OFFSHORE RENEWABLE ENERGY ACTION PLAN

SEA Scoping Report

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ABBREVIATIONS

AA	Appropriate Assessment
AFBI	Agri-Food and Biosciences Institute
AoHSV	Area of High Scenic Value
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ASSI	Area of Special Scientific Interest
ASAI	Area of Significant Archaeological Interest
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
COWRIE	Collaborative Offshore Wind Research Into the Environment
DAERA	Department of Agriculture, Environment and Rural Affairs
DAFM	Department of Agriculture, Food and the Marine
DECC	Department of the Environment, Climate and Communications
DEFRA	Department for Environment, Food & Rural Affairs
DETI	Department of Enterprise, Trade and Investment
DfI	Department for Infrastructure
DfE	Department for the Economy
DHLGH	Department of Housing, Local Government and Heritage
DoH	Department of Health
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EA	Environment Agency
EPO	Environmental Protection Objective
FCS	Favourable Conservation Status
GBF	Global Biodiversity Framework
GES	Good Environmental Status
GHG	Green House Gas
GIS	Geographical Information System
GSNI	Geological Survey of Northern Ireland
HED	Historic Environment Division
HERoNI	Historic Environment Record of Northern Ireland
HES	Historic Environment Scotland
HRA	Habitats Regulations Assessment
IBA	Important Bird Area
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
IWDG	Irish Whale and Dolphin Group
JNCC	Joint Nature Conservation Committee

LAQM	Local Air Quality Management
LCA	Landscape Character Area
MCZ	Marine Conservation Zones
MCAA	Marine and Coastal Access Act
MoD	Ministry of Defence
MMO	Marine Management Organisation
MSFD	Marine Strategy Framework Directive
NAEI	National Atmospheric Emissions Inventory
NERC	Natural Environment Research Council
NHA	Natural Heritage Area
NIE	Northern Ireland Electricity
NIEA	Northern Ireland Environment Agency
NILCA	Northern Ireland Landscape Character Assessment
NISRA	Northern Ireland Statistics and Research Agency
NNR	National Nature Reserve
NPWS	National Parks and Wildlife Service
NRW	Natural Resources Wales
OREF	Offshore Renewable Energy Forum
ORESAP	Offshore Renewable Energy Strategic Action Plan
OREAP	Offshore Renewable Energy Action Plan
PNHA	Proposed Natural Heritage Area
QUB	Queens University Belfast
RBMP	River Basin Management Plan
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SCOS	Special Committee on Seals
SEA	Strategic Environmental Assessment
SEO	Strategic Environmental Objective
SEPA	Scottish Environmental Protection Agency
SLNCI	Sites of Local Nature Conservation Importance
SONI	System Operator for Northern Ireland
SPA	Special Protection Area
TCE	The Crown Estate
TDPNI	Transmission Development Plan for Northern Ireland
UKCP	United Kingdom Climate Prediction
UKHO	UK Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization
WFD	Water Framework Directive

EXECUTIVE SUMMARY

This Environmental Scoping Report is presented as part of the scoping phase of the Strategic Environmental Assessment (SEA) for the draft Offshore Renewable Energy Action Plan (OREAP) for Northern Ireland. The purpose of this Scoping Report is to provide sufficient information on the draft OREAP to enable the consultees to form an opinion on the appropriateness of the scope, format, level of detail, methodology for assessment and the consultation period proposed for the SEA Environmental Report.

The Department for the Economy (DfE) is developing the draft OREAP to update the Offshore Renewable Energy Strategic Action Plan (ORESAP), developed by the then Department of Enterprise, Trade and Investment (DETI), and published in 2012. The OREAP will be the first Action Plan subsequent to the 2021 Energy Strategy and the targets set out in same and strengthened by the Climate Change Act of 2022. It aims to deliver on the Energy Strategy and the intention to develop an action plan to deliver 1 GW of offshore wind as set out in the Energy Strategy Action Plan 2022. DfE has commissioned RPS to undertake an SEA of the draft OREAP. This will provide further information to DfE on the potential positive and negative implications of implementing the draft OREAP, which will feed into the development process.

The SEA Directive aims to integrate environmental considerations into the preparation of plans and programmes and is a means of ensuring a high level of protection for the environment, while also promoting sustainable development. The SEA Directive, and Northern Ireland's implementing Regulations, will ensure that consideration is given to the environment in implementing the OREAP. DfE have determined that an update to the SEA assessment is appropriate for the OREAP. This SEA Scoping Report is the next step in the process. This document establishes the scope of works involved for the SEA for the draft OREAP.

An Environmental Report will be produced as part of the SEA and this will be available, together with the draft OREAP, for public consultation. All comments received during this SEA Scoping consultation, and the public consultation on the draft OREAP, SEA Environmental Report, and Habitats Regulations Assessment Report (RIAA), will be considered in the development and revision of the OREAP.

Please send all comments on the scope of the SEA of the draft OREAP to:

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1 INTRODUCTION

1.1 Background

This Strategic Environmental Assessment (SEA) Scoping Report has been prepared in accordance with the European Communities Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive), and in accordance with the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004).

The purpose of this Scoping Report is to provide sufficient information on the draft Offshore Renewable Energy Action Plan (OREAP) for Northern Ireland, to enable the consultees to form an opinion on the appropriateness of the scope, format, level of detail, methodology for assessment and the consultation period proposed for the SEA Environmental Report.

The SEA of the draft OREAP is being completed on behalf of the Department for the Economy (DfE). The views and opinions of the consultees are sought on the following questions:

1. Is there any information missing from the key plans and programmes listed, relevant to the draft OREAP that you think should be included, and why?
2. Do you agree with the geographical and temporal scope of the assessment?
3. Do you agree with the scoping of the environmental assessment topics?
4. Have we identified the key environmental issues relevant to the draft OREAP?
5. Are we proposing the most appropriate data and scale of data to be used?
6. Can you propose any other data to be used in the SEA, and why it would be beneficial?
7. Do you agree with the approach to the assessment?
8. Do you agree with the draft SEA objectives?
9. Do you agree with the proposed project timescales, and proposed consultees in the SEA process?

1.2 Strategic Environmental Assessment and purpose of this Scoping Report

The SEA Directive requires that certain Plans and Programmes, prepared by statutory bodies, which are likely to have a significant impact on the environment, be subject to the SEA process. The SEA process is broadly comprised of the steps shown in

Figure 1-1. These are given a summary description in **Table 1-1**. DfE has commissioned RPS to undertake an SEA of the draft OREAP. This will provide further information to DfE on the potential positive and negative implications of implementing the draft OREAP, which will feed into the development process.

