

SCOTTISHPOWER  
RENEWABLES

# East Anglia TWO and East Anglia ONE North Offshore Windfarms

## Deadline 12 Offshore Ornithology Cumulative and In-Combination Collision and Displacement Update

Applicants: East Anglia TWO Limited / East Anglia ONE North Limited

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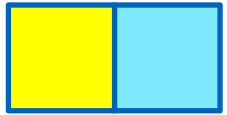
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Applicable to **East Anglia TWO** and **East Anglia ONE North**

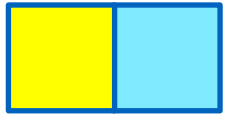


### Revision Summary

Rev	Date	Prepared by	Checked by	Approved by
001	28/06/2021	Paolo Pizzolla	Lesley Jamieson / Ian MacKay	Rich Morris

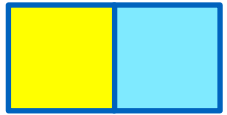
### Description of Revisions

Rev	Page	Section	Description
001	n/a	n/a	Final for Submission



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## Glossary of Acronyms

AEoI	Adverse Effect on Integrity
AOE	Alde-Ore Estuary
CRM	Collision Risk Model
FFC	Flamborough and Filey Coast
GBBG	Great Black-Backed Gull
HRA	Habitats Regulations Assessment
LBBG	Lesser Black-Backed Gull
ISAA	Information to Support Appropriate Assessment Report
MHWS	Mean High Water Springs
MSL	Mean Sea Level
NE	Natural England
NMC	Non-material change
SNH	Scottish Natural Heritage
SPA	Special Protection Area

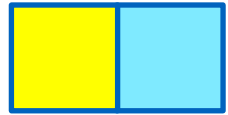


## Glossary of Terminology

Applicant	East Anglia TWO Limited / East Anglia ONE North Limited
Construction operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Generation Deemed Marine Licence (DML)	The deemed marine licence in respect of the generation assets set out within Schedule 13 of the draft DCO.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms, these cables will include fibre optic cables.
Jointing bay	Underground structures constructed at intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.
Meteorological mast	An offshore structure which contains metrological instruments used for wind data acquisition.
Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.
Marking buoys	Buoys to delineate spatial features / restrictions within the offshore development area.



Monitoring buoys	Buoys to monitor <i>in situ</i> condition within the windfarm, for example wave and metocean conditions.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Offshore cable corridor	This is the area which will contain the offshore export cables between offshore electrical platforms and landfall.
Offshore development area	The East Anglia TWO / East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs).
Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall. These cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the construction, operation and maintenance platform and the offshore electrical platforms.
Platform link cable	Electrical cable which links one or more offshore platforms. These cables will include fibre optic cables.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.
Transmission DML	The deemed marine licence in respect of the transmission assets set out within Schedule 14 of the draft DCO.



# 1 Introduction

1. This document provides cumulative and in-combination collision risk and displacement abundance updates, replacing the previous versions of these tables submitted at Deadline 11 (REP11-027). The updates in the current tables are as follows:
  - Hornsea Project Three; using the values provided by Ørsted (2021<sup>1</sup>) and accepted by Natural England (as advised via email 10<sup>th</sup> June 2021); and
  - East Anglia THREE reverting to the Norfolk Boreas Deadline 8 numbers.
2. The Applicants note that a Non-Material Change (NMC) application for the East Anglia THREE project has been granted<sup>2</sup> and that a NMC application for East Anglia ONE to update the consent to match the as-built operational windfarm has been submitted to the Planning Inspectorate. Both of these NMCs include reduced collision estimates which the Applicants consider should be used in this document however Natural England do not consider this to be appropriate (REP11-121) and so the Applicants have used the Natural England agreed estimates.
3. Given that a NMC for East Anglia ONE has not yet been granted, no estimates associated with the NMC application have been incorporated into the cumulative and in-combination collision risk and displacement abundance tables below. The Applicants do however note that the NMC for East Anglia ONE is seeking to amend the DCO to reflect the as-built windfarm.
4. Given that the NMC for East Anglia THREE has been granted and therefore the DCO for East Anglia THREE has been amended, the Applicants consider the East Anglia THREE estimates reflected within the NMC application to be the most appropriate for use within the cumulative and in-combination assessment. However, given NE's position on this matter, the Applicants have retained the Norfolk Boreas Deadline 8 numbers within the tables in **section 2** but for context, **Table 1** provides a comparison of the East Anglia THREE estimates from Norfolk Boreas Deadline 8 and the estimates reflected within the NMC application.

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<sup>1</sup> Hornsea Three: Calculation of effect estimates. Ørsted, 2021.

