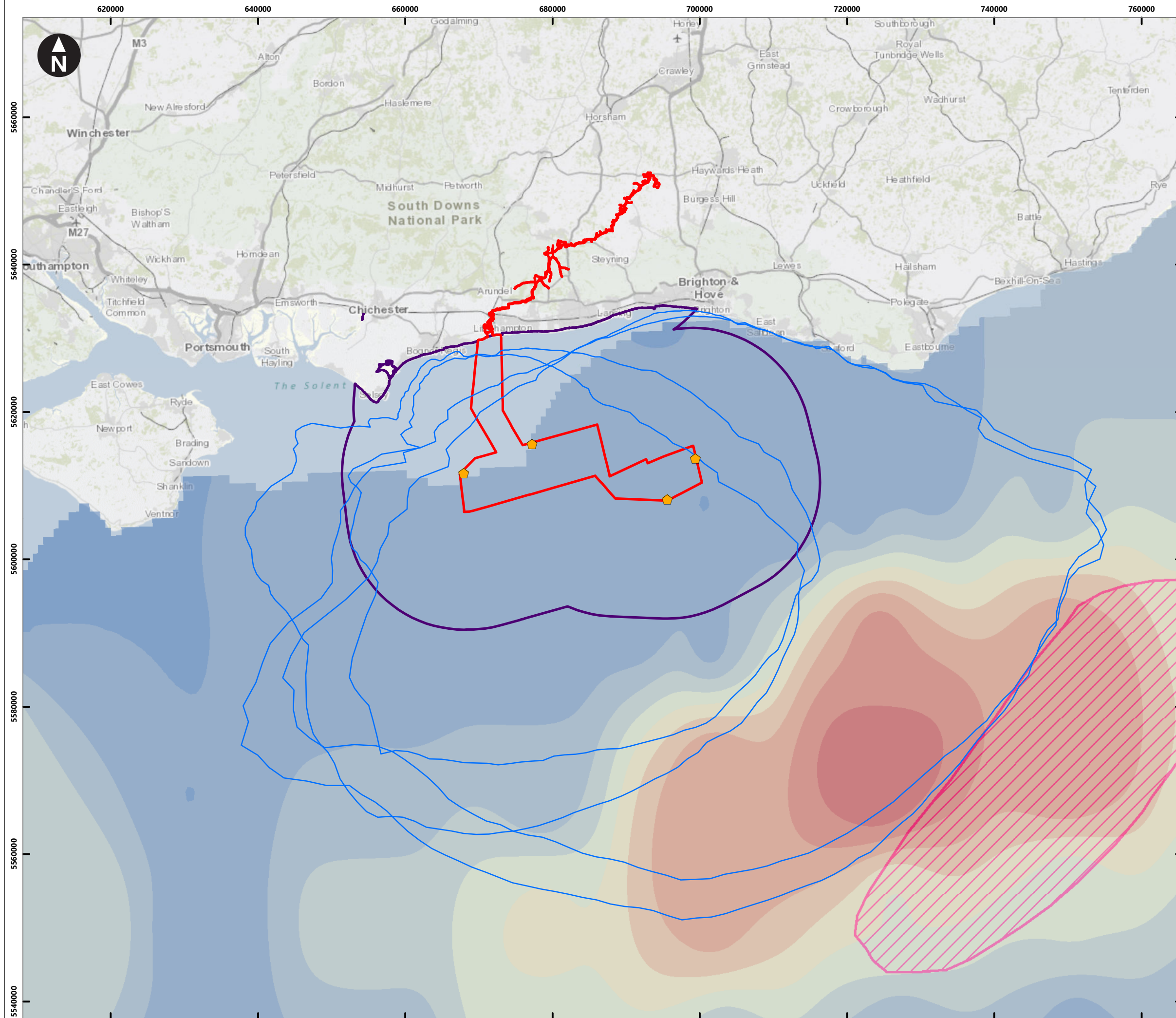
Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 04/08/2023	Status: FINAL
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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

IHLS 2007/2020 downs data  
Larval abundance per m<sup>2</sup>

- 0
- 0.1 - 2,500
- 2,500 - 7,000
- 7,000 - 14,000
- 14,000 - 23,000
- 23,000 - 35,000
- 35,000 - 48,000
- 48,000 - 63,000
- 63,000 - 80,000
- 80,000 - 98,500

