

Outer Dowsing Offshore Wind

Environmental Statement

Chapter 10 Fish and Shellfish Ecology

Volume 2 Figures

Part 1 of 2

Date: March 2024

Document Reference: 6.2.10

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

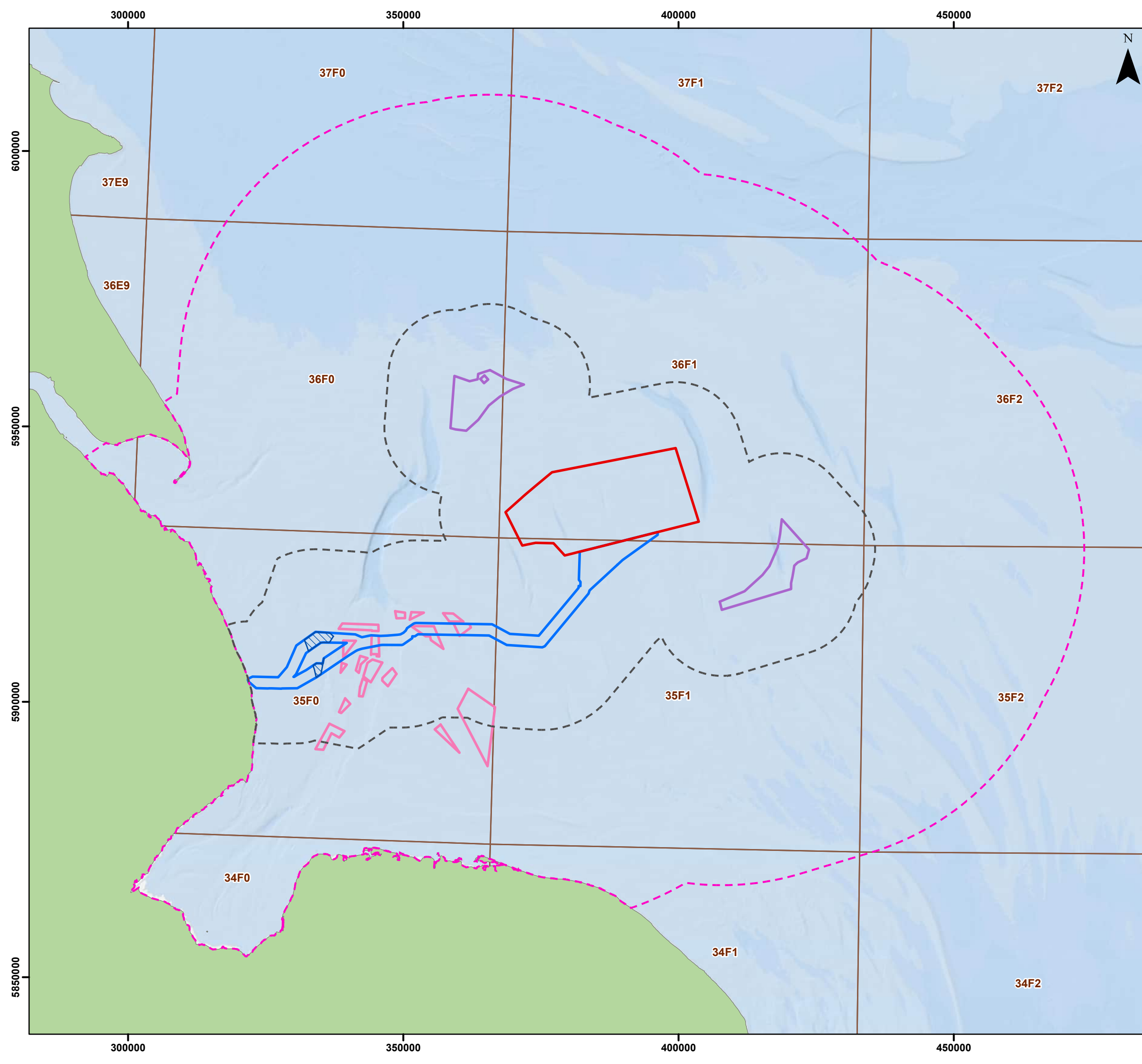
Rev: 1.0

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Project:	Whole Wind Farm	Sub Project/Package:	Whole Asset			
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Rev 1.0	March 2024	DCO Application	GoBe	GoBe	Shepherd and Wedderburn	ODOW

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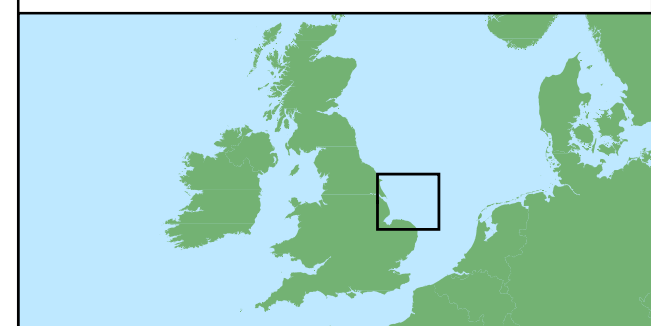
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- Figure 10.2 Spawning Grounds 1998 2010 (Document Reference: 6.2.10.2)
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- Figure 10.4 Spawning Grounds 1998 2010 (Document Reference: 6.2.10.4)
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- Figure 10.6 Spawning Grounds 1998 2010 (Document Reference: 6.2.10.6)
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Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- ICES Rectangles



Coordinate System: WGS 1984 UTM Zone 31N
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 Scale: 1:650,000 A3 Page Size

Environmental Statement
 Fish and Shellfish Ecology Study Area
 Figure 10.1



OUTER DOWSING
OFFSHORE WIND

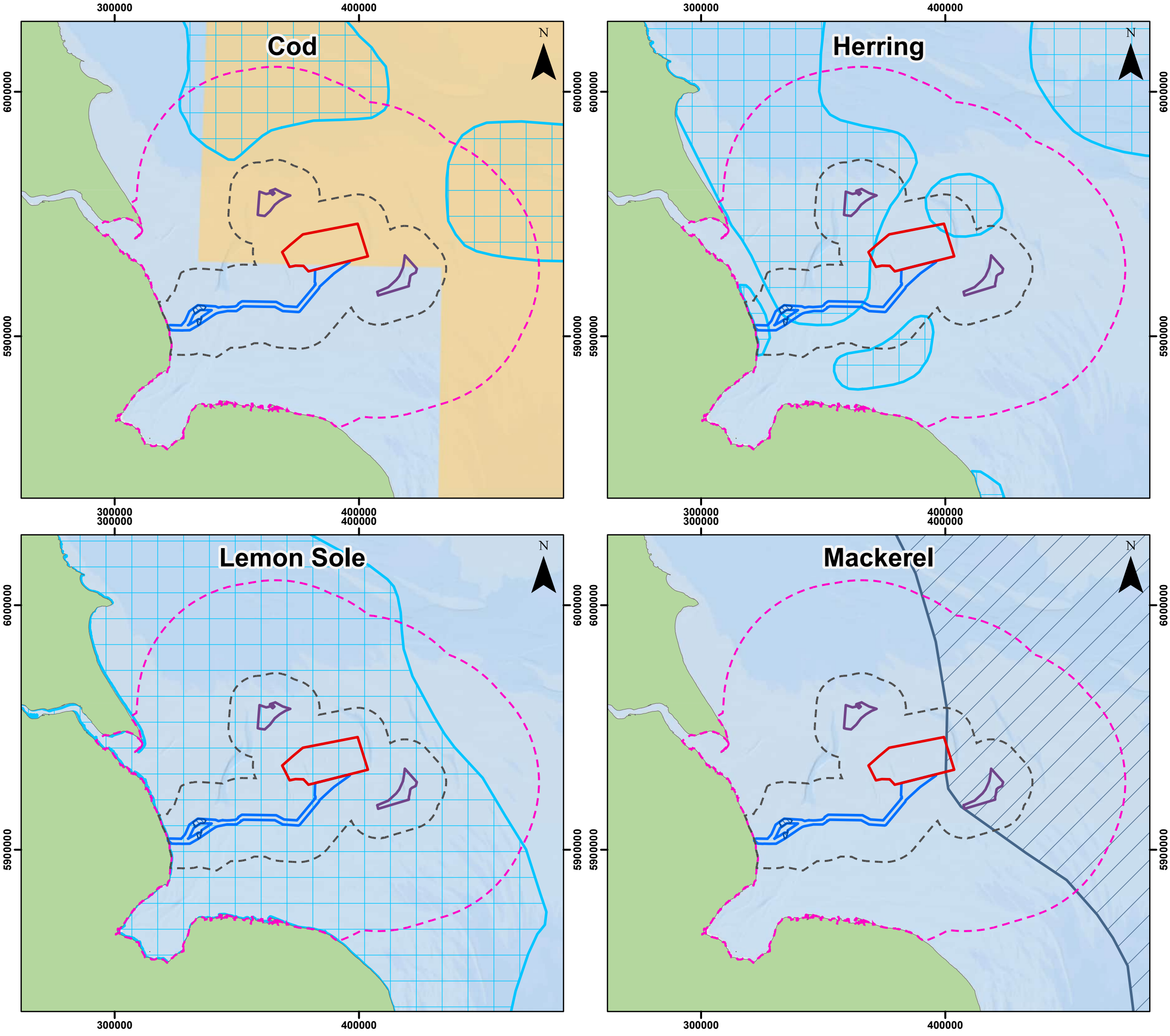


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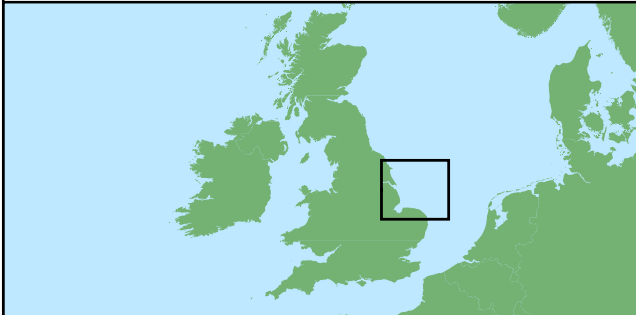
- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

Spawning Grounds (Coull *et al.*, 1998) - Intensity

- Higher
- Lower
- Undetermined

Spawning Grounds (Ellis *et al.*, 2012) - Intensity

- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N

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Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Spawning Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