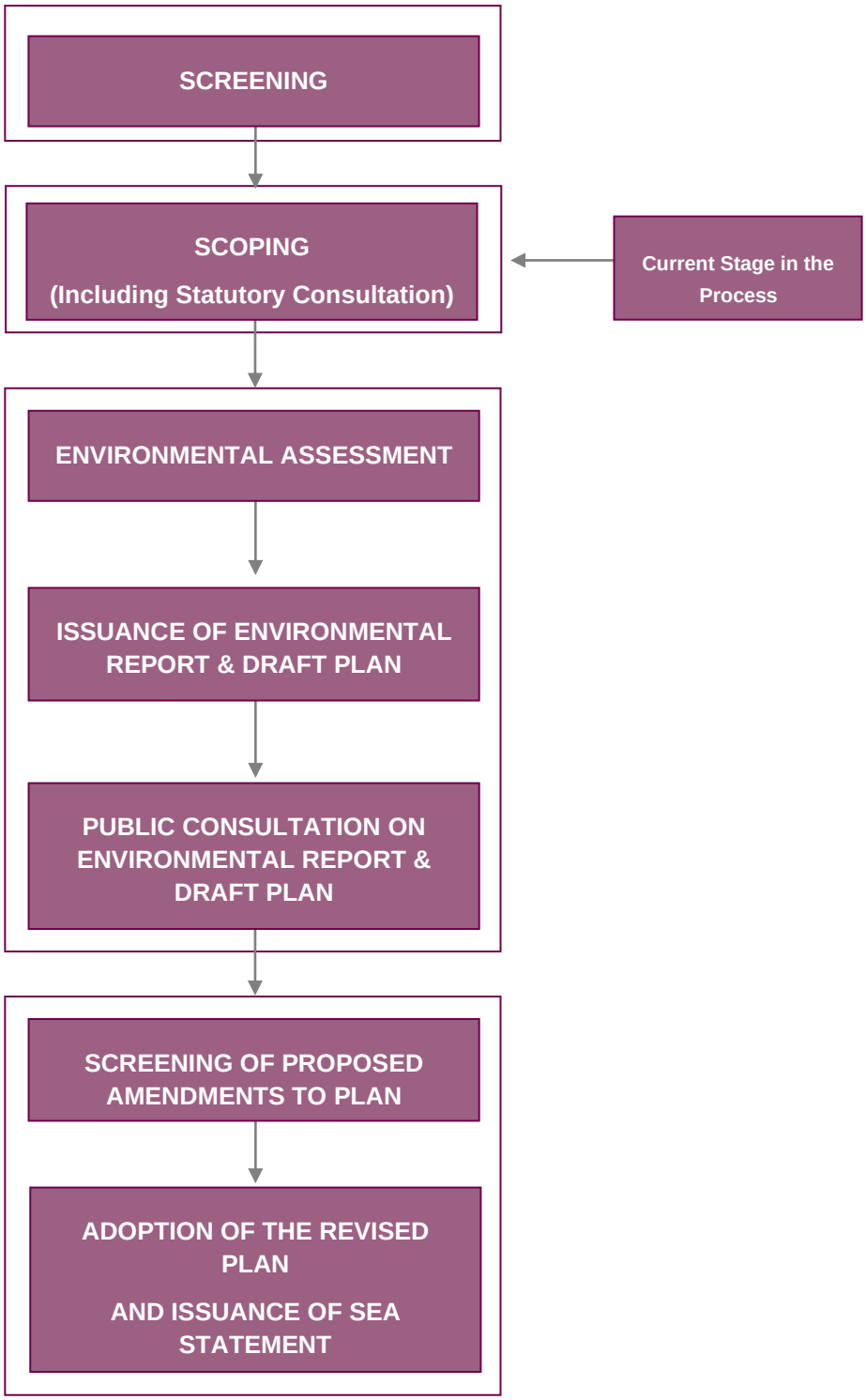

Figure 1-1 Overview of the SEA Process

Table 1-1 Summary Descriptions of the Main Stages in the SEA Process

Stage	Description	Status
Screening	Determines whether SEA is required for a Plan / Programme in consultation with the designated statutory consultees.	Completed
Scoping	Determines the scope and level of assessment detail for the SEA, in consultation with the designated statutory consultees.	Current stage
Environmental Assessment	Formal and transparent assessment of the likely significant impacts on the environment arising from the implementation of the Plan / Programme, including all reasonable alternatives. The output from this is an Environmental Report, which must go on public display along with the draft Plan / Programme.	October 2023 - February 2024
SEA Statement	Summarises the process undertaken and identifies the manner in which environmental considerations and consultations have been integrated into the final Plan / Programme.	May – June 2024

1.3 Screening for SEA

Under Article 2 (2) of the SEA Directive, energy plans require mandatory SEA. DfE have therefore concluded that it is appropriate to update the SEA assessment for the draft OREAP.

1.4 Scoping for SEA

This SEA Scoping Report is presented as part of the scoping phase of the SEA for the draft OREAP. The purpose of this Scoping Report is to provide sufficient information on the Plan to enable the consultees to form an opinion on the appropriateness of the scope, format, level of detail, methodology for assessment and the consultation period proposed for the Environmental Report. A Scoping Report can inform stakeholders about the key environmental issues and the key elements of the Plan. In addition, the Scoping Report can be used as a tool to generate comments from stakeholders on the scope and approach of the SEA.

1.5 SEA Guidance

Key guidance documents that are to be used in the SEA for the OREAP are listed in **Appendix A** of this Scoping Report.

1.6 Statutory Consultees for SEA

Under Article 6 of the SEA Directive, the competent authority (in this case DfE) preparing the plan or programme is required to consult with specific “environmental authorities” (statutory consultees) on the scope and level of detail of the information to be included in the Environmental Report.

The statutory consultee established within the SEA legislation for Northern Ireland is:

- The Department of Agriculture, Environment and Rural Affairs (DAERA)

There is the potential for transboundary impacts from the implementation of the Plan. For this reason, there is a requirement to undertake transboundary consultations as part of this SEA process.

The statutory consultees are established within the Irish national legislation, European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 [S.I. 435/2004] and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 [S.I. 436/2004], and their recent amendments of European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 [S.I. 200/2011] and the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 [S.I. 201/2011], as being:

- Environmental Protection Agency (EPA);
- Department of Housing, Local Government and Heritage (DHLGH);
- Department of the Environment, Climate and Communications (DECC);
- Department of Agriculture, Food and the Marine (DAFM); and,
- Any adjoining planning authority whose area is contiguous to the area of the planning authority.

The Scottish statutory consultees, as established in the Environmental Assessment (Scotland) Act 2005, are:

- NatureScot;
- Scottish Environmental Protection Agency (SEPA); and
- Historic Environment Scotland (HES).

The English statutory consultees, as established in The Environmental Assessment of Plans and Programmes Regulations 2004, are:

- Environment Agency (EA);
- Historic England; and
- Natural England.

The Welsh statutory consultees, as established in the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004, are:

- Cadw; and
- Natural Resources Wales (NRW).

1.7 Appropriate Assessment

The Habitats Directive (Council Directive 92/43/EEC) on the conservation of natural habitats and of wild fauna and flora obliges Member States to designate, protect and conserve habitats and species of importance in a European Union context. Article 6(3) of the Habitats Directive requires that "*Any plan or project not directly connected with or necessary to the conservation of a site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives*." The Directive was transposed into Northern Ireland legislation through the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995. Any proposed plan or project that has potential to result in a likely significant effect on a designated European site will require an Appropriate Assessment (AA). Case law has determined that the likelihood need not be great, merely possible, and that the precautionary principle must apply as set out in European Commission Guidance and as required by CJEU case law (i.e., C 127/02 '*Waddenzee'*).

Habitats Regulations Assessment (HRA) for the draft OREAP is being carried out in parallel with the SEA process. The first stage of the HRA process is Screening, which is to determine whether implementation of the OREAP has the potential to have a likely significant effect on designated European sites.

2 DESCRIPTION OF THE OREAP FOR NORTHERN IRELAND

2.1 The Offshore Renewable Energy Strategic Action Plan 2012

The Offshore Renewable Energy Strategic Action Plan (ORESAP) was developed by the then Department of Enterprise, Trade and Investment (DETI), and was published in 2012[1]. This presented the Department's vision for the delivery of offshore renewable energy in Northern Ireland's waters, and the possible scenarios whereby offshore renewables could contribute to a target of 40% renewable electricity by 2020. The draft ORESAP was subject to the SEA and AA processes, and key recommendations and mitigation measures from this work were built into the final plan. This process reviewed earlier studies and developer interest, identifying resource potential for marine renewable technologies in Northern Ireland's waters and potential Resource Zones suitable for offshore wind, wave and tidal technologies. The SEA proposed that between 900 MW and 1200 MW of electricity could be generated from offshore wind and tidal energy without significant effects on the environment or other users.

As part of the subsequent offshore leasing round by The Crown Estate, one 600 MW fixed offshore wind site off the coast of County Down (First Flight Wind) and two 100 MW tidal energy sites off the north coast (Torr Head and Fair Head) received Agreements for Lease. Planning for the offshore windfarm was abandoned in 2014, and the Torr Head project was abandoned following the liquidation of the company in 2019. The Fair Head Tidal Project initially consists of a 10 MW demonstration array phase to connect to the existing grid system at Ballycastle, before advancing to a proposed 100 MW array of turbines; there are currently delays to this project owing to issues with cable infrastructure routing and facilitation of onshore grid connections. There has therefore been no additional commercial offshore energy developed since the ORESAP was published.

2.2 The Energy Strategy for Northern Ireland and Renewable Energy Targets

The Energy Strategy for Northern Ireland – The Path to Net Zero Energy was published by DfE in 2021[2] and set out a roadmap for energy to 2030 that will 'mobilise the skills, technologies and behaviours needed to take us towards our vision of net zero carbon and affordable energy by 2050'.