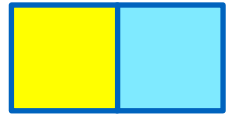
<sup>2</sup><https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/EN010056/EN010056-002489-210415%20Decision%20Letter%20-%20EA3%20NMC.pdf>



**Table 1 Comparison of collision risk estimates using the East Anglia THREE figures from the NMC application and Norfolk Boreas Deadline 8**

Windfarm	Version	Gannet		Kittiwake		LBBG		GBBG	Herring gull
		EIA	HRA (FFC SPA)	EIA	HRA (FFC SPA)	EIA	HRA (AOE SPA)	EIA	EIA
East Anglia THREE	Boreas Deadline 8	49	8.3	112.7	6.4	10	0.7	39	23
	DCO as amended 16 April 2021	41.8	7.1	92.3	6.1	8.5	0.6	34.4	21.4
<b>Annual total (all projects) with East Anglia THREE DCO as amended 16 April 2021</b>		<b>3004.8</b>	<b>340.0</b>	<b>4223.1</b>	<b>531.8</b>	<b>531.0</b>	<b>56.2</b>	<b>995.5</b>	<b>755.4</b>
<b>Annual total (all projects) with East Anglia THREE estimates from Boreas Deadline 8</b>		<b>3012.0</b>	<b>341.6</b>	<b>4243.5</b>	<b>532.9</b>	<b>532.5</b>	<b>55.5</b>	<b>1000.1</b>	<b>757.0</b>





## 2 Updated Cumulative and In-Combination Collision Risk Tables

5. In this Deadline 12 update, the Applicants have included summary rows which include all projects previously agreed at Deadline 8 of the Norfolk Boreas examination (which is the commonly agreed position), with the inclusion of Hornsea Project Three (using Natural England agreed figures). Norfolk Vanguard and the PEIR projects (Hornsea Project Four, Dudgeon Extension and Sheringham Extension (DEP and SEP)) are then included individually and altogether in a grand total for all windfarms in the tables.

### 2.1 Gannet

**Table 1 Updated gannet cumulative and in-combination collision risk**

Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Beatrice Demonstrator	0.6	0	0.9	0.04	0.7	0.05	2.2	0.1
1	Greater Gabbard	14	0	8.8	0.42	4.8	0.3	27.5	0.7
1	Gunfleet Sands	-	-	-	-	-	-	-	-
1	Kentish Flats	1.4	0	0.8	0.04	1.1	0.07	3.3	0.1
1	Kentish Flats Extension	-	-	-	-	-	-	-	-
1	Lincs	2.1	2.1	1.3	0.06	1.7	0.1	5	2.3
1	London Array	2.3	0	1.4	0.07	1.8	0.11	5.5	0.2
1	Lynn and Inner Dowsing	0.2	0.2	0.1	0.01	0.2	0.01	0.5	0.2
1	Scroby Sands	-	-	-	-	-	-	-	-
1	Sheringham Shoal	14.1	14.1	3.5	0.17	0	0	17.6	14.3
1	Teesside	4.9	2.4	1.7	0.08	0	0	6.7	2.5
1	Thanet	1.1	0	0	0	0	0	1.1	0



Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Humber Gateway	1.9	1.9	1.1	0.05	1.5	0.09	4.5	2
1	Westermost Rough	0.2	0.2	0.1	0.01	0.2	0.01	0.5	0.2
1	Hywind	5.6	0	0.8	0.04	0.8	0.05	7.2	0.1
2	Kincardine	3	0	0	0	0	0	3	0
2	Beatrice	37.4	0	48.8	2.34	9.5	0.59	95.7	2.9
2	Dudgeon	22.3	22.3	38.9	1.87	19.1	1.18	80.3	25.3
2	Galloper	18.1	0	30.9	1.48	12.6	0.78	61.6	2.3
2	Race Bank	33.7	33.7	11.7	0.56	4.1	0.25	49.5	34.5
2	Rampion	36.2	0	63.5	3.05	2.1	0.13	101.8	3.2
2	Hornsea Project One	11.5	11.5	32	1.54	22.5	1.4	66	14.4
3	Blyth Demonstration Project	3.5	0	2.1	0.1	2.8	0.17	8.4	0.3
3	Dogger Bank Creyke Beck Projects A and B	81.1	40.6	83.5	4.0	54.4	3.4	219.0	47.9
3	East Anglia ONE	3.4	3.4	131.0	6.3	6.3	0.4	141.0	10.1
3	European Offshore Wind Deployment Centre	4.2	0	5.1	0.25	0.1	0	9.3	0.3
3	Firth of Forth Alpha and Bravo	800.8	0	49.3	2.37	65.8	4.08	915.9	6.4
3	Inch Cape	336.9	0	29.2	1.4	5.2	0.32	371.3	1.7
3	Methil	6	0	0	0	0	0	6	0



Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
3	Moray Firth (EDA)	80.6	0	35.4	1.7	8.9	0.55	124.9	2.3
3	Near na Gaoithe	143	0	47	2.26	23	1.43	213	3.7
3	Dogger Bank Teesside Projects A and B	14.8	7.4	10.1	0.49	10.8	0.67	35.7	8.5
3	Triton Knoll	26.8	26.8	64.1	3.08	30.1	1.87	121	31.7
3	Hornsea Project Two	7	7	14	0.67	6	0.37	27	8
4	East Anglia THREE	6.1	6.1	33.3	1.6	9.6	0.6	49	8.3
5	Hornsea Project Three - revised	10	6	5	0	4	0	19	7
5	Moray West	10	0	2	0.1	1	0.06	13	0.2
6	Norfolk Boreas	14.1	14.2	12.7	0.61	3.9	0.24	30.7	15.1
6	East Anglia TWO	12.5	12.5	23.1	1.1	4.0	0.2	39.6	13.8
6	East Anglia ONE North	12.4	12.4	11.0	0.52	1.1	0.07	24.5	13.0
	<b>Total (all projects above)</b>	<b>1783.8</b>	<b>224.8</b>	<b>804.2</b>	<b>38.4</b>	<b>319.7</b>	<b>19.6</b>	<b>2907.8</b>	<b>283.6</b>
6	Norfolk Vanguard	8.2	8.2	18.6	0.89	5.3	0.33	32.1	9.4
	<b>Total with Norfolk Vanguard</b>	<b>1792.0</b>	<b>233.0</b>	<b>822.8</b>	<b>39.3</b>	<b>325.0</b>	<b>19.9</b>	<b>2939.9</b>	<b>293.0</b>
6	Hornsea 4 (PEIR)	3.96	3.96	6.43	0.31	0.36	0.02	10.75	4.29



Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
6	DEP and SEP (PEIR)	43.3	43.3	9.9	0.48	8.1	0.5	61.3	44.3
	<b>Total with Hornsea 4, DEP and SEP</b>	<b>1831.1</b>	<b>272.1</b>	<b>820.5</b>	<b>39.2</b>	<b>328.2</b>	<b>20.1</b>	<b>2979.9</b>	<b>332.2</b>
	<b>Total (all projects)</b>	<b>1839.3</b>	<b>280.3</b>	<b>839.1</b>	<b>40.1</b>	<b>333.5</b>	<b>20.5</b>	<b>3012.0</b>	<b>341.6</b>



## 2.2 Kittiwake

**Table 2 Updated kittiwake cumulative and in-combination collision risk**

Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Beatrice Demonstrator	0.0	0.0	2.1	0.1	1.7	0.1	3.8	0.2
1	Greater Gabbard	1.1	0.0	15.0	0.8	11.4	0.8	27.5	1.6
1	Gunfleet Sands	-	-	-	-	-	-	-	
1	Kentish Flats	0.0	0.0	0.9	0.1	0.7	0.1	1.6	0.1
1	Kentish Flats Extension	0.0	0.0	0.0	0.0	2.7	0.2	2.7	0.2
1	Lincs	0.7	0.7	1.2	0.1	0.7	0.1	2.6	0.8
1	London Array	1.4	0.0	2.3	0.1	1.8	0.1	5.5	0.3
1	Lynn and Inner Dowsing	-	-	-	-	-	-	-	
1	Scroby Sands	-	-	-	-	-	-	-	
1	Sheringham Shoal	-	-	-	-	-	-	-	
1	Teesside	38.4	0.0	24.0	1.3	2.5	0.2	64.9	1.5
1	Thanet	0.2	0.0	0.5	0.0	0.4	0.0	1.1	0.1
1	Humber Gateway	1.9	1.9	3.2	0.2	1.9	0.1	7.0	2.2
1	Westermost Rough	0.1	0.1	0.2	0.0	0.1	0.0	0.5	0.1
1	Hywind	16.6	0.0	0.9	0.1	0.9	0.1	18.3	0.1
2	Kincardine	22.0	0.0	9.0	0.5	1.0	0.1	32.0	0.6
2	Beatrice	94.7	0.0	10.7	0.6	39.8	2.9	145.2	3.5
2	Dudgeon	-	-	-	-	-	-	-	
2	Galloper	6.3	0.0	27.8	1.5	31.8	2.3	65.9	3.8
2	Race Bank	1.9	1.9	23.9	1.3	5.6	0.4	31.4	3.6
2	Rampion	54.4	0.0	37.4	2.0	29.7	2.1	121.5	4.2
2	Hornsea Project One	44.0	36.5	55.9	3.0	20.9	1.5	120.8	41.0



Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
3	Blyth Demonstration Project	1.7	0.0	2.3	0.1	1.4	0.1	5.4	0.2
3	Dogger Bank Creyke Beck Projects A and B	288.6	55.8	135.0	7.3	295.4	21.3	719.0	84.3
3	East Anglia ONE	1.8	0	160.4	8.7	46.8	3.4	209.0	12.0
3	European Offshore Wind Deployment Centre	11.8	0.0	5.8	0.3	1.1	0.1	18.7	0.4
3	Firth of Forth Alpha and Bravo	153.1	0.0	313.1	16.9	247.6	17.8	713.8	34.7
3	Inch Cape	13.1	0.0	224.8	12.1	63.5	4.6	301.4	16.7
3	Methil	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0
3	Moray Firth (EDA)	43.6	0.0	2.0	0.1	19.3	1.4	64.9	1.5
3	Neart na Gaoithe	32.9	0.0	56.1	3.0	4.4	0.3	93.4	3.4
3	Dogger Bank Teesside Projects A and B	136.9	26.4	90.7	4.9	216.9	15.6	444.5	46.9
3	Triton Knoll	24.6	24.6	139.0	7.5	45.4	3.3	209.0	35.4
3	Hornsea Project Two	16.0	13.3	9.0	0.5	3.0	0.2	28.0	14.0
4	East Anglia THREE	6.1	0	69	3.7	37.6	2.7	112.7	6.4
5	Hornsea Project Three - revised <sup>3</sup>	77	0 (72)	38	0 (2)	8	0 (1)	123	0 (75)
5	Moray West	79.0	0.0	24.0	1.3	7.0	0.5	110.0	1.8
6	Norfolk Boreas	13.3	11.4	32.2	1.7	11.9	0.9	57.5	14.0
6	East Anglia TWO	29.5	0	5.4	0.3	7.4	0.5	42.3	0.8

<sup>3</sup> Note that the contribution from Hornsea Project Three to the FFC SPA has been removed on the assumption that these collisions will be fully compensated for by the project. The actual estimates are provided in parentheses.



Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
6	East Anglia ONE North	40.4	0	8.1	0.43	3.5	0.25	52	0.7
	<b>Total (all projects above)</b>	<b>1253.5</b>	<b>172.6</b>	<b>1529.9</b>	<b>80.5</b>	<b>1174</b>	<b>84.1</b>	<b>3957.3</b>	<b>337.1</b>
6	Norfolk Vanguard	21.8	18.7	16.4	0.9	19.3	1.4	57.5	21
	<b>Total with Norfolk Vanguard</b>	<b>1275.3</b>	<b>191.3</b>	<b>1546.3</b>	<b>81.4</b>	<b>1193</b>	<b>85.5</b>	<b>4014.8</b>	<b>358.1</b>
6	Hornsea 4 (PEIR)	153.3	153.3	34.7	1.9	9.9	0.7	197.9	155.9
6	DEP and SEP (PEIR)	18.13	18.13	10.46	0.56	2.2	0.16	30.79	18.85
	<b>Total with Hornsea 4, DEP and SEP</b>	<b>1424.9</b>	<b>344</b>	<b>1575.1</b>	<b>83</b>	<b>1185.9</b>	<b>84.9</b>	<b>4186.0</b>	<b>511.9</b>
	<b>Total (all projects)</b>	<b>1446.7</b>	<b>362.7</b>	<b>1591.5</b>	<b>83.9</b>	<b>1205.2</b>	<b>86.3</b>	<b>4243.5</b>	<b>532.9</b>



## 2.3 Lesser Black-Backed Gull

**Table 3 Updated lesser black-backed gull cumulative and in-combination collision risk**

Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	AOE SPA	Total	AOE SPA	Total	AOE SPA (nonbreeding season apportioned plus breeding season for wind farms <141km)*
1	Beatrice Demonstrator	-	-	-	-	-	-
1	Greater Gabbard	12.4	8	49.6	2	62	10
1	Gunfleet Sands	1	0.3	0	0	1	0.3
1	Kentish Flats	-	-	-	-	-	-
1	Kentish Flats Extension	0.3	0.1	1.3	0.1	1.6	0.2
1	Lincs	1.7		6.8	0.3	8.5	0.3
1	London Array	-	-	-	-	-	-
1	Lynn and Inner Dowsing	-	-	-	-	-	-
1	Scroby Sands	-	-	-	-	-	-
1	Sheringham Shoal	1.7	0.3	6.6	0.3	8.3	0.6
1	Teesside	0		0	0	0	0
1	Thanet	3.2	1.4	12.8	0.5	16	1.9
1	Humber Gateway	0.3		1.1	0	1.4	0
1	Westermost Rough	0.1		0.3	0	0.4	0
1	Hywind	0		0	0	0	0
2	Kincardine	0		0	0	0	0
2	Beatrice	0		0	0	0	0
2	Dudgeon	7.7	1.1	30.6	1.2	38.3	2.3





Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	AOE SPA	Total	AOE SPA	Total	AOE SPA (nonbreeding season apportioned plus breeding season for wind farms <141km)*
2	Galloper	27.8	18	111	4.4	138.8	22.4
2	Race Bank	43.2		10.8	0.4	54	0.4
2	Rampion	1.6		6.3	0.3	7.9	0.3
2	Hornsea Project One	4.4		17.4	0.7	21.8	0.7
3	Blyth Demonstration Project	0		0	0	0	0
3	Dogger Bank Creyke Beck Projects A and B	2.6		10.4	0.4	13	0.4
3	East Anglia ONE	5.9	2.2	33.8	1.4	39.7	3.6
3	European Offshore Wind Deployment Centre	0		0	0	0	0
3	Firth of Forth Alpha and Bravo	2.1		8.4	0.3	10.5	0.3
3	Inch Cape	0		0	0	0	0
3	Methil	0.5		0	0	0.5	0
3	Moray Firth (EDA)	0		0	0	0	0
3	Neart na Gaoithe	0.3		1.2	0	1.5	0
3	Dogger Bank Teesside Projects A and B	2.4		9.6	0.4	12	0.4
3	Triton Knoll	7.4		29.6	1.2	37	1.2



Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	AOE SPA	Total	AOE SPA	Total	AOE SPA (nonbreeding season apportioned plus breeding season for wind farms <141km)*
3	Hornsea Project Two	2		2	0.1	4	0.1
4	East Anglia THREE	1.8	0.4	8.2	0.3	10	0.7
4	Hornsea Project Three - revised	8		1	0	9	0
5	Moray West	0		0	0	0	0
6	Norfolk Boreas	6.2	1.9	8.1	0.2	14.3	2.1
6	East Anglia TWO	4.2	1.6	0.5	0	4.7	1.6
6	East Anglia ONE North	0.9	0.2	0.6	0.1	1.5	0.3
	<b>Total (all projects above)</b>	<b>149.7</b>	<b>35.5</b>	<b>368</b>	<b>14.6</b>	<b>517.7</b>	<b>50.1</b>
5	Norfolk Vanguard	8.4	2.5	3.6	0.1	12.0	2.6
	<b>Total with Norfolk Vanguard</b>	<b>158.1</b>	<b>38</b>	<b>371.6</b>	<b>14.7</b>	<b>529.7</b>	<b>52.7</b>
6	Hornsea 4 (PEIR)	1.9	1.9	1.9	1.9	1.9	1.9
6	DEP and SEP (PEIR)	0.85	0.85	0.85	0.85	0.85	0.85
	<b>Total with Hornsea 4, DEP and SEP</b>	<b>152.5</b>	<b>38.3</b>	<b>370.8</b>	<b>17.4</b>	<b>520.5</b>	<b>52.9</b>
	<b>Total (all projects)</b>	<b>160.9</b>	<b>40.8</b>	<b>374.4</b>	<b>17.5</b>	<b>532.5</b>	<b>55.5</b>

\* The apportioning of lesser black-backed gull collisions to the Alde Ore Estuary SPA from breeding colonies in Norfolk and Suffolk uses the connectivity rates estimated in the Table 1 of the **Cumulative and In-Combination Collision Risk Update** submitted at Deadline 1 (REP1-047).



