

MONA OFFSHORE WIND PROJECT

Review of Cumulative Effects Assessment and In-Combination Assessment

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Image of an offshore wind farm

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Glossary

Term	Meaning
Applicant	Mona Offshore Wind Limited.
Cumulative effects assessment	Assessment of the likely effects arising from the Mona Offshore Wind Project alongside the likely effects of other development activities in the vicinity of the Mona Offshore Wind Project.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Effect	The consequence of an impact.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Mona Offshore Wind Project.
Impact	A change that is caused by an action.
In-combination effect	The combined effect of the Mona Offshore Wind Project in-combination with the effects from a number of different projects on the same feature/receptor.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for a DCO to apply for a 'deemed' marine licence as part of the DCO process. In addition, licensable activities within 12 nm of the Welsh coast require a separate marine licence from Natural Resource Wales (NRW).
Maximum Design Scenario (MDS)	The scenario within the design envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets, offshore and onshore transmission assets, and associated activities.
Morgan Offshore Wind Project	The Morgan Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The transmission assets for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the Offshore Substation Platforms (OSPs), interconnector cables, Morgan offshore booster station, offshore export cables, landfall site, onshore export cables, onshore substations, 400kV grid connection cables and associated grid connection infrastructure such as circuit breaker infrastructure.
Morecambe Offshore Windfarm: Generation Assets	The Morecambe Offshore Windfarm is located in the east Irish Sea approximately 28.75km (15.5nm) from the northwest coast of England (when measured from Mean High Water Springs (MHWS)). The anticipated nominal capacity of the Morecambe Offshore Windfarm is 480MW.
Mona Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables, offshore export cables and offshore substation platforms (OSPs) forming part of the Mona Offshore Wind Project will be located.
Morgan Offshore Wind Project: Generation Assets	This is the name given to the Morgan Generation Assets project as a whole (includes all infrastructure and activities associated with the project construction, operations and maintenance, and decommissioning).
Offshore Substation Platform (OSP)	The offshore substation platforms located within the Mona Array Area will transform the electricity generated by the wind turbines to a higher voltage allowing the power to be efficiently transmitted to shore.

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Term	Meaning
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects.
Underwater sound	Sound waves made underwater
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.

Acronyms

Acronym	Description
CCS	Carbon capture and storage
CEA	Cumulative Effects Assessment
CoCP	Code of construction practice
CRNRA	Cumulative regional navigational risk assessment
DCO	Development Consent Order
DNS	Development of National Significance
EIA	Environmental Impact Assessment
EWG	Expert Working Group
EVMP	Environmental Vessel Management Plan
ExA	Examining Authority
HRA	Habitats Regulations Assessment
INNS	Invasive non-native species
IoM	Isle of Man
iPCoD	interim Population Consequences of Disturbance
ISAA	Information to Support Appropriate Assessment
LSE	Likely significant effect
MDS	Maximum design scenario
MMMP	Marine Mammal Mitigation Protocol
MU	Management Unit
NGET	National Grid Electricity Transmission
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
OSP	Offshore substation platform
PEIR	Preliminary Environmental Information Report
PSR	Primary Surveillance Radar
SAC	Special Area of Conservation
SOLAS	Safety of Life at Sea
SPA	Special Protection Areas

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Acronym	Description
SSC	Suspended Sediment Concentration
UXO	Unexploded ordnance
WFD	Water framework directive

Units

Unit	Description
%	percentage
kJ	Kilojoules
km	Kilometres
m	Metres
MW	Megawatt
nm	Nautical miles

1 REVIEW OF CUMULATIVE EFFECTS ASSESSMENT AND IN-COMBINATION ASSESSMENT

1.1 Background

1.1.1.1 Mona Offshore Wind Limited (hereafter referred to as ‘the Applicant’) submitted a Development Consent Order (DCO) application for the Mona Offshore Wind Project on 22 February 2024. The DCO application included an Environmental Statement, which presented the results of the Environmental Impact Assessment (EIA), encompassing a Cumulative Effects Assessment (CEA) (as presented within the topic specific chapters in Volumes 2, 3 and 4, of the Environmental Statement (APP-052 to APP-078)). The DCO application also included an Information to Support Appropriate Assessment (ISAA) which encompassed an in-combination assessment (APP-031, APP-032 and APP-033).

1.1.1.2 The CEA identified those projects, plans or activities with which the Mona Offshore Wind Project may interact to produce a cumulative effect. Information on other projects, plans or activities which was publicly available in November 2023 (up to three months before the application) was considered in the CEA and in-combination assessment.

1.1.1.3 Since November 2023, new or amended assessment material has been published on projects that had been considered in the CEA, and new projects not previously considered in the CEA have entered the public domain. This document presents a review of information published up to 23 September 2024 and considers if the new information would alter the conclusions of the CEA and in-combination assessment.

1.1.1.4 This document has been prepared to cover the following projects in response to the Examining Authority (ExA) written questions:

- West Irish Sea offshore wind farms as requested in ExA written question Q1.0.1 and Q.10.15, and as noted in the Meath County Council submission (OD-021)
- Microsoft Wales-Ireland telecommunications cable as requested in the ExA written question Q1.19.6 and as noted in the Microsoft Ireland Operations Limited written representation (REP1-069).

1.1.1.5 This document does not include the National Grid Electricity Transmission (NGET) proposal to extend the existing Bodelwyddan electricity substation or the Battery storage facility at Pentre Mawr which has been highlighted in the IGP Solar 21 Limited additional submission (AS-023). This is because planning applications had not been submitted to the local planning authority at the time of writing this document. The Applicant will review any further information once available and update the Examining Authority as appropriate.

1.2 Methodology

1.2.1 Background

1.2.1.1 This document has been prepared to supplement the CEA undertaken for the Mona Offshore Wind Project within the topic specific chapters in Volumes 2, 3 and 4 of the Environmental Statement (APP-052 to APP-078) (hereafter referred to as ‘the Mona CEA’).

1.2.1.2 The CEA methodology is described in full in Volume 1, Chapter 5: Environmental Impact Assessment methodology (APP-052). The methodology was developed in

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accordance with the Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to Nationally Significant Infrastructure Projects (NSIPs) (Planning Inspectorate, 2019).

1.2.1.3 For a cumulative effect to occur, there must be an impact-receptor-pathway, which includes conceptual overlap, physical overlap and temporal overlap. The screening criteria to identify an impact-receptor-pathway is described in Volume 1, Chapter 5: Environmental Impact Assessment methodology (APP-052).

1.2.1.4 For the Mona CEA, a tiered approach has been adopted. The tiered approach uses the following categorisations:

- Tier 1
 - Under construction
 - Permitted application
 - Submitted application
 - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an evidenced ongoing impact
- Tier 2
 - Scoping report has been submitted and is in the public domain
- Tier 3
 - Scoping report has not been submitted and is not in the public domain
 - Identified in a relevant development plan
 - Identified in other plans and programmes.

1.2.1.5 This document presents a review of the Mona CEA according to the stages described in sections 1.2.2 to 1.2.4 below.

1.2.2 Identification of new project information

1.2.2.1 An update to the CEA long list (as set out within Volume 5, Annex 5.1: Cumulative effects screening matrix (F5.5.1 F02)) has been completed based on information made publicly available on project or government websites. This update includes changes to existing projects on the long list as well as additional projects identified since November 2023 when the Mona CEA was undertaken.

1.2.2.2 Each project that has been identified as having published substantial assessment material since the Mona CEA was produced was taken forward to the screening stage below. Substantial assessment material includes:

- Projects where the information means it has moved from a lower tier to a higher one (as described in paragraph 1.2.1.4)
- Projects where the status of the project changed, for example from submitted to consented
- New projects not considered in the Mona CEA which have been identified in the long-list screening process
- Other new information, such as publication of Environmental Statements, scoping reports or supplementary documents such as project programmes, has

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become available that could potentially lead to a change in the assessment presented in the Mona CEA.

- 1.2.2.3 Minor updates to existing projects which did not constitute substantial assessment material (for example, updates to project names, project developers, completion of site investigation surveys where no previously unknown information was made available, etc.) were not taken forward.

1.2.3 Topic screening of new project information

- 1.2.3.1 New project information (as described in section 1.2.2) has been screened on a topic-by-topic basis to identify projects to be taken forward for the CEA review described in section 1.2.4, with the topics defined as per the topic specific chapters in Volumes 2, 3 and 4 of the Mona Offshore Wind Project Environmental Statement (APP-052 to APP-056, REP2-016, and APP-058 to APP-078) and the in-combination section of the ISAA (APP-031, APP-032 and REP2-010).
- 1.2.3.2 The screening process is outlined in Figure 1.1. Firstly, new project information was screened to identify whether there is spatial and temporal overlap between the project and the Mona CEA study area for each topic and the Mona project schedule (as described in Volume 1, Chapter 3: Project Description (APP-050)). The study areas have been defined as described in Volume 1, Chapter 5: Environmental Impact Assessment methodology (APP-052).
- 1.2.3.3 Secondly, the screening considered whether the new project information is relevant to the assessment for that topic; specifically, whether it has potential to result in any change to the maximum design scenario for each impact compared to that which has been assessed in the Mona CEA. This includes where there has been a temporal change and therefore the project's impacts may overlap with Mona where they previously were considered to not overlap.
- 1.2.3.4 Finally, the screening considered whether the new project information could lead to an increase in the impacts assessed for each topic compared to that which has been assessed in the Mona CEA.
- 1.2.3.5 The offshore projects that have been screened in for consideration in this review are listed in Table 1.1. The onshore projects that have been screened in for consideration in this review are listed in Table 1.2.

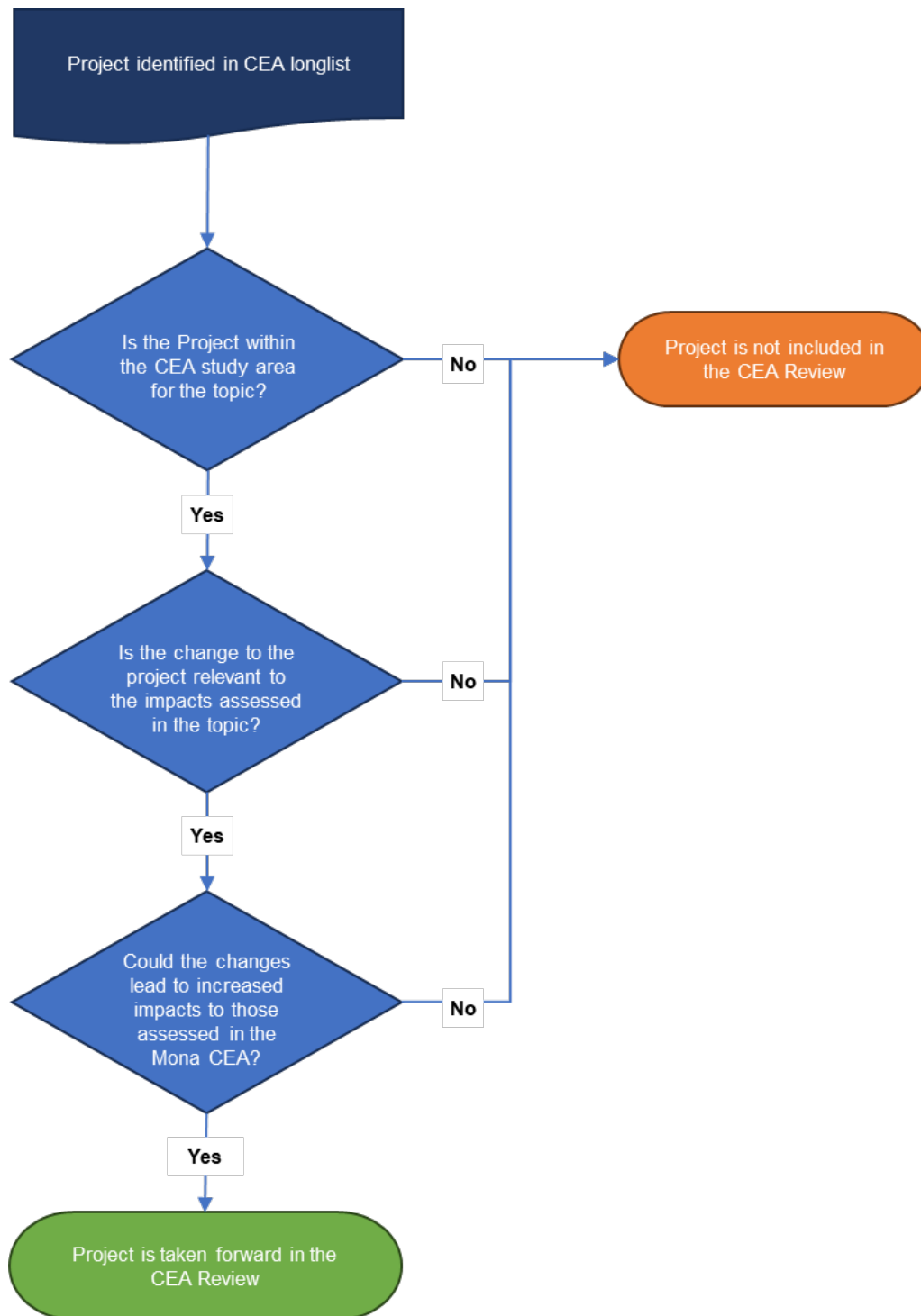


Figure 1.1: Flow chart for cumulative effects assessment topic screening process.

1.2.4 Topic review of the cumulative effects assessment

1.2.4.1 A review of the CEA has been undertaken on a topic-by-topic basis and is presented in section 1.4.

1.2.4.2 Several topic chapters were not considered in the review as the chapters did not include an assessment of cumulative impacts:

- Inter-related effects (offshore) (Volume 2, Chapter 11 (APP-063))
- Inter-related effects (onshore) (Volume 3, Chapter 11 (APP-074))

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- Climate change (Volume 4, Chapter 2 (APP-076)).

- 1.2.4.3 A summary of the projects that have the potential to result in significant effects to offshore receptors when considered cumulatively with the Mona Offshore Wind Project are presented in Table 1.3, and a more detailed review is presented in Table 1.5.
- 1.2.4.4 A summary of the projects that have the potential to result in significant effects to onshore receptors when considered cumulatively with the Mona Offshore Wind Project are presented in Table 1.4, and a more detailed review is presented in Table 1.6.
- 1.2.4.5 Volume 4, Chapter 1: Aviation and radar (APP-075) predominantly took into account offshore projects as part of the CEA, and as such, this topic has been included in Table 1.3 and Table 1.5.
- 1.2.4.6 With regard to the CEA undertaken for Socio-economics (Volume 4, Chapter 3 (APP-077)) and Human health (Volume 4, Chapter 4 (APP-078)), the assessment considered both onshore and offshore projects that may have had a cumulative effect. The review for these topics is presented in Table 1.7.

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Table 1.1: Projects reviewed for potential cumulative effects for offshore topics, with Tier and programme details.

Project	Capacity/scale/description	Status	Tier	Construction period	Operation period
Arklow Bank Offshore Wind Park Phase 2	Offshore wind farm.	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted June 2024 (SSE Renewables, 2024). Project description updated and additional data available.	1	2026-2030	From 2030
Cair Vie Onshore Wind Farm	Isle of Man onshore wind farm identified through Morgan Generation hearings/submissions.	New project, scoping report submitted February 2024 (Manx Utilities, 2024).	2	2026	From Q3 2026
Codling Offshore Wind Farm	Offshore wind farm.	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted September 2024 (Codling Wind Park Limited, 2024). Project description updated and additional data available.	1	2026-2029	From 2030
Foel Fach Onshore Wind Farm	Development of National Significance (DNS): Construction and operation of up to 11 turbines, and associated infrastructure.	New project, pre-application. Scoping Report submitted June 2024 (Foel Fach Wind Farm Limited, 2024).	2	From 2026	Unknown
Hynet Carbon Dioxide Transportation and Storage Project	Offshore elements of a carbon capture and storage project.	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted February 2024 (Liverpool Bay CCS Ltd, 2024). Project description updated and additional data available.	1	2024-2026	From 2026

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Project	Capacity/scale/description	Status	Tier	Construction period	Operation period
Isle of Man-UK Interconnector 2	There is limited public information available on the project, however the Applicant has been made aware of it through consultation with Manx Utilities. Understood to be an electrical cable interconnector, and the route will be to the south of Morgan Generation Assets.	New project, pre-application.	3	Unknown	Unknown
Llŷr Offshore Wind Farm	Offshore wind farm.	Previously considered in the CEA. Application submitted but not yet determined, Tier updated from Tier 2 to Tier 1 – Application submitted August 2024 (Llŷr Floating Wind Ltd., 2024). Project description updated and additional data available.	1	2027-2028	From Q4 2028
MaresConnect Interconnector	MaresConnect is a proposed 750 MW subsea and underground electricity interconnector system linking the electricity grids in Ireland and Great Britain.	Previously considered in the CEA. Pre-application. Some additional information provided through an application to the Irish Government for site investigation works (MaresConnect Limited, 2023) which has not resulted in a change to the Tier.	3	2025-2027	From 2028
Microsoft Wales-Ireland telecommunications cable	There is limited public information available on the project, however the Applicant has been made aware of it through the written submission by Microsoft Ireland Operations Limited (REP1-069).	New project, pre-application. Additional information provided through applications for site investigation surveys to Natural Resources Wales (NRW) and the Irish Government (Natural Resources Wales 2024a and 2024b and Maritime Area Regulatory Authority, 2024).	3	From 2026	Unknown
Morecambe Offshore Windfarm Generation Assets	Array area for the offshore wind farm, transmission being	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted May	1	2026-2029	From 2030

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Project	Capacity/scale/description	Status	Tier	Construction period	Operation period
	developed as a separate project.	2024 (Morecambe Offshore Windfarm Ltd, 2024). Project description updated and additional data available.			
Morgan Offshore Wind Project: Generation Assets	Array area for the offshore wind farm, transmission being developed as a separate project.	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted April 2024 (Morgan Offshore Wind Ltd, 2024). Project description updated and additional data available.	1	2026-2029	From 2030
North Irish Sea Array Offshore Wind Farm	Offshore wind farm.	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted June 2024 (North Irish Sea Array Windfarm Limited, 2024). Project description updated and additional data available.	1	2027-2029	From 2030
Oriel Offshore Wind Farm	Offshore wind farm.	Previously considered in the CEA. Submitted but not yet determined, Tier updated from Tier 2 to Tier 1 - application submitted March 2024 (Oriel Windfarm Limited, 2024). Project description updated and additional data available.	1	2026-2028	From 2029
Project Erebus Floating Offshore Wind Project	Floating offshore wind farm. Was expected to be operational before Mona was constructed, and Mona CEA undertaken on that basis.	Previously considered in the CEA. Construction ongoing. The project has extended its construction period to 2026 (Blue Gem Wind, 2024) which does not result in a change to the Tier.	1	2025-2026	From 2026
Royal Seaforth Dock Repowering	Decommissioning and removal of five Vestas V44 turbines (maximum tip height of 75m) and the installation of four Enercon E138 turbines	New project, pre-application, EIA Scoping Opinion submitted June 2024 (E.ON UK Heat Ltd, 2024). See Table 1.6.	2	Unknown	Unknown

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Project	Capacity/scale/description	Status	Tier	Construction period	Operation period
	with a maximum blade tip of 180 m.				
South Pembrokeshire Demonstration Zone	Floating offshore wind and transmission demonstrator.	Previously considered in the CEA. Pre-application, Tier updated from Tier 3 to Tier 2. Additional information available from scoping report submitted April 2023 (Celtic Sea Power Limited, 2023).	2	2025-2026	From 2026
West Ireland Offshore Wind Farm	Understood to be being developed by Hexicon and Sinbad Marine Services, of up to 2000 MW. No further details available.	New project, pre-application.	3	Unknown	Unknown

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Table 1.2: Projects reviewed for potential cumulative effects for onshore topics, with Tier and programme details.