The Energy Strategy is centred around the delivery of five key principles:

1. **Placing you at the heart of our energy future:** We will make energy as simple as possible for everyone in society and develop policies that enable and protect consumers through the energy transition. Affordability and fairness will be key considerations in all our policy decisions.
2. **Grow the green economy:** We will create new jobs and grow a skills base for the low carbon economy through innovation, support and focusing on our competitive strengths.
3. **Do more with less:** We will set clear targets, standards and regulations that drive improvements in energy efficiency, provide support to invest in improvements to buildings and help consumers make changes that reduce their energy use.
4. **Replace fossil fuels with renewable energy:** We will phase out fossil fuels by growing our indigenous renewable base, supported by sustainable renewable imports and use these to decarbonise power, heat and transport.
5. **Create a flexible, resilient and integrated energy system:** We will create a flexible, smart and digitised energy system that integrates renewables across heat, power and transport, creates value for consumers and enhances security of supply.

[1] Offshore Renewable Energy Strategic Plan (ORESAP) 2012-2020

[2] Economy NI Publication Energy Strategy-Path to Net Zero Energy

The overall goal of the Energy Strategy is to achieve net zero carbon and affordable energy for all. It sets out three high-level targets:

1. Energy Efficiency: Deliver energy savings of 25% from buildings and industry by 2030.
2. Renewables: Meet at least 70% of electricity consumption from a diverse mix of renewable sources by 2030.
3. Green Economy: Double the size of our low carbon and renewable energy economy to a turnover of more than £2 billion by 2030 (supporting the 10X Economic Vision).

Energy-related sectors (business, energy supply, industrial process, public, residential and transport) together account for almost 60% of Northern Ireland's GHG emissions. The aim is to reduce energy-related emissions by 56% by 2030 relative to 1990 levels, with at least 70% of electricity consumption from a diverse mix of renewable resources, and a 100% reduction in energy-related emissions by 2050. Successful implementation of the Strategy, and the pathway to decarbonise the power supply, form an important part of Northern Ireland's overall plan to address climate change, supporting the Climate Change Committee's (CCC) pathway to net zero carbon by 2050 and the Northern Ireland Green Growth Strategy, which emphasises that addressing climate change is essential for international competitiveness and attractiveness.

The Strategy states that, given the need to diversify the renewable technology mix, there will be a renewed focus on marine technologies, as DfE are committed to offshore wind forming a part of the future renewable electricity generation mix. The energy strategy is supported by the Energy Strategy Action Plan[3], setting out the key supporting actions to progress and deliver on the Energy Strategy: Under the Key Principle 5 of the Energy Strategy 'Replace Fossil Fuels with Renewable Energy', the Action Plan includes the following Action:

- Action 14 - DfE to "Develop an action plan to deliver 1GW of offshore wind from 2030". Reach agreement with the Crown Estate for leasing. Establish plan for implementing regulatory approvals. Develop competition process.

DfE and the Crown Estate have agreed a Statement of Intent to express their commitment towards establishing offshore wind leasing for Northern Ireland.

Subsequent to the publishing of the Energy Strategy, the Climate Change Act (NI) was introduced in 2022. This introduced more ambitious emissions targets for Northern Ireland, as follows:

- Net zero emissions by 2050, with at least 48% reduction in net emissions by 2030.
- 80% renewable electricity by 2030 (i.e., raised from the 70% target of the Strategy).

2.3 Review and Update of the OREAP

Offshore wind is currently the fastest-growing sector in renewable energy[4]; in the UK offshore wind generation overtook that of onshore generation in 2019 and accounted for 55% of all wind generation in 2021[5]. The UK has become one of the world leaders in offshore wind energy deployment, with 13 GW of offshore wind capacity and a target set out in the UK Energy Strategy of 50 GW by 2030 of which 5 GW will be floating wind. In the Republic of Ireland, one project has been connected to date (Arklow Bank), while there are a significant number of projects in development, and a target to produce 7 GW by 2030. A report by BVG Associates for RenewableNI[6] estimates that the addition of 1.5 GW of offshore wind in Northern Ireland would result in enough clean electricity to power 1.6 million homes; £2.4 billion of Gross Value Added (GVA); up to 1,500 additional jobs at peak construction; and 49 $MtCO_2e$ savings.

The draft OREAP will be the first Action Plan subsequent to the 2021 Energy Strategy and the targets set out in same and strengthened by the Climate Change Act of 2022. To deliver on the Energy Strategy and the intention to develop an action plan to deliver 1 GW of offshore wind as set out in the Energy Strategy Action Plan, DfE led the development of the draft OREAP during 2022. DfE established an OREAP Steering Group

[3] Economy NI Energy Strategy for Northern Ireland-The Path to Net Zero Action Plan

[4] Invest NI: Off-shore wind: the fastest growing sector in renewable energy

[5] Renewable Sources of Energy

[6] Renewable NI-The Clean Revolution

to guide its development and to bring together key delivery partners: DAERA, DfI, the Utility Regulator for Northern Ireland (UR), The Crown Estate (TCE), the System Operator for Northern Ireland (SONI), Northern Ireland Electricity (NIE) Networks, and RenewableNI. Four expert stakeholder working groups were established to identify key actions required to deliver the deployment of offshore wind in Northern Ireland waters, as follows: Planning, Licensing and Consenting; Network Development; Legislative Powers; and Sectoral Growth. An Offshore Renewable Energy Forum (OREF) was also established, comprising bodies representative of this that live close to, work in, or use the marine environment, to ensure that their views are fully considered; this included the fishing industry, local Government, maritime safety, environmental protection, maritime and marine economic development, ports and harbours, and marine heritage.

An early-stage draft OREAP, considered as a living and evolving document, was published for stakeholder consultation purposes in December 2022, with the aim of taking the first steps towards delivering on these commitments. It proposed principles and actions to take forward the Energy Strategy's ambition and was designed to accelerate this ambition through deployment of offshore wind in advance of 2030, if feasible.

The draft OREAP has been developed with ***three principles*** to guide the implementation of the action plan:

1. **Sustainable development in the marine environment**

   The Marine Plan and the Energy Strategy support the growth of the low carbon economy in Northern Ireland. Ensuring that this occurs in the most appropriate locations, with co-existence of compatible marine users where possible, and balancing all competing factors in a sustainable, environmentally positive way. Sustainable development also means maximising the long-term economic benefits that the offshore wind sector can offer communities and businesses in NI.

2. **Adaptive approach**

   Delivery will be managed through an adaptive approach which will allow the OREAP to be adjusted, if necessary, based on what is learned and as new data and insights become available. As such, the OREAP is an evolving, flexible document, which will address uncertainties and improve understanding of the processes of developing offshore wind in NI.

3. **Collaboration and partnership**

   Offshore renewable energy development involves several government departments, and multiple stakeholders. Therefore, pivotal to success will be the ability to work collaboratively and to regularly engage with key delivery partners including other government departments, regulators and other relevant bodies, the energy industry, and wider stakeholders who live close to, work in, or otherwise use the marine environment. The OREAP process will be delivered through a multidisciplinary and cross-sectoral approach.

The draft OREAP has been developed around ***five themes***, capturing the overarching strategic priorities that would need to the coordinated to enable deployment of offshore renewable energy on Northern Ireland waters:

- **Theme 1: Sustainability and co-existence**

  Offshore renewable energy development in the marine environment will work within the framework of DAERA's Marine Plan for Northern Ireland. The highest standards of environmental, social, and economic sustainability, and where possible, innovative approaches to co-location and co-existence in the marine environment, will be practiced. Three actions have been identified under Theme 1.

- **Theme 2: Enabling frameworks**

  A coherent and coordinated process for offshore wind developers to establish an offshore wind farm in Northern Ireland will be established. This process will involve a combination of marine licensing, development consent, planning permission, and generation and transmission licences. Government departments, regulators and relevant bodies will work in a coordinated and aligned way to deliver this. Five actions have been identified under Theme 2.

- **Theme 3: Electricity networks**

  Government departments, regulators, electricity networks and relevant bodies will work in coordination and collaboration to establish a joint approach to deliver the Energy Strategy for Northern Ireland's long-term ambitions for offshore renewable energy. Coordinated research and analysis activities will be aligned with and drive policy and inform decision making. Three actions have been identified under Theme 3.

- **Theme 4: Economic growth**

  Certainty and assurance on the route to market for offshore wind will be established. Public, private and education sector collaboration will bring forward the necessary skills and workforce to meet the requirements of the energy sector in the future. Ensuring Northern Ireland maximises the economic benefits of offshore wind in Northern Ireland will be prioritised by government departments and agencies, and industry partners. Eight actions have been identified under Theme 4.

- **Theme 5: Legislation and regulation**

  Legislation and regulation will be reviewed as necessary to be fit for purpose to deliver on the Energy Strategy for Northern Ireland's offshore wind and low carbon technology ambitions. Three actions have been identified under Theme 5.

