

OWEKH

Offshore Wind Evidence + Knowledge Hub

Evidence Review Note: Environmental Impact Assessment

Evidence Review Note on the Environmental
Impact Assessment of Offshore Wind Projects

Acknowledgements

This note has been developed by OWEKH’s Impact Assessment Technical Topic Group, led by The Crown Estate and Rufus Howard of the Institute of Sustainability and Environmental Professionals (ISEP), with Secretariat support from AtkinsRéalis.

The document reflects the prevailing knowledge and evidence base at the time of publication, developed through open collaboration between practitioners, industry representatives, consultancies and technical experts. It reflects a shared understanding of current challenges and opportunities in relation to impact assessment for offshore wind.

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Author’s Note: Contributions to this document are made in a personal or professional capacity and do not imply endorsement by the contributors’ respective organisations.

About OWEKH

The Offshore Wind Evidence Knowledge Hub (OWEKH) is a centralised platform that supports evidence-based decision-making in the offshore wind sector. It brings together stakeholders to share best practice, access data, and apply learning and trusted knowledge, helping to inform development, proportionate impact assessment, policy and planning. Find out more at: www.owekh.com.

The suggested citation: OWEKH (2025) OWEKH Evidence Review Note: Environmental Impact Assessment © 2025 OWEKH. This work may be shared with attribution for non-commercial purposes under a Creative Commons BY-NC-SA license.

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Executive Summary

This Evidence Review Note (ERN) provides overarching guidance on Environmental Impact Assessment (EIA) for offshore wind development in the UK. It forms the foundation of the OWEKH ERN series, offering a consistent, strategic framework to support proportionate, transparent, and high-quality assessment practice across all environmental topics. Drawing on insights from 79 offshore windfarms (OWF) EIAs, sector guidance, and stakeholder consultation, this ERN addresses common weaknesses in current practice and proposes a shared approach to scoping, reporting, cumulative assessment, and post-consent delivery. It is designed to support developers and regulators to produce clearer, more consistent Environmental Statement (ES) to achieve more efficient consenting. This ERN identifies recurring challenges, including:

- Excessive or inconsistent scoping effort and protracted assessments
- Fragmented terminology – vague and confusing text that reduces accessibility and consistency
- Disjointed structure – incoherent or repetitive
- Disconnected strategic- and project-level assessments
- Weak tracking of mitigation delivery and post-consent commitments
- Insufficient recognition of beneficial effects and sector learning

To address these, this ERN presents nine core recommendations (**Section 5**):

1. Strategic Approach to Risk Assessment: Address key risks early through strategic planning e.g. Strategic Environmental Assessment (SEA), and potentially through a future option of Environmental Outcome Reports (EOR) to reduce uncertainty and avoid unmitigable effects at project level.

2. Address Sector-Level Evidence Gaps: Collaborate to close key data gaps in baselines, thresholds, impacts, environmental effects and monitoring, and improve integration of digital tools and shared evidence platforms. Be clear where evidence gaps mean an assessment is not possible, and where resource would be best concentrated on mitigation and monitoring.

3. Standardisation of Scoping: Adopt a consistent UK-wide scoping approach using a three-tier (A-C) framework to focus assessment on Likely Significant Effects (LSE) and reduce unnecessary effort.

4. Consistency and Clarity of Reporting: Use a standard chapter structure and consistent terminology (Annex B) to improve accessibility, comparability and clarity across the ES.

5. Proportionality of Reporting and Survey: Ensure reporting and survey effort is proportionate to risk and project design stage. Use digital tools to enhance clarity and reduce duplication (Annex B). Reference to pre-agreed ERNs may reduce volume and enhance consistency across documentation.

6. Monitoring, Verification and Enforcement: Secure mitigation through enforceable conditions and proportionate monitoring, supported by clear, standardised, post-consent plans and standardised wording (Annex C).

7. Use of Cumulative Effects Assessment: Apply consistent, proportionate cumulative effects methods, using shared baselines and supporting sector-wide meta-reviews where possible.

8. Acknowledge Beneficial Effects: Clearly identify and provide evidence of positive outcomes, such as improved data or environmental enhancements, and agree how they are reported. This could also be addressed at the strategic stage, refined at project level and incorporated into monitoring and reporting at project, regional and national level.

9. Maintain and Evolve Guidance Through Collaborative Learning: Review and update the ERNs regularly using new evidence, stakeholder input, and post-consent learning to support continuous improvement. This could, for example, be based on the best practice approach for continual improvement in ISO 9001.

This ERN does not replace topic-specific guidance, but complements it, providing a common structure and direction for all OWF EIAs. This guidance is not legal advice on EIA or advice about the application process in the UK. By implementing the recommendations, the offshore wind sector can reduce duplication, improve confidence and deliver more effective environmental decision making, while supporting the UK's transition to Net Zero.



Jason Hawkes, 2015

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Alison Pettitt/UPY 2022

List of Abbreviations and Acronyms

Acronym / Name / Abbreviation	Description
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
DCO	Development Consent Order
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EOR	Environmental Outcome Report
ERN	OWEKH Evidence Review Note
ES	Environmental Statement
GIS	Geographic Information System
HRA	Habitat Regulations Assessment (Appraisal in Scotland)
IEMA	Institute of Environmental Management and Assessment
IEP	Industry Evidence Programme
ISEP	Institute of Sustainability and Environmental Professionals (formerly IEMA)
LPA	Local Planning Authority
MMO	Marine Management Organisation
NGO	Non-Governmental Organisation
NTS	Non-Technical Summary
oCEMP	Outline Construction Environmental Management Plan
oEMP	Outline Environmental Management Plan
OWF	Offshore Wind Farm
OWEKH	Offshore Wind Evidence and Knowledge Hub
PEIR	Preliminary Environmental Information Report
SEA	Strategic Environmental Assessment

1. Introduction

1.1 Overview of OWEKH

The Offshore Wind Evidence and Knowledge Hub (OWEKH) has a mission to facilitate and streamline the consenting process for the offshore wind sector through a comprehensive, sector-wide online portal. This portal (owekh.com) offers a unified access point for critical data and information, including the latest guidance and best practice documents. Supported by a network of key stakeholders, including regulators, government departments, industry and practitioners, the portal fosters collaboration and data sharing across the offshore wind sector.

OWEKH is sponsored by The Crown Estate and supported by:

- Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland
- Department for Energy Security and Net Zero (DESNZ)
- Department for Environment, Food & Rural Affairs (DEFRA)
- The Institute of Sustainability and Environmental Professionals (ISEP)
- Natural Resources Wales (NRW)
- Marine Management Organisation (MMO)
- Offshore Wind Evidence and Change (OWEC) Programme
- Offshore Wind Industry Council (OWIC)
- Planning Inspectorate (Observer)
- Welsh Government

The portal's data component provides access to a diverse range of datasets from public, private, and non-governmental organisation (NGO) sources, all relevant to OWF development. Meanwhile, the knowledge component analyses this data to generate evidence-based insights and guidance.

By consulting with key regulators and statutory bodies, OWEKH ensures that these insights are translated into high-quality and actionable Evidence Review Notes (ERNs). ERNs aim to bring consistency, efficiency, and standardisation to the assessment, planning and development of OWF projects.

An evidence-led approach supports impact assessments and informs consenting decisions by offering clear and consistent guidance which can be easily and widely disseminated to interested parties. OWEKH's efforts are designed to accelerate the sustainable growth of offshore wind energy, aligning with the UK government's Net Zero energy generation objectives. This may also link to emerging requirements of Environmental Outcome Reports (EOR).

This Evidence Review Note (ERN) is intended as a referenceable best practice guide which distils key insights from a review of Environmental Statements/Reports, submitted for offshore wind projects. It is intended to support strategic decision-making across the sector—by regulators, developers, consultants, and advisors—through the identification of common assessment practices, recurring challenges, and evidence gaps.

The findings are designed to inform more consistent and effective environmental assessments and to guide future planning and engagement. This document should be used alongside project-specific evidence and expert input.

1.2 Introduction of OWEKH ERNs

The OWEKH ERN concept has been designed to enhance the Environmental Impact Assessment (EIA) process for OWF projects. As part of ongoing initiatives to improve consenting and EIA practices, the ERN concept aims to address challenges identified across the offshore wind sector, including methodological issues, scoping inconsistencies, increasing length of reports and gaps in coordination and consultation. These challenges, highlighted during multiple stakeholder consultations, underscore the need for a more systematic and evidence-based approach to EIA.

Based on the Industry Evidence Programme¹ (IEP) pilot and subsequent discussions with key stakeholders (**Section 6**), there is wide agreement that current EIA practices can be significantly improved. There is a consensus that more strategic, coordinated efforts are necessary to advance the practice of EIA, ensuring it is both effective and efficient. However, translating these improvements into actionable steps requires robust evidence and thorough scrutiny to secure acceptance from all stakeholders, and to produce recommendations that are widely endorsed and – more importantly – applied in practice.

An ERN serves as a platform to address these needs by providing a standardised analysis of existing data, identifying key findings, and offering actionable insights. ERNs focus on several key areas:

Evidence-Based Practice:

Drawing on EIA findings from 79 previous offshore wind projects – alongside decision notices, monitoring data, and the latest published research – this ERN clarifies key environmental impacts, highlights established mitigation measures and outlines standard commitments developed over 25 years of UK sector experience.

Proportionate Scoping:

Using the evidence-based analysis, ERNs provide advice on the scoping of EIAs to ensure focus is placed on identifying and mitigating impacts that are likely to result in significant adverse effects.

Avoiding Duplication of Effort:

ERNs emphasise the importance of building on existing protocols and procedures, learning from previous practice and recognising the effort that went into agreeing previous conditions, requirements and mitigations, thereby avoiding unnecessary work within the EIA process.

Standardisation and Consistency:

Many impacts are similar across projects, however, the language used to describe impacts, mitigation and commitments can vary between projects. This is unhelpful for stakeholders, regulators, contractors and the public, in understanding and implementing recommendations. By providing suggested common language, ERNs can bring greater clarity and uniformity to assessment and mitigation.

Stakeholder Agreement:

A major source of delays is often reaching an agreement on methods, impacts, mitigations and appropriate conditions and requirements with key stakeholders, statutory consultees and regulators. By providing a central, frequently updated and reliable source of evidence, ERNs have already consulted with key stakeholders and have been accepted as good practice. Developers that follow the ERN can be

confident that the advice followed already has acceptance from key stakeholders, reducing the potential for conflict, delays and disagreements during the EIA and decision-making process.

Collaboration and Consensus:

Each ERN is a carefully crafted document that brings together data and insights from various sources, and crucially, involves experts from public, private and NGO sectors to ensure key stakeholders' views are included. By developing a consensus, an ERN serves not only as a reference, but also as a guide for implementing more consistent, efficient, standardised and robust EIA practices across the offshore wind sector. By fostering a shared understanding and approach, the ERN aims to support a more streamlined consenting processes, ultimately contributing to the sustainable growth of offshore wind energy in alignment with national environmental objectives.

Continuous Improvement

By establishing ERNs, lessons learned from each subsequent EIA can be documented and carried forward into the next round of EIAs. As consultants and regulatory reviewers are based in project teams, this helps to ensure consistency across individuals and organisations. Continuous improvement will align with best practice standards for quality such as ISO 9001.

1.3 Introduction to the EIA ERN

This ERN provides the overarching guidance on the structure and principles of EIA assessment and reporting across all OWF topics. Topic-specific ERNs provide further detail on specific technical areas.

