07 November 2025

Llŷr Marine Ornithological Clarification Note 3 – UPDATED
Collated cumulative / in-combination figures for EIA and HRA

As requested by NRW (A) on the call held on Friday 2nd May, we – the Llŷr applicant – have collated cumulative / in-combination figures for EIA and HRA from the Mona deadline 7, REP7-033 report (for EIA) and the Mona deadline 7, REP7-020 (for HRA). These are the figures which include the long-standing Liverpool Bay projects for which there are no available data. For these, Mona has carried out a 'gap-filling exercise' in collaboration with Morecambe.

Further to the call held with JNCC on 17 September 2025, we have updated this note to include the PVA output tables from these two Mona reports. We have not carried out any independent quality assurance or third-party review of impact estimates derived from Mona's 'gap-filling exercise' nor their PVA modelling.

NRW (A) have already confirmed their acceptance of the Mona figures, and the Mona project consent is based on this information, therefore acting as the legally agreed baseline for cumulative impact assessment going forward. We confirm that we agree with NRW(A) on the Mona collation, as referenced below, alongside the supplementary assessment provided by NRW (A) in Appendix 1 (EIA) and Appendix 2 (HRA) their response to NRW-MLT, dated 29 July 2025. The NRW (A)'s in-combination mortality calculations and the NRW (A) 's in combination mortality calculations are reproduced in Appendix 1 of this clarification note.

We concur with NRW (A)'s conclusion that there will be no adverse impact on site integrity (Table 6) from project Llŷr, alone or in-combination, against any of the SPA breeding seabird populations in question. The applicant also concurs with NRW (A)'s conclusions that there will be no significant impacts under EIA against any regional seabird populations (Table 4).

1. EIA cumulative / in-combination assessment

The modelling, methodologies and overall approach adopted here by Mona have been accepted by NRW (A). The figures in **Table 1** and **Table 2** are all taken from **Mona deadline 7 ES Cumulative Assessments, REP7-033, Section 5.9** except for the Llŷr displacement estimates in **Table 1**, which are from the relevant tables (EIA annual estimates) in **Llŷr ES Appendix 22D, Marine Ornithology Displacement Assessment**.

Table 1 – EIA (regional) displacement mortality estimates agreed by NRW(A)

Species for displacement assessment	Estimated mortality (no. of birds)		% increase in baseline mortality from cumulative impact	Mona ref
	Llŷr	Cumulative total		
Guillemot	75.18 (*45.11 – 1,052.45*)	558 (*335 – 7,814*)	0.40 (*0.26 – 5.16*)	Table 5-85
Razorbill	13.3 (*7.98 – 186.13*)	98 (*59 – 1,372*)	0.12 (*0.08 – 1.34*)	Table 5-93
Puffin	3.72 (*2.23 – 52.08*)	46 (*28 – 648*)	0.02 (*0.01 – 0.25*)	Table 5-99
Gannet	7.18 (*6.16 – 82.08*)	60 (*51 – 683*)	0.05 (*0.04 - 0.54*)	Table 5-104
Manx shearwater	23.64 (*4.73 – 236.40*)	178 (*107 – 2,492*)	0.08 (*0.05 - 1.05*)	Table 5-114

Table 2 – EIA (regional) collision mortality estimates agreed by NRW(A)

Species for collision assessment	'Worst case' avoidance rate from Mona ES	Estimated mortality (no. of birds)		% increase in baseline mortality from cumulative impact	Mona ref
		Llŷr	Cumulative total		
Kittiwake	99.28	24.48	641.13	0.45	Table 5-116
Lesser black-backed gull	99.39	1.93	299.28	1.03	Table 5-123
Gannet	99.28	3.91	182.58	0.14	Table 5-127
Great black-backed gull	99.39	1.61	167.41	9.93	Table 5-117

The species **highlighted in bold** are those where Mona undertook PVA to investigate population consequence of the estimated cumulative impacts. The PVA outputs are presented in the following tables included in Section 5.9 of the Mona deadline 7 ES report:

- guillemot - Table 5-87
- razorbill - Table 5-95
- lesser black-backed gull - Table 5-126
- great black-backed gull - Table 5-120

At JNCC's request from the call held on 17 September 2025, these PVA output tables are presented below:

Table 5-87: PVA outputs for common guillemot CEA.

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	1,685,359	2.72	1.027	0.955	1.092	-	-
	Impact (Scenario A)	1,685,270	2.68	1.027	0.955	1.091	1.000	1.000
	Impact (Scenario B)	1,685,202	2.65	1.027	0.955	1.091	0.999	0.999
	Impact (Scenario C)	1,672,311	1.92	1.019	0.947	1.084	0.992	0.992
2065	Baseline	4,138,135	151.65	1.026	1.017	1.034	-	-
	Impact (Scenario A)	4,083,497	148.17	1.026	1.017	1.034	0.986	1.000
	Impact (Scenario B)	4,048,656	146.28	1.025	1.017	1.033	0.979	0.999
	Impact (Scenario C)	3,134,554	90.50	1.018	1.009	1.026	0.757	0.992

Table 5-95: PVA outputs for razorbill CEA.

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	701,018	1.63	1.016	0.896	1.096	-	-
	Impact (Scenario A)	701,050	1.61	1.016	0.896	1.095	1.000	1.000
	Impact (Scenario B)	700,652	1.59	1.016	0.895	1.095	1.000	1.000
	Impact (Scenario C)	699,439	1.35	1.014	0.894	1.093	0.997	0.997
2065	Baseline	957,341	38.64	1.009	0.992	1.025	-	-
	Impact (Scenario A)	953,183	37.90	1.009	0.992	1.025	0.994	1.000
	Impact (Scenario B)	950,308	37.47	1.009	0.992	1.025	0.992	1.000
	Impact (Scenario C)	871,000	26.19	1.006	0.989	1.022	0.910	0.997

Table 5-126: PVA outputs for lesser black-backed gull CEA.

Year	Impact scenario	Median adult population size	Population change (%) since 2015	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	223,566	-1.54%	0.985	0.859	1.206	-	-
2030	Impact (Scenario A)	223,271	-1.63%	0.984	0.858	1.204	0.999	0.999
2030	Impact (Scenario B)	223,177	-1.70%	0.983	0.858	1.205	0.999	0.999
2065	Baseline	183,729	-17.88%	0.995	0.972	1.017	-	-
2065	Impact (Scenario A)	176,802	-20.88%	0.994	0.971	1.016	0.962	0.999
2065	Impact (Scenario B)	174,610	-21.87%	0.993	0.971	1.015	0.950	0.999

Table 5-120: PVA outputs for great black-backed gull CEA.

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	106,348	12.72%	1.127	1.058	1.195	-	-
2030	Impact (Scenario A)	106,167	12.55%	1.125	1.057	1.193	0.999	0.998
2030	Impact (Scenario B)	105,180	11.54%	1.115	1.046	1.183	0.990	0.990
2065	Baseline	6,830,545	7151.07%	1.126	1.120	1.133	-	-
2065	Impact (Scenario A)	6,466,720	6765.40%	1.125	1.118	1.131	0.947	0.998
2065	Impact (Scenario B)	4,702,469	4891.86%	1.115	1.108	1.121	0.688	0.990

As previously noted in the original clarification note 3, our review of these counterfactual metrics – the counterfactual of growth rate (CGR) and the counterfactual of population size (CPS) – does not indicate that there is any cause for concern for any of these regional seabird populations from cumulative offshore wind impacts, except perhaps great black-backed gull at the highest modelled impact scenario (scenario B). This has been confirmed by NRW (A) in their conclusions on EIA significance (**Table 3** below).

For **gannet** the summed collision and displacement figures (project alone and cumulative) are still below the 1% baseline mortality threshold advised by NRW (A), so that no PVA was required under EIA for this species.

NRW (A)'s conclusions on **herring gull** are also included in **Table 3** for completeness, although Llŷr project alone impacts are zero for this species. No individuals were recorded within the project area during the two-year programme of baseline digital aerial survey work.

Table 3 – NRW advice on marine ornithological EIA conclusions

Species and impact pathway	NRW advice on marine ornithological EIA conclusions	
	Llŷr project alone[1]	Cumulative impacts from all plans & projects incl. Llŷr [2]
Gannet, collision	No significant adverse impact	No significant adverse impact
Gannet, displacement	No significant adverse impact	No significant adverse impact
Gannet, collision + displacement	No significant adverse impact	No significant adverse impact
Kittiwake, collision	No significant adverse impact	No significant adverse impact
Lesser black-backed gull, collision	No significant adverse impact	No significant adverse impact
Herring gull, collision	*No significant adverse impact*	*No significant adverse impact*
Great black-backed gull, collision	No significant adverse impact	Unable to rule out significant adverse impact
Guillemot, displacement	No significant adverse impact	No significant adverse impact
Razorbill, displacement	No significant adverse impact	No significant adverse impact
Puffin, displacement	No significant adverse impact	No significant adverse impact
Manx shearwater, displacement	No significant adverse impact	No significant adverse impact

[1] Summarised from the NRW (A) advisory response on Llŷr, as sent to the Marine Licensing Team on 29 January 2025

[2] Summarised from NRW's deadline 7 submission and closing statement on Mona, dated 14 January 2025 - with the cumulative impact estimates including correct Llŷr figures, as previously checked and presented in clarification note 1

2. HRA cumulative / in-combination assessment

The modelling, methodologies and overall approach adopted here by Mona have been accepted by NRW (A). The figures presented in **Table 4** are taken from **Mona deadline 7**, **Offshore Ornithology Information to Support an Appropriate Assessment, Annex E1.3.1, REP7-020, Section 1.4.3**.

Table 4 – HRA mortality estimates agreed by NRW(A)

Species and Impact type C = collision D = displacement C&D = sum of these impact types	Estimated mortality (no. of birds)		% increase in baseline mortality from cumulative impact	Mona ref
	Llŷr	Cumulative total		
Grassholm SPA				
Gannet (C&D)	4.93 – 30.05	75 (*73 – 231*)	1.29 (*1.25 – 3.96*)	Tables 1.96, 1.97, 1.98
Gannet (C&D) accounting for macro-avoidance	2.59 – 27.70	70.71 (*68.58– 226.47*)	0.61 (*1.21 – 3.88*)	Tables 1.160 1.161, 1.162 1.163, 1.164 1.165
Skomer, Skokholm and Seas off Pembrokeshire (SSSP) SPA				
Guillemot (D)	16.84 – 92.51	54 (*32 – 754*)	1.99 (*1.19 – 27.83*)	Tables 1.81, 1.82, 1.83
Razorbill (D)	0.18 – 4.21	3 (*2 – 35*)	0.20 (*0.12 – 2.81*)	Tables 1.120, 1.121, 1.122
Manx shearwater (D)	11.85 – 276.40	110 (*66 – 1,547*)	0.09 (*0.06 – 1.31*)	Tables 1.90, 1.91, 1.92
Kittiwake (C&D)	0.71 – 3.83	11.3 (*10.89 – 19.08*)	2.42 (*2.37 – 4.16*)	Tables 1.42, 1.43, 1.44

Mona undertook PVA to investigate population consequence of these estimated cumulative impacts, against each relevant SPA breeding seabird colony population. These PVA outputs are presented as follows in **REP7-020**:

- guillemot - Table 1.143
- razorbill - Table 1.158
- Manx shearwater - Table 1.151
- kittiwake – Table 1.132
- gannet – Table 1.147

At JNCC's request from the call held on 17 September 2025, these PVA output tables have been extracted and are presented overleaf:

Table 1.143: PVA outputs for common guillemot from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro.

Year	Impact scenario	Median adult population size	Population change (%) since 2024	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	46,113	2.67%	1.027	0.952	1.092	-	-
2030	70% displacement and 10% mortality	45,827	2.03%	1.020	0.945	1.086	0.994	0.994
2030	70% displacement and 2% mortality	46,062	2.56%	1.026	0.951	1.091	0.999	0.999
2065	Baseline	112,672	151.23%	1.026	1.017	1.034	-	-
2065	70% displacement and 10% mortality	88,628	97.43%	1.019	1.010	1.027	0.786	0.993
2065	70% displacement and 2% mortality	107,544	139.59%	1.025	1.016	1.033	0.953	0.999

Table 1.158: PVA outputs for razorbill from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA.

Year	Impact scenario	Median adult population size	Population change (%) since 2013	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	14,023	16.83%	1.022	0.840	1.129	-	-
2030	70% displacement and 10% mortality	13,970	16.40%	1.018	0.837	1.126	0.997	0.997
2065	Baseline	19,205	60.01%	1.009	0.992	1.025	-	-
2065	70% displacement and 10% mortality	17,033	41.92%	1.006	0.988	1.022	0.885	0.997

Table 1.151: PVA outputs for Manx shearwater from Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA.