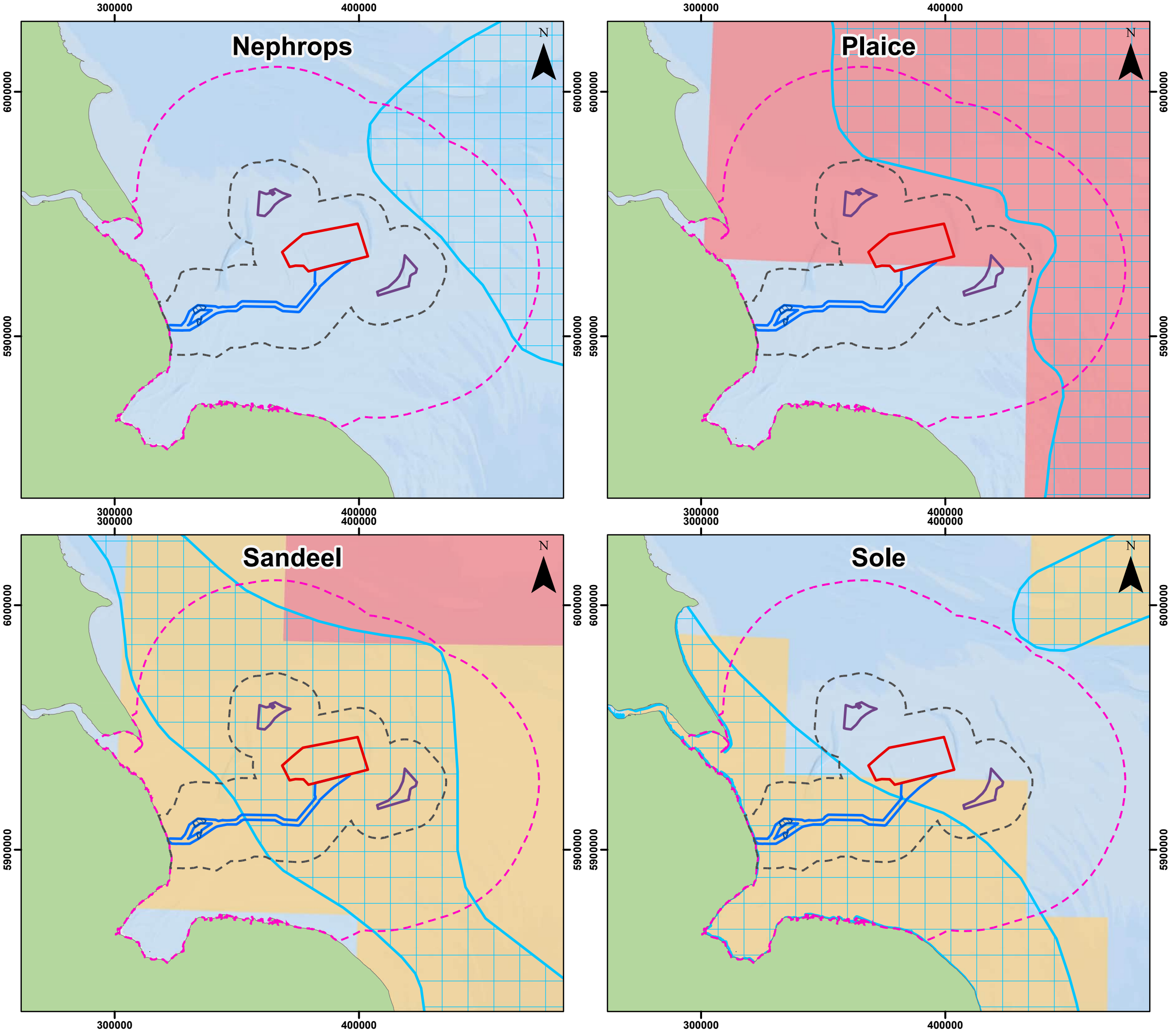
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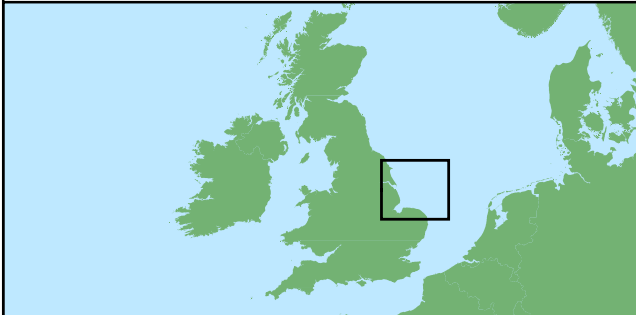
- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

Spawning Grounds (Coull *et al.*, 1998) - Intensity

- Higher
- Lower
- Undetermined

Spawning Grounds (Ellis *et al.*, 2012) - Intensity

- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

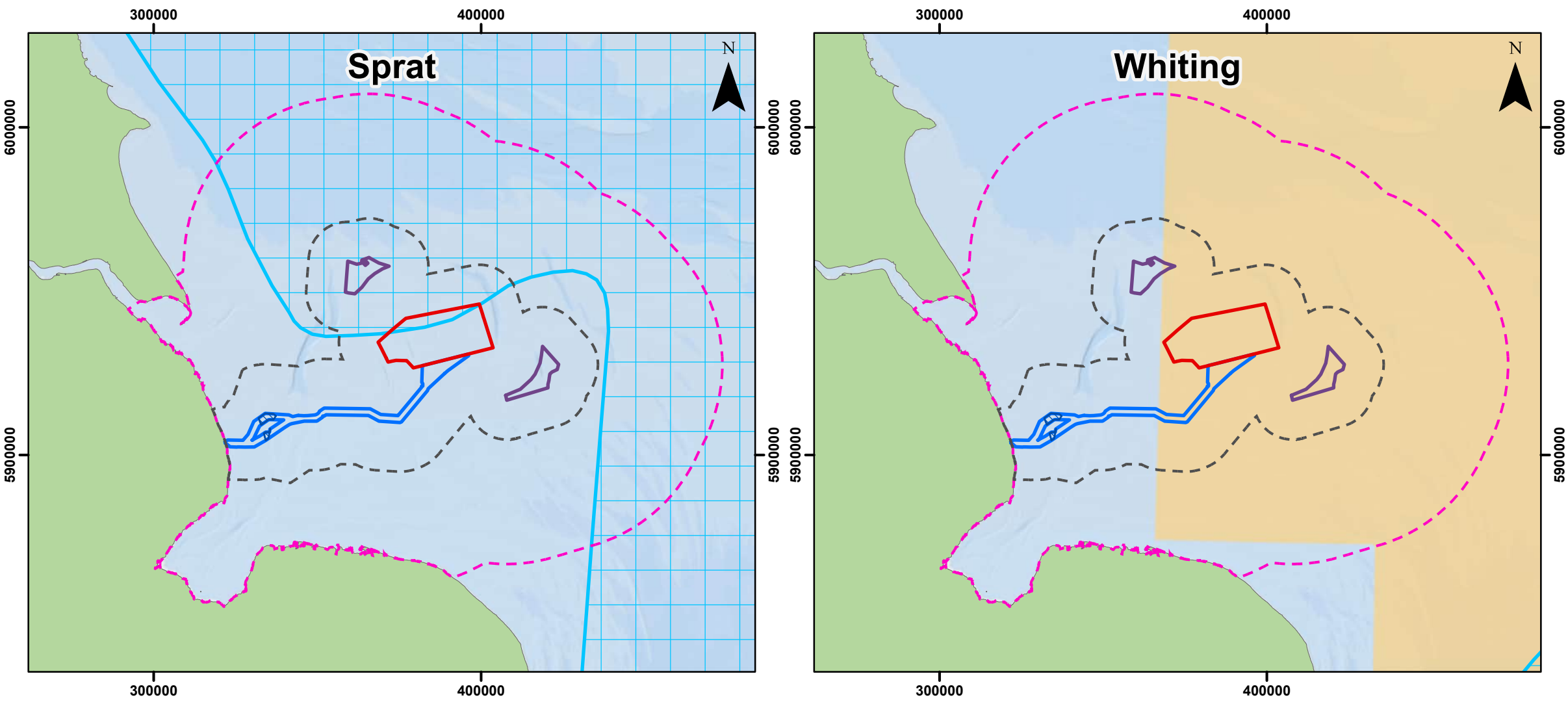
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Environmental Statement

Spawning Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

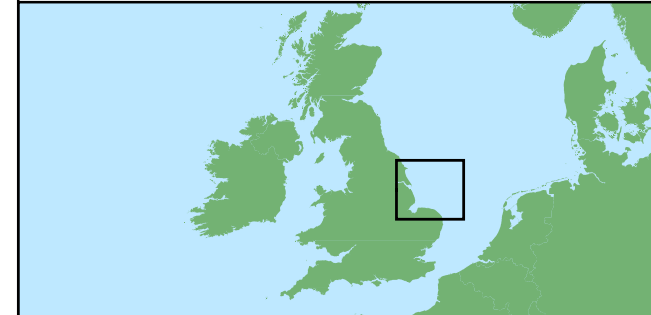
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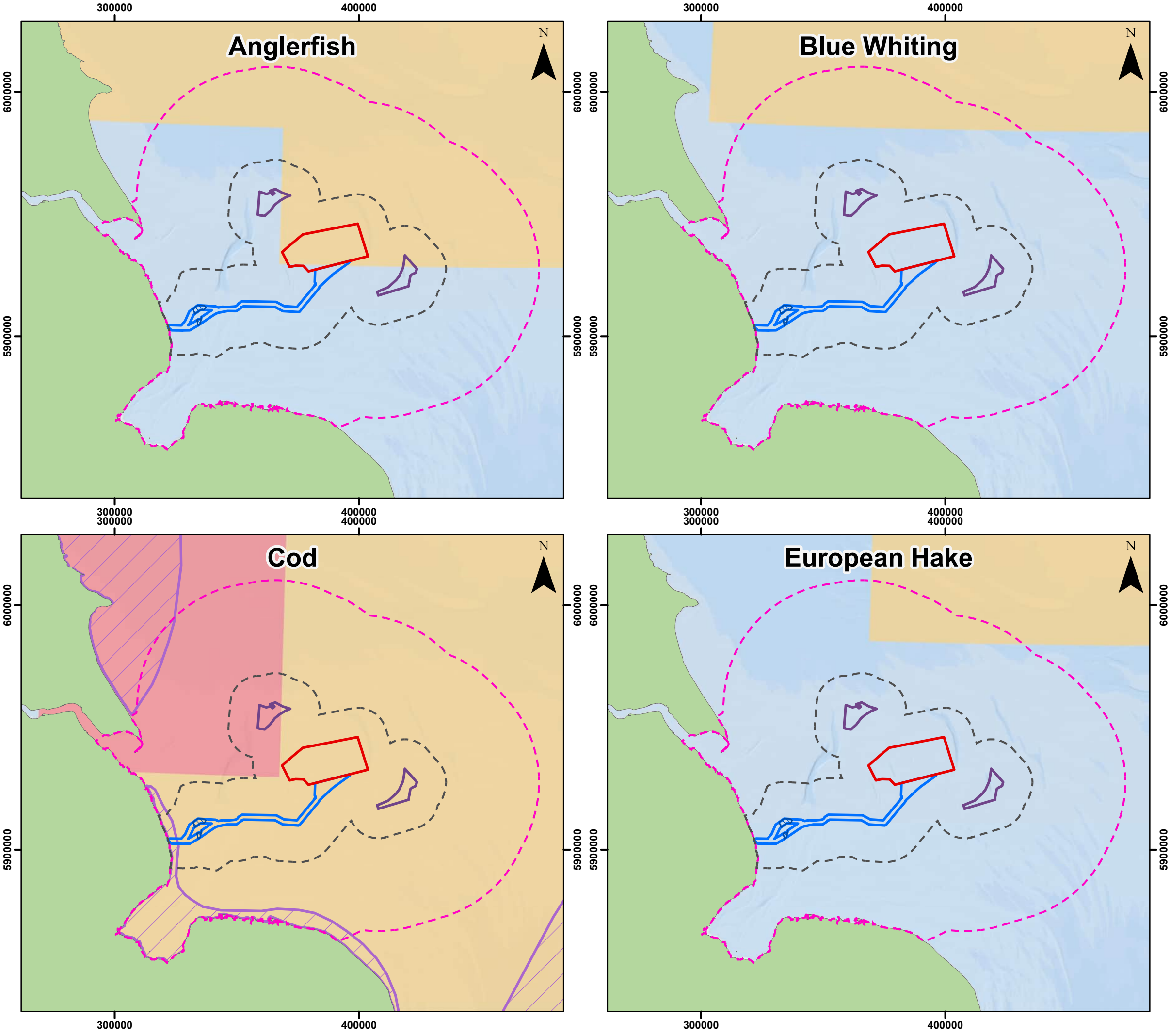
- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Spawning Grounds (Coull *et al.*, 1998) - Intensity**
- Higher
- Lower
- Undetermined
- Spawning Grounds (Ellis *et al.*, 2012) - Intensity**
- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N
0 50 100 km
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Environmental Statement
Spawning Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)
Figure 10.4



