



# Hornsea Project Four: Reports

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## B2.2: Report to Inform Appropriate Assessment Part 5: Summary of Designated Sites

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## 1 Introduction

1.1.1.1 Summary information on each designated site screened in for potential LSE alone and/ or in combination is provided within this Appendix, including the designated feature(s), key literature sources describing the site and the features/ effects screened in under potential LSE. The conservation objectives for each site are also provided.

## 2 Southern North Sea SAC

2.1.1.1 The Southern North Sea SAC, located to the east of England, stretches from the central North Sea (north of Dogger Bank) to the Straits of Dover in the south, covering an area of 36,951 km<sup>2</sup><sup>1</sup>. A major portion of the site lies offshore, though it does extend into coastal areas of Norfolk and Suffolk crossing the 12 nautical mile boundary. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammals Technical Report;**
- JNCC and Natural England SAC Selection Assessment Document (dated January 2017)<sup>2</sup>;
- JNCC and Natural England Conservation Objectives and Advice on Operations for Harbour Porpoise (*Phocoena phocoena*) SAC: Southern North Sea (dated March 2019)<sup>3</sup>;
- Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (dated June 2020)<sup>4</sup>;
- JNCC Natura 2000 Standard Data Form (dated 26th March 2019)<sup>5</sup>; and
- JNCC: A Conservation Literature Review for the Harbour Porpoise (*Phocoena phocoena*) (dated December 2015)<sup>6</sup>.

2.1.1.2 The site is designated for the following Annex II species only:

- Harbour porpoise (*Phocoena phocoena*).

2.1.1.3 The site assessment in the recent citation assigns a grade of 'A' conservation, which is deemed 'excellent'<sup>7</sup>.

2.1.1.4 Following the formal designation of the site in February 2019, the Conservation Objectives and Advice on Operations (2019) and 'Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs' (2020) have now been finalised by the SNCBs and therefore this document presents best available advice for impacts assessment of offshore wind activities.

2.1.1.5 Potential LSE has been identified for harbour porpoise with respect to Hornsea Four under the following scenarios (alone and in-combination unless stated):

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<sup>1</sup> <http://jncc.defra.gov.uk/page-7243>

<sup>2</sup> <http://jncc.defra.gov.uk/PDF/SouthernNorthSeaSelectionAssessmentDocument.pdf>

<sup>3</sup> [http://jncc.defra.gov.uk/pdf/SNorthSea\\_ConsAdvice.pdf](http://jncc.defra.gov.uk/pdf/SNorthSea_ConsAdvice.pdf)

<sup>4</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/889842/SACNoiseGuidanceJune2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889842/SACNoiseGuidanceJune2020.pdf)

<sup>5</sup> <http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0030395.pdf>

<sup>6</sup> [http://jncc.defra.gov.uk/pdf/JNCCReport566\\_AConservationLiteratureReviewForTheHarbourPorpoise.pdf](http://jncc.defra.gov.uk/pdf/JNCCReport566_AConservationLiteratureReviewForTheHarbourPorpoise.pdf)

<sup>7</sup> <https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0030395.pdf>

- Increase in underwater noise (construction, operation & maintenance and decommissioning);
- Vessel disturbance (construction, operation & maintenance and decommissioning);
- Collision risk (construction, operation & maintenance and decommissioning);
- Long term physical loss of habitat (operations and maintenance in-combination only); and
- Accidental pollution (construction, operations and maintenance and decommissioning).

2.1.1.6 The Conservation Objectives for the site<sup>89</sup> are as follows:

**To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters.**

**In the context of natural change, this will be achieved by ensuring that:**

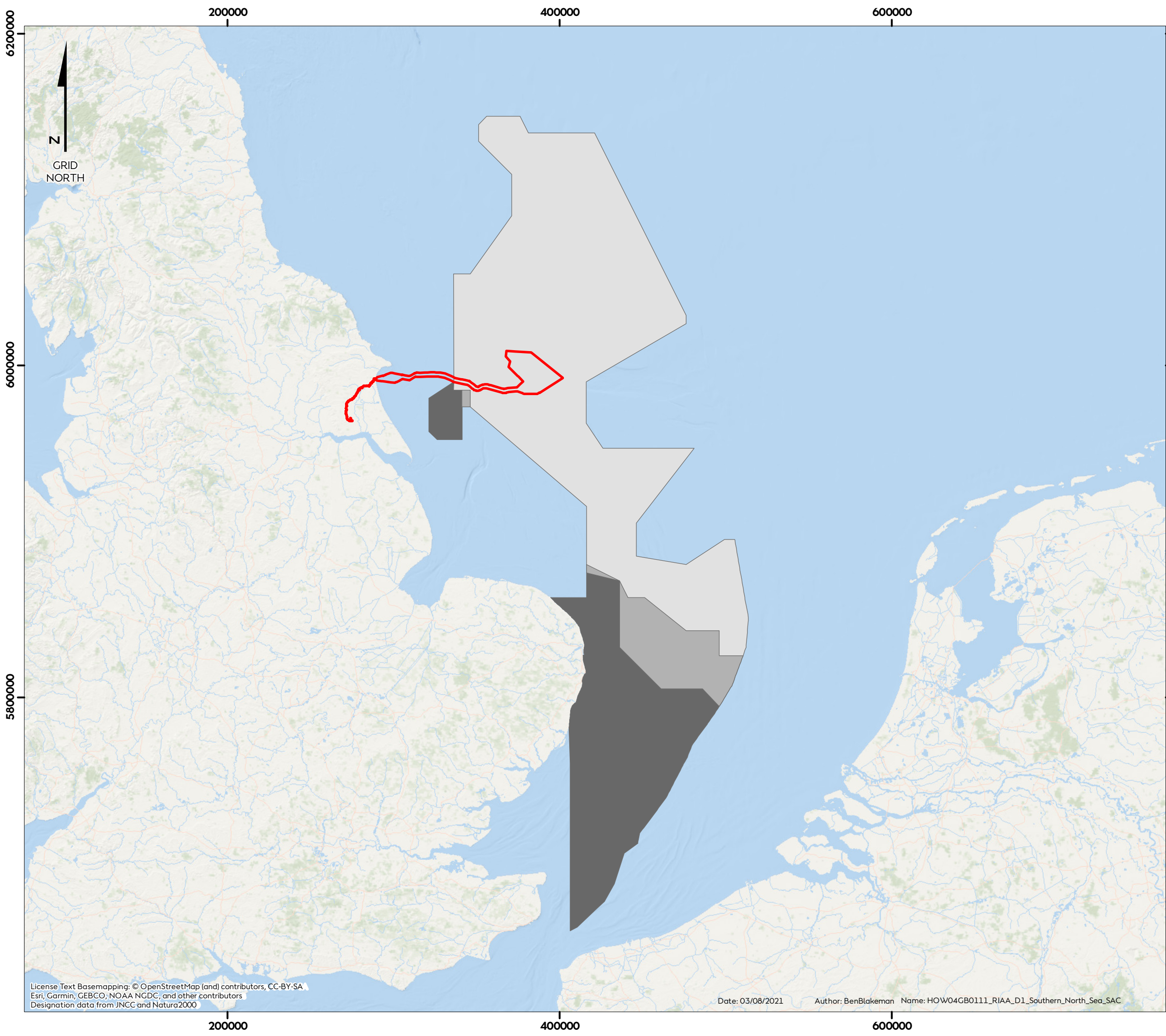
- Harbour porpoise is a viable component of the site;
- There is no significant disturbance of the species; and
- The condition of supporting habitats and processes, and the availability of prey is maintained.

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<sup>8</sup> [http://jncc.defra.gov.uk/pdf/SNorthSea\\_ConsAdvice.pdf](http://jncc.defra.gov.uk/pdf/SNorthSea_ConsAdvice.pdf)

<sup>9</sup> It is noted that the conservation objectives listed in the June 2020 Guidance on Significant Disturbance ([https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/889842/SACNoiseGuidanceJune2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889842/SACNoiseGuidanceJune2020.pdf)) have slightly different wording to the phrase 'best possible contribution' instead stating 'appropriate contribution' however the term used in the citation is applied here.



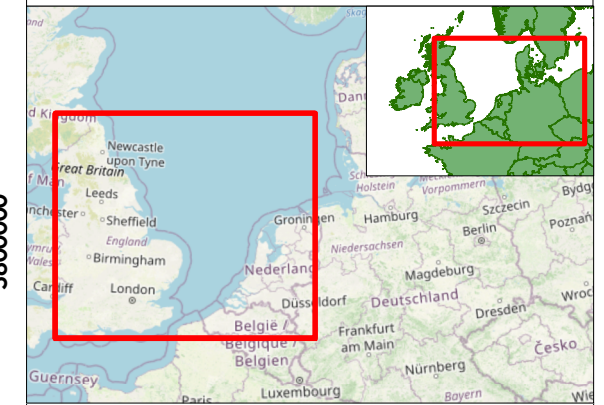


# Hornsea Four

## Figure D 1

### Southern North Sea SAC Relative to Hornsea Four

- Order Limits
- Southern North Sea SAC**
- Summer Area
- Summer and Winter Area
- Winter Area



Coordinate system: ETRS 1989 UTM Zone 31N  
 Scale@A3: 1:2,200,000

REV	REMARK	DATE
...	First Issue	24/06/2019
A	Updated following PEIR consultation, for DCO	03/08/2021

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 Esri, Garmin, GEBCO, NOAA NGDC, and other contributors  
 Designation data from JNCC and Natura2000



### 3 Flamborough Head SAC

3.1.1.1 The Flamborough Head SAC is a coastal site, designated for chalk reef, submerged and partially submerged sea caves and vegetated sea cliff. The site covers some 6,403 ha. The receptor group 'subtidal and intertidal benthic ecology' is relevant to the Flamborough Head SAC. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 1: Marine Geology, Oceanography and Physical Processes;**
- **Volume A2, Chapter 2: Benthic and Intertidal Ecology;**
- **Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report;**
- Natural England Conservation Advice for Marine Protected Areas: Flamborough Head SAC and Advice on Operations (updated March 2020)<sup>10</sup>;
- Natural England Flamborough Head European Marine Site Management Scheme (dated September 2016)<sup>11</sup>.
- Flamborough Head European Marine Site website<sup>12</sup>; and
- Flamborough Head SAC citation (dated May 2001 vs 1).

3.1.1.2 The site is designated for the following Annex I habitats:

- Reefs;
- Submerged or partially submerged sea caves; and
- Vegetated sea cliffs of the Atlantic and Baltic coasts.

3.1.1.3 No feature condition is provided under Natural England's Designated Sites View<sup>13</sup>. The Flamborough Head SAC is located along the North Yorkshire coastline, and includes areas of hard and soft chalk cliffs. The location of the site, at the meeting point of two water bodies, is considered important in terms of algae and plankton, with the sublittoral and littoral reef habitats considered to be the most diverse in the UK. The difference in chalk (hard and soft) means erosion differs, resulting in different habitats. There are a number of sub-features associated with the chalk reefs, specifically the following:

- Circalittoral rock - characterised by subtidal faunal turf communities which are diverse assemblages of attached animals growing on subtidal hard substrata and are an important component of the reefs. Subtidal faunal turf makes up a significant proportion of the reef resource and extends below 2 m depth;
- Infralittoral rock - kelp forests are found in the shallow subtidal waters and are a key structural and functional component of the reefs, supporting a wide variety of plants and animals in the infralittoral zone; and
- Intertidal rock - the rich and variable rocky shores are of considerable conservation value since they make a significant contribution to the structure and diversity of the site as a whole.