Within the framework of these themes, 12 key objectives have been identified and a total of 22 actions scheduled as far as 2025, have been set out. These include the initial delivery steps necessary towards ensuring policy direction is established, necessary legislation brought forward, and regulatory requirements needed for offshore renewable energy deployment in Northern Ireland waters are implemented, while also identifying actions to coordinate the work of key delivery partners, develop insight and data through research and bringing the right people together to steer sustainable development of the industry.

2.4 Overview of Policy Context

The SEA Environmental Report will set out how the draft OREAP interacts with other key relevant plans and programmes and their environmental protection objectives, as required by Article 5(1) of Annex 1 of the SEA Directive, i.e., the environmental protection objectives (EPOs) within these plans / programmes that will directly influence, or be influenced by, the draft OREAP. These EPOs shall be used to create the Strategic Environmental Objectives (SEOs) that will inform the assessment of the draft OREAP.

Table 2-1 identifies the main significant environmental plans, programmes and legislation, adopted at International / European level, National / Regional level or Sub-Regional level, which would be expected to influence, or be influenced by, the draft OREAP.

The draft OREAP is intrinsically linked to the Energy Strategy for Northern Ireland and the Energy Strategy Action Plan, as discussed previously. Significantly, the draft OREAP will operate within a new marine planning system for Northern Ireland, underpinned by the draft Marine Plan for Northern Ireland 2018[7], the NI Marine Act 2013 and the UK Marine Policy Statement 2011, and the Marine and Coastal Access Act (MCAA) 2009. The draft Marine Plan will inform and guide the regulation, management, use, and protection of the Northern Ireland marine area, and the MCCA and Marine Act require that public authorities, in taking authorisation or enforcement decisions that might affect the marine area, must do so in accordance with the draft Marine Plan. Core policies of the draft Marine Plan relate to Stakeholder engagement, Air Quality, Climate Change, Coastal Processes, Co-Existence, Cumulative Impacts Heritage Assets, Invasive Alien Species, Land and Sea Interaction Marine Litter, Marine Noise, Natural Heritage Seascape, Use of Evidence, and Water Quality. Objective 2 (of 8 objectives set out in the draft Marine Plan) is 'to help realise the potential of energy resources and energy storage within the marine area, while fully considering the requirements of other marine interests'. The following renewable energy policy is of direct relevance to the OREAP:

"There is a presumption in favour of energy proposals that improve the security and diversity of energy supply, where it can be demonstrated:

a) there will be no unacceptable adverse impact throughout the lifetime of the proposal on marine activities, uses and/or the marine area and any potential adverse impact is, in order of preference, avoided, minimised and/or mitigated; and

b) restoration/decommissioning measures have been agreed, where necessary"

When assessing energy proposals, public authorities must consider the contribution that the proposal would make to the security and diversity of energy supply in Northern Ireland and the wider economy and society. Public authorities should only authorise a proposal if they are satisfied that it will not have any unacceptable

[7] DAERA NI Marine Plan for Northern Ireland

adverse impacts on the marine area, its ecosystem services and other marine users; and that the decision is consistent with requirements under UK and EU legislation and the UK's obligations under international law.

More information on plans and programmes, along with their potential interaction with the draft OREAP, is given in **Appendix B** of this Scoping Report.

Table 2-1 Summary of Key Plans and Programmes Relevant to the draft OREAP

Level	Plan / Programme / Policy / Legislation
International / EU Level	*Biodiversity* • UN Convention on Biological Diversity (1992) • Ramsar Convention on Wetlands of International Importance (1971 and amendments) • Bern Convention (Convention on European Wildlife and Natural Habitats) (1982) • The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (1992) • Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) (1983) • EU Biodiversity Strategy to 2030 • EU Birds Directive (Directive on the conservation of wild birds) [2009/147/EC] • EU Habitats Directive (Directive on the conservation of natural habitats and of wild fauna and flora) [92/43/EEC] • Convention for the Conservation of Salmon in the North Atlantic *Climate Change* • Paris Agreement (UNFCCC, 2015) • UN Kyoto Protocol, The United Nations Framework Convention on Climate Change (UNFCC, 1997) • EU 20-20-20 Climate and Energy Package Agreement (2007) • The European Green Deal 2019 • Renewable Energy Directive [2009/28/EC] • EU Strategy on Adaptation to Climate Change 2013 • Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change 2021[COM(2021)82] • Second European Climate Change Programme (ECCP II) 2005 • EU Green Infrastructure Strategy (COM(2013) 249 final) *Air quality* • Stockholm Convention (2004) • WHO Air Quality Guidelines – global update (2005) • The Gothenburg Protocol (1999) • Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive [2008/50/EC] & 4th Daughter Directive of the Air Quality Framework Directive [2004/107/EC] • Industrial Emissions Directive [2010/75/EU] • National Emissions reduction Commitments (NEC) Directive [2016/2284/EU] • Geneva Convention (1979) *Sustainable Development & Energy* • Eight Environmental Action Programme (2021-2030) of the European Community • EUROPE 2020 A strategy for smart, sustainable and inclusive growth (COM/2010/2020) • Roadmap to a Resource Efficient Europe (COM(2011) 571) • SEA Directive [2001/42/EC] • EIA Directive [85/337/EEC] [2014/52/EU] • Energy Efficiency Directive [2012/27/EU] • UN 2030 Agenda for Sustainable Development *Water*

Level	Plan / Programme / Policy / Legislation
	• The MARPOL Convention (preventing pollution from shipping) • UNCLOS (United Nations Convention on the Law of the Sea) 1982 • European Integrated Maritime Policy 2007 • Water Framework Directive [2000/60/EC] and amendments • Marine Strategy Framework Directive [2008/56/EC] • Floods Directive [2007/60/EC] • Bathing Water Directive [2006/7/EC] • Environmental Quality Standards Directive [2008/105/EC] (also known as the Priority Substances Directive), as amended by Directive 2013/39/EU. • Environmental Liability Directive [2004/35/EC] *Waste* • Waste Electrical and Electronic Equipment Directive [2002/96/EC], as recast by [201219/EU] • Waste Framework Directive [2008/98/EC] *Cultural Heritage* • Valetta Treaty (1992) • Granada Treaty (1985) • World Heritage Convention [WHC-2005/WS/02] *Landscape* • European Landscape Convention [ETS No. 176]
National / Regional Level	*Biodiversity* • Biodiversity Strategy for Northern Ireland to 2020 • UK Post-2020 Biodiversity Framework • Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 • Wildlife and Natural Environment Act (NI) 2011, amending The Wildlife (Northern Ireland) Order 1985 • The Environment (Northern Ireland) Order 2002 • DAERA Conservation Management Plans for SACs (in prep.) • UK National Ecosystem Assessment (2011) • Northern Ireland Species and Habitat Action Plans • Marine Protected Areas (Prohibited Methods of Fishing) Regulations (NI) 2022 • The Scallop Enhancement Sites (Prohibited Methods of Fishing) Regulations (NI) 2022 • (ROI) National Biodiversity Action Plan 2017-2022 and Ireland's 4th National Biodiversity Action Plan (draft, 2022) *Climate Change / Air Quality* • Northern Ireland's second Climate Change Adaptation Programme (NICCAP2) 2019 – 2024 • UK Climate Change Act 2008 • Change Act 2008 (2050 Target Amendment) Order 2019 • Climate Change (Northern Ireland) Act 2022 • UK Climate Change Risk Assessment 2022 • (RoI) National Adaptation Framework 2018 • (RoI) Climate Action Plan 2023 • The National Emissions Ceiling Regulations 2018 • UK National Air Pollution Control Programme (NAPCP) 2023 • The Environment Act 2021 and The Environment (2021 Act) (Commencement and Saving Provision) Order (Northern Ireland) 2022 • Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 (due to be amended May 2023) • Air Quality Standards Regulations (Northern Ireland) 2010