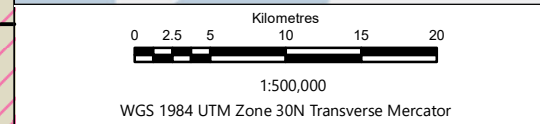
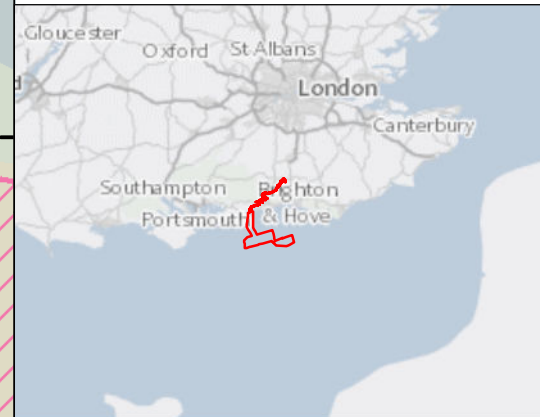
- ◆ Noise Modelling Locations

MDS Monopile Contours 4,400kJ dB SELs:

- 135dB

Spawning Grounds (Coull et al 1999):

- Herring



Rampion Extension Development



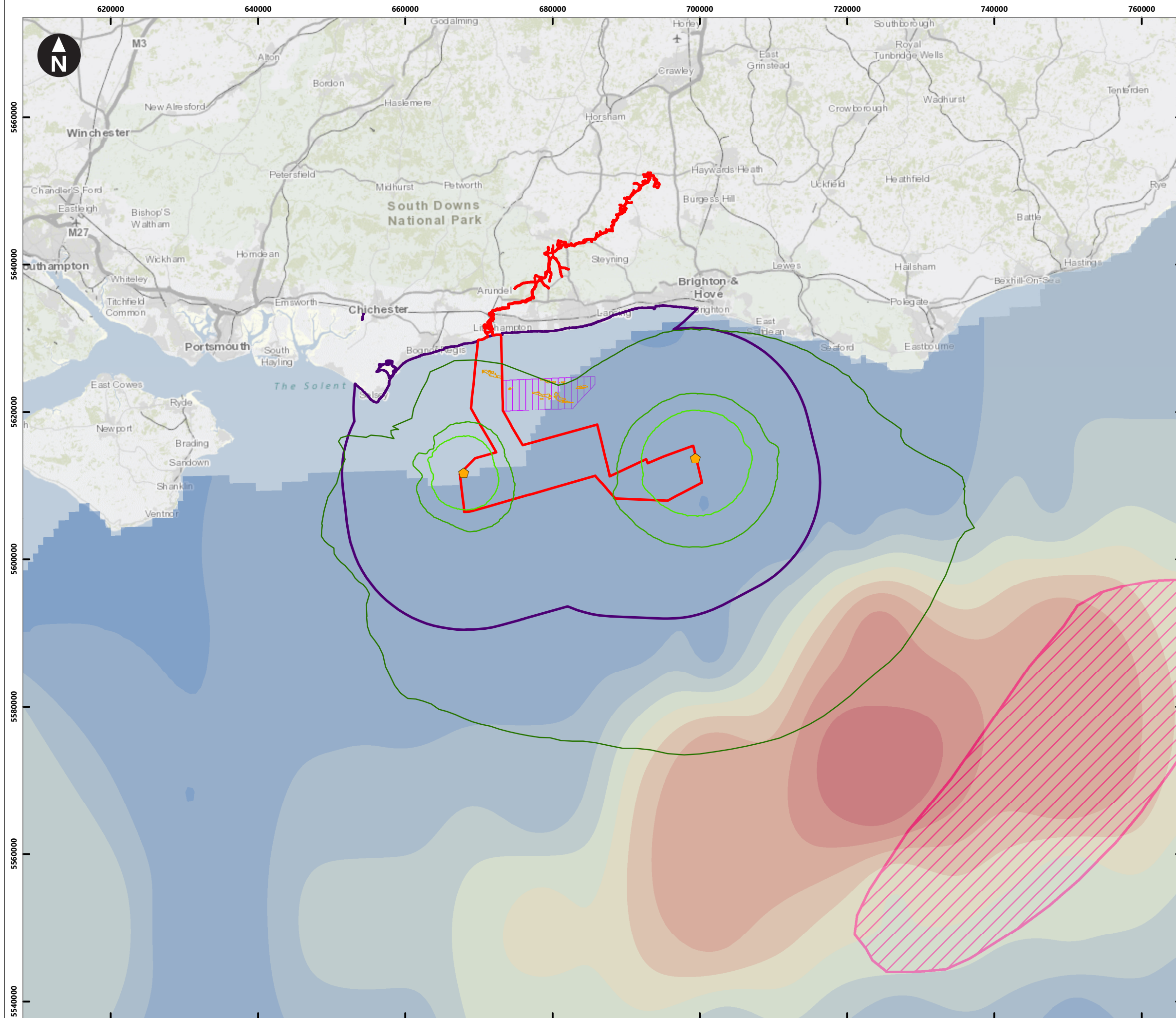
**Rampion 2 Offshore Wind Farm**

Figure 8.20: Predicted worst-case behavioural response impact ranges of herring from the sequential piling of monopile foundations

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-2329				Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 02/06/2023	Status: FINAL