Year	Impact scenario	Median adult population size	Population change (%) since 2018	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	1,033,392	2.59%	1.026	0.805	1.165	-	-
2030	70% displacement and 10% mortality	1,031,439	2.38%	1.024	0.803	1.163	0.998	0.998
2065	Baseline	1,502,390	47.99%	1.011	0.991	1.030	-	-
2065	70% displacement and 10% mortality	1,400,686	38.10%	1.009	0.989	1.028	0.932	0.998

Table 1.132: PVA outputs for black-legged kittiwake Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

Year	Impact scenario	Median adult population size	Population change (%) since 2022	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	3,189	1.51	1.015	0.810	1.164	-	-
2030	Collisions only	3,173	1.18	1.012	0.809	1.159	0.997	0.996
2030	30% displacement and 3% mortality plus collisions	3,181	1.21	1.012	0.808	1.159	0.995	0.996
2030	70% displacement and 10% mortality plus collisions	3,162	0.79	1.008	0.805	1.156	0.993	0.993
2065	Baseline	3,490	11.16	1.003	0.981	1.022	-	-
2065	Collisions only	3,012	-4.01	0.999	0.977	1.018	0.865	0.996
2065	30% displacement and 3% mortality plus collisions	2,968	-5.91	0.998	0.977	1.018	0.851	0.996
2065	70% displacement and 10% mortality plus collisions	2,685	-14.70	0.996	0.974	1.015	0.768	0.993

Table 1.147: PVA outputs for northern gannet from Grassholm SPA.

Year	Impact scenario	Median adult population size	Population change (%) since 2015	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	86,645	2.03%	1.020	0.913	1.085	-	-
2030	80% displacement and 10% mortality plus collisions (no macro-avoidance)	86,311	1.67%	1.017	0.909	1.082	0.996	0.996
2065	Baseline	131,362	55.39%	1.012	1.001	1.023	-	-
2065	80% displacement and 10% mortality plus collisions (no macro-avoidance)	114,832	35.38%	1.008	0.997	1.019	0.873	0.996

As previously noted in the original clarification note 3, our review of these counterfactual metrics – CGR and CPS – does not indicate that there is any cause for concern for the guillemot, razorbill, Manx shearwater, or kittiwake populations at SSSP SPA from cumulative offshore wind impacts, nor for the gannet population at Grassholm SPA. Also, note that HPAI was discussed in some depth in the submitted **Llŷr ES Volume 3, Chapter 22 Marine Ornithology,** paragraphs 146 – 148.

Therefore, we concur with NRW (A)'s conclusions that there would be **no adverse effect on site integrity** (AEoSI) for any of the SPA populations of seabirds assessed for Llŷr project alone and in combination with other plans and projects (**Table 5**).

Table 5 – NRW (A) conclusions under marine ornithological HRA

Species	NRW advice on marine ornithological HRA conclusions	
	Llŷr project alone[1]	Cumulative impacts from all plans & projects incl. Llŷr [2]
Grassholm SPA		
Gannet, collision	No AEoSI	No AEoSI
Gannet, displacement	No AEoSI	No AEoSI
Gannet, collision + displacement	No AEoSI	No AEoSI
Skomer, Skokholm and Seas off Pembrokeshire (SSSP) SPA		
Kittiwake, collision	No AEoSI	No AEoSI
Lesser black-backed gull, collision	No AEoSI	No AEoSI
Herring gull, collision[3]	*No AEoSI*	*No AEoSI*
Great black-backed gull, collision[3]	*No AEoSI*	*No AEoSI*
Guillemot, displacement	No AEoSI	No AEoSI
Razorbill, displacement	No AEoSI	No AEoSI
Puffin, displacement	No AEoSI	No AEoSI
Manx shearwater, displacement	No AEoSI	No AEoSI

[1] Summarised from the NRW (A) advisory response on Llŷr, as sent to the Marine Licensing Team on 29 January 2025

[2] Summarised from NRW's deadline 7 submission and closing statement on Mona, dated 14 January 2025 - with the cumulative impact estimates including correct Llŷr figures, as previously checked and presented in clarification note 1

[3] Herring gull and great black-backed gull are included in Table 5 for completeness, although neither species required assessment at Llŷr under HRA.

We provided our original clarification note 1 on cumulative / in-combination impacts on 28 March 2025, supported by the stakeholder gap analysis spreadsheet. At the meeting held with NRW (A) to discuss these matters on 1 May 2025, they requested that we give further consideration to cumulative impacts in relation to **lesser black-backed gull** and **puffin** as they had not required PVA in respect of the Mona application. We provided this consideration in the original clarification note 3, dated 21 May 2025 and this allowed NRW (A) to conclude their advice as confirmed in their final response on Llŷr, dated 29 July 2025.

Following the meeting with JNCC on 17 September 2025, we reiterate the information we have previously provided for these two species, supported by the following two figures:

- **Figure 1** mapping the location of the developments considered under cumulative HRA as presented in **Appendix 8E: HRA RIAA** of the submitted Llŷr project application.
- **Figure 2** providing a plot of the 'at sea' distance calculation between SSSP and Mona, produced in support of this clarification note 3.

Lesser black-backed gull (LBBG)

Within the EIA, the estimate of LBBG collision mortality is **1.93 for Llŷr project-alone** and **1.92 for Mona project alone.** For HRA, the colony-apportioned impact estimate for Llŷr project-alone against the LBBG population at SSSP SPA is **1.1 birds**. This mortality estimate is well below the advised PVA threshold of a <1% change in baseline mortality, this being 19 birds as noted in Table 22-4 of **Llŷr ES Appendix 22E Marine Ornithology Impact Scenarios**.

As advised in the original clarification note 3, the offshore wind farms in Liverpool Bay, including Mona, lie at the outer reaches of LBBG foraging range and so the apportioned level of breeding season mortality is well below the 1% threshold.

The cumulative non-breeding season mortality estimates from offshore wind projects within the BDMPS[1] (Furness, 2015) is the same in all project assessments as it is based on a weighting derived from the SPA population size as a proportion of the BDMPS population size. The assumption for Llŷr therefore remains the same as that for Mona, that (annual) cumulative impacts within the wider BDMPS remain below a 1% change in baseline mortality.

This 1% change in baseline mortality (to determine PVA requirements) is the threshold that both NRW (A) and JNCC advised us to work to throughout the pre-application dialogue for our project submission. It was first set out in NRW (A) advice dated 5 April 2023, adopted for the threshold calculations we presented in the information note sent to NRW (A) and JNCC on 15 August 2023, and discussed together at the stakeholder meeting held the following day, 16 August 2023.

NRW (A) have already concluded **no AEoSI** alone or in-combination for LBBG at SSSP SPA, based on the information provided to date, and the applicant concurs with this conclusion.

Puffin

For puffin, the project-alone mortality estimate for puffin at SSSP SPA is between 0.50 – 11.36 birds based on displacement matrix outputs: Table 22-9 of **Llŷr ES Appendix 22E, Marine Ornithology Project Alone and Cumulative Impact Scenarios**. As set out in the project application, Llŷr modelled the population consequence of a 'worst-case' annual cumulative impact of 111.63 puffin mortalities against the SSSP SPA population.

Checking Mona, this figure of ~111 puffin is equivalent to that for total annual mortalities of this species from all cumulative offshore wind farm development that NRW (A) and JNCC wished assessed; based on matrix outputs with a displacement rate of 60% and the mortality rate of 2% which NRW (A) have been using to base their conclusions on – Table 5-99 of **Mona deadline 7 ES Cumulative Assessments, REP7-033, Section 5.9**.

As set out in their response, NRW (A) conclude **no AEoSI** for Llŷr project-alone or in-combination against the puffin population at SSSP SPA, and we concur with this advice.

[1] BDMP = biologically defined minimum population scale

Figure 1 – Cumulative offshore wind development considerd in the Llŷr RIAA, as submitted

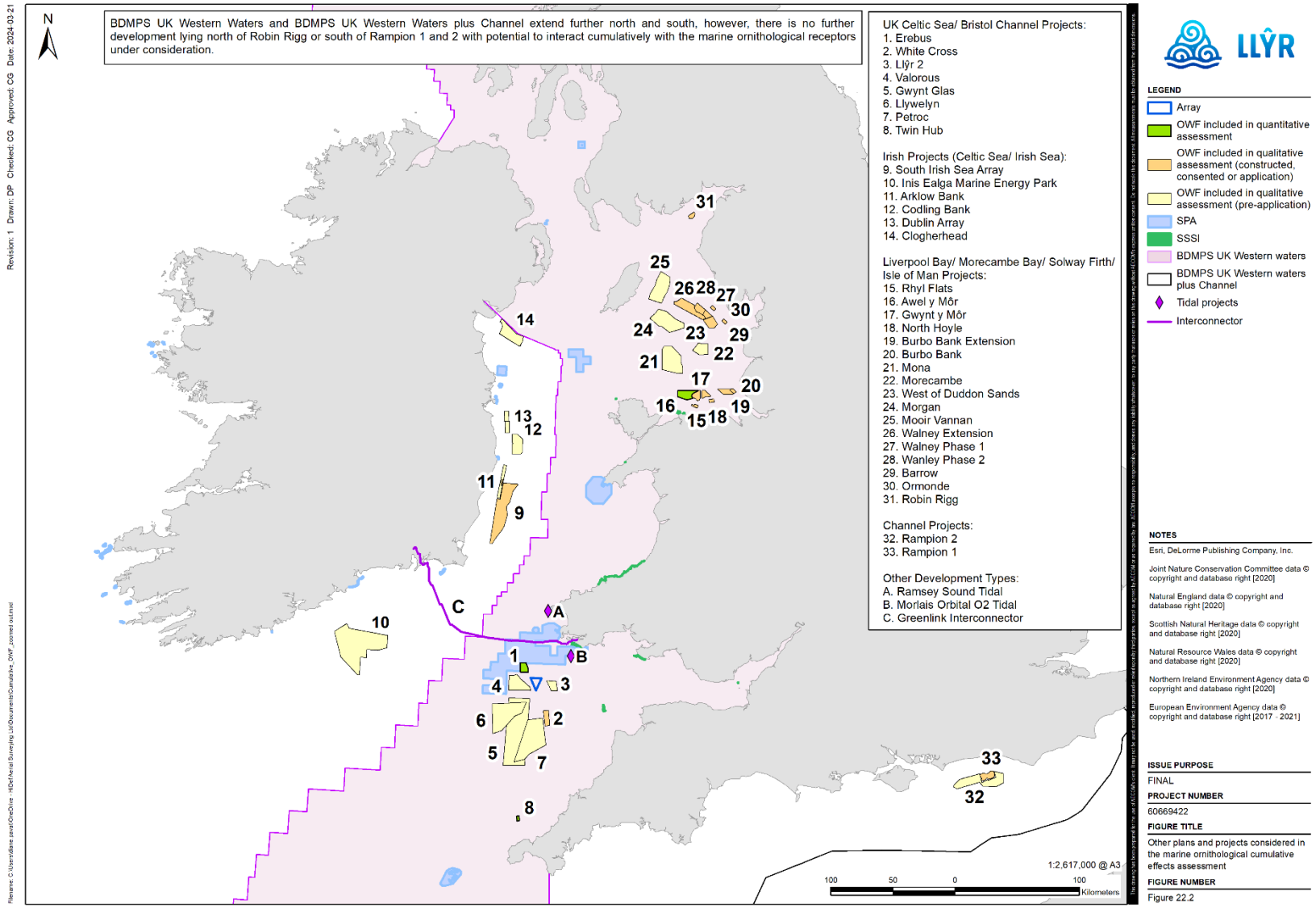
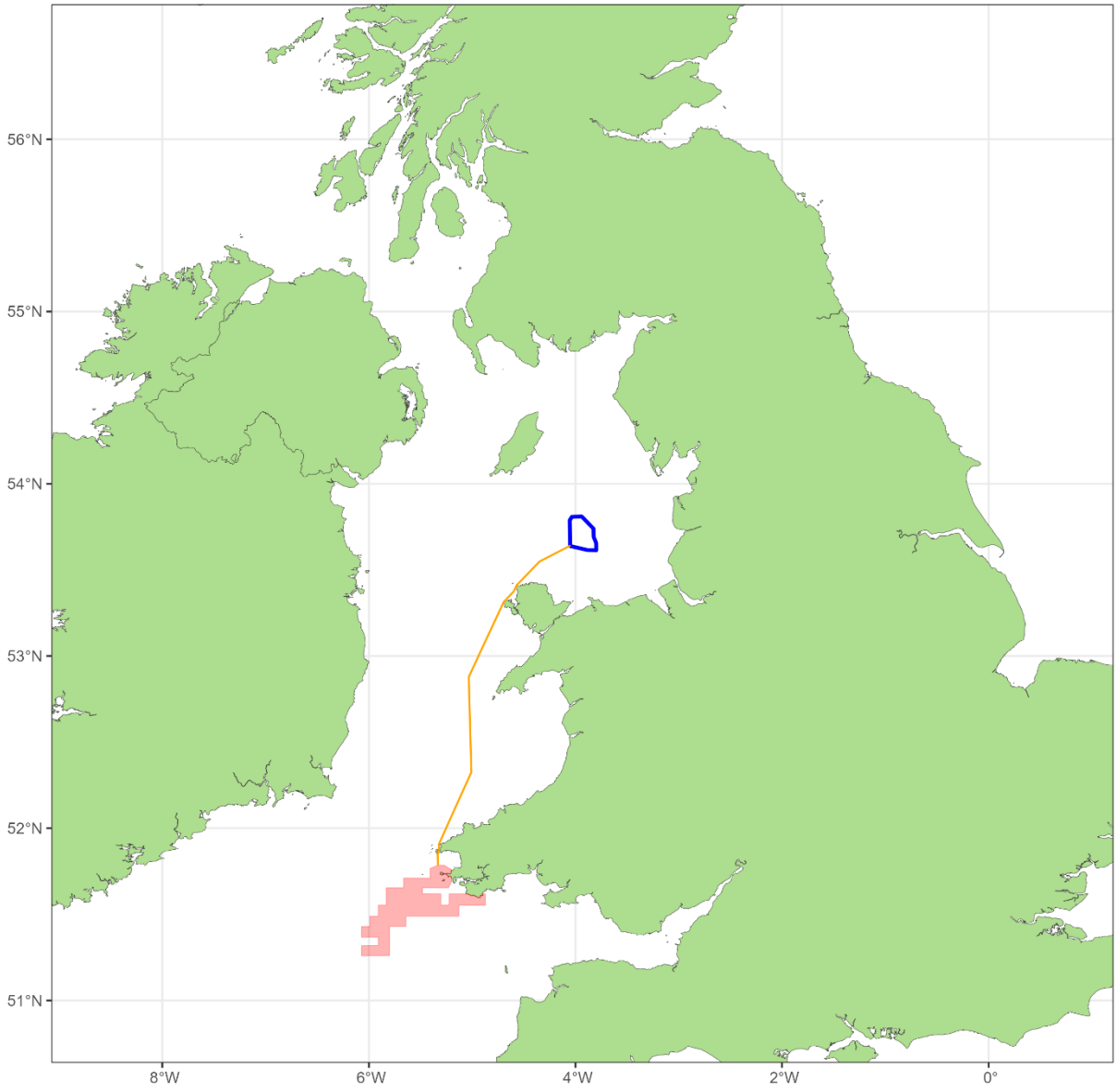