- Section 1:** Introduces OWEKH and the ERN concept.
- Section 2:** A summary of the key evidence that has been reviewed to inform recommendations.
- Section 3:** Key recommendations and guidance for future projects.
- Section 4:** Calls for further research and evidence gaps.
- Section 5:** A summary of the key recommendations.
- Section 6:** Members of the Technical Topic Group, who have contributed to the creation of the ERN.
- Section 7:** Key references and recommended further reading.
- Annex A:** OWF projects that have published EIAs.
- Annex B:** Guidance on writing an Environmental Statement (ES) and Environmental Report.
- Annex C:** Recommended standard wording for mitigations for outline Construction Environmental Management Plans (oCEMP), commitment registers, conditions and requirements.

2. Review of Evidence

2.1 Purpose of Evidence Review

The key focus of the evidence review for each topic-specific ERN is to:

- Identify impacts² and effects of negligible concern.
- Identify impacts with established mitigations that reliably reduce the significance of effects.
- Identify impacts with likelihood of any significant adverse or beneficial effects.
- Document areas and issues of agreed common ground.
- Document standardised templates for conditions, requirements and commitments.
- Document standardised monitoring for impacts and use of adaptive monitoring.

The findings from the evidence review are then used to develop recommendations within each ERN which aim to:

- Reduce costs and consenting timescales for developers, regulators and stakeholders.
- Provide greater legal and scientific certainty for all stakeholders.
- Contribute to accelerating and de-risking consenting for developers of projects.
- Establish knowledge gaps to direct further research.

2.2 Methodology

This overarching ERN on EIA differs slightly from topic-specific ERNs in that it looks at generic or cross-cutting issues that apply to all chapters within an ES/EIA Report, in addition to covering advice on the non-technical chapters within an ES/EIA Report, such as EIA methodology, policy, project description and non-technical summary.

This ERN follows a three-part structure:

- A review of 79 previous reports³ undertaken as part of the EIA process for UK OWF farms over 25 years.
- A review of any other key reports or research related to the impact assessment of OWF farms, for example, decision notices, monitoring reports, academic and industry research, government and stakeholder guidance.
- Stakeholder engagement with leading experts, consultees and regulators of offshore wind.

Where documents have been referenced, the aim is to ensure these are available and accessible within OWEKH.

All OWEKH ERNs are live documents and will be updated at regular intervals as new evidence becomes available. Existing recommendations will be reviewed, and superseded versions will be archived as appropriate. For example, recommendations in Categories A-C (**Section 3.1.1**) may change as new policy drivers and evidence bases come into effect.

² In all cases, impacts can mean aspects of impacts, or particular matters.

³ Environmental Statements (England, Wales and Northern Ireland) and EIA Reports (Scotland).

2.3 Summary of EIA Review

EIA is a globally recognised process used in more than 100 countries to support sustainable development and good design. It helps identify the likely significant environmental and social effects of major developments, allowing project development to avoid negative environmental effects, deliver early mitigation of adverse effects and maximise benefits.

In the UK, EIA is a legal requirement for OSW projects and is underpinned by national and international policy frameworks. It supports informed consent decisions by evaluating project effects across all stages, from design to decommissioning, and presenting these in a publicly accessible report (ES or EIA).

EIA is a vital design tool. By identifying opportunities for environmental improvements and embedding mitigation into early project stages, EIA enables the avoidance and reduction of potential environmental harm and helps developers build in opportunities for environmental and community benefit. It also facilitates meaningful engagement by presenting clear, evidence-based information to decision-makers and stakeholders.

To be effective, EIA must be based on robust, proportionate, and transparent assessment methods. As set out in the IEMA Proportionate EIA Strategy⁴ and the Industry Evidence Programme⁵, streamlining assessment through better use of existing evidence and consistent good practice helps to reduce duplication, focus on key issues, and deliver higher-quality outcomes. This ERN provides practical guidance derived from lessons learned and opportunities for improvement identified in EIA practice over the past 79 EIA OWF projects. It utilises monitoring data and evidence to close the loop between realised environmental effects on existing projects and EIA scoping for future projects.

2.3.1 Assessment of Environmental Factors (Offshore)

EIA Regulations across the UK jurisdictions require that all likely significant effects of a proposed development on the environment are identified, described, and assessed. For OWF projects, this includes both direct and indirect effects throughout the project lifecycle, from construction through to operation and decommissioning. The EIA must cover the factors set out in the respective national EIA regulations, typically including:

- **Population and human health:** Impacts may relate to socioeconomic factors such as employment, coastal communities, marine users (e.g. fisheries and shipping), recreation and potential health effects from underwater noise.
- **Biodiversity, with particular attention to species and habitats protected under national and international legislation:** This includes marine mammals, seabirds, benthic habitats, and migratory species affected by disturbance or displacement (e.g. from underwater noise, habitat loss, or collision risks).
- **Land, soil, water, air, and climate:** OWF may influence seabed sediment transport and water quality (e.g. during construction) and positively contribute to climate mitigation through renewable energy generation.

⁴ IEMA (2017) Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice.

⁵ IEMA, TCE, RHDHV (2018) Industry Evidence Programme Offshore Wind Farms - Pilot Industry Evidence Base.

- **Material assets, cultural heritage and the landscape:** This includes physical and visual impacts on known and potential heritage assets, historic seascapes and setting. The consideration of listed wrecks, submerged landscapes, and the character of seascapes are typically included.
- **The interaction between the above factors:** The assessment should consider how multiple environmental factors combine or interact, such as how underwater noise might impact biodiversity and commercial fisheries.

These factors must be assessed individually and cumulatively, considering other existing and planned projects. The objective is to support informed decision-making, enable the early identification of significant adverse effects and embed mitigation measures into design and delivery.

As the OWF sector matures after 25 years of operation in the UK, it is important to reflect on the unanticipated environmental effects (often due to unforeseen activity during the operational period or having a longer timeseries of monitoring data) and ensure these are incorporated into a full lifecycle review. This is particularly important as many sites reach the end of operational life and asset owners consider repowering or decommissioning.

2.3.2 Analysis of EIA Data and Reports

The Industry Evidence Programme (IEP)⁶ undertook a review of OWF impact assessment up to 2018, to develop an evidence base to drive proportionate impact assessment in the sector. As part of this study, the ES for 50 different wind farms were reviewed, and consultation held with key stakeholders in the industry⁷. In 2024-2025 the IEP review was updated to include an additional 29 EIAs for OWF developed since the IEP review was undertaken, and included as part of the evidence review to support the drafting of this OWEKH ERN.

The methodology was based on a review of ES. It identified and aggregated the findings to establish trends in impact identification, mitigation and monitoring. Further work was undertaken to review decision notices to assess conditions and requirements imposed in consenting decisions. Where possible, post-consent monitoring reports were used to further inform implementation and post-implementation of mitigations, requirements and conditions. The results of these analyses are contained within the respective topic-specific ERNs.

Effectiveness of Mitigation in Reducing Significance of Effect

Before discussing the data as presented in the graphs below, it is important to clarify some points regarding the methodology. The approach taken by each ES to present impact significance, is particularly important when looking at the summary numbers below. On first inspection it may appear that the raw counts of impact increase from pre-mitigation to post-mitigation data. In fact, this is an artefact of the approach taken, particularly with Round 3 projects onwards. In these projects, many assessors have considered it unnecessary to present unmitigated impacts, when mitigation will clearly be mandated as part of Marine Licence conditions. While it should be remembered that the ES data derives from assessments written by different authors with varying methods, the overall trend of the data on predicted impacts can be seen in the following graphs.

⁶ IEMA, TCE, RHDHV (2018) Industry Evidence Programme Offshore Wind Farms - Pilot Industry Evidence Base.

⁷ Ibid.

Figure 1: Pre-mitigation impacts reporting in 50 OWF EIAs, 2003-2017

Pre-Mitigation Impacts (IEP 50)

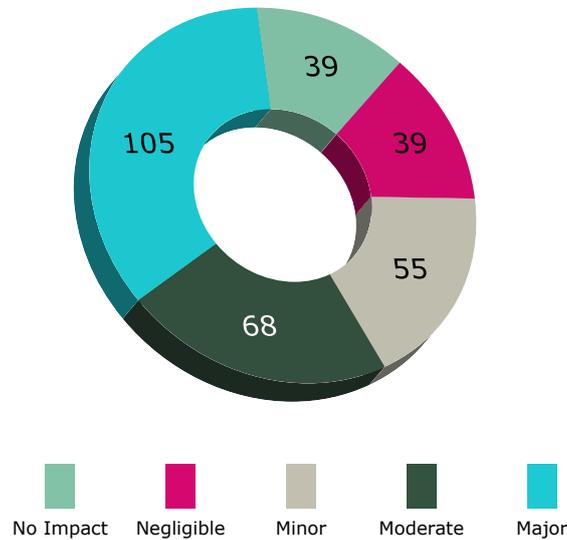
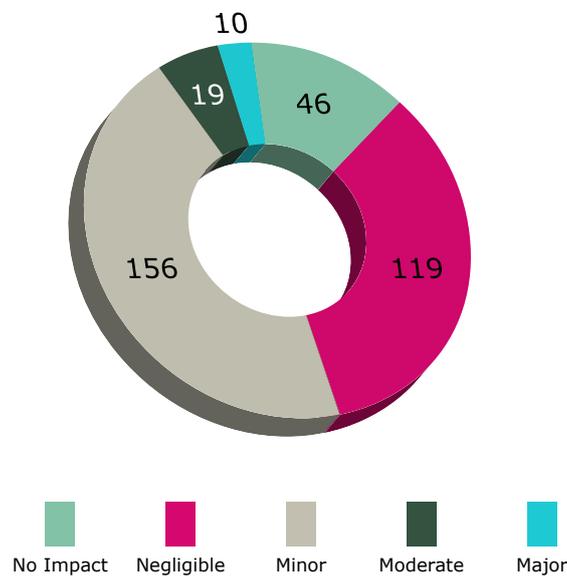


Figure 2: Post-mitigation impacts reporting in 50 OWF EIAs, 2003-2017

Post-Mitigation Impacts (IEP 50)



As shown by Figures 1 and 2 above, from the IEP data, the application of mitigation reduced the total number of major adverse impacts from 105 to 10 – more than 90% – and a reduction of moderate adverse impacts from 68 to 19 – a reduction of over 70%. This indicates that a range of mitigation techniques had become established and were being used to reliably reduce the predicted significance of the impacts.

The following two figures present the equivalent data from more recent projects.

Figure 3: Pre-mitigation impacts reporting in 26 OWF EIAs, 2017-2024

Pre-Mitigation Impacts (Post IEP 26)

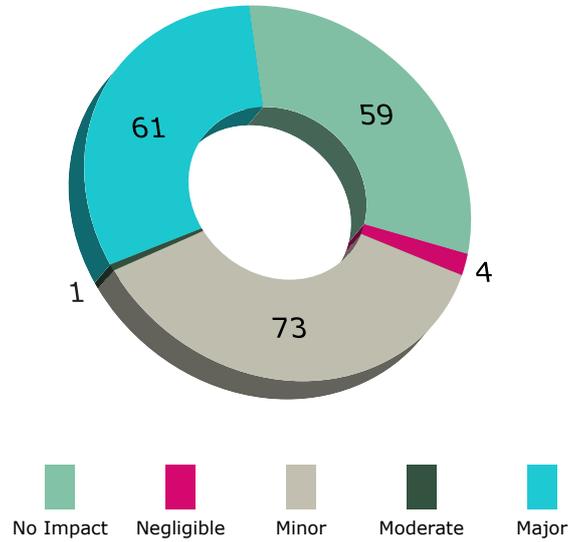
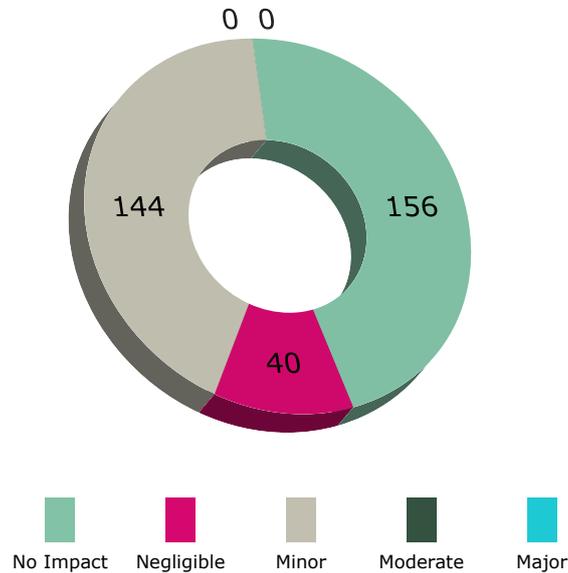


Figure 4: Post-mitigation impacts reporting in 26 OWF EIAs, 2017-2024

Post-Mitigation Impacts (Post IEP 26)



As shown in figures 3 and 4, this earlier trend is even more pronounced in the new data from 2017-2024 with moderate and major impacts being reduced from 62 to 0 between pre- and post-mitigation – a 100% reduction.