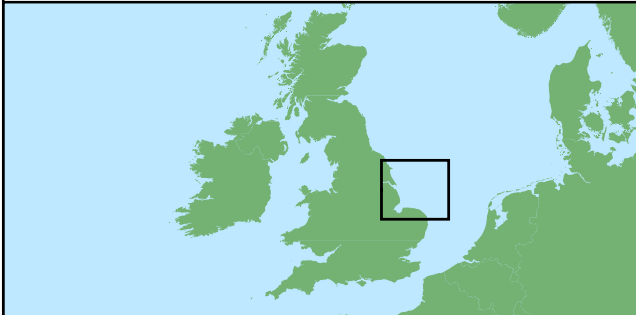


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Nursery Grounds (Coull *et al.*, 1998)
- Higher
- Lower

Nursery Grounds (Ellis *et al.*, 2012) - Intensity

- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Nursery Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

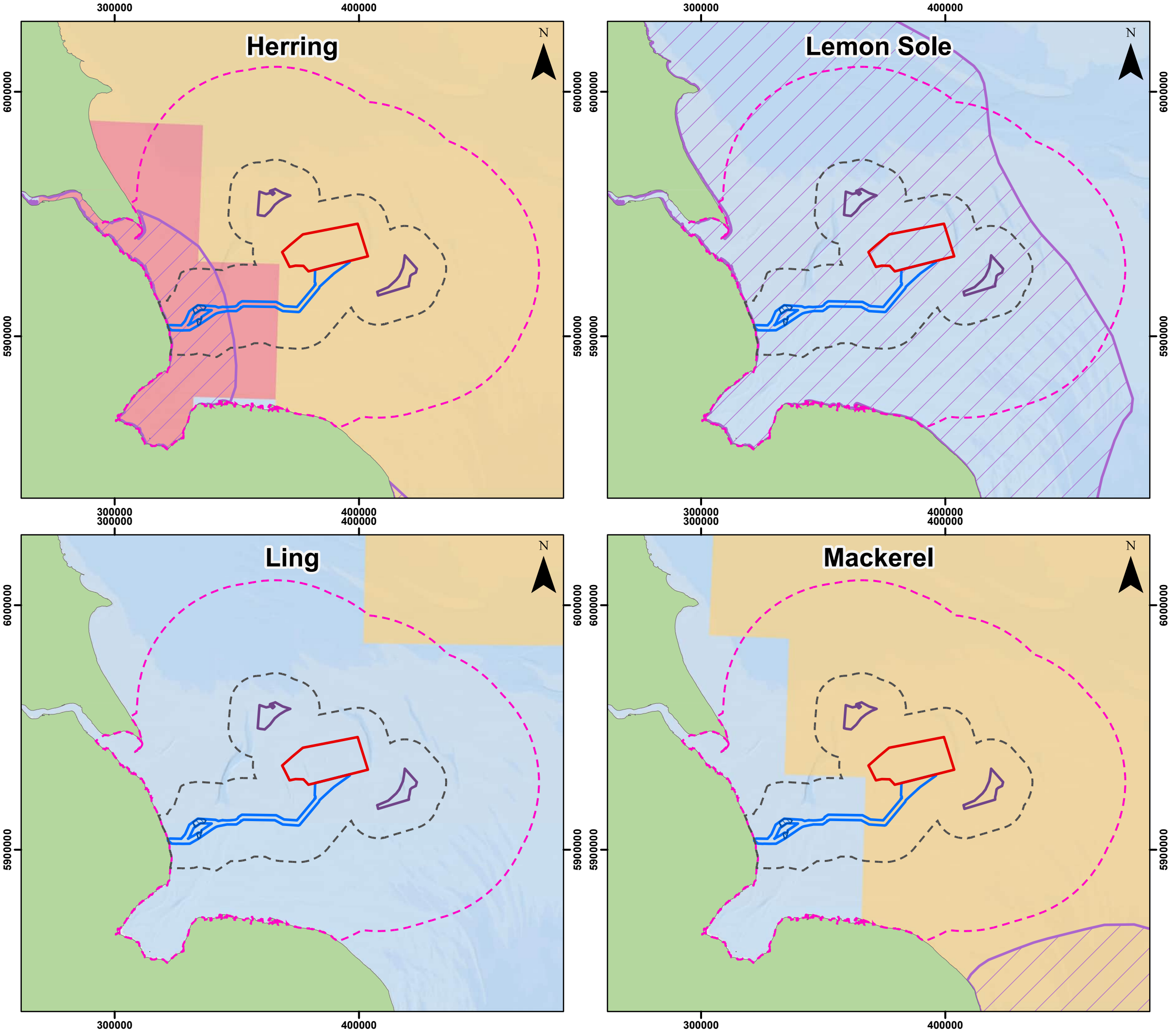
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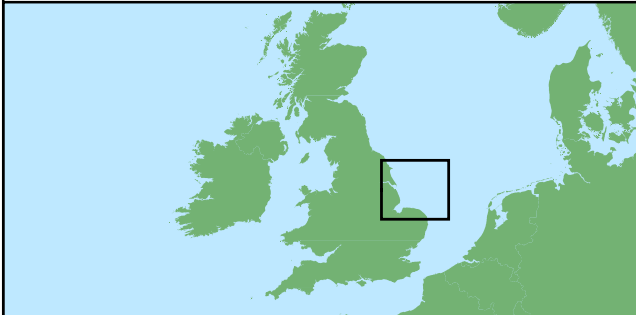


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Nursery Grounds (Coull *et al.*, 1998)

Nursery Grounds (Ellis *et al.*, 2012) - Intensity

- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Nursery Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

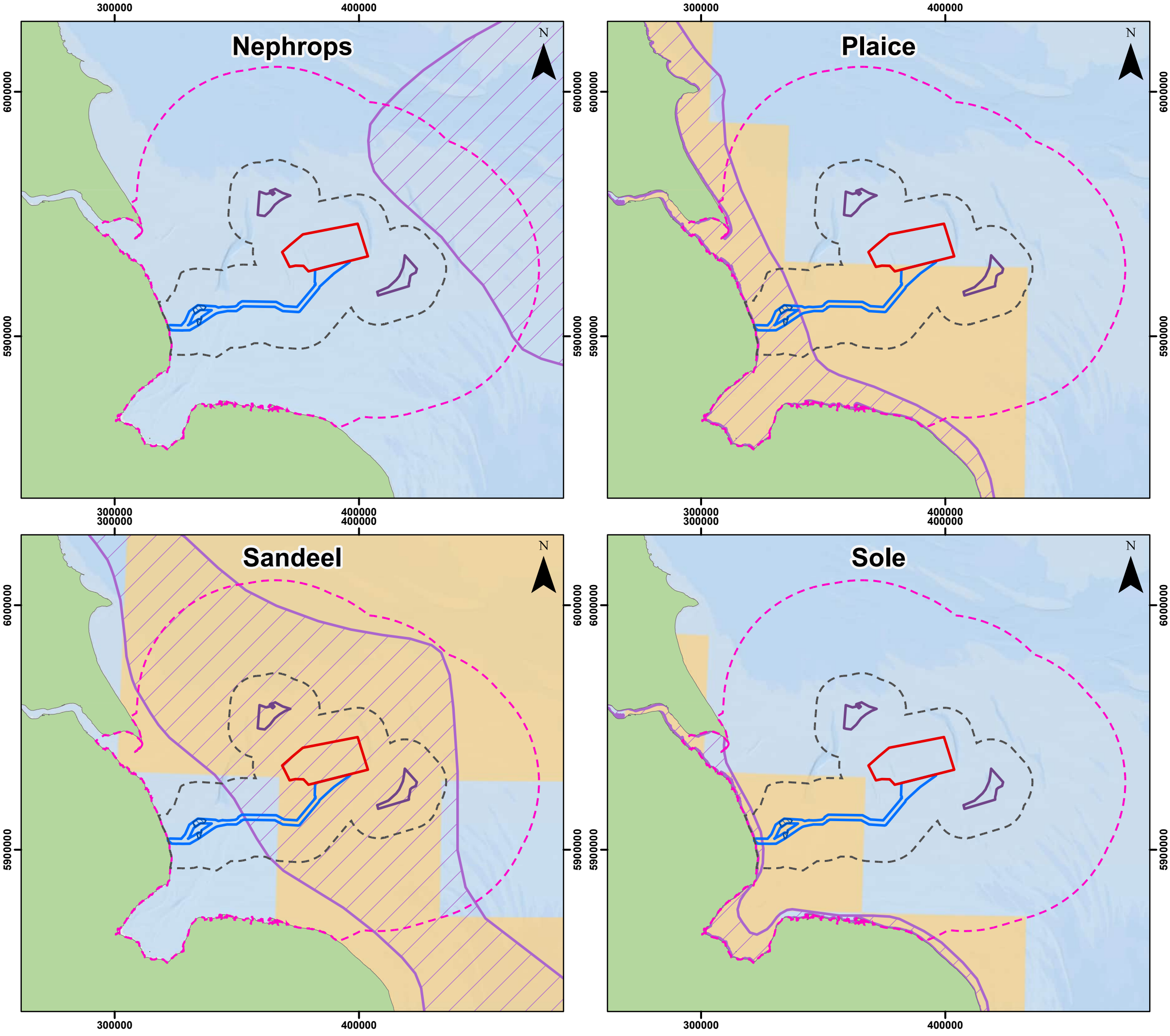
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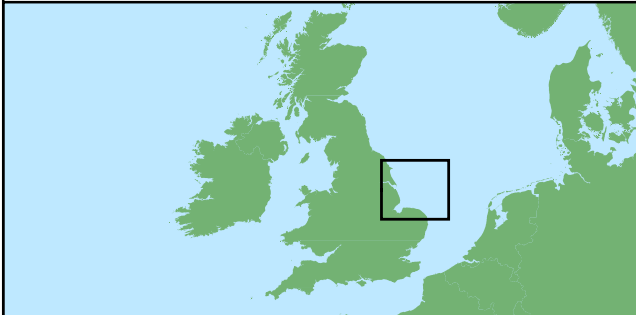


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Nursery Grounds (Coull *et al.*, 1998)

Nursery Grounds (Ellis *et al.*, 2012) - Intensity

- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Nursery Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