3.1.1.4 No sub features are listed for the submerged or partially submerged sea cave or vegetated sea cliff features.

<sup>10</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0013036&SiteName=flambor&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=#SiteInfo>

<sup>11</sup>[http://www.flamboroughheadsac.org.uk/documents/17-03-15%202016-2021%20Management%20Plan%20Final\\_2017%20Update.pdf](http://www.flamboroughheadsac.org.uk/documents/17-03-15%202016-2021%20Management%20Plan%20Final_2017%20Update.pdf)

<sup>12</sup><http://www.flamboroughheadsac.org.uk/downloads/>

<sup>13</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineFeatureCondition.aspx?SiteCode=UK0013036&SiteName=flambor&SiteNameDisplay=Flamborough+Head+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

- 3.1.1.5 Of the designated features, no LSE has been identified for the vegetated sea cliff feature with respect to Hornsea Four (Natural England agreed that terrestrial elements of the Flamborough Head SAC could be screened out during the Evidence Plan Process meeting on 12/09/2018, as flagged in Table 1 of **B2.2 Report to Inform Appropriate Assessment**), with Appendix A to that report identifying the potential for LSE for the reef and submerged sea cave features only, under the following scenarios:
- Changes to physical processes (reef feature only, during operations and maintenance only);
  - Temporary increase in suspended sediment (reef feature associated with all offshore aspects, submerged and partially submerged sea caves during works along the cable corridor only) (for both features during construction, operations and maintenance, decommissioning);
  - Invasive non-native species (to the reef feature and submerged and partially submerged sea caves feature, during construction, operations and maintenance and decommissioning); and
  - Accidental pollution (to the reef feature and submerged and partially submerged sea caves feature, during construction, operations and maintenance decommissioning).
- 3.1.1.6 The 2016 European Site Management Plan identified that all features of the Flamborough Head SAC were in favourable condition<sup>14</sup>.
- 3.1.1.7 The Site Improvement Plan for Flamborough Head SAC was issued in February 2015<sup>15</sup>, as part of the Flamborough and Filey Coast. Reference to the features of the SAC is as follows:
- Reefs – investigate potential impacts of fisheries (specifically potting); and
  - Vegetated sea cliffs – investigate the impact of invasive species (onshore risk in relation to illegal dumping of garden waste, e.g. the introduction of *Montbretia* on cliffs).
- 3.1.1.8 Advice on operations was last updated in March 2020<sup>16</sup>, including advice for offshore wind and cables (during construction, operations and maintenance and decommissioning). All relevant effects have been included within the broad potential effect terms applied here – with the equivalent terms clarified in Table 4 of the Screening Report (Appendix A of **B2.2 Report to Inform Appropriate Assessment**). Management measures were issued in September 2017<sup>17</sup>, with these limited to commercial fishing activities.
- 3.1.1.9 The Supplementary Advice for the Flamborough Head SAC was updated in September 2019<sup>18</sup>, with the targets provided being as follows (not all being applicable to both features screened in for potential LSE; where only applicable to one feature, this is noted):
- Maintain the presence and spatial distribution of communities;

<sup>14</sup>[http://www.flamboroughheadsac.org.uk/documents/17-03-15%202016-2021%20Management%20Plan%20Final\\_2017%20Update.pdf](http://www.flamboroughheadsac.org.uk/documents/17-03-15%202016-2021%20Management%20Plan%20Final_2017%20Update.pdf)

<sup>15</sup><http://publications.naturalengland.org.uk/publication/6404364100960256>

<sup>16</sup><https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0013036&SiteName=flambor&SiteNameDisplay=Flamborough+Head+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>17</sup><https://designatedsites.naturalengland.org.uk/SiteMMO.aspx?SiteCode=UK0013036&SiteName=flambor&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>18</sup><https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0013036&SiteName=flambor&SiteNameDisplay=Flamborough+Head+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

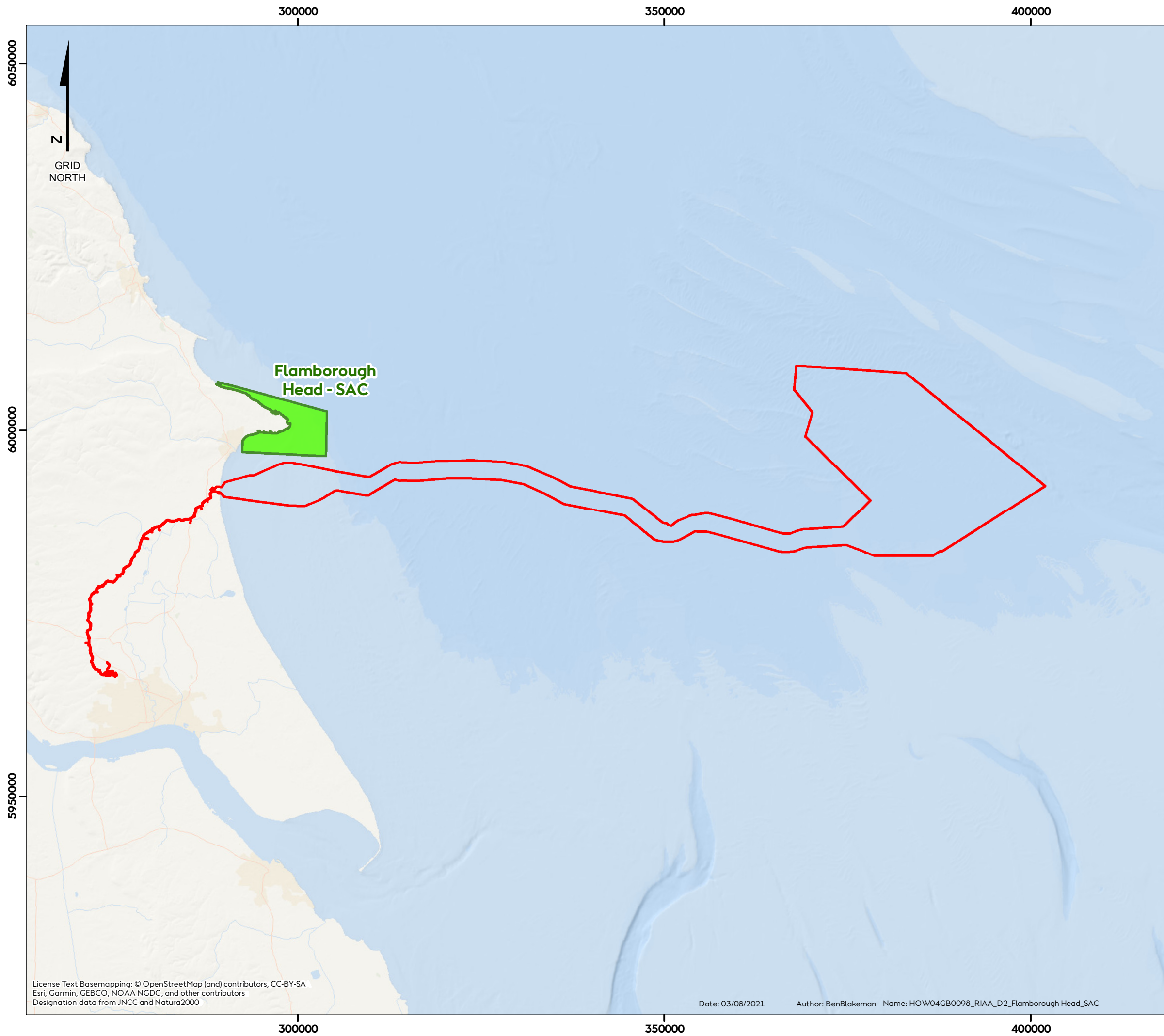
- Maintain the total extent, spatial distribution and types of the features (and each reef subfeatures/sea caves subject to natural variation in sedimentation);
- Maintain the abundance of the species listed to enable each of them to be a viable component of the habitats;
- Maintain the characteristic morphology of the sea cave features;
- Restrict the introduction and spread of non-native species and pathogens, and their impacts;
- Maintain the surface and structural complexity of habitats, and the stability of the reef and rocky cave structures;
- Maintain the species composition of component communities;
- Maintain the natural physical energy resulting from waves, tides and other water flows, so that the exposure does not cause alteration to the biotopes and stability, across the habitats;
- Maintain the natural light availability to the caves;
- Maintain the natural physico-chemical properties of the water;
- Restrict surface sediment contaminant levels to concentrations where they are not adversely impacting the infauna of the cave feature;
- Maintain the natural rate of sediment deposition;
- Restrict aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels;
- Maintain the dissolved oxygen (DO) concentration [at levels equating to High Ecological Status (specifically  $\geq 5.7$  mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels;
- Maintain water quality and specifically mean winter dissolved inorganic nitrogen (DIN) at a concentration equating to High Ecological Status (specifically mean winter DIN is  $< 12 \mu\text{M}$  for coastal waters), avoiding deterioration from existing levels; and
- Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

3.1.1.10 The Conservation Objectives for the site<sup>19</sup> are as follows:

**The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:**

- the extent and distribution of qualifying natural habitats and habitats of the qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of the qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- the populations of each of the qualifying species; and
- the distribution of qualifying species within the site.

<sup>19</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0013036&SiteName=flambor&countyCode=&responsiblePerson=&SeaArea=&IFCAAra=#hlco>

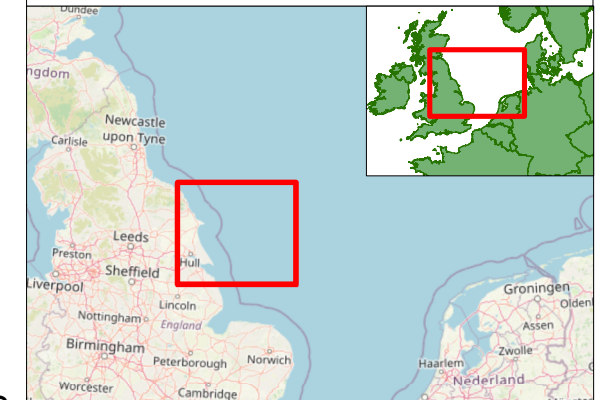


# Hornsea Four

## Figure D 2

### Flamborough Head SAC Relative to Hornsea Four

- Order Limits
- Flamborough Head SAC



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:500,000

0 10 20 Kilometres

0 5 10 Nautical Miles

REV	REMARK	DATE
....	First Issue	26/04/2019
A	Updated following PEIR consultation, for DCO	03/08/2021

Flamborough Head SAC  
 Relative to Hornsea Four  
 Document no: HOW04GB0098  
 Created by: BPHB  
 Checked by: SK  
 Approved by: LK





## 4 The Wash and North Norfolk Coast SAC

4.1.1.1 Situated on the East Coast of England, The Wash and North Norfolk SAC covers some 1077.6 km<sup>2</sup> and encompasses the largest embayment in the UK<sup>20</sup>. Based on screening for potential LSE, the receptor group 'marine mammals' is relevant to The Wash and North Norfolk Coast SAC.

4.1.1.2 Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammal Technical Report;**
- Natural England Conservation Advice for Marine Protected Areas: The Wash and North Norfolk Coast SAC (dated March 2019)<sup>21</sup>;
- Natural England The Wash and North Norfolk SAC Advice on Operations<sup>22</sup> (dated March 2019);
- The Wash and North Norfolk Coast SAC Citation<sup>23</sup>; and
- JNCC Natura 2000 Standard Data Form<sup>24</sup> (dated 25 January 2016).

4.1.1.3 The site is designated for the following Annex I habitats:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*);
- Coastal lagoons;
- Large shallow inlets and bays;
- Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*);
- Mudflats and sandflats not covered by seawater at low tide;
- Reefs;
- *Salicornia* and other annuals colonising mud and sand; and
- Sandbanks which are slightly covered by sea water all the time.

4.1.1.4 Together with the following Annex II species:

- Harbour (common) seal (*Phoca vitulina*); and
- Otter (*Lutra lutra*).

4.1.1.5 For the feature screened in for potential LSE (harbour seal), the recent condition assessment does not provide an assessment<sup>25</sup>.

4.1.1.6 Subtidal sandbanks and reefs are widespread throughout The Wash and North Norfolk Coast SAC. Commercially important fish species use sandbanks as nursery grounds and reefs are associated with elevated biodiversity and species abundance. The site has an outstanding example of the habitat *Sabellaria spinulosa* reef, large areas of intertidal sand and mudflats, often colonised by *Salicornia* sp. and saltmarsh communities. Coastal lagoons on the North Norfolk coast are maintained by the barrier beach system and inland

<sup>20</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and%20countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>21</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0017075&SiteName=>

<sup>22</sup><https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and%20countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>23</sup><http://publications.naturalengland.org.uk/file/5068730392379392>

<sup>24</sup><http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0017075.pdf>

<sup>25</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineFeatureCondition.aspx?SiteCode=UK0017075&SiteName=&SiteNameDisplay=The+Wash+and+North+Norfolk+Coast+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

coastal lagoons provide habitat for unique invertebrate communities. The site is also important for common seals (*Phoca vitulina*), providing key habitat for breeding and hauling-out.

4.1.1.7 The Wash is over 64,000 ha and represents the large shallow inlet and bay feature on the English East Coast. This is a complex feature, which encompasses a number of other features, of which some have subfeatures associated with them, specifically the features 'mudflats and sandflats not covered by seawater at low tide', 'sandbanks which are slightly covered by sea water all the time' and 'reefs'. No sub features are listed for the features 'Atlantic salt meadows (*Glauco-Puccinellietalia maritima*)', 'coastal lagoons', 'Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)' and 'Salicornia and other annuals colonising mud and sand'.

4.1.1.8 Of the site features, potential LSE has been identified for Harbour (common) seal (*Phoca vitulina*) only with respect to Hornsea Four under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operation & maintenance and decommissioning).

4.1.1.9 Natural England carried out a feature condition assessment of some (but not all) site features and the results reported in January 2019 are presented in **Table 1**.

**Table 1: The Wash and North Norfolk Coast SAC Feature Condition Assessment<sup>26</sup>.**

Feature	Date Assessed	Favourable	Unfavourable recovering	Unfavourable No Change	Unfavourable Declining	Destroyed	Not assessed
H1110 Sandbanks which are slightly covered by sea water all the time	26/01/2019	72%	28%				
H1140 Mudflats and sandflats not covered by seawater at low tide	26/01/2019			99%	1%		
H1170 Reefs	26/01/2019	1%	37%	61%			1%
H1160 Large shallow inlets and bays	26/01/2019	39%		60%			1%

4.1.1.10 Advice on operations was last updated in March 2020, including advice for offshore wind and cables (during construction, operations and maintenance and decommissioning)<sup>27</sup>. Management measures were issued in September 2017<sup>28</sup>, with these limited to commercial fishing activities.