Project	Capacity/scale/description	Status	Tier	Construction period	Operation period
Major Development: 46/2024/1200/PF	Demolition of existing buildings, change of use of land from agricultural land to a new nature reserve and habitat creation comprising of the restoration of existing ponds, the creation of new ponds, the creation of a wetland area adjacent to two small watercourses and creation of woodland and grassland habitat areas, construction of a permissive pathway and engineering works to create a raised viewing area together with associated works.	New project, submitted, not yet permitted (Denbighshire County Council, 2024)	1	2025	Unknown

1.3 Screening for the Mona cumulative effects review

1.3.1 Offshore

Table 1.3: Screening of new project information that may affect cumulative effects assessment and in-combination assessment for offshore topics in the Mona Offshore Wind Project Environmental Statement.

Topic	Summary of Mona Offshore Wind Project CEA and in-combination assessment conclusions as presented within the Environmental Statement	Projects with potential for additional cumulative effects with the Mona Offshore Wind Project																
		Arklow Bank 2	Cair Vie	Codling	Foel Fach	Hynet	IoM-UK Interconnector	Llŷr	MaresConnect	Microsoft Wales-Ireland	Morgan Generation	Morecambe Generation	North Irish Sea Array	Oriel	Project Erebus	Royal Seaforth Dock	South Pembrokeshire	West Ireland
Physical processes (Volume 2, Chapter 1 (APP-053))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	No	Yes	No	No	Yes	No	No	No	No	No	n/a	No	No
Benthic subtidal and intertidal ecology (Volume 2, Chapter 2 (APP-054))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	n/a	No	No
Fish and shellfish ecology (Volume 2, Chapter 3 (APP-055))	There will be potentially significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans to herring and cod during their respective spawning seasons through the impact of underwater sound from piling (moderate adverse significance).	No	n/a	No	n/a	Yes	No	No	No	No	Yes	Yes	No	No	No	n/a	No	No
Marine mammals (Volume 2, Chapter 4 (APP-056))	Overall, it has been concluded that for most impacts there will be no significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans, except as a result of behavioural disturbance during piling for bottlenose dolphins within the Irish Sea Management Unit and potential injury from unexploded ordnance (UXO) clearance for harbour porpoise, which have a significant cumulative effect.	Yes	n/a	Yes	n/a	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	n/a	No	No
Offshore ornithology (Volume 2, Chapter 5 (REP2-016))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	Yes	n/a	Yes	n/a	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	n/a	No	No
Commercial fisheries (Volume 2, Chapter 6 (APP-058))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	No	No	No	No	No	Yes	Yes	No	No	No	n/a	No	No
Shipping and navigation (Volume 2, Chapter 7 (APP-059))	A cumulative regional navigational risk assessment (CRNRA) was undertaken, which adopted a regional (co-ordinated) approach to assessment for the Mona, Morgan Generation Assets and Morecambe Generation Assets projects, as well as known Tier 1 projects, and measures put in place to mitigate for significant effects.	No	n/a	No	n/a	Yes	Yes	No	No	Yes	No	No	No	No	No	n/a	No	No
Seascape and visual resources (Volume 2, Chapter 8 (APP-060))	There will be a moderate cumulative effect on the 'Tranquillity and Solitude – Peaceful Areas' special quality of Eryri National Park in combination with the Tier 2 projects, which is significant. There will be moderate, significant cumulative effects on views from the higher parts of Eryri National Park of the Mona Offshore Wind Project, together with Tier 2 proposed offshore wind farms, when seen from Eryri National Park, during the operations and maintenance phase.	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	No

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Topic	Summary of Mona Offshore Wind Project CEA and in-combination assessment conclusions as presented within the Environmental Statement	Projects with potential for additional cumulative effects with the Mona Offshore Wind Project																
		Arklow Bank 2	Cair Vie	Codling	Foel Fach	Hynet	IoM-UK Interconnector	Llŷr	MaresConnect	Microsoft Wales-Ireland	Morgan Generation	Morecambe Generation	North Irish Sea Array	Oriel	Project Erebus	Royal Seaforth Dock	South Pembrokeshire	West Ireland
Marine archaeology (Volume 2, Chapter 9 (APP-061))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	No	No	No	Yes	Yes	No	No	No	No	No	n/a	No	No
Other sea users (Volume 2, Chapter 10 (APP-062))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	No	Yes	No	No	Yes	No	No	No	No	No	n/a	No	No
Aviation and radar (Volume 4, Chapter 1 (APP-075))	No significant residual cumulative effects from the Mona Offshore Wind Project alongside other projects/plans, as the Mona CEA considered further mitigation that would be put in place to address likely significant effects.	No	n/a	No	n/a	No	No	No	No	No	No	No	No	No	No	n/a	No	No
Annex I habitats (offshore and coastal) (Section 1.5 of HRA Stage 2 ISAA (APP-032))	No adverse effect on the integrity of assessed sites from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	Yes	No	No	No	No	Yes	Yes	No	No	No	n/a	No	No
Annex II diadromous fish (Section 1.6 of HRA Stage 2 ISAA (APP-032))	No adverse effect on the integrity of assessed sites from the Mona Offshore Wind Project alongside other projects/plans.	No	n/a	No	n/a	Yes	No	No	No	No	Yes	Yes	No	No	No	n/a	No	No
Annex II marine mammals (Section 1.7 of HRA Stage 2 ISAA (APP-032))	No adverse effect on the integrity of assessed sites from the Mona Offshore Wind Project alongside other projects/plans.	Yes	n/a	Yes	n/a	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	n/a	No	No
Offshore ornithology (HRA Stage 2 ISAA (REP2-011))	No adverse effect on the integrity of assessed sites from the Mona Offshore Wind Project alongside other projects/plans.	Yes	n/a	Yes	n/a	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	n/a	No	No

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1.3.2 Onshore

Table 1.4: Screening of updated project information that may affect cumulative effects assessment for onshore topics in the Mona Offshore Wind Project Environmental Statement .

Topic	Summary of Mona Offshore Wind Project CEA conclusions as presented within the Environmental Statement	Projects with potential for additional cumulative effects with the Mona Offshore Wind Project Major Development: 46/2024/1200/PF
Geology, hydrogeology and ground conditions (Volume 3, Chapter 1 (APP-064))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	Yes
Hydrology and flood risk (Volume 3, Chapter 2 (APP-065))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	Yes
Onshore ecology (Volume 3, Chapter 3 (APP-066))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	Yes
Onshore and intertidal ornithology (Volume 3, Chapter 4 (APP-067))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	Yes
Historic environment (Volume 3, Chapter 5 (APP-068))	Effect of moderate adverse significance arising from the construction and operations and maintenance of the Onshore Substation within the setting of the Grade II listed Pentre Meredydd, although by Year 15 summer the landscape planting scheme around the substation site would reduce this effect to one of minor adverse significance. No other significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No
Landscape and visual resources (Volume 3, Chapter 6 (APP-069))	No significant cumulative effects on landscape and seascape character or on people's views or visual amenity from the Mona Offshore Wind Project alongside other projects/plans.	No

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Topic	Summary of Mona Offshore Wind Project CEA conclusions as presented within the Environmental Statement	Projects with potential for additional cumulative effects with the Mona Offshore Wind Project Major Development: 46/2024/1200/PF
Land use and recreation (Volume 3, Chapter 7 (APP-070))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No
Traffic and transport (Volume 3, Chapter 8 (APP-071))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No
Noise and vibration (Volume 3, Chapter 9 (APP-072))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No
Air quality (Volume 3, Chapter 10 (APP-073)).	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	No
Water Framework Directive surface water and groundwater assessment (Volume 7, Annex 2.4: (APP-120))	No significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	Yes

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1.4 Review of the Mona CEA

1.4.1 Offshore

Table 1.5: Review of project updates that may affect offshore topic cumulative effects assessment and in-combination assessment in the Mona Offshore Wind Project Environmental Statement.

Offshore topic	Review of potential for cumulative effects	Summary of change
Physical processes (Volume 2, Chapter 1 (APP-053))	<p>The Isle of Man-UK Interconnector 2 and Microsoft Wales-Ireland telecommunications cable are located within the CEA study area for Mona and have the potential to have physical processes impacts. The cumulative effects assessed in section 1.9 of Volume 2, Chapter 1: Physical processes (APP-053) with potential to be influenced by the new project information include:</p> <ul style="list-style-type: none"> • Increase in suspended sediment concentrations (SSCs) due to construction, operations and maintenance and/or decommissioning related activities, and the potential impact to physical features: information on the Isle of Man-UK Interconnector 2, and Microsoft Wales-Ireland telecommunications cable is very limited. The Isle of Man-UK project is expected to be located to the north of the Mona project. Given east-west tidal patterns, it is not expected that this project will have a significant cumulative impact with Mona. The Microsoft Wales-Ireland telecommunications cable crosses the Mona export cable corridor. It is unlikely that multiple cable corridors can be constructed in the same place at exactly the same time due to health and safety requirements, although the Microsoft Wales-Ireland telecommunications cable is due to be constructed in 2026, with the Mona cable due to start construction in 2027. There is potential for construction sediment plumes leading to increased SSCs on a short-term basis. Following completion of works, the turbidity levels would return to baseline within a couple of tidal cycles. Unconsolidated seabed material deposited at the end of construction could be remobilised at the spring tide following completion of works, which would subsequently become incorporated into the existing sediment transport regime within a 14-day spring-neap tidal cycle. None of the projects predict cumulative activities that result in significant SSCs during operations and maintenance. On this basis, it is considered that the conclusions of the Mona CEA remain unchanged, and that the increase in suspended sediments during construction/decommissioning and operation is of negligible adverse significance. • Impacts to the tidal regime and wave climate and due to presence of infrastructure and the associated potential impacts along adjacent shorelines, and impacts to sediment transport and sediment transport pathways due to presence of infrastructure and associated potential impacts to physical features and bathymetry: during the construction, operations and maintenance and decommissioning phases, no impacts are expected due to the presence of Isle of Man-UK Interconnector 2 and Microsoft Wales-Ireland telecommunications cable, as both projects are expected to be buried to a sufficient depth that leads to no permanent raised feature on the seabed. 	Changes are all minimal and no additional potential significant cumulative effects have been identified.

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>Therefore, there is no change from the original Mona CEA, and the impact is of negligible adverse significance during construction, operations and maintenance and decommissioning.</p>	
<p>Benthic subtidal and intertidal ecology (Volume 2, Chapter 2 (APP-054))</p>	<p>Hynet, Isle of Man-UK Interconnector 2, Microsoft Wales-Ireland, Morgan and Morecambe are located within the benthic subtidal and intertidal CEA study area for Mona and have the potential to have benthic subtidal and intertidal ecology impacts. The cumulative effects assessed in section 2.10 of Volume 2, Chapter 2: Benthic subtidal and intertidal ecology (APP-054) with potential to be influenced by the new project information include:</p> <ul style="list-style-type: none"> • Increase in suspended sediment concentrations and associated deposition and changes in physical processes: the physical processes review (above) concluded that the potential for SSCs and deposition and changes in physical processes are not significant, and so there is no change to the Mona CEA assessment for impacts due to increased SSC and associated deposition during the construction, operations and maintenance and decommissioning phases. • Temporary habitat loss/disturbance and long term habitat loss/habitat alteration: the projects identified have the potential for temporary habitat loss/disturbance, long term habitat loss/habitat alteration and introduction of artificial structures during construction/decommissioning and operation. Morgan and Morecambe were assessed in the Mona CEA, and the published Environmental Statements for these projects have reduced the footprint of the works, and so the impacts remain unchanged from the Mona CEA. Hynet was assessed qualitatively in the Mona CEA based on the information provided in the project's Scoping Report, however Hynet has now published an Environmental Statement which allows for a quantitative assessment. The small scale of the Hynet project means this additional quantitative information will not change the conclusion of the Mona CEA. The Isle of Man-UK Interconnector 2 and Microsoft Wales-Ireland are new projects, and little is known about their project parameters, but both are cable projects that are unlikely to result in significant additional cumulative impacts from the Mona project, as the footprint of the works is unlikely to be large and buried cables will have minimal long-term effects. Therefore, there is no change from the original Mona CEA, and the effects are of minor to negligible adverse significance during construction, operations and maintenance and decommissioning. • Increased risk of introduction and spread of invasive non-native species: the introduction and spread of invasive non-native species (INNS) during all phases may be facilitated by increased boat traffic. Morgan and Morecambe were assessed in the Mona CEA, and the published Environmental Statements for these projects have overall reduced the footprint of the works, and vessel movements were overall reduced from that assessed in the Mona CEA and so the cumulative assessment remains unchanged from the Mona CEA. Hynet was assessed in the Mona CEA, and Hynet's published Environmental Statement has provided more information regarding the potential for the introduction and spread of INNS. However, the scale of the project means that this additional quantitative information will not change the conclusion of the Mona CEA. The Isle of Man-UK Interconnector 2 and Microsoft Wales-Ireland are new projects, and little is known about their project parameters, but both are cable projects that are unlikely to give rise to significant marine traffic levels. Therefore, there is no change from the original Mona 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>CEA, and the effects are of minor adverse significance during construction, operations and maintenance and decommissioning.</p> <ul style="list-style-type: none"> Removal of hard substrate: In relation to the removal of hard substrate during the decommissioning phase, Morgan and Morecambe were assessed in the Mona CEA, and although the Environmental Statements for these projects predict that the footprint of the works to be higher than that assessed in the Mona CEA, the cumulative effect will remain of regional spatial extent, long term duration, continuous and low reversibility. The magnitude is, therefore, still considered to be low. Hynet was assessed in the Mona CEA, and the additional quantitative information on the removal of hard substrates during the decommissioning phase will not change the conclusions regarding this impact in the Mona CEA due to the small scale of Hynet. The Isle of Man-UK Interconnector 2 and Microsoft Wales-Ireland are unlikely to result in significant impacts, whether any cable protection is allowed to remain <i>in situ</i> after decommissioning or not. Therefore, there is no change from the original Mona CEA, and the effects are of minor adverse significance during decommissioning. 	
<p>Fish and shellfish ecology (Volume 2, Chapter 3 (APP-055))</p>	<p>Of the projects considered, only Morgan Generation Assets, Morecambe Generation Assets and Hynet are within the cumulative study area for underwater sound impacting fish and shellfish receptors, and vessel movements causing injury due to increased risk of collision, but only for basking shark (<i>Cetorhinus maximus</i>). The physical processes review (above) concluded that the potential for SSCs and deposition is not significant.</p> <p>Underwater sound impacting fish and shellfish receptors.</p> <p>For the Hynet project, only eight piles are estimated to be required, with construction taking up to 100 minutes per pile, and, as Hynet will be piling in 2026, and Mona in 2027, it is highly unlikely that piling will be undertaken simultaneously with the Mona and surrounding projects.</p> <p>For the Morgan Generation Assets, updated underwater sound modelling of pile driving using a 4,400 kJ hammer energy for the Environmental Statement indicated a reduction in the ranges for mortality from sound produced within the Morgan Array Area to up to 546 m (reduced from 745 m in the PEIR) for group 1 fish, 1.87 km (from 2.12 km in the PEIR) for group 2 fish, and 2.74 km (from 2.98 km in the PEIR) for group 3 and 4 fish, if modelled as static receptors. In all cases, modelling the fish as receptors moving away from the sound source substantially reduced mortality ranges, with mortality sound thresholds not exceeded for all groups. Recoverable injury ranges were modelled to reach up to 4.52 km (reduced from 4.76 km in the PEIR) for group 2 to 4 static receptors, with this again reducing to <100 m (or with the defined recoverable injury threshold from Popper <i>et al.</i> (2014) not exceeded) in most cases (with the exception of group 2 fish with an increased range of 254 m in the Environmental Statement (increased from 79 m in the PEIR)) when fish were modelled as receptors moving away from the sound source.</p> <p>For the Morecambe Generation Assets, updated underwater sound modelling of pile driving using a 6,600 kJ hammer energy for the Environmental Statement (increased from 5,000 kJ in the PEIR) indicated an increase in the ranges for mortality from sound produced within the Morecambe Array Area to up to 1.9 km (increased from 830 m in</p>	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>the PEIR) for group 1 fish, 6 km (increased from 2.9 km in the PEIR) for group 2 fish, and 8.2 km (increased from 3.3 km in the PEIR) for group 3 and 4 fish, if modelled as static receptors. In all cases, modelling the fish as receptors moving away from the sound source substantially reduced mortality ranges, with mortality sound thresholds not exceeded for all groups. Recoverable injury ranges were modelled to reach up to 12 km (increased from 6.7 km in the PEIR) for group 2 to 4 static receptors.</p> <p>In assessing these changes for fish and shellfish ecology receptors, the magnitude of impact on herring and cod during their respective spawning seasons through the cumulative impact of underwater sound from piling remains predicted to be of regional spatial extent, short term duration, intermittent and of high reversibility. It is predicted that the impact will affect the receptor directly. Therefore, for cod and herring receptors the cumulative effect is considered to be of moderate adverse significance, which remains unchanged from that presented in the Mona Environmental Statement. The measures outlined within the Outline Underwater Sound Management Strategy (UWSMS) (APP-202) will also reduce any cumulative effect based upon reducing the magnitude of sound generated by the Mona Offshore Wind Project. Hynet, Morgan Generation Assets, and Morecambe Generation Assets have committed to measures to minimise underwater sound impacts to fish and shellfish from piling activities as part of their applications (APP-068 of the Morgan Generation Assets DCO Application, APP-149 of the Morecambe Generation Assets DCO application, and Volume 3 of the Hynet Environmental Statement (Liverpool Bay CCS Limited, 2024)).</p> <p>Injury due to increased risk of collision with vessels (basking shark only).</p> <p>Increased levels of vessel activity related to the construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project, Morgan Generation Assets, Morecambe Generation Assets and Hynet will represent a cumulative increased risk of collision with basking shark. However, the changes in vessel movements between that assessed in the Mona CEA and the published Environmental Statements for Morgan Generation Assets and Morecambe Generation Assets are very low.</p>	