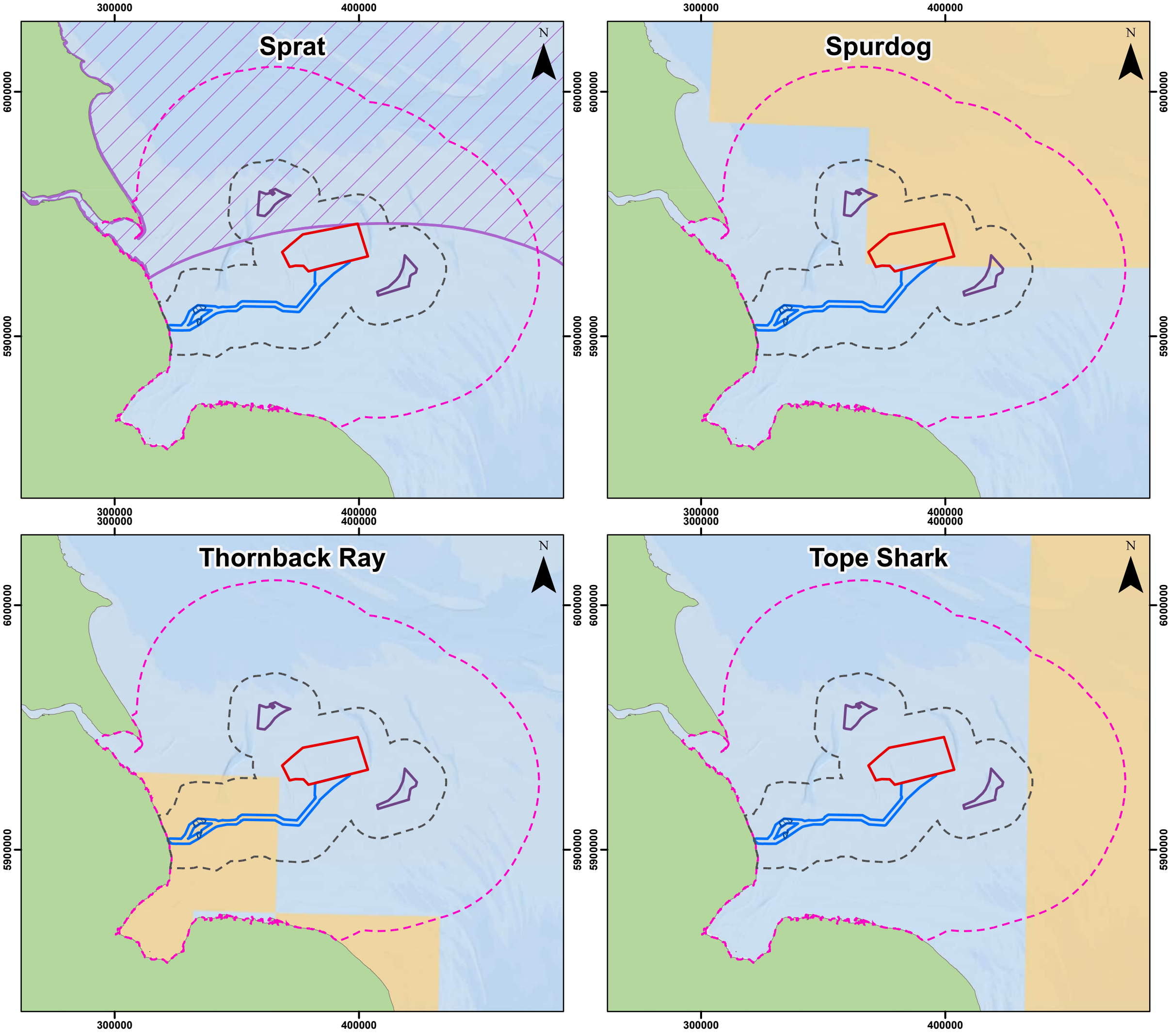
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OUTER DOWSING OFFSHORE WIND

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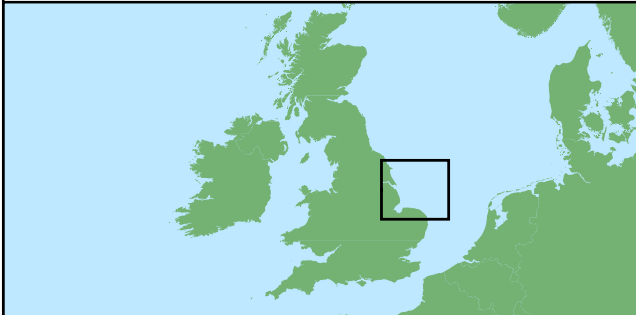


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Nursery Grounds (Coull *et al.*, 1998)

Nursery Grounds (Ellis *et al.*, 2012) - Intensity

- Higher
- Lower



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Nursery Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

Figure 10.8

OUTER DOWSING OFFSHORE WIND

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300000










400000

500000



Whiting

Legend

-  Array Area
-  Offshore Export Cable Corridor
-  ORCP Area
-  Artificial Nesting Structure Area
-  Secondary Zone of Influence
-  Underwater Noise Impacts 50km Buffer
-  Nursery Grounds (Coull *et al.*, 1998)
- Nursery Grounds (Ellis *et al.*, 2012) - Intensity**
-  Higher
-  Lower

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000009

5900000

000065

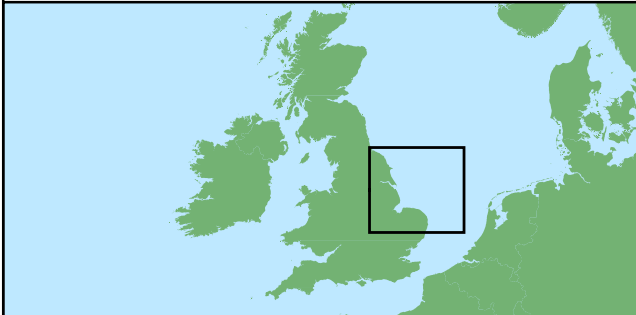
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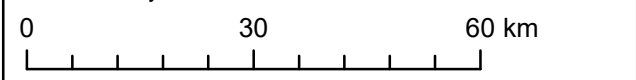
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Coordinate System: WGS 1984 UTM Zone 31N



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Environmental Statement

Nursery Grounds Relative to the Project
(Coull *et al.*, 1998; Ellis *et al.*, 2012)

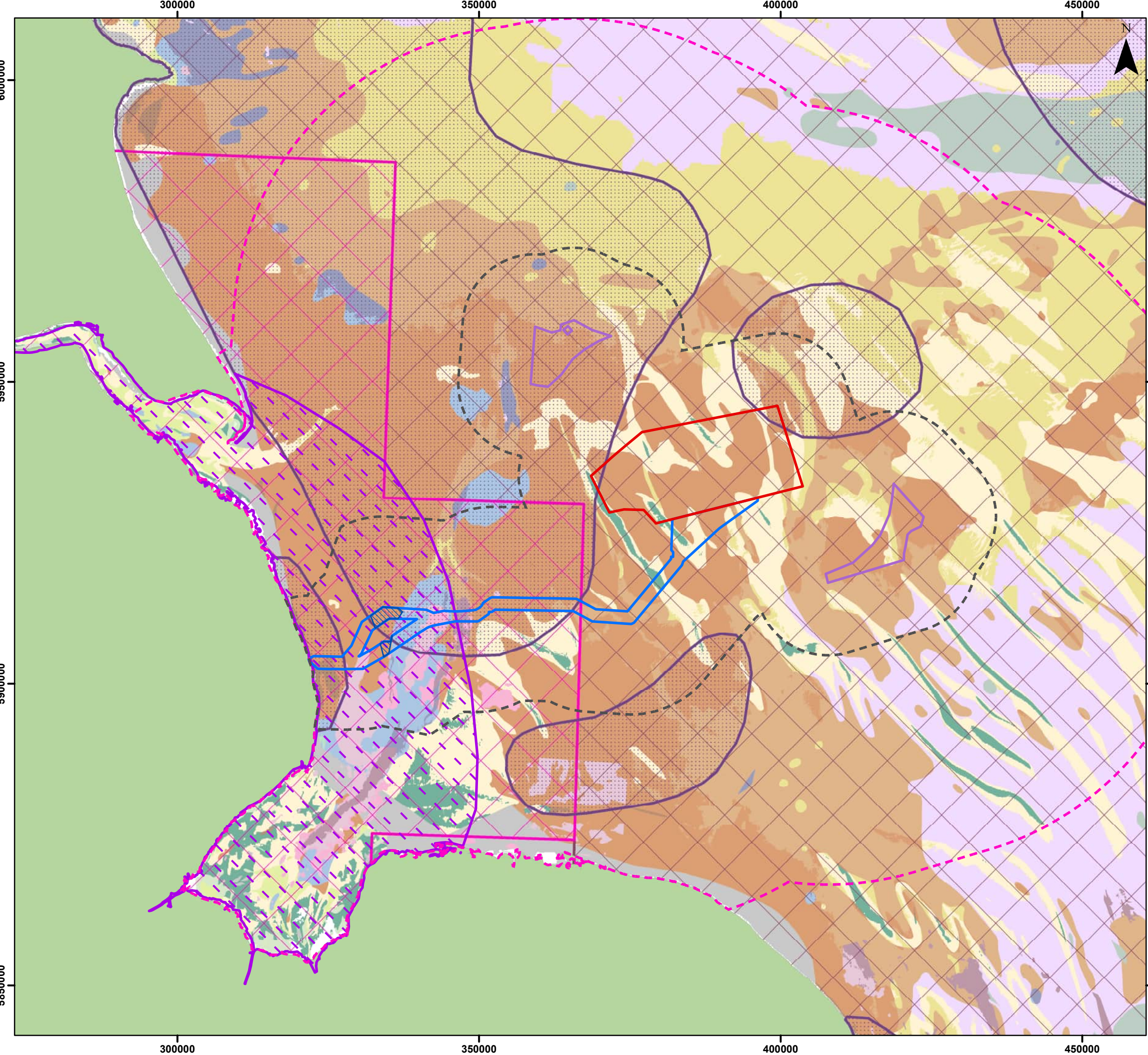
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Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Herring Nursery Grounds (Coull et al., 1998)
- Herring Spawning Grounds (Coull et al., 1998)
- Herring Nursery Grounds - High Intensity (Ellis et al., 2010)
- Herring Nursery Grounds - Low Intensity (Ellis et al., 2010)

EUSeaMap 2021 (EMODnet, 2021)

- A3.1: Atlantic and Mediterranean high energy infralittoral rock
- A3.2: Atlantic and Mediterranean moderate energy infralittoral rock
- A4.1: Atlantic and Mediterranean high energy circalittoral rock
- A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
- A4.27: Faunal communities on deep moderate energy circalittoral rock
- A5.13: Infralittoral coarse sediment
- A5.14: Circalittoral coarse sediment
- A5.15: Deep circalittoral coarse sediment
- A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand
- A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand
- A5.27: Deep circalittoral sand
- A5.33: Infralittoral sandy mud
- A5.34: Infralittoral fine mud
- A5.35: Circalittoral sandy mud
- A5.36: Circalittoral fine mud
- A5.37: Deep circalittoral mud
- A5.43: Infralittoral mixed sediments
- A5.44: Circalittoral mixed sediments
- A5.45: Deep circalittoral mixed sediments
- A5.6: Sublittoral biogenic reefs
- A5.61: Sublittoral polychaete worm reefs on sediment
- A5.611: [Sabellaria spinulosa] on stable circalittoral mixed sediment
- No EUNIS habitat assigned

Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km



Scale: 1:600,000

A3 Page Size

Environmental Statement

Herring Spawning and Nursery Grounds with EUSeaMap 2021 Relative to the Project

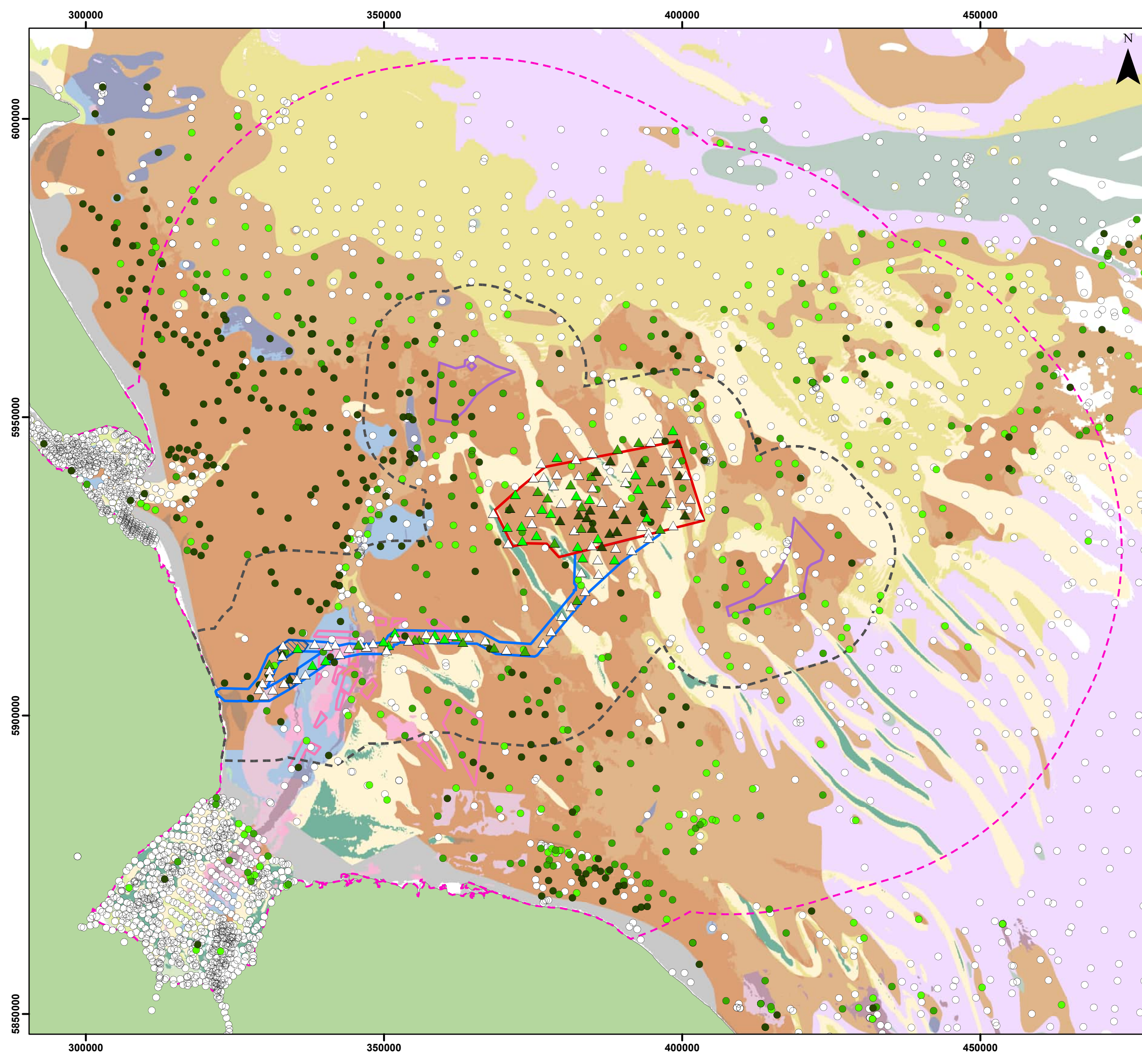
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Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

EUSeaMap 2021 (EMODnet, 2021)

- A3.1: Atlantic and Mediterranean high energy infralittoral rock
- A3.2: Atlantic and Mediterranean moderate energy infralittoral rock
- A4.1: Atlantic and Mediterranean high energy circalittoral rock
- A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
- A4.27: Faunal communities on deep moderate energy circalittoral rock
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- A5.33: Infralittoral sandy mud
- A5.34: Infralittoral fine mud
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- A5.36: Circalittoral fine mud
- A5.37: Deep circalittoral mud
- A5.43: Infralittoral mixed sediments
- A5.44: Circalittoral mixed sediments
- A5.45: Deep circalittoral mixed sediments
- A5.6: Sublittoral biogenic reefs
- A5.61: Sublittoral polychaete worm reefs on sediment
- A5.611: [Sabellaria spinulosa] on stable circalittoral mixed sediment
- No EUNIS habitat assigned

Herring Habitat Suitability (Reach et al., 2013)

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

Data Source:

- BGS, 2015
- Outer Dowsing, 2022

Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:600,000

A3 Page Size

Environmental Statement

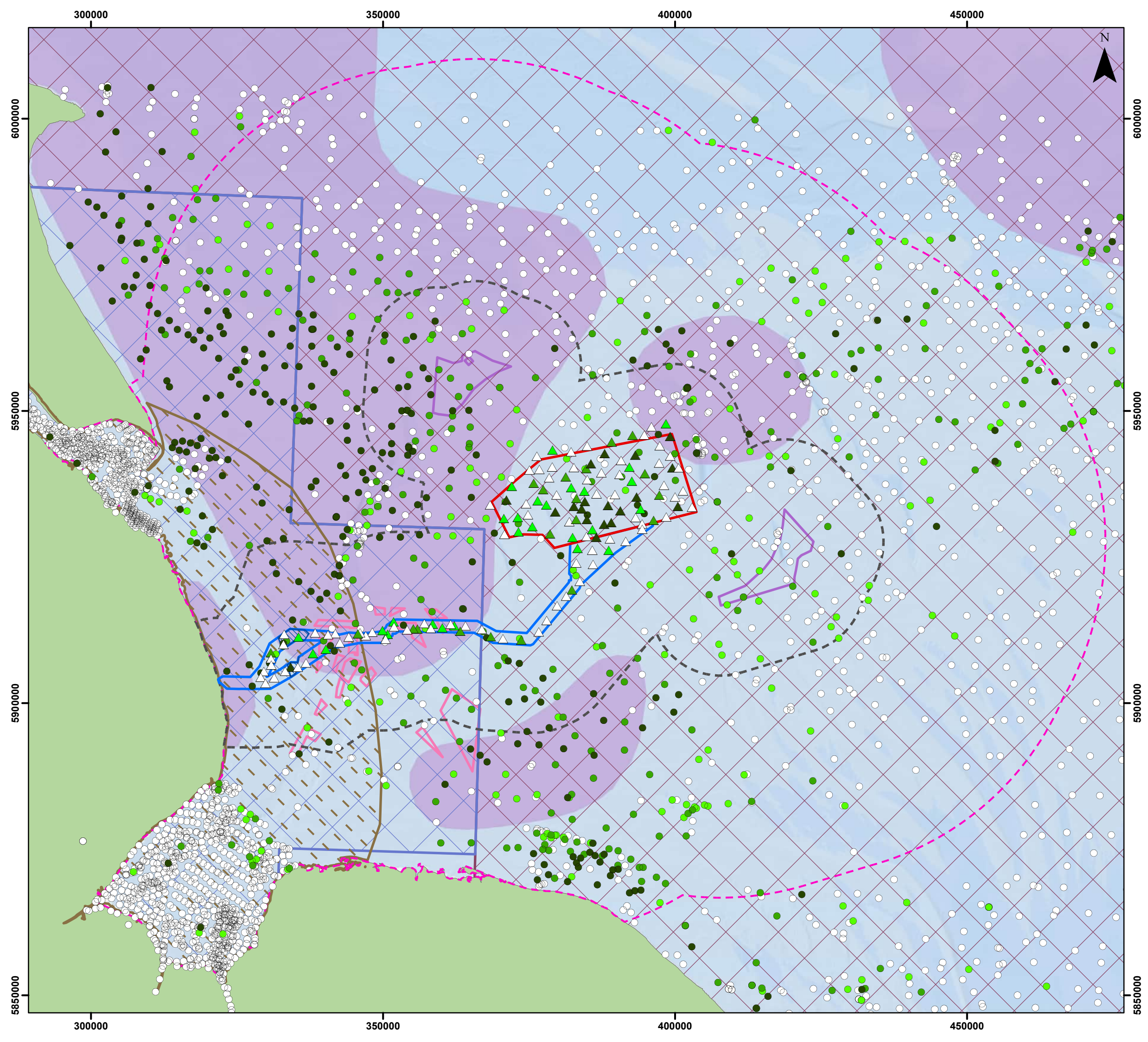
Herring Habitat Suitability Data with EUSeaMap 2021 Relative to the Project

Figure 10.11

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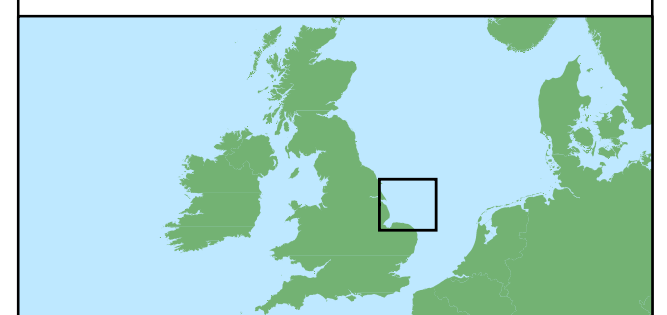
- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Herring Nursery Grounds (Coull et al., 1998)
- Herring Spawning Grounds (Coull et al., 1998)
- Herring Nursery Grounds - High Intensity (Ellis et al., 2012)
- Herring Nursery Grounds - Low Intensity (Ellis et al., 2012)

Herring Habitat Suitability (Reach et al., 2013)

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

Data Source:

- BGS, 2015
- Outer Dowsing, 2022



Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:600,000

A3 Page Size

Environmental Statement

Herring Spawning and Nursery Grounds with BGS and Site Specific Data Relative to the Project

Figure 10.12



OUTER DOWSING
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350000

400000



- Legend**
- Array Area
 - Offshore Export Cable Corridor
 - ORCP Area
 - Artificial Nesting Structure Area
 - Biogenic Reef Restoration Area
 - Secondary Zone of Influence
- Herring Habitat Suitability (Reach et al., 2013)**
- ▲ Prime, Preferred
 - ▲ Sub-Prime, Preferred
 - ▲ Suitable, Marginal
 - △ Unsuitable

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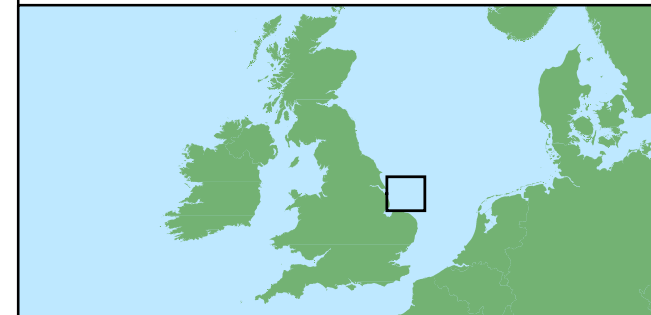
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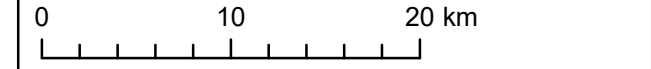
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Environmental Statement