<sup>26</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineFeatureCondition.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and&SiteNameDisplay=The+Wash+and+North+Norfolk+Coast+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>27</sup><https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0017075&SiteName=&SiteNameDisplay=The+Wash+and+North+Norfolk+Coast+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>28</sup><https://designatedsites.naturalengland.org.uk/SiteMMO.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

4.1.1.11 The Site Improvement Plan for The Wash and North Norfolk Coast SAC was issued in December 2014, as part of The Wash and North Norfolk Coast EMS<sup>29</sup>. Reference to the harbour seal feature of the SAC is in relation to public access/disturbance.

4.1.1.12 The Supplementary Advice for The Wash and North Norfolk Coast SAC was updated in March 2020<sup>30</sup>. The only feature screened in for potential LSE for the site is harbour seal (*Phoca vitulina*). The targets applicable to this feature are listed below:

- Maintain the population size within the site;
- Maintain the reproductive and recruitment capability of the species;
- Maintain the presence and spatial distribution of the species and their ability to undertake key life cycle stages and behaviours;
- Maintain connectivity of the habitat within sites and the wider environment to allow movement of migratory species;
- Restrict the introduction and spread of non-native species and pathogens, and their impacts;
- Maintain the extent and spatial distribution of the following supporting habitats: foraging and haul out sites;
- Maintain the abundance of preferred food items required by the species;
- Maintain the natural physico-chemical properties of the water;
- Maintain all hydrodynamic and physical conditions such that natural water flow and sediment movement is not significantly altered or constrained;
- Restrict aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels;
- Maintain water quality to mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features avoiding deterioration from existing levels; and
- Maintain natural levels of turbidity (e.g. suspended concentrations of sediment, plankton and other material) in areas where this species is or could be present.

4.1.1.13 The Conservation Objectives for The Wash and North Norfolk Coast SAC<sup>31</sup> are as follows:

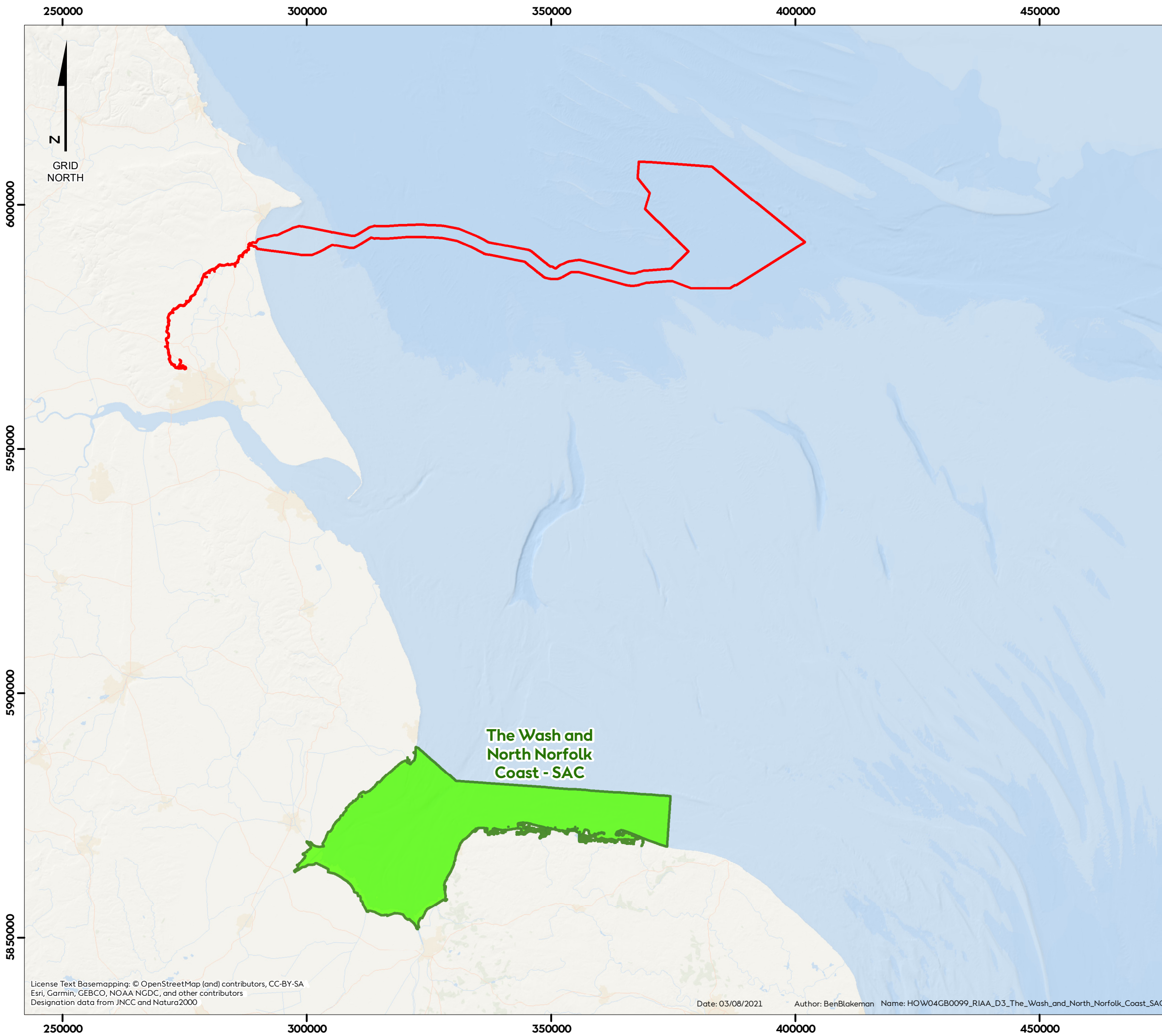
**The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:**

- the extent and distribution of qualifying natural habitats and habitats of the qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of the qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- the populations of each of the qualifying species; and
- the distribution of qualifying species within the site.

<sup>29</sup> <http://publications.naturalengland.org.uk/publication/5327498292232192?category=4873023563759616>

<sup>30</sup> <https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and&SiteNameDisplay=The+Wash+and+North+Norfolk+Coast+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArae=>

<sup>31</sup> <https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and&countyCode=&responsiblePerson=&SeaArea=&IFCAArae=#h/co>

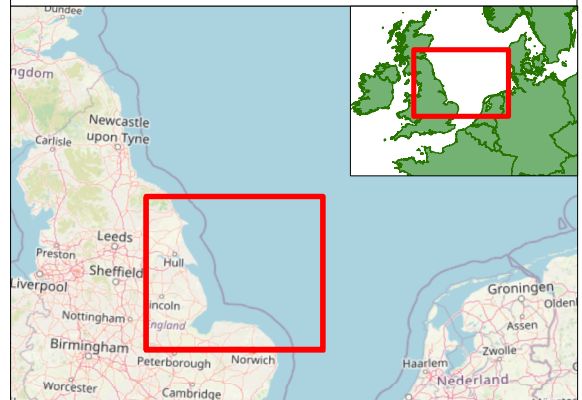


# Hornsea Four

## Figure D 3

### The Wash and North Norfolk Coast SAC Relative to Hornsea Four

- Order Limits
- The Wash and North Norfolk Coast SAC




Coordinate system: ETRS 1989 UTM Zone 31N  
 Scale@A3: 1:750,000

0 10 20 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
....	First Issue	26/04/2019
A	Updated following PEIR consultation, for DCO	03/08/2021

The Wash and North Norfolk Coast SAC  
 Relative to Hornsea Four  
 Document no: HOW04GB0099  
 Created by: BPHB  
 Checked by: SK  
 Approved by: LK



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 Designation data from JNCC and Natura2000



## 5 Humber Estuary SAC

5.1.1.1 The Humber Estuary SAC extends about 70 km from the mouth of the Humber, past the ports of Grimsby, Immingham, Hull and Goole and up to the limit of saline intrusion on the rivers Ouse and Trent and covers an area of around 366.57 km<sup>2</sup>. The receptor groups benthic and intertidal habitats' and 'marine mammals' are relevant to the Humber Estuary SAC. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 2: Benthic and Intertidal Ecology;**
- **Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report;**
- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammal Technical Report;**
- **Volume A4, Annex 4.5: Subsea Noise Technical Report;**
- Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SAC and Supplementary Advice on Conservation Objectives (dated September 2017);
- Humber Estuary Advice on Operations (dated March 2019) and Advice on Seasonality (dated March 2018);
- Humber Estuary SAC citation (dated November 2009 v2); and
- Environment Agency TraC Fish Counts <sup>32</sup>.

5.1.1.2 The site is designated for the following Annex I habitats:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*);
- Coastal lagoons;
- Dunes with *Hippophae rhamnoides*;
- Embryonic shifting dunes;
- Estuaries;
- Fixed dunes with herbaceous vegetation ("Grey dunes")
- Mudflats and sandflats not covered by seawater at low tide
- *Salicornia* and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time; and
- Shifting dunes along the shoreline with *Ammophila arenaria* ("White dunes").

5.1.1.3 Together with the following Annex II species:

- Grey seal (*Halichoerus grypus*);
- Sea lamprey (*Petromyzon marinus*); and
- River lamprey (*Lampetra fluviatilis*).

5.1.1.4 The Humber is the largest coastal plain estuary on the east coast of Britain. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them. Habitats within the Humber Estuary SAC include Atlantic salt meadows and a range of sand dune types in the outer estuary, together with subtidal sandbanks, extensive intertidal mudflats, *Salicornia* saltmarsh and coastal lagoons. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary. Significant fish species include river lamprey and sea lamprey, which

<sup>32</sup> <https://data.gov.uk/dataset/41308817-191b-459d-aa39-788f74c76623/trac-fish-counts-for-all-species-for-all-estuaries-and-all-years>



breed in the River Derwent. Grey seals come ashore in autumn to form breeding colonies on the sandy shores of the south bank at Donna Nook.

- 5.1.1.5 The Humber estuary is a complex feature, which encompasses a number of other features, of which some have subfeatures associated with them, specifically 'Mudflats and sandflats not covered by seawater at low tide' and 'sandbanks which are slightly covered by sea water all the time'. No sub features are listed for the following habitat features: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), coastal lagoons, dunes with *Hippophae rhamnoides*, embryonic shifting dunes, fixed dunes with herbaceous vegetation ("grey dunes"), *Salicornia* and other annuals colonising mud and sand, shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes").
- 5.1.1.6 Of the designated features, potential for LSE has been identified for grey seal (*Halichoerus grypus*), and the two saltmarsh habitats (Atlantic salt meadows and *Salicornia* and other annuals colonising mud and sand) only, under the following scenarios:
- Increased nitrogen deposition - Atlantic salt meadows and *Salicornia* and other annuals colonising mud and sand (construction and decommissioning);
  - Increase in underwater noise – grey seal only (construction and decommissioning);
  - Vessel disturbance – grey seal only (construction, operations and maintenance and decommissioning); and
  - Collision risk – grey seal only (construction, operations and maintenance and decommissioning).
- 5.1.1.7 No information on feature condition is available following the 2016 Natural England's review<sup>33</sup>.
- 5.1.1.8 Advice on operations was last updated in March 2020<sup>34</sup>, including advice for offshore wind (during construction, operations and maintenance and decommissioning and cable laying, operations and maintenance and decommissioning). Management measures were issued in September 2017<sup>35</sup>, with these limited to commercial fishing activities.
- 5.1.1.9 The Environment Agency TraC data, which consists of information collected from fisheries monitoring work on rivers, lakes, transitional and coastal waters, were accessed in June 2019 (database updated: 16 December 2019, but not required as the relevant features were screened out as no LSE at that point)<sup>36</sup>. For the Humber Estuary (all sites) the database (which extends back to 1981) included just 4 records of river lamprey and none of sea lamprey.
- 5.1.1.10 The Site Improvement Plan for Humber Estuary<sup>37</sup> that includes the Humber Estuary SAC was issued in July 2015. Reference to the features of the SAC screened in for potential LSE is as follows:

<sup>33</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineFeatureCondition.aspx?SiteCode=UK0030170&SiteName=humber%20estuary&SiteNameDisplay=Humber+Estuary+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>34</sup><https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0030170&SiteName=humber%20estuary&SiteNameDisplay=Humber+Estuary+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>35</sup><https://designatedsites.naturalengland.org.uk/SiteMMO.aspx?SiteCode=UK0030170&SiteName=humber%20estuary&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

<sup>36</sup><https://data.gov.uk/dataset/41308817-191b-459d-aa39-788f74c76623/trac-fish-counts-for-all-species-for-all-estuaries-and-all-years>

<sup>37</sup><http://publications.naturalengland.org.uk/publication/5427891407945728?category=5171232873906176>

- Coastal squeeze (saltmarsh);
- Undergrazing (saltmarsh);
- Invasive species (saltmarsh);
- Public access/disturbance (saltmarsh); and
- Air pollution (saltmarsh).