This indicates that mitigation measures are now sufficiently established. The most recent 26 OWF EIAs have not reported a single significant adverse effect since mitigation has been put in place and secured by conditions, commitments and requirements.

Combining the data for all published OWF EIAs between 2003 and 2024 (a total of 76 projects) shows a reduction in pre- and post-mitigation of moderate effects from 69 to 19 – over 70%. Major effects were reduced from 166 to 10 – a reduction of 94%. This data included results from OWF projects that were abandoned or refused.

The full data set includes smaller and demonstrator wind farms from round 1 and 2 (as well as refused and withdrawn consent applications for OWF farms)⁸ where there was historically less assessment and more uncertainty. The data from figures 3 and 4 are more likely to represent an accurate picture of current practice, assessment methods, mitigation and project design. Recommendations are therefore weighted towards more recent evidence and practice from 2017- 2024.

2.3.3 Additional Evidence

ERNs are designed to be live documents, with periodic and iterative updates as new information, data, research and good practice emerges. Therefore, in addition to EIAs, the ongoing review of evidence will also consider any reports and data arising from the decision notices, published monitoring reports and monitoring reviews, academic research, government and non-governmental guidance (**Section 6**).

2.3.4 Expert Stakeholder Input

In addition to documentary sources, the review includes stakeholder feedback from workshops, questionnaires, individual and organisational submissions of evidence and expert opinion through the Technical Topic Group.



Kirsty Andrews/UPY 2022

3. Guidance for OWF EIA

3.1 EIA Scoping

EIA is a vital tool to support sustainable development by identifying, assessing and mitigating the significant adverse effects of infrastructure projects. However, in recent years the effectiveness of EIA has been undermined by a growing trend towards disproportionate assessment, marked by overly broad scopes, excessive data collection and voluminous ES or EIA reports that obscure key findings.

Based on stakeholder consultation and reviews undertaken by IEMA⁹, a primary root cause of this issue lies in ineffective scoping – the process intended to focus assessment on likely significant effects. In practice, scoping can be undermined by risk aversion, poor planning and commercial pressures that encourage the inclusion of all possible topics, ‘just in case’. This results in EIA reports that are lengthy, repetitive and difficult for decision-makers and stakeholders to navigate.

Focusing on proportionality means:

- Prioritising the assessment of topics where previous projects have confirmed that significant effects are likely.
- Avoiding duplication by referencing existing data and established protocols.
- Using scoping as a strategic tool to streamline EIA and improve clarity.

By delivering more proportionate assessments, the offshore wind sector can reduce costs, accelerate consenting, improve transparency and reinforce public understanding and trust, while maintaining robust environmental protection. Getting scoping right is the first and most critical step to achieving this goal¹⁰.

3.1.1 Developing OWF Scoping Advice

In each of the OWEKH topic-specific ERNs, **Section 3** provides structured guidance to improve the consistency, clarity and proportionality of EIA for OWF. A central component of this guidance is the development of a standardised scoping framework, set out in **Section 3.1** of each ERN.

To address longstanding concerns about ineffective and overly precautionary scoping, the OWEKH ERNs have a three-category system (A-C). Notably, the references A, B, and C are for the purposes of distinguishing categories only; they are not intended for coding. These categorisations serve as a tool to encourage focus on the key areas, rather than being definitive labels. They are not intended to be referenced as specific categories used in the presentation of impacts, but rather to support clarity and structure during analysis. This classification provides a transparent, evidence-based rationale for determining the appropriate scope of assessment for each topic:

- **Category A – Impacts likely to result in significant adverse effects and where mitigation is unavailable, or its effectiveness is unreliable or uncertain:** these must be assessed in detail in the EIA.
- **Category B – Impacts unlikely to be significant if standard mitigation is committed to:** these can be streamlined in the scoping report, provided clear commitments are made and secured.
- **Category C – Impacts unlikely to be significant even without specific mitigation:** these should be scoped out of detailed assessment but clearly acknowledged in the scoping report, with presentation of the pertinent evidence base.

⁹ See IEMA publications such as ‘State of EIA’ (2012), ‘Proportionate EIA Strategy’ (2017), ‘IEP’ (2018).

¹⁰ Effective EIA scoping <https://www.isepglobal.org/articles/effective-eia-scoping>.

Each ERN provides supporting scoping tables that identify the typical impact pathways, outline the evidence base and define the conditions under which an impact can reasonably be scoped out or scoped down. This structure enables developers, regulators, and consultees to focus their time and resources on the issues that matter most: those with the potential to generate significant environmental effects.

This approach draws directly on the findings of the IEP and the analysis of 79 OWF EIAs, as well as input from expert stakeholders. It builds on IEMA's Proportionate EIA Strategy¹¹ and seeks to embed a shared understanding of good scoping practice across the sector.

By applying this method consistently, we aim to reduce unnecessary assessment effort, improve the accessibility of the ES, and provide a clear audit trail for decision-makers and stakeholders.

For the purpose of the tables in each ERN we use the following standardised language:

Aspect: The factor¹² (i.e. cultural heritage, biodiversity, human health) that may be impacted by direct and indirect significant effects of the OWF.

Impact: A potential change brought about by the proposals. An impact can be broad or specific, for example, it could be on a setting of a broad landscape, or a single tree. It can be adverse or beneficial.

Effect: The assessment of the consequence of an impact on a receptor. It should take the context into account, including the characteristics of the impact (i.e. duration, magnitude, reversibility, certainty, direct, indirect, cumulative, transboundary, etc.), the presence and nature of receptors (i.e. sensitivity, importance, rarity, legal protection, etc.) and any other factors or considerations (i.e. if the effect is beneficial or adverse for the receptor).

In terms of EIA terminology, the following terms have specific meanings:

Matter: A subdivision of an aspect, such as a specific impact on a receptor during a particular phase of development.

Mitigation Hierarchy¹³: All ERN tables have been developed following the mitigation hierarchy as advocated by IEMA and other impact assessment institutions. The mitigation hierarchy is a systematic approach used to minimise the adverse effects of a project or scheme on the environment and people. It is a series of steps or principles to guide decision-making and prioritise activity. The hierarchy goes through four stages, with the most desirable first: avoid, prevent, reduce and, finally, offset. The hierarchy indicates that avoidance is the priority, and offsetting must only be a last resort.

Outline Construction Environmental Management Plan (oCEMP): A document included at the pre-consent stage of an application which sets out the responsibilities and environmental standards with which the planning applicant (and any contractors) will comply. An oCEMP serves as a commitment, a framework and baseline from which the final Construction Environmental Management Plan (CEMP) will be developed, post-consent, in line with the mitigation required to manage impacts to the assessed level.

¹¹ IEMA (2017) [Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice](#).

¹² Factors are listed in most EIA regulations. For example, in: [The Infrastructure Planning \(Environmental Impact Assessment\) Regulations 2017 \(legislation.gov.uk\)](#).

¹³ See Figure 1 in Section 3.6.1.

Phase: The phase of a project lifecycle. Typically divided into construction, operation and decommissioning phases to differentiate the changing impacts of a project across the phases.

Receptor: A receptor refers to something that is being impacted. It is a broad category which can include humans, species, receiving environments and resources, as well as specific entities, locations or assets.

Significance: A binary determination of whether an effect on a receptor is substantial and material, taking into account the context of the impact, receptor and effect(s) identified, based on a scale of impact and a threshold of significance.

In terms of topic-specific impact assessment terminology, where technical terms also have specific meanings, these are set out in further detail in each corresponding ERN.

3.1.2 ERN Scoping Tables

Table 1 sets out templates that are used for identifying Category A impacts of OWF likely to have significant adverse effects. These impacts must follow the mitigation hierarchy, be carefully managed and are best avoided through project location siting and design¹⁴. The consideration of alternatives and design process should apply the mitigation hierarchy to avoid the impacts listed in Table 1. Where a project proceeds with Category A impacts this is likely to result in significant adverse effects, most likely to be contested by key stakeholders, and become a material consideration for decision-makers.

Table 1: Category A Impacts

Ref	Impact	Information to Support Scoping		
		Rationale	Advice and Evidence for scoping	Commitment required

Table 2 sets out the Category B impacts of OWF with potential to have significant adverse effects if mitigation is not applied. These impacts must be carefully managed following the mitigation hierarchy. With mitigations in place and appropriately secured through conditions, requirements and commitments, any residual effects ought to be reduced below a level where they would be considered to be significant adverse effects. Similarly, early engagement with Natural England is encouraged for projects within English, waters as laid out in Phase II of the Best Practice Advice for Offshore Wind Applications¹⁵.

¹⁴ IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction.

¹⁵ Environmental considerations for offshore wind and cable projects: <https://defra.sharepoint.com/sites/WorkDelivery2512/SitePages/Home.aspx>.

Table 2: Category B Impacts

Ref	Impact	Information to Support Scoping		
		Rationale	Advice and Evidence for scoping	Commitment required (and control)

Table 3 sets out other aspects of OWF where there is clear evidence to support the rationale that the aspect will have no, or negligible, impact and will not lead to any significant adverse effects. These impacts should be scoped out of the assessment to reduce unnecessary assessment time and cost for all parties.

Table 3: Category C Impacts

Ref	Impact	Information to Support Scoping	
		Rationale	Advice and Evidence for scoping

As set out in tables 1-3, improving scoping is key to efficient and proportionate assessment and reporting. The central role of scoping in delivering proportionate EIA is clearly advocated in the IEMA Proportionate EIA Strategy¹⁶. Ultimately, it will be necessary to put greater focus on providing evidence and early stakeholder engagement earlier on in the scoping process to provide sufficient confidence that the EIA scope can be more streamlined. In Scotland, the Marine Directorate emphasises the importance of early pre-application meetings and a scoping workshop as part of its guidance on marine licensing and consenting requirements for offshore renewable energy projects¹⁷.

Recommendation: Standardisation of Scoping

A consistent UK-wide approach to scoping is adopted across all OWF ES/ EIARs. This could be based on the scoping framework set out in tables 1–3 of each topic-specific ERN, using the three-tiered classification (categories A–C) to improve transparency and efficiency for all stakeholders.

¹⁶ IEMA (2017) Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice.

¹⁷ www.gov.scot/publications/marine-licensing-and-consenting-offshore-renewable-energy-projects.