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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Bream nest extents (historic surveys)

IHLS 2007/2020 downs data  
Larval abundance per m<sup>2</sup>

- 0
- 0.1 - 2,500
- 2,500 - 7,000
- 7,000 - 14,000
- 14,000 - 23,000
- 23,000 - 35,000
- 35,000 - 48,000
- 48,000 - 63,000
- 63,000 - 80,000
- 80,000 - 98,500

MDS Multileg foundation contours 2500 kJ dB SEL cum

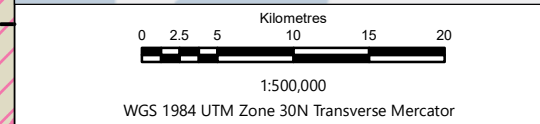
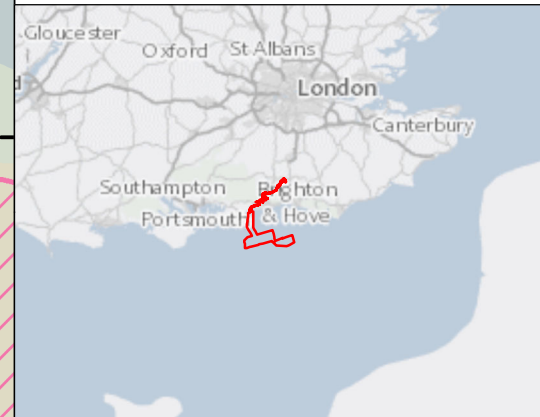
- 207 dB
- 203 dB
- 186 dB

- Kingmere MCZ

Spawning Grounds (Coull et al 1999):