5.1.1.11 The Supplementary Advice for the Humber Estuary SAC was updated in September 2019<sup>38</sup>. The targets applicable to the features screened in for potential LSE (grey seal (*Halichoerus grypus*), Atlantic salt meadows and *Salicornia* and other annuals colonising mud and sand) are listed below (not all being applicable to all three features screened in for potential LSE; where only applicable to specific features, this is noted):

- Maintain the range and continuity of the saltmarsh habitats and its natural transitions within saltmarsh types and to other habitats seaward and landward;
- Restore the total extent of the saltmarsh habitats;
- Restore the ability for colonisation each year of the annual species that comprise the *Salicornia* and other annuals colonising mud and sand habitat;
- Restore the ability to achieve long-term fluctuations in the extent of Atlantic salt meadows in response to coastal processes;
- Maintain the Grey seal population size within the site;
- Maintain the reproductive and recruitment capability of Grey seal;
- Maintain the presence and spatial distribution of Grey seal and their ability to undertake key life cycle stages and behaviours;
- Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I saltmarsh features;
- Maintain connectivity of the habitat within sites and the wider environment to ensure recruitment, and / or to allow movement of migratory species (grey seal);
- Maintain naturally-occurring patterns of creeks and salt pans;
- Maintain the degree of patterning of patches of bare mud of varying sizes in a mosaic with saltmarsh vegetation;
- Maintain the availability and size range of those sediments typical of saltmarsh features at the site;
- Maintain any desirable variation in elevation and / or topography across the site that supports Atlantic salt meadows;
- The frequency / cover of the following undesirable species are maintained acceptable levels and are not encouraged by changes in surface condition, soils, nutrient levels or changes to hydrology: *Spartina anglica*;
- Ensure the component vegetation communities of Atlantic salt meadows are referable to and characterised by the following National Vegetation Classification type (s);
- Maintain the species composition of component vegetation communities and associated transitions, allowing for successional changes in response to natural processes (*Salicornia* and other annuals colonising mud and sand);
- Maintain the full range of zonations (low-mid, mid, mid-upper and transitional zones) between component saltmarsh communities found in H133 (Atlantic salt meadows);
- Maintain any existing zonations between H1310 and other adjacent saltmarsh or intertidal communities (*Salicornia* and other annuals colonising mud and sand);

<sup>38</sup><https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030170&SiteName=humber%20Estuary&SiteNameDisplay=Humber+Estuary+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

- Restrict the introduction and spread of non-native species and pathogens, and their impacts (Grey seal);
- Maintain the extent and spatial distribution of the following supporting habitats: haulout sites for Grey seal;
- Maintain the cover / abundance of preferred food items required by Grey seal;
- Restore the ability of saltmarsh habitats, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site;
- Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (saltmarsh habitats);
- Maintain the management measures (either within and / or outside the site boundary as appropriate) that are necessary to maintain / restore the structure, functions and supporting processes associated with the saltmarsh habitat features;
- Maintain adequate inputs of sediment in the water column from the sediment sources (offshore / eroding cliffs, etc) (saltmarsh habitats);
- Maintain the morphological setting of the habitat within the wider estuarine and coastal system (saltmarsh habitats);
- Maintain the natural physico-chemical properties of the water (Grey seal);
- Maintain the pre-marsh biological processes that aid the stabilisation of intertidal sediment surfaces and support successful seedling establishment (*Salicornia* and other annuals colonising mud and sand);
- Maintain all hydrodynamic and physical conditions such that natural water flow and sediment movement is not significantly altered or constrained (Grey seal);
- Maintain both the sediment nutrient status to within typical values for the habitat and the processes that sustain effective nutrient cycling by the saltmarsh feature;
- Maintain the sedimentary processes (suspended sediment, sediment transfer, etc) that sustain the elevation and topography of the marsh surface;
- Maintain the degree of tidal immersion and emersion that supports the function of the saltmarsh habitat type;
- Where the feature is dependent on estuarine water, ensure water quality and quantity is maintained to a standard that provides the necessary conditions to support saltmarsh features;
- Restrict aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels (Grey seal);
- Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features avoiding deterioration from existing levels (Grey seal); and
- Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) in areas where this species is, or could be, present (Grey seal).

5.1.1.12 The Conservation Objectives for the site<sup>39</sup> are as follows:

<sup>39</sup><https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0030170&SiteName=humber%20estuary&countyCode=&responsiblePerson=&SeaArea=&IFCAAarea=>

**The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:**

- the extent and distribution of qualifying natural habitats and habitats of the qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of the qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- the populations of each of the qualifying species; and
- the distribution of qualifying species within the site.

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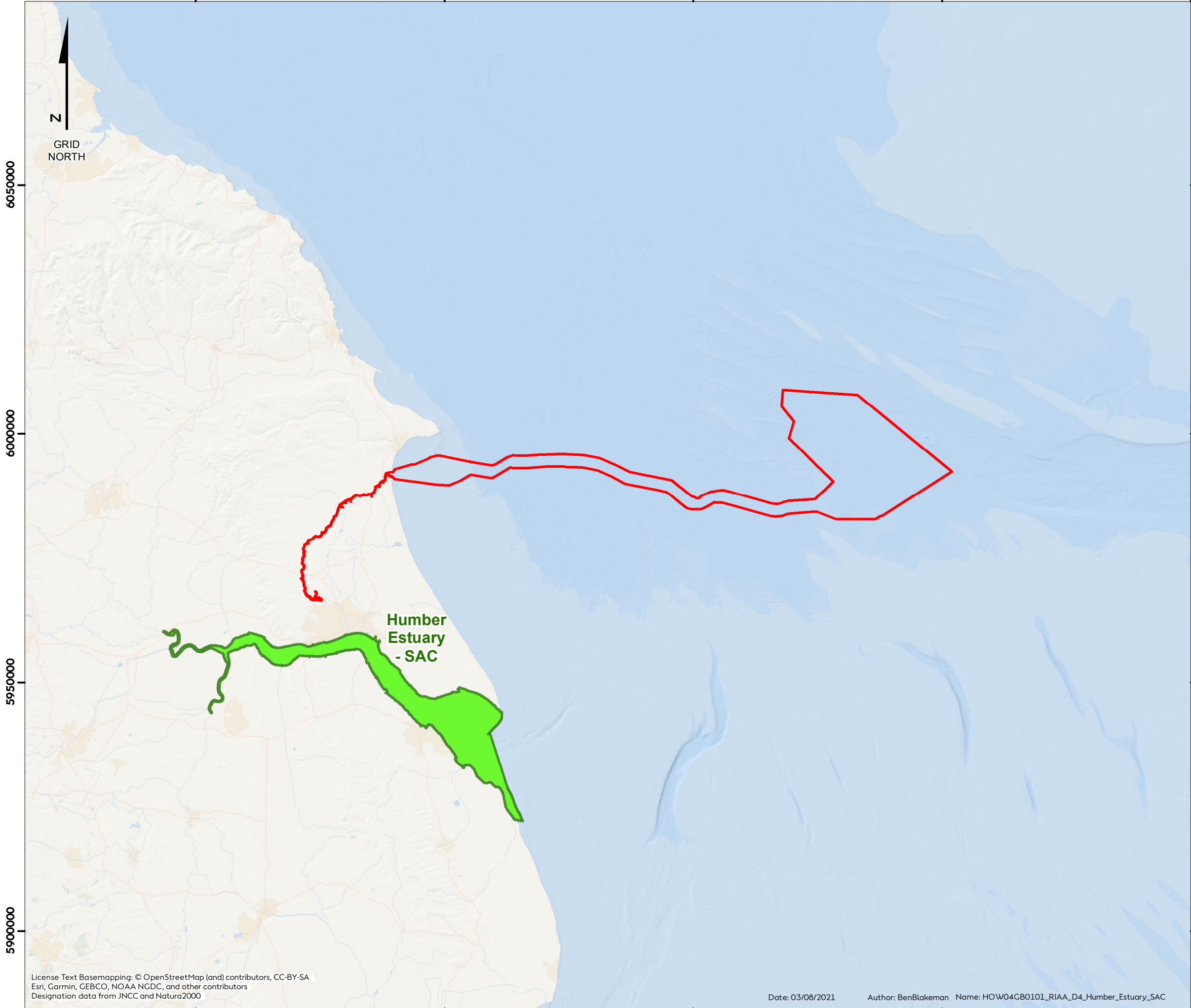
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# Hornsea Four

## Figure D 4 Humber Estuary SAC Relative to Hornsea Four

-  Order Limits
-  Humber Estuary SAC



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:750,000



REV	REMARK	DATE
...	First Issue	26/04/2019
A	Updated following PEIR consultation, for DCO	03/08/2021

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 Esri, Garmin, GEBCO, NOAA NGDC, and other contributors  
 Designation data from JNCC and Natura2000

Humber Estuary SAC  
 Relative to Hornsea Four  
 Document no: HOW04GB0101  
 Created by: BPHB  
 Checked by: SK  
 Approved by: LK





## 6 Humber Estuary Ramsar

6.1.1.1 The Humber Estuary is located on the boundary between the East Midlands Region and the Yorkshire and the Humber Region and is the largest macro-tidal estuary on the British North Sea coast. The Humber Estuary Ramsar site covers an area of 37,987.8 ha. The receptor groups saltmarsh' and 'marine mammals' are relevant to the Humber Estuary Ramsar. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 2: Benthic and Intertidal Ecology;**
- **Volume A5, Annex 2.1: Benthic and Intertidal Ecology Technical Report;**
- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammals Technical Report;**
- **Volume A4, Annex 4.5: Subsea Noise Technical Report;** and
- Humber Estuary Information Sheet on Ramsar Wetlands (dated August 2007).

6.1.1.2 The site is designated for the following Ramsar criteria<sup>40</sup>:

- Criterion 1: The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons;
- Criterion 3: The site supports a breeding colony of grey seals (*Halichoerus grypus*) at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe are the most north-easterly breeding site in Great Britain of the natterjack toad (*Bufo calamita*);
- Criterion 5: Assemblages of international importance - 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001);
- Criterion 6: species/populations occurring at levels of international importance: Eurasian golden plover (*Pluvialis apricaria altifrons* subspecies) wintering and on passage, red knot (*Calidris canutus islandica* subspecies) wintering and on passage, dunlin (*Calidris alpina alpina* subspecies) wintering and on passage, black-tailed godwit (*Limosa limosa islandica* subspecies) wintering and on passage, common redshank (*Tringa totanus brittanica* subspecies) wintering and on passage, common shelduck (*Tadorna tadorna*) wintering, bar-tailed godwit (*Limosa lapponica lapponica* subspecies) wintering; and
- Criterion 8: The Humber Estuary acts as an important migration route for both river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*) between coastal waters and their spawning areas.

6.1.1.3 Of these, potential for LSE has been identified for grey seal (*Halichoerus grypus*), saltmarsh habitats and 23 bird species under the following scenarios:

- Increased nitrogen deposition – saltmarsh only (construction and decommissioning);
- Increase in underwater noise – grey seal only (construction and decommissioning);
- Vessel disturbance – grey seal only (construction, operations and maintenance and decommissioning);
- Collision risk – grey seal only (construction, operations and maintenance and decommissioning);

<sup>40</sup> <http://jncc.defra.gov.uk/pdf/RIS/UK11031.pdf>

- Collision risk – species present in numbers of international importance including; golden plover, dunlin, black-tailed godwit, bar-tailed godwit, redshank, shelduck, red knot (operations and maintenance); and
- Collision risk – species present in numbers of national importance that make up part of the bird assemblage including; hen harrier, dark-bellied brent goose, teal, wigeon, goldeneye, avocet, oystercatcher, ringed plover, grey plover, lapwing, sanderling, curlew, whimbrel and turnstone (operations and maintenance).

6.1.1.4 Natural England has not published any information on the condition of the site. The Site Improvement Plan for Humber Estuary<sup>41</sup> that includes the Humber Estuary Ramsar site was issued in July 2015. Reference to the criteria for which the site was designated and in context of the features screened in for potential LSE is as follows:

- Undergrazing (saltmarsh);
- Invasive species (saltmarsh);
- Public access/disturbance (saltmarsh); and
- Air pollution (saltmarsh).

6.1.1.5 For Ramsar sites, a decision has been made by Defra and Natural England not to produce Conservation Advice packages, instead focussing on the production of High Level Conservation Objectives. However, no Conservation Objectives have yet been published for the Humber Estuary Ramsar. As the provisions on the Habitats Regulations relating to HRAs extend to Ramsar sites, Natural England considers the Conservation Advice packages for the overlapping European Marine Site designations to be, in most cases, sufficient to support the management of the Ramsar interests. Given that the features screened in for the Humber Estuary Ramsar are the same as those screened in for the Humber Estuary SAC and SPA, it is therefore reasonable to apply the relevant Humber Estuary SAC and SPA conservation objectives equally here. Those conservation objectives are provided above.