3.2 Consistency and Clarity of EIA Reporting

The review of 79 OWF EIAs highlights significant variations in how environmental impacts are reported, both in chapter structure and the terminology used to describe impacts, effects, and mitigation. This variation can increase the burden on reviewers, hinder transparency, and undermine public engagement. To address this, OWEKH recommends a standardised chapter structure for all technical topic chapters, outlined in **Annex B**, and used consistently across all topic-specific ERNs. This structure improves usability for stakeholders, regulators and the public.

3.2.1 Chapter Structure and Accessibility

Each technical chapter should follow a 12-section format (see **Annex B**), beginning with a clear summary of likely significant effects and concluding with a schedule of topic-specific commitments. This format ensures that critical information is accessible, comparable and traceable throughout the consenting process.

1. Introduction
2. Policy and Legislative Framework
3. Study Area and Scope of Assessment
4. Consultation
5. Assessment Methodology
6. Baseline Environment
7. Design Parameters and Maximum Design Scenario (MDS), including embedded mitigation
8. Assessment of Effects
9. Additional Assessments
10. Mitigation and Enhancement Measures
11. Residual Effects and Monitoring
12. Summary of Commitments

3.2.2 Clarity of Impact Reporting

Further to the inconsistency in chapter structures across OWF EIAs, inconsistent terminology and impact classification practices have emerged as a major source of confusion, for decision-makers, consultees, and the public. Through a process of engagement with stakeholders and the drafting of ERNs, the following issues have been identified:

- Projects use differing scales to describe effect levels (*e.g. negligible, minor, moderate, major*) with no common threshold for what constitutes a 'significant effect'.
- Some topics (*e.g. radar, shipping*) tend to apply a binary approach to significance (*yes/no*), whereas others (*e.g. seascape, heritage*) sometimes present a graduated 'spectrum of significance', which can blur regulatory clarity.
- Terminology such as *impact vs effect*, or *sensitivity vs importance* is used inconsistently, even within single ES.
- Clarification and definition of timescales (*e.g. temporary, long-term, and permanent*) recognising that this may differ across receptors.

Such inconsistencies:

- Increase the risk of legal challenge.
- Obscure material findings in lengthy reports.
- Erode stakeholder trust.

A good example of inconsistent terminology in EIA practice across the UK is the various terms used to describe the document that collates all proposed mitigation and monitoring measures. In England and Wales, particularly for Development Consent Orders (DCOs) for offshore wind under the Planning Act 2008, this is often called a *Commitments Register* or *Register of Environmental Commitments*. More generally, under Town and Country Planning Act applications, practitioners may refer to a *Schedule of Mitigation* or *Mitigation Schedule*. In Scotland, the terms *Schedule of Mitigation* and *Mitigation and Monitoring Schedule (MMS)* are commonly used, while in Northern Ireland, *Schedule of Mitigation* and *Environmental Commitments Register* are both seen in practice. Although these documents serve the same essential purpose, i.e. providing a clear record of how environmental effects will be controlled, the diversity of terminology can lead to confusion among consultees and decision-makers.

Adopting a single, consistent term across the UK's EIA regimes, such as *Mitigation and Monitoring Schedule*, would offer clear advantages. It would improve understanding among stakeholders, streamline review processes, and reduce ambiguity when projects cross administrative boundaries or when consultants work in multiple jurisdictions. A standard term could also enhance onward communication post-consent to contractors and third parties, as well as allowing standard referencing in requirements and conditions. A standard term would also help further embed good practice by reinforcing the principle that mitigation measures must be systematically recorded, secured and monitored, regardless of consenting regime. Consistency in terminology ultimately supports transparency and strengthens confidence in the UK's EIA processes.

Clear distinction in the presentation of information specifically for the purposes of Habitat Regulation Assessment can be beneficial and support the correct use of similar terminology in the correct context. For example, in the context of a Habitats Regulations Assessment (HRA), the term 'likely significant effects' refers to a critical screening test used to determine whether a proposed plan or project could potentially impact a protected European site (such as SACs, SPAs, or Ramsar sites) in a way that might compromise its conservation objectives (no consideration of mitigation). In the context of an EIA, 'likely significant effects' refers to the likelihood that impacts will have a notable influence on the environment due to the nature, scale or duration of a proposed development. In EIA, 'likely significant effects' is a broader concept used to determine whether a project needs a comprehensive environmental review, allowing for mitigation to be considered early.

OWEKH recommends the following principles for consistent and clear impact reporting:

- **Distinguish 'impact' from 'effect':** Use impact to describe the action or change (e.g. turbine noise) and effect for the consequence on a receptor (e.g. disturbance to marine mammals).
- **Treat 'significance' as a binary outcome:** An effect is either significant in EIA terms (i.e. material to the decision) or it is not. Determining significance often involves expert judgment, informed by context, evidence and professional standards. Use other language (e.g. level of effect) to describe gradations of magnitude.

- **Apply consistent thresholds:** Where topic-specific significance criteria exist (e.g. MOD radar line-of-sight, shipping proximity, noise thresholds in SACs) they should be transparently stated and, where possible, standardised across the sector.
- **Respect topic-specific terminology:** For example, seascape and heritage assessments may reference setting, character, or substantial harm. These must be clearly cross-referenced to the EIA significance test to avoid conflation.
- **Avoid jargon:** Write for a multidisciplinary audience. Provide a comprehensive glossary of terms, use diagrams and consistent signposting to aid comprehension. Use acronyms sparingly and only when essential.
- **Use of expert judgement:** Where expert judgement is used (e.g. to conclude level of significance at an EIA scale), narrative should be provided to justify the conclusions drawn.
- Consistent use of language across topic chapters, coupled with the standard 12-section structure (**Annex B**), is essential to improve transparency, comparability and legal robustness.

Recommendation: Consistency and Clarity of Reporting

A consistent structure and approach is adopted across all OSW ES/EIARs to improve usability, accessibility, and stakeholder engagement.

This includes:

- Using clear, standardised terminology when describing impacts, effects, and significance.
- Ensuring terminology is aligned across chapters and inclusive of sector-specific language where appropriate. **See Annex B** for further recommendations on consistent terminology.
- Presenting information in a way that is accessible to non-specialist audiences, including planning officers and the public.



Jason Hawkes, 2015

3.3 Proportionate Reporting

Proportionality is a core principle of EIA. The regulations require that the ES focuses on the *likely significant effects* of a development, not every conceivable effect. Yet in practice, many OWF EIAs continue to generate large volumes of technical reporting, much of which does not materially influence decision-making.

This overproduction is often driven by:

- Concerns about legal challenge or consultation expectations.
- Precautionary 'just-in-case' inclusion of topics without clear justification.
- Duplication of data already covered in separate assessments (e.g. Navigation Risk Assessments, Aviation Technical Reports, Habitat Regulation Assessment/Appraisals).
- A lack of editorial control or consistency across author teams working for different developers and different consultancies.

The result is that ES often exceed 10,000 pages, which risks key findings being buried in lengthy, technical, tedious or repetitive material. This undermines the ability of regulators, consultees and the public to understand and engage with the assessment, and the conclusions that are being drawn from it.

These principles align with findings from recent IEMA reviews of proportionate IA¹⁸, which note that excessive reporting is a key driver of mistrust and inefficiency. As one Local Planning Authority (LPA) practitioner put it: "*What I need to agree to scope something out is sufficient justification that the proposed development is not likely to result in a significant effect*". Importantly, this would need to apply to both project effects on their own, and to cumulative effects. This is where an industry-wide evidence-based approach is crucial.

3.3.1 Principles of Proportionate EIA Reporting

OWEKH encourages EIA leads and topic authors to adopt the following principles to promote proportionate and effective reporting:

- **Focus on significance:** Prioritise assessment of effects that are likely to be significant, based on robust scoping and stakeholder engagement. Avoid in-depth treatment of low-risk or well-evidenced issues.
- **Streamline repetition:** Do not repeat content from other chapters or parallel documents (e.g. project description, design parameters or standard mitigation). Use precise cross-referencing and summary tables to aid the flow of information for the reader.
- **Use appendices wisely:** Technical reports and raw data should be in appendices, allowing the main chapters to focus on interpretation, outcomes and decisions.
- **Standardise chapter format:** Use the 12-section structure (**Annex B**) to ensure consistency across topics and to support efficient review.

- **Summarise clearly:** Begin each chapter with a summary of likely significant effects, and end with a table of commitments, mitigation and monitoring.
- **Avoid unnecessary policy duplication:** Legislative and policy frameworks should be concise and relevant to the topic. Avoid reproducing entire policy texts unless directly required.

3.3.2 Practical Enablers of Proportionate Reporting

Our review of OWF ES identified several practical enablers for consultants writing the ES:

- Maintaining editorial oversight across the EIA to ensure a consistent and proportionate tone.
- Empowering chapter authors with briefings, templates and examples of clear and concise reporting.

Our review of OWF ES identified several practical enablers for consultants writing the ES and wider enablers:

- Pre-agreeing scope with regulators and consultees, including clear justifications for scoped-out issues.
- Building in mitigation early, so that avoidable impacts are addressed by design rather than over-analysed, *post hoc*.
- Using summary tables and dashboards to present cumulative and residual effects in a visually accessible format.

As the IEMA *Proportionate EIA Strategy* (2017) and 2025 IEMA Outlook Journal highlight, well-written, focused EIAs are more likely to gain stakeholder trust and reduce the risk of legal challenge, whereas longer reports often contain the inconsistencies that trigger them. Proportionate assessment is not about cutting corners; it is about ensuring that every element of the ES/EIAR earns its place and contributes meaningfully to the decision-making process.



Alison Pettitt/UPY 2022

3.3.3 Non-Technical Summaries

The Non-Technical Summary (NTS) plays a vital role in making EIA accessible to a wide audience, including local communities, non-specialist stakeholders and decision-makers. For OWF projects, the NTS should clearly and concisely explain what is proposed, what its environmental impacts are, and how those impacts will be managed.

In line with the 2023 IEMA guidance¹⁹, the NTS should:

- Be written in plain English, avoiding technical jargon.
- Provide a clear narrative on the project, consider alternatives, likely significant effects and mitigation measures.
- Include maps, figures and illustrations to aid understanding.
- Remain consistent with the ES, while being digestible without reference to it.
- Function as a standalone, proportionate and user-focused document that can typically be read within 15–20 minutes.

As many stakeholders now access EIA information digitally, OWF EIA leads are encouraged to adopt digital NTS formats where feasible, using interactive visualisations, spatial mapping and accessibility tools, while also ensuring that printable and inclusive formats remain available. Producing an effective NTS is not a tick-box exercise. It requires careful planning, skilled authorship, and strong coordination between technical experts, communication professionals and the EIA Lead. Done well, the NTS builds public trust, enhances transparency and enables informed participation in the planning process.

3.3.4 Use of Digital Reporting

The increasing availability of digital tools, spatial data, and visualisation platforms presents a significant opportunity to modernise OWF EIA and improve the clarity, accessibility, and proportionality of the ES. Ideally, digital reporting should run across the life of a project to capture monitoring results through construction, operation and decommissioning, and predicted and realised impacts should be visible on a GIS-enabled dashboard²⁰.

Traditional ES formats are often lengthy, static PDF documents with inconsistent terminology and structure, making them difficult to navigate for decision-makers and almost impenetrable for the public. As IEMA^{21,22} and others^{23,24} have noted, digital reporting offers a step-change in how EIA findings are communicated, bridging the gap between technical depth and public engagement. Recommendations for using digital impact assessment approaches to reporting are set out in the following table.

¹⁹ IEMA (2023) Effective Non-Technical Summaries for Environmental Impact Assessment.

²⁰ For more information see IEMA (2024) Roadmap to Digital Impact Assessment and IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction.

²¹ IEMA (2020) Digital Impact Assessment Primer.

²² IEMA (2024) Roadmap to Digital Environmental Assessment.