## 2.4 Herring gull

**Table 4 Herring gull cumulative collision risk**

Tier	Windfarm	Breeding season	Nonbreeding season	Annual
1	Beatrice Demonstrator	0		0
1	Greater Gabbard	0		0
1	Gunfleet Sands	-	-	-
1	Kentish Flats	0	0	0
1	Kentish Flats Extension	0.5	1.7	2.2
1	Lincs	0		0
1	London Array	-	-	-
1	Lynn and Inner Dowsing	0		0
1	Scroby Sands	-	-	-
1	Sheringham Shoal	0		0
1	Teesside	8.7	34.5	43.2
1	Thanet	4.9	19.6	24.5
1	Humber Gateway	0.4	1.1	1.5
1	Westermost Rough	0.1	0	0.1
1	Hywind	0.6	7.8	8.4
2	Kincardine	1	0	1
2	Beatrice	49.4	197.4	246.8
2	Dudgeon	-	-	-
2	Galloper	27.2		27.2
2	Race Bank	0		0
2	Rampion	155		155
2	Hornsea Project One	2.9	11.6	14.5
3	Blyth Demonstration Project	0.5	2.2	2.7
3	Dogger Bank Creyke Beck Projects A and B	0		0
3	East Anglia ONE	0	19	19
3	European Offshore Wind Deployment Centre	4.8		4.8



Tier	Windfarm	Breeding season	Nonbreeding season	Annual
3	Firth of Forth Alpha and Bravo	10	21	31
3	Inch Cape	0	13.5	13.5
3	Methil	5.8	3.7	9.5
3	Moray Firth (EDA)	52		52
3	Nearr na Gaoithe	5	12.5	17.5
3	Dogger Bank Teesside Projects A and B	0		0
3	Triton Knoll	0		0
3	Hornsea Project Two	23.8		23.8
4	East Anglia THREE	0	23	23
5	Hornsea Project Three -revised	1	4	5
5	Moray West	12	1	13
6	Norfolk Boreas	1.5	5.4	6.9
6	East Anglia TWO	0	0.5	0.5
6	East Anglia ONE North	0.0	0.0	0.0
	<b>Total (all projects above)</b>	<b>367.1</b>	<b>379.5</b>	<b>746.6</b>
6	Norfolk Vanguard	0.4	7.1	7.5
	<b>Total with Norfolk Vanguard</b>	<b>367.5</b>	<b>386.6</b>	<b>754.1</b>
6	<i>Hornsea 4 (PEIR)</i>	1.8	0.8	2.6
6	<i>DEP and SEP (PEIR)</i>	0.25	0	0.25
	<b>Total with Hornsea 4, DEP and SEP</b>	<b>369.2</b>	<b>380.3</b>	<b>749.5</b>
	<b>Total (all projects)</b>	<b>369.6</b>	<b>387.4</b>	<b>757.0</b>



## 2.5 Great black-backed gull

**Table 5 Great black-backed gull cumulative collision risk**

Tier	Windfarm	Breeding season	Nonbreeding season	Annual
1	Beatrice Demonstrator	0	0	0
1	Greater Gabbard	15	60	75
1	Gunfleet Sands	-	-	-
1	Kentish Flats	-	-	-
1	Kentish Flats Extension	0.1	0.2	0.3
1	Lincs	0	0	0
1	London Array	-	-	-
1	Lynn and Inner Dowsing	0	0	0
1	Scroby Sands	-	-	-
1	Sheringham Shoal	0	0	0
1	Teesside	8.7	34.8	43.6
1	Thanet	0.1	0.4	0.5
1	Humber Gateway	1.3	5.1	6.3
1	Westermost Rough	0	0	0.1
1	Hywind	0.3	4.5	4.8
2	Kincardine	0	0	0
2	Beatrice	30.2	120.8	151
2	Dudgeon	0	0	0
2	Galloper	4.5	18	22.5
2	Race Bank	0	0	0
2	Rampion	5.2	20.8	26
2	Hornsea Project One	17.2	68.6	85.8
3	Blyth Demonstration Project	1.3	5.1	6.3
3	Dogger Bank Creyke Beck Projects A and B	5.8	23.3	29.1
3	East Anglia ONE	0	46	46
3	European Offshore Wind Deployment Centre	0.6	2.4	3