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>For Hynet, traffic data was not available at the time of the Mona CEA, but it was predicted that vessel movements would be low. In the Hynet Environmental Statement, there will be a total of 236 round trips of vessels associated with the construction phase (2025-2027, and therefore will only overlap with Mona from 2026-2027). This includes a total of 219 round trips of vessels associated with installation of the new Douglas platform and wells (over a 28-month construction period). The remaining 17 round trips of vessels will be associated with installation of the cables. Over the 25-year operational period, there will be an average of 30 vessel round trips per year. At decommissioning, approximately 128 round trips of vessels are required, with a maximum of 17 vessels on site at any one time, however, decommissioning is unlikely to be undertaken at the same time as the Mona decommissioning due to differences in design life of the projects (with Mona proposed to be 35 years). When taken together with the reduction in vessel movements in the Morecambe and Morgan projects, vessel transits in the Mona CEA study area are likely to slightly increase overall from that assessed in the Mona CEA (from 6871 to 6914, an increase of 0.6%) during construction and decrease during operations and maintenance. Vessel numbers on site at any one time (within each of the site boundaries) are likely to be increased from that assessed, but the increases are low and not significant to the assessment.</p> <p>The cumulative effect of minor adverse significance is considered to be unchanged from that presented in the Environmental Statement.</p>	
<p>Marine mammals (Volume 2, Chapter 4 (APP-056))</p>	<p>Eight projects that have been updated to Tier 1 (Five in the western Irish Sea: Arklow Bank 2, LIÿr, North Irish Sea Array, Codling Wind Park and Oriel, and three in the eastern Irish Sea: Morgan Generation Assets, Morecambe Generation Assets, and Hynet) are located within the regional marine mammal study area. They have temporal overlap with the Mona construction phase and may, therefore, lead to changes in cumulative effects on marine mammal species.</p> <p>The Mona CEA considered Morgan Generation Assets and Morecambe Generation Assets in detail as information was available from PEIR, but these projects have moved from Tier 2 to Tier 1 with updated information in the respective Environmental Statements.</p> <p>South Pembrokeshire Demonstration Zone and MaresConnect were considered Tier 3 projects in the Mona CEA. Although further information is now available for each project, no further information is available to make a quantitative assessment and as they were considered in the Mona CEA, there is no change to the assessment.</p> <p>West Ireland and Isle of Man-UK Interconnector 2 are new Tier 3 projects; however, there is limited information on project design or construction dates and although temporal and/or spatial overlap cannot be discounted, it is not possible to undertake meaningful assessment, and therefore these projects have been screened out (as per Table 1.3).</p>	<p>Cumulative changes for piling are expected but will not result in additional potential significant effects. Changes are minimal for all other impacts and no potential additional significant effects.</p>

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Injury and disturbance from elevated underwater sound generated during piling

The Mona CEA concluded that there was, conservatively, potential for moderate adverse effects for piling specifically for bottlenose dolphins in the context of possible declining Irish Sea Management Unit (MU) population and the semi-resident population in Cardigan Bay with seasonal movements across to the Isle of Man (which are significant in EIA terms). For all other marine mammal species, the Mona CEA concluded there was potential for minor adverse effects for piling (which are not significant in EIA terms). Therefore, the focus for piling is on bottlenose dolphin, due to the potential for significant effects.

The extension of Erebus's construction phase to 2026 does not result in an overlap with piling for Mona Offshore Wind Project (2027) and Project Erebus is located outside the bottlenose dolphin Irish Sea MU (259.9 km from Mona). Similarly, Llŷr is located 263 km from the Mona Offshore Wind Project, outside of the bottlenose dolphin Irish Sea MU and will be operational in 2026, a year prior to piling at Mona. Hynet is located within the bottlenose dolphin Irish Sea MU but will be operational from 2026, prior to piling commencing at Mona. Therefore, there is no potential for cumulative piling effects with Erebus, Llŷr or Hynet projects due to the lack of temporal overlap of piling activities.

Given the proximity of Morgan Generation Assets and Morecambe Generation Assets to the Mona Offshore Wind Project, population modelling with information from the respective Environmental Statements has been re-run for the cumulative assessment (presented in Appendix A:). The results demonstrated that the project refinements for Morgan and Morecambe from the PEIRs to the Environmental Statements would not lead to additional cumulative population-level effects on bottlenose dolphin during cumulative piling.

This CEA review has also considered the quantitative information and conclusions of significance for those Tier 1 projects in the western Irish Sea that have a temporal overlap for piling impacts with the Mona Offshore Wind Project (as set out in the respective Environmental Statements for each project). These projects include Arklow Bank 2, North Irish Sea Array, Codling Wind Park and Oriel (located at 146.7 km, 112.7 km, 125.1 km and 130.4 km from the Mona Offshore Wind Project, respectively). The project alone assessments for these four projects have concluded no significant effects on bottlenose dolphin (SSE Renewables, 2024; North Irish Sea Array, 2024; Codling Wind Park, 2024; Oriel Windfarm Ltd, 2024). Cumulative population modelling undertaken for the North Irish Sea Array application for all the western Irish Sea projects (which included Dublin Array, a Tier 2 project) concluded that, whilst there would be a decrease in the population in the short-term (as some individuals could be affected during piling at cumulative projects), the long-term trajectory of the population would not be altered. Therefore, the conclusion was reached in the North Irish Sea Array application that there would be no significant cumulative effects on bottlenose dolphin at the population level (North Irish Sea Array, 2024).

Whilst the four additional Tier 1 projects in the Irish Sea MU (Arklow Bank 2, North Irish Sea Array, Codling Wind Park and Oriel Windfarm) have the potential to contribute to medium term effects on bottlenose dolphin if piling were to coincide with the Mona Offshore Wind Project, it is unlikely that piling for all projects in the wider Irish Sea would coincide due to availability of piling vessels. Furthermore, whilst these four projects were not included in the re-run of the population modelling for Mona (see Appendix A:), the results of the North Irish Sea Array population modelling (as set out in the paragraph above), alongside the distance of these projects from the Mona Offshore Wind Project, give confidence to the position that even if piling were to coincide with the Mona Offshore Wind Project, this would

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>not lead to a change in the significance of the effects assessed for bottlenose dolphin in the Irish Sea MU, as presented in the Mona CEA.</p> <p>In summary, there are 11 Tier 1 projects (including eight new projects) within the Irish Sea involving piling, and it is considered highly unlikely that piling would coincide across all projects. Cumulative population models included in the applications for the western Irish Sea projects with overlapping construction phases concluded no significant adverse effect, and updated population modelling for projects in the eastern Irish Sea with overlapping construction phases (namely Morgan Generation Assets and Morecambe Generation Assets, as presented in Appendix A:) did not change the outcomes of the population model for bottlenose dolphin. Therefore, it is considered that the significance of effect considering the additional Tier 1 projects would remain unchanged and would remain as moderate adverse significance for bottlenose dolphin.</p> <p>For all other marine mammal species, it is considered that the significance of effect would also remain unchanged (minor adverse significance). Given the proximity of Morgan Generation Assets and Morecambe Generation Assets to the Mona Offshore Wind Project, population modelling with information from the respective Environmental Statements has been re-run for the cumulative assessment (presented in Appendix A:). Results demonstrated that the project refinements from the PEIRs to Environmental Statements would not lead to additional population-level effects on the marine mammal species modelled (harbour porpoise, bottlenose dolphin, minke whale, grey seal, harbour seal) during cumulative piling. Cumulative modelling was carried out for all western Irish Sea projects (Arklow Bank 2, North Irish Sea Array, Oriel, Codling Wind Park and Dublin Array) in North Irish Sea Array (2024). For harbour porpoise, minke whale, grey seal and harbour seal, modelling concluded potential temporary changes in the behaviour and distribution of individuals in the short term, but that the long-term trajectory of the population would not be altered, and a conclusion of no significant effect was reached for all species (North Irish Sea Array, 2024). Therefore, it is considered that the significance of effect considering the additional Tier 1 projects would remain unchanged and would remain a minor adverse significance for harbour porpoise, minke whale, short-beaked common dolphin, Risso's dolphin, grey seal and harbour seal.</p> <p>The Applicant has committed to the Outline Underwater Sound Management Strategy (APP-202) to reduce any significant effects from the project to a non-significant level and, as such, minimise the Mona Offshore Wind Project's contribution to any cumulative effect. Hynet, Morgan Generation Assets, and Morecambe Generation Assets have committed to measures to minimise underwater sound impacts to marine mammals from piling activities as part of their applications (APP-068 of the Morgan Generation DCO Application, APP-149 of the Morecambe Generation DCO application, and Volume 3 of the Hynet Environmental Statement (Liverpool Bay CCS Limited, 2024)). It is anticipated that other updated projects would be required to adhere to similar mitigation measures. These mitigation measures would also reduce potential underwater sound impacts to other marine mammal receptors.</p>	

Injury and disturbance from pre-construction site investigation surveys

The Mona CEA considered the disturbance from pre-construction surveys (as there is very low potential for cumulative impacts for injury from elevated underwater sound due to site investigation surveys). The methodology (as agreed with the Marine Mammal Expert Working Group (EWG) as described in Appendix C of E4.1 Technical Engagement Plan Appendices - Part 1 (A to E) (APP-042)) assumed up to 14 Tier 1 site investigation surveys identified in the CEA screening area for marine mammals. As surveys typically occur over short durations (typically up to 2 months) (based on expert judgment), as a conservative approach the CEA assumed as a worst case scenario that up to additional two surveys could overlap with the Mona site-investigation surveys at any one point.

Of the new Tier 1 projects, Arklow Bank 2, North Irish Sea Array, Codling Wind Park, Morecambe Generation, Morgan Generation, LIŷr and Hynet also considered site investigation surveys and each concluded that the impact was of negligible/minor adverse significance. Oriel windfarm considered routine geophysical surveys during the operational phase and concluded that the impact was of slight (minor) adverse significance. Site investigation surveys are predicted to be local spatial extent, medium term duration and intermittent with high reversibility, and the likelihood of temporal overlap constrained by survey equipment availability. Therefore, it is considered that the conclusions of the Mona CEA remain unchanged, and that the cumulative injury and disturbance effect from pre-construction site investigation surveys is of **minor adverse significance**.

Injury and disturbance from underwater sound from unexploded ordnance (UXO) detonation

The Mona CEA concluded a significant cumulative effect for potential injury from UXO clearance for harbour porpoise only. The Mona CEA included the UXO clearance activities for Project Erebus, Morgan Generation Assets and Morecambe Generation Assets. It is considered that the conclusions of the Mona CEA remain unchanged for these projects in light of the updated project parameters.

Of the new Tier 1 projects, Arklow Bank 2, North Irish Sea Array, Codling Wind Park, Oriel, and LIŷr are all located over 100 km from Mona Offshore Wind Project and therefore there is no potential for spatial overlap in underwater sound from UXO clearance. A summary of the findings of the effects of UXO on marine mammals from these projects is provided below.

The application for Arklow Bank 2, which lies 146.7 km from Mona, included an assessment of UXO clearance (based on high order and low order UXOs) for two project design options and concluded no significant effect for injury and disturbance and adopts a UXO specific Marine Mammal Mitigation Protocol (MMMP). Both North Irish Sea Array and Codling Wind Park concluded no significant effect from injury for all species except for minke whale, which was assessed as moderate significance prior to the consideration of mitigation. However, the adoption of the MMMP with specific UXO measures led to a residual conclusion of no significant effect for both projects. Disturbance was concluded as not significant for all species for the project alone and scoped out of the CEA in North Irish Sea Offshore Wind Farm application. As no significant effect for minke whale was concluded for Mona and considering the distance between the North Irish Sea Offshore Wind Farm from Mona (112.7 km) and the likelihood that UXO will be cleared prior to construction at Mona (2026), it is anticipated that it is highly unlikely to result in an additional significant cumulative impact. LIŷr will be operational in 2026 and therefore there is considered to be no potential for

Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>temporal overlap with UXO clearance at Mona. The Oriel offshore wind farm application did not include UXO clearance in their project design envelope.</p> <p>Hynet lies 12.1 km from Mona, but it is likely clearance will be carried out prior to construction in 2024, well in advance of construction at Mona. The Hynet Environmental Statement assessed UXO clearance and determined that the impact would be of minor significance for injury and negligible significance for disturbance.</p> <p>On this basis, it is considered that the conclusions of the Mona CEA remain unchanged, and that the disturbance from underwater sound from UXO detonation during construction is of minor adverse significance.</p> <p>Injury and disturbance from vessel use and other (non-piling) sound producing activities</p> <p>The Mona CEA focuses only on disturbance, as injury from underwater sound generated by vessels and other activities is not considered to be significant. For potential disturbance from vessel use and other non-piling sound producing activities, the Mona assessment has not identified any significant effects.</p> <p>The published Environmental Statements for Morgan Generation Assets and Morecambe Generation Assets showed only very minor changes in the number of vessels and sound producing activities to those assessed in the Mona CEA. The modelled impact ranges for Morgan Generation Assets also reduced in the Environmental Statement from PEIR. Therefore, potential cumulative effects from Morgan Generation Assets and Morecambe Generation Assets are considered to be unchanged from that presented in the Mona Environmental Statement.</p> <p>Of the new Tier 1 projects, Arklow Bank 2, North Irish Sea Array, Codling Wind Park, Oriel windfarm, and Llŷr all lie over 100 km from Mona and therefore there is no potential for direct spatial overlap in disturbance effect ranges. Arklow Bank 2 predicted no significant effects from disturbance from vessels in the project alone, but excluded the impact from the CEA, and adopts an Environmental Vessel Management Plan (EVMP) which includes measures to minimise the potential disturbance of marine mammals from vessel activities. Both North Irish Sea Array and Codling Wind Park predicted disturbance from vessels was not significant for the construction, operational and decommissioning phases for the project alone and these projects have committed to adopting an EVMP. The effect of vessel was excluded from the North Irish Sea Array CEA due to the highly localised impact. Codling Wind Park cumulatively assessed the disturbance from vessel activity as of minor adverse significance. Oriel windfarm concluded no significant effect from the project alone or cumulatively (which included Mona). For Llŷr, the assessment identified vessel noise effects of negligible adverse significance. Considering this conclusion and the distance between Mona and Llŷr (263 km), cumulative effects are highly unlikely.</p> <p>For Hynet, a Tier 1 project located 12.1 km from Mona, the activities are similar to Mona, but vessel movements are much lower (236 total round trips in construction phase and 750 trips over the 25-year operational phase). The Hynet Environmental Statement predicted a minor adverse cumulative impact (which included Mona) which is not significant during construction, operations and maintenance and decommissioning.</p>	