Level	Plan / Programme / Policy / Legislation
	• Clean Air Strategy for Northern Ireland – A Public Discussion Document, 2020
	Sustainable Development & Energy
	• Northern Ireland Energy Strategy – the Path to Net Zero (2021)
	• Energy Strategy for Northern Ireland – the Path to Net Zero Energy. Action Plan (2022).
	• Energy Strategy Action Plan 2023
	• Electricity (Northern Ireland) Order 1992 (Article 39)
	• Food and Environment Protection Act 1985
	• Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004
	• (RoI) European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, as amended
	• (Scotland) Environmental Assessment (Scotland) Act 2005
	• (England) The Environmental Assessment of Plans and Programmes Regulations 2004
	• (Wales) Environmental Assessment of Plans and Programmes (Wales) Regulations 2004
	• (RoI) Offshore Renewable Energy Development Plan (OREDP) 2014, and draft OREDP II
	• UK Offshore Energy Plan and SEA 3 (OESEA3). Department of Energy & Climate Change 2016
	• Offshore Wind Leasing Round 4 (Regions Refinement Report). The Crown Estate 2019
	• Broad Horizons: Key Resource areas for offshore wind. Everoze Report, commissioned by The Crown Estate 2020
	• (Scotland) National Marine Plan 2015
	• (Scotland) ScotWind Offshore Wind Leasing Round (The Crown Estate)
	• (RoI) National Marine Planning Framework
	• (RoI) The Maritime Area Planning Act 2021 (all-encompassing Act that covers both on-shore and off-shore planning)
	• The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017
	• Draft Transmission Development Plan for Northern Ireland 2023-2032
	• (ROI) Grid Implementation Plan 2017-2022 for the Electricity Transmission System in Ireland
	• Air defence and offshore wind – working together towards Net Zero 2021
	• Northern Ireland Executive Programme for Government 2016-2021
	• Programme for Government Draft Outcomes Framework 2021
	• Strategic Planning Policy Statement for Northern Ireland 2015
	• Planning Policy Statements 1 – 23
	• The Regional Development Strategy 2035 – Shaping Our Future
	• (RoI) National Planning Framework (Project Ireland 2040)
	• UK Sustainable Development Strategy
	• 10X Economy – An Economic Vision for a Decade of Innovation 2021
	• Draft Green Growth Strategy for Northern Ireland – Balancing our Climate, Environment and Economy 2021
	Water
	• The Marine Strategy Regulations 2010
	• Draft Marine Plan for Northern Ireland 2018
	• Marine Act (NI) 2013
	• Marine and Coastal Access Act 2009
	• UK Marine Policy Statement 2011
	• (Scotland) Marine (Scotland) Act 2010
	• Integrated Coastal Zone Management Strategy for Northern Ireland 2006-2026

Level	Plan / Programme / Policy / Legislation
	• The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017 • Draft 3rd cycle River Basin Management Plan (RBMP) for Northern Ireland 2021-2027 • Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015 • The Quality of Bathing Water Regulations (Northern Ireland) 2008 • Water Environment (Floods Directive) (Amendment) Regulations (Northern Ireland) 2018 • NI Flood Risk Management Plan, 2021-2027 • Environmental Liability (Prevention and Remediation) Regulations 2009 and amendment • Pollution Control and Local Government (Northern Ireland) Order 1978 *Waste* • Northern Ireland Waste Management Strategy, 2012 (new Strategy under development 2023) • Draft Waste Management Plan for Northern Ireland 2019 *Cultural Heritage* • Archaeology 2030 – A Strategic Approach for Northern Ireland • Historic Monuments and Archaeological Objects (NI) Order 1995 • Planning Act (NI) 2011 • The Regional Development Strategy 2035 – RG11 • The Protection of Wrecks Act 1973 • (RoI) National Monuments (Amendment) Act 1987 *Landscape* • Nature conservation and Amenity Lands Order (NI) 1985 • (ROI) National Landscape Strategy for Ireland 2015-2025
Sub-Regional Level	• Local Biodiversity Action Plans (LBAPs) • Local Development Plans / Draft Plan Strategies

Scoping Question:

1. Is there any information missing from the key plans and programmes listed, relevant to the draft OREAP, that you think should be included, and why?

3 SCOPING FOR THE OFFSHORE RENEWABLE ENERGY ACTION PLAN FOR NORTHERN IRELAND

The following section outlines the proposed scope of the SEA for the draft OREAP, including the geographic and temporal scope of the assessment, the likely significant impacts arising from the implementation of the draft OREAP, and what elements of the draft OREAP will be part of the assessment.

3.1 Plan Development

As described in **Section 2.3**, an early-stage draft OREAP was published for stakeholder consultation purposes in December 2022. The draft OREAP is an environmentally led plan, and its further development will be undertaken in an iterative manner in conjunction with the SEA and HRA, comprised of several stages and taking on board stakeholder views and recommendations. These proposed steps are shown in **Table 3-1**, and the process is illustrated in **Figure 3-1**.

Table 3-1 Flow steps in the development of the OREAP, SEA and HRA

Step	Description	Purpose	Outcome	Timeframe
1	Data collection, collation and cleansing	Gathering of all relevant technical, environmental and social geospatial data which can represent constraints to offshore renewable infrastructure development. Data coverage must be across all study area and not spatially constrained site-specific studies. Ranking of constraints (BRAG and score) as to the level of constraint they would place upon the proposed offshore infrastructure. Note BRAG and scoring includes for technical operational envelopes for the offshore infrastructure and for environmental and social sensitivities. Constraints also connect with the baseline data collection for the SEA and HRA. Constraints linked to environmental indicators in SEA assessment. Geographic cleansing and transformation of data to ensure efficient working in web mapping and models.	Constraints data to be used in technical, environmental and social assessment of proposed offshore renewable energy development in Northern Irish waters.	June – August 2023
2	Stakeholder Review 1	Tiered stakeholder review of proposed constraint information and ranking / scoring. Stakeholders to propose and provide additional constraint data / sensitivities, of adequate quality and coverage. If applicable RPS will collate into database and / or amend constraint rankings / scores.	Stakeholder agreement on constraints data and ranking / scoring to be used in resource assessment and within SEA and HRA.	June – July 2023
3	Constraint Mapping and Modelling	Mapping of agreed constraints data and development of web mapping for stakeholder access. Mapping by BRAG ranking and by cumulative constraints scoring.	Detailed mapping system for assessment purposes and summary mapping system for stakeholder interaction.	August – October 2023

4	SEA Scoping	Development of SEA Scoping Report. The purpose of the SEA Scoping Report is to provide sufficient information on the OREAP to enable the consultees to form an opinion on the appropriateness of the scope, format, level of detail, methodology for assessment and the consultation period proposed for the SEA Environmental Report.	Draft SEA Scoping Report for client review.	June – September 2023
5	SEA Scoping Consultation	5-week consultation on SEA Scoping Report to environmental consultees, including transboundary and stakeholders	SEA Scoping completion.	September – October 2023
6	Stakeholder Review 2	Tiered stakeholder review of all constraints data collated and mapped. RPS review feedback and undertake required updates	Stakeholder agreement on constraints mapping, ranking, scoring and modelling.	October 2023
7	Resource Identification	Two step approach to identification of suitable resource zones. - Areas within the study area that are within the technical operational envelopes for the various renewable energy infrastructure. - Constraints screening of resource zones to identify areas of lower constraint and reduced risk	Technical opportunity zones for each type of infrastructure. Areas of lower environmental and social constraint for offshore renewable development.	November – December 2023
8	Resource Quantification	Quantification of renewables potential within technically suitable areas of lower environmental and social constraint. High level, theoretical quantification, based on technology footprints. Not detailed assessment or commitment. All assessment based on data collected in step 1.	Potential generating capacities of resource zones. Provides indication of resource potential within lower constraint areas, for DfE / TCE to consider further for leasing rounds.	December 2023
9	Stakeholder Review 3	Tiered stakeholder review of resource zones and potential capacities. RPS review feedback and undertake required updates.	Stakeholder agreement on identified zones and capacities.	January 2024
10	Environmental Assessment	Environmental assessment of proposals based on SEA Objectives, Targets and Indicators, which are linked to the constraints data. Identification of wider environmental issues and opportunities.	Wider environmental issues and opportunities to feedback into resource zone refinement.	October 2023 – February 2024
11	HRA - AA Stage 1 - Screening	Screening for Appropriate Assessment. Potential for effects of the Plan on designated European sites / National Site Network.	HRA Screening Report.	December 2023 – January 2024
12	Resource Zone Refinement	Feedback from SEA and HRA into refinement of resource zones.	Agreed resource zones.	December 2023 – January 2024
13	OREAP Development	OREAP development based on the resource zone identification and quantification.	Draft revised OREAP.	October 2023 – February 2024
14	SEA Environmental Report	Development of SEA Environmental Report.	SEA Environmental Report.	February 2024