Figure 2 – Plot of the 'at sea' distance measurement, closest edge to closest edge, between SSSP SPA and the Mona offshore wind project located in Liverpool Bay, a distance of ~237km



APPENDIX 1 - NRW (A)’s in-combination mortality calculations and the NRW (A) 's in combination mortality calculations

4 APPENDIX 1: NRW (A) detailed comments/conclusions on the Llŷr project EIA scale cumulative assessments following the Applicant's further information in '*Offshore Ornithology Clarification Notes 1 and 3*', and; NRW (A)'s further work to extract the relevant information from the Mona project submission documents in order to produce advice for NRW MLT

This document is a technical document to provide scientific justification for NRW (A)'s advice provided on the significance of the potential impacts at the Environmental Impact Assessment (EIA) scale from the project cumulatively with other plans and projects, as summarised within each section. Our advice is based on best available evidence at the time of writing and is subject to change in the future should further evidence be presented.

1.1 EIA impacts from collision risk from Llŷr project cumulatively with other plans and projects

We welcome that the Llŷr Applicant has presented the indicative cumulative collision mortality totals calculated by the Mona project in Table 2 of *'Clarification Note 3'.* We note that the Llŷr Applicant has presented the percentage of baseline mortality that these predicted cumulative collision totals equate to of the respective species EIA scale reference populations (in Table 2 of *'Clarification Note 3'*). However, the Applicant has not included any information on the reference populations and mortality rates used to calculate these, and therefore, they cannot be replicated. As the numbers presented are the same as those presented by Mona, we assume the Llŷr Applicant's figures are based on the same EIA reference populations and mortality rates used by the Mona project, which we have included for information in ***Table A1.1*** below.

Table A1.1 Percentage of baseline mortality for indicative predicted impact levels for cumulative operational collision risk for the Llŷr project cumulatively with other plans and projects at EIA scale (based on indicative cumulative totals calculated by the Mona project in Section 5.9.3 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a) and as presented by Llŷr in Table 2 of *'Clarification Note 3'*). Largest Biologically Defined Minimum Population Scale (BDMPS) reference populations and average across all age class mortality rates, as used by the Mona project have been used. (Note herring gull is not considered for cumulative collisions, as 0 collisions are predicted from the Llŷr project alone). Highlighted cells indicate where 1% of baseline mortality is exceeded.

	Annual total indicative cumulative CRM prediction (from Table 2 of Llŷr clarification note 3, and as calculated by Mona project*)	**Largest BDMPS individuals (as used by Mona project)**	**Mortality rate (%) (weighted mean across all ages, as used by Mona project)**	**% baseline mortality largest BDMPS**
Gannet (note: assumed no reduction for macro avoidance)	183	661,888	19.3	0.14
Kittiwake	641	911,586	15.6	0.45
LBBG	299	240,750	12.1	1.03
GBBG	167	17,742	9.5	9.93

* Annual indicative collision predictions using species-group avoidance rates (ARs) and for the consented (where available) plus as built (where consented figures are unavailable) project parameters as calculated by the Mona project and presented in Section 5.9.3 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a), and as presented by the Llŷr Applicant in Table 2 of *'Clarification Note 3'.* Note: Collision predictions rounded to whole birds.

1.1.1 Gannet and kittiwake

As shown in ***Table A1.1*** above, the indicative cumulative collision risk assessments, as calculated by Mona and presented by the Llŷr Applicant in Table 2 of *'Clarification Note 3'*, suggest that the predicted cumulative collision mortalities would not exceed 1% of baseline mortality for gannet and kittiwake. This could therefore be considered to be undetectable against background mortality and hence we advise that **cumulative collision impacts would not result in a significant adverse effect (i.e. no greater than minor adverse effect) for cumulative EIA scale for gannet and kittiwake.**

With regard to gannet, we understand that the Mona indicative cumulative impact of 183 collisions per year as presented by the Llŷr Applicant, does not consider any accounting for macro avoidance by gannet of offshore wind farms. Therefore, if this is the case, it is likely that the gannet indicative cumulative collision total presented by the Llŷr Applicant in Table 2 of *'Clarification Note 3'* could be an overestimate.

1.1.2 Lesser black-backed gull (LBBG)

The indicative cumulative collision totals for LBBG of 299 birds per annum, as calculated by Mona and presented by the Llŷr Applicant in Table 2 of *'Clarification Note 3'*, equates to 1.03% of baseline mortality of the UK western waters BDMPS scale population (***Table A1.1*** above). We note that there is uncertainty in the predicted collision figures due to the uncertainty/variability in the input parameters and some degree of precaution in the cumulative total regarding build out scenarios of projects. It is also worth noting that there is limited evidence and therefore some uncertainty around baseline mortality rates (Horswill & Robinson 2015).

As noted by the Llŷr Applicant in *'Clarification Note 3'* the Mona project undertook a PVA for LBBG cumulative collision impacts. Despite NRW (A)'s advice to the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) have extracted the relevant PVA output metrics in ***Table A1.2*** below.

Table A1.2 PVA outputs for lesser black-backed gull indicative cumulative assessment, as presented by Mona in Table 5-126 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	183,729	0.995	-	-
Impact*	174,610	0.993	0.950	0.999

* Using species-group avoidance rate of 0.9939, as advised by SNCBs and for the consented (where available) plus as built (where consented figures are unavailable) project parameters

Using the PVA model undertaken by the Mona Applicant, as this represents best available evidence at this time, if the additional mortality from the offshore wind farms is 299 LBBGs per annum (indicative Mona calculated cumulative collision mortality figure for the SNCB advised species-group avoidance rate) then:

- The BDMPS population after 35 years (time period model impacts were run by Mona) will be approximately 5% lower than it would have been in the absence of the additional mortality (see ***Table A1.2***).
- The BDMPS population growth rate would be reduced by around 0.1% (see ***Table A1.2***).

The LBBG is classified as 'Least Concern' in the GB International Union for Conservation of Nature (IUCN)2a assessment (Stanbury et al. 2024). The species is Amber listed in Birds of Conservation Concern (BoCC) 5a (Stanbury et al. 2024) due to the International importance of the UK breeding population, with the UK supporting a large proportion of the North Atlantic biogeographical populations (>30%) (Burnell et al. 2023).

Based on the above, the cumulative collision mortality is unlikely to be detectable against background mortality and **would not result in a significant adverse effect (i.e. no greater than minor adverse effect) from cumulative collision to LBBG at an EIA scale.**

1.1.3 Great black-backed gull (GBBG)

The indicative cumulative collision totals for GBBG of 167 birds per annum, as calculated by Mona and presented by the Llŷr Applicant in Table 2 of *'Clarification Note 3'* equates to 1% of baseline mortality of the BDMPS population (***Table A1.1*** above). **This is not insignificant and requires further consideration.**

As noted by the Llŷr Applicant in *'Clarification Note 3',* the Mona project undertook a PVA for GBBG cumulative collision impacts. Despite NRW (A)'s advice to the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) have extracted the relevant PVA output metrics in ***Table A1.3*** below.

Table A1.3 PVA outputs for great black-backed gull indicative cumulative assessment, as presented by Mona in Table 5-120 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	6,830,545	1.126	-	-
Impact*	4,702,469	1.115	0.688	0.990

* Using species-group avoidance rate of 0.9939, as advised by SNCBs and for the consented (where available) plus as built (where consented figures are unavailable) project parameters

Using the PVA model undertaken by the Mona Applicant, as this represents best available evidence at this time, if the additional mortality from the offshore wind farms is 167 GBBGs per annum (indicative Mona calculated cumulative collision mortality figure for the SNCB advised species-group avoidance rate) then:

- The BDMPS population after 35 years (time period model impacts were run by Mona) will be approximately 31.2% lower than it would have been in the absence of the additional mortality (see ***Table A1.3***).
- The BDMPS population growth rate would be reduced by around 1% (see ***Table A1.3***).

We note that GBBG moved to the Red list in UK BoCC5a owing to a severe population decline of 56% since Operation Seafarer (1969–70). The species was Green-listed in the first two BoCC assessments and Amber-listed in BoCC3 and BoCC4 (Stanbury et al. 2024). In the GB IUCN2a assessment the species moved from 'Least Concern' in IUCN1 to 'Critically Endangered' (Stanbury et al. 2024). Seabirds Count (Burnell et al. 2023) reported a 43% decline since Seabird 2000.

Based on consideration of: the PVA metrics from the Mona PVA presented in ***Table A1.3*** (which suggest a reduced growth rate as a result of the cumulative impact of the Llŷr project

with other offshore wind projects, than would be experienced by an unimpacted population); our included conservation assessment, and particularly that the GBBG population is declining; and that we are not aware of any evidence to suggest that the population is likely to increase during the project lifetime, we consider that the predicted cumulative collision impacts at the south-west and Channel population scale (relevant BDMPS considered for the Llŷr cumulative assessment) have the potential to give rise to a moderate adverse impact. Additionally, the uncertainties around demographic rates for the species, with juvenile and immature survival rates unknown (Horswill & Robinson 2015), require a more precautionary approach to interpreting PVA model results. Therefore, **we are unable to rule out a moderate adverse, i.e. significant adverse impact, on GBBG from cumulative collision mortality at an EIA scale**.

Whilst we would suggest that the Applicant consider mitigation, such as raising the turbine draught height (i.e. clearance of the lower turbine tip height above seas surface), we note that given the very low predicted GBBG collisions from the Llŷr project alone (1.61 collisions per annum), it is unlikely that any increases in draught height would make a significant difference in this instance. Therefore, **in this instance**, we are satisfied that the Applicant does not need to consider changes to draught height any further. This conclusion is based on the assumption that the change in upper-tip height does not alter the air gap with the sea surface (i.e the lower-tip height) (see details in Section in 1.6.1.1 above).

However, given the concerns relating to this species, we recommend that for future projects located within the UK south-west and Channel BDMPS, consideration of inclusions of measures to reduce collision mortality (such as raising turbine draft height by as much as possible) be given in order to allow maximum realisation of renewable energy for the minimum environmental impact.

1.2 EIA impacts from Llŷr project cumulatively with other plans and projects: displacement

We welcome that the Llŷr Applicant has presented the indicative cumulative displacement mortality totals calculated by the Mona project in Table 1 of *'Clarification Note 3'.* However, we note that the figures presented appear to be a central value with a range of impacts given in brackets, but no information is presented as to what these refer to (e.g. which % displacement and % mortality rates the numbers refer to). Given that the numbers match those presented by the Mona project in their operation and maintenance phase cumulative displacement assessments presented Section 5.9.2 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a), we assume the numbers relate to the following rates that were presented by Mona:

- Guillemot, razorbill, puffin and Manx shearwater: central value for 50% displacement and 1% mortality, with a range in brackets for 30% displacement and 1% mortality – 70% displacement and 10% mortality.
- Gannet: central value for 70% displacement and 1% mortality, with a range in brackets for 60% displacement and 1% mortality – 80% displacement and 10% mortality.

Whilst the Llŷr Applicant has presented the % of baseline mortality that these predicted cumulative displacement totals equate to (in Table 1 of 'Clarification Note 3'), we note that the Applicant has not included any information on the reference populations and mortality rates used to calculate these. As the numbers presented are the same as those presented by Mona, we assume the Llŷr Applicant's figures are based on the same EIA reference populations and

mortality rates used by the Mona project, which we have included for information in **Table A1.4** below.