²³ Fothergill, J. and Murphy, J. (2021) The State of Digital Impact Assessment Practice. International Association for Impact Assessment (IAIA).

²⁴ 2021 Ravn-Bøss, E., Lyhne, I. and Kørnøv, L. (2021) Digitalisation in Environmental Assessment. International front runners. The Danish Center for Environmental Assessment, Aalborg University, Denmark.

Approach	Recommendations
Interactive and dynamic reporting	Use web-based ES platforms that allow users to navigate content via hyperlinks, search functions and topic filters. Interactive interfaces should highlight mitigation measures, key effects and spatial context.
Enhanced use of GIS and mapping tools	Integrate GIS viewers with layered data, allowing users to toggle between baseline, impact and cumulative maps. Link maps to assessment text and receptor locations to improve transparency.
Clear and engaging visualisations	Use infographics, flow diagrams, dashboards and animated timelines to communicate complex information simply. Identify jurisdictional boundaries where relevant e.g. cross-border (Welsh/English waters), 12nm boundary etc. Apply these tools in NTS and technical chapters.
Accessibility and inclusivity	Ensure compliance with Web Content Accessibility Guidelines (WCAG). Design user-friendly interfaces that work across devices and support different user needs, including low-vision users.
Integrated reporting and monitoring	Where appropriate, link EIA outputs with digital monitoring dashboards. This enables stakeholders to track the implementation and effectiveness of commitments and conditions over time.
Version control	Digital tools should allow EIA chapters to be updated throughout the examination process to reflect the most up-to-date information while retaining a version control function to allow edits to be clearly viewed.

Table 4: Digital Approaches to Environmental Impact Assessment Reporting

To maximise the value of digital EIA, the sector should move beyond viewing digital reporting as an add-on. Instead, digital tools should be embedded from the start of the EIA process, shaping how data is collected, analysed and communicated. Standardisation is key; developers and consultancies are encouraged to adopt shared templates for digital ES outputs, using consistent terminology, metadata standards and scoping structures across projects. Doing so can reduce costs, increase comparability and improve review efficiency. Any digital tool should be publicly accessible for the lifetime of the project and not require specific software, or be associated with any fees for the reader. By embracing digital practices, the OWF sector can deliver assessments that are more accessible and engaging, and more proportionate and aligned with the needs of 21st-Century infrastructure planning.

Recommendation: Proportionate Reporting

All OWF ES adopt a proportionate reporting approach, focusing on likely significant effects and reducing unnecessary duplication of effort and content.

See **Annex B** for guidance on proportionality, a recommended standard chapter structure for the ES and a common chapter format for all technical chapters.

Digital tools can be used where appropriate to improve clarity, streamline reporting and support post-consent implementation and monitoring.

3.4 The Design Envelope and Parameter-Based Approach

Offshore Wind farms are large and complex infrastructure projects that often evolve during design and development. To accommodate necessary flexibility, developers commonly use the Design Envelope (or Rochdale Envelope²⁵) approach, which allows for assessment of a defined range of design parameters rather than fixed project details.

This approach is supported in UK planning and EIA practice and is particularly relevant to OWF Nationally Significant Infrastructure Projects (NSIPs) under the Planning Act 2008 and Scottish OWF applications under Section 36 of the Electricity Act 1989. Scottish Government Marine Directorate and the Energy Consents Unit (ECU) explicitly recognise and support the use of the Rochdale Envelope /Design Envelope in their publication 'Guidance for applicants on using the design envelope for applications under Section 36 of the Electricity Act 1989', June 2022.²⁶

The goal is to assess the likely *worst-case environmental effects* within a clearly defined parameter range, ensuring that impacts are fully understood even if some project details change post-consent. The benefits of the Design Envelope approach include:

- Allowing projects to progress through planning without finalised design.
- Reducing delays and re-works due to minor post-application changes.
- Providing clarity that significant effects have been properly assessed, even at an early design stage.
- Allowances for technological advances or innovation.

However, challenges include:

- Excessive parameter ranges that inflate the scope of the EIA and erode clarity.
- Overly precautionary worst-case scenarios that do not reflect the likely development.
- Reduced confidence among stakeholders if the final scheme is too uncertain or under-specified.
- Potential for re-assessment, post-consent, if the final project design falls outside the parameters assessed.
- Potential additional marine licence requirements.

OWEKH recommends that:

- Developers define their Design Envelope carefully, using evidence to justify parameter ranges. A smaller, more accurate reflection of final design within the Design Envelope will reduce uncertainty in the impact assessment and reduce some of the burden on an EIA assessment.
- Stakeholder consultation, and where applicable, PEIRs and draft EIA reports, can be used to iteratively refine the envelope between scoping and final ES submission.

²⁵ The Design or Rochdale Envelope originates from two UK legal cases: [R. v Rochdale MBC ex parte Tew \[1999\]](#) and [R. v Rochdale MBC ex parte Milne \(No. 1 and No. 2\) \[2000\]](#). These cases dealt with outline planning applications and established that a project can be assessed based on a realistic worst-case scenario, allowing for design evolution within clearly defined parameters.

²⁶ [Guidance for applicants on using the design envelope for applications under section 36 of the Electricity Act 1989.](#)

- The worst-case assumptions are clearly stated and consistently applied across topic chapters.
- Parameter ranges are narrowed as far as practicable by the time of application to ensure worst-case scenarios are realistic.
- Stakeholders are clearly informed about how the flexibility is managed and how likely significant effects are being robustly assessed.
- The final design parameters are entered onto the proposed 'as built' register when available²⁷.

3.5 Monitoring, Verification and Enforcement

Mitigation is only effective if it is delivered. For OWF EIA to achieve its purpose, robust post-consent mechanisms must be in place to monitor the implementation of mitigation, verify its outcomes, and enforce compliance where necessary.

The IEMA mitigation hierarchy and best practice guidance²⁸ emphasises that mitigation is not only to be described in the ES, but also tracked, secured and evidenced throughout the project lifecycle, from EIA, to consent, to construction and operation and decommissioning.

3.5.1 Securing Mitigation Through Conditions and Management Plans

To ensure that commitments made in the ES are delivered:

- All embedded and additional mitigation measures must be clearly recorded in the ES and summarised in a Mitigation and Monitoring Schedule (MMS), Commitments Register, or equivalent.
- These commitments can be secured through enforceable DCO requirements, Section 36 conditions or marine licence conditions, and linked explicitly to management plans (e.g. oCEMP, oWSI, oEMP, IPMP).
- Conditions should specify the timing, responsibility and evidence required to demonstrate delivery.
- Where applicable, mitigation should align with strategic frameworks (e.g. designated site management objectives, aviation safeguarding requirements, archaeological research frameworks).
- Traditional approaches to monitoring might not be possible in all instances, and it may be beneficial to consider a coordinated strategic approach to setting monitoring priorities to increase yielding meaningful results, in agreement with the authorities.

²⁷ <https://owic.org.uk/resources/as-built-register-task-finish-group-workshop-report>.

²⁸ IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction.

3.5.2 Monitoring and Adaptive Management

The purpose of monitoring must be clear. Monitoring serves three main functions:

1. To confirm that mitigation measures are implemented as planned.
2. To verify that mitigation is effective in practice and achieves the intended outcomes.
3. To verify whether impacts are predicted, e.g. inform adaptive management²⁹ where measures may need to be adjusted in response to unforeseen impacts, potential use of novel techniques or in response monitoring results.

Effective monitoring is:

- Proportionate to the risk and potential significance of effects.
- Clearly scoped in the ES and further refined in post-consent documents, with the specific purpose or function of each piece of monitoring clearly stated.
- Time- or results-bound, and linked to specific development phases (e.g. pre-construction, operation etc.).
- Designed with stakeholders, especially where community or regulator confidence is important, e.g. MMO's Compliance and Engagement Strategy³⁰ or NE's Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards³¹.
- Defined with clear triggers for adaptive management and remediation works in the event of unforeseen or excessive impacts.

3.5.3 Public Access, Learning and Feedback Loops

To support transparency and sector-wide learning the following measures are recommended:

- Monitoring results are made publicly available wherever possible, for example through the Marine Data Exchange (MDE), Marine Management Organisation (MMO) website or digital dashboards.
- Project archives (e.g. environmental datasets, archaeological reports) are deposited with appropriate public repositories, e.g. MEDIN Data Archive Centres.
- Post-consent evidence is used to inform future EIA scoping, impact assessment and mitigation design.
- Feedback loops are embedded to allow new data to refine guidance, modelling approaches or cumulative impact baselines, with potential to use the Technical Topic Group framework established through OWEKH.

²⁹ [Natural Resources Wales / Using adaptive management for marine developments.](#)

³⁰ [Compliance and Enforcement Strategy - GOV.UK.](#)

³¹ Parker, J., Fawcett, A., Rowson, T., Allen, S., Hodgkiss, R., Harwood, A., Caldow, R., Ludgate, C., Humphrey, O. & Copley, V. (2022d). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase IV: Expectations for monitoring and environmental requirements at the post-consent phase. Natural England. Version 1.0. 117 pp.

3.5.4 Role of Digital Tools in Monitoring and Enforcement

Digital EIA platforms offer increasing opportunities to:

- Link mitigation measures directly to spatial data and design parameters.
- Track implementation progress using dashboards.
- Automate reminders for condition compliance or monitoring milestones.
- Allow ready comparison between pre- and post-construction spatial data.
- Support adaptive management through real-time environmental feedback.

In summary, post-consent monitoring and enforcement are not administrative formalities but an essential element of the EIA process. All OWF EIAs should clearly demonstrate how mitigation will be secured, delivered, monitored and verified, and how results will be used to inform better decision-making across the project and sector.

Recommendation: Monitoring, Verification and Enforcement

All mitigation measures identified in the ES are clearly recorded, secured through enforceable conditions (e.g. within the DCO or marine licence) and supported by proportionate and transparent monitoring protocols. Monitoring plans must:

- Be designed in consultation with relevant regulators and stakeholders.
- Be proportionate to the likely significance and scale of impact.
- Include clear triggers, responsibilities, and reporting mechanisms.
- Support adaptive management and continuous learning.

Wherever possible, conditions and monitoring ought to follow standardised approaches across the OSW sector to promote consistency and reduce regulatory burden. See **Annex C** for examples of recommended conditions and monitoring requirements.



Rick Ayrton/UPY 2022

3.6 Addressing Significant Adverse Effects

Despite the application of avoidance, prevention, reduction, mitigation and offset measures, there may be cases where OWF developments result in residual significant adverse effects on environmental or community receptors. These effects must be clearly identified in the ES/EIAR and transparently reported as material considerations in the planning balance.

Under national planning policy frameworks and EIA regulations, the existence of a significant adverse effect does not automatically prevent consent. Decision-makers are required to consider the full suite of environmental, social and economic effects, including project benefits such as decarbonisation, energy security and employment. OWF projects may, therefore, be consented even where significant residual effects remain, provided these are justified, unavoidable and adequately evidenced.

Notably, where additional regulatory regimes apply, e.g. significant impacts within protected sites, additional requirements will be required, such as compensation measures under the Habitats/Birds Directives or Measure of Equivalent Environmental Benefit (MEEB) under the Marine and Coastal Access Act.