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>On this basis, it is considered that the conclusions of the Mona CEA remain unchanged, and that the disturbance from vessel use and other (non-piling) sound producing activities during construction/decommissioning and operation is of minor adverse significance.</p> <p>Increased likelihood of injury due to collision with vessels</p> <p>Increased vessel activity related to the construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project, and the other projects considered will represent a localised cumulative increased risk of collision with marine mammals. For potential impacts of vessel activity, the Mona assessment did not predict any significant impacts due to collision risk.</p> <p>Arklow Bank 2, North Irish Sea Array, Oriel windfarm, Codling Wind Park and Llŷr OWF all lie over 100 km from Mona and therefore the conclusions of the assessment in the CEA remain unchanged given the highly localised nature of collision risk and assumption that vessels will follow existing transit routes to the respective array areas.</p> <p>Morgan Generation Assets, Morecambe Generation Assets and Hynet are within closer proximity to Mona. The changes in vessel movements between that assessed in the Mona CEA and the published Environmental Statements for Morgan Generation Assets and Morecambe Generation Assets are very low and the cumulative effect is considered to be unchanged from that presented in the Environmental Statement. Hynet is close to Mona (12.1 km), but construction will only overlap for up to one year (in 2026) and the number of vessels is low (236 round trips over the construction phase) in comparison to Mona. Morgan Generation Assets, Morecambe Generation Assets and Hynet all included Mona in their respective CEAs and concluded no residual significant effect cumulatively from collision risk.</p> <p>On this basis, it is considered that the conclusions of the Mona CEA remain unchanged, and that the increased likelihood of injury due to collision with vessels during construction/decommissioning and operation is of minor adverse significance.</p> <p>Effects on marine mammals due to changes in prey availability</p> <p>The cumulative effect prey availability is dependent on the conclusions of the fish and shellfish assessment, and as this review has not identified any change in impacts from SSC on fish and shellfish, it is concluded that there is no change from the original Mona CEA, and the impact is of minor adverse significance during construction, operations and maintenance and decommissioning.</p>	
<p>Offshore ornithology (Volume 2, Chapter 5 (REP2-016))</p>	<p>The Arklow Bank 2, Codling Wind Park, Hynet, Llŷr, Morgan Generation Assets, Morecambe Generation Assets, North Irish Sea Array and Oriel projects are located within the CEA study area for Mona and have the potential to have ornithological impacts. There is potential for cumulative effects to occur for displacement and collision risk.</p> <p>The Mona CEA included the quantitative assessment of Morgan Offshore Windfarm Generation Assets and Morecambe Offshore Windfarm Generation Assets, using the quantified impacts from both PEIR documentation. Arklow Bank 2, Codling Wind Park, Oriel Wind Farm, Llŷr 1 Floating Wind Farm, Llŷr 2 Floating Wind Farm, North</p>	<p>For the purposes of this review, additional work is required to understand the potential cumulative effects of these projects.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>Irish Sea Array Offshore Wind Farm were included as Tier 2 projects but were not assessed in the Mona CEA as quantitative data were not available. Hynet was not assessed as no data was available; however, the Hynet project would only affect displacement, as there is no collision risk associated with the project.</p> <p>Disturbance and displacement from airborne noise, underwater sound, and presence of vessels and infrastructure</p> <p>For displacement effects, the Mona CEA concluded that the cumulative effects during construction, operations and maintenance, and decommissioning would be of minor or negligible significance for all six species assessed (Table 5.80 for construction and Table 5.116 for operation of Volume 2, Chapter 5: Offshore Ornithology (REP2-016)).</p> <p>The additionality of Arklow Bank 2, Codling Wind Park, Hynet, LIÿr, North Irish Sea Array and Oriel abundance estimates and the amended Morgan and Morecambe abundance estimates will alter the assessments. However, the extent to which these abundance estimates change the conclusion of the assessments is unknown. For the purposes of this review, additional work is required to understand the potential cumulative effects of these projects; this will be undertaken for Deadline 4.</p> <p>Collision risk</p> <p>Similarly, for the collision risk estimates, additional work is required to understand the potential cumulative effects of these projects; this will be undertaken for Deadline 4.</p>	<p>This will be undertaken for Deadline 4</p>
<p>Commercial fisheries (Volume 2, Chapter 6 (APP-058))</p>	<p>Of the projects considered, the Morecambe Generation Assets and the Morgan Generation Assets are located within the commercial fisheries cumulative study area for Mona and have the potential to have commercial fisheries impacts. Updated information for both Morecambe Generation Assets and Morgan Generation Assets includes a reduction in the footprint of the Array Area and a reduction in the maximum number of wind turbines. The Morgan Generation Assets will implement a similar Outline Fisheries Co-existence and Liaison Plan to the one proposed for Mona Offshore Wind Project (J13 Outline Fisheries Liaison and Co-Existence Plan F02) including a commitment to a scallop mitigation zone over key areas of scallop grounds in the Morgan Array Area. It is also assumed that Morecambe Generation Assets will implement measures to reduce potential impacts to commercial fisheries in line with good industry practice. The cumulative effects assessed in section 6.9 of Volume 2, Chapter 6: Commercial fisheries (APP-058) with potential to be influenced by the new project information include:</p> <ul style="list-style-type: none"> • Loss or restricted access to fishing grounds and loss or damage to fishing gear due to snagging for Scottish west coast scallop vessels: the reduced array areas and maximum number of turbines for Morecambe Generation Assets and Morgan Generation Assets leads to a reduction in the potential cumulative effect. • Interference with fishing activity for offshore static gear vessels: the reduced array areas and maximum number of turbines for Morecambe Generation Assets and Morgan Generation Assets leads to a reduction in the potential cumulative effect. 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<ul style="list-style-type: none"> • Fish and shellfish ecology impacts on commercially important fish and shellfish resources: The cumulative effect on commercially important fish and shellfish resources is dependent on the conclusions of the fish and shellfish ecology assessment, and as this review has not identified any change in impacts on fish and shellfish ecology for commercially important species, it is concluded that there is no change from the original Mona CEA, and the impact is of minor significance during construction, operations and maintenance and decommissioning. 	
<p>Shipping and navigation (Volume 2, Chapter 7 (APP-059))</p>	<p>Of the projects considered, the newly identified tier 3 Isle of Man-UK interconnector 2 and Microsoft Wales-Ireland telecommunications cable projects and the updated information for Hynet Carbon Dioxide Capture Transportation and Storage project have been identified as having the potential to result in cumulative effects within the shipping and navigation study area. Updated information for Hynet includes an increase in vessel movements but negligible changes to physical structures or obstacles. Cable installation and maintenance and repair activities associated with Isle of Man-UK interconnector 2 and Microsoft Wales-Ireland telecommunications cable projects have the potential to disrupt traffic navigating through the shipping and navigation cumulative study area. It is assumed that these projects would be required to implement similar measures to those outlined for the Mona Offshore Wind Project in section 7.8 of Volume 2, Chapter 7: Shipping and navigation (APP-059) in order to reduce their impacts as far as practical, such as a Vessel Traffic Management Plan and compliance with international conventions such as the Collision Regulations and Safety of Life at Sea (SOLAS) Convention. The cumulative effects assessed in section 7.10 of Volume 2, Chapter 7: Shipping and navigation (APP-059) with potential to be influenced by the new project information include:</p> <ul style="list-style-type: none"> • Impact on recognised sea lanes essential to international navigation: updated project information for Hynet includes negligible change to physical structures or obstacles, which would not result in any change to the magnitude of this impact. Therefore, the significance of the cumulative effect would not change from that assessed in the Mona CEA. • Impact to commercial operators including strategic routes and lifeline ferries in both typical and adverse weather conditions: the updated information for Hynet and newly identified tier 3 cables will result in increased vessel traffic, which has the potential to result in a small change the magnitude of impacts to shipping routes. However, it is not anticipated that this would result in any change to the significance of effects from that assessed in the Mona CEA. • Impact on emergency response capability due to increased incident rates and reduced access for SAR responders: This will be managed by the respective projects and therefore the significance of the cumulative effects would not change from that assessed in the Mona CEA. • Impact of vessel to vessel collision risk: the updated information for Hynet and newly identified tier 3 cables will result in increased vessel traffic which has the potential to result in a small change in the magnitude of impact of vessel to vessel collision risk. However, given the available searoom and small increase in vessel movements, it is not anticipated that this would change the significance of cumulative effects from that assessed in the Mona CEA. 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<ul style="list-style-type: none"> Impact of allision (contact) risk to vessels: updated project information for Hynet includes negligible change to physical structures or obstacles, which would not result in any change to the magnitude of this impact. Therefore, the significance of the cumulative effect would not change from that assessed in the Mona CEA. Impact on recreational craft passages and safety: the updated information for Hynet and newly identified tier 3 cables will result in increased vessel traffic which has the potential to result in a small change in the magnitude of impact of vessel to vessel collision risk. However, it is not anticipated that this would change the significance of cumulative effects from that assessed in the Mona CEA. Impact on snagging risk to vessel anchors and fishing gear: additional cables and associated cable crossings has the potential to increase the likelihood of snagging risk to vessel anchors and fishing gear across the study area, however, the measures likely to be put in place to manage this risk are robust this would not result in a change to the significance of this cumulative effect from that assessed in the Mona CEA. 	
<p>Seascape and visual resources (Volume 2, Chapter 8 (APP-060))</p>	<p>Of the projects considered, the Tier 2 Foel Fach Onshore Wind Farm and the Cair Vie Onshore Wind Farm have potential to give rise to cumulative effects in combination with the Mona Offshore Wind Project.</p> <p>Foel Fach Onshore wind farm is located within the cumulative study area of 85 km in relation to the Mona Array and hence is considered for potential cumulative effects on seascape, landscape and visual amenity. At distances exceeding 60 km and with the influence of intervening vegetation screens, there is no potential for additional significant cumulative effects on seascape, landscape and visual receptors.</p> <p>Cair Vie Onshore wind farm is located within the cumulative study area of 85 km in relation to the Mona Array and hence is considered for potential cumulative effects on seascape, landscape and visual amenity. At a distance of 55.4 km from the boundary of Mona, and with the influence of intervening vegetation screens and topography of the Isle of Man, there is no potential for additional significant cumulative effects on seascape, landscape and visual receptors.</p> <p>Royal Seaforth Dock (onshore wind) is referenced in Appendix B of Volume 2, Chapter 8: Seascape and visual resources (APP-060) as potentially relevant to the cumulative effects assessment albeit scoped out as having no potential for significant cumulative effects. The nature of the repowering, comprising an overall reduction of turbine numbers from 5 to 4 is such that there would be no potential for additional potential significant effects on seascape, landscape and visual receptors.</p>	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>
<p>Marine archaeology (Volume 2, Chapter 9 (APP-061))</p>	<p>Of the projects considered, only the tier 3 MaresConnect and Microsoft Wales-Ireland telecommunications cable projects have potential to result in cumulative effects within the marine archaeology study area. Available project information indicates that MaresConnect and the Microsoft telecommunications cable projects cable corridors would overlap with the Mona Offshore Cable Corridor and based on the project type, it is anticipated that activities could potentially involve sandwave clearance, cable installation, vessel movements and anchoring. The potential for the</p>	<p>Due to the potential for tier 3 project cable routes to intersect the Mona export cable corridor, a new potential cumulative effect has been identified</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>new project information to influence the impacts assessed in Volume 2, Chapter 9: Marine archaeology (APP-061) is as follows:</p> <ul style="list-style-type: none"> • Direct damage to marine archaeology receptors (e.g. wrecks, debris, submerged prehistoric receptors (palaeolandscapes and associated archaeological receptors)): for the project alone, minor adverse effects were identified for this impact. Potential direct impacts from MaresConnect or Microsoft Wales-Ireland cable installation activities will affect separate receptors to those potentially impacted by the Mona Offshore Wind Project. In addition, it is expected that the MaresConnect and Microsoft telecommunications cable projects will adhere to measures similar to those set out for Mona in the Outline Offshore Written Scheme of Investigation and Protocol for Archaeological Discoveries (REP2-032). Therefore, the cumulative effect on marine archaeology receptors would be equivalent to the minor adverse significance of effect assessed for this impact for the project alone in Volume 2, Chapter 9: Marine archaeology (APP-061). • Direct damage to deeply buried marine archaeology receptors – submerged prehistoric receptors (e.g. Palaeolandscapes and associated archaeological receptors): for the project alone, it was not considered that cable installation activities had the potential to lead to direct damage to deeply buried marine archaeology receptors. Therefore, MaresConnect or Microsoft Wales-Ireland cable installation activities would not result in any potential impact to this receptor. • Sediment disturbance and deposition leading to indirect impacts on marine archaeology receptors (the exposure or burial of receptors): the physical processes CEA and review (above) concluded that the potential for SSCs and associated deposition are not significant, so there would be no change to the significance of affects assessed in the Mona CEA for indirect impacts on marine archaeology receptors during the construction, operations and maintenance and decommissioning phases. • Alteration of sediment transport regimes: as the MaresConnect and Microsoft telecommunications cable will not include any permanent infrastructure within the water column which could obstruct tidal flow and influence the sediment transport regime, there is no potential for indirect impacts on marine archaeology receptors. 	<p>for Direct damage to marine archaeology receptors (e.g. wrecks, debris, submerged prehistoric receptors (palaeolandscapes and associated archaeological receptors)). However, the significance of the new potential cumulative effect would not differ from the minor adverse effects identified for these impacts for the project alone in Volume 2, Chapter 9: Marine archaeology (APP-061), which are not significant in EIA terms.</p>
<p>Other sea users (Volume 2, Chapter 10 (APP-062))</p>	<p>Of the projects considered, the tier 3 Isle of Man-UK interconnector 2 and Microsoft Wales-Ireland telecommunications cable projects have potential to result in cumulative effects in the other sea users study area. Available project information indicates that the Microsoft telecommunications cable projects cable corridor would overlap with the Mona Offshore Cable Corridor whilst the Isle of Man-UK interconnector 2 project would be sited to the north of the Mona Array area. Of the cumulative effects assessed in section 10.11 of Volume 2, Chapter 10: Other sea users (APP-061), the impact due to displacement of recreational activities has the potential to be influenced by the new project information. Recreational vessels may be displaced by the presence of vessels associated with the Isle of Man-UK interconnector 2 and Microsoft Wales-Ireland telecommunications cable projects.</p>	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
	<p>However, it is not anticipated that this would result in any change to the minor adverse significance of effects as assessed within the Mona CEA.</p>	
<p>Aviation and radar (Volume 4, Chapter 1 (APP-075))</p>	<p>Of the projects considered, the Morgan Generation Assets and Morecambe Generation Assets are located within the aviation and radar cumulative study area for Mona and have the potential to have aviation and radar impacts. Updated information for the Morecambe Generation Assets includes a reduction in the maximum number of wind turbines and a reduction in the maximum turbine blade tip height. The updated information for Morgan Generation Assets includes a reduction in the maximum number of wind turbines and an increase in the maximum turbine tip height to 364 m (increased from 324 m in the PEIR). The cumulative effects assessed in section 1.11 of Volume 4, Chapter 1: Aviation and radar (APP-075) with potential to be influenced by the new project information are as follows:</p> <ul style="list-style-type: none"> • Creation of a physical obstacle to aircraft operations – Military and other low flying operations: similarly, the increased maximum turbine tip height for Morgan Generation Assets would have the potential to increase the magnitude of the cumulative impacts caused by the creation of physical obstacles to military and other low flying operations. • Wind turbines causing interference to civil Primary Surveillance Radar (PSR) systems: the theoretical line of sight analysis for the Morgan Generation Assets wind turbines with the increased tip height of 364 m would be considered to be detectable (by varying degrees) to the PSR systems of NATS Lowther Hill, NATS St Anne’s and the Isle of Man Ronaldsway Airport. Therefore, there could potentially be an increase in the magnitude of impact for these PSRs, however this is not expected to result in a change to the moderate adverse significance of effect assessed within the Mona CEA. Both The Mona Offshore Wind Project and the Morgan Generation Assets are committed to engaging with the relevant stakeholders to identify appropriate mitigation, and therefore, with mitigation in place, these cumulative effects are still expected to be of minor adverse significance, which is unchanged from that assessed in the Mona CEA. 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>
<p>Annex I habitats (offshore and coastal) (Section 1.5 of HRA Stage 2 ISAA (APP-032))</p>	<p>There is the potential for in-combination effects from underwater sound generation as a result of construction phase of the Mona Offshore Wind Project with other projects.</p> <p>The projects that would result in in-combination effects are the same projects as described in the reviews for Volume 2, Chapter 1: Physical processes (APP-053) and Volume 2, Chapter 2: Benthic intertidal and subtidal ecology (APP-054) above. As the conclusions of these reviews were that the projects reviewed did not change the original overall conclusions of the Mona CEA, then it can be concluded beyond reasonable scientific doubt that there is no risk of an adverse effect on the integrity on any sites designated for offshore and coastal Annex 1 habitats as a result of underwater sound impacts with respect to construction of the Mona Offshore Wind Project in-combination other projects.</p>	<p>Changes are all minimal and no change to the conclusions of the ISAA.</p>

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Offshore topic	Review of potential for cumulative effects	Summary of change
Annex II diadromous fish (Section 1.6 of HRA Stage 2 ISAA (APP-032))	<p>There is the potential for in-combination effects from underwater sound generation as a result of construction phase of the Mona Offshore Wind Project with other projects that involve pile driving and UXO clearance.</p> <p>The projects that would result in in-combination effects are the same projects as described in the fish and shellfish topic (Volume 2, Chapter 3 (APP-055)) above. As the conclusions of these reviews were that the projects reviewed did not change the original overall conclusions of the Mona CEA, then it can be concluded beyond reasonable scientific doubt that there is no risk of an adverse effect on the integrity on any sites designated for diadromous fish as a result of underwater sound impacts with respect to construction of the Mona Offshore Wind Project in-combination with other projects.</p>	Changes are all minimal and no change to the conclusions of the ISAA.
Annex II marine mammals (Section 1.7 of HRA Stage 2 ISAA (APP-032))	<p>There is the potential for in-combination effects from underwater sound generation as a result of construction phase of the Mona Offshore Wind Project with other projects that involve pile driving and UXO clearance.</p> <p>The overlap in potential construction phases between the Mona Offshore Wind Project and other cumulative projects may lead to cumulative disturbance to marine mammals from piling. As noted in the review of marine mammals above, there are 11 Tier 1 projects (including eight new projects) within the Irish Sea (five in the western Irish Sea and three in the Eastern Irish Sea). It is considered highly unlikely that piling would coincide across all these projects. Cumulative population models for the western Irish Sea projects concluded no significant adverse effect, and updated population modelling for projects in the eastern Irish Sea with overlapping construction phases, as presented in Appendix A., did not change the outcomes of the population model for bottlenose dolphin. Therefore, it is considered that the significance of effect considering the additional Tier 1 projects would remain unchanged.</p> <p>The Mona ISAA concluded that, even though the project had a moderate impact on bottlenose dolphin from elevated underwater sound generated during piling, no adverse effects were predicted on any sites considered in the ISAA. Therefore, as there is no change to the conclusions of the Mona CEA, then no change is assumed to the conclusions of the ISAA. Similarly, the information provided in other Tier 1 projects has been reviewed, and for all other Annex II marine mammal species, there would be no change to the conclusions of the assessment.</p> <p>There was no change to the assessment of UXOs between the Morgan PEIR and Morecambe PIER, as assessed in the Mona CEA, and the Morgan Environmental Statement (Morgan Offshore Wind Ltd, 2024)) and Morecambe Environmental Statement (Morecambe Offshore Windfarm Ltd, 2024)). Codling Wind Park and Llyr wind farms were assessed in the Mona CEA as having some potential overlap, but both projects are located off the Irish coast and, therefore, based on the distance from Mona, are unlikely to result in a significant in-combination effect. Neither project identified a likely significant in-combination effect with Mona due to UXO clearance events. Therefore, it is considered that the conclusion of the in-combination assessment in the Mona CEA, when considering the additional Tier 1 projects, would remain unchanged.</p>	Changes are unlikely to amend the conclusions of the ISAA.
Offshore ornithology (HRA)	The Mona Offshore Wind Project, together with the other projects under review, may contribute to cumulative displacement and collision risk in the event that the operations and maintenance phases overlap. As noted in this	For the purposes of this review, additional work is

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Offshore topic	Review of potential for cumulative effects	Summary of change
Stage 2 ISAA (REP2-010))	review, further assessment of displacement and collision risk impacts with other projects in the cumulative assessment study area is required to understand the potential in-combination effects of these projects. This will be undertaken for Deadline 4	required to understand the potential cumulative effects of these projects; this will be undertaken for Deadline 4

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1.4.2 Onshore

Table 1.6: Review of project updates that may affect onshore topic cumulative effects assessment and in-combination assessment in the Mona Offshore Wind Project Environmental Statement.