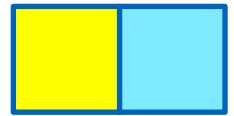
Tier	Windfarm	Breeding season	Nonbreeding season	Annual
3	Firth of Forth Alpha and Bravo	13.4	53.4	66.8
3	Inch Cape	0	36.8	36.8
3	Methil	0.8	0.8	1.6
3	Moray Firth (EDA)	9.5	25.5	35
3	Nearr na Gaoithe	0.9	3.6	4.5
3	Dogger Bank Teesside Projects A and B	6.4	25.5	31.9
3	Triton Knoll	24.4	97.6	122
3	Hornsea Project Two	3	20	23
4	East Anglia THREE	4.6	34.4	39
5	Hornsea Project Three - revised	8	28	36
5	Moray West	4	5	9
6	Norfolk Boreas	6.9	28.7	35.6
6	East Anglia TWO	3.5	3.4	6.9
6	East Anglia ONE North	3.7	1.2	5.0
	<b>Total (all projects above)</b>	<b>179.4</b>	<b>773.9</b>	<b>953.4</b>
6	Norfolk Vanguard	4.5	21.5	26
	<b>Total with Norfolk Vanguard</b>	<b>183.9</b>	<b>795.4</b>	<b>979.4</b>
6	Hornsea 4 (PEIR)	3	13.6	13.6
6	DEP and SEP (PEIR)	6.8	0.3	7.1
	<b>Total with Hornsea 4, DEP and SEP</b>	<b>189.2</b>	<b>787.8</b>	<b>974.1</b>
	<b>Total (all projects)</b>	<b>193.7</b>	<b>809.3</b>	<b>1000.1</b>



## 2.6 Gannet

Table 6 Gannet cumulative and in-combination abundance.

Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Beatrice Demonstrator	-	-	-	-	-	-	-	-
1	Greater Gabbard	252	0	69	3.3	105	6.5	426	9.8
1	Gunfleet Sands	0	0	12	0.6	9	0.6	21	1.2
1	Kentish Flats	-	-	-	-	-	-	-	-
1	Kentish Flats Extension	0	0	13	0.6	0	0	13	0.6
1	Lincs	-	-	-	-	-	-	-	-
1	London Array	-	-	-	-	-	-	-	-
1	Scroby Sands	-	-	-	-	-	-	-	-
1	Sheringham Shoal	47	47	31	1.5	2	0.1	80	48.6
1	Teesside	1	0.5	0	0	0	0	1	0.5
1	Thanet	-	-	-	-	-	-	-	-
1	Humber Gateway	-	-	-	-	-	-	-	-
1	Westermost Rough	-	-	-	-	-	-	-	-
1	Hywind	10	0	0	0	4	0.2	14	0.2
1	Kincardine	120	0	0	0	0	0	120	0


**Deadline 12 Cumulative and In-Combination Collision and Displacement Update**  
 28<sup>th</sup> June 2021

Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
2	Beatrice	151	0	0	0	0	0	151	0
2	Dudgeon	53	53	25	1.2	11	0.7	89	54.9
2	Galloper	360	0	907	43.5	276	17.1	1543	60.6
2	Race Bank	92	92	32	1.5	29	1.8	153	95.3
2	Rampion	0	0	590	28.3	0	0	590	28.3
2	Hornsea Project One	671	671	694	33.3	250	15.5	1615	719.8
2	Blyth Demonstration Project	-	-	-	-	-	-	-	-
3	Dogger Bank Creyke Beck Projects A and B	1155	577.5	2048	98.3	394	24.4	3597	700.2
3	East Anglia ONE	161	161	3638	174.6	76	4.7	3875	340.3
3	European Offshore Wind Deployment Centre	35	0	5	0.2	0	0	40	0.2
3	Firth of Forth Alpha and Bravo	2956	0	664	31.9	332	20.6	3952	52.5
3	Inch Cape	2398	0	703	33.7	212	13.1	3313	46.8
3	Methil	23	0	0	0	0	0	23	0
3	Moray Firth (EDA)	564	0	292	14	27	1.7	883	15.7
3	Neart na Gaoithe	1987	0	552	26.5	281	17.4	2820	43.9

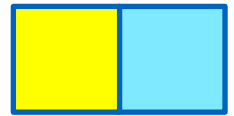



**Deadline 12 Cumulative and In-Combination Collision and Displacement Update**  
 28<sup>th</sup> June 2021

Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
3	Dogger Bank Teesside Projects A and B	2250	1125	887	42.6	464	28.8	3601	1196.4
3	Triton Knoll	211	211	15	0.7	24	1.5	250	213.2
3	Hornsea Project Two	457	457	1140	54.7	124	7.7	1721	519.4
3	East Anglia THREE	412	412	1269	60.9	524	32.5	2205	505.4
5	Hornsea Project Three - revised	1333	844	984	47	527	33	2844	924
5	Moray West	2827	0	439	21.1	144	8.9	3410	30
6	Norfolk Boreas	1229	1229	1723	82.7	526	32.6	3478	1344.3
6	East Anglia TWO	192	192	891	42.8	192	11.9	1275	246.7
6	East Anglia ONE North	149	149	468	22.5	44	2.7	661	174.2
	<b>Total (all projects above)</b>	<b>20096</b>	<b>6221</b>	<b>18091</b>	<b>868</b>	<b>4577</b>	<b>284</b>	<b>42764</b>	<b>7373</b>
5	Norfolk Vanguard	271	271	2453	117.7	437	27.1	3161	415.8
	<b>Total with Norfolk Vanguard</b>	<b>20367</b>	<b>6492</b>	<b>20544</b>	<b>985.7</b>	<b>5014</b>	<b>311.1</b>	<b>45925</b>	<b>7788.8</b>
6	Hornsea 4 (PEIR)	1892	1892	1192	57.2	659	40.9	3743	1990.1
6	DEP and SEP (PEIR)	401	401	638	30	47	3	1086	434
	<b>Total with Hornsea 4, DEP and SEP</b>	<b>22389</b>	<b>8514</b>	<b>19921</b>	<b>955.2</b>	<b>5283</b>	<b>327.9</b>	<b>47593</b>	<b>9797.1</b>