As noted in Section 1.6.1.2.3 of our main comments above, the Applicant has not included the additional mortalities from underwater collisions from tidal energy sites that the Mona project did include for guillemot, razorbill, puffin and gannet cumulative displacement assessments. We have added these into our cumulative assessments in ***Table A1.4*** below.

Table A1.4 Percentage of baseline mortality for indicative predicted impact levels for cumulative operational displacement plus underwater collision mortality for the Llŷr project cumulatively with other plans and projects at EIA scale (based on indicative cumulative totals calculated by the Mona project in Section 5.9.2 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a). Largest BDMPS reference populations and average across all age class mortality rates, as used by the Mona project have been used. Figures in bold text indicate where 1% of baseline mortality is exceeded.

	Indicative annual cumulative mortalities			**Largest BDMPS individuals (as used by Mona project)**	**Mortality rate (%) (weighted mean across all ages, as used by Mona project)**	**% baseline mortality largest BDMPS**
	Displacement mortality (from Table 1 of Llŷr clarification note 3, and as calculated by Mona project*)	**Underwater cumulative collision mortality (from tables in Section 5.9.2 Mona ES Chapter)**	**Combined indicative cumulative mortality**			
Guillemot	335-7,814	54	389-7,868	1,145,528	13.3	0.26-***5.16***
Razorbill	59-1,372	24	83-1,396	606,914	17.2	0.08-***1.34***
Puffin	28-648	1	29-649	1,482,791	17.6	0.01-0.25
Gannet	51-683	1	52-684	661,888	19.3	0.04-0.54
Manx shearwater	107-2,492	-	107-2,492	1,821,544	13.0	0.05-***1.05***

*Displacement predictions based on ranges of 30-70% for auks and Manx shearwater and 60-80% for gannet. All based on 1-10% mortality for all species. Lower figure relates to the lower displacement and mortality rates, upper figure relates to the upper displacement and mortality rates.

1.2.1 Puffin and gannet

The indicative cumulative operational displacement plus underwater collision mortality, as calculated by Mona, suggest that the predicted cumulative mortalities would not exceed 1% of baseline mortality even at the worst-case scenario of the advised SNCB ranges of % displacement and % mortality for both puffin and gannet (see ***Table A1.4***). This could therefore be considered to be undetectable against background mortality and hence **we advise that cumulative displacement plus underwater collision impacts of puffin and gannet would not result in a significant adverse effect (i.e. no greater than minor adverse effect) for cumulative EIA scale.**

1.2.2 Razorbill

As shown in ***Table A1.4*** above, the indicative cumulative operational displacement plus collision mortalities for the NRW (A) recommended rates of 30-70% displacement and 1-10% mortality, as calculated by Mona suggest that the predicted cumulative razorbill mortality is between 83 (30% displacement and 1% mortality) and 1,396 (70% displacement and 10%

mortality) birds per annum. This equates to 0.08-1.34% of baseline mortality for the largest BDMPS (***Table A1.4***). This is significant at the upper level of the displacement/mortality range that the SNCBs advise for auks (70% displacement and 10% mortality) and therefore requires further consideration.

As noted by the Llŷr Applicant in *'Clarification Note 3'*, the Mona project undertook a PVA for a range of predicted razorbill cumulative impacts. Despite NRW (A)'s advice to the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) have extracted the relevant PVA output metrics in ***Table A1.5*** below.

Table A1.5 PVA outputs for razorbill indicative cumulative assessment scenarios, as presented by Mona in Table 5-95 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	957,341	1.009	-	-
Impact A (30% D, 1% M)	953,183	1.009	0.994	1.000
Impact B (50% D, 1% M)	950,308	1.009	0.992	1.000
Impact C (70% D, 10% M)	871,000	1.006	0.910	0.997

Using the PVA model undertaken by the Mona Applicant in Mona Offshore Wind Limited (2025a), if the additional mortality from the offshore wind farms is 83-1,396 razorbills per annum (indicative updated cumulative mortalities across the range of SNCB advised % displacement and % mortality rates: 30-70% displacement and 1-10% mortality) then:

- The BDMPS population after 35 years (time period model impacts were run by Mona) will be approximately 0.6-9.0% lower than it would have been in the absence of the additional mortality (see ***Table A1.5***).
- The BDMPS population growth rate would be reduced by around 0.0-0.3% (see ***Table A1.5***).

Razorbill are listed as Amber on BoCC5a (Stanbury et al. 2024) and are listed as 'Vulnerable' in the latest IUCN2a update (Stanbury et al. 2024).

While there is some empirical evidence to support the displacement levels for auks we do not know what the likely mortality impacts of displacement are. We therefore consider it appropriate to consider a range of mortalities from 1-10%. However, on the basis that the projects that have been scoped into the cumulative assessment largely lie in areas of the UK western waters that represent low to medium levels of razorbill density during both the breeding (where relevant) and non-breeding seasons (MERP), it is assumed that areas of low/medium density will be less important/desirable feeding areas and therefore mortality impacts of displacement from less good areas would be lower than displacement from optimal/important areas. Therefore, we do not expect mortality rates to be at the top of the range considered.

Based on the above, **we advise a significant adverse impact to razorbill from cumulative operational displacement plus underwater collision morality can be ruled out at an EIA scale.**

1.2.3 Guillemot

As shown in ***Table A1.4*** above, the indicative cumulative operational displacement plus underwater collision mortalities for the NRW (A) recommended rates of 30-70% displacement and 1-10% mortality, as calculated by Mona suggest that the predicted cumulative guillemot mortality is between 389 (30% displacement and 1% mortality) and 7,868 (70% displacement and 10% mortality) birds per annum. This equates to 0.26-5.16% of baseline mortality for the largest BDMPS (***Table A1.4***). This is significant at the upper level of the displacement/mortality range that the SNCBs advise for auks (70% displacement and 10% mortality) and therefore **requires further consideration**.

As noted by the Llŷr Applicant in *'Clarification Note 3'*, the Mona project undertook a PVA for a range of predicted guillemot cumulative impacts. Despite NRW (A)'s advice to the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) have extracted the relevant PVA output metrics in ***Table A1.6*** below.

Table A1.6 PVA outputs for guillemot indicative cumulative assessment scenarios, as presented by Mona in Table 5-87 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	4,138,135	1.026	-	-
Impact A (30% D, 1% M)	4,083,497	1.026	0.986	1.000
Impact B (50% D, 1% M)	4,048,656	1.025	0.979	0.999
Impact C (70% D, 10% M)	3,134,554	1.018	0.757	0.992

Using the PVA model undertaken by the Mona Applicant in Mona Offshore Wind Limited (2025a), if the additional mortality from the offshore wind farms is 389-7,868 guillemots per annum (indicative updated cumulative mortality across the range of SNCB advised % displacement and % mortality rates: 30-70% displacement and 1-10% mortality) then:

- The BDMPS population after 35 years (time period model impacts were run by Mona) will be approximately 1.4-24.3% lower than it would have been in the absence of the additional mortality (see ***Table A1.6***).
- The BDMPS population growth rate would be reduced by around 0.0-0.8% see (***Table A1.6***).

Guillemot are listed as Amber on BoCC5a (Stanbury et al. 2024) and are listed as 'Vulnerable' in the latest IUCN2a update (Stanbury et al. 2024).

While there is some empirical evidence to support the displacement levels for auks, we do not know what the likely mortality impacts of displacement are. We therefore consider it appropriate to consider a range of mortalities from 1-10%. However, on the basis that the projects that have been scoped into the cumulative assessment largely lie in areas of the UK

western waters that represent low to medium levels of guillemot density during both the breeding (where relevant) and non-breeding seasons (MERP), it is assumed that areas of low/medium density will be less important/desirable feeding areas and therefore mortality impacts of displacement from less good areas would be lower than displacement from optimal/important areas. Therefore, we do not expect mortality rates to be at the top of the range considered.

Based on the above, **we advise a significant adverse impact to guillemot from cumulative operational displacement plus underwater collision mortality can be ruled out at an EIA scale.**

1.2.4 Manx shearwater

As shown in ***Table A1.4*** above, the indicative cumulative operational displacement mortality for Manx shearwater just exceeds 1% of baseline mortality (1.05%) for the worst-case scenario of 70% displacement and 10% mortality (see ***Table A1.4*** above). However, we note it is only at this particular % displacement and % mortality scenario (i.e. the extreme worst case) across the whole SNCB advised range of advised rates (30-70% displacement and 1-10% mortality) where the predicted impact exceeds 1% baseline mortality.

Based on the above, **we advise a significant adverse impact to Manx shearwater from cumulative operational displacement can be ruled out at an EIA scale.**

1.3 EIA Impacts for gannet from Llŷr project cumulatively with other plans and projects: operational collision risk and displacement

In *'Clarification Note 3',* the Applicant has presented the gannet cumulative EIA scale collision predicted impacts and the displacement predicted impacts calculated by Mona separately (see Tables 1 and 2 of *'Clarification Note 3'*). We note that in *'Clarification Note 3'*, the Applicant states that:

*'For **gannet** the summed collision and displacement figures (project alone and cumulative) are still below the 1% baseline mortality threshold advised by NRW (A), so that no PVA was required under EIA for this species.'*

However, this statement is not evidenced by any presentation of the cumulative collision plus displacement predicted impact, nor what this equates to of baseline mortality of the relevant gannet EIA scale reference population. Therefore, NRW (A) have undertaken this assessment below (see ***Table A1.7***).

Table A1.7 Combined indicative predicted cumulative collision plus displacement mortalities and percentage of baseline mortality for gannet at EIA scale (based on indicative cumulative totals calculated by the Mona project in Section 5.9 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a), using average across all age class mortality rate of 19.3% and largest BDMPS reference population as used by the Mona project

	Gannet predicted mortalities per annum (rounded to whole birds)
Cumulative wind farm collision, including gap filled projects (from Table 2 of Llŷr clarification note 3)	183
Cumulative displacement: 60% D, 1% M (from Table 1 of Llŷr clarification note 3)	52

Cumulative displacement: 80% D, 10% M (from Table 1 of Llŷr clarification note 3)	684		
Cumulative collision plus displacement		**Largest BDMPS individuals**	**% baseline mortality largest BDMPS**
Combined cumulative collision + displacement (with 60% D, 1% M)	235	661,888	0.18
Combined cumulative collision + displacement (with 80% D, 10% M)	867	661,888	0.68

Based on ***Table A1.7*** above, the combined indicative impact of operational collision plus displacement to gannet from Llŷr cumulatively with other plans and projects - including gap filled projects - equals between 235 birds per annum when a 60% displacement and 1% mortality rate is used, and up to 867 birds per annum when an 80% displacement and 10% mortality rate is used. These predicted figures both equate to less than 1% of baseline mortality and hence could be considered to be undetectable against background mortality. Therefore, we can conclude that **cumulative displacement plus collision impacts would not result in a significant adverse effect (i.e. no greater than minor adverse effect) for cumulative EIA scale for gannet.**

5 APPENDIX 2: NRW (A) detailed comments/conclusions on the Llŷr project HRA scale in-combination assessments following the Applicant's further information in '*Offshore Ornithology Clarification Notes 1 and 3*', and; NRW (A)'s further work to extract the relevant information from the Mona project submission documents in order to produce advice for NRW MLT

This document is a technical document submitted to provide scientific justification for NRW (A)'s advice provided on the significance of the potential impacts for Habitats Regulations Assessment (HRA) scale impacts from the Llŷr project in-combination with other plans and projects, as summarised within each section. Our advice is based on best available evidence at the time of writing and is subject to change in the future should further evidence be presented.

1. SKOMER, SKOKHOLM & SEAS OFF PEMBROKESHIRE (SSSP) SPA: MANX SHEARWATER

1.1 Impacts from the Llŷr project in-combination with other plans and projects: displacement

The indicative in-combination displacement total calculated by the Mona project in Table 1.81 of Mona Offshore Wind Limited (2025b) and as presented by the Applicant in Table 4 of '*Clarification Note 3'*, is 66-1,547 adult Manx shearwaters (rounded to whole birds) from the SSSP SPA per annum for all projects. This predicted in-combination displacement impact equates to 0.06-1.31% of baseline mortality of the colony (based the 2018 colony count of 910,312 breeding adults and an adult mortality rate of 13.0% as used in the Mona assessment, as per Table 1.90 of Mona Offshore Wind Limited 2025b). This exceeds 1% of baseline mortality of the colony at the worst case scenario of the advised range and **requires further consideration**. As noted by the Llŷr Applicant in *'Clarification Note 3',* the Mona project undertook a PVA for SSSP SPA in-combination impacts for the worst case scenario of 70% displacement and 10% mortality, as presented in Table 1.151 of Mona Offshore Wind Limited (2025b). However, despite NRW (A)'s advice to the Llŷr Applicant advising of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) have extracted the relevant PVA output metrics in ***Table A2.1*** below.