15	HRA - AA Stage 2 - Assessment	Plan level Appropriate Assessment of proposals for potential effects on designated European sites / National Site Network.	Report to Inform Appropriate Assessment.	January – February 2024
16	Public and Stakeholder Consultation	12-week public and stakeholder consultation. Draft OREAP, SEA Environmental Report and Report to Inform Appropriate Assessment available for public viewing and feedback.	Public consultation.	February – April 2024
17	Consultation Review	Review and collation of all feedback received on the draft revised OREAP, SEA Environmental Report and Report to Inform Appropriate Assessment.	Consultation feedback log and actions developed.	April – May 2024
18	Stakeholder Review 4	Tiered stakeholder review of proposed amendments to final revised OREAP based on consultation responses.	Stakeholder agreement on Final revised OREAP.	April 2024
19	Plan Finalisation and Adoption	Finalisation of the revised OREAP based on consultation feedback.	Final revised OREAP.	May – June 2024
20	SEA Statement	Update and finalisation of SEA Environmental Report. Development of SEA Statement to demonstrate how OREAP has considered the environment in its development, how the public and stakeholder have been consulted upon, and the reason for choosing the final Plan.	SEA Statement.	May – June 2024
21	HRA - Final Report to Inform Appropriate Assessment	Post consultation Final Report to Inform Appropriate Assessment.	Final Report to inform Appropriate Assessment.	May – June 2024

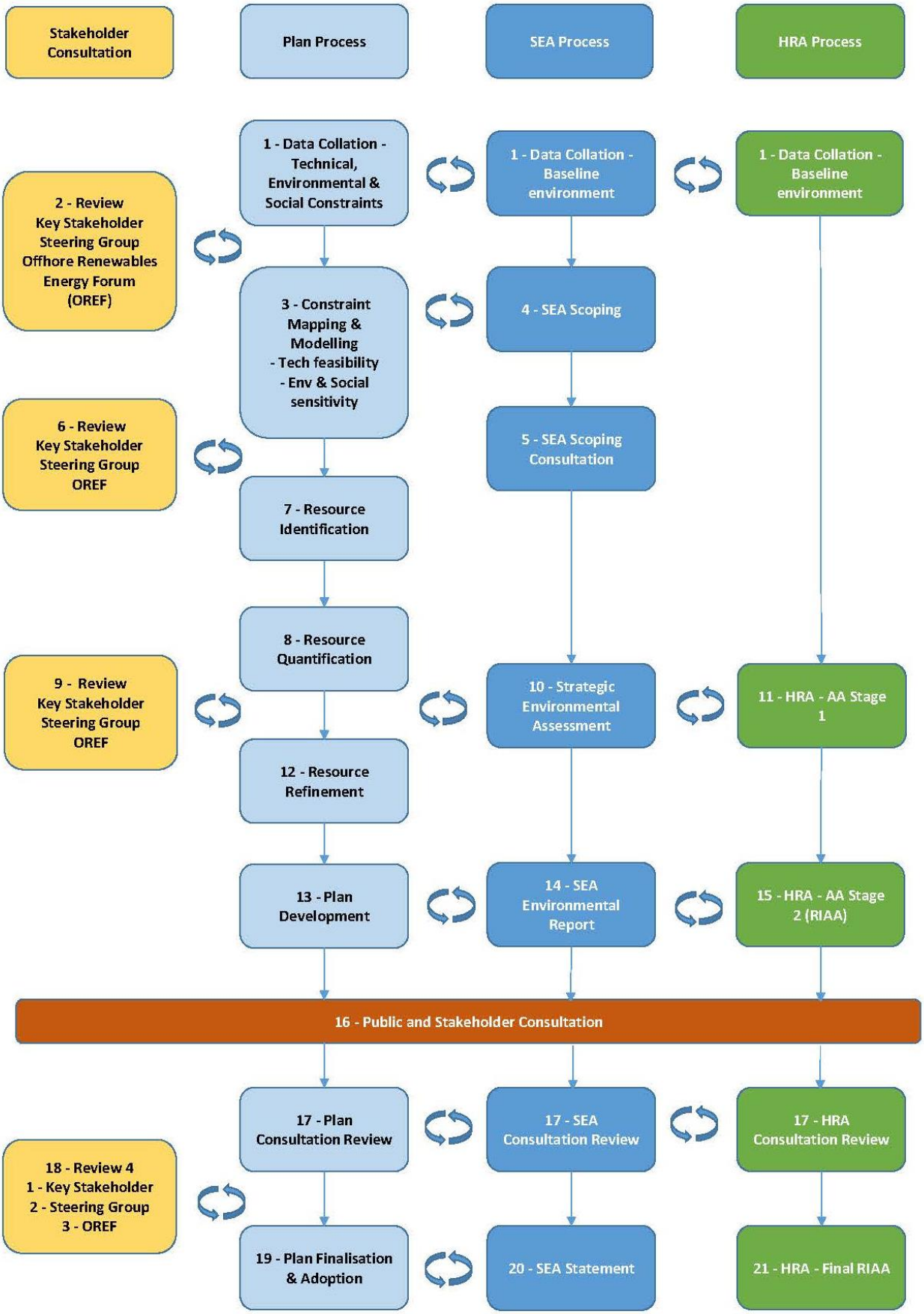

Figure 3-1 Flowchart for the iterative development of the OREAP, SEA and HRA

3.1.1 Environmental Constraints Mapping and Modelling

As described in **Section 3.1**, the iterative development of the draft OREAP and SEA will involve the mapping and modelling of constraints, including those of a technical, environmental and social nature. The modelling of environmental constraints will be used as part of the toolbox in focussing the plan through the identification of lower constrained areas that meet the right technical criteria for offshore renewable technologies, while also having potential feasibility for cables to make landfall.

In the first instance, this can enable the identification of areas within the study area that are within the technical operational envelopes for the various offshore renewable energy infrastructure. The types of offshore renewable energy included in this process are fixed and floating wind, wave and tidal power. The technical operational envelopes for these device types were established through a thorough review of published EIAs for offshore renewable energy projects within the UK, and through feedback from stakeholders. Further information on these renewable energy types and their operational parameters will be provided within the SEA Environmental Report.

Constraints screening of these technically suitable areas can then help to identify areas of lower constraint and reduced risk to offshore renewable energy development in Northern Ireland's waters. Constraints will initially be given a BRAG ranking – Black, Red, Amber, Green, based on the level of risk that impacting them would pose to the consenting of infrastructure development within an area or across a feature or the level of risk posed to the establishment of an asset. These ratings will be as detailed as possible, based on specific feature sensitivities, where identified by stakeholders. For example, all Special Areas of Conservation (SACs) would typically be given a Red rating where they are designated for fixed features (habitats and / or sedentary species), and an Amber rating where they are designated for mobile species, i.e. the Red constraints are a sub-set of the Amber designations, accounting for the increased sensitivity of fixed features to direct impacts from infrastructure. The proposed BRAG ratings to be used for this process are detailed alongside the constraints given in **Appendix C**. The constraints analysis will be informed by a series of principles, established in conjunction with the Project Team and stakeholders, covering issues such as allowable proximity, features to avoid etc., all of which are used ultimately to assign a weighting or rating to each constraint. The proposed buffer distances to be applied to the constraints to be used for this process are detailed in **Appendix C**. The proposed constraints data have also been linked to one or more SEA topics and SEA indicators.

With the principles established, GIS techniques can be used to generate a "heat map" or "cost surface" whereby the study area can be mapped based on the "cost" of establishing offshore renewable devices or routing a cable through each cell in a raster of constraints. In this context "cost" does not represent an actual monetary value, rather it represents the combined influence of multiple criteria that affect the feasibility of establishing an asset or laying a cable, under the broad headings of environmental, social and technical. Areas of environmental constraints arise due to there being environmentally sensitive habitats or species present and / or the areas being designated through international, European, national, or local planning legislation. Areas of social constraint are where there is likely to be disturbance to or risk to human activity or impacts on heritage features. Technical constraints are areas where it would be technically difficult or not technically feasible to construct and operate offshore renewable infrastructure and includes issues such as high shipping density or Traffic Separation Scheme areas.

In order to apply constraint mapping, a constraint has to meet all of the following requirements:

- Constraint has to represent a level of impedance to the project.
- There has to be reliable, published data available on the spatial distribution of the constraint.
- There has to be consistent data availability across the entire study area.

The BRAG rating of data allows for easy and quick identification of constraints and their relative sensitivities to offshore renewable infrastructure. The heat mapping allows for easy and quick identification of cumulative constraints and sensitivities. By using heat mapping the BRAG-rated data can be mapped and assessed qualitatively, with heat mapping used to generate least cost / lower constrained areas, to assist in the identification of potential resource zones for offshore renewable energy development and their strategic alternatives.