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<sup>41</sup><http://publications.naturalengland.org.uk/publication/5427891407945728?category=5171232873906176>

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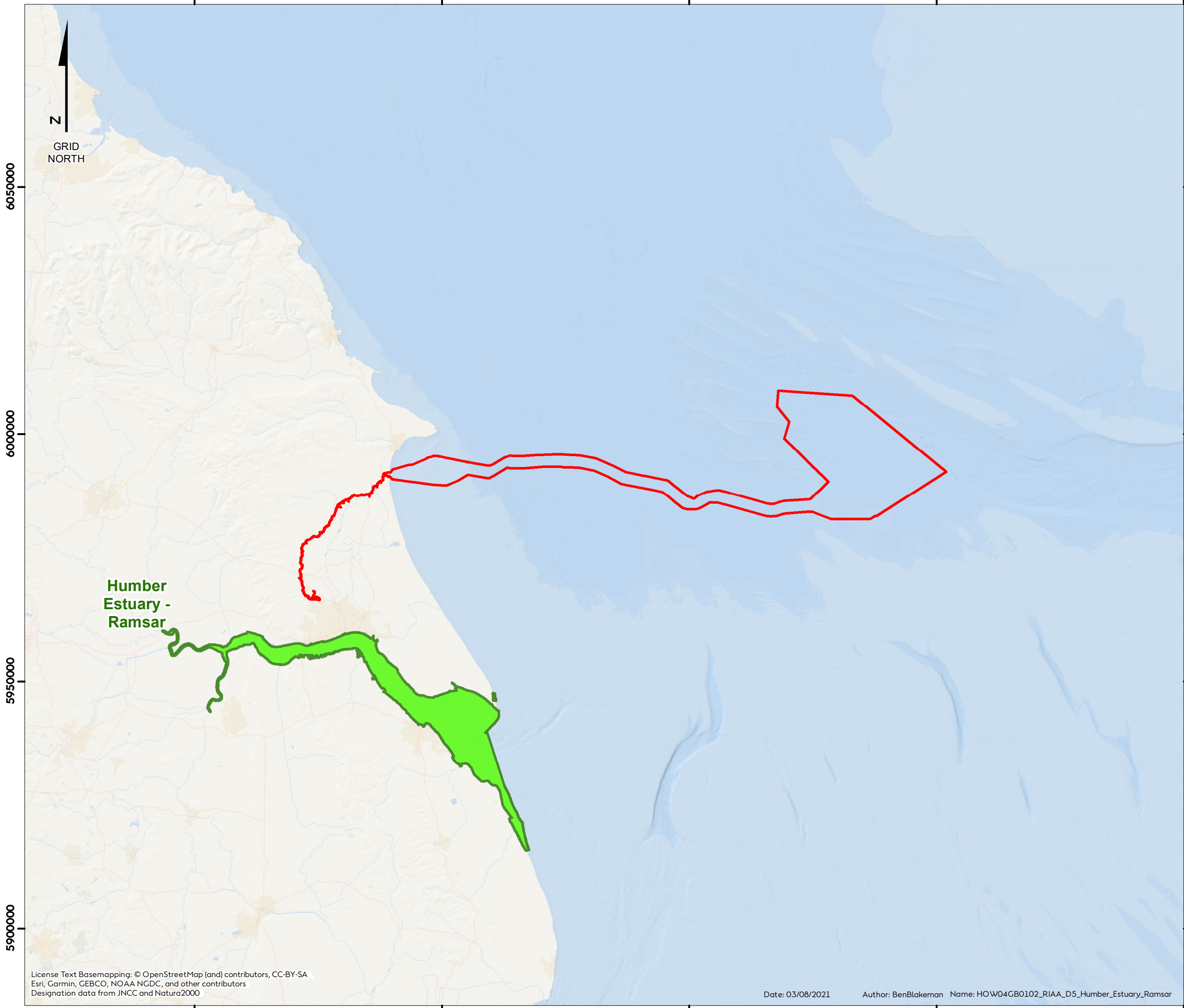
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# Hornsea Four

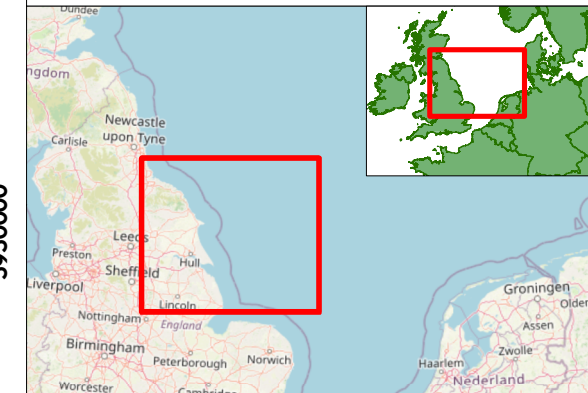
## Figure D 5

### Humber Estuary Ramsar Relative to Hornsea Four

- Order Limits
- Humber Estuary Ramsar



**Humber Estuary - Ramsar**



Coordinate system: ETRS 1989 UTM Zone 31N  
 Scale@A3: 1:750,000

0 10 20 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
...	First Issue	26/04/2019
A	Updated following PEIR consultation, for DCO	03/08/2021

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 Designation data from JNCC and Natura2000

Date: 03/08/2021 Author: BenBlakeman Name: HOW04GB0102\_RIAA\_D5\_Humber\_Estuary\_Ramsar

Humber Estuary Ramsar  
 Relative to Hornsea Four  
 Document no: HOW04GB0102  
 Created by: BPHB  
 Checked by: SK  
 Approved by: LK

## 7 Berwickshire and North Northumberland Coast SAC

7.1.1.1 The Berwickshire and North Northumberland Coast SAC covers a varied stretch of coastline, encompassing around 65,226 km<sup>2</sup>. The receptor group 'marine mammals' is relevant to the Berwickshire and North Northumberland Coast SAC. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammal Technical Report;**
- **Volume A4, Annex 4.5: Subsea Noise Technical Report;**
- The Natural England and SNH Regulation 33 Advice for the Berwickshire and North Northumberland Coast European Marine Site (2000)<sup>42</sup>;
- Berwickshire and North Northumberland Coast Conservation Objectives (dated November 2018)<sup>43</sup>;
- Berwickshire and North Northumberland Coast SAC citation (dated July 2014<sup>44</sup>); and
- SNH advice on Feature condition<sup>45</sup>.

7.1.1.2 The site is designated for the following Annex I habitats:

- Large shallow inlets and bays;
- Mudflats and sandflats not covered by seawater at low tide;
- Reefs; and
- Submerged and partially submerged sea caves.

7.1.1.3 Together with the following Annex II species:

- Grey seal (*Halichoerus grypus*).

7.1.1.4 Of these, potential for LSE has been identified for grey seal (*Halichoerus grypus*) only (with no condition of the feature sourced), under the following scenarios:

- Increase in underwater noise – (construction and decommissioning);
- Vessel disturbance – (construction, operations and maintenance and decommissioning); and
- Collision risk - (construction, operations and maintenance and decommissioning).

7.1.1.5 The citation describes the site as being representative of grey seal breeding colonies in the south-east of its breeding range in the UK, supporting around 2.5% of annual UK pup production (noting that other sources give different numbers, e.g. the Regulation 33 document<sup>46</sup> cites 3%). The Regulation 33 document notes that the UK holds some 33% of the world population of grey seals and 95% of the European population. The Berwickshire and North Northumberland SAC population is one of the largest breeding colonies on the North Sea coast, with the area around the Farne Islands being the preferred food source for grey seals in this area. SNH lists the feature condition as 'favourable'.

<sup>42</sup> <http://publications.naturalengland.org.uk/file/3495936>

<sup>43</sup> <http://publications.naturalengland.org.uk/file/5347333881724928>

<sup>44</sup> <http://publications.naturalengland.org.uk/file/4527238296895488>

<sup>45</sup> <https://sitelink.nature.scot/site/8207>

<sup>46</sup> <http://publications.naturalengland.org.uk/file/3495936>

7.1.1.6 The Advice on Activities is provided in the Regulation 33 Advice (dating from 2000), which for grey seal is a need to manage activities resulting in deterioration or disturbance to habitats or species resulting from the following:

- Visual disturbance and/or disturbance by noise; and
- Synthetic toxic contamination.

7.1.1.7 The Supplementary Advice for The Wash and North Norfolk Coast SAC was updated in March 2020<sup>47</sup>. The only feature screened in for potential LSE for the site is Grey seal (*Halichoerus grypus*). The targets applicable to this feature are listed below:

- Maintain the population size within the site;
- Maintain the reproductive and recruitment capability of the species;
- Maintain the presence and spatial distribution of the species and their ability to undertake key life cycle stages and behaviours;
- Maintain connectivity of the habitat within sites and the wider environment to ensure recruitment, and / or to allow movement of migratory species;
- Restrict the introduction and spread of non-native species and pathogens, and their impacts;
- Maintain the extent and spatial distribution of the following supporting habitats: haulout sites;
- Maintain the cover / abundance of preferred food items required by the species;
- Maintain the natural physico-chemical properties of the water;
- Maintain all hydrodynamic and physical conditions such that natural water flow and sediment movement is not significantly altered or constrained;
- Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels;
- Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features, avoiding deterioration from existing levels; and
- Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) in areas where this species is, or could be, present.

7.1.1.8 The relevant site improvement plan is dated April 2015<sup>48</sup>, with measures linked to grey seal including public access to the site (disturbance) and direct threat from a third party. The measures identified were managing visitor access to the site and the provision of visitor information.

7.1.1.9 The Conservation Objectives for the site<sup>49</sup> are as follows:

<sup>47</sup><https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0017075&SiteName=the%20wash%20and&SiteNameDisplay=The+Wash+and+North+Norfolk+Coast+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAAreq=>

<sup>48</sup><http://publications.naturalengland.org.uk/file/4788230077546496>

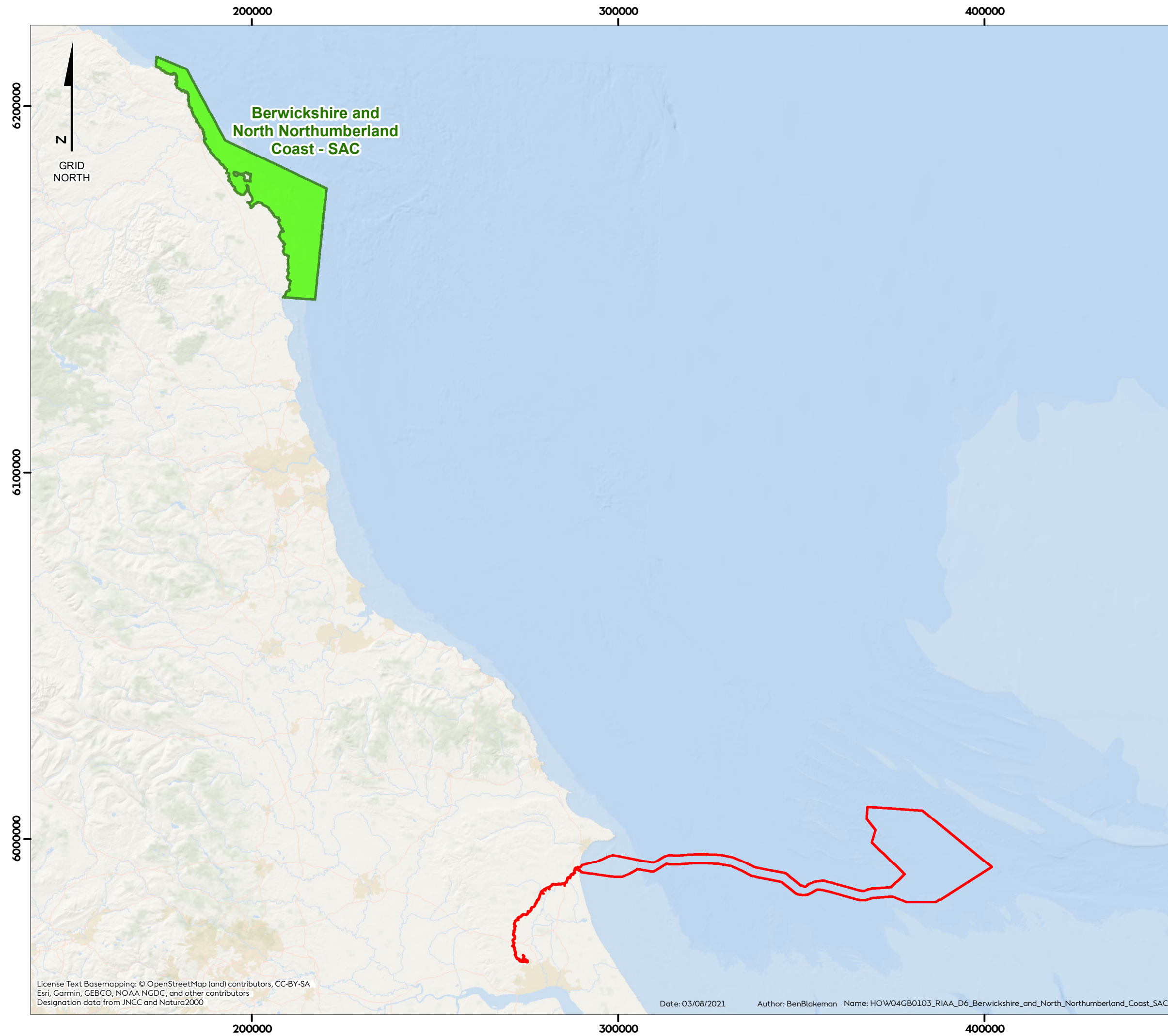
<sup>49</sup><http://publications.naturalengland.org.uk/file/5347333881724928>



**With regard to the SAC and the natural habitats and/or species for which the site has been designated, and subject to natural change;**

**Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;**

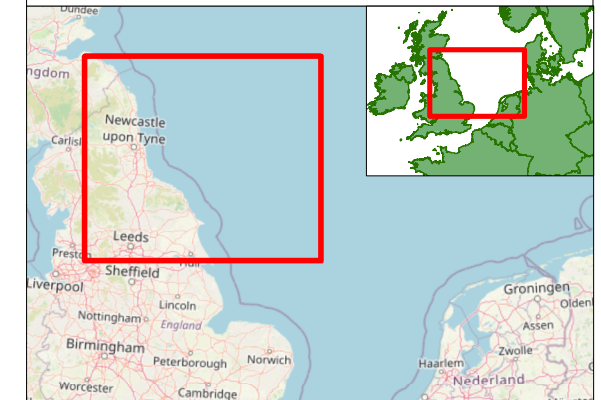
- the extent and distribution of qualifying natural habitats and habitats of the qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of the qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- the populations of qualifying species; and
- the distribution of qualifying species within the site.