Table A2.1 PVA outputs for SSSP SPA Manx shearwater indicative in-combination displacement assessment, as presented by Mona in Table 1.151 of Mona Deadline 7 HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments Annex E1.3.1 (Mona Offshore Wind Limited 2025b)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	1,502,390	1.011	-	-
Impact: 70% displacement, 10% mortality	1,400,686	1.009	0.932	0.998

Using the PVA model undertaken by the Mona Applicant (as this represents best available evidence at this time), if the additional mortality from the offshore wind farms is up to 1,547

adult Manx shearwaters per annum (indicative in-combination displacement mortality for worst case scenario of 70% displacement and 10% mortality) then:

- The SPA population after 35 years (time period model impacts were run by Mona) would be approximately 6.8% lower than it would have been in the absence of the additional mortality (see ***Table A2.1***).
- The SPA population growth rate would be reduced by around 0.2% (see ***Table A2.1***).

Manx shearwater numbers at the SSSP SPA have increased by 201% from Seabird 2000 to the most recent Seabird Count Census (Burnell et al. 2023): Seabirds 2000 Census count of 151,000 Apparently Occupied Sites (AOS) (302,000 adults) undertaken in 1998, Seabirds Count Census count of 455,156 AOS (910312 adults) undertaken in 2018. Over this time many of the offshore wind farms (OWFs) included in the in-combination assessments have been constructed and become operational. Hence as the colony population has continued to increase, it would suggest they have not been adversely impacted by the operation of the OWFs. Additionally, the PVA suggests that for an impact of up to 1,547 Manx shearwaters per annum (predicted impact for worst case scenario of 70% displacement and 10% mortality), the Manx shearwater population of the SPA will be able to continue growing beyond its current level, even with the additional impact from the OWFs, as indicated by a growth rate above 1, and the Counterfactual of Growth Rate is 0.998 (see ***Table A2.1***). This suggests that there will be only a small impact on the growth rate in comparison to baseline conditions. Hence there will remain a thriving Manx shearwater population at the site and the Conservation Objective target population of 300,000 adults (150,000 pairs)[5] would be achieved. On the basis of these figures, **NRW advises that an adverse effect on site integrity (AEoSI) can be ruled out for predicted displacement impacts on the Manx shearwater feature from the project in-combination with other plans and projects for the SSSP SPA**.

2. SKOMER, SKOKHOLM & SEAS OFF PEMBROKESHIRE (SSSP) SPA: LESSER BLACK-BACKED GULL (LBBG)

2.1 Impacts from the Llŷr project in-combination with other plans and projects: collision risk

As noted in ***Section 1.6.1.2.3*** of our main comments above, the Applicant has still not undertaken any updated in-combination assessments for SSSP SPA LBBG and has made no attempt to apportion the EIA scale figures to the colony for a complete assessment. Given the lack of thorough in-combination assessment including all relevant projects, it is therefore unclear from the documents submitted by the Applicant whether there would be a significant impact on the LBBG feature of the site and whether an AEoSI could be ruled out. Therefore, in order to assist NRW MLT and to expedite the consenting process, NRW (A) has undertaken its own apportionment exercise to inform our assessment. We again note that such an assessment should have been undertaken by the Applicant.

In the breeding season, the following OWF projects are located within the mean-maximum foraging range + 1SD of 127 + 109km of LBBG (Woodward et al. 2019) from the SSSP SPA colony and hence have connectivity with the colony: Llŷr, Erebus, White Cross and Wave Hub floating wind farm.

[5] Currently available conservation objective target populations for SSSP SPA available from: https://naturalresources.wales/media/673958/Skomer.Skokholm%20management%20plan%2007.pdf

In the non-breeding seasons, based on tracking data of LBBGs from Skokholm (undertaken by BTO), it can be considered unlikely that LBBGs from the SSSP SPA colony will migrate through or winter in the Liverpool Bay/NE Irish Sea area and hence it could be assumed that there is unlikely to be connectivity with the OWFs here in the non-breeding seasons (essentially, birds from the colony generally go south) (Thaxter et al 2019; see ***Figure A2.1***).

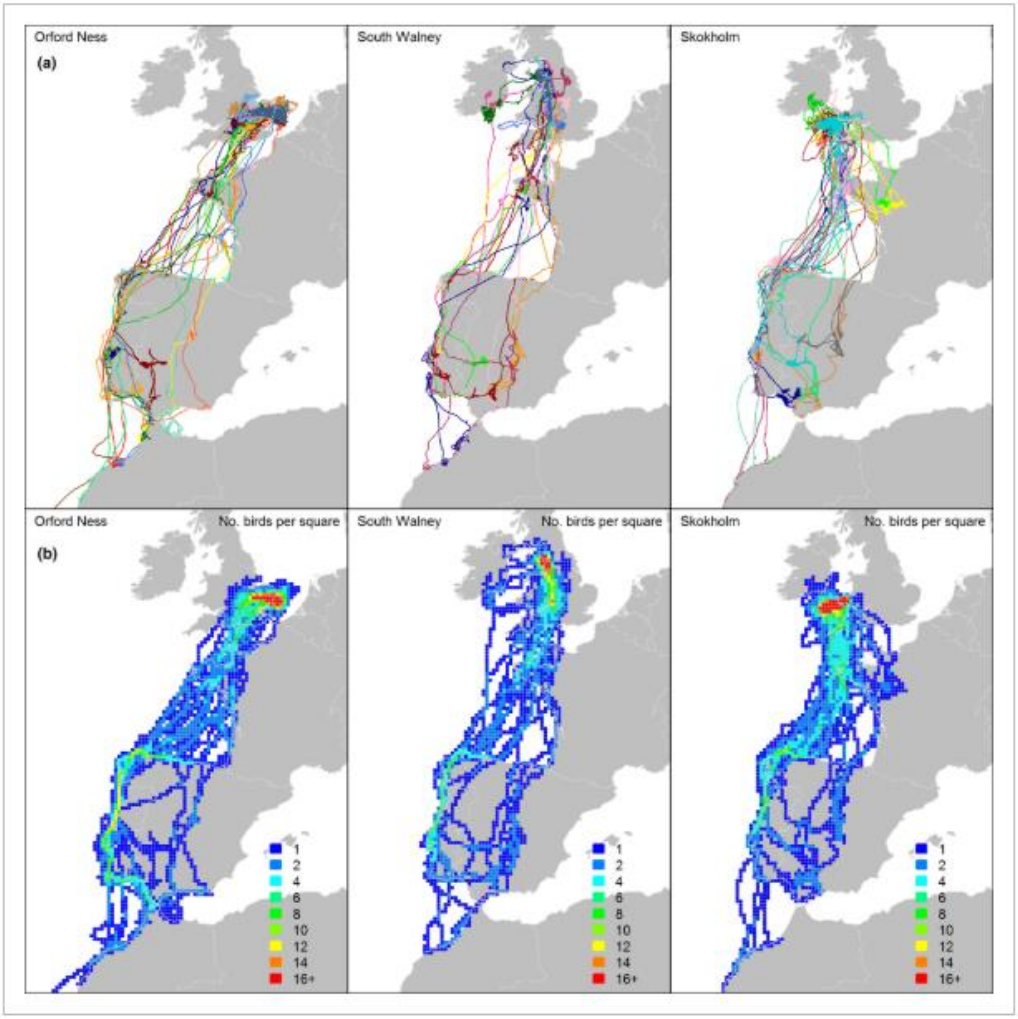


Figure A2.1 Movements of birds through the year as (a) GPS tracks and (b) the annual flux of movement, depicted as number of birds per square per year. Reproduced from Thaxter et al. (2019)

Therefore, taking the above into account NRW (A) have taken the EIA scale LBBG collision impacts for the species-group avoidance rate of 0.9939 presented in Table 5-123 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a) and apportioned these to the SSSP SPA colony (***see Table A2.2***).

Based on this approach we have calculated an indicative in-combination LBBG SSSP SPA total to be in the region of 11 adult LBBG collisions from the SPA per annum (***Table A2.2***), which equates to around 0.57% of baseline mortality of the colony (based on an adult mortality rate of 11.5% calculated from the adult survival rate in Horswill & Robinson (2015) and a colony size of 16,704 breeding adults (2021-22 colony size used by LIŷr in Table 22E-2 of Appendix 22E of the original submission – the most contemporaneous count with the LIŷr baseline surveys)). This is below 1% of baseline mortality for the SSSP SPA LBBG colony and can be

considered undetectable against background mortality and hence an **AEoSI can be ruled out for in-combination collision mortality.**

Table A2.2 NRW (A) calculated indicative LBBG in-combination collision mortalities apportioned to SSSP SPA based on an avoidance rate of 0.9939 *

	Season	Llŷr	Erebus	White Cross	Wave Hub floating OWF[1]
EIA Scale Collisions	Breeding	1.12	7.61	0.41	3.45[1]
	Post-breeding	0.20	0.60	0.00	1.38[1]
	Winter	0.20	0.00	0.00	2.76[1]
	Pre-breeding	0.41	0.00	0.00	0.69[1]
Apportioning	Breeding	0.951[2]	0.978[3]	0.951[4]	0.422[5]
	Post-breeding[6]	0.083	0.083	0.083	0.083
	Winter[6]	0.094	0.094	0.094	0.094
	Pre-breeding[6]	0.083	0.083	0.083	0.083
SSSP SPA Apportioned collisions	Breeding	1.07	7.44	0.39	1.46
	Post-breeding	0.02	0.05	0.00	0.11
	Winter	0.02	0.00	0.00	0.26
	Pre-breeding	0.03	0.00	0.00	0.06
	Annual	***1.14***	***7.49***	***0.39***	***1.89***
Annual indicative in-combination collision total					**10.91**

*Note that the figures used here are based on the Mona project's cumulative assessment and NRW (A) has undertaken an assessment following the approach taken by Mona for other sites, in order to give us an indication of what the in-combination total might be, and an indication on whether an AEoSI can be ruled out. As a result, these numbers should not be seen as NRW "agreed" figures and we advise that future projects undertaking an in-combination assessment for this site and feature should discuss their approaches with NRW (A) in advance of any submission

[1] We have reviewed the Wave Hub floating wind farm 'Revised Bird Collision Risk' document and note that from Table 4 of this document there does not appear to be any major peaks in densities of LBBGs in flight in the survey area, we have assumed that the annual total EIA scale collisions for the project (8.3 collisions) are equally distributed across each month. Then to give an EIA scale seasonal breakdown of collision we have simply multiplied the monthly collision figure by the number of months making up each seasonal definition for LBBG.

[2] Llŷr 1 Floating Offshore Wind Farm Environmental Statement Volume 6: Appendix 22B Marine Ornithology Colony Apportioning, Table 22B-6.

[3] Erebus: Offshore Ornithology 11.2 Technical Appendix - Apportioning, Table 9

[4] Assuming the same SPA breeding season apportioning value as Llŷr, noting this is likely to be precautionary.

[5] As in Table 4.6 of the Wave Hub floating wind farm HRA Screening Report – review and update the Applicant attributed 57.8% of LBBG collisions to the Isles of Scilly SPA and the only other LBBG SPA likely to have breeding season connectivity with the project is the SSSP SPA, we have made the assumption that the remaining 42.2% of collisions in the breeding season are attributed to the SSSP SPA. However, we do note that this is likely to be precautionary.

[6] Applying the standard SNCB advised approach of calculating the proportion of the SPA adult birds present in the relevant BDMPS season across the BDMPS total of birds of all ages for each relevant non-breeding BDMPS season (as used by Llŷr)

We note that the LBBG population at the SSSP SPA is in decline. The latest census indicates a 47% decline: Seabird 2000 (1998-2002) = 15,748 Apparently Occupied Nests (AON); Seabirds Count (2015-2021) = 8,347 AON (Burnell et al., 2023). The most recent population count from 2024 from the Seabird Monitoring Programme (SMP) suggests a current population of 3,024 AON (6,064 breeding adults). The Conservation Objective is for the breeding population to be stable or increasing, aiming for at least 20,300 pairs (40,600 breeding adults)[5]. Whilst there may be few in-combination mortalities from the OWF projects with connectivity to the SPA, which can be considered to be undetectable against background mortality, a combination of further declines in population abundance and increased impact from future developments with potential connectivity to the colony may increase mortality to a level where more detailed assessment (such as through PVA) is required for those future projects. We therefore recommend for future projects that inclusion of measures to reduce collision mortality (such as raising turbine draft height as much as possible) be considered in order to allow maximum realisation of renewable energy for the minimum environmental impact.

3. SKOMER, SKOKHOLM & SEAS OFF PEMBROKESHIRE (SSSP) SPA: PUFFIN

3.1 Impacts from the Llŷr project in-combination with other plans and projects: displacement

In *'Clarification Note 3',* the Applicant notes that the original Llŷr in-combination assessment (included Llŷr, Erebus and White Cross only) for the worst case scenario of 70% displacement and 10% mortality of 111.63 puffin mortalities from the SSSP SPA, is similar to the Mona EIA scale cumulative predicted impact of 111 puffins at 60% displacement and 2% mortality. However, we note that the Mona project's EIA scale cumulative impact - at 70% displacement and 10% mortality -was 648 mortalities. These are clearly significantly different totals at the same % displacement and mortality rates, and is because the Mona values are EIA scale and have not been apportioned to the SSSP SPA colony. Clearly these are not comparative metrics.