Tier	Wind farm	Breeding season		Autumn migration		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
	<b>Total (all projects)</b>	<b>22660</b>	<b>8785</b>	<b>22374</b>	<b>1072.9</b>	<b>5720</b>	<b>355</b>	<b>50754</b>	<b>10212.9</b>



## 2.7 Guillemot

Table 7 Guillemot cumulative and in-combination abundance

Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Beatrice Demonstrator	No estimate available					
1	Gunfleet Sands	0	0	363	16	363	16
1	Kentish Flats	0	0	3	0.1	3	0.1
1	Kentish Flats Extension	0	0	4	0.2	4	
1	Greater Gabbard	345	0	548	24.1	893	24.1
1	Lincs & LID	582	0	814	35.8	1396	35.8
1	London Array	192	0	377	16.6	569	16.6
1	Scroby Sands	No estimate available					
1	Sheringham Shoal	390	0	715	31.5	1105	31.5
1	Teesside	267	267	901	39.6	1168	306.6
1	Thanet	18	0	124	5.5	142	5.5
1	Humber Gateway	99	99	138	6.1	237	105.1
1	Westermost Rough	347	347	486	21.4	833	368.4
1	Hywind	249	0	2136	94	2385	94
1	Kincardine	632	0	0	0	632	0



Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Beatrice	13610	0	2755	121.2	16365	121.2
1	Dudgeon	334	0	542	23.8	876	23.8
1	Galloper	305	0	593	26.1	898	26.1
1	Race Bank	361	0	708	31.2	1069	31.2
1	Rampion	10887	0	15536	683.6	26423	683.6
1	Hornsea Project One	9836	4554.1	8097	356.3	17933	4910.4
1	Blyth Demonstration Project	1220	0	1321	58.1	2541	58.1
1	East Anglia ONE	274	0	640	28.2	914	28.2
1	European Offshore Wind Deployment Centre	547	0	225	9.9	772	9.9
2	Dogger Bank Creyke Beck A	5407	1892.5	6142	270.2	11549	2162.7
2	Dogger Bank Creyke Beck B	9479	3317.7	10621	467.3	20100	3785
2	Firth of Forth Alpha	13606	0	4688	206.3	18294	206.3
2	Firth of Forth Bravo	11118	0	4112	180.9	15230	180.9
2	Inch Cape	4371	0	3177	139.8	7548	139.8
2	Methil	25	0	0	0	25	0
2	Moray Firth (EDA)	9820	0	547	24.1	10367	24.1



Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
2	Neart na Gaoithe	1755	0	3761	165.5	5516	165.5
2	Dogger Bank Teesside A	3283	1149.1	2268	99.8	5551	1248.9
2	Dogger Bank Teesside B	5211	1823.9	3701	162.8	8912	1986.7
2	Triton Knoll	425	425	746	32.8	1171	457.8
2	Hornsea Project Two	7735	3581.3	13164	579.2	20899	4160.5
3	East Anglia THREE	1744	0	2859	125.8	4603	125.8
5	Hornsea Project Three - revised	13374	0	17772	782	31146	782
5	Moray West	24426	0	38174	1679.7	62600	1679.7
6	Norfolk Boreas	7767	0	13777	606.2	21544	606.2
6	East Anglia TWO	2077	0	1675	73.7	3752	73.7
6	East Anglia ONE North	4183	0	1888	83.1	6071	83.1
	<b>Total (all projects)</b>	<b>166301</b>	<b>17456.6</b>	<b>166098</b>	<b>7308.5</b>	<b>332399</b>	<b>24764.9</b>
6	Norfolk Vanguard	4320	0	4776	210.2	9096	210.2
	<b>Total with Norfolk Vanguard</b>	<b>170621</b>	<b>17456.6</b>	<b>170874</b>	<b>7518.7</b>	<b>341495</b>	<b>24975.1</b>
6	Hornsea 4 (PEIR)	15245	15245	69555	3060.4	84800	18305.4
6	DEP and SEP (PEIR)	3576	0	8671	382	12247	382



Tier	Windfarm	Breeding season		Nonbreeding season		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
	<b>Total with Hornsea Project Four, DEP and SEP</b>	<b>185122</b>	<b>32701.6</b>	<b>244324</b>	<b>10750.9</b>	<b>429446</b>	<b>43452.3</b>
	<b>Total (all projects)</b>	<b>189442</b>	<b>32701.6</b>	<b>249100</b>	<b>10961.1</b>	<b>438542</b>	<b>43662.5</b>



## 2.8 Razorbill

Table 8 Razorbill cumulative and in-combination abundance.