Onshore topic	Review of potential for cumulative effects	Summary of change
<p>Geology, hydrogeology and ground conditions (Volume 3, Chapter 1 (APP-064))</p>	<p>Of the projects considered, only the Tier 1 Major Development 46/2024/1200/PF has the potential to result in cumulative effects within the geology, hydrogeology and ground conditions study area. Available project information indicates that construction of a wetland near to the onshore cable corridor. There is potential for interaction during construction and as such it is not possible to rule out additional cumulative effects.</p> <p>The potential for this project to result in changes to the magnitude of the impacts considered in Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions (APP-064) is as follows:</p> <ul style="list-style-type: none"> Alteration to groundwater quantity or quality in the glacial till superficial aquifer (Secondary undifferentiated): for the project alone, minor adverse effects were identified for this impact during construction and operation. Temporary dewatering may be required during the construction of Major Development 46/2024/1200/PF. The cumulative impact is predicted to be of limited local spatial extent, short term duration and of moderate reversibility and therefore the cumulative effect during construction is predicted to be similar to the minor adverse effect assessed for the project alone. During operation, the inert granular fill within the onshore export cables, may create new shallow pathways for groundwater flow in the glacial till, however, a large increase in connectivity with potential groundwater dependent receptors is considered unlikely to occur. The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. Alteration to groundwater quantity or quality in the bedrock aquifers of the Fernant Formation and Warwickshire Group (Secondary A aquifers): for the project alone, minor adverse effects were identified for this impact during construction and operation. The sandstone bedrock aquifers are concealed beneath significant depth of till in the east (e.g. under the Onshore Substation) and therefore no pathways are expected to be created and a negligible magnitude of impact is expected on groundwater quality, level or flow. The cumulative effect is predicted to be similar to the minor adverse effect assessed for the project alone. Deterioration in groundwater quality as a result of accidental release or spillage of potentially polluting substances, during the construction and decommissioning phase: for the project alone, the overall negligible to minor adverse effects were identified for this impact during construction and decommissioning. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline Code of Construction Practice (CoCP) 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

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Onshore topic	Review of potential for cumulative effects	Summary of change
	<p>(REP2-068). The cumulative effect is therefore predicted to be similar to the negligible effect assessed for the project alone.</p> <ul style="list-style-type: none"> • Deterioration of groundwater quality in the glacial till aquifer by the disturbance and mobilisation of existing areas of contamination associated with recent or historical land-use: for the project alone, a negligible effect was identified for this impact. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The cumulative effect is therefore predicted to be similar to the negligible adverse effect assessed for the project alone. • Deterioration in groundwater quality in bedrock aquifers through the disturbance and mobilisation of existing areas of contaminated land associated with recent or historical land-use: for the project alone, a negligible effect was identified for this impact. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. <p>Therefore, the significance of all potential cumulative effects to geology, hydrogeology and ground conditions receptors remains unchanged from that assessed within section 1.10 of Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions.</p>	
<p>Hydrology and flood risk (Volume 3, Chapter 2 (APP-065))</p>	<p>Of the projects considered, only the Tier 1 Major Development 46/2024/1200/PF has the potential to result in cumulative effects within the hydrology and flood risk study area. Available project information indicates that a new nature reserve is proposed approximately 300 m to the north of the Mona Offshore Wind Farm Order limit where the proposed access road to the onshore substation meets Glascoed Road.</p> <p>The potential for this project to result in changes to the magnitude of the impacts considered in Volume 3, Chapter 2: Hydrology and flood risk (APP-065) is as follows:</p> <ul style="list-style-type: none"> • The impact of increased flood risk arising from additional surface water runoff: for the project alone, a minor adverse effect was identified for this impact. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • The impact of increased flood risk arising from additional surface water runoff during operation of the Mona Onshore Substation: for the project alone, a negligible effect was identified for this impact. Given the nature of 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>

Onshore topic	Review of potential for cumulative effects	Summary of change
	<p>Major Development 46/2024/1200/PF, it is unlikely that it will increase surface water runoff compared to the existing site use. Given that increase in surface water runoff for the Mona Offshore Wind Farm is controlled by design commitments within the Outline Operational Drainage Management Plan (APP-231), the cumulative effect is predicted to be similar to the negligible effect assessed for the project alone.</p> <ul style="list-style-type: none"> • The impact of increased flood risk arising from damage to existing flood defences: for the project alone, a minor adverse effect was identified for this impact. Major Development 46/2024/1200/PF is not located within an area known to benefit from existing flood defences and therefore there will be no change to the cumulative assessment. • The impact of contaminated runoff on the quality of watercourses: for the project alone, a minor adverse effect was identified for this impact. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • The impact of damage to existing field drainage: for the project alone, a minor adverse effect was identified for this impact. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • The impact of damage to existing water pipelines: for the project alone, a minor adverse effect was identified for this impact. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with a construction management plan which will require adherence to measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. <p>Therefore, the significance of all potential cumulative effects to hydrology and flood risk receptors remains unchanged from that assessed within section 2.9 of Volume 3, Chapter 2: Hydrology and flood risk (APP-065).</p>	
Onshore ecology (Volume 3, Chapter 3 (APP-066))	Of the projects considered, only the Tier 1 Major Development 46/2024/1200/PF has the potential to result in cumulative effects within the onshore ecology study area. Available project information indicates that a new nature reserve is proposed approximately 300 m to the north of the Mona Offshore Wind Farm Order limit where the proposed access road to the onshore substation meets Glascoed Road.	Changes are all minimal and no additional potential significant cumulative effects have been identified.

Onshore topic	Review of potential for cumulative effects	Summary of change
	<p>The potential for this project to result in changes to the magnitude of the impacts considered in Volume 3, Chapter 3: Onshore Ecology (APP-066) is as follows:</p> <ul style="list-style-type: none"> • Temporary and permanent habitat loss impacts on GCN: for the project alone, minor beneficial effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the negligible adverse effect assessed for the project alone. • Temporary and permanent habitat loss impacts on bats: for the project alone, minor adverse effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • Temporary and permanent habitat loss impacts on badger: for the project alone, minor adverse effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • Temporary and permanent habitat loss impacts on reptiles: for the project alone, minor beneficial effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the minor beneficial effect assessed for the project alone. Temporary and permanent habitat loss of hedgerows: for the project alone, minor beneficial effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the negligible adverse effect assessed for the project alone. • Habitat disturbance impacts on bats: for the project alone, minor adverse effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction and operations to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • Habitat disturbance impacts on badgers: for the project alone, minor adverse effects were identified. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction and 	

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Onshore topic	Review of potential for cumulative effects	Summary of change
	<p>operation to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 3.35 of Volume 3, Chapter 3: Onshore Ecology (APP-066). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone.</p>	
<p>Onshore and intertidal ornithology (Volume 3, Chapter 4 (APP-067))</p>	<p>Of the projects considered, only the Tier 1 Major Development 46/2024/1200/PF has the potential to result in cumulative effects within the onshore and intertidal ornithology study area. Available project information indicates that a new nature reserve is proposed approximately 300 m to the north of the Mona Offshore Wind Farm Order limit where the proposed access road to the onshore substation meets Glascoed Road.</p> <p>The potential for this project to result in changes to the magnitude of the impacts considered in Volume 3, Chapter 4: Onshore and intertidal ornithology (APP-067) is as follows:</p> <ul style="list-style-type: none"> • The potential impact of temporary and permanent habitat loss during construction, operation and maintenance and decommissioning of the Mona Offshore Wind Project: for the project alone, a minor adverse effect was identified during construction, operation and decommissioning. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction and operation to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 4.41 of Volume 3, Chapter 4: Onshore and intertidal ornithology (APP-067). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. • The potential impact of habitat disturbance during construction, operation and maintenance and decommissioning of the Mona Offshore Wind Project: for the project alone, a minor adverse effect was identified during construction, operation and decommissioning. It is likely that any planning permission approved for Major Development 46/2024/1200/PF will require construction and operation to be carried out in accordance with measures similar to those adopted for the Mona Offshore Wind Farm as set out in Table 4.41 of Volume 3, Chapter 4: Onshore and intertidal ornithology (APP-067). The cumulative effect is therefore predicted to be similar to the minor adverse effect assessed for the project alone. 	<p>Changes are all minimal and no additional potential significant cumulative effects have been identified.</p>
<p>Historic environment (Volume 3, Chapter 5 (APP-068))</p>	<p>No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.</p>	<p>No change</p>
<p>Landscape and visual resources (Volume 3,</p>	<p>No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.</p>	<p>No change</p>

MONA OFFSHORE WIND PROJECT

Onshore topic	Review of potential for cumulative effects	Summary of change
Chapter 6 (APP-069))		
Land use and recreation (Volume 3, Chapter 7 (APP-070))	No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.	No change
Traffic and transport (Volume 3, Chapter 8 (APP-071))	No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.	No change
Noise and vibration (Volume 3, Chapter 9 (APP-072))	No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.	No change
Air quality (Volume 3, Chapter 10 (APP-073)).	No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.	No change
Water Framework Directive (WFD) surface water and groundwater assessment (Volume 7, Annex 2.4 (APP-120)) and Annex 3.5 to the Applicant's response to Relevant Representations at the Procedural	<p>Of the projects considered, only the Tier 1 Major Development 46/2024/1200/PF has the potential to result in cumulative effects within the Pont Robin Cut (Bodelwyddan) river water body, the Clwyd Permo-Triassic Sandstone groundwater body and the downstream Clywd transitional water body and North Wales coastal water body. Available project information indicates that a new nature reserve is proposed approximately 300 m to the north of the Mona Offshore Wind Farm Order limit where the proposed access road to the onshore substation meets Glascoed Road.</p> <p>The assessment of cumulative effects presented in Volume 7, Annex 2.4: Water Framework Directive surface water and groundwater assessment has been undertaken based on whether the Mona Offshore Wind Project when considered alongside other projects/plans will:</p> <ul style="list-style-type: none"> • Cause deterioration in water body status • Impact upon protected areas objectives designated under the European Directives listed in Article 5 of the WFD • Prevent the achievement of WFD status objectives. 	Changes are all minimal and no additional potential significant cumulative effects have been identified.

MONA OFFSHORE WIND PROJECT

Onshore topic	Review of potential for cumulative effects	Summary of change
<p>Deadline: Applicant's Response to Relevant Representation from Natural Resources Wales (NRW): RR-011.111 (PDA-013)</p>	<p>In their response to the Major Development 46/2024/1200/PF consultation, NRW highlighted that the site is adjacent to two watercourses and have included an informative to require that all works at the site must be carried out in accordance with Guidance for Pollution Prevention documents. It is therefore likely that any planning permission for Major Development 46/2024/1200/PF will require construction to be carried out in accordance with measures similar to those set out for the Mona Offshore Wind Farm Project in the Outline CoCP (REP2-068). The development will also provide long-term benefit to the watercourses from the habitat creation works through diversity of stream habitat structure and enhancement of biodiversity quality within adjacent habitats.</p> <p>Overall, it is concluded that there will be no significant cumulative effects from the Mona Offshore Wind Project alongside this additional project or other projects/plans and the CEA conclusion in relation to the potential for impact on the water body objectives and protected area objectives remain unchanged. Therefore, the Project is WFD compliant.</p>	

MONA OFFSHORE WIND PROJECT

1.4.3 Onshore and offshore

Table 1.7: Review of project updates that may affect joint onshore and offshore topic cumulative effects assessment in the Mona Offshore Wind Project Environmental Statement.

Topic	Summary of Mona Offshore Wind Project CEA conclusions as presented within the Environmental Statement	Projects with potential for additional cumulative effects with the Mona Offshore Wind Project	Review of potential for cumulative effects
Socio-economics (Volume 4, Chapter 3 (APP-077))	After providing an Outline Skills and Employment Plan, there are no significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans.	All projects outlined in Table 1.1 and Table 1.2.	No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.
Human health (Volume 4, Chapter 4 (APP-078))	In relation to collision and allision risk when including the effects of the Mooir Vannin Offshore Wind Farm within the assessment, there would be a cumulative moderate adverse effect for human health. Wider societal infrastructure and resources in relation to renewable energy generation will have a moderate beneficial effect for population health.	All projects outlined in Table 1.1 and Table 1.2	No additional developments have been identified which are likely to give rise to significant cumulative effects in combination with the Mona Offshore Wind Project.

1.5 Conclusions

1.5.1.1 This review has been undertaken to update the cumulative effects assessment and in-combination assessment presented in the Mona Environmental Statement, published in February 2024 (the Mona CEA). This review has considered all known projects that have been published up to 23 September 2024. Further information has been published on a number of projects, and the review identified 17 projects that had the potential to result in cumulative effects. Of these projects:

- Ten were offshore wind
- One was offshore carbon capture and storage (CCS)
- Three were offshore cables and interconnectors
- Two were onshore wind
- One was other onshore development.

1.5.1.2 Furthermore:

- Eleven of the projects had previously been considered in the Mona CEA:
 - One Tier 1 project has been assessed as their construction programme has been delayed and now overlaps with the Mona construction period
 - Eight projects were assessed previously as Tier 2, but consent application information has moved them to Tier 1
 - One project was considered at Tier 3 but has moved to Tier 2 with the publication of a scoping report
 - One project is still considered to be Tier 3, but additional information was published to provide more detail on the project.
- Five new projects were considered, including:
 - Two Tier 2 projects
 - Three Tier 3 projects
 - One Tier 1 project.

1.5.1.3 The Applicant has undertaken a review of the projects, including reviewing applicable Environmental Statements, scoping reports and application documents, to identify if these projects would result in significant environmental effects greater than those considered in the Mona CEA. For the majority of the projects reviewed, there is no potential for additional significant effects for each of the topics considered in the Mona CEA.

1.5.1.4 The Applicant cannot rule out the potential for additional cumulative impacts on ornithology. For the purpose of this review, additional work is required to understand the potential cumulative effects from these projects, this will be undertaken for Deadline 4.

1.6 References

Blue Gem Wind (2024) Blue Gem Wind Newsletter Available at:

<https://www.bluegemwind.com/wp-content/uploads/2020/07/Blue-Gem-Newsletter-4-LQ.pdf> [accessed 22/08/2024].

Celtic Sea Power Limited (2023) Pembrokeshire Demonstration Zone Scoping Report. Available at: https://celticseapower.co.uk/wp-content/uploads/2023/09/PC3562-RHD-ZZ-XX-RP-Z-0001_PDZ-Scoping-Report.pdf [accessed 22/08/2024].

Codling Wind Park Limited (2024) Codling Wind Park Environmental Impact Assessment Report. Available at: <https://codlingwindparkplanningapplication.ie/environmental-impact-assessment-report-eiar/> [accessed 11/09/2024].

Denbighshire County Council (2024) Application for the proposed change of use of land and construction of an "Integrated Constructed Treatment Wetland (ICTW)" scheme and associated works. Available at: <https://developments.denbighshire.gov.uk/planning/index.html?fa=getApplication&id=125208> [accessed 11/09/2024].

E.ON UK Heat Ltd (2024) Royal Seaforth Dock Repowering Scoping Opinion Request. Available at: <https://pa.sefton.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=SF9TBXNW08N00> [accessed 11/09/2024].

Foel Fach Wind Farm Limited (2024) Foel Fach Wind Farm Information to Support an EIA Scoping Direction Request. Available at: <https://foelfach.cymru/en/project-documents/> [accessed 11/09/2024].

Llŷr Floating Wind Ltd (2024) Llŷr Floating Offshore Wind Farm Environmental Statement. Available at: <https://publicregister.naturalresources.wales/Search/Results?SearchTerm=orml2465> [accessed 10/09/2024].

Liverpool Bay CCS Ltd (2024) Hynet Carbon Dioxide Transportation and Storage Project - Offshore Environmental Statement. Available at: <https://www.gov.uk/government/publications/hynet-carbon-dioxide-transportation-and-storage-project-offshore> [accessed 22/08/2024].

Manx Utilities (2024) Cair Vie Onshore Wind Farm, Manx Utilities/Wardell Armstrong Scoping report and opinion. Available at: <https://www.manxutilities.im/energy-transition/wind/reports/> [accessed 15/09/2024]. MaresConnect Limited (2023) Foreshore Licence Application For Site Investigations for the MaresConnect Interconnector Reference FS007635 - Non Statutory Environmental Report. Available at: <https://www.gov.ie/pdf/?file=https://assets.gov.ie/262740/363ccef7-bc34-4302-a352-6f6eef0a2473.pdf#page=null> [accessed 30/08/2024].

Maritime Area Regulatory Authority (2024) LIC230018 [Microsoft Wales-Ireland Subsea Cable Application for Geotechnical Surveys]. Available at: <https://www.maritimeregulator.ie/applications/lic230018/> [accessed 05/07/2024].

Morecambe Offshore Windfarm Ltd (2024) Morecambe Offshore Windfarm: Generation Assets Environmental Statement. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010121/EN010121-000408-Morecambe%20Offshore%20Wind%20Farm%20-%20Examination%20Library.pdf> [accessed 22/08/2024].

Morgan Offshore Wind Ltd (2024) Morgan Offshore Wind Project: Generation Assets Environmental Statement. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp->

content/ipc/uploads/projects/EN010136/EN010136-000241-Morgan%20OWF%20Examination%20Library.pdf [accessed 22/08/2024].

Natural Resources Wales (2024a) RML2335 [Microsoft Wales-Ireland Subsea Cable Application for Geotechnical Surveys] on Natural Resources Wales Public register. Available at: <https://publicregister.naturalresources.wales/Search/Results?SearchTerm=rml2335> [accessed 05/07/2024].

Natural Resources Wales (2024b) RML2413 [Microsoft Wales-Ireland Subsea Cable Application for Geotechnical Surveys] on Natural Resources Wales Public register. Available at: <https://publicregister.naturalresources.wales/Search/Results?SearchTerm=rml2335> [accessed 05/07/2024].

North Irish Sea Array Windfarm Limited (2024) North Irish Sea Array Offshore Wind Farm Environmental Impact Assessment Report. Available at: <https://www.pleanala.ie/en-ie/case/319866> [accessed 22/08/2024].

Oriel Windfarm Limited (2024) Oriel Wind Farm Project Environmental Impact Assessment Report. Available at: <https://orielwindfarm-marineplanning.ie/environmental-documents/ear/> [accessed 22/08/2024].

SSE Renewables (2024) Arklow Bank Wind Park 2 Environmental Impact Assessment. Available at: <https://www.arklowbank2offshoreplanning.ie/ear/> [accessed 22/08/2024].

The Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. Available at: <https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seventeen-cumulative-effects-assessment-relevant-to-nationally-significant-infrastructure-projects> [accessed 22/08/2024].

Appendix A: Marine mammal population modelling report: Cumulative effects review

A.1 Marine mammal population modelling report: Cumulative effects review

A.1.1 Introduction

A.1.1.1.1 Morgan Generation Assets and Morecambe Generation Assets have now submitted Development Consent Order applications, with refined project information available in their Environmental Statements (Morecambe Offshore Windfarm Ltd (2024) and Morgan Offshore Windfarm Ltd (2024)). Therefore, the Applicant has revised the population models to incorporate the most recent information presented for relevant cumulative projects and to identify any changes to the cumulative effects assessment (CEA).

A.1.1.1.2 In summary, the changes are as follows:

- All piling parameters and piling schedules and the number of animals disturbed have been updated for Morgan Generation Assets following the submission of their Environmental Statement (Morgan Offshore Windfarm Ltd, 2024).
- All piling parameters and piling schedules and the number of animals disturbed have been updated for Morecambe Generation Assets following the submission of their Environmental Statement (Morecambe Offshore Windfarm Ltd, 2024).

A.1.1.1.3 The parameters inputted into the model for all other projects in the CEA remain unchanged from the modelling in Volume 2, Chapter 4: Marine Mammals (APP-056).