Therefore, the in-combination PVA previously conducted by the Llŷr Applicant - assuming 111 mortalities in-combination - may not necessarily present the worst-case scenario, particularly given that all relevant plans and projects have not been included in the in-combination assessment.

As with lesser black-backed gull, given the lack of thorough in-combination assessment including all relevant projects (those within foraging range during the breeding season and within the BDMPS region during the non-breeding season), it is therefore unclear from the documents submitted by the Applicant whether there would be a significant impact on the puffin feature of the site and whether an AEoSI could be ruled out. Therefore, in order to assist NRW MLT and to expedite the consenting process, NRW (A) has undertaken its own apportionment exercise to inform our assessment. We again note that such an assessment should have been undertaken by the Applicant.

In the breeding season, the following OWF projects are located within the mean-maximum foraging range + 1SD of 119.6 + 131.2 km of puffin (Woodward et al. 2019, data excluding Fair Isle where foraging range may have been unusually high as a result of reduced prey availability during the study year) from the SSSP SPA colony and hence have connectivity with the colony: Llŷr, Erebus, White Cross, Twin Hub, Awel-y-Môr, Gwynt-y-Môr, Rhyl and North Hoyle. We have used the breeding season apportionment rates used in the project alone assessments for Llŷr, Erebus and Awel-y-Môr. As no breeding season apportionment rates are available from White Cross, Twin Hub, Gwynt-y-Môr. Rhyl or North Hoyle we have applied a proxy approach and used the rate from the nearest project with an apportionment rate, as per the approach taken by the Mona project in their other in-combination assessments (noting that this is likely to be precautionary, given the distance of the projects from the colony).

Based on the puffin tables in Appendix A of Furness (2015), 18% of SSSP SPA adult puffins are present in the western waters biologically defined minimum population scale (BDMPS) in the non-breeding season. Assuming birds within the western waters BDMPS are evenly mixed, then all the other OWFs within the western waters puffin BDMPS may contribute in-combination impacts outside of the breeding season, albeit these are likely to be small from each project – applying the standard SNCB advised approach of calculating the proportion of the SPA adult birds present in the relevant BDMPS season across the BDMPS total of birds of all ages for each relevant non-breeding BDMPS season, which for SSSP SPA puffin results in a non-breeding season apportionment rate of 2.9%.

Based on this, NRW (A) have taken the EIA scale puffin abundances presented in Table 5-96 of Mona Deadline 7 ES Offshore Ornithology Chapter 5 (Mona Offshore Wind Limited 2025a) and apportioned these to the SSSP SPA colony. From this an indicative annual total of 1,678 puffins from the SSSP SPA are at risk of displacement (***Table A2.3***).

Table A2.3 NRW (A) calculated indicative puffin abundance apportioned to SSSP SPA.

	Mean Seasonal Peak		**Apportioning**		**Apportioned abundances**	
OWF	**Breeding**	**Non-breeding**	**Breeding**	**Non-breeding**	**Breeding**	**Non-breeding**
Llŷr	152	592	0.98[1]	0.029	148.96	17.17
White Cross	49	31	0.98[2]	0.029	48.02	0.899
Erebus	1416	160	0.997[3]	0.029	1411.75	4.64
Wave Hub floating OWF	0	0	0.98[2]	0.029	0.00	0.00
Gwynt y Môr	2	1	0.628[5]	0.029	1.26	0.03
Awel y Môr	8	0	0.628[4]	0.029	5.02	0.00
North Hoyle	0	0	0.628[5]	0.029	0.00	0.00
Rhyl Flats	0.5	0.5	0.628[5]	0.029	0.31	0.01
Barrow	1	0	0.00	0.029	0.00	0.00
Burbo Bank	0.5	0.5	0.00	0.029	0.00	0.01
Burbo Bank extension	10	0	0.00	0.029	0.00	0.00
Morecambe	39	20	0.00	0.029	0.00	0.58
Morgan	9	5	0.00	0.029	0.00	0.15
Ormonde	1	0	0.00	0.029	0.00	0.00
Robin Rigg	0	0	0.00	0.029	0.00	0.00
Walney 1 & 2	3	2	0.00	0.029	0.00	0.06
Walney 3 & 4	53	119	0.00	0.029	0.00	3.45
West of Duddon Sands	61	35	0.00	0.029	0.00	1.02
West of Orkney	5272	1177	0.00	0.029	0.00	34.13
Mona	15	22	0.00	0.029	0.00	0.64
Seasonal apportioned abundance total					***1615.32***	***62.79***
Annual apportioned abundance total						***1678***

*Note that the figures used here are based on the Mona project's cumulative assessment and NRW (A) has undertaken an assessment following the approach taken by Mona for other sites, in order to give us an indication of what the in-combination total might be, and an indication on whether an AEoSI can be ruled out. As a result, these numbers should not be seen as NRW "agreed" figures and we advise that future projects undertaking an in-combination assessment for this site and feature should discuss their approaches with NRW (A) in advance of any submission

[1] Llŷr 1 Floating Offshore Wind Farm Environmental Statement Volume 6: Appendix 22B Marine Ornithology Colony Apportioning, Table 22B-6.

[2] Assuming the same SPA breeding season apportioning value as used by the Llŷr project, noting this is precautionary.

[3] Erebus: Offshore Ornithology 11.2 Technical Appendix – Apportioning, Table 8.

[4] Awel y Môr: Deadline 8 Report 5.2: Report to Inform Appropriate Assessment, paragraph 849.

[5] Assuming the same SPA breeding season apportioning value as used by the Awel y Môr project, noting this is potentially precautionary.

Table A2.4 Displacement matrix for NRW (A) calculated indicative SSSP SPA in-combination displacement impacts. Cells within the dark lined box indicted the range of SNCB advised % displacement and % mortality rates. Highlighted cells indicate those where 1% of baseline mortality is exceeded (based on an adult mortality rate 9.4% and a colony population of 33,619 adults from 2021-22 count, as used by the Applicant in Table 22E-2 of Appendix E of the submission documents)

		Mortality Rate (%)											
		1	**2**	**3**	**4**	**5**	**10**	**20**	**30**	**40**	**50**	**75**	**100**
Displacement Rate (%)	**1**	0	0	1	1	1	2	3	5	7	8	13	17
	5	1	2	3	3	4	8	17	25	34	42	63	84
	10	2	3	5	7	8	17	34	50	67	84	126	168
	20	3	7	10	13	17	34	67	101	134	168	252	336
	30	5	10	15	20	25	50	101	151	201	252	378	503
	40	7	13	20	27	34	67	134	201	268	336	503	671
	50	8	17	25	34	42	84	168	252	336	419	629	839
	60	10	20	30	40	50	101	201	302	403	503	755	1007
	70	12	23	35	47	59	117	235	352	470	587	881	1175
	80	13	27	40	54	67	134	268	403	537	671	1007	1342
	90	15	30	45	60	76	151	302	453	604	755	1133	1510
	100	17	34	50	67	84	168	336	503	671	839	1258	1678

From ***Table A2.4***, the indicative in-combination displacement total calculated by NRW (A) is 5-117 adult puffins (rounded to whole birds) from the SSSP SPA per annum for all projects. This predicted in-combination displacement impact equates to 0.16-3.72% of baseline mortality of the colony (an adult mortality rate 9.4% and a colony population of 33,619 adults from 2021-22 count, as used by the Applicant in Table 22E-2 of Appendix E of the submission documents). This is significant at the upper end of the range of advised rates and **requires further consideration.**

However, we note that the NRW (A) indicative worst case scenario (70% displacement and 10% mortality) in-combination impact of 117 displacement mortalities is a small increase compared to the 111 mortalities previously assessed via Llŷr's PVA (Table 22F-5 and Table 22F-9,of Appendix F of original submission) – the difference is an additional 6 mortalities per annum. As such, we are content that this would result in a negligible difference in the results of the PVA. Therefore, as the previous PVA undertaken by the Applicant suggests that the puffin population of the SPA will be able to continue growing beyond its current level, even with the additional impact from the OWFs, as indicated by Figure 22F-5 of Appendix F of the original submission, and the Counterfactual of Growth Rate is 0.996 (see Table 22F-9 of Appendix F of original submission). This suggests that there will be only a small impact on the growth rate in comparison to baseline conditions.

Additionally, the count data from seabird 2000 through to counts in 2022 shows an increase from 13,706 individual puffins in 2000 to 46,507 individual puffins in 2022. Over this time many of the OWFs included in the in-combination assessments have been constructed and become operational. Hence as the colony population has continued to increase, it would suggest they have not been adversely impacted by the operation of the OWFs.

Based on the above, there will remain a thriving puffin population at the site and the Conservation Objective target population of 19,000 adults (9,500 pairs)[5] would be achieved. On the basis of these figures, **NRW advises that an adverse effect on site integrity (AEoSI) can be ruled out for predicted displacement impacts on the puffin feature from the project in-combination with other plans and projects for the SSSP SPA**.

4. SKOMER, SKOKHOLM & SEAS OFF PEMBROKESHIRE (SSSP) SPA: EUROPEAN STORM PETREL

Given the very low numbers of storm petrel recorded in the site-specific surveys, we consider that there would be no measurable effects on storm petrel due to the project alone and hence there would be no contribution to any in-combination effects on this feature. Therefore, **we can agree that an AEoSI can be ruled out for predicted impacts on the European storm petrel feature from the project alone and in-combination with other plans and projects for the SSSP SPA**.

5. SKOMER, SKOKHOLM & SEAS OFF PEMBROKESHIRE (SSSP) SPA: SEABIRD ASSEMBLAGE

5.1 Impacts from Llŷr project in-combination with other plans and projects: kittiwake (collision)

The Applicant has only presented SSSP SPA kittiwake in-combination collision plus displacement impacts in Table 4 of *'Clarification Note 3'*. We note that NRW (A) does not recommend that displacement is assessed for kittiwake as we currently consider the evidence base to be insufficient. Therefore, it would have been useful if the Applicant had provided the split of in-combination collision impacts and in-combination displacement impacts separately as well as combined. However, this information is extractable from the Mona assessment (in Table 1.42 of Mona Deadline 7 HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments Annex E1.3.1: Offshore ornithology ISAA supporting information (Mona Offshore Wind Limited 2025b). Hence, we have extracted this information and have provided advice on in-combination collision impacts only for SSSP SPA kittiwake.

The indicative in-combination collision total calculated by the Mona project in Table 1.42 of Mona Offshore Wind Limited (2025b) is 11 adult kittiwakes (rounded to whole birds) from the SSSP SPA per annum for all projects. This predicted in-combination collision impact equates to approximately 2.29% of baseline mortality of the colony (based the 2024 colony count of 3,144 breeding adults and an adult mortality rate of 14.6% as used in the Mona assessment). This therefore requires further consideration. As noted by the Llŷr Applicant in *'Clarification Note 3'* the Mona project undertook a PVA for SSSP SPA in-combination impacts, including a separate PVA for just in-combination collision impacts in Table 1.132 of Mona Offshore Wind Limited (2025b). However, despite NRW (A)'s advice to the Llŷr Applicant advising of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3*'). Therefore, NRW (A) has extracted the relevant PVA output metrics in ***Table A2.5*** below.

Table A2.5 PVA outputs for SSSP SPA kittiwake indicative in-combination collision only assessment, as presented by Mona in Table 1.132 of Mona Deadline 7 HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments Annex E1.3.1 (Mona Offshore Wind Limited 2025b)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	3,490	1.003	-	-
Impact*	3,012	0.999	0.865	0.996

* Using species-group avoidance rate of 0.9928, as advised by SNCBs and for the consented (where available) plus as built (where consented figures are unavailable) project parameters

Using the PVA model undertaken by the Mona Applicant, as this represents best available evidence at this time, if the additional mortality from the offshore wind farms is 11 adult kittiwakes per annum (indicative in-combination collision mortality) then:

- The SPA population after 35 years (time period model impacts were run by Mona) would be approximately 13.5% lower than it would have been in the absence of the additional mortality (see ***Table A2.5***).
- The SPA population growth rate would be reduced by around 0.4% (see ***Table A2.5***).

The Mona project's in-combination collision PVA suggest that the SSSP SPA kittiwake population would decline due to the in-combination impact (as shown by a growth rate of <1, see ***Table A2.5***). We note that breeding season connectivity of the SSSP SPA kittiwake colony is based on the mean-maximum foraging range of kittiwake of 156.1 ± 144.5 km from Woodward et al. (2019). However, we note that tracking data for kittiwake from Skomer from 2016-17, albeit from a small sample size (n=17) did not record birds foraging over any great distance, with a mean maximum foraging range across both years of 22.0 ± 2.6 km (Trevail et al. 2019). The tracking study from Skomer presented in Trevail et al. (2019) was not included in the review undertaken by Woodward et al. (2019). Based on this, it can be considered to be unlikely that there would be breeding season connectivity with the OWF projects located in the NE Irish Sea/Liverpool Bay area and the Wave Hub floating offshore wind farm project. Hence, it is likely that the breeding season apportionment values and resulting apportioned impacts, calculated by the Mona project for these projects in their in-combination collision impacts to the colony presented in the assessment above, are overly precautionary. Based on consideration of this, the in-combination collision impact to SSSP SPA is considered likely to be below 1% of baseline mortality of the colony, and be unlikely to be detectable against background mortality.