- Herring

- Noise Modelling Locations



Rampion Extension Development

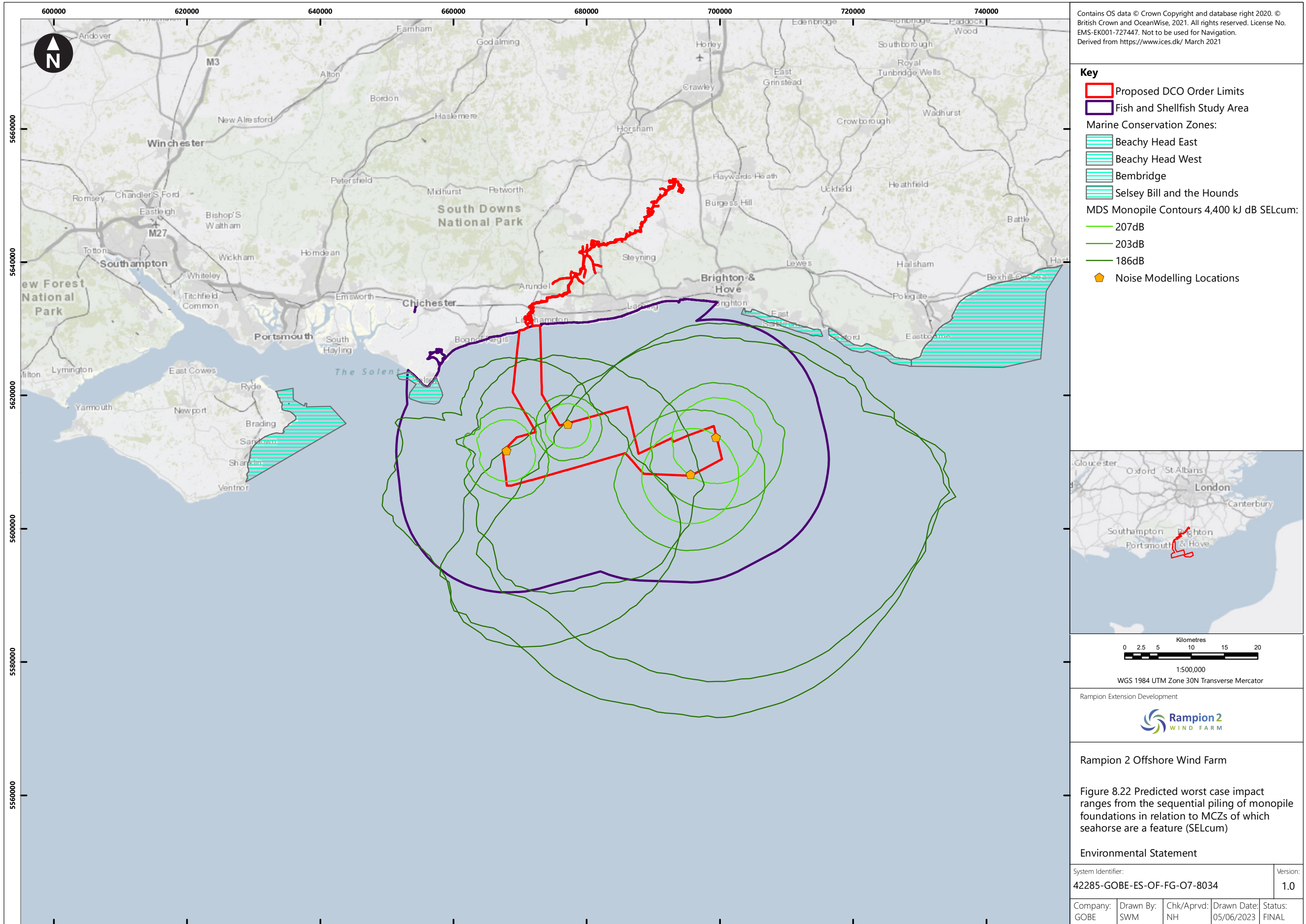


**Rampion 2 Offshore Wind Farm**

Figure 8.21: Predicted worst case impact ranges of stationary receptors from the simultaneous piling of multileg foundations

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-4890		Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH
Drawn Date: 28/07/2023	Status: FINAL	



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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

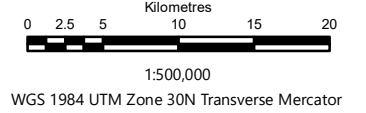
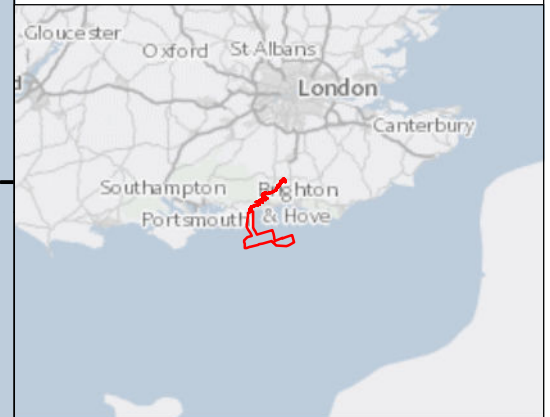
Marine Conservation Zones:

- Beachy Head East
- Beachy Head West
- Bembridge
- Selsey Bill and the Hounds

MDS Monopile Contours 4,400 kJ dB SELcum:

- 207dB
- 203dB
- 186dB

◆ Noise Modelling Locations



Rampion Extension Development



**Rampion 2 Offshore Wind Farm**

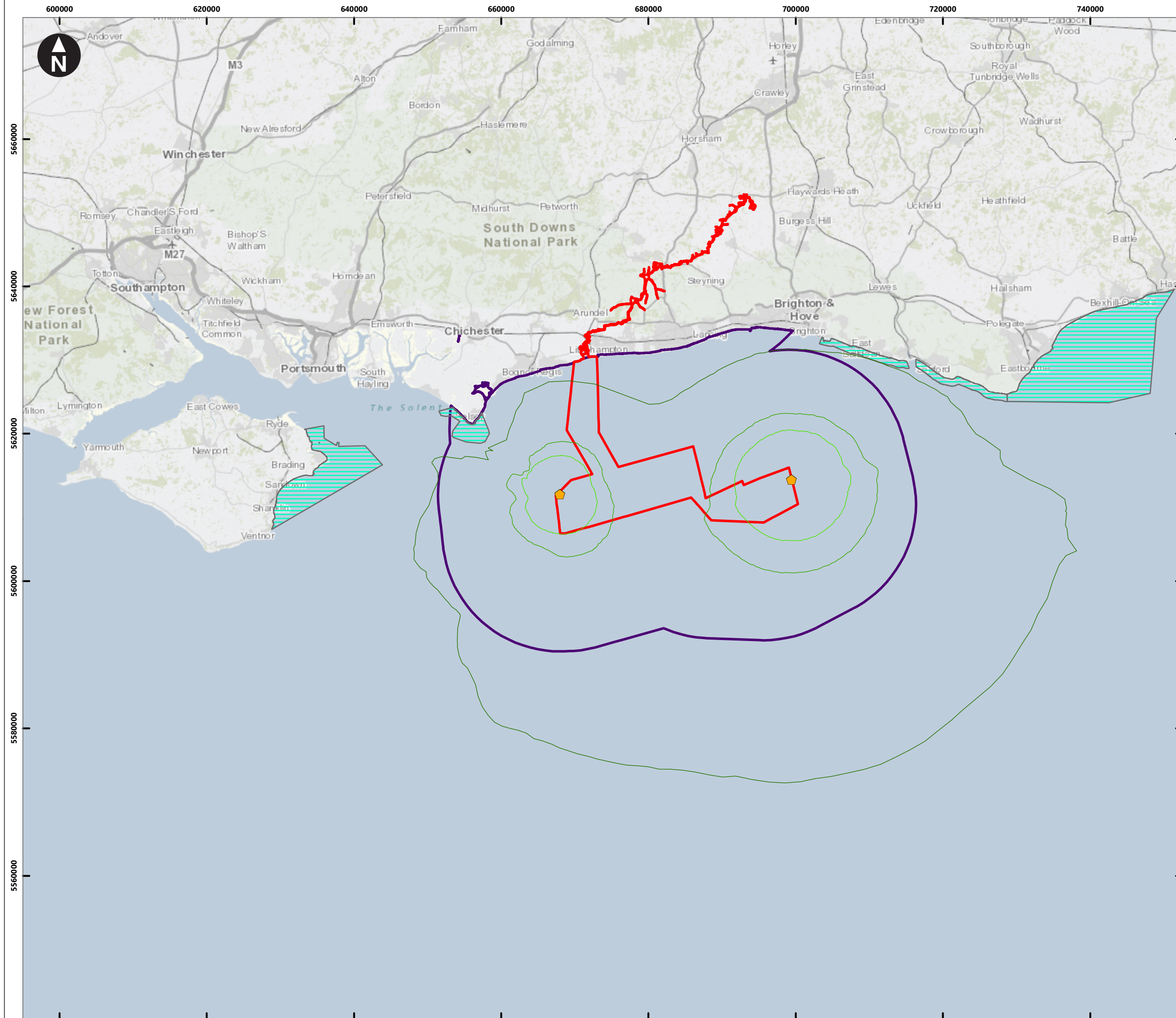
Figure 8.22 Predicted worst case impact ranges from the sequential piling of monopile foundations in relation to MCZs of which seahorse are a feature (SELcum)