3.6.1 The Role of the Mitigation Hierarchy

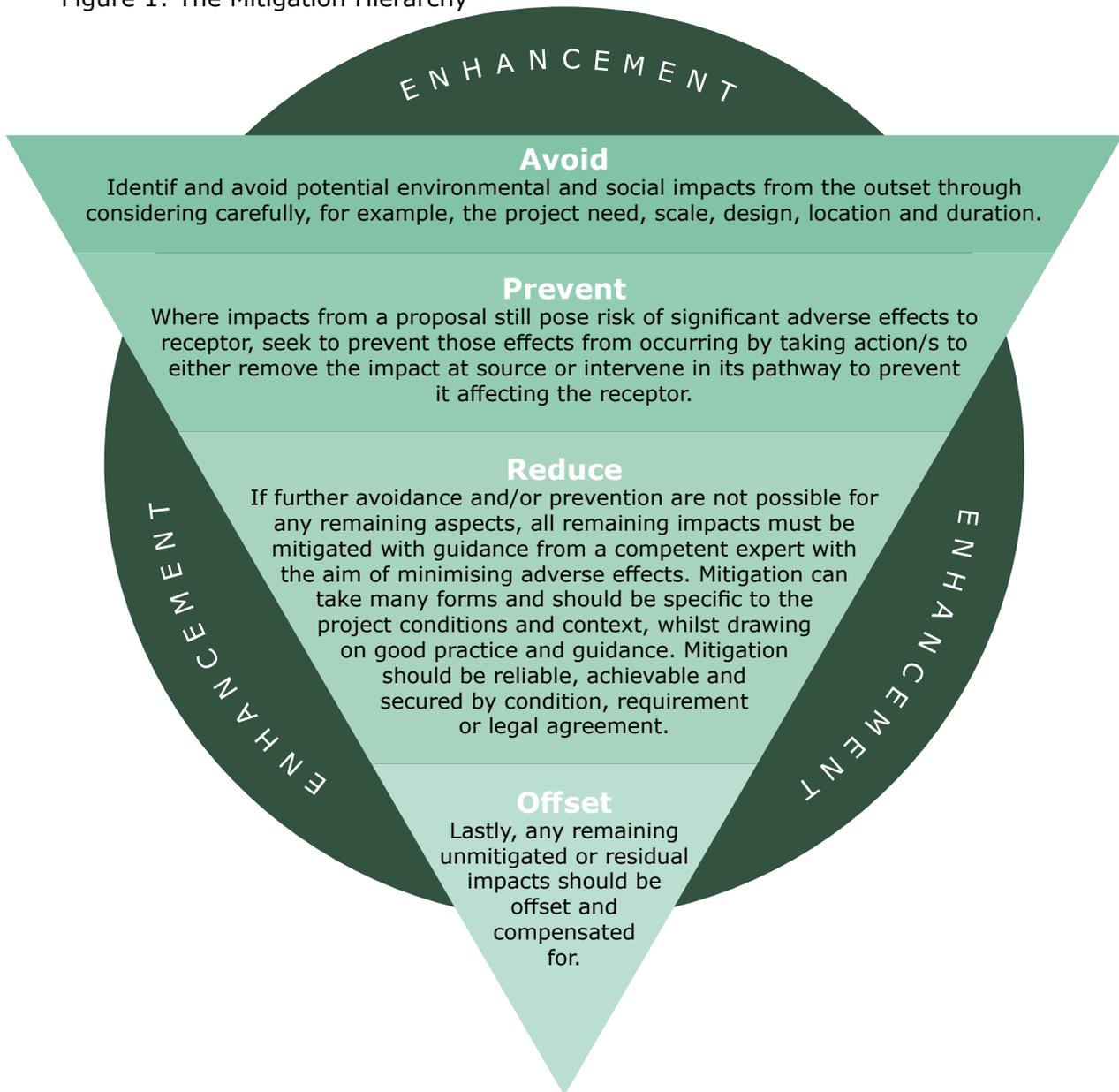
A key test of EIA effectiveness is whether the mitigation hierarchy is applied properly to:

- Avoid effects from arising, through site selection, design or timing.
- Prevent adverse effects from occurring, through design, construction methods and/or mitigation.
- Reduce severity and/or frequency of adverse effects, through embedded or additional mitigation.
- Offset where residual effects remain, especially for biodiversity or cultural heritage.
- Enhance where opportunities arise to generate positive effects and outcomes.

Evidence from reports and stakeholders as part of the ERN review process suggests that in most cases, likely significant effects can be avoided through early planning and the consistent application of standard mitigation measures. Where significant residual effects are claimed, they should be:

- Justified as the realistic worst-case outcome under the Design Envelope.
- Clearly explained in terms of receptor sensitivity, uncertainty and confidence levels.
- Accompanied by a rationale for why additional mitigation or alternatives were not feasible. Project scale consideration of alternatives should be fully described in the *Site Selection and Alternatives* chapter of the EIA.

Figure 1: The Mitigation Hierarchy³²



3.6.2 Planning Balance and the Importance of Transparency

The existence of residual significant effects increases the importance of:

- Providing a clear and accessible summary of residual effects in the ES.
- Documenting how these effects were considered during design evolution.
- Explaining how they interact with other effects in cumulative and transboundary assessments.
- Ensuring that all committed mitigation is deliverable, verifiable, enforceable and secured, with a clear securing mechanism identified.

³² IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction. Other versions of the 'mitigation hierarchy' exist from various sources, all versions follow a similar hierarchy from avoidance as the first step to compensation or offset as the last step.

3.6.3 Learning from Past Experience

Case studies across multiple sectors have shown that when early-stage assessments underplay risk or rely solely on procedural mitigation without clear contingency plans, significant discoveries or impacts can emerge during construction or operation. This can lead to:

- Delays and additional cost.
- Reputational risk for the developer and the sector.
- Regulatory enforcement actions or retrospective assessments.
- Isolation of assets.

To minimise these risks, OWF EIAs should maintain a cautious but evidence-based approach to identifying and disclosing significant adverse effects, along with commitments to appropriate mitigation and monitoring.

In the early days of UK OWF, there was limited practical knowledge on the operations and maintenance requirements during the operational phase. Experience has shown that an adaptive approach to future marine licencing (for activities outside the foreseen programme) is beneficial, typically making commitments to work within the boundaries of assessed impacts, e.g. Outline Operations and Maintenance Plans. This enables clarity when additional consents may be required, and cumulative effects may need to be considered. Likewise, as the wealth of knowledge and research develops around decommissioning OWF assets, the sharing of best practice and knowledge becomes more critical, particularly when assessing the end life of mitigation and its impact on the surrounding environment.



Paul Pettitt/UPY 2022

4. Further Calls for Evidence and Research

This section identifies areas where deeper evidence, strategic analysis or future research would enhance the robustness, efficiency and proportionality of OWF EIA. These issues often extend beyond the remit of individual projects and require collaboration across government, industry and expert stakeholders.

4.1 Strategic-Level Assessment for Foreseeable Significant Effects

Some environmental and community effects associated with offshore wind, particularly those relating to cumulative changes, landscape or seascape character, aviation constraints or ecological networks, cannot be effectively addressed through project-level mitigation alone. These issues are best considered at a strategic level, such as during:

- Zone selection or leasing rounds.
- SEA or its future replacement under EOR.
- Marine plans and national infrastructure planning (e.g. grid transmission connections, MSPri, Scotland's National Marine Plan, Welsh National Marine Plan, English Inshore and Offshore Marine Area Plans).

OWEKH recommends that:

- Plan-making bodies, including The Crown Estate, Crown Estate Scotland, and marine planning authorities, integrate strategic environmental risks earlier into spatial planning process.
- Early sensitivity mapping and thematic research is used to flag areas of higher environmental constraint and reduce project-level uncertainty, with consideration of strategic data collection to inform the latter stages of spatial planning and contextualise project-level assessments.
- SEA or EOR processes adopt consistent, data-driven approaches to cumulative and in-combination assessments that are used to shape project-level scoping.
- Transmission and grid strategy is coordinated with marine spatial planning to avoid disconnects between landfall options and offshore zones.
- Stakeholder engagement happens early at a strategic level to secure a shared understanding of constraints, trade-offs and opportunities for enhancement.
- Strategic-level evidence gaps and research requirements are identified early in the offshore wind planning process. This includes recognising any overarching monitoring priorities that may be necessary to support specific plans or leasing rounds.

By addressing foreseeable significant effects upstream, at the plan- or zone-level, project-level EIAs can focus on more refined and proportionate assessments, avoiding duplication and increasing certainty for developers and regulators.

It is important that a clear communication pathway is identified to ensure only appropriate and relevant details are filtered down from strategic- to project-level. They should be used effectively and must avoid suggesting that conclusions drawn at the strategic level pre-determine the outcome of project-level assessments or consent decisions.

Recommendation: Strategic Approach to Risk Assessment

A strategic approach is adopted to the identification and assessment of likely significant effects during OSW spatial planning, leasing and zone selection. Strategic-level assessments, such as SEAs, marine plans and EORs, should incorporate early sensitivity mapping, stakeholder input, and the application of the mitigation hierarchy to reduce the likelihood of unmitigable effects arising at project level.

Strategic-level interventions can expedite mitigation and monitoring delivery to reduce or remove burden from individual projects. This is particularly important for aspects of the assessment where residual impacts are less easily mitigated at project-scale, such as landscape and seascape character, biodiversity connectivity, cultural heritage setting and cumulative radar effects.

4.2 Cumulative Effects

Cumulative Effects Assessment (CEA) is a legal requirement under EIA Regulations and an essential component of good practice in OWF assessment. It requires that ES/EIARs consider not only the impacts of a proposed development in isolation, but also how the effects may combine with existing, consented or reasonably foreseeable projects. Two broad types of cumulative effects are recognised in EIA:

- Inter-project (inter-cumulative) effects: Where multiple developments contribute to shared environmental pressure on a single receptor (e.g. displacement of birds, visual intrusion or navigational risk). These developments may include other OWF projects, as well as marine aggregates, pipelines and other forms of development.
- Intra-project (intra-cumulative) effects: Where multiple types of impact from the same project interact with and affect a receptor (e.g. noise and lighting on marine mammals).

4.2.1 Challenges and Considerations

Assessing cumulative effects presents a number of technical and procedural challenges:

- Availability and quality of data from other projects (in absence of an 'as-built register').
- Consistency of assessment methods and significance criteria.
- Uncertainty around future baseline conditions.
- Spatial and temporal overlap between projects, particularly in dynamic marine environments.

Despite these challenges, CEA plays a critical role in:

- Identifying where tipping points or thresholds of concern are being approached or exceeded (e.g. seabird mortality, radar clutter or underwater noise accumulation).
- Protecting sensitive or already pressured receptors (e.g. rare habitats, declining fish stocks or culturally important seascapes or coastal landscapes).
- Supporting strategic planning and adaptive management at a sector-level. See JNCC Report 768 *Cumulative Effects Assessments to support marine plan development*³³.

4.2.2 Opportunities for Beneficial Cumulative Effects

While CEA often focuses on adverse effects, there is also potential for positive cumulative effects, such as:

- The accumulation of data from multiple projects improving our understanding of receptors through survey and research (e.g. heritage discoveries, benthic mapping).
- Shared mitigation infrastructure (e.g. radar infill, biodiversity corridors).
- Sector-wide learning that reduces future risk.

To support robust and proportionate cumulative assessment:

- Developers should use shared regional baselines and GIS layers where available.
- Statutory bodies should promote consistency in receptor definitions, thresholds and methods. See Natural England's Approach to Offshore Wind^{34, 35}.
- Cumulative effects that are well understood and have already been strategically assessed in sufficient detail (e.g. through SEA or plan-level studies) should be clearly signposted to avoid duplication.
- Where uncertainty remains high, precautionary assumptions and transparent reporting should be used.

Recommendation: Use of CEA

All OSW ES/EIARs adopt a consistent, proportionate and transparent approach to CEA, aligned with national guidance and cross-sector good practice. Regulators and stakeholders should support the development and use of shared data, regional baselines and sector-wide assessment tools to improve consistency and reduce duplication.