However, as kittiwake is not a qualifying feature of the SSSP SPA in its own right, it is a named component of the seabird assemblage feature, this should be considered in the wider context of the assemblage feature and consideration of the assemblage feature Conservation Objectives. Therefore, see ***Section 5.4*** below for the overall conclusion of significance of effect on this qualifying feature.

5.2 Impacts from the Llŷr project in-combination with other plans and projects: guillemot (displacement)

The indicative in-combination displacement total calculated by the Mona project in Table 1.81 of Mona Offshore Wind Limited (2025b) is 29-678 adult guillemots (rounded to whole birds) from the SSSP SPA per annum for all projects. This predicted in-combination displacement impact equates to 1.19-27.83% of baseline mortality of the colony (based the 2024 colony count of 39,923 breeding adults and an adult mortality rate of 14.6% as used in the Mona assessment, as per Table 1.83 of Mona Offshore Wind Limited 2025b) and is significant across the entire range of advised rates and requires further consideration. As noted by the Llŷr Applicant in *'Clarification Note 3'* the Mona project undertook a PVA for SSSP SPA in-combination impacts for two impact scenarios ((i) the worst case scenario of 70% displacement and 10% mortality, and (ii) an alternative of 70% displacement and 2% mortality), as presented in Table 1.143 of Mona Offshore Wind Limited (2025b). However, despite NRW (A) advising the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3*'). Therefore, NRW (A) has extracted the relevant PVA output metrics in ***Table A2.6*** below.

Table A2.6 PVA outputs for SSSP SPA guillemot indicative in-combination displacement assessment, as presented by Mona in Table 1.143 of Mona Deadline 7 HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments Annex E1.3.1 (Mona Offshore Wind Limited 2025b)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	112,672	1.026	-	-
Impact: 70% displacement, 10% mortality	88,628	1.019	0.786	0.993
Impact: 70% displacement, 2% mortality	107,544	1.025	0.953	0.999

Using the PVA model undertaken by the Mona Applicant, as this represents best available evidence at this time, if the additional mortality from the offshore wind farms is up to 678 adult guillemots per annum (indicative in-combination displacement mortality for worst case scenario of 70% displacement and 10% mortality) then:

- The SPA population after 35 years (time period model impacts were run by Mona) would be approximately 21.4% lower than it would have been in the absence of the additional mortality (see ***Table A2.6***).
- The SPA population growth rate would be reduced by around 0.7% (see ***Table A2.6***).

The PVA suggests that for an impact of up to 678 guillemots per annum (predicted impact for worst case scenario of 70% displacement and 10% mortality), the guillemot population of the SPA will be able to continue growing beyond its current level, even with the additional impact from the OWFs, as indicated by a growth rate above 1, and the Counterfactual of Growth Rate is 0.993 (see ***Table A2.6***). This suggests that there will be only a small impact on the growth rate in comparison to baseline conditions. Additionally, the count data from Seabird 2000 through to counts in 2022 shows an increase from 14,848 individual guillemots in 2000 to 37,305 individual guillemots in 2022. Over this time many of the OWFs included in the in-combination assessments have been constructed and become operational. Hence as the colony population has continued to increase, it would suggest they have not been adversely impacted by the operation of the OWFs.

As guillemot is not a qualifying feature of the SSSP SPA in its own right, it is a named component of the seabird assemblage feature, this should be considered in the wider context of the assemblage feature and consideration of the assemblage feature Conservation Objectives. Therefore, see ***Section 5.4*** below for the overall conclusion of significance of effect on this qualifying feature.

5.3 Impacts from the Llŷr project in-combination with other plans and projects: razorbill (displacement)

The indicative in-combination displacement total calculated by the Mona project in Table 1.120 of Mona Offshore Wind Limited (2025b) is 2-35 adult razorbills (rounded to whole birds) from the SSSP SPA per annum for all projects. This predicted in-combination displacement impact equates to 0.10-2.27% of baseline mortality of the colony (based the 2024 colony count of 14,846 breeding adults and an adult mortality rate of 10.5% as used in the Mona assessment). This exceeds 1% of baseline mortality of the colony at several scenarios across the advised range (see ***Table A2.7***).

Table A2.7 NRW (A) calculated percent of baseline mortality for predicted annual in-combination displacement impact levels for razorbill for SSSP SPA for NRW (A) preferred range of 30-70% displacement and 1-10% mortality – baseline mortality calculated using adult only colony size (14,846 breeding adults) and adult mortality rate (10.5% from Horswill & Robinson 2015)

Displacement (%)	% Baseline mortality of SSSP SPA						
	Mortality rate (%)						
	1	2	4	5	6	8	10
30	0.10	0.19	0.39	0.49	0.58	0.77	0.97
40	0.13	0.26	0.52	0.65	0.77	1.03	1.30
50	0.16	0.32	0.65	0.81	0.96	1.28	1.62
60	0.19	0.39	0.78	0.97	1.15	1.54	1.95
70	0.23	0.45	0.91	1.14	1.35	1.80	2.27

As noted by the Llŷr Applicant in *'Clarification Note 3'*, the Mona project undertook a PVA for SSSP SPA in-combination impacts for the worst case scenario of 70% displacement and 10% mortality, as presented in Table 1.158 of Mona Offshore Wind Limited (2025b). However, despite NRW (A)'s advice to the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) has extracted the relevant PVA output metrics in ***Table A2.8*** below.

Table A2.8 PVA outputs for SSSP SPA razorbill indicative in-combination displacement assessment, as presented by Mona in Table 1.158 of Mona Deadline 7 HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments Annex E1.3.1 (Mona Offshore Wind Limited 2025b)

Scenario (after 35 yrs impact: 2030-2065)	Median adult population size	Median growth rate	Median counterfactual of population size (CPS)	Median counterfactual of growth rate (CGR)
Baseline	19,205	1.009	-	-
Impact: 70% displacement, 10% mortality	17,033	1.006	0.885	0.997

Using the PVA model undertaken by the Mona Applicant, as this represents best available evidence at this time, if the additional mortality from the offshore wind farms is up to 35 adult razorbills per annum (indicative in-combination displacement mortality for worst case scenario of 70% displacement and 10% mortality) then:

- The SPA population after 35 years (time period model impacts were run by Mona) would be approximately 11.5% lower than it would have been in the absence of the additional mortality (see ***Table A2.8***).
- The SPA population growth rate would be reduced by around 0.3% (see ***Table A2.8***).

The PVA suggests that for an impact of up to 35 razorbills per annum (predicted impact for worst case scenario of 70% displacement and 10% mortality), the razorbill population of the SPA will be able to continue growing beyond its current level, even with the additional impact from the OWFs, as indicated by a growth rate above 1, and the Counterfactual of Growth Rate is 0.997 (see ***Table A2.8***). This suggests that there will be only a small impact on the growth rate in comparison to baseline conditions. Additionally, the count data from Seabird 2000 through to counts in 2022 shows an increase from 5,140 individual razorbills in 2000 to 14,157 individual razorbills in 2022. Over this time many of the OWFs included in the in-combination assessments have been constructed and become operational. Hence as the colony population

has continued to increase, it would suggest they have not been adversely impacted by the operation of the OWFs.

As razorbill is not a qualifying feature of the SSSP SPA in its own right, it is a named component of the seabird assemblage feature, this should be considered in the wider context of the assemblage feature and consideration of the assemblage feature Conservation Objectives. Therefore, see ***Section 5.4*** below for the overall conclusion of significance of effect on this qualifying feature.

5.4 Impacts from the Llŷr project in-combination with other plans and projects: seabird assemblage (collision and displacement)

The seabird assemblage is a qualifying feature of the SSSP SPA in its own right. The Conservation Objective for the seabird assemblage feature states that:
During the breeding season the SPA will regularly support at least 67,000 individual seabirds of the following species, most of which also qualify independently as SPA features:

- *Puffin*
- *Manx shearwater*
- *European storm petrel*
- *Lesser black-backed gull*
- *Guillemot*
- *Razorbill*
- *Kittiwake*

Based on the above, the growth rates of guillemot, razorbill, Manx shearwater are unlikely to be significantly affected over the lifetime of the project as a result of in-combination impacts and will continue to be stable or increasing. Under a worst-case scenario of assuming connectivity of the NE Irish Sea/Liverpool Bay OWFs in the breeding season with the SSSP SPA kittiwake colony for in-combination collision risk the kittiwake population is predicted to decline. However, based on evidence from tracking data we consider there is an extremely low risk that kittiwake would become locally extinct as a result of impacts from the proposed project in-combination with other plans and projects, and the species would still contribute to the assemblage. Additionally, the indicative in-combination impacts to the puffin and LBBG features are considered to be likely to be undetectable against background mortality. Therefore, based on this we consider that the abundance target (67,000 individuals)**Error! Bookmark not defined.** of the assemblage will be met and that the diversity of species making up the assemblage is not at risk from the project alone and in-combination collision and displacement impacts from offshore wind farms. Therefore, the Conservation Objective can be met and we advise **that an AEoSI of the seabird assemblage feature of the SSSP SPA can be ruled out for collision and displacement impacts from both the project alone and in-combination impacts**.

6. GRASSHOLM SPA: GANNET

6.1 Impacts from Llŷr project in-combination with other plans and projects: gannet (collision and displacement)

We note that the Applicant's original assessment was undertaken using the Grassholm SPA colony count from 2015, and that the Mona assessment in Mona Offshore Wind Limited (2015b) was also based on this. This is because the 2015 colony count of 72,022 breeding adults (Burnell et al. 2023) is the count that is most contemporaneous with the Llŷr (and Mona) project site-specific survey data conducted between March 2020-March 2022. We consider that it is important to use contemporaneous data in order to be comparing like-for-like impacts

against populations. This is particularly important should there be a large change in a colony population after baseline surveys have been carried out. For example, the HPAI outbreak caused large numbers of mortalities in summer 2022 and 2023 with the Grassholm SPA gannet colony having been severely affected: with a 54% reduction between the pre-HPAI baseline (2015) and 2023 counts, or a 57% decline when the 2023 count is compared with the predicted population estimate for 2021, produced using colony-specific average annual rates of change since 2003-05 by Wanless et al. (2023) (Tremlett et al. 2024). This is reflected in Seabird Monitoring Programme (SMP) counts showing 78,584 adults in 2009 and 72,022 in 2015, then just 32,964 in 2023 and 38,398 in 2024. Therefore, comparing mortalities associated with offshore wind farm development calculated using data collected pre-HPAI against colony counts post-HPAI is not appropriate, and is likely to overestimate relative impacts. We expect seabird data collected prior to summer 2022 (approx. August) (as is the case for the Llŷr project survey data) to remain a valid representation of 'typical' seabird distribution and density, as this was before mass mortality events began to take place. Broadly, we expect any changes in abundance at colonies to be reflected proportionately in the at sea data. That is, it is reasonable to assume distribution patterns will remain broadly similar, but densities to change accordingly.

For the worst case scenario of 80% displacement and 10% mortality, the indicative in-combination collision plus displacement total calculated by the Mona project in Table 1.96 of Mona Offshore Wind Limited (2025b), is 231 adult gannets (rounded to whole birds) from the SPA per annum, which equates to 3.96% of baseline mortality of the colony (based on the adult 2015 colony count of 72,022, used by both the Applicant in Table E22-2 of Appendix E of original submission documents, and the Mona Applicant and adult mortality rate of 8.1% from Horswill & Robinson (2015)), see ***Table A2.9*** below.

Table A2.9 Combined indicative predicted in-combination collision plus displacement mortalities and percentage of baseline mortality for Grassholm SPA gannet (based on indicative in-combination totals calculated by the Mona project in Table 1.96 of Mona Offshore Wind Limited (2025b), using adult mortality rate of 8.1% and 2015 colony count)

	Gannet predicted mortalities per annum (rounded to whole birds)		
In-combination wind farm collision, including gap filled projects	60		
In-combination displacement: 60% displacement, 1% mortality	13		
In-combination displacement: 80% displacement, 10% mortality	171		
In-combination collision plus displacement		**Colony count, breeding adults (2015)**	**% baseline mortality**
Combined in-combination collision + displacement (with 60% D, 1% M)	73	72,022	1.25
Combined in-combination collision + displacement (with 80% D, 10% M)	231	72,022	3.96

As noted by the Llŷr Applicant in *'Clarification Note 3'*, the Mona project undertook a PVA for SSSP SPA in-combination impacts for the worst case scenario of 80% displacement and 10% mortality plus collisions (with no consideration of macro avoidance), as presented in Table 1.147 of Mona Offshore Wind Limited 2025b). However, despite NRW (A)advising the Llŷr Applicant of the need to present the Mona PVA outputs in their assessment, the Applicant has

not done this in any of their submission documents (including *'Clarification Note 3'*). Therefore, NRW (A) has extracted the relevant PVA output metrics in ***Table A2.10*** below.