# Hornsea Four

Figure D 6  
Berwickshire and North  
Northumberland Coast SAC  
Relative to Hornsea Four

- Order Limits
- Berwickshire and North Northumberland Coast SAC



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:1,000,000

0 20 40 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
....	First Issue	26/04/2019
A	Updated following PEIR consultation, for DCO	03/08/2021

Berwickshire and North Northumberland  
Coast SAC Relative to Hornsea Four  
Document no: HOW04GB0103  
Created by: BPHB  
Checked by: SK  
Approved by: LK



## 8 Doggersbank (Dutch) SAC

8.1.1.1 The Doggersbank SAC is located in the northern part of the Dutch North Sea and covers almost 4,745 km<sup>2</sup>. The Dutch part of the Dogger Bank is part of the sandbank that extends over the British, Dutch, German and Danish Continental Shelves. It is an example of a shallow, permanently flooded sandbank, with the depth varying from 20 to 40 m. The receptor group 'marine mammals' is relevant to the Doggersbank SAC. Key literature sources, including relevant project literature, are as follows:

- [Volume A2, Chapter 4: Marine Mammals](#);
- [Volume A5, Annex 4.1: Marine Mammal Technical Report](#);
- [Volume A4, Annex 4.5: Subsea Noise Technical Report](#);
- Doggersbank SAC site information (in Dutch)<sup>50</sup>.

8.1.1.2 The site is designated for the following Annex I habitat:

- Sandbanks which are slightly covered by seawater all the time.

8.1.1.3 The following Annex II species:

- Harbour porpoise (*Phocoena phocoena*);
- Harbour (common) seal (*Phoca vitulina*); and
- Grey seal (*Halichoerus grypus*).

8.1.1.4 Due to its shallow depth, orientation and scale, Dogger Bank has a major effect on marine processes. The fauna north of the Dogger Bank differs considerably from that of the southern North Sea. Tidal currents and wave action cause intense water mixing above the shallow parts of the bank. Dogger Bank is more productive than the surrounding areas due to high benthic primary production and strong growth of organisms in the water column.

8.1.1.5 Potential for LSE has been identified for harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operations and maintenance and decommissioning).

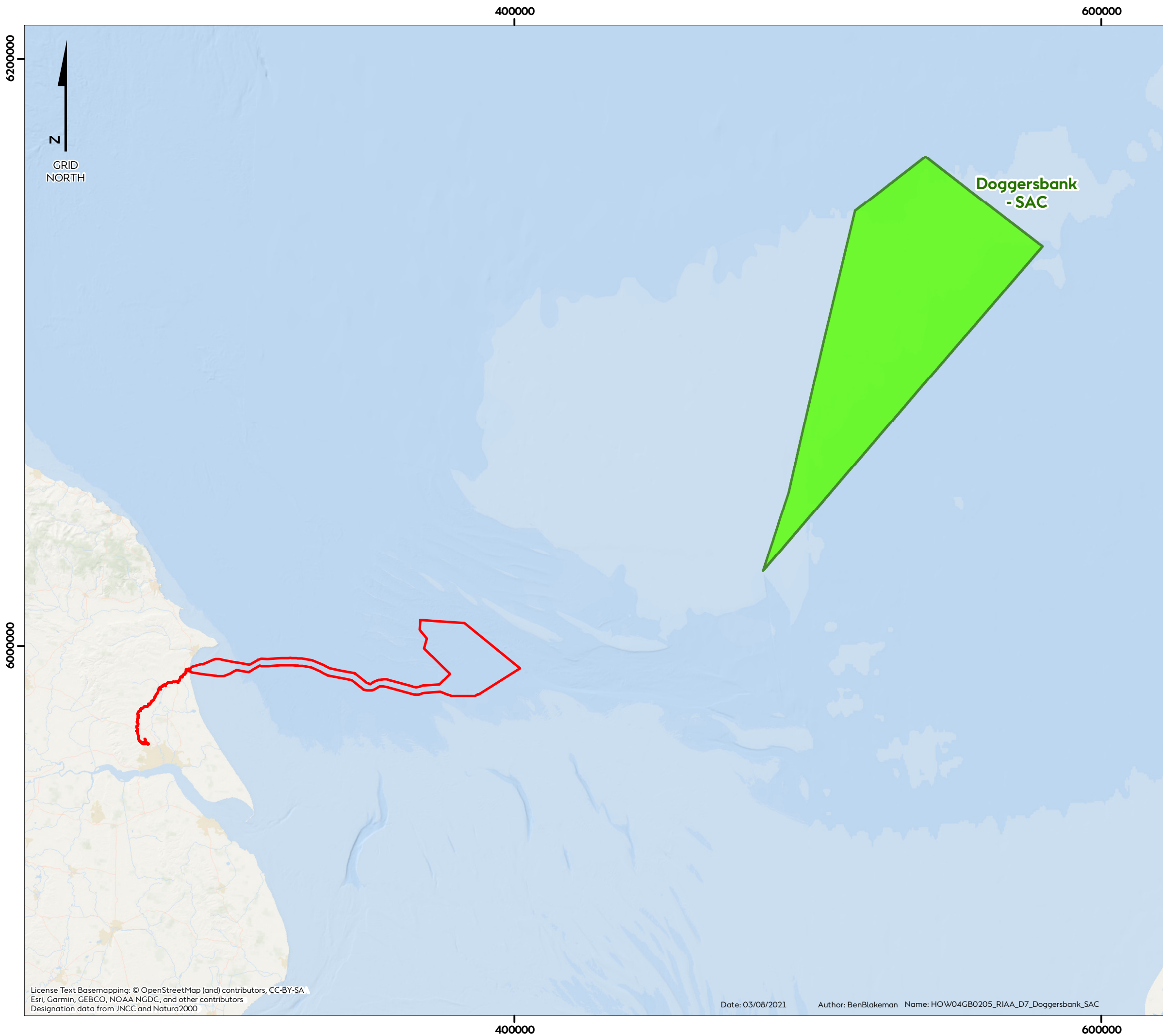
8.1.1.6 Further information for the Doggersbank SAC can be found on the Ministry of Agriculture, Nature and Food Quality website<sup>51</sup>, and includes national conservation status and conservation targets for the site features. For all relevant features national conservation status is identified as 'moderately favourable'. The targets applicable to features for which potential LSE was identified are listed below:

- Conserve the area and quality of supporting habitat; and
- Conserve the population size.

<sup>50</sup><https://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx?subj=n2k&groep=13&id=n2k164&topic=introductie>

<sup>51</sup><https://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx?subj=n2k&groep=13&id=n2k164&topic=doelstelling>





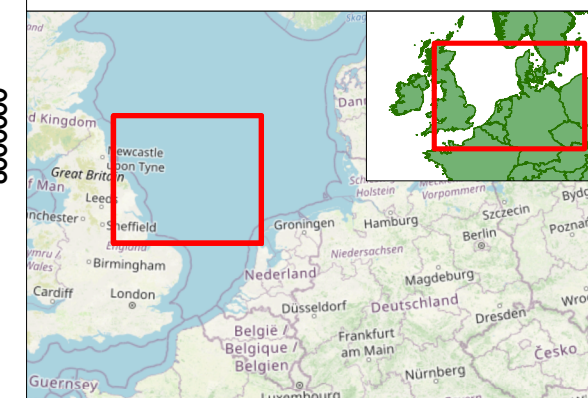
# Hornsea Four

## Figure D 7

### Doggersbank SAC

#### in Relation to Hornsea Four

- Order Limits
- Doggersbank SAC



Coordinate system: ETRS 1989 UTM Zone 31N  
 Scale@A3: 1:1,250,000

0 25 50 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
...	First Issue	03/08/2021

Doggersbank SAC  
 Relative to Hornsea Four  
 Document no: HOW04GB0205  
 Created by: BPHB  
 Checked by: SK  
 Approved by: LK



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 Designation data from JNCC and Natura2000

## 9 Klaverbank SCI

9.1.1.1 The Klaverbank is located in the northwestern part of the Dutch North Sea. The sediments consists of (coarse) gravel and larger stones in alternation with coarse sand and shell material. The presence of coarse sediment types offers a specific living environment for, among other things, organisms bound to substrate. The structure of the habitat type is formed by the growth of organisms that are connected to the substrate, and by algae that can fix the loose sediment together. The receptor group 'marine mammals' is relevant to the Klaverbank SCI. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammal Technical Report;**
- **Volume A4, Annex 4.5: Subsea Noise Technical Report;** and
- Klaverbank SCI site information (in Dutch)<sup>52</sup>.

9.1.1.2 The site is designated for the following Annex I habitat:

- Reefs.

9.1.1.3 The following Annex II species:

- Harbour porpoise (*Phocoena phocoena*);
- Harbour (common) seal (*Phoca vitulina*); and
- Grey seal (*Halichoerus grypus*).

9.1.1.4 Potential for LSE has been identified for harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operations and maintenance and decommissioning).

9.1.1.5 Additional information for the Klaverbank SCI can be found on the Ministry of Agriculture, Nature and Food Quality website<sup>53</sup>, and includes national conservation status and conservation targets for the site features. For all relevant features national conservation status is identified as 'moderately favourable'. The targets applicable to features for which potential LSE was identified are listed below:

- Conserve the area and quality of supporting habitat; and
- Conserve the population size.

<sup>52</sup> <https://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx?subj=n2k&groep=1.3&id=n2k1.65>

<sup>53</sup> <https://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx?subj=n2k&groep=1.3&id=n2k1.65&topic=doelstelling>

300000

400000

500000

6100000





6100000

# Hornsea Four

## Figure D 8

### Klaverbank SCI

in Relation to Hornsea Four

-  Order Limits
-  Klaverbank SCI

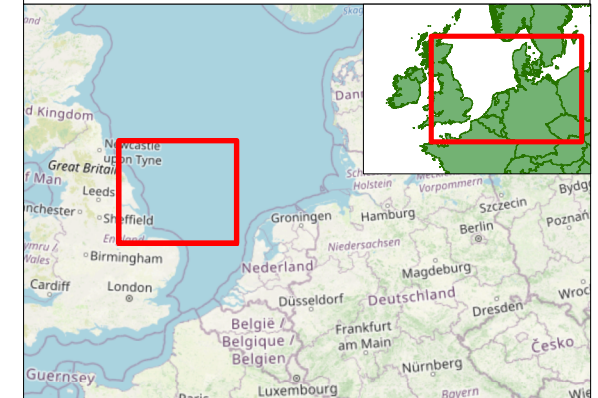
6000000

Klaverbank  
- SCI

6000000

5900000

5900000



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:1,000,000

0 20 40 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
...	First Issue	03/08/2021

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Designation data from JNCC and Natura2000

Date: 03/08/2021

Author: BenBlakeman

Name: HOW04GB0206\_RIAA\_D8\_Klaverbank\_SCI

Klaverbank SCI  
Relative to Hornsea Four  
Document no: HOW04GB0206  
Created by: BPHB  
Checked by: SK  
Approved by: LK



300000

400000

500000

## 10 Bancs des Flandres SCI

10.1.1.1 The Bancs des Flandres SCI (Bank of Flanders) was first proposed in 2010, with the site information sourced dated May 2019<sup>54</sup>. The site is wholly marine and located in French waters and extends for some 112,919 ha. The receptor group 'marine mammals' is relevant to the Bancs des Flandres SCI. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammal Technical Report;**
- **Volume A4, Annex 4.5: Subsea Noise Technical Report;** and
- Bancs des Flandres SCI site information (in French)<sup>55</sup>.

10.1.1.2 The site is designated for the following Annex I habitat:

- Sandbanks which are slightly covered by sea water all the time.

10.1.1.3 The following Annex II species:

- Harbour porpoise (*Phocoena phocoena*);
- Harbour (common) seal (*Phoca vitulina*); and
- Grey seal (*Halichoerus grypus*).

10.1.1.4 Potential for LSE has been identified for grey seal (*Halichoerus grypus*) only, under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operations and maintenance and decommissioning).