A.1.1.1.4 This report presents the outputs of the revised cumulative population models and concludes there is no significant change in the conclusions of the CEA assessment presented in Volume 2, Chapter 4: Marine Mammals (APP-056).

A.1.2 Modelled parameters

A.1.1.1.5 Full details of the iPCoD modelling approach are presented in Section A.1.2 Appendix A of Volume 2, Chapter 4: Marine Mammals (APP-056). Input parameters for the population modelling, as agreed with relevant stakeholders via the Marine Mammals Expert Working Group process, were retained for this CEA review (presented in Table A.2 of Volume 2, Chapter 4: Marine Mammals (APP-056)).

A.1.1.1.6 As detailed in paragraph A.3.8.1.5 of Volume 2, Chapter 4: Marine Mammals (APP-056), the original cumulative models in the Environmental Statement were run in two stages: one set of models incorporating the Mona Offshore Wind Project and only Tier 1 projects in the regional marine mammal study area, and one set incorporating all Tier 1 and Tier 2 projects. Cumulative projects were only included in species' models if they overlapped spatially with the species-specific management units (MU) relevant to the Mona Offshore Wind Project.

A.1.2.1 Numbers of animals disturbed

A.1.1.1.7 The number of animals affected for each of the key species and number of days on which piling occurred was taken from the maximum design scenario (MDS) for each of the cumulative projects, including the updated Morgan Generation Assets and Morecambe Generation Assets Environmental Statements.

A.1.1.1.8 For each project, piling days were spread evenly throughout the offshore construction phases. As was the case for Volume 2, Chapter 4: Marine Mammals (APP-056), the time points selected from the iPCoD model outputs for cumulative

projects were chosen to coincide with key periods in the piling programmes, and with statutory reporting periods for SACs (see Table A.10 and Table A.11 in Volume 2, Chapter 4: Marine Mammals (APP-056)).

- A.1.1.1.9 As discussed in paragraph A.1.1.1.1, Morgan Generation Assets and Morecambe Generation Assets have published their Environmental Statements which include updated project parameters and updated assessment of disturbance, which leads to updated numbers of animals estimated to experience disturbance. These projects are now Tier 1 projects (see section 4.10.1 in Volume 2, Chapter 4: Marine Mammals (APP-056) for remodelling. All other projects remained unchanged for the population modelling undertaken for this CEA review.
- A.1.1.1.10 A summary of the number of animals for each species affected and the number of piling days for each cumulative project, updated with the numbers from their respective Environmental Statements, is provided in Table A. 1.

Table A. 1: Summary of number of animals estimated to experience disturbance for revised cumulative iPCoD models for the maximum adverse spatial scenario. Numbers shown in blue are the new values taken forward for this CEA review, while the numbers struck out in red are those applied in the CEA population modelling for the Mona application as presented in Volume 2, Chapter 4: Marine mammals (APP-056).

Project		Piling days	Maximum number of animals disturbed			
			Harbour porpoise	Bottlenose dolphin	Minke whale	Grey seal
Mona Offshore Wind Project	Wind turbine (3,000 kJ, concurrent)	24	1,142	7	72	31
	Wind turbine (4,400 kJ)	16	971	6	61	27
	OSP (4,400 kJ)	12	971	6	61	27
	Wind turbine (Gravity Base Foundation (GBF): 3,000 kJ)	38	803	5	51	17
Tier 1 projects previously assessed in the submitted application						
Awel y Môr	Wind turbine (monopile, 5,000 kJ)	201	2,112	23	36	81
Project Erebus	Wind turbine (pin pile, 800 kJ)	18	1,967	n/a	55	18
White Cross Offshore Windfarm	Wind turbine (pin pile, 800 kJ) plus OSP (pin pile, 2,500 kJ)	6	2,754	n/a	61	10
New Tier 1 projects (previously in Tier 2) updated for this CEA review						
Morgan Offshore Wind Project Generation Assets (Final)	Wind turbine (3,000 kJ, concurrent)	24	1,007	5	67	61
	Wind turbine (4,400 kJ)	16	858	4	57	54
	OSP (4,400 kJ)	12	858	4	57	54

Project		Piling days	Maximum number of animals disturbed			
			Harbour porpoise	Bottlenose dolphin	Minke whale	Grey seal
	Wind turbine (GBF: 3000 kJ)	38	713	4	48	41
Morgan Offshore Wind Project Generation Assets (PEIR)	Wind turbine (monopile, 5,500 kJ, concurrent)	35	1,370	16	96	48
Morecambe Offshore Wind Farm Generation Assets (Final)	Wind turbine (monopile, 6,600 kJ)	37	3,443	57	25	197
Morecambe Offshore Wind Farm Generation Assets (PEIR)	Wind turbine (monopile, 5,000 kJ)	42	2,961	<1	2	<1
Tier 2 projects (no change from submitted application)						
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	Morgan OSP	2	2,465	11	69	88
	Morecambe OSP	2	2,465	<1	2	88
	Morgan booster station	2	1,793	4	17	28

A.1.3 Results

- A.1.1.1.11 In keeping with the population modelling presented in Volume 2, Chapter 4: Marine Mammals (APP-056), the metrics used to assess the impact on the population are:
- The predicted mean population at the end of 25 years (time point 26¹)
 - the mean ratio of the impacted to un-impacted population (counterfactual, at time point 26)
- A.1.1.1.12 If the ratio of impacted to unimpacted population size equals one, this represents a situation where the impacted population size is no different to the unimpacted population size. If the ratio of impacted to unimpacted population size is less than one, this represents a situation where the impacted population size is smaller than the median unimpacted population size.

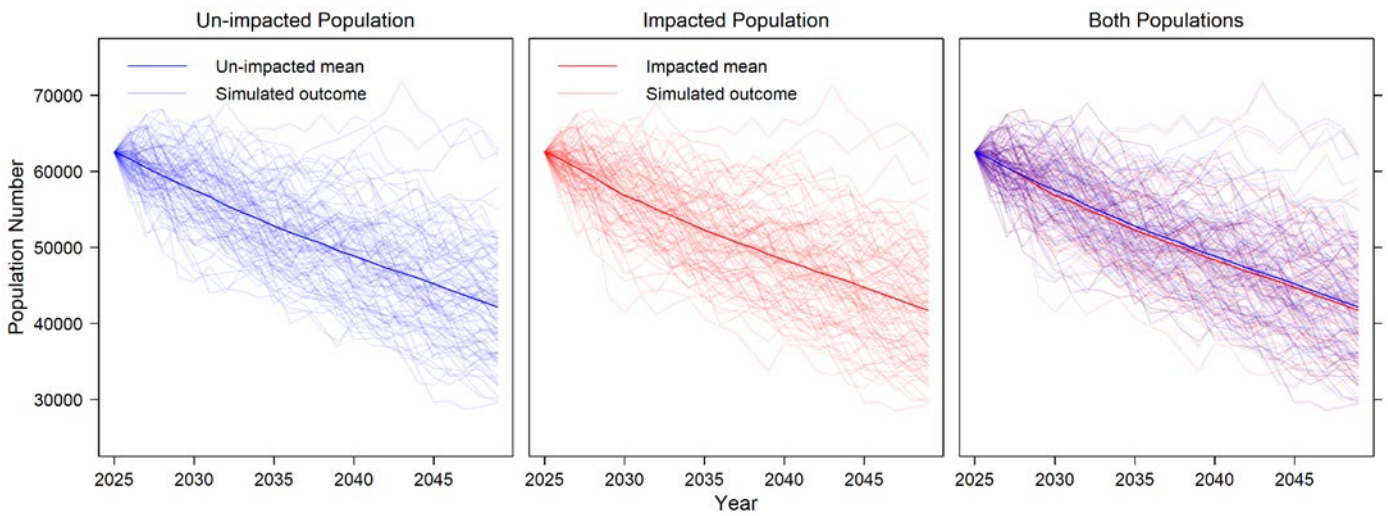
A.1.3.1 Harbour porpoise

- A.1.1.1.13 Results of the iPCoD modelling for harbour porpoise for this CEA review are presented in Table A. 2 and illustrated in Figure A. 1.

¹ Time points refer to a discrete interval in the simulation timeline where the model evaluates the state of the population. E.g. Time Point 1 = the start of year 1, before any time has passed. Time point 26 = the start of year 26, after 25 simulated years.

- A.1.1.1.14 The impacted population in Volume 2, Chapter 4: Marine Mammals (APP-056) at time point 26 was 40,973 harbour porpoise (416 animals less than the unimpacted scenario), whilst for the revised iPCoD model the impacted population for the same time point was 41,276 animals (401 animals less than the unimpacted scenario), leading to a difference of 303 animals between the impacted population in the Environmental Statement model and the impacted population in this CEA review (= 0.485% of the MU). This equates to a 0.734% increase in the number of animals disturbed in the cumulative scenario from the Environmental Statement CEA model and this CEA review model. Whilst it may be counterintuitive that the population at time point 26 is predicted to be greater for the revised iPCoD model compared to the population presented in the Mona application (Volume 2, Chapter 4: Marine Mammals (APP-056)) since a larger number of harbour porpoise could be affected at any one time during each piling event, it is highlighted that overall the number of days of piling over the cumulative scenario has decreased and this is likely to have a bearing on the final population prediction.
- A.1.1.1.15 The median and mean counterfactual of population size at the 26-year time point in the Environmental Statement was 0.9938 and 0.9900, respectively, at the 26-year time point.
- A.1.1.1.16 The results show that the differences in disturbed to undisturbed populations approach a ratio of 1 (0.99) in the population modelling for this CEA review; therefore, there is not considered to be a potential for a long-term effect upon harbour porpoise, and therefore, these results do not affect the conclusions of the assessment in Volume 2, Chapter 4: Marine Mammals (APP-056).

Environmental Statement model



Model results for the CEA review

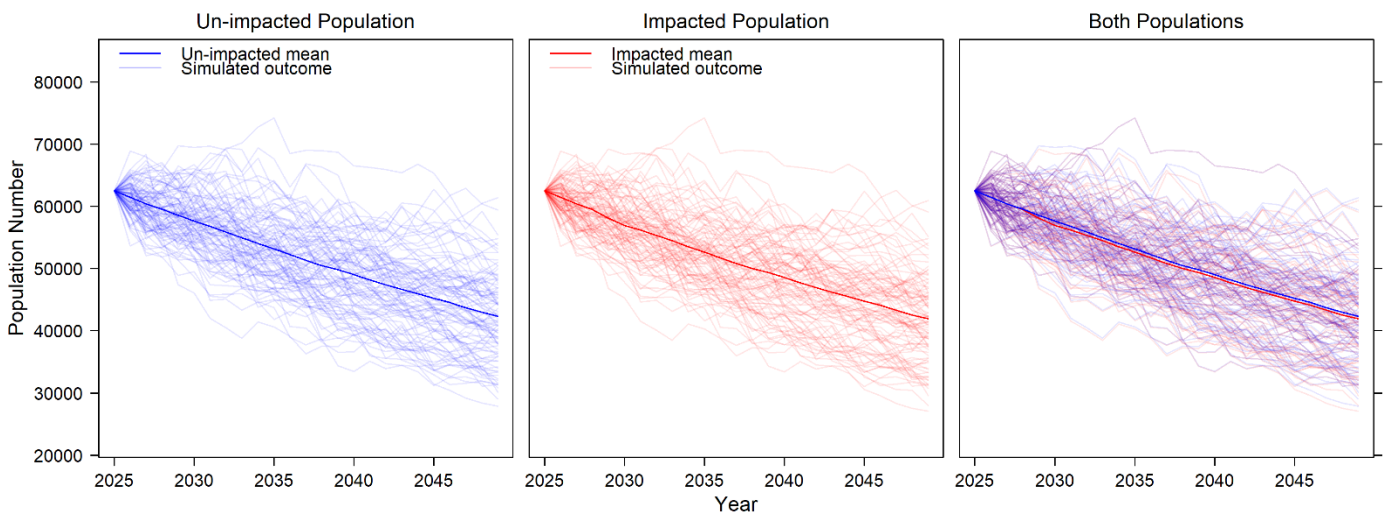


Figure A. 1: Simulated harbour porpoise population trajectories in un-impacted versus impacted populations, for the Environmental Statement scenario as presented in Volume 2, Chapter 4: Marine mammals (APP-056) (Top Row) versus the CEA review model (Bottom Row).

Table A. 2: Comparison of mean population estimates and mean counterfactuals of population size for harbour porpoise, from the original Environmental Statement (scenario HP-C2) as presented in Volume 2, Chapter 4: Marine mammals (APP-056) and the CEA review model.

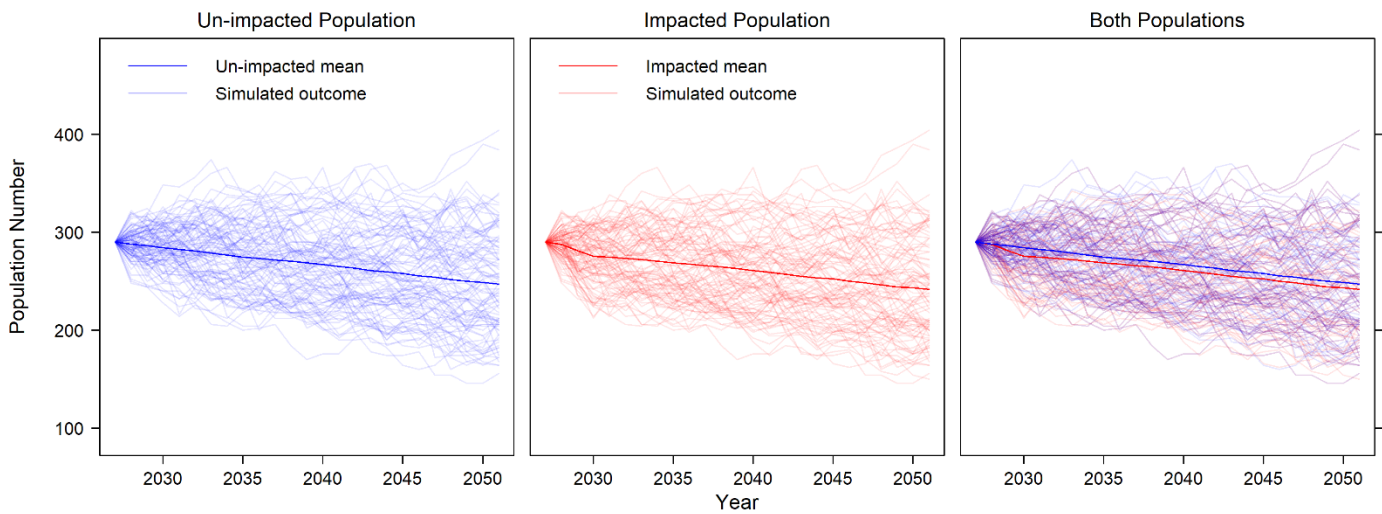
Time Point	Un-Impacted Pop Mean			Impacted Pop Mean			Mean Counterfactual			Median Counterfactual		
	ES	Review	Percent Change (%)	ES	Review	Percent Change (%)	ES	Review	Difference	ES	Review	Difference
1	62,514	62,514	0.000	62,514	62,514	0.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
3	60,481	60,414	-0.111	60,453	60,397	-0.093	0.9995	0.9997	0.0002	1.0000	1.0000	0.0000
4	59,451	59,563	0.188	59,351	59,479	0.215	0.9983	0.9986	0.0003	0.9996	0.9996	0.0000
5	58,456	58,547	0.155	57,995	58,088	0.160	0.9921	0.9922	0.0001	0.9950	0.9951	0.0001
7	56,641	56,766	0.220	56,029	56,180	0.269	0.9892	0.9897	0.0005	0.9928	0.9933	0.0005
9	54,621	54,966	0.628	54,109	54,468	0.659	0.9907	0.9911	0.0004	0.9941	0.9943	0.0002
10	53,733	54,012	0.517	53,205	53,499	0.550	0.9902	0.9906	0.0004	0.9938	0.9940	0.0002
11	52,762	53,135	0.702	52,232	52,618	0.734	0.9900	0.9904	0.0004	0.9937	0.9938	0.0001
13	51,223	51,303	0.156	50,709	50,803	0.185	0.9900	0.9904	0.0004	0.9937	0.9938	0.0001
15	49,579	49,804	0.452	49,085	49,323	0.483	0.9901	0.9904	0.0003	0.9937	0.9939	0.0002
23	43,639	43,697	0.133	43,203	43,277	0.171	0.9900	0.9904	0.0004	0.9937	0.9939	0.0002
26	41,389	41,677	0.691	40,973	41,276	0.734	0.9900	0.9904	0.0004	0.9938	0.9939	0.0001

A.1.3.2 Bottlenose dolphin

Lower fertility rate (0.22)

- A.1.1.1.17 Results of the iPCoD modelling for bottlenose dolphin for this CEA review with a 0.22 fertility rate are presented in Table A. 3: and illustrated in Figure A. 2.
- A.1.1.1.18 The impacted population in Volume 2, Chapter 4: Marine Mammals (APP-056) at time point 26 was 239 animals (six animals less than the unimpacted scenario), whilst for the revised iPCoD model the population was 236 animals (six animals less than the unimpacted scenario), leading to a difference of three animals between the impacted population in the Environmental Statement model and the population model in this CEA review (= 1.02% of the MU). Therefore, there is a 1.271% decrease in the number of animals disturbed cumulatively between the Environmental Statement CEA model and the population model in this CEA review at time point 26, when using a fertility rate of 0.22.
- A.1.1.1.19 The median and mean counterfactual of population size for the Environmental Statement was 1 and 0.97 respectively at the 26-year time point. For the population model in this CEA review, the median and mean counterfactual of population was 1 and 0.97 respectively at the 26-year time point.
- A.1.1.1.20 Therefore, given that the differences in disturbed to undisturbed populations approaches a ratio of 1 in the population modelling for this CEA review and remains at 0.97 (the same as the modelling for the Environmental Statement), there is not considered to be an increased potential for a long-term effect upon bottlenose dolphin. The results of the population modelling for this CEA review therefore do not affect the conclusions of the assessment in Volume 2, Chapter 4: Marine Mammals (APP-056).