A periodic meta-review of cumulative effects across the OWF sector be undertaken. It should identify long-term environmental or socio-economic trends, assess sector-wide risks and benefits, and inform the future refinement of project-level scoping and mitigation. Findings from this review should be integrated into future updates of OWEKH ERNs to ensure they reflect emerging risks and best practice.

³³ Willsteed, E.A.1, Collin, S.1 & Koehler, L.1 2024. Cumulative effects assessments to support marine plan development. JNCC Report 768 (Project Report), JNCC, Peterborough, ISSN 0963-8091 <https://hub.jncc.gov.uk/assets/ad2730d3-493e-438c-981d-66d1dd25a8c5>.

³⁴ Natural England. 2021. Natural England's Approach to Offshore Wind. Natural England Technical Information Note, TIN181. Natural England.

³⁵ Parker, J., Fawcett, A., Banks, A., Rowson, T., Allen, S., Rowell, H., Harwood, A., Ludgate, C., Humphrey, O., Axelsson, M., Baker, A., Copley, V., Robertson, A., Hodgkiss, R., Berridge, R. & Farmer R. (2025c). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase III: Expectations for data analysis and presentation at examination for offshore wind applications. Natural England. Version 2. 140 pp.

4.3 Recognition and Reporting of Beneficial Effects

EIA has traditionally focused on identifying and mitigating adverse effects. However, EIA regulations have always required assessment to look at beneficial and adverse effects. UK planning and assessment frameworks are increasingly recognising the importance of identifying and communicating the beneficial effects of development proposals.

OWF projects can deliver a range of positive effects, including:

- Contribution to national and global climate targets through decarbonisation.
- Improved understanding of marine environments via surveys and monitoring.
- Technological upgrades to radar, navigation or environmental monitoring infrastructure.
- Creation of new employment opportunities and economic value in coastal communities.
- Long-term biodiversity benefits through habitat enhancement or exclusion zones. *(This can often be a controversial issue between SNCBs and developers as biodiversity benefits potentially change the natural habitat. The right balance needs to be found).*
- Contribution to scientific research and public knowledge, for example, through heritage discoveries or ecological baselines.

These beneficial effects are often overlooked or under-reported in the ES. Where they are included, they may not be clearly distinguished from mitigated adverse effects or may lack sufficient evidence to be treated as material planning benefits.

OWEKH encourages project teams to:

- Clearly identify and provide evidence for beneficial effects as a distinct part of the assessment process.
- Ensure that beneficial effects are realistic, verifiable and proportionate; not speculative or overstated.
- Consider direct and indirect benefits, including cumulative positive impacts over time.
- Engage stakeholders early to build consensus on what constitutes a meaningful benefit.
- Make full use of data-sharing platforms and national archives to promote transparency and public value, particularly where new data or insights have been generated.

Recognising beneficial effects can help to build public trust, support balanced decision-making and align EIA more closely with sustainable development principles.

Recommendation: Acknowledge Beneficial Effects

OWF project EIAs explicitly identify, evidence and communicate likely beneficial environmental or socio-economic effects, including cumulative benefits where applicable. Stakeholders and regulators should support the development of consistent approaches to recognising such effects, and integrating them into project decision-making, public engagement and sector-wide learning.

Where appropriate, beneficial effects, such as improved environmental understanding, system upgrades or long-term biodiversity enhancements, should be tracked post-consent to verify outcomes and inform future good practice.

4.4 Sector-Level Research and Evidence Needs

The increasing scale and complexity of offshore wind development calls for a coordinated and forward-looking approach to research and evidence gathering. Strategic assessments, cumulative effects and beneficial outcomes (**Sections 4.1–4.3**) all depend on robust and accessible evidence. While individual project-level monitoring can still make important contributions to strategic evidence gathering, much of the research or evidence needed lies beyond the remit of individual projects. OWEKH recommends that government, regulators, industry and research institutions collaborate to address the following sector-wide evidence priorities:

- Standardised cumulative baselines for key environmental and socio-economic receptors (e.g. underwater noise, bird populations, radar zones, landscape character areas).
- Longitudinal monitoring data to track long-term environmental change, mitigation effectiveness and sector-wide trends.
- Potential to identify evidence-based thresholds and tipping points for sensitive receptors, especially where regulatory or scientific consensus is lacking.
- Spatial decision support tools (e.g. interactive constraint maps such as POSIDON³⁶, cultural and ecological sensitivity layers) to guide plan-making and project design.
- Data sharing infrastructure, such as centralised repositories, shared metadata standards and improved access to marine survey data.
- Cross-disciplinary research on enhancement and co-benefits, integrating ecology, archaeology, socio-economics and infrastructure innovation.

The OWEKH ERNs should be periodically updated to reflect the outcomes of new research and the evolving needs of stakeholders, including the marine planning and consenting authorities, for example incorporating new evidence and research arising from Offshore Wind Environmental Evidence Register (OWEER). By investing in shared evidence platforms and strategic research, the offshore wind sector can reduce uncertainty, improve the efficiency of the EIA process, and strengthen environmental outcomes over time.

³⁶ Natural England is leading the multi-year POSEIDON project (Planning Offshore Wind Strategic Environmental Impact Decisions) which seeks to support the expansion of sustainable offshore wind alongside thriving marine nature.

Recommendation: Address Sector-Level Evidence Gaps

Government, industry, regulators and researchers should collaborate to identify and address strategic evidence gaps that affect the quality and consistency of OSW EIA. Priority areas include:

- Shared cumulative baselines and thresholds.
- Long-term environmental and socio-economic monitoring data.
- Open-access digital tools and data standards.
- Cross-topic research on mitigation effectiveness and co-benefits.

The outcomes of this research should be made publicly available wherever possible and used to periodically update OWEKH ERNs and inform spatial planning, scoping and assessment practices.

4.5 Updating Guidance Through Collaborative Learning

The OWEKH ERNs are intended to be **living documents** that evolve over time. As new data emerges from post-consent monitoring, strategic assessment and applied research, this guidance will be reviewed and, where appropriate, updated by the relevant OWEKH Technical Topic Group.

This process ensures that the ERNs continue to reflect:

- The most up-to-date science and best practice.
- Lessons learned from project implementation and decision-making.
- Stakeholder perspectives and emerging policy priorities.

All stakeholders, including government agencies, statutory bodies, industry, NGOs, researchers and professional institutes, are encouraged to contribute to this shared evidence base.

By embedding continuous learning into the OWF EIA process, the sector can build greater trust, improve decision-making and deliver more consistent, transparent, and sustainable outcomes over the long-term.

Recommendation: Maintain and Evolve Guidance Through Collaborative Learning

OWEKH ERNs are to be maintained as live guidance documents, subject to periodic review and revision based on new evidence, monitoring outcomes, policy changes and stakeholder feedback. All stakeholders across government, industry, academia and civil society are encouraged to contribute to this process through:

- Sharing monitoring data and research findings.
- Reporting implementation lessons from real-world projects.
- Participating in Technical Topic Groups.
- Supporting open access to sector-wide knowledge.

This collaborative model will ensure that OSW EIA guidance remains relevant and evidence-based, and that it continues to align with evolving good practice.

5. Summary of Recommendations

Sections 3 and 4 of this ERN outline a series of recommendations to improve the consistency, proportionality and transparency of EIA for OWF projects. These recommendations are grounded in a review of existing practice, IEMA and professional guidance, as well as insights from OWEKH topic-specific ERNs.

The recommendations below are intended for developers, practitioners, consultees and regulators involved with the preparation and review of OWF ES and EIA reports.

5.1 Strategic Approach to Risk Assessment

A strategic approach should be adopted to identify and assess likely significant effects during offshore wind spatial planning, leasing and zone selection. Strategic-level assessments, such as SEAs, marine plans and EORs, should incorporate early sensitivity mapping, stakeholder input, and the application of the mitigation hierarchy to reduce the likelihood of unmitigable effects arising at project-level.

Strategic-level interventions, including data collection, can expedite mitigation and monitoring delivery to reduce or remove the burden on individual projects. This is particularly important for aspects of the assessment where residual impacts are less easily mitigated at project-scale, such as landscape and seascape character, biodiversity connectivity, cultural heritage setting and cumulative radar effects.

5.2 Address Sector-Level Evidence Gaps

Government, industry, regulators and researchers should collaborate to identify and address strategic evidence gaps that affect the quality and consistency of OWF EIA. Priority areas include:

- Shared cumulative baselines and thresholds.
- Long-term environmental and socio-economic monitoring data.
- Open-access digital tools and data standards.
- Cross-topic research on mitigation effectiveness and co-benefits.

The outcomes of this research should be made publicly available wherever possible and used to periodically update OWEKH ERNs and inform spatial planning, scoping and assessment practices.

5.3 Standardisation of Scoping

A consistent, UK-wide approach to scoping is recommended across all OWF ES/ EIARs. This should be based on the scoping framework set out in Tables 1–3 of each topic-specific ERN, using the three-tiered classification (Categories A–C) to improve transparency and efficiency for all stakeholders.

5.4 Consistency and Clarity of Reporting

A consistent structure and approach should be adopted across all OWF ES/EIARs to improve usability, accessibility, and stakeholder engagement. This includes:

- Using clear, standardised terminology when describing impacts, effects and significance.
- Ensuring terminology is aligned across chapters and inclusive of sector-specific language where appropriate.
- Presenting information in a way that is accessible to non-specialist audiences, including planning officers and the public.

See **Annex B** for further recommendations on consistent terminology.

5.5 Proportionality of Reporting and Survey

An OWF ES should adopt a proportionate reporting approach, focusing on likely significant effects and reducing unnecessary duplication of effort and content.

See **Annex B** for guidance on proportionality, a recommended standard chapter structure for the ES and a common chapter format for all technical chapters.

Digital tools should be used where appropriate to improve clarity, streamline reporting and support post-consent implementation and monitoring.

5.6 Monitoring, Verification and Enforcement

All mitigation measures identified in the ES should be clearly recorded, secured through enforceable conditions (e.g. within the DCO or marine licence) and supported by proportionate and transparent monitoring protocols. Monitoring plans should:

- Be designed in consultation with relevant regulators and stakeholders.
- Be proportionate to the likely significance and scale of impact.
- Clearly state the purpose of each monitoring element, including clear triggers, responsibilities and reporting mechanisms.
- Support adaptive management and continuous learning.

Wherever possible, conditions and monitoring should follow standardised approaches across the offshore wind sector to promote consistency and reduce regulatory burden. See **Annex C** for examples of recommended conditions and monitoring requirements.

5.7 Use of Cumulative Effects Assessment

OWF ES/EIARs should adopt a consistent, proportionate and transparent approach to CEA, aligned with national guidance and cross-sector good practice. Regulators and stakeholders should support the development and use of shared data, regional baselines and sector-wide assessment tools to improve consistency and reduce duplication.

A periodic meta-review of cumulative effects across the offshore wind sector should also be undertaken. It should identify long-term environmental or socio-economic trends, assess sector-wide risks and benefits, and inform the future refinement of project-level scoping and mitigation. Findings from this review should be integrated into future updates of OWEKH ERNs to ensure they reflect emerging risks and best practice.

5.8 Acknowledge Beneficial Effects

OWF EIAs should explicitly identify, evidence and communicate any likely beneficial environmental or socio-economic effects, including cumulative benefits where applicable. Stakeholders and regulators should support the development of consistent approaches to recognising these effects, and their integration into project decision-making, public engagement and sector-wide learning.

Where appropriate, beneficial effects, such as improved environmental understanding, system upgrades or long-term biodiversity enhancements, should be tracked post-consent to verify outcomes and inform future good practice.

As nature-inclusive design aspects are incorporated more commonly into UK OWF projects, different protocols may be required to support innovation and collaboration on data and evidence.