Herring Habitat Suitability Site Specific Data

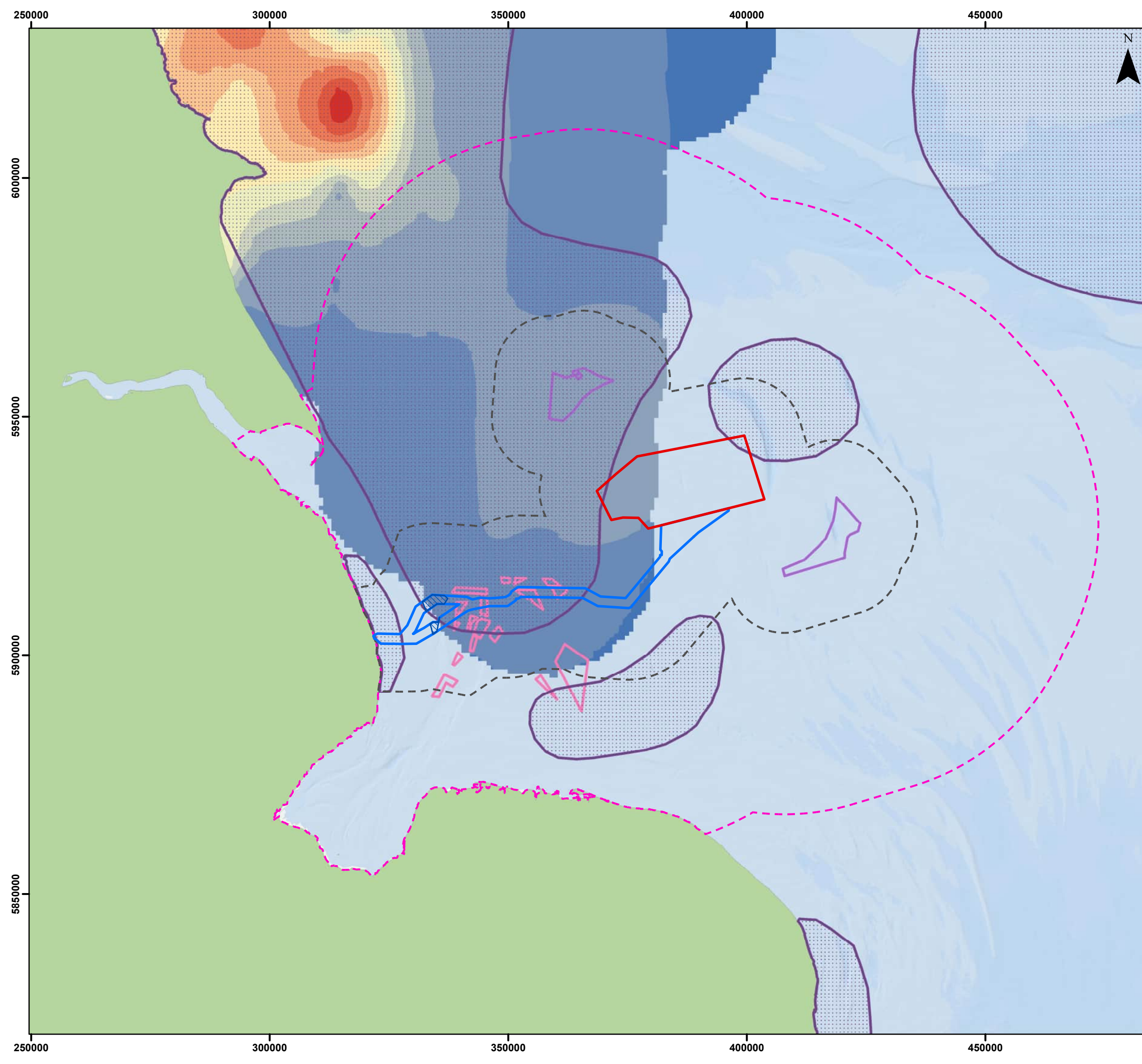
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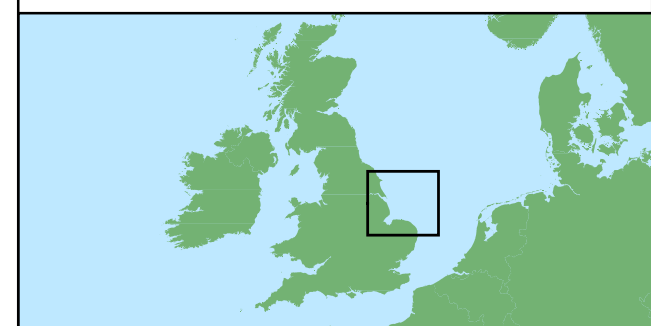
- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

Spawning Grounds (Coull et al., 1998)
(Species, Intensity)

- Herring, Undetermined

IHLS 2009/2010-2020/2021 Banks Data - Total Larval Abundance Per m²

- 0
- 0.1 - 1,500
- 1,500.1 - 6,000
- 6,000.1 - 12,750
- 12,750.1 - 20,500
- 20,500.1 - 28,500
- 28,500.1 - 36,500
- 36,500.1 - 44,500
- 44,500.1 - 53,000
- 53,000.1 - 63,000
- 63,000.1 - 74,250
- 74,250.1 - 93,250



Coordinate System: WGS 1984 UTM Zone 31N

0 25 50 km

Scale: 1:750,000 A3 Page Size

Environmental Statement

Herring Spawning Grounds
IHLS Comparison

Figure 10.14

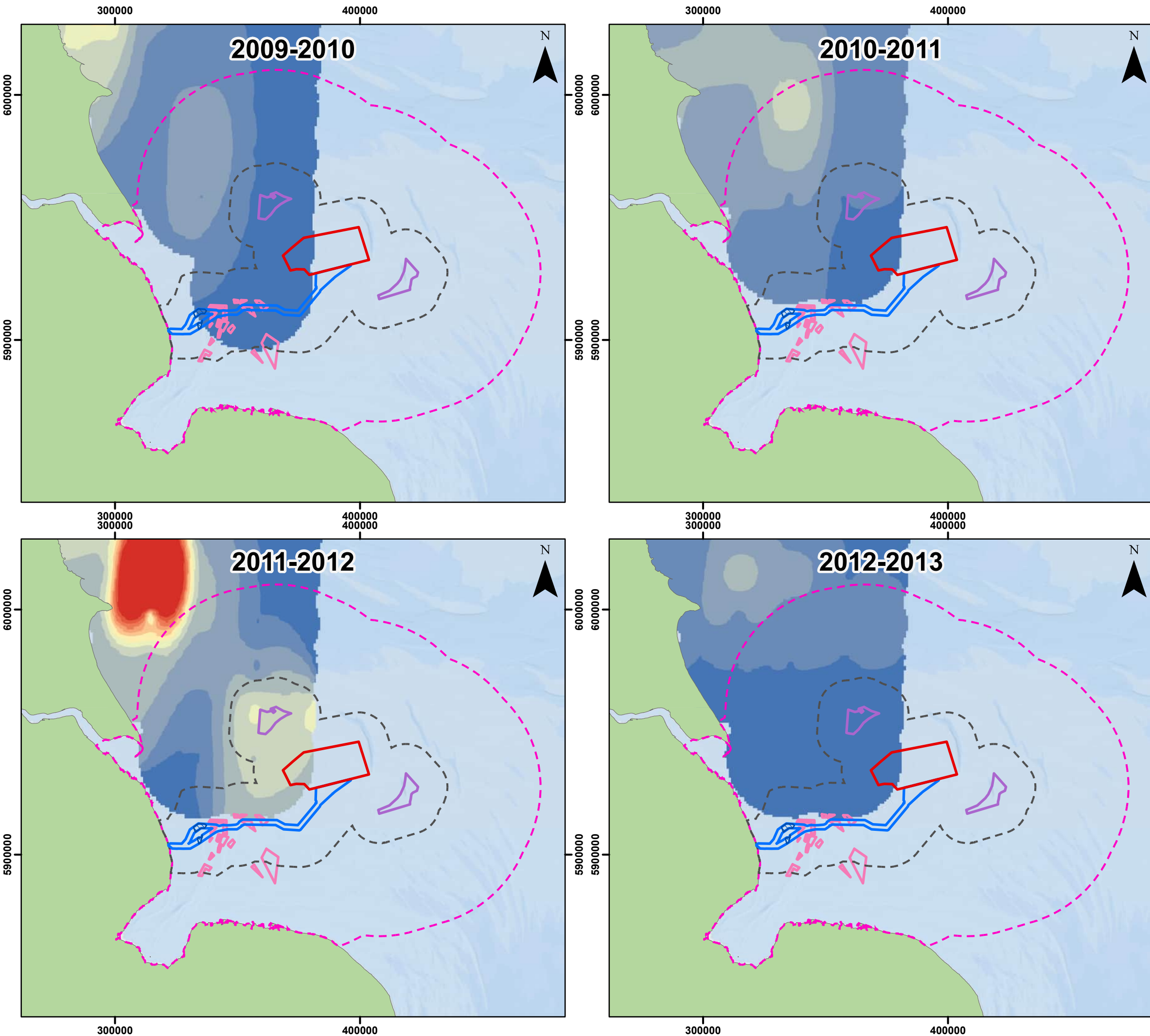
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Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

IHLs Banks Data - Larval Abundance Per m²

	0
	0.1 - 150
	150.1 - 600
	600.1 - 1,275
	1,275.1 - 2,050
	2,050.1 - 2,850
	2,850.1 - 3,650
	3,650.1 - 4,450
	4,450.1 - 5,300
	5,300.1 - 6,300
	6,300.1 - 7,425
	7,425.1 - 9,325



Coordinate System: WGS 1984 UTM Zone 31N

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Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Outer Dowsing with Herring Spawning Grounds IHLs Comparison, 2009 – 2013

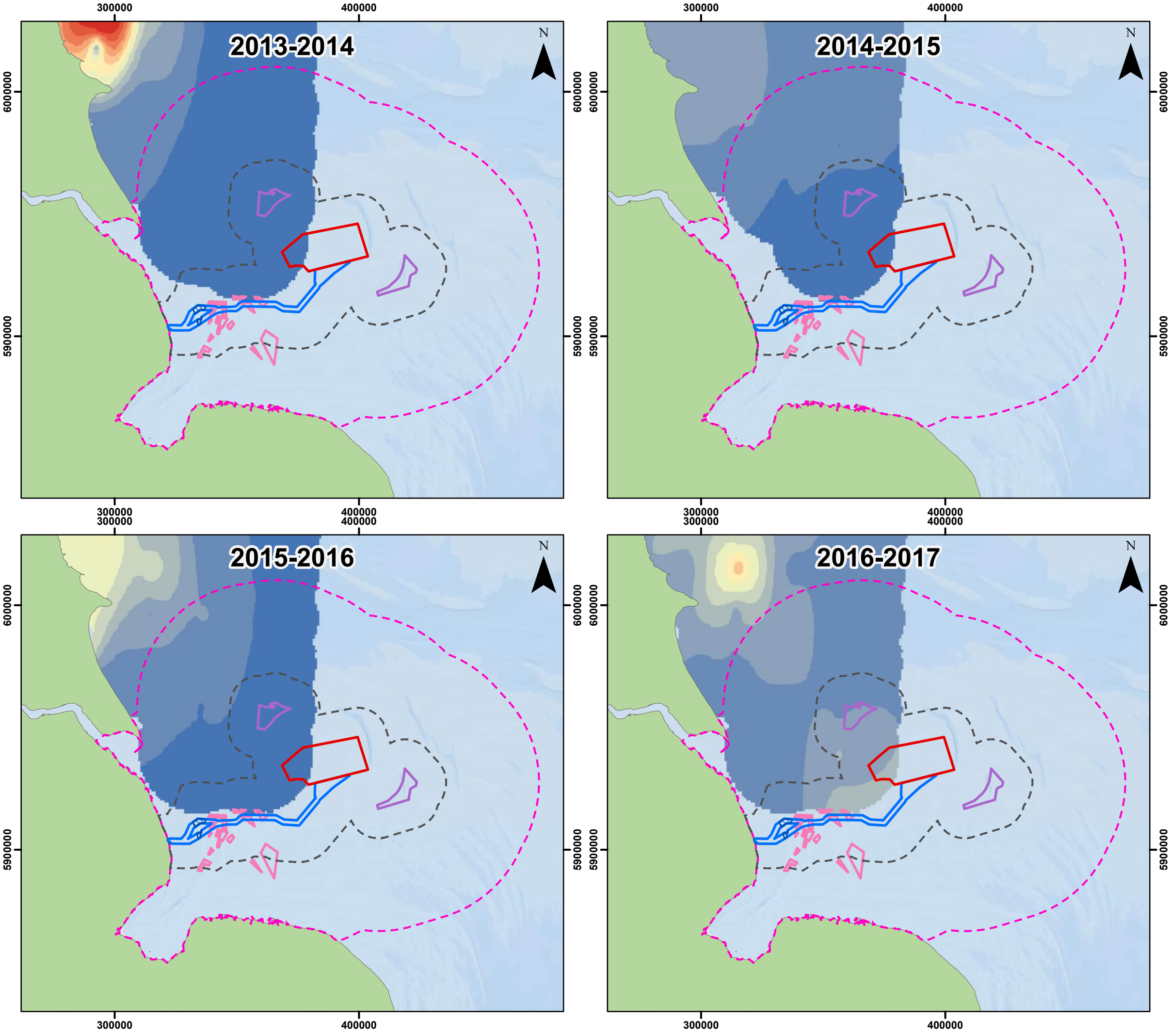
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Contains ESRI Basemapping; Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