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-8034	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 05/06/2023	Status: FINAL
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**Key**

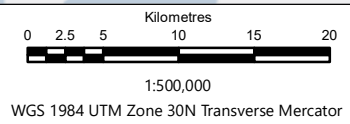
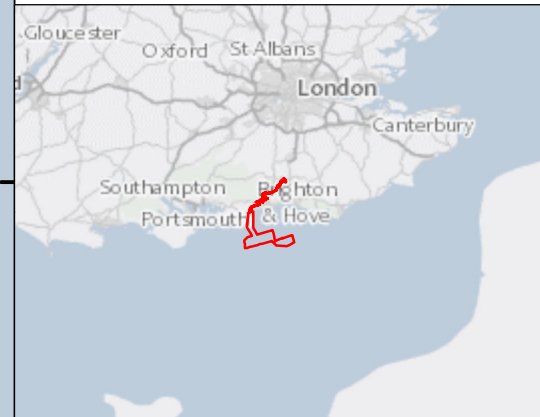
- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- ◆ Noise Modelling Locations

Marine Conservation Zones:

- Beachy Head East
- Beachy Head West
- Bembridge
- Selsey Bill and the Hounds

MDS Multileg Foundation Contours 2500kJ dB SELcum:

- 207dB
- 203dB
- 186dB



Rampion Extension Development



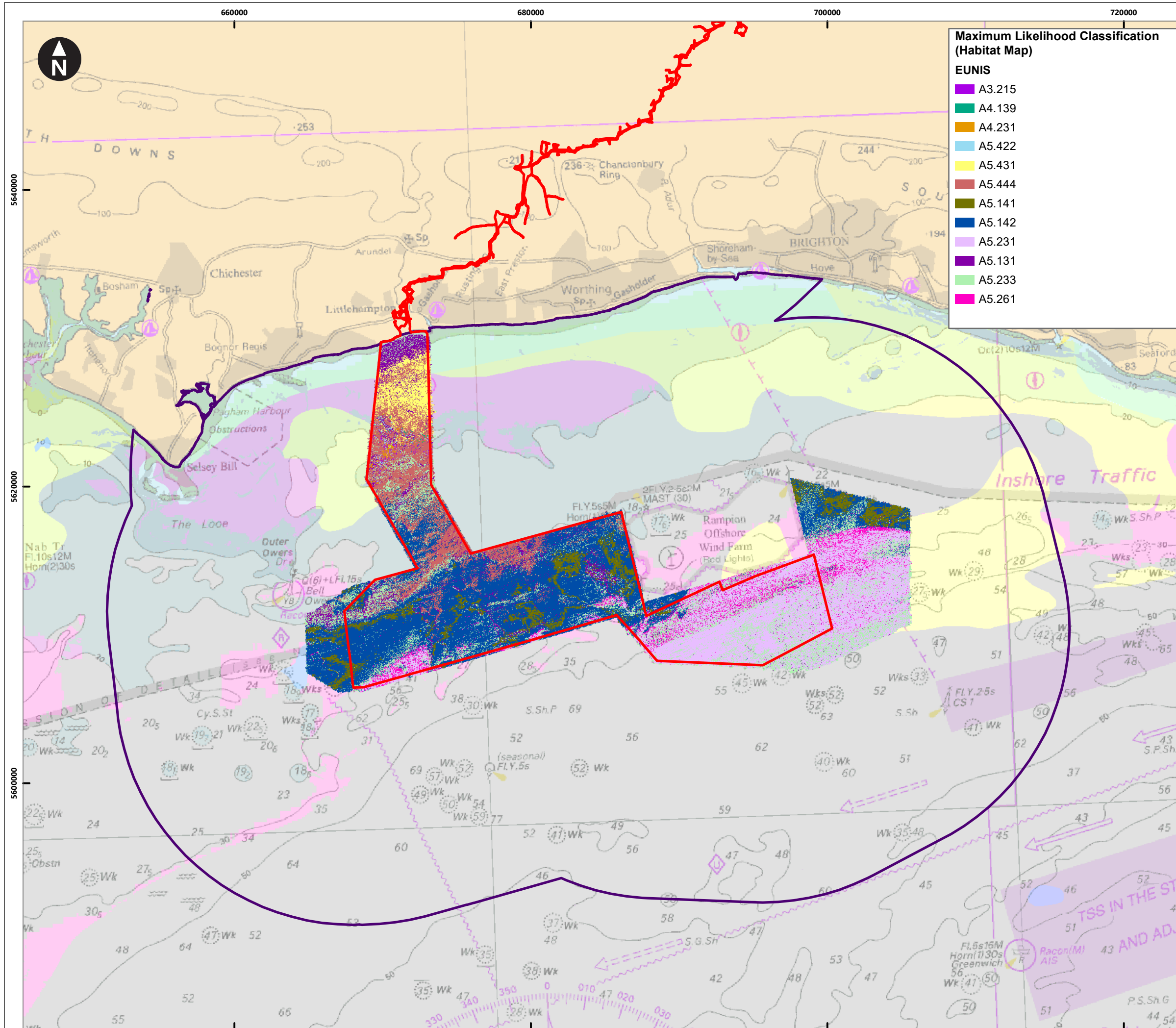