Table A2.10 PVA outputs for Grassholm SPA gannet indicative in-combination collision plus displacement assessment, as presented by Mona in Table 1.147 of Mona Deadline 7 HRA Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments Annex E1.3.1 (Mona Offshore Wind Limited 2025b)

Scenario (after 35 yrs impact: 2030-2065)	**Median adult population size**	**Median growth rate**	**Median counterfactual of population size (CPS)**	**Median counterfactual of growth rate (CGR)**
Baseline	131,362	1.012	-	-
Impact: 80% displacement, 10% mortality plus collisions (with no macro avoidance)	114,832	1.008	0.873	0.996

Using the PVA model undertaken by the Mona Applicant, as this represents best available evidence at this time, if the additional mortality from the offshore wind farms is up to 321 adult razorbills per annum (indicative in-combination collision plus displacement mortality for worst case scenario of 80% displacement and 10% mortality) then:

- The SPA population after 35 years (time period model impacts were run by Mona) would be approximately 12.7% lower than it would have been in the absence of the additional mortality (see ***Table A2.10***).
- The SPA population growth rate would be reduced by around 0.4% (see ***Table A2.10***).

The PVA suggests that for an impact of up to 321 gannets per annum (predicted impact for worst case scenario of 80% displacement and 10% mortality plus collisions), the gannet population of the SPA will be able to continue growing beyond its current level, even with the additional impact from the OWFs, as indicated by a growth rate above 1, and the Counterfactual of Growth Rate is 0.996 (see ***Table A2.10***). This suggests that there will be only a small impact on the growth rate in comparison to baseline conditions.

We also note that during the Mona project examination (at Deadline 5) the (Mona) Applicant did produce a PVA based on an in-combination impact of 230 mortalities and with a starting population for the colony using the post HPAI 2024 count of 38,398 adults. The results of this did suggest that the colony could continue to grow beyond its 2024 starting level even with the impact of the OWFs: predicted growth rate above 1 and counterfactual of growth rate of 0.993 (see Table 1.22 and Figure 1.6 of Mona Offshore Wind 2024).

It should also be considered that the above assessment can be considered **overly precautionary** for a number of reasons, as set out in ***Sections 6.1.1 to 6.1.3*** below.

6.1.1 Tracking data and connectivity with wind farms in Liverpool Bay/north-east Irish Sea area

Tracking data (e.g. from Votier et al. 2010) and utilisation distributions (e.g. Wakefield et al. 2013) suggest that gannets have been shown to display spatial segregation between colonies and that it is unlikely that gannets from Grassholm SPA will forage in the Liverpool Bay/north-east Irish Sea area (see ***Figures A2.2 and A2.3***). Therefore, it can be considered unlikely that there is breeding season connectivity with projects located in Liverpool Bay/north-east Irish Sea area. Hence, the apportionment values calculated by the Mona Applicant for these OWFs

in their in-combination assessment using the generic NatureScot approach and the subsequent apportioned in-combination collision, displacement and combined collision plus displacement impacts to the colony in the Applicant's assessment are overly precautionary.

Additionally, Fort et al. (2012) analysed geolocator tag (GLS) data to reveal non-breeding movements and winter distribution for 86 gannets from five breeding colonies, including Grassholm. The results found that after their breeding season, almost all gannets moved to the south, including those from Grassholm. Therefore, it could be assumed that there is unlikely to be connectivity with the OWFs located in the Liverpool Bay/north-east Irish Sea area during these periods also.

Taking the above into account, this would mean that the only projects with likely potential connectivity in all seasons would be Llŷr, Erebus, White Cross and Wave Hub.

Fig. 1. Gannet colony foraging ranges. (**A**) Gannets tracked from colonies around the British Isles forage in largely mutually exclusive areas, despite their potential home ranges overlapping (red, study colonies; yellow, others). Home ranges predicted by the hinterland model (*3*) form Voronoi polygons, bounded by lines of equidistance between colonies (black lines). (**B**) Satellite tracks from 184 individuals show that foraging birds direct their movements away from neighboring colonies (colors correspond to different colonies). Data were collected in 2011, except for St Kilda (SK), which were collected in 2010. Gray lines, 200- and 1000-m isobaths; LS, Little Skellig; TB, Bull Rock (mentioned in the text; see table S1 for colony details).

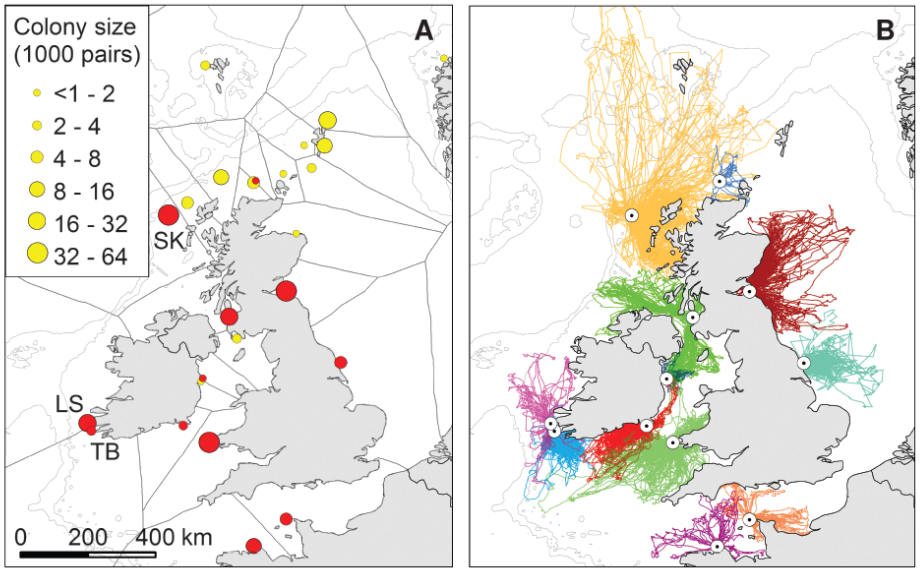


Fig. 2. Density-dependent competition and colony segregation. Density-dependent competition within and between colonies explains large-scale among-colony segregation. (**A**) Observed colony utilization distributions (colored polygons plus 95, 75, 50, and 25% UD contours) are largely mutually exclusive. This is at odds with the null model (predicted 75 and 95% UDs, solid and dashed lines), which assumes density-dependent competition only within colonies, predicting broad overlap between some UDs. (**B**) The density-dependent hinterland (DDH) model additionally assumes competition between colonies, providing a better fit to the tracking data.

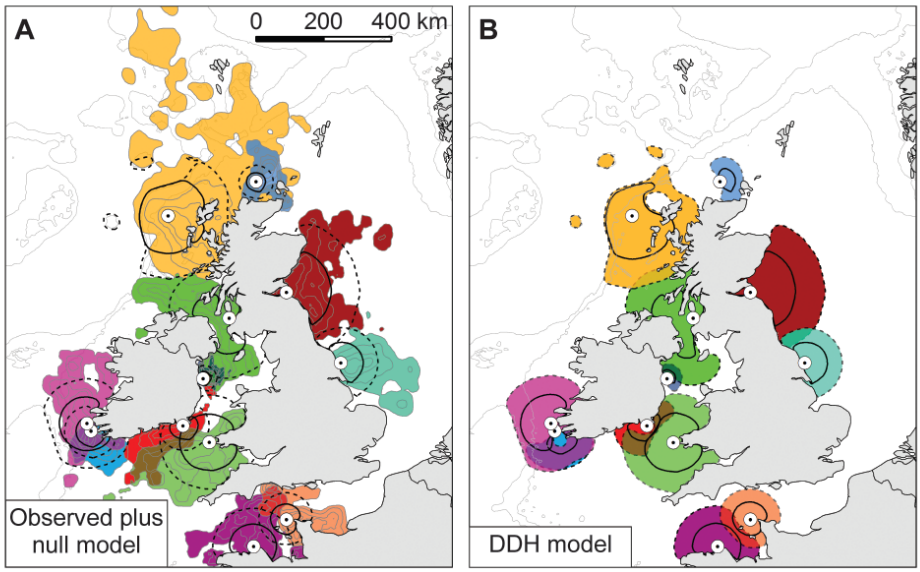


Figure A2.2 Spatial partitioning between gannet breeding colonies in the breeding season. Grassholm is indicated on the figure (reproduced from Wakefield et al. (2013))

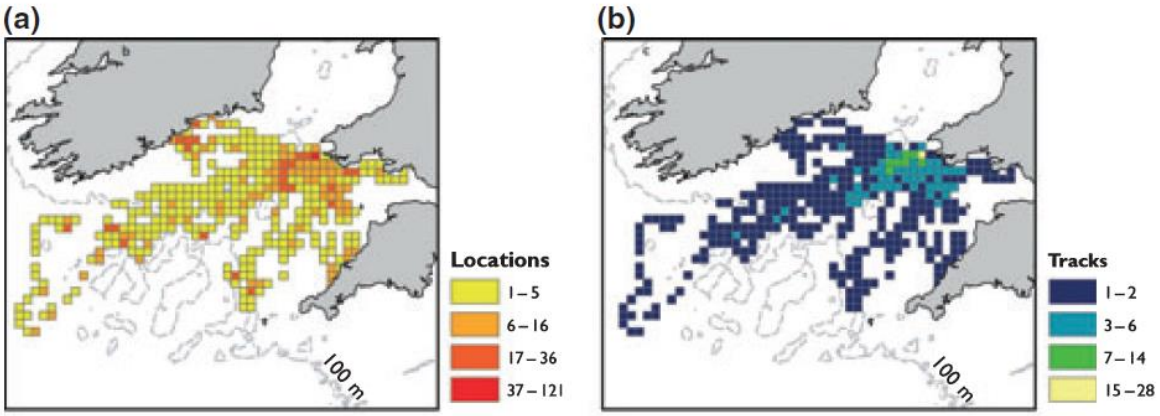


Figure A2.3 Plots of Grassholm gannet GPS locations: a) gannet GPS fixes 2006; b) gannet foraging tracks 2006 (reproduced from Votier et al. 2010)

6.1.2 Macro avoidance of offshore wind farms by gannet

Evidence suggests that gannets show strong macro-avoidance of offshore windfarms (e.g. Dierschke et al. 2016; Pavat et al. 2023). Therefore, assessments where there has been no consideration of macro avoidance should be considered precautionary. This is the case in the in-combination assessment presented above.

6.1.3 Gannet foraging range and habitat flexibility

Gannet has a large foraging range (mean-maximum of 516.7km for Grassholm SPA, Woodward et al. 2019) and has a high habitat flexibility (Furness & Wade 2012) suggesting that displaced birds would readily find alternative habitats including foraging areas. Therefore, it is considered unlikely that in-combination displacement mortality rates would be at the top of the range of % mortality considered and may be more likely to be towards the lower end of the range.

6.1.4 Conclusions

Taking account of the elements of precaution considered in Sections 6.1.1 to 6.1.3 above, we consider it is most likely that the in-combination collision plus displacement mortality is likely to be below 1% of baseline mortality of the colony (as shown in ***Table A2.11*** below), which can be considered to be undetectable against background mortality. We also note that using the post HPAI 2024 count of 38,398 adults, the predicted impact at a potentially more realistic worst case scenario of 80% displacement and 1% mortality equates to 0.74% of baseline mortality. Together with the PVA outputs, this suggests the colony can continue to grow, even for the extreme worst case scenario of in-combination collision plus displacement (i.e. no macro avoidance, 80% displacement and 10% mortality), we consider that the Conservation Objective of 33,000 pairs[6] would not be undermined and an **AEoSI can be ruled for in-combination collision, displacement and collision plus displacement.**

[6] NRW (2025) Grassholm Special Protection Area: Advice provided by Natural Resources Wales in fulfilment of Regulation 37(3) of the Conservation of Habitats and Species Regulations 2017.conservation-advice-for-grassholm-spa.pdf

Table A2.11 Indicative in-combination collision plus displacement Grassholm SPA gannet impacts for projects with likely connectivity, accounting for macro avoidance annually for SNCB advised range of displacement (60-80%) and mortality (1-10%) scenarios. Shaded cells exceed 1% baseline mortality of the colony (based on adult mortality rate of 8.1% and 2015 colony count of 72,022 adults – most contemporaneous count with Llŷr baseline surveys and as used by Applicant in their assessment)

		% mortality									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
% displaceme	**60**	21	27	33	39	46	52	58	64	70	77
	70	22	29	36	44	51	58	65	72	80	87
	80	23	31	39	48	56	64	72	81	89	97

Whilst it is considered likely that there may be few in-combination mortalities from the OWF projects with connectivity to the SPA, which can be considered to be undetectable against background mortality, the colony has declined significantly followed the HPAI outbreak. We note that a combination of any further declines in population abundance and increased impact from future developments with potential connectivity to the colony may increase mortality to a level where further consideration is required for future projects. We therefore recommend that future projects consider inclusion of measures to reduce mortality (such as raising turbine draft height as much as possible to reduce collision mortalities) in order to allow maximum realisation of renewable energy for the minimum environmental impact.