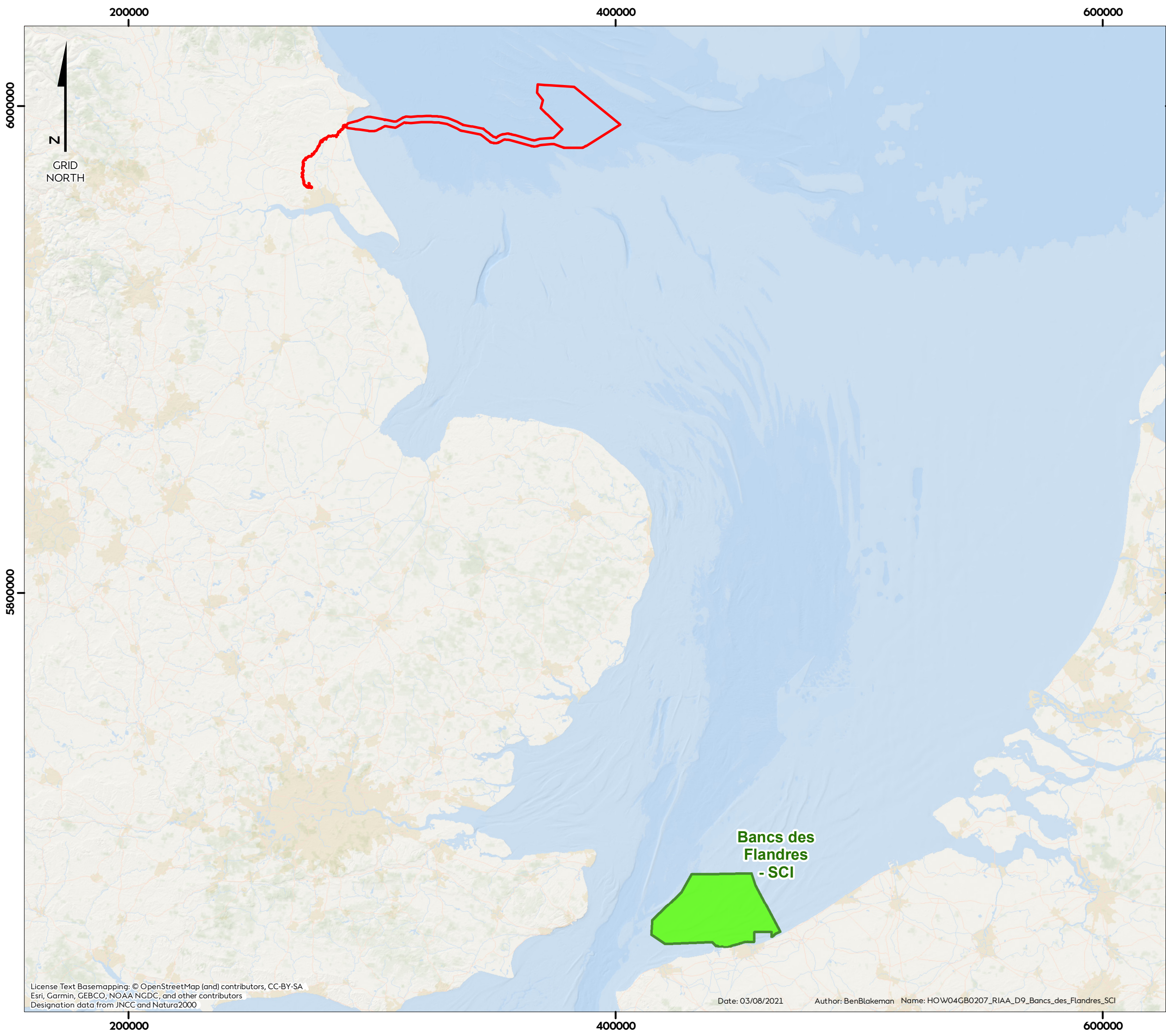
10.1.1.5 No draft Conservation Objectives have been sourced for the Bancs des Flandres SCI, with no management plan available and the information indicating that an objectives document is yet to be produced<sup>56</sup>. Therefore, as a proxy and to ensure consistency across the RIAA, the conservation objectives applied elsewhere for transboundary assessments for grey seal have been applied here. The focus of these is on conserving the habitat and population.

<sup>54</sup> <https://inpn.mnhn.fr/site/natura2000/FR3102002>

<sup>55</sup> <https://inpn.mnhn.fr/site/natura2000/FR3102002/tab/gestion>

<sup>56</sup> <https://inpn.mnhn.fr/site/natura2000/FR3102002/tab/gestion>

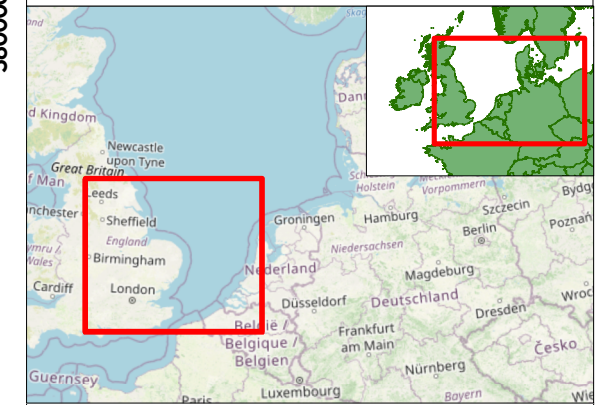




# Hornsea Four

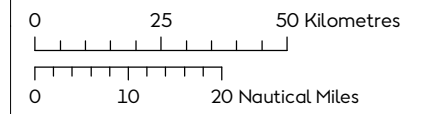
Figure D 9  
Bancs des Flandres SCI  
in Relation to Hornsea Four

- Order Limits
- Bancs des Flandres SCI



**Bancs des Flandres - SCI**

Coordinate system: ETRS 1989 UTM Zone 31N  
Scale@A3: 1:1,500,000



REV	REMARK	DATE
...	First Issue	03/08/2021

Bancs des Flandres SCI  
Relative to Hornsea Four  
Document no: HOW04GB0207  
Created by: BPHB  
Checked by: SK  
Approved by: LK



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Designation data from JNCC and Natura2000



## 11 Vlaamse Banken SCI

11.1.1.1 The Vlaamse Banken SCI is located in Belgian waters and extends for some 109,940 ha<sup>57</sup>. The receptor group 'marine mammals' is relevant to the Vlaamse Banken SCI. Key literature sources, including relevant project literature, are as follows:

- [Volume A2, Chapter 4: Marine Mammals](#);
- [Volume A5, Annex 4.1: Marine Mammal Technical Report](#);
- [Volume A4, Annex 4.5: Subsea Noise Technical Report](#); and
- Vlaamse Banken SCI site information<sup>58</sup>.

11.1.1.2 The site is designated for the following Annex I habitat:

- Sandbanks which are slightly covered by sea water all the time;
- Reefs.

11.1.1.3 The following Annex II species:

- Twaite shad (*Alosa fallax*);
- River lamprey (*Lampetra fluviatilis*);
- Sea lamprey (*Petromyzon marinus*);
- Harbour porpoise (*Phocoena phocoena*);
- Harbour (common) seal (*Phoca vitulina*); and
- Grey seal (*Halichoerus grypus*).

11.1.1.4 Potential for LSE has been identified for grey seal (*Halichoerus grypus*) only under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operations and maintenance and decommissioning).

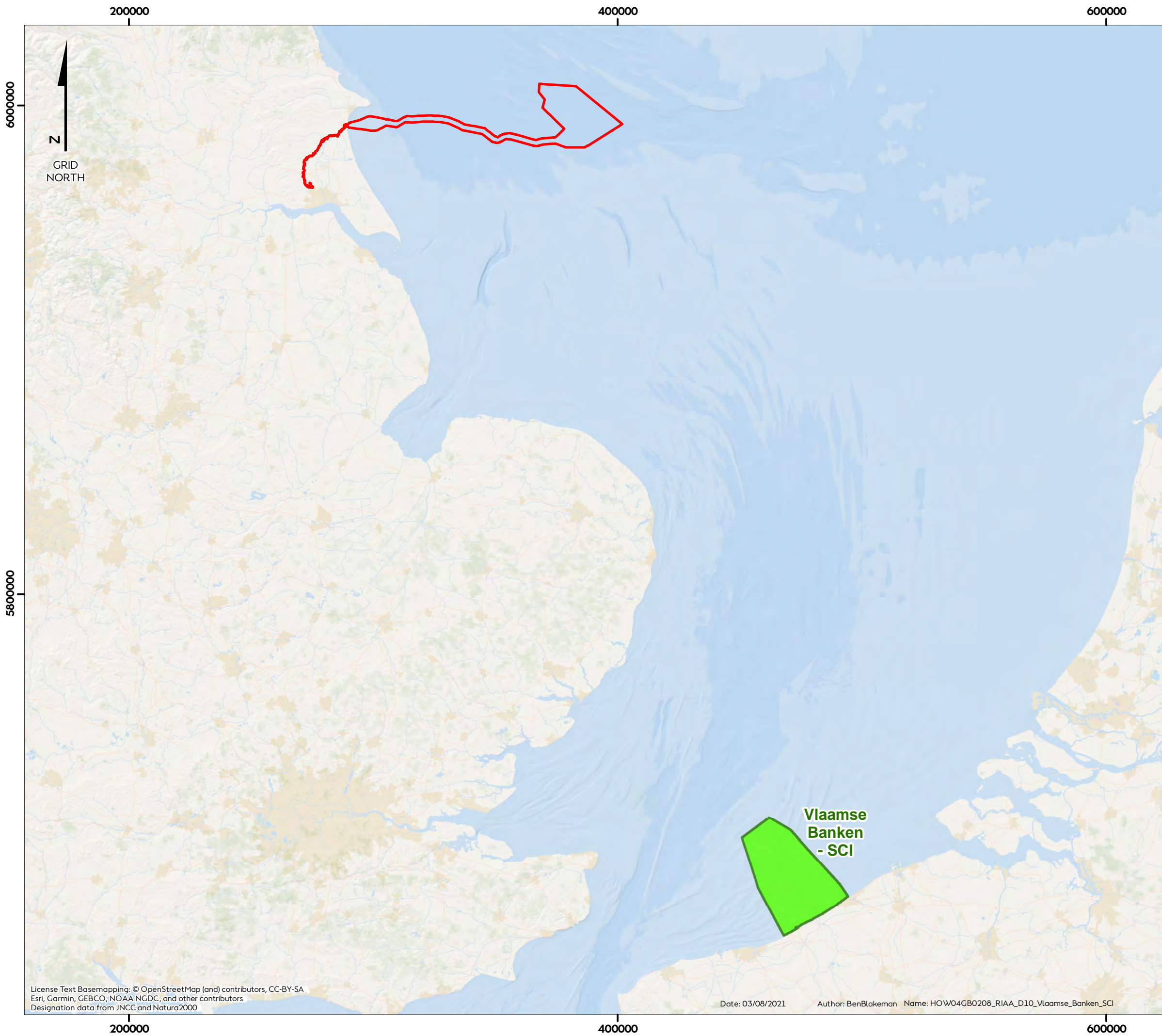
11.1.1.5 Additional information for the Vlaamse Banken SCI can be found in the Natura 2000 data form<sup>59</sup>; no information on conservation status or conservation targets for the site features have been sourced. Therefore, as a proxy and to ensure consistency across the RIAA, the conservation objectives applied elsewhere for transboundary assessments for grey seal have been applied here. The focus of these is on conserving the habitat and population.

<sup>57</sup> <http://natura2000.eea.europa.eu/natura2000/SDF.aspx?site=BEMNZ0001#3>

<sup>58</sup> <http://natura2000.eea.europa.eu/natura2000/SDF.aspx?site=BEMNZ0001#3>

<sup>59</sup> <http://natura2000.eea.europa.eu/natura2000/SDF.aspx?site=BEMNZ0001#3>

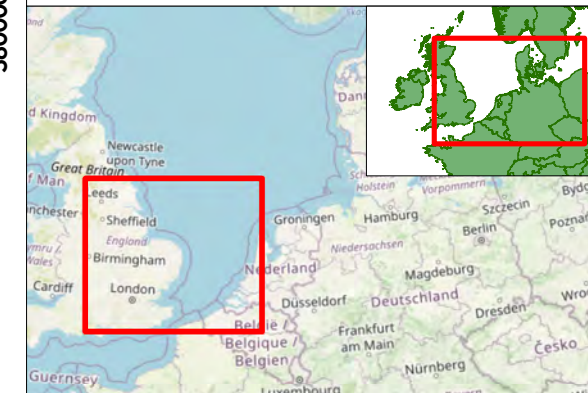




# Hornsea Four

Figure D 10  
 Vlaamse Banken SCI  
 in Relation to Hornsea Four

- Order Limits
- Vlaamse Banken SCI



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:1,500,000

0 25 50 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
...	First Issue	03/08/2021

Vlaamse Banken SCI  
 Relative to Hornsea Four  
 Document no: HOW04GB0208  
 Created by: BPHB  
 Checked by: SK  
 Approved by: LK



## 12 SBZ 1 SCI

12.1.1.1 The SBZ 1 SCI is located in Belgian waters and extends for some 6,315.6 ha<sup>60</sup>. The receptor group 'marine mammals' is relevant to the SBZ 1 SCI. Key literature sources, including relevant project literature, are as follows:

- **Volume A2, Chapter 4: Marine Mammals;**
- **Volume A5, Annex 4.1: Marine Mammal Technical Report;**
- **Volume A4, Annex 4.5: Subsea Noise Technical Report;** and
- SBZ 1 SCI site information<sup>61</sup>.

12.1.1.2 The site is designated for the following Annex I habitat:

- Sandbanks which are slightly covered by sea water all the time;
- Reefs.