5.9 Maintain and Evolve Guidance Through Collaborative Learning

OWEKH ERNs should be maintained as live guidance documents, subject to periodic review and revision based on new evidence, monitoring outcomes, policy changes and stakeholder feedback. All stakeholders across government, industry, academia and civil society are encouraged to contribute to this process through:

- Sharing monitoring data and research findings.
- Reporting implementation lessons from real-world projects.
- Participating in Technical Topic Groups.
- Supporting open access to sector-wide knowledge.

This collaborative model will ensure that OWF EIA guidance remains relevant and evidence-based, and that it continues to align with evolving good practice.

6. Collaboration and Review

Through participation in the Impact Assessment Technical Topic Group (TTG), representatives from the following organisations have contributed to this document. Technical Topic Group representatives

Information to Support Scoping	
ABPmer	Natural England
AtkinsRéalis	Natural Resources Wales
BlueFloat Energy	Neptune Environmental Consenting
BP	Ørsted
Copenhagen Offshore Partners	Planning Inspectorate
ERM	Ramboll
GoBe	RPS
Haskoning	RSK Group
HiDef	SSE Renewables
ISEP	Xodus Group
Mott MacDonald	

Document Update Roadmap

The ERN is a dynamic document designed to evolve with advancements in knowledge, technology, and regulatory frameworks. The following update schedule is proposed:

- Launch ERN as pilot for use on projects.

Short-term updates (6-12 months):

- Incorporate user feedback from pilot and update ERN.
- Assess the adoption rate of key recommendations and adjust where uptake is low.
- Launch updated and formal ERN.

Long-term updates (1+ years):

- Bi-annual meetings of the Impact Assessment TTG will be held to review evidence and feedback.
- After 12 months the TTG will conduct a comprehensive review of the ERN's effectiveness, incorporating stakeholder surveys and case studies.
- The TTG will maintain the ERN as a live document, revising it on a regular and ad hoc basis to reflect new legislation, policy updates and stakeholder consensus.

7. Key References

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Scottish Government (2013) Planning Advice Note 1/2013: *Environmental Impact Assessment*.

Scottish Government (2022) [Guidance for applicants on using the design envelope for applications under Section 36 of the Electricity Act 1989](#).

Scottish Government (2023) [Marine licensing and consenting - Environmental Impact Assessment: overview](#).

ANNEX A: Offshore Wind Farms

The following 79 OWF have undertaken EIAs and published information on the potential impacts in the ES and EIA reports. These assessments have informed the development of this ERN.

Atlantic Array	Kincardine
Awel y Môr	Lincs
Barrow	London Array I
Beatrice	Lynn
Beatrice Extension	Mona
Berwick Bank	Moray West
Blyth Offshore Demonstrator	Morecambe Offshore Windfarm Generation Assets
Burbo Bank	Morgan Offshore Wind Project
Burbo Bank Extension	Muir Mhor
Docking Shoal	Navitus Bay
Dogger Bank Creyke Beck	Neart na Gaoithe
Dogger Bank South	Norfolk Boreas
Dogger Bank Teesside	Norfolk Vanguard East
Dogger Bank C	Norfolk Vanguard West
Dudgeon	North Falls
Dudgeon and Sheringham Shoal Extensions	North Hoyle
East Anglia One	Ormonde
East Anglia One North	Ossian
East Anglia Two	Outer Dowsing
East Anglia Three	Pentland
European Offshore Wind Deployment Centre (EOWDC)	Race Bank
Five Estuaries	Rampion
Forthwind	Rampion 2
Galloper	Rhyl Flats
Greater Gabbard	Robin Rigg
Green Volt	Salamander
Gunfleet Sands 1	Scroby Sands
Gunfleet Sands 3	Seagreen Phase 1
Gunfleet Sands 3	Sheringham Shoal
Gwynt Y Môr	Teeside
Hornsea 1	Thanet
Hornsea 2	Thanet Extension
Hornsea 3	Triton Knoll
Hornsea 4	Walney 1
Humber Gateway	Walney 2
Hywind	Walney 3
Inch Cape	West of Duddon Sands
Inner Dowsing	Westernmost Rough
Kentish Flats	Whitecross
Kentish Flats 2 Extension	

ANNEX B: Recommended ES Structure and Format

Annex B provides two tables that together support a consistent and proportionate approach to structuring an ES for OWF projects:

- **Table 1** sets out the recommended overarching structure of the ES document across volumes
- **Table 2** provides a standardised 12-section structure for technical topic chapters.

Both tables are based on a review of good practice from recent OWF applications, the findings of OWEKH ERNs, and IEMA guidance on effective EIA reporting. Standardisation of structure across projects is essential to improve accessibility, reduce unnecessary duplication, and to support more efficient review by consultees, decision-makers and the public.

Table 1 Recommended Structure of the ES Document across Volumes

ES Volume/Section	Purpose and Typical Contents
Non-Technical Summary (NTS)	A clear, accessible summary of the project, key impacts, mitigation measures and residual effects for a general audience. EIA Leads are encouraged to follow the IEMA guidance on NTS good practice ³⁷ .
Volume 1: Introductory Chapters	
1. Introduction	Purpose of the ES, project overview, summary of key significant effects and mitigation, legal context and EIA process.
2. Project Description and Site Selection	Description of the proposed infrastructure (offshore and onshore), design parameters and site-selection rationale.
3. EIA Methodology and Structure	Overview of EIA approach, scoping, significance criteria, assessment phases and cumulative assessment methods.
4. Policy and Legislative Context	Overview of applicable national and devolved legislation, policy and relevant guidance.
Volume 2: Topic-Based Technical Chapters	
5–XX. Environmental Topics	One chapter per topic (e.g., marine mammals, commercial fisheries, seascape, aviation). Each follows the 12-section format in Table 2.

Volume 3: Additional Assessments	
A. Cumulative Effects Assessment	Includes intra-project and inter-project effects.
B. Transboundary Effects Assessment	Identification and assessment of likely effects on other states (e.g. Espoo/UNECE obligations).
C. Interaction Between Topics	Narrative or matrix-based summary of how different topic effects may interact.
D. Climate Change and Carbon Assessment	Assessment of climate resilience, adaptation and greenhouse gas emissions.
Volume 4: Commitments and Management	
E. Schedule of Mitigation and Commitments	Consolidated table of embedded and additional mitigation measures, including delivery mechanisms.
F. Monitoring and Management Frameworks	Outline of post-consent monitoring and delivery plans (e.g. oEMP, oCEMP, oWSI).
Volume 5: Technical Appendices	
G. Topic-Specific Appendices	Detailed modelling, data and supporting evidence for each technical chapter.
H. Consultation Records	Scoping opinion, stakeholder engagement and summary of consultation feedback.

Table 2 Standardised 12-Section Structure for Technical Topic Chapters

Chapter Section	Standard Considerations
1. Introduction	Define the scope and relevance of the topic. Clarify geographic and temporal boundaries and cross-references. <i>(Target: 1 page.)</i>
2. Policy and Legislative Framework	Summarise topic-specific legislation and policy. Adjust for national/devolved differences. <i>(Target: 1-2 pages.)</i>
3. Study Area and Scope of Assessment	Define the spatial and temporal boundaries, assessment buffers and key assumptions. <i>(Target: 1-2 pages.)</i>
4. Consultation	Summarise engagement with consultees, including methods, outcomes and topic-relevant feedback. <i>(Target: 1-2 pages.)</i>
5. Assessment Methodology	Describe baseline, impact and significance assessment methods. Include reference to standard tools or models. <i>(Target: 2-3 pages.)</i>
6. Baseline Environment	Describe existing conditions and key receptors. Use figures and summary text. Reference appendices. <i>(Target: 4-6 pages.)</i>
7. Design Parameters and Maximum Design Scenario (MDS)	Explain key parameters and how the worst-case scenario has been identified for assessment. <i>(Target: 1-2 pages.)</i>
8. Assessment of Effects	Assess effects by project phase, magnitude, receptor sensitivity and significance. <i>(Target: 4-6 pages.)</i>
9. Additional Assessments	Include cumulative, transboundary and inter-topic effects as relevant. <i>(Target: 2-3 pages.)</i>
10. Mitigation and Enhancement Measures	Summarise embedded and additional mitigation. Identify enhancement opportunities. <i>(Target: 2-3 pages.)</i>
11. Residual Effects and Monitoring	Describe post-mitigation effects and monitoring. Confirm implementation mechanisms. <i>(Target: 1-2 pages.)</i>
12. Summary of Commitments	Tabulate topic-specific mitigation and monitoring commitments with timing and delivery responsibilities. <i>(Target: 1-2 pages.)</i>
Appendices and Technical Outputs	Where needed, each chapter should reference supporting documents and studies. These should be included in the ES appendices.

ANNEX C: Recommended Conditions and Requirements

Annex C provides a framework to support the drafting and implementation of robust, enforceable mitigation and monitoring measures across all OWF EIAs. It builds on **Section 3.5** of this ERN, which outlines the importance of securing mitigation, verifying delivery and enabling adaptive management through clearly defined commitments and post-consent obligations.

Annex C includes:

- **C1:** A checklist of standard commitments and mitigation actions expected at scoping and application stages.
- **C2:** Example wording for conditions and consent requirements.

C1. Standard Commitments at Scoping and Application Stage

At the scoping stage, developers should include a preliminary commitments register summarising embedded mitigation, good practice measures and assumptions about monitoring or future surveys. This supports early understanding of likely significant effects and provides confidence to regulators and consultees.

By the time of application, this commitments register should be updated and submitted as a Schedule of Mitigation and Commitments, typically within ES Volume 4. It should:

- Clearly distinguish between embedded, additional and compensatory mitigation.
- Indicate delivery mechanisms and control documents (e.g. through DCO requirements, marine licence conditions or post-consent plans).
- Identify responsible parties (e.g. Ecological Clerk of Work, Environmental Manager), roles, accountability and timing (pre-construction, construction, operation).
- Be structured to enable future audit, monitoring and enforcement.

The following types of commitments are commonly expected across OWF EIAs:

1. Use of standard digital tools for impact mapping and design refinement.
2. Application of the Design Envelope within defined parameter ranges.
3. Topic-specific embedded mitigation (e.g. buffer zones, turbine spacing, timing restrictions).
4. Commitment to pre-construction surveys where risk remains, post-EIA.
5. Use of monitoring frameworks and dashboards to verify performance.
6. Submission of post-consent management plans (e.g. oEMP, oCEMP).
7. Transparent public reporting of monitoring outcomes.

C2. Example Requirements/Conditions and Standard Language

The following sample language is based on recent DCO and marine licence conditions. It is not topic-specific and can be tailored for use in areas such as:

- Marine mammals and noise thresholds.
- Radar safeguarding and aviation.
- Seascape and visual receptor monitoring.
- Cultural heritage survey protocols.
- Fisheries liaison and adaptive management.

Example Condition (Generic Form):

"The Licence Holder must submit a [Post-Consent Plan] no later than six months prior to the commencement of construction. The Plan must set out:

- The methodology for further investigation, monitoring or mitigation.
- Any exclusion zones, timing restrictions, or buffer distances.
- Data-sharing and reporting protocols.
- Roles and responsibilities.
- A timeline for implementation.

The Plan must be approved in writing by the Licensing Authority following consultation with [Named Statutory Bodies], and no development may begin until such approval is obtained. The Licence Holder must carry out the licensed activities in accordance with the approved plan unless otherwise agreed in writing.

'Reason: to ensure impacts on marine mammals from vessel transits are minimised'"

Topic-specific conditions (e.g. for underwater noise, radar modelling or geophysical survey) should be based on the standard advice given in Annex C of the relevant OWEKH ERNs.