3.2 Scope of the Plan

As part of the SEA scoping process, decisions need to be made as to what parts of the draft OREAP should be assessed, and to what level of detail. The purpose of the SEA is to provide a meaningful assessment of those parts of the plan that may lead to *significant* environmental effects. This will contribute to more transparent decision making, whilst ensuring that the objective of integrating environmental considerations into plan making is realised.

The objectives of the draft OREAP are described in **Section 2.3**. To support the 12 Key Objectives of the draft plan, a total of 22 initial actions, scheduled as far as 2025, have been set out. Included in these are early actions to establish the resources available in Northern Ireland waters and to update the SEA undertaken in 2012. Action 1 is to "Procure external consultants to conduct SEA/HRA update of offshore renewable energy in the NI marine area", and Action 7 is to "Undertake spatial characterisation work in parallel with DfE work to update SEA/HRA". Included in the outputs of the OREAP will be the identification of a number of potential Resource Zones for the development of offshore renewable energy technology, that will inform further investigation by TCE over the next six years.

3.2.1 Geographic Scope

The draft OREAP is a plan for the Northern Ireland marine area. The Study Area for the OREAP, shown in **Figure 3-1**, comprises this marine area, i.e., the inshore region (up to the 12 nm limit) and the Northern Ireland offshore region, which extends into the UK EEZ. Within this, potential resource zones currently anticipated to have potential to accommodate each of the technology types considered by the plan, and taking into account significant environmental and social constraints, will also be identified.

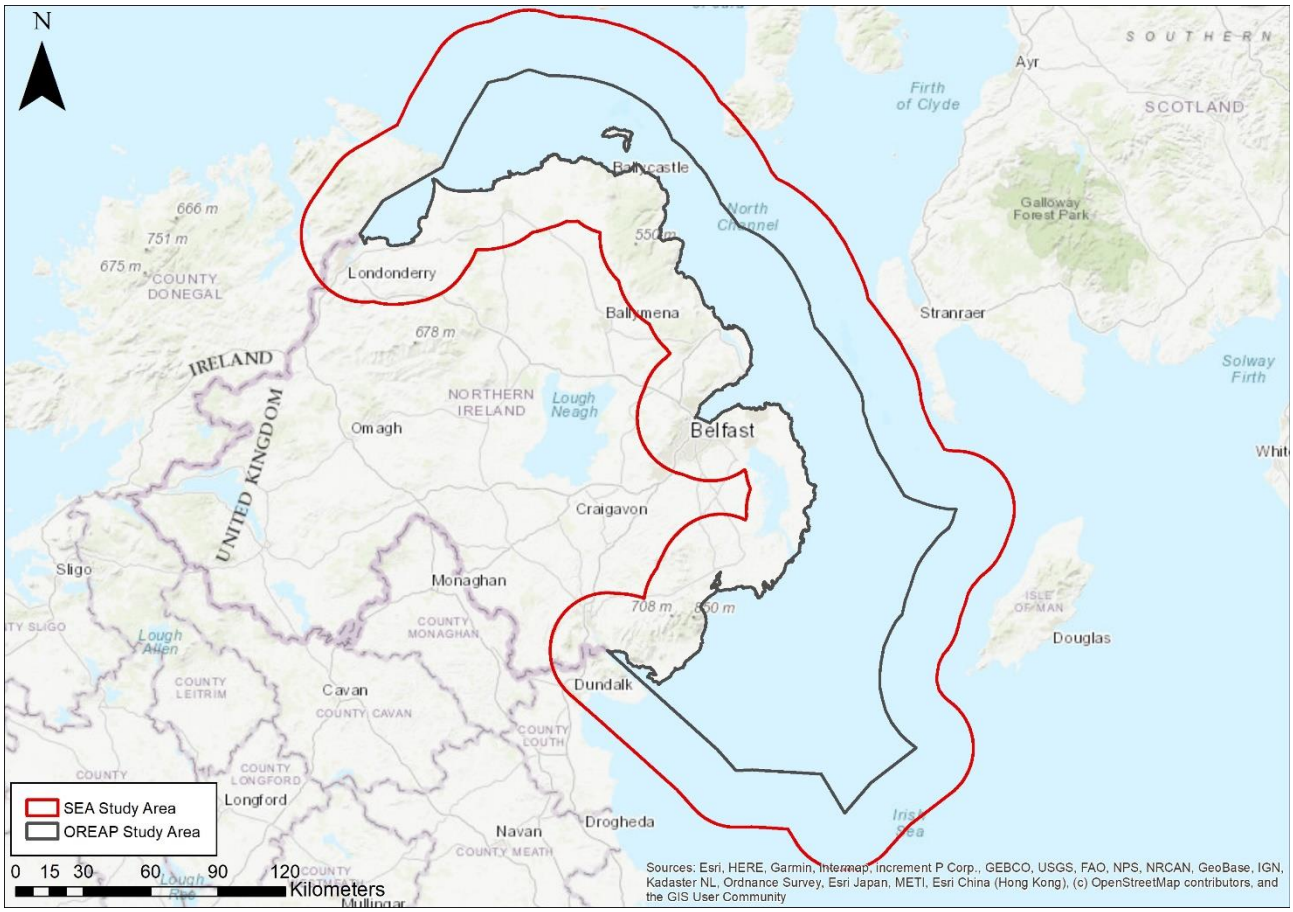

Figure 3-2 OREAP SEA Study Area

For the purpose of SEA assessment, a preliminary SEA Study Area, shown in **Figure 3-1**, has been defined comprising the OREAP Study Area (Northern Ireland inshore and offshore areas), and a 15 km buffer around this area. Within this SEA Study Area, the potential for positive or negative effects on SEA environmental

topic areas will be determined, with reference, where relevant, to the potential for effects at a greater distance (e.g., for mobile species).

The HRA for the draft OREAP will investigate the potential impacts on the European sites (National Site Network Sites) and may cover a much wider study area and zones of influence to address ex situ impacts to habitats and species.

3.2.2 Temporal Scope

The draft OREAP is proposed to cover the period from up to 2030. It is established that the OREAP will be subject to review annually subsequently to allow for the consideration of technical or legislative changes.

This SEA process represents a full SEA review and update of the OREAP. It is proposed that any future updates to the OREAP will be reviewed for the purpose of undertaking a new SEA, if required.

It is proposed that the SEA will consider the potential for short-term (construction phase), medium-term (re-establishment and initial operational phase, considered as 0-5 years post-construction), and long-term (operational phase, 5 years post-construction onwards) impacts from implementing the potential renewable energy projects that could arise from implementation of the OREAP (including reference to secondary, cumulative, synergistic, permanent and temporary, positive and negative effects), in line with the requirements of the SEA Directive.

3.3 Scoping of Strategic Environmental Assessment Topics

In accordance with the SEA Regulations (NI), consideration has been given to the type of environmental effects, both positive and negative, that could be expected to arise from implementation of the draft OREAP through development of offshore marine renewable energy. **Table 3-1** has been created to generate discussion in the scoping process and consultations. It is anticipated that this table may evolve as the OREAP develops, and as a clearer picture of the likely technology, characteristics, construction and management practices and the receiving environment becomes fully apparent.

Table 3-2 Scoping of SEA Issues

SEA Topic	Scoped In / Out	Potential Environmental Issues
Biodiversity, Flora & Fauna	**In**	• Potential for direct permanent loss of habitat and species, including protected or priority habitats and species, in the footprint of new infrastructure. • Potential for construction phase disturbance of habitat and species, or indirect changes in habitat type post construction e.g., through changes in sediment dynamics / smothering effects, effects on water quality / temperature, or cable protection. • Potential for infrastructure to create new habitat e.g., for epifauna colonisation. • Potential disturbance effects from underwater sound on marine mammals, fish and seabirds during construction and operation. • Potential collision risk for marine mammals, fish, seabirds (above and below the water surface), and other marine fauna with vessels during the construction phase, and with infrastructure during operation. • Potential barrier effects / habitat exclusion from the presence of infrastructure during operation. • Potential effects of EMF from transmission cables on fauna such as marine mammals and electrosensitive fish. • Potential for introduction or spread of non-native species during construction.
Population & Human Health	**In**	• Potential for disturbance of the local population during construction (e.g., noise) and impacts on residential amenity. • Potential for conflict with other users of the coastal and marine environment (e.g., fishing and leisure), or indirect effects on leisure activities (e.g., through alteration of hydrodynamics).