**Rampion 2 Offshore Wind Farm**

Figure 8.23 Predicted worst case impact ranges from the simultaneous piling of multileg foundations in relation to MCZs of which seahorse are a feature (SELcum)

Environmental Statement

System Identifier:	Version:
42285-GOBE-ES-OF-FG-07-9499	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	SWM	NH	28/07/2023	FINAL



**Maximum Likelihood Classification (Habitat Map)**

**EUNIS**

- A3.215
- A4.139
- A4.231
- A5.422
- A5.431
- A5.444
- A5.141
- A5.142
- A5.231
- A5.131
- A5.233
- A5.261

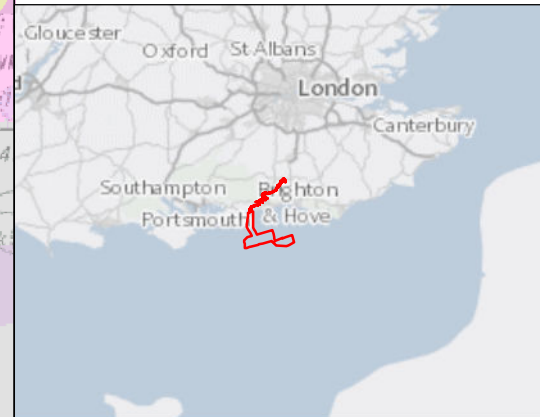
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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