Tier	Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Beatrice Demonstrator	No estimate available									
1	Gunfleet Sands	0	0	0	0	30	0.8	0	0	30	1
1	Kentish Flats	No estimate available									
1	Kentish Flats Extension	No estimate available									
1	Greater Gabbard	0	0	0	0	387	10.5	84	2.8	471	13
1	Lincs & LID	45	0	34	1.1	22	0.6	34	1.1	134	3
1	London Array	14	0	20	0.7	14	0.4	20	0.7	68	2
1	Scroby Sands	No estimate available									
1	Sheringham Shoal	106	0	1343	45.7	211	5.7	30	1	1690	52
1	Teesside	16	0	61	2.1	2	0.1	20	0.7	99	3
1	Thanet	3	0	0	0	14	0.4	21	0.7	37	1
1	Humber Gateway	27	0	20	0.7	13	0.4	20	0.7	80	2
1	Westermost Rough	91	91	121	4.1	152	4.1	91	3.1	455	102


**Deadline 12 Cumulative and In-Combination Collision and Displacement Update**  
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Tier	Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
1	Hywind	30	0	719	24.4	10	0.3			759	<b>25</b>
1	Kincardine	22	0		0		0			22	<b>0</b>
1	Beatrice	873	0	833	28.3	555	15	833	28.3	3094	<b>72</b>
1	Dudgeon	256	0	346	11.8	745	20.1	346	11.8	1693	<b>44</b>
1	Galloper	44	0	43	1.5	106	2.8	394	13.4	587	<b>18</b>
1	Race Bank	28	0	42	1.4	28	0.8	42	1.4	140	<b>4</b>
1	Rampion	630	0	66	2.2	1244	33.6	3327	113.1	5267	149
1	Hornsea Project One	1109	534.5	4812	163.6	1518	41	1803	61.3	9242	<b>800</b>
1	Blyth Demonstration Project	121	0	91	3.1	61	1.6	91	3.1	364	<b>8</b>
1	Dogger Bank Creyke Beck A	1250	375	1576	53.6	1728	46.7	4149	141.1	8703	<b>616</b>
1	Dogger Bank Creyke Beck B	1538	461.4	2097	71.3	2143	57.9	5119	174	10897	<b>765</b>
2	East Anglia ONE	16	0	26	0.9	155	4.2	336	11.4	533	<b>17</b>
2	European Offshore Wind Deployment Centre	161	0	64	2.2	7	0.2	26	0.9	258	<b>3</b>
2	Firth of Forth Alpha	5876	0			1103	29.8			6979	30




**Deadline 12 Cumulative and In-Combination Collision and Displacement Update**  
 28<sup>th</sup> June 2021

Tier	Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
2	Firth of Forth Bravo	3698	0			1272	34.3			4970	34
2	Inch Cape	1436	0	2870	97.6	651	17.6			4957	<b>115</b>
2	Methil	4	0	0	0	0	0	0	0	4	0
2	Moray Firth (EDA)	2423	0	1103	37.5	30	0.8	168	5.7	3724	<b>44</b>
2	Near na Gaoithe	331	0	5492	186.7	508	13.7			6331	<b>200</b>
2	Dogger Bank Teesside A	834	250.2	310	10.6	959	25.9	1919	65.2	4022	<b>352</b>
2	Dogger Bank Teesside B	1153	345.9	592	20.1	1426	38.5	2953	100.4	6125	<b>505</b>
2	Triton Knoll	40	0	254	8.6	855	23.1	117	4	1265	<b>36</b>
2	Hornsea Project Two	2511	1210.3	4221	143.5	720	19.4	1668	56.7	9119	<b>1430</b>
3	East Anglia THREE	1807	0	1122	38.1	1499	40.5	1524	51.8	5952	<b>130</b>
3	Hornsea Project Three - revised	630	0	2020	69	3649	99	2105	72	8404	240
5	Moray West	2808	0	3544	120.5	184	5	3585	121.9	10121	<b>247</b>
6	Norfolk Boreas	630	0	263	8.9	1065	28.8	345	11.7	2303	<b>49</b>
6	East Anglia TWO	281	0	44.1	1.5	136.4	3.7	230	7.8	692	13
6	East Anglia ONE North	403	0	85	2.9	54	1.5	207	7	749	11



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		Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
	<b>Total (all projects)</b>	<b>31245</b>	<b>3268.3</b>	<b>34234.1</b>	<b>1164.2</b>	<b>23256.4</b>	<b>628.8</b>	<b>31607</b>	<b>1074.8</b>	<b>120340</b>	<b>6136</b>
6	Norfolk Vanguard	879	0	866	29.5	839	22.7	924	31.4	3508	<b>84</b>
	<b>Total with Norfolk Vanguard</b>	<b>32124</b>	<b>3268.3</b>	<b>35100.1</b>	<b>1193.7</b>	<b>24095.4</b>	<b>651.5</b>	<b>32531</b>	<b>1106.2</b>	<b>123848</b>	<b>6220</b>
6	Hornsea 4 (PEIR)	580	580	5960	202.6	685	18.5	1361	46.3	8586	847.4
6	DEP and SEP (PEIR)	1064	0	4295	146	1310	35	420	14	7089	195
	<b>Total with Hornsea Project Four, DEP and SEP</b>	<b>32889</b>	<b>3848.3</b>	<b>44489.1</b>	<b>1512.8</b>	<b>25251.4</b>	<b>682.3</b>	<b>33388</b>	<b>1135.1</b>	<b>136015</b>	<b>7178.4</b>
	<b>Total (all projects)</b>	<b>33768</b>	<b>3848.3</b>	<b>45355.1</b>	<b>1542.3</b>	<b>26090.4</b>	<b>705</b>	<b>34312</b>	<b>1166.5</b>	<b>139523</b>	<b>7262.4</b>