Environmental Statement model



Model results for the CEA review

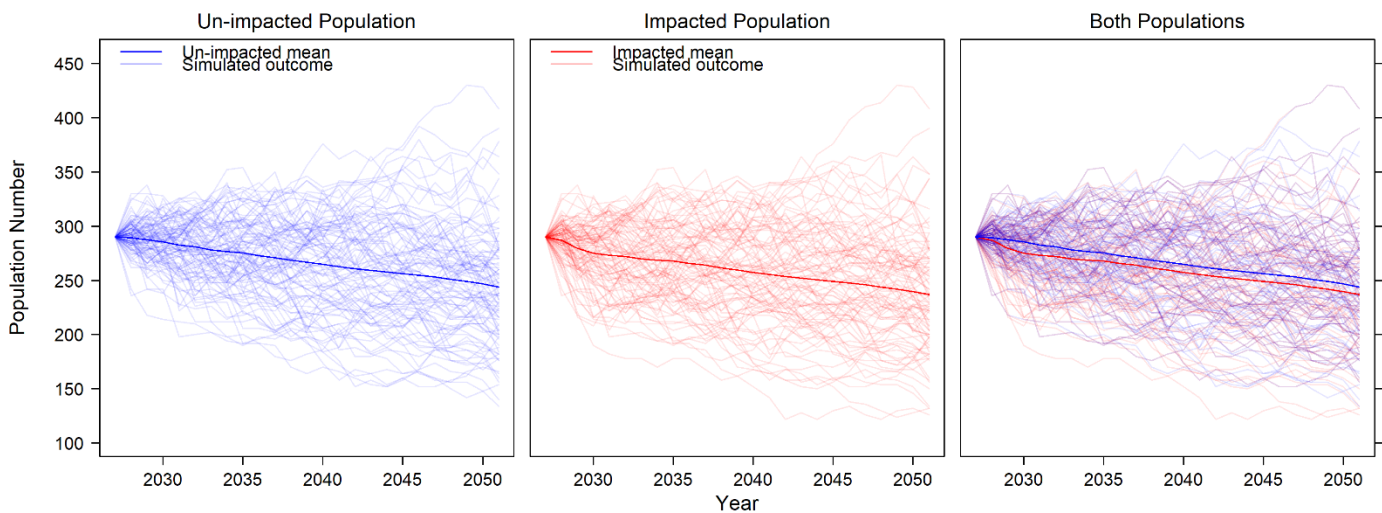


Figure A. 2: Simulated bottlenose dolphin population trajectories (fertility rate = 0.22) in un-impacted versus impacted populations, for the Environmental Statement scenario as presented in Volume 2, Chapter 4: Marine mammals (APP-056) (Top Row) versus the CEA review model (Bottom Row).

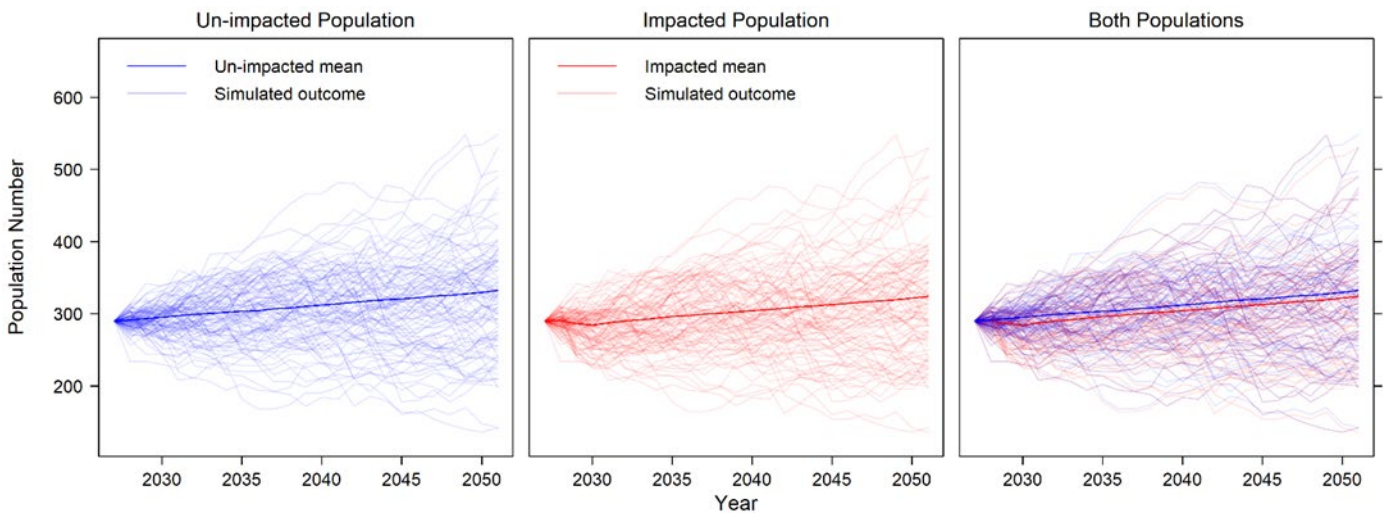
Table A. 3: Comparison of mean population estimates (fertility rate = 0.22) and mean counterfactuals of population size for bottlenose dolphin, from the original Environmental Statement (scenario BND-C2a) as presented in Volume 2, Chapter 4: Marine mammals (APP-056) and the CEA review model.

Time Point	Un-Impacted Pop Mean			Impacted Pop Mean			Mean Counterfactual			Median Counterfactual		
	ES	Review	Percent Change (%)	ES	Review	Percent Change (%)	ES	Review	Difference	ES	Review	Difference
1	290	290	0.000	290	290	0.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
2	288	289	0.346	288	287	-0.348	0.9974	0.9917	-0.0057	1.0000	1.0000	0.0000
3	287	288	0.347	280	280	0.000	0.9772	0.9729	-0.0043	1.0000	1.0000	0.0000
7	279	278	-0.360	271	270	-0.370	0.9720	0.9707	-0.0013	1.0000	0.9937	-0.0063
8	278	276	-0.725	271	269	-0.743	0.9738	0.9725	-0.0013	1.0000	0.9943	-0.0057
9	276	275	-0.364	269	268	-0.373	0.9756	0.9740	-0.0016	1.0000	1.0000	0.0000
11	271	271	0.000	265	264	-0.379	0.9770	0.9746	-0.0024	1.0000	1.0000	0.0000
13	268	267	-0.375	262	260	-0.769	0.9760	0.9734	-0.0026	1.0000	1.0000	0.0000
21	253	253	0.000	247	246	-0.407	0.9757	0.9725	-0.0032	1.0000	1.0000	0.0000
26	245	242	-1.240	239	236	-1.271	0.9757	0.9724	-0.0033	1.0000	1.0000	0.0000

Higher fertility rate (0.30)

- A.1.1.1.21 Results of the iPCoD modelling for bottlenose dolphin under the this CEA review with a 0.30 fertility rate are presented in Table A. 4 and illustrated in Figure A. 2.
- A.1.1.1.22 The impacted population in Volume 2, Chapter 4: Marine Mammals (APP-056) at time point 26 was 326 animals (eight animals less than the unimpacted scenario), whilst for the revised iPCoD model the impacted population was 320 animals (12 animals less than the unimpacted scenario), leading to a difference of six animals between the impacted population in the Environmental Statement model and the population model in this CEA review (= 2.048% of the MU). Therefore, there is a 1.875% decrease in the numbers of animals disturbed cumulatively between the Environmental Statement CEA model and this CEA review model at time point 26, when using a fertility rate of 0.30. It must be noted that the impacted (and unimpacted) bottlenose dolphin MU population has increased in size over the 25 years modelled (e.g. from 293 to 320 for the impacted population representing a 9.2% increase from the population start point).
- A.1.1.1.23 The median and mean counterfactual of population size for the Environmental Statement was 1 and 0.97, respectively, at the 26-year time point. For the population model in this CEA review, the median and mean counterfactual of population was 1 and 0.97, respectively, at the 26-year time point.
- A.1.1.1.24 Therefore, given that the differences in disturbed to undisturbed populations approach a ratio of 1 in the population modelling for this CEA review, there is not considered to be a significantly increased potential for a long-term effect upon bottlenose dolphin. The results of the population modelling for this CEA review therefore do not affect the conclusions of the assessment in Volume 2, Chapter 4: Marine Mammals (APP-056).

Environmental Statement model



Model results for the CEA review

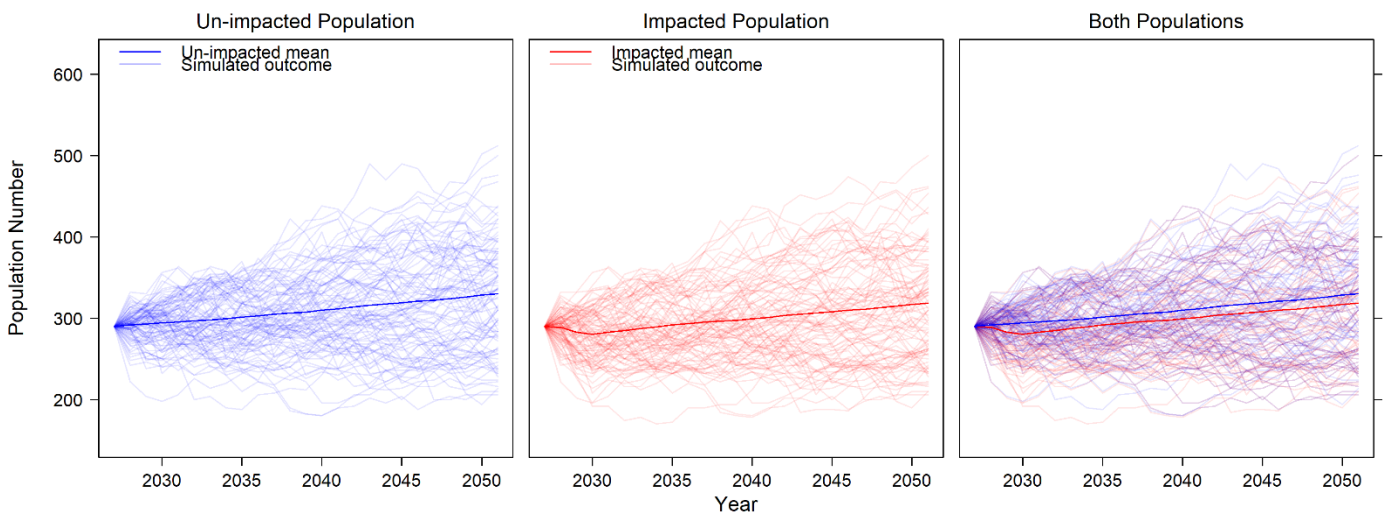


Figure A. 3: Simulated bottlenose dolphin population trajectories (fertility rate = 0.30) in un-impacted versus impacted populations, for the Environmental Statement scenario as presented in Volume 2, Chapter 4: Marine mammals (APP-056) (Top Row) versus the CEA review model (Bottom Row).

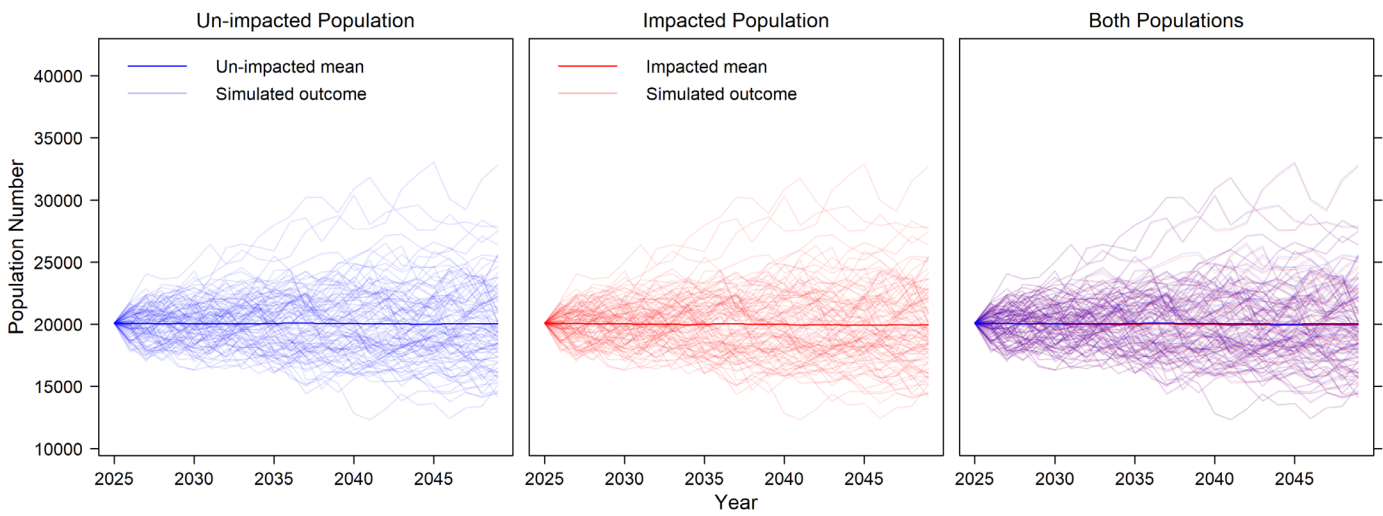
Table A. 4: Comparison of mean population estimates (fertility rate = 0.30) and mean counterfactuals of population size for bottlenose dolphin, from the original Environmental Statement (scenario BND-C2b) as presented in Volume 2, Chapter 4: Marine mammals (APP-056) and the CEA review model.

Time Point	Un-Impacted Pop Mean			Impacted Pop Mean			Mean Counterfactual			Median Counterfactual		
	ES	Review	Percent Change (%)	ES	Review	Percent Change (%)	ES	Review	Difference	ES	Review	Difference
1	290	290	0.000	290	290	0.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
2	291	292	0.342	290	289	-0.346	0.9977	0.9884	-0.0093	1.0000	1.0000	0.0000
3	293	293	0.000	286	283	-1.060	0.9759	0.9653	-0.0106	1.0000	0.9934	-0.0066
7	300	298	-0.671	292	287	-1.742	0.9715	0.9640	-0.0075	1.0000	0.9938	-0.0062
8	302	299	-1.003	294	289	-1.730	0.9737	0.9668	-0.0069	1.0000	0.9940	-0.0060
9	304	301	-0.997	296	292	-1.370	0.9758	0.9688	-0.0070	1.0000	0.9943	-0.0057
11	307	305	-0.656	300	295	-1.695	0.9768	0.9695	-0.0073	1.0000	1.0000	0.0000
13	310	308	-0.649	302	297	-1.684	0.9751	0.9674	-0.0077	1.0000	1.0000	0.0000
21	325	322	-0.932	317	311	-1.929	0.9751	0.9668	-0.0083	1.0000	1.0000	0.0000
26	334	332	-0.602	326	320	-1.875	0.9749	0.9664	-0.0085	1.0000	1.0000	0.0000

A.1.3.3 Minke whale

- A.1.1.1.25 Results of the iPCoD modelling for minke whale for this CEA review are presented in Table A. 5 and illustrated in Figure A. 4 against the original Environmental Statement scenario.
- A.1.1.1.26 The impacted population at time point 26 in Volume 2, Chapter 4: Marine Mammals (APP-056) is 19,990 animals (77 animals less than the unimpacted scenario), whilst for the revised iPCoD model the population was 19,775 animals (72 animals less than the unimpacted scenario), leading to a difference of 215 animals between the impacted population in the Environmental Statement model and population model in this CEA review (= 1.069% of the MU). Therefore, there is a 1.087% decrease in the number of animals disturbed cumulatively between the Environmental Statement CEA model and the population model in this CEA review at time point 26.
- A.1.1.1.27 The median and mean counterfactual of population size for the Environmental Statement was 0.9968 and 0.9961, respectively, at the 26-year time point. For the population model in this CEA review, the median and mean counterfactual of population was 0.9970 and 0.9964, respectively, at the 26-year time point.
- A.1.1.1.28 Therefore, given that the differences in disturbed to undisturbed populations approach a ratio of 1 in the population modelling for this CEA review, there is not considered to be a potential for a long-term effect upon minke whale. The results of the population modelling for this CEA review therefore do not affect the conclusions of the assessment in Volume 2, Chapter 4: Marine Mammals (APP-056).

Environmental Statement model



Model results for the CEA review

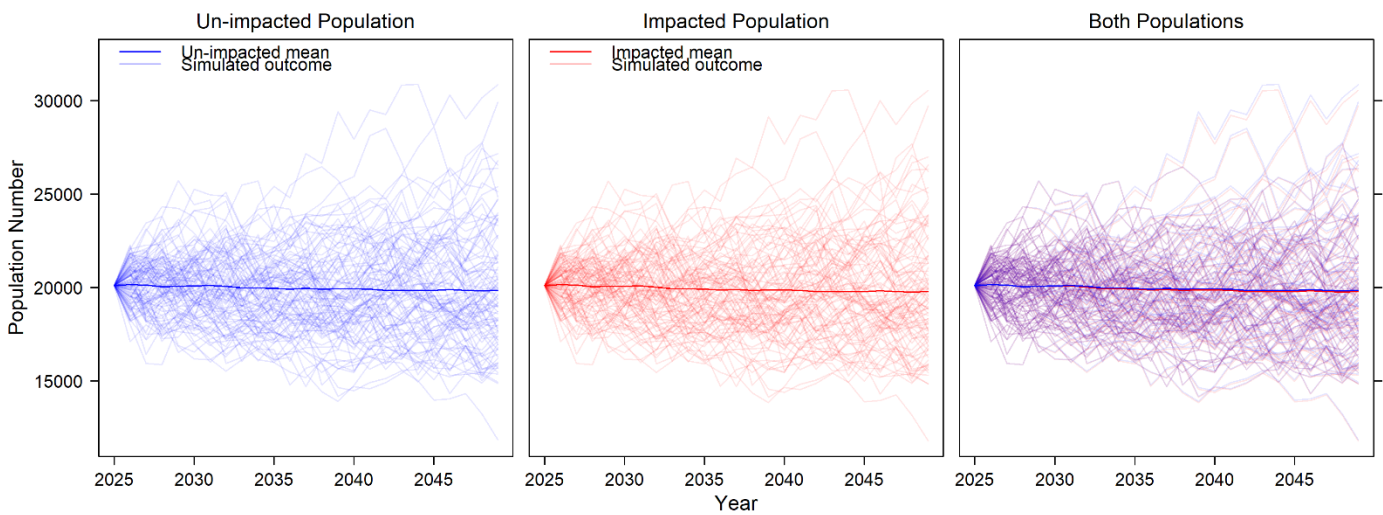


Figure A. 4: Simulated minke whale population trajectories in un-impacted versus impacted populations, for the Environmental Statement scenario as presented in Volume 2, Chapter 4: Marine mammals (APP-056) (Top Row) versus the CEA review model (Bottom Row).

Table A. 5: Comparison of mean population estimates and mean counterfactuals of population size for minke whale, from the original Environmental Statement (scenario MW-C2) as presented in Volume 2, Chapter 4: Marine mammals (APP-056) and the CEA review model.