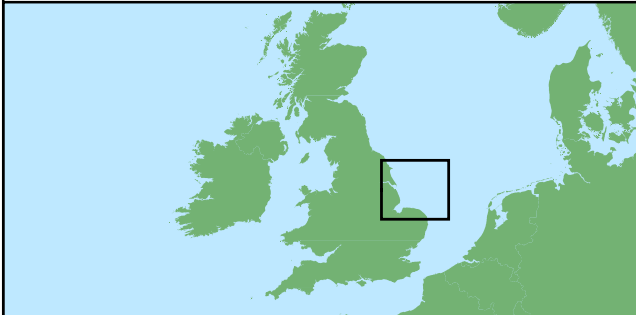


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

IHLS Banks Data - Larval Abundance Per m²

- 0
- 0.1 - 150
- 150.1 - 600
- 600.1 - 1,275
- 1,275.1 - 2,050
- 2,050.1 - 2,850
- 2,850.1 - 3,650
- 3,650.1 - 4,450
- 4,450.1 - 5,300
- 5,300.1 - 6,300
- 6,300.1 - 7,425
- 7,425.1 - 9,325



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

Scale: 1:1,500,000 A3 Page Size

Environmental Statement

Outer Dowsing with Herring Spawning Grounds IHLS Comparison, 2013 – 2017

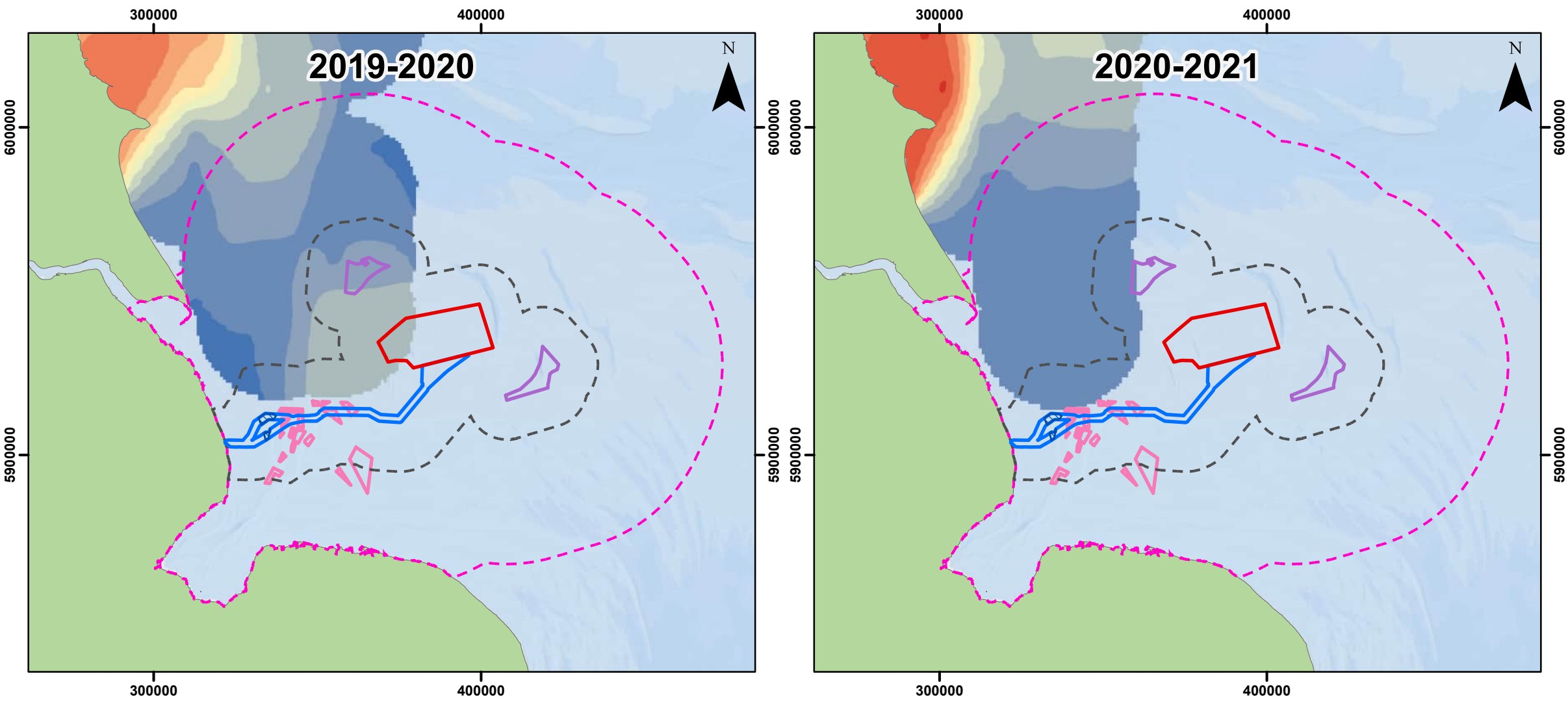
Figure 10.16

OUTER DOWSING
OFFSHORE WIND

Gobe

Date: 16/02/2024
Produced By: BPHB
Revision: 0.1

Contains ESRI Basemapping; Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

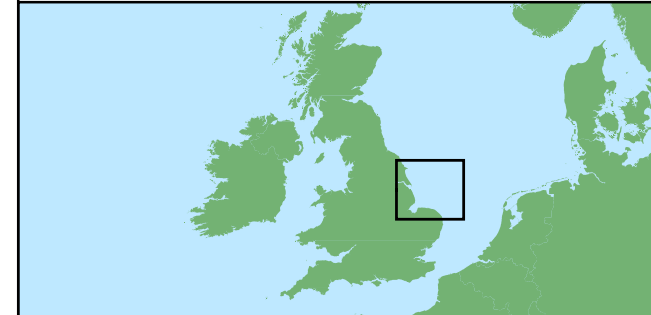


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

IHLS Banks Data - Larval Abundance Per m²

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150.1 - 600
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2,850.1 - 3,650
3,650.1 - 4,450
4,450.1 - 5,300
5,300.1 - 6,300
6,300.1 - 7,425
7,425.1 - 9,325



Coordinate System: WGS 1984 UTM Zone 31N

0 50 100 km

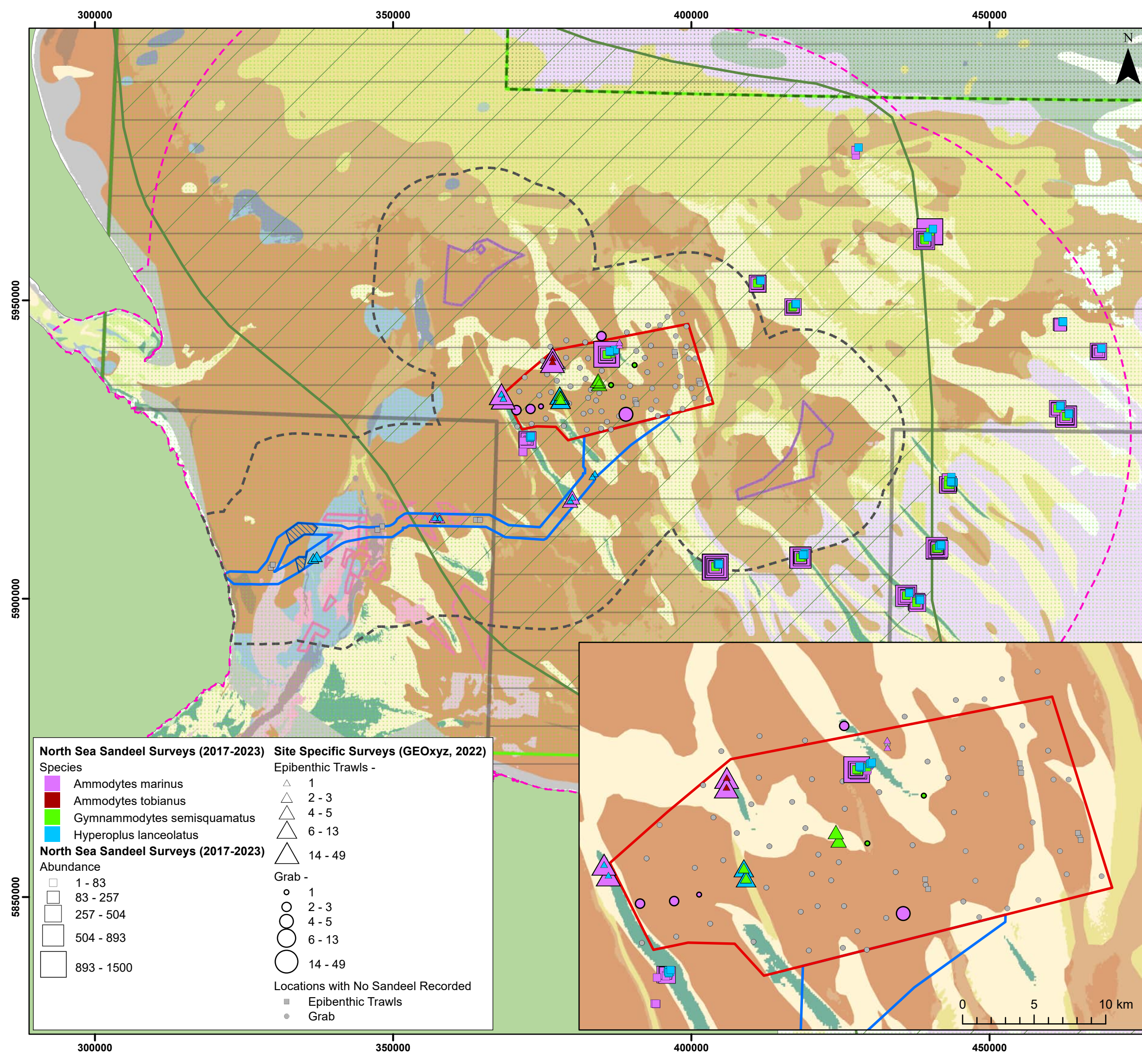
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Environmental Statement

Outer Dowsing with Herring Spawning Grounds IHLS Comparison, 2019 – 2021

Figure 10.17





Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Sandeel Nursery and Spawning Grounds (Coull et al., 1998)
- Sandeel, High Intensity (Ellis et al., 2012)
- Sandeel, How Intensity (Ellis et al., 2012)
- Sandeel Low Intensity Nursery Grounds (Ellis et al., 2012)

EUNIS Map 2021 (EMODnet, 2021)

- A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
- A4.27: Faunal communities on deep moderate energy circalittoral rock
- A5.13: Infralittoral coarse sediment
- A5.14: Circalittoral coarse sediment
- A5.15: Deep circalittoral coarse sediment
- A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand
- A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand
- A5.27: Deep circalittoral sand
- A5.33: Infralittoral sandy mud
- A5.34: Infralittoral fine mud
- A5.35: Circalittoral sandy mud
- A5.36: Circalittoral fine mud
- A5.37: Deep circalittoral mud
- A5.43: Infralittoral mixed sediments
- A5.44: Circalittoral mixed sediments
- A5.45: Deep circalittoral mixed sediments
- A5.6: Sublittoral biogenic reefs
- A5.61: Sublittoral polychaete worm reefs on sediment
- A5.611: [Sabellaria spinulosa] on stable circalittoral mixed sediment
- No EUNIS habitat assigned

North Sea Sandeel Surveys (2017-2023)

Species

- Ammodytes marinus
- Ammodytes tobianus
- Gymnammodytes semisquamatus
- Hyperoplus lanceolatus