12.1.1.3 The following Annex II species:

- Twaite shad (*Alosa fallax*);
- River lamprey (*Lampetra fluviatilis*);
- Sea lamprey (*Petromyzon marinus*);
- Harbour porpoise (*Phocoena phocoena*);
- Harbour (common) seal (*Phoca vitulina*); and
- Grey seal (*Halichoerus grypus*).

12.1.1.4 Potential for LSE has been identified for grey seal (*Halichoerus grypus*) only under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operations and maintenance and decommissioning).

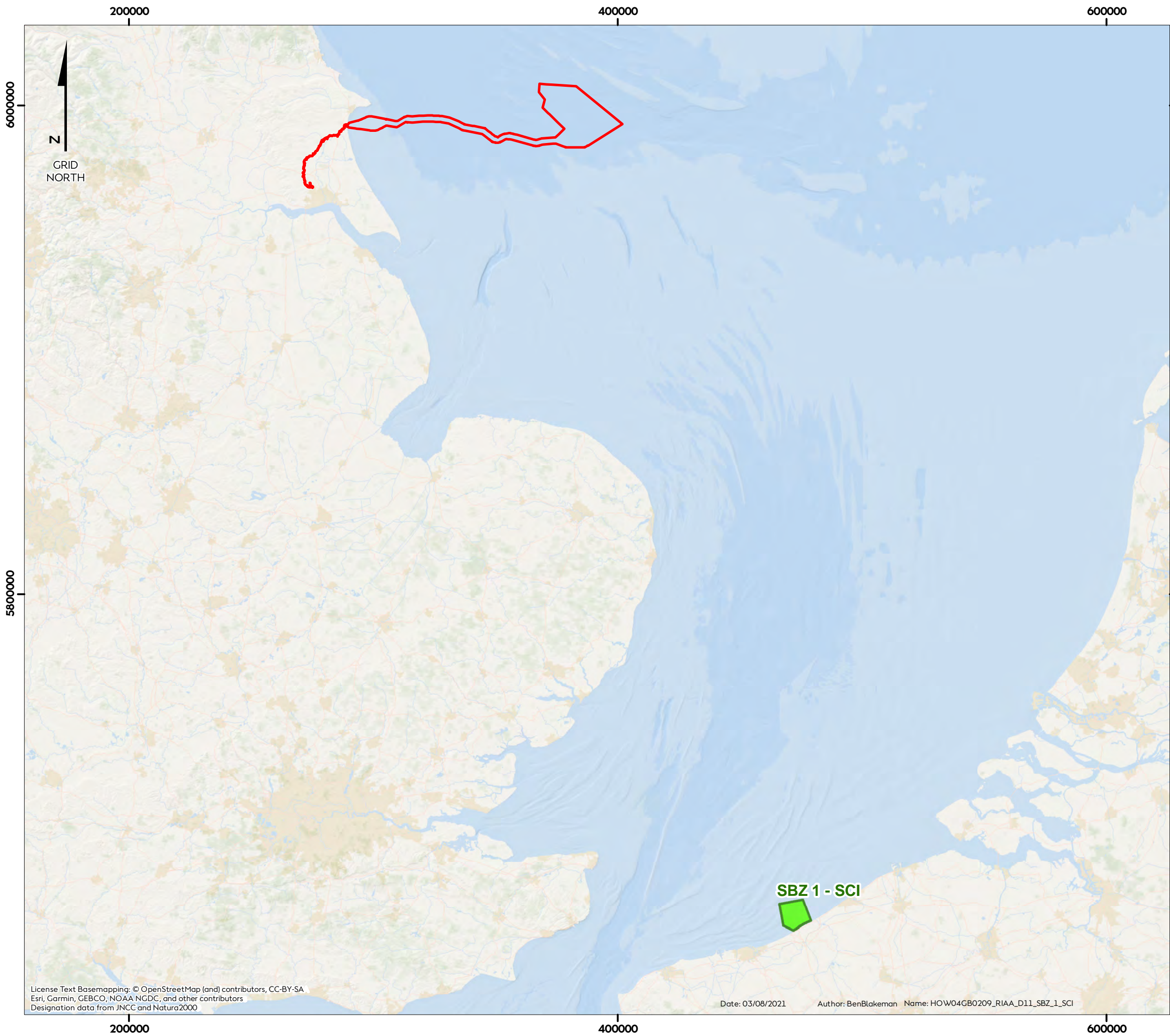
12.1.1.5 Additional information for the SBZ 1 SCI can be found in the Natura 2000 data form<sup>62</sup>; no information on conservation status or conservation targets for the site features have been sourced. Therefore, as a proxy and to ensure consistency across the RIAA, the conservation objectives applied elsewhere for transboundary assessments for grey seal have been applied here. The focus of these is on conserving the habitat and population.

<sup>60</sup> <http://eunis.eea.europa.eu/sites/BEMNZ0002>

<sup>61</sup> <http://eunis.eea.europa.eu/sites/BEMNZ0002>

<sup>62</sup> <http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BEMNZ0002>

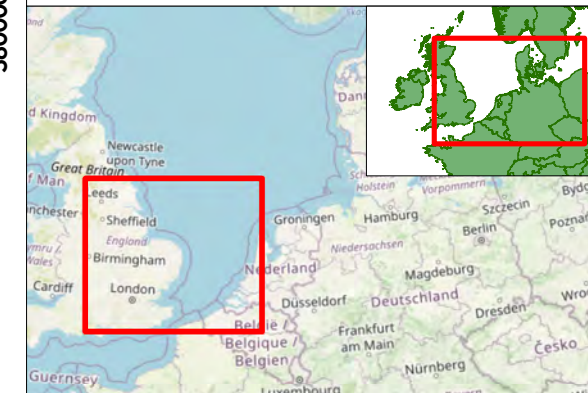




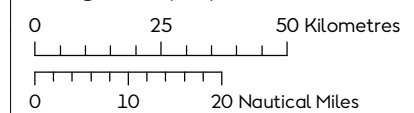
# Hornsea Four

Figure D 11  
SBZ 1 SCI  
in Relation to Hornsea Four

- Order Limits
- SBZ 1 SCI



Coordinate system: ETRS 1989 UTM Zone 31N  
Scale@A3: 1:1,500,000



REV	REMARK	DATE
...	First Issue	03/08/2021

SBZ 1 SCI  
Relative to Hornsea Four  
Document no: HOW04GB0209  
Created by: BPHB  
Checked by: SK  
Approved by: LK



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Designation data from JNCC and Natura2000

## 13 SBZ 2 SCI

13.1.1.1 The SBZ 2 SCI is located in Belgian waters and extends for some 8,139.7 ha<sup>63</sup>. The receptor group 'marine mammals' is relevant to the SBZ 2 SCI. Key literature sources, including relevant project literature, are as follows:

- [Volume A2, Chapter 4: Marine Mammals](#);
- [Volume A5, Annex 4.1: Marine Mammal Technical Report](#);
- [Volume A4, Annex 4.5: Subsea Noise Technical Report](#); and
- SBZ 2 SCI site information<sup>64</sup>.

13.1.1.2 The site is designated for the following Annex I habitat:

- Sandbanks which are slightly covered by sea water all the time;
- Reefs.

13.1.1.3 The following Annex II species:

- Twaité shad (*Alosa fallax*);
- River lamprey (*Lampetra fluviatilis*);
- Sea lamprey (*Petromyzon marinus*);
- Harbour porpoise (*Phocoena phocoena*);
- Harbour (common) seal (*Phoca vitulina*); and
- Grey seal (*Halichoerus grypus*).

13.1.1.4 Potential for LSE has been identified for grey seal (*Halichoerus grypus*) only under the following scenarios:

- Increase in underwater noise (construction and decommissioning); and
- Vessel disturbance (construction, operations and maintenance and decommissioning).

13.1.1.5 Additional information for the SBZ 2 SCI can be found in the Natura 2000 data form<sup>65</sup>; no information on conservation status or conservation targets for the site features have been sourced. Therefore, as a proxy and to ensure consistency across the RIAA, the conservation objectives applied elsewhere for transboundary assessments for grey seal have been applied here. The focus of these is on conserving the habitat and population.

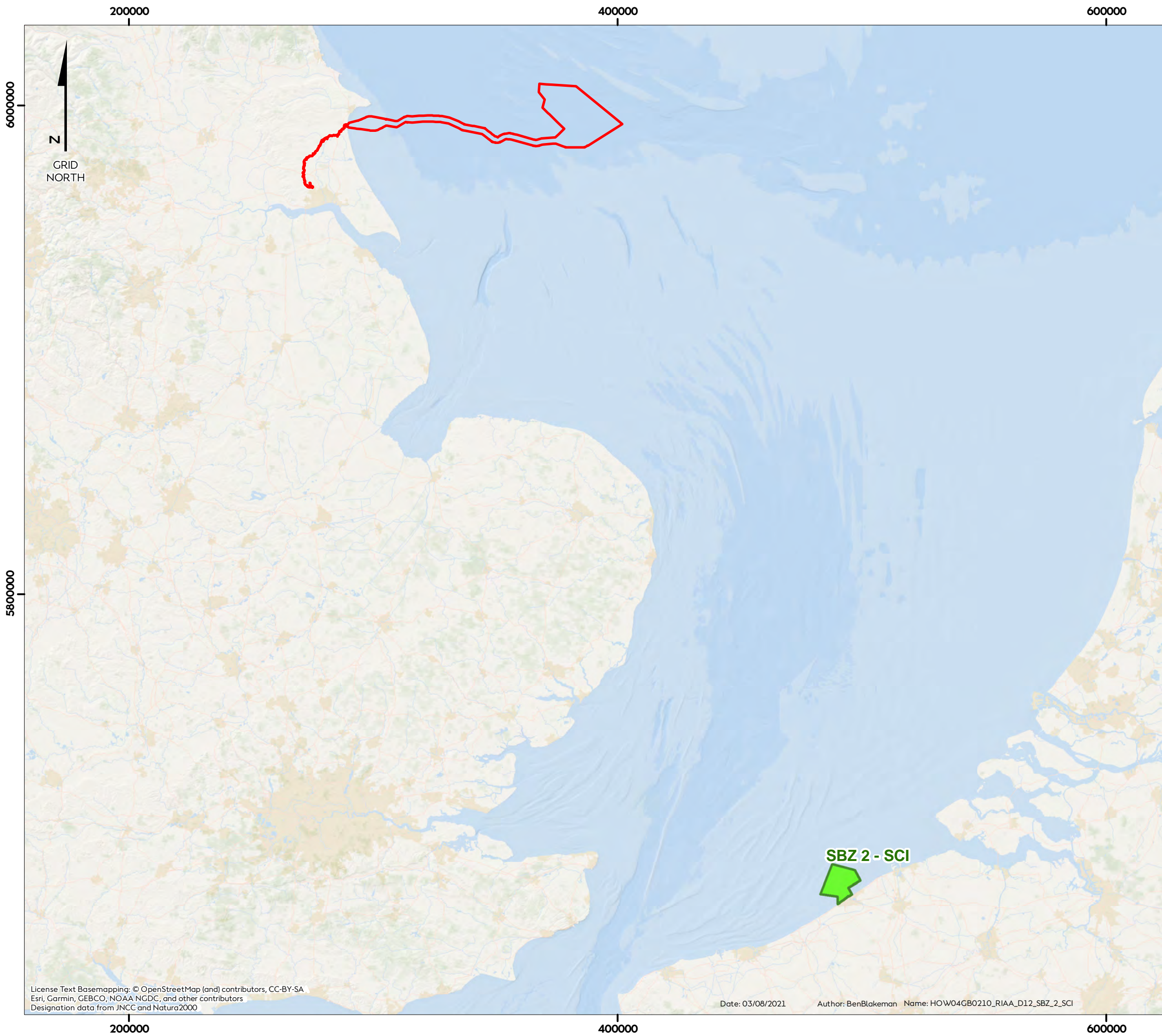
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<sup>63</sup> <http://eunis.eea.europa.eu/sites/BEMNZ0003>

<sup>64</sup> <http://eunis.eea.europa.eu/sites/BEMNZ0003>

<sup>65</sup> <http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=BEMNZ0003>

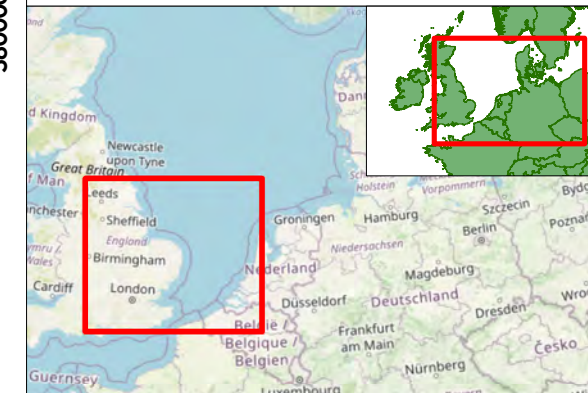




# Hornsea Four

Figure D 12  
SBZ 2 SCI  
in Relation to Hornsea Four

- Order Limits
- SBZ 2 SCI



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:1,500,000

0 25 50 Kilometres

0 10 20 Nautical Miles

REV	REMARK	DATE
...	First Issue	03/08/2021

SBZ 2 SCI  
Relative to Hornsea Four  
Document no: HOW04GB0210  
Created by: BPHB  
Checked by: SK  
Approved by: LK