Time point	Un-Impacted Pop Mean			Impacted Pop Mean			Mean Counterfactual			Median Counterfactual		
	ES	Review	Percent Change (%)	ES	Review	Percent Change (%)	ES	Review	Difference	ES	Review	Difference
1	20,120	20,120	0.000	20,120	20,120	0.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
3	20,060	20,144	0.417	20,060	20,144	0.417	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
4	20,040	20,059	0.095	20,037	20,056	0.095	0.9999	0.9999	-0.0000	1.0000	1.0000	0.0000
5	20,058	20,078	0.100	20,045	20,066	0.105	0.9993	0.9994	0.0001	0.9996	0.9996	0.0000
7	20,053	20,126	0.363	20,019	20,094	0.373	0.9983	0.9984	0.0001	0.9988	0.9989	0.0001
9	20,047	19,992	-0.275	20,000	19,948	-0.261	0.9976	0.9978	0.0002	0.9982	0.9984	0.0002
10	20,038	19,992	-0.230	19,986	19,943	-0.216	0.9974	0.9976	0.0002	0.998	0.9981	0.0001
11	20,063	19,973	-0.451	20,007	19,921	-0.432	0.9972	0.9974	0.0002	0.9978	0.9980	0.0002
13	20,106	19,963	-0.716	20,042	19,904	-0.693	0.9968	0.9970	0.0002	0.9975	0.9976	0.0001
15	20,089	19,950	-0.697	20,020	19,885	-0.679	0.9965	0.9968	0.0003	0.9972	0.9974	0.0002
23	20,043	19,856	-0.942	19,966	19,784	-0.920	0.9961	0.9964	0.0003	0.9968	0.9970	0.0002
26	20,067	19,847	-1.108	19,990	19,775	-1.087	0.9961	0.9964	0.0003	0.9968	0.9970	0.0002

A.1.3.4 Grey seal

A.1.1.1.29 For grey seal, iPCoD models incorporating the maximum temporal scenario and the maximum spatial scenario were based upon two reference populations: the Grey Seal Reference Population (GSRP) and the OSPAR Region III population (as described in section A.3.3 and Table A. 3 in Volume 2, Chapter 4: Marine Mammals (APP-056)).

Grey Seal Reference Population

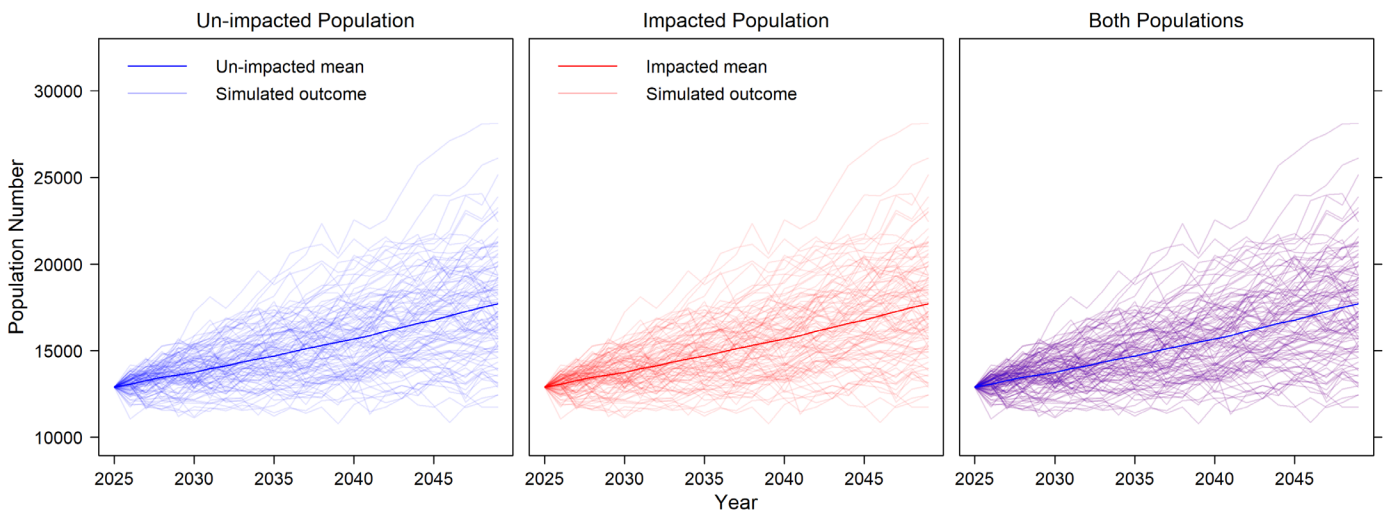
A.1.1.1.30 Results of the iPCoD modelling at the time points described for grey seal using the GSRP for this CEA review are presented in Table A. 6 and illustrated in Figure A. 5.

A.1.1.1.31 The impacted population in Volume 2, Chapter 4: Marine Mammals at time point 26 is 17,992 animals (the same as the unimpacted scenario), whilst for the revised iPCoD model the population was 18,086 animals (also the same as the unimpacted scenario), leading to a difference of 94 animals between the impacted population in the Environmental Statement model and the population model in this CEA review (= 0.15% of the MU). Therefore, there is a 0.052% decrease in the numbers of animals disturbed cumulatively between the Environmental Statement CEA model and this CEA review model at time point 26.

A.1.1.1.32 The median and mean counterfactual of population size for the Environmental Statement was 1 and 1, respectively, at the 26-year time point. For the CEA review model, the median and mean counterfactual of population was 1 and 1, respectively, at the 26-year time point.

A.1.1.1.33 Therefore, given that the differences in disturbed to undisturbed populations is a ratio of 1 in the population modelling for this CEA review, there is not considered to be a potential for a long-term effect upon grey seal. The results of the population modelling for this CEA review, therefore, do not affect the conclusions of the assessment in Volume 2, Chapter 4: Marine Mammals (APP-056).

Environmental Statement model



Model results for the CEA review

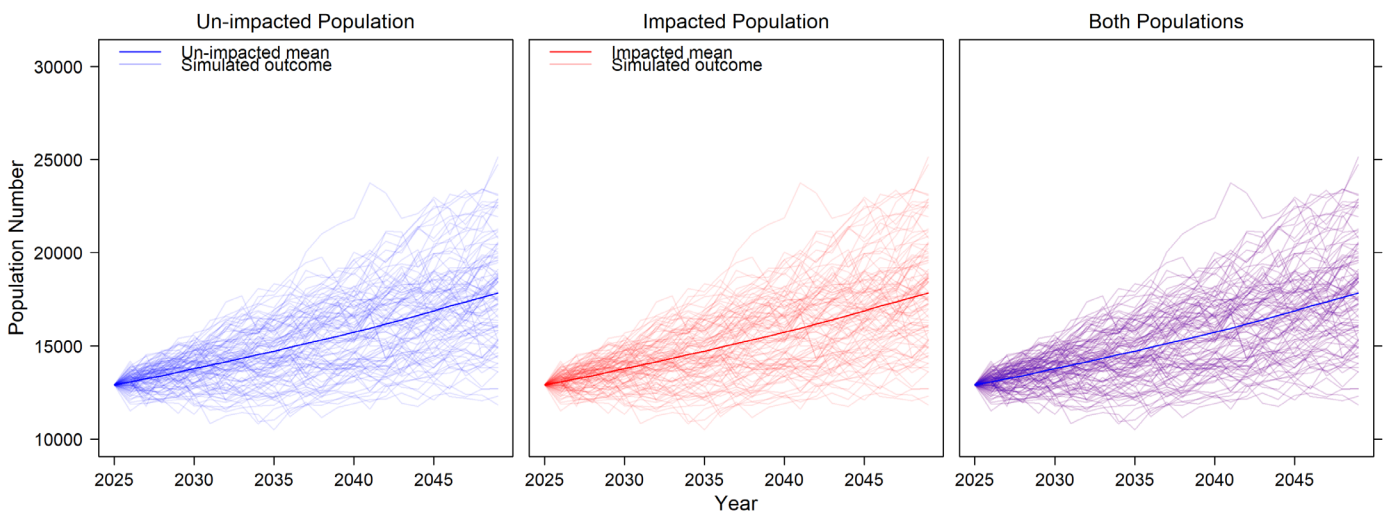


Figure A. 5: Simulated grey seal population trajectories for the GSRP in an un-impacted versus impacted population, for the Environmental Statement scenario as presented in Volume 2, Chapter 4: Marine mammals (APP-056) (Top Row) versus the CEA review model (Bottom Row).

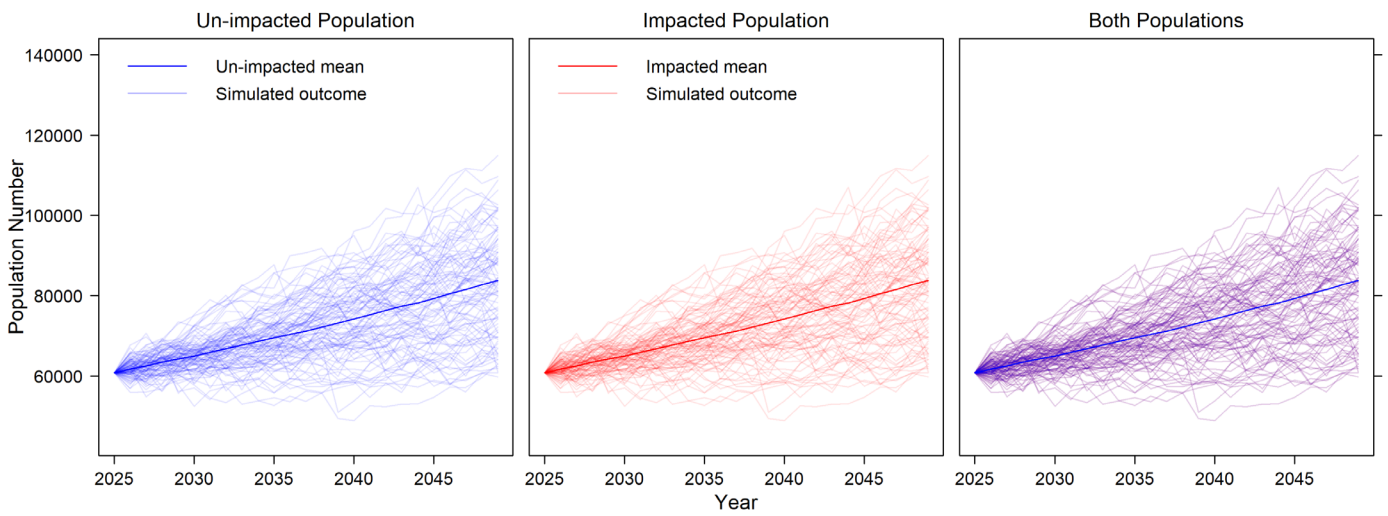
Table A. 6: Comparison of mean population estimates (GSRP) and mean counterfactuals of population size for grey seal, from the original Environmental Statement (scenario GS-C2a) as presented in Volume 2, Chapter 4: Marine mammals (APP-056) and the CEA review model.

Time point	Un-Impacted Pop Mean			Impacted Pop Mean			Mean Counterfactual			Median Counterfactual		
	ES	Review	Percent change (%)	ES	Review	Percent change (%)	ES	Review	Difference	ES	Review	Difference
1	12,908	12,908	0.000	12,908	12,908	0.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
3	13,227	13,242	0.113	13,227	13,242	0.113	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
4	13,409	13,402	-0.052	13,409	13,402	-0.052	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
5	13,596	13,584	-0.088	13,596	13,584	-0.088	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
7	13,938	13,961	0.165	13,938	13,961	0.165	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
9	14,320	14,327	0.049	14,320	14,327	0.049	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
10	14,537	14,524	-0.090	14,537	14,524	-0.090	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
11	14,739	14,701	-0.258	14,739	14,701	-0.258	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
13	15,139	15,123	-0.106	15,139	15,123	-0.106	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
15	15,559	15,521	-0.245	15,559	15,521	-0.245	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
23	17,330	17,348	0.104	17,330	17,348	0.104	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
26	17,992	18,086	0.520	17,992	18,086	0.520	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000

OSPAR Region III reference population

- A.1.1.1.34 Results of the iPCoD modelling at the time points described for grey seal using the OSPAR Region III under this CEA review are presented in Table A. 7 and illustrated in Figure A. 6.
- A.1.1.1.35 The impacted population in Volume 2, Chapter 4: Marine Mammals at time point 26 is 84,843 animals (the same as the unimpacted scenario), whilst for the revised iPCoD model the population was 84,725 animals (also the same as the unimpacted scenario), leading to a difference of 118 animals between the impacted population in the Environmental Statement model and the population model in this CEA review (= 0.194% of the MU) at time point 26. Therefore, there is a 0.139% decrease in the number of animals disturbed cumulatively between the Environmental Statement CEA model and this CEA review.
- A.1.1.1.36 The median and mean counterfactual of population size for the Environmental Statement was 1 and 1, respectively, at the 26-year time point. For the CEA review model, the median and mean counterfactual of population was 1 and 1, respectively, at the 26-year time point.
- A.1.1.1.37 Therefore, given that the differences in disturbed to undisturbed populations is a mean and median ratio of 1 in the population modelling for this CEA review, there is not considered to be a potential for a long-term effect model upon grey seal. The results of the population modelling for this CEA review, therefore, do not affect the conclusions of the assessment in Volume 2, Chapter 4: Marine Mammals (APP-056).

Environmental Statement model



Model results for the CEA review

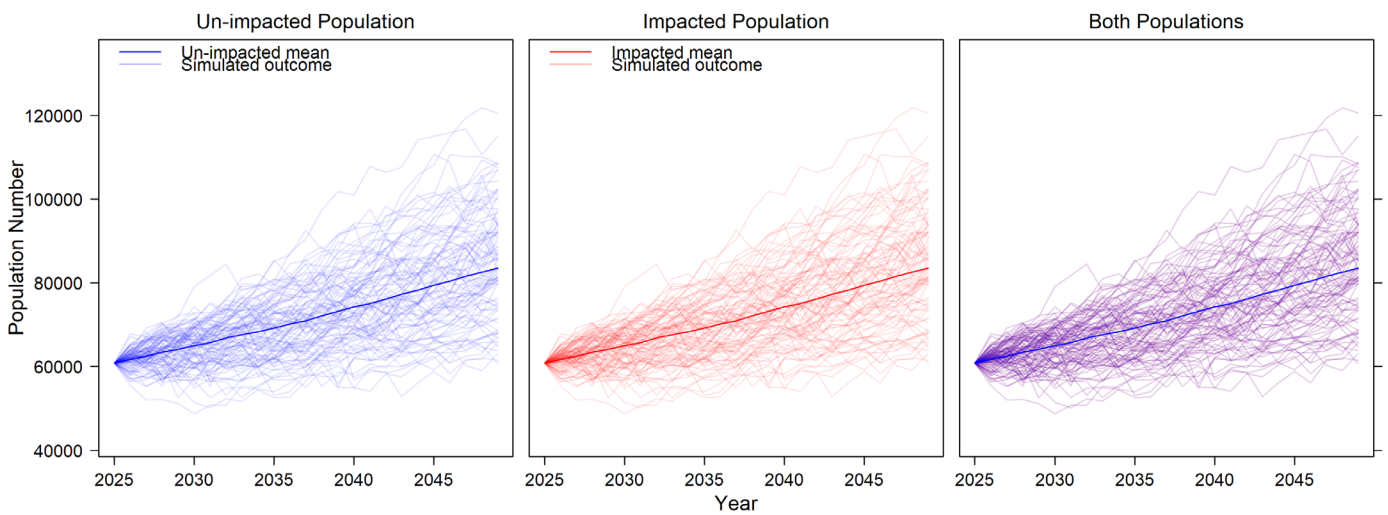


Figure A. 6: Simulated grey seal population trajectories for the OSPAR Region III reference population in an un-impacted versus impacted population, for the Environmental Statement scenario as presented in Volume 2, Chapter 4: Marine mammals (APP-056) (Top Row) versus the CEA review model (Bottom Row).

Table A. 7: Comparison of mean population estimates (OSPAR Region III) and mean counterfactuals of population size for grey seal, from the original Environmental Statement (scenario GS-C2b) as presented in Volume 2, Chapter 4: Marine mammals (APP-056) and the CEA review model.

Time point	Un-Impacted Pop Mean			Impacted Pop Mean			Mean Counterfactual			Median Counterfactual		
	ES	Review	Percent change (%)	ES	Review	Percent change (%)	ES	Review	Difference	ES	Review	Difference
1	60,780	60,780	0.000	60,780	60,780	0.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
3	62,462	62,444	-0.029	62,462	62,444	-0.029	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
4	63,395	63,409	0.022	63,395	63,409	0.022	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
5	64,193	64,139	-0.084	64,193	64,139	-0.084	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
7	65,853	65,693	-0.244	65,853	65,693	-0.244	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
9	67,688	67,632	-0.083	67,688	67,632	-0.083	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
10	68,572	68,282	-0.425	68,572	68,282	-0.425	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
11	69,482	69,235	-0.357	69,482	69,235	-0.357	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
13	71,191	70,924	-0.376	71,191	70,924	-0.376	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
15	73,189	73,167	-0.030	73,189	73,167	-0.030	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
23	81,541	81,583	0.051	81,541	81,583	0.051	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
26	84,843	84,725	-0.139	84,843	84,725	-0.139	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000

A.1.4 Summary

- A.1.1.1.38 Population modelling was undertaken using the updated project parameters and numbers of animals disturbed for the Morgan Generation Assets and Morecambe Generation Assets projects that have submitted their Environmental Statements since the Mona DCO Application.
- A.1.1.1.39 The median ratio was close to 1 for harbour porpoise (0.99), and minke whale (0.99), and 1 for bottlenose dolphin and grey seal for both the GSRP and OSPAR Region III population models. For all species, this represents a situation where the median impacted population size is very close to or is no different to the median unimpacted population size and was the same median ratio as predicted in models presented in the Environmental Statement. The mean ratio remained the same in the modelling undertaken for this CEA review as for the modelling presented in Volume 2: Chapter 4: Marine Mammals (APP-056); 0.99 for harbour porpoise and minke whale, 0.97 for bottlenose dolphin and 1 for grey seal (for both the GSRP and OSPAR Region III population models). Therefore, the conclusions in the iPCoD modelling (Appendix A) of Volume 2: Chapter 4: Marine Mammals (APP-056) (which demonstrated no long-term population level effects for any of the species assessed), remains valid based on the modelling undertaken for this CEA review.
- A.1.1.1.40 The results showed whilst more animals were disturbed at Morgan Generation Assets and Morecambe Generation Assets in the population models for this CEA review which use the numbers from respective Environmental Statements, this did not lead to increased population level impacts and therefore does not change the conclusions of the cumulative assessment presented in Volume 2, Chapter 4: Marine Mammals (APP-056).