Abundance

- 1 - 83
- 83 - 257
- 257 - 504
- 504 - 893
- 893 - 1500

Site Specific Surveys (GEOxyz, 2022)

Epibenthic Trawls -

- 1
- 2 - 3
- 4 - 5
- 6 - 13
- 14 - 49

Grab -

- 1
- 2 - 3
- 4 - 5
- 6 - 13
- 14 - 49

Locations with No Sandeel Recorded

- Epibenthic Trawls
- Grab

Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:600,000

A3 Page Size

Environmental Statement

Sandeel Spawning and Nursery Grounds with EUNIS Map 2021 Relative to the Project

Figure 10.18

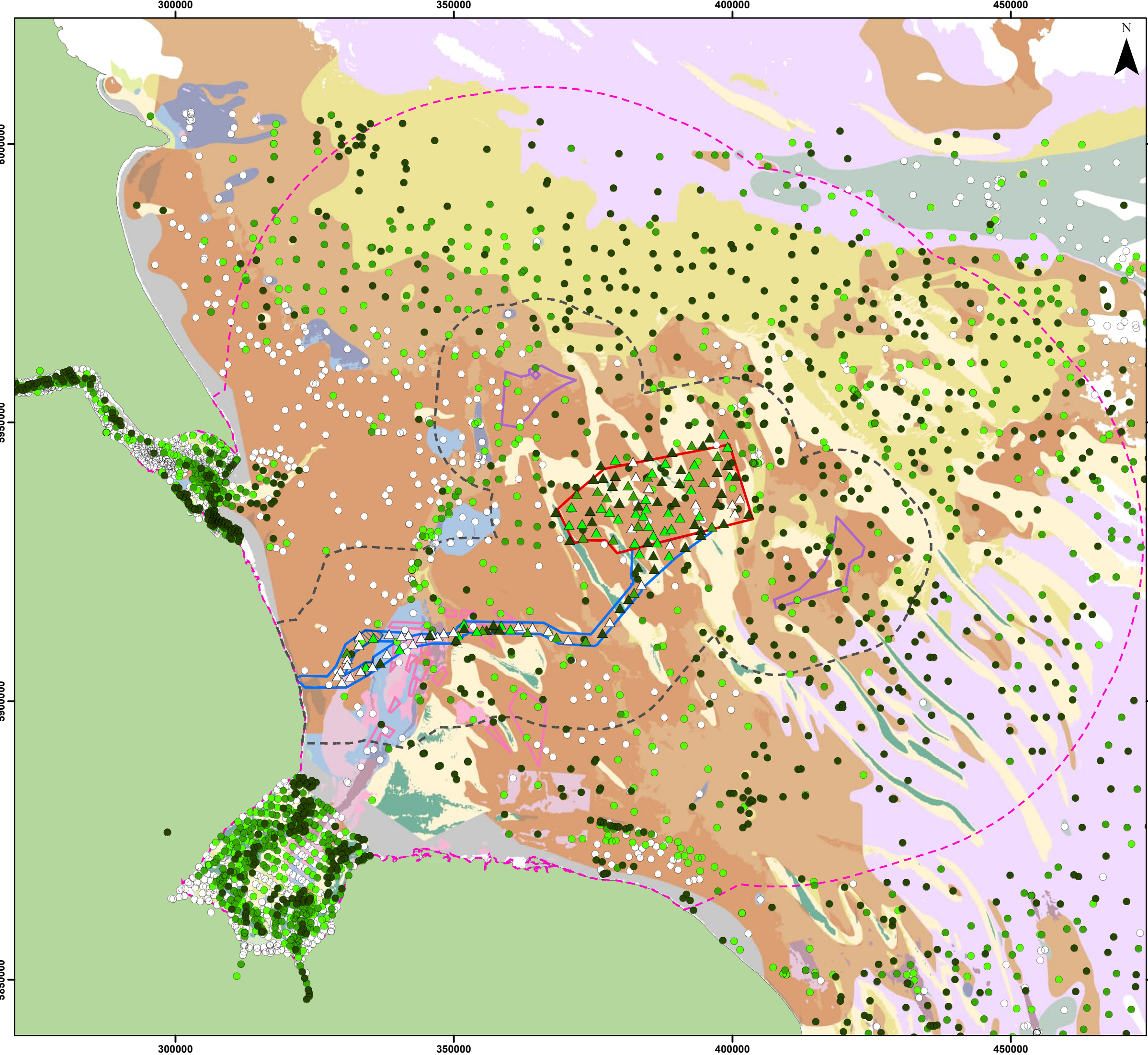


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Contains ESRI Basemapping;
 EMDnet 2020 bathymetry

Gobe

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Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure
- Biogenic Reef Restoration
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer

EUSeaMap 2021 (EMODnet, 2021)

- A3.1: Atlantic and Mediterranean high energy infralittoral rock
- A3.2: Atlantic and Mediterranean moderate energy infralittoral rock
- A4.1: Atlantic and Mediterranean high energy circalittoral rock
- A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
- A4.27: Faunal communities on deep moderate energy circalittoral rock
- A5.13: Infralittoral coarse sediment
- A5.14: Circalittoral coarse sediment
- A5.15: Deep circalittoral coarse sediment
- A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand
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- A5.36: Circalittoral fine mud
- A5.37: Deep circalittoral mud
- A5.43: Infralittoral mixed sediments
- A5.44: Circalittoral mixed sediments
- A5.45: Deep circalittoral mixed sediments
- A5.6: Sublittoral biogenic reefs
- A5.61: Sublittoral polychaete worm reefs on sediment
- A5.611: [Sabellaria spinulosa] on stable circalittoral mixed sediment
- No EUNIS habitat assigned

Sandeel Habitat Suitability (Latto et al., 2013)

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

Data Source:

- BGS, 2015
- Outer Dowsing, 2022

Coordinate System: WGS 1984 UTM Zone 31N



0 20 40 km

Scale: 1:650,000 A3 Page Size

Environmental Statement

Sandeel Habitat Suitability Data with EUSeaMap 2021 Relative to the Project

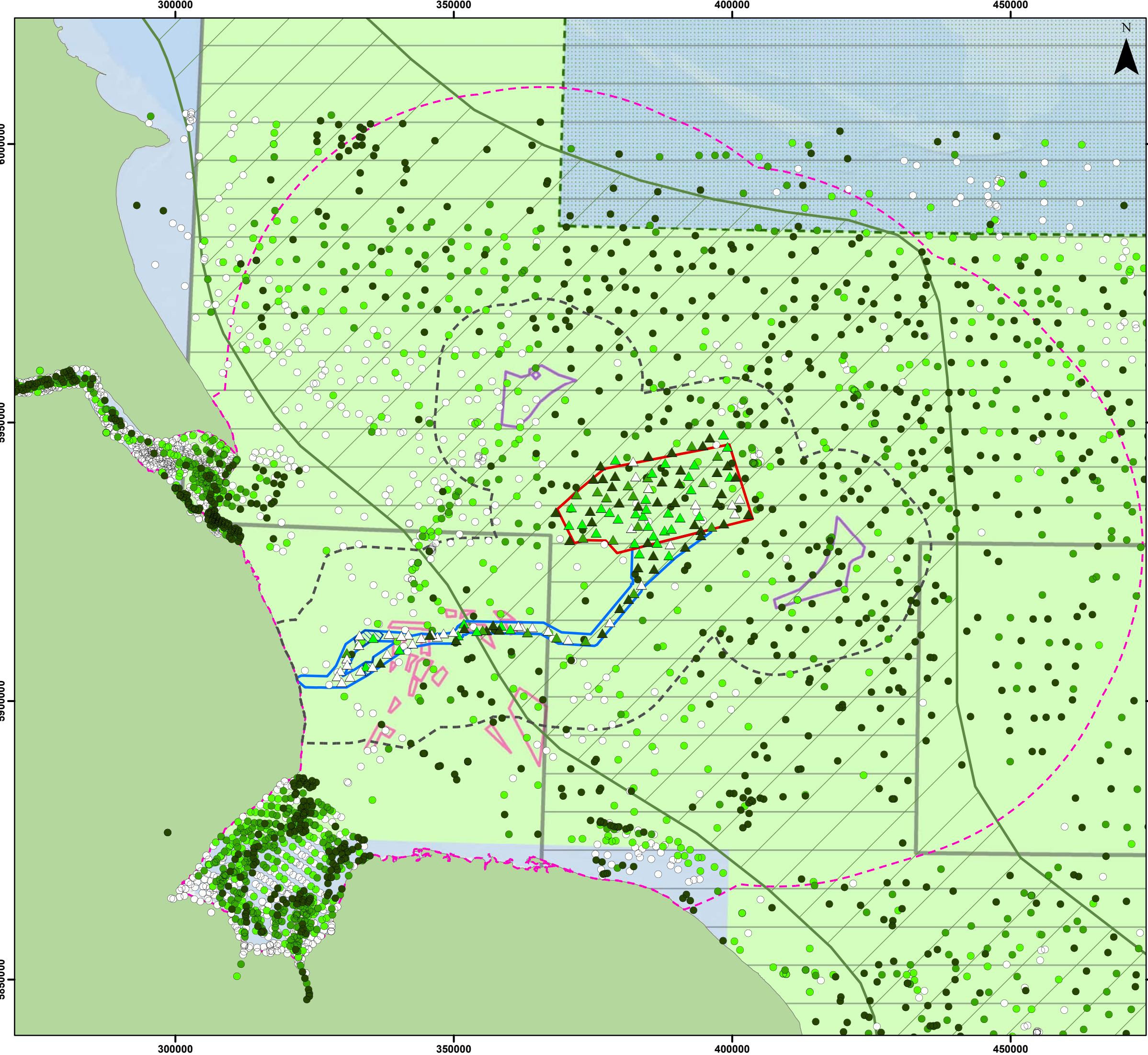
Figure 10.19

Date: 16/02/2024
 Produced By: BPHB
 Revision: 0.1

Contains ESRI Basemapping; EMODnet 2020 bathymetry

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Legend

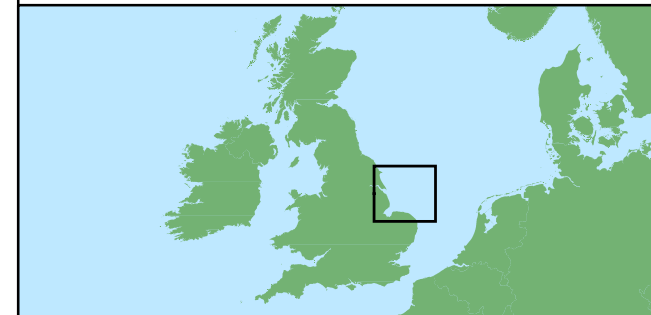
- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Secondary Zone of Influence
- Underwater Noise Impacts 50km Buffer
- Sandeel Nursery and Spawning Grounds (Coull et al., 1998)
- Sandeel Spawning Grounds, High Intensity (Ellis et al., 2012)
- Sandeel Spawning Grounds, Low Intensity (Ellis et al., 2012)
- Sandeel Low Intensity Nursery Grounds (Ellis et al., 2012)

Sandeel Habitat Suitability (Latto et al., 2013)

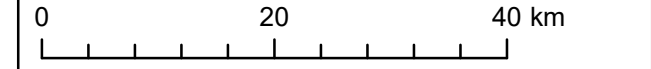
- Prime, Preferred
- Sub-Prime, Preferred
- Suitable, Marginal
- Unsuitable

Data Source:

- BGS, 2015
- Outer Dowsing, 2022



Coordinate System: WGS 1984 UTM Zone 31N



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Environmental Statement

Sandeel Spawning and Nursery Grounds with BGS and Site Specific Data Relative to the Project
Figure 10.20



Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Fish and Shellfish\ODOW_0152_FS_Fig10.20 Sandeel BGS Site Data v1.mxd