**UK Sea Map 2021 (EUNIS)**

- Hard substrata
- Coarse substrate
- Sand
- Mixed sediment
- Undefined

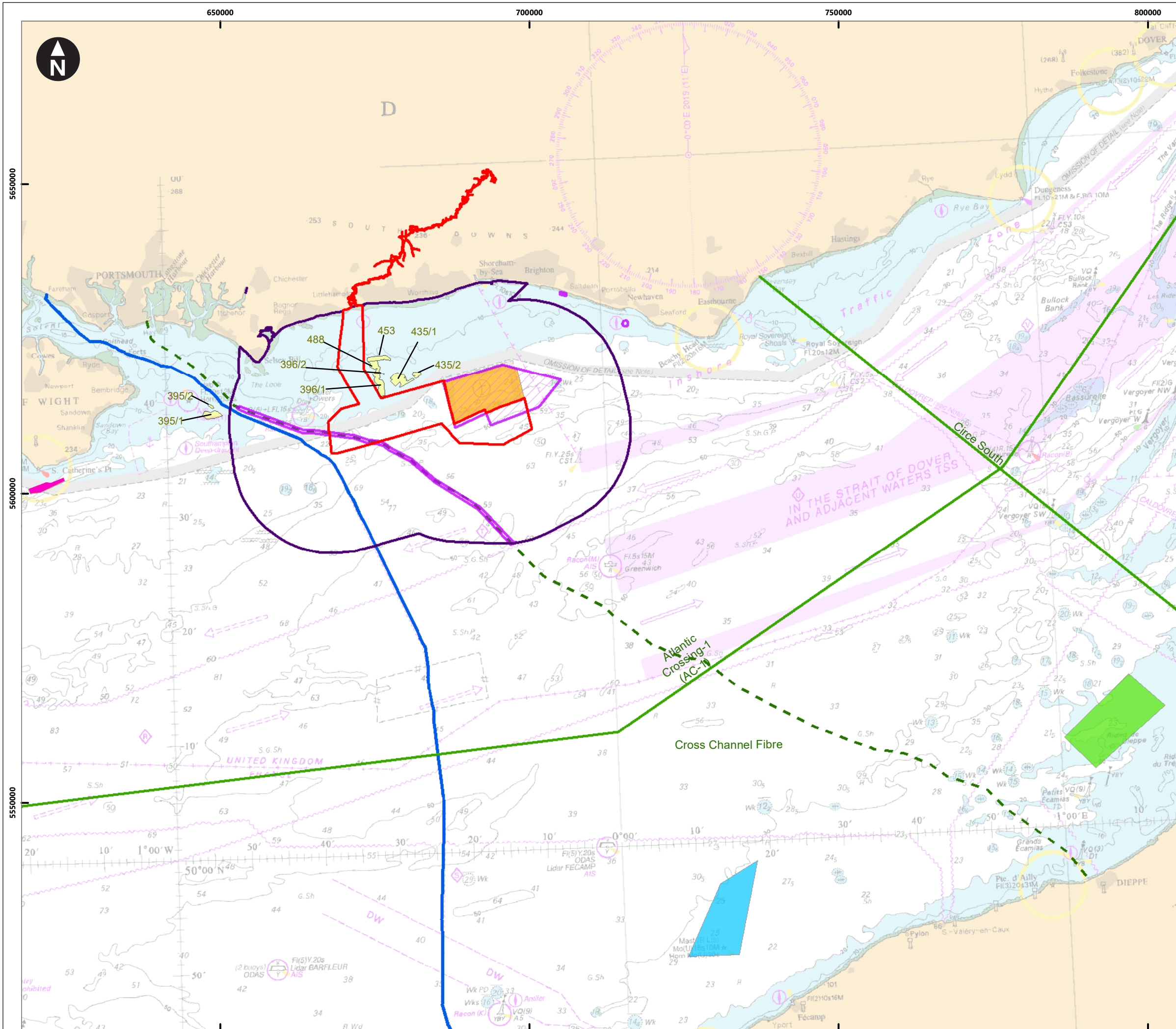


0 1 2 4 6 8  
Kilometres  
1:250,000  
WGS 1984 UTM Zone 30N Transverse Mercator

Rampion Extension Development

**Rampion 2 Offshore Wind Farm**  
 Figure 8.24 Rampion 2 Level 5 benthic predictive habitat map  
 Environmental Statement

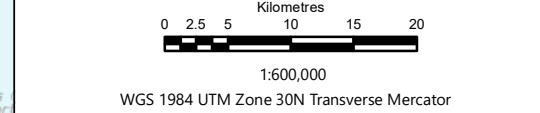
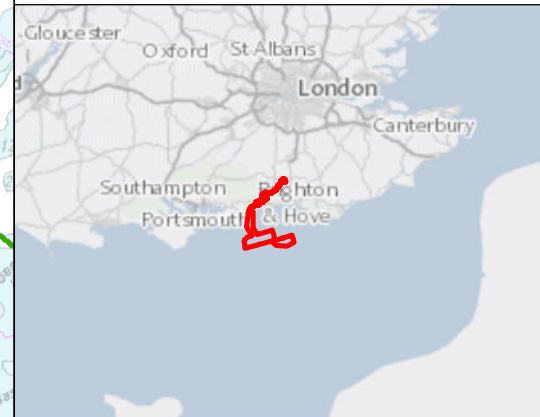
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Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH
Drawn Date: 05/06/2023	Status: FINAL	



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**Key**

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Tidal Sites Agreements
- Open disposal site
- Dieppe - Le Treport wind farm
- Fecamp wind farm
- Rampion wind farm
- Cable
- Proposed Aquind cable
- Planned IFA-2 cable
- Tidal Energy Centre
- Aggregate license area



Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 8.25 Projects screened into the cumulative assessment

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-6164		Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH
Drawn Date: 19/07/2023	Status: FINAL	