		• Potential positive or negative effects on employment and the local economy (e.g., local community employment, fisheries, and skilled technical workers, potential for increased capital investment in the local area). • Potential for long-term indirect health effects on the local population. • Potential for long-term positive effects on air quality (reduced emissions).
Geology, Soils & Land Use	**In**	• Potential for physical damage to the seabed from new infrastructure. • Potential for indirect physical effects on the seabed or subsurface from new infrastructure e.g., through alteration of the sediment regime, changes to seabed morphology, depositing of dredged material. • Potential for alteration of hydrodynamics or coastal processes.
Water	**In**	• Potential for the accidental release of contaminants or disturbance of historic sediment contaminants during construction, or release of contaminants from vessels during construction and operation. • Potential for the disturbance and mobilisation of marine sediments and effects on turbidity. • Potential for indirect effects on the water column e.g., temperature, turbidity, salinity. • Potential for the introduction of temporary or permanent sound sources into the marine environment. • Potential for the introduction of non-natural EMF into the marine environment • Potential for the introduction of marine litter and seabed debris into the marine environment. • Potential to adversely affect the status and / or the potential to achieve Good Environmental Status of Marine Strategy Descriptors. • Potential to adversely affect the status and / or the potential to achieve Good Status of WFD transitional and coastal water bodies, and WFD Protected Areas (Bathing and Shellfish Waters).
Air / Climate	**In**	• Potential for localised effects of air pollutants during the construction phase and / or operational support / maintenance (plant emissions). • Potential for localised noise effects during construction and operation. • Potential for indirect positive effects on air quality in the long-term through reduction in emissions from power stations owing to new renewable energy connections. • Potential for marine renewable energy to contribute to a net reduction in GHG emissions. • Potential for a permanent loss of blue carbon resources. • Potential for marine renewable infrastructure to be resilient to the effects of climate change.
Material Assets	**In**	• Potential for interaction with / disruption effects on ports, shipping and navigation during construction. • Potential for interaction with areas of marine infrastructure (cables & pipelines, existing or planned renewable energy infrastructure). • Potential for temporary or permanent disturbance or displacement from areas of importance for commercial fisheries and aquaculture. • Potential for indirect effects on tourism. • Potential for temporary or permanent disruption effects on areas of known military / defence activity. • Potential for temporary or permanent disruption of aviation operations, including navigational radar and telecommunications. • Potential for interaction with / disturbance of areas used for disposal or for aggregate extraction.
Cultural Heritage	**In**	• Potential for direct or indirect effects on marine archaeological features (including protected features) such as wrecks and submerged landscapes

		during construction. • Potential for indirect effects on the setting of coastal archaeological or architectural features. • Potential for the discovery of new cultural heritage features during construction.
Landscape / Seascape & Visual Amenity	**In**	• Potential for effects on areas of designated landscape quality and scenic views (AONBs, AoHSV). • Potential for effects on the general landscape and seascape and its sensitivity to development (potential compatibility with landscape and seascape character types). • Potential visibility of offshore structures and / or onshore support structures by human receptors.

Scoping Questions:

2. Do you agree with the geographical and temporal scope of the assessment?
3. Do you agree with the scoping of the environmental assessment topics?
4. Have we identified the key environmental issues relevant to the draft OREAP?

4 BASELINE AND ENVIRONMENTAL PROBLEMS

In line with the SEA Directive, an environmental baseline will be compiled for the SEA Environmental Report of the draft OREAP. This will include: a description of the state of the environment at present; a discussion of the key problems / issues currently being faced in the area; and a description of the expected evolution of the environment should the OREAP not be implemented, i.e., in the absence of the plan.

4.1 Environmental Baseline Data

The SEA Environmental Report will contain a full description of the environmental baseline data within the overall study area. The key baseline information intended to be used are detailed in **Table 4-1**. It is proposed that much of the baseline information will be presented in the form of maps and tables, with supporting text in the Environmental Report which focuses on data directly relevant to the draft OREAP.

The baseline description will focus in the first instance on Northern Ireland, however there may be potential for transboundary environmental impacts on some topics (e.g., biodiversity, flora and fauna, water, climatic factors). As such, the baseline description will include reference, where relevant, to transboundary sites.

Much of the proposed baseline information has been included within this SEA Scoping Report, with the anticipation of receiving more specific responses or recommendations from consultees at this scoping stage that can be taken into account in the SEA Environmental Report.

Table 4-1 Summary of Proposed Environmental Baseline Data and Sources

Environmental Baseline Data	Data Sources
Biodiversity, Flora & Fauna	
Location and Condition of Designated Nature Conservation Sites and Species	DAERA, JNCC (Article 17 Reporting), National Trust, RSPB, NPWS, Local Authority data: • SACs (NI & RoI) • SPAs (NI & RoI) • Ramsar Sites (NI & RoI) • Designated Sites condition / monitoring • ASSIs • NHAs and pNHAs • SLNCIs • Nature Reserves • Marine Conservation Zones
Benthic and Intertidal Habitats	EMODNet, DAERA data: • Benthic marine habitat types • Protected and priority benthic habitats and designated sites
Fish and Shellfish	DAERA, IWDG, CEFAS, COWRIE, Fish RAMP data: • Numbers and types of species • Protected and priority fish & shellfish species and designated sites • Fisheries statistics (See under Material Assets) • Spawning and Nursery Grounds • Marine Strategy status • Status and vulnerabilities
Birds	DAERA, Birdlife International, BTO data: / reporting

	• Protected and priority species, designated sites and areas of importance (SPAs, MCZs, IBAs) • Status and Vulnerabilities
Marine Mammals	IWDG, AFBI, DAERA, NERC Special Committee on Seals (SCOS) QUB, JNCC data/reporting: • Marine mammals in NI waters • Seal distribution and management • Protected and priority species • Status and vulnerabilities
Bats	DAERA, Bat Surveys Ireland, EUROBATS • Bat species in NI • Bats and wind turbines • Bat migration & offshore foraging
Reptiles	DAERA, IUCN, Marine Environmental Monitoring data: • Reptiles in NI marine waters • Status and protection, priority species • Vulnerabilities
Non-indigenous Species	DAERA, British Irish Council, GB non-native species secretariat (NNSS) data/reporting: • Marine Strategy status • Strategies & management
Population & Human Health	
Population Demographics and Health	NISRA data: • Census Small Areas • Settlements • Population Health and wellbeing DoH data: • Population Health and wellbeing Seas, Oceans and Public Health in Europe (SOPHIE) Research project
Employment	NISRA data: • Employment statistics UK Office for National Statistics data • Low carbon and renewable energy economy
Coastal and Marine Recreation	Royal Yachting Association (RYA) data: • RYA clubs, marinas, areas Charter Boats UK (CBUK) data: • Directory of charter boats in the UK DAERA data: • Bathing waters
Geology, Soils & Land Use	
Bathymetry and seabed features	UKHO, EMODNet, JNCC, AFBI data: • Bathymetry and water depths

Marine and coastal geology and sediments	BGS, GSNI, AFBI, DAERA data: • Bedrock and quaternary geology • Sediment characteristics and transport • Coastal and marine sites designated for earth science features
Water	
Locations, Status and Risk of Water Bodies	DAERA data: • Marine Strategy Descriptors and status • Number, status and trends of WFD coastal and transitional water bodies • Numbers and status of Shellfish Areas (WFD Protected Areas) • Numbers and status of Bathing Waters (WFD Protected Areas)
Air and Climatic Factors	
Air Quality and Emissions	Local Authority, DAERA, DEFRA, NAEI data: • Air Quality Management Areas • Air Quality Monitoring (National / Regional emissions)
GHG, Climatic Change projections and risks, blue carbon	DAERA. Met Office, NERC, Climate Change Committee data: • GHG emissions monitoring • Climate change projections • Blue carbon
Carbon cost of marine renewables	IPCC, Ulster Wildlife, Bernstein Research data: • Comparative lifecycle assessments for energy technologies
Material Assets	
Number and Type of Infrastructure Assets and potential areas of interaction with other users of the marine area	NISRA, Marine Management Organisation (MMO), Wind Energy Ireland, DAERA data: • Ports, shipping and navigation NIE, DAERA, North Channel Wind, Simply Blue Group, SeaGen, Minnesota Group, QES Group, Marinegen data/reporting: • Marine infrastructure, including cables & pipelines and renewable energy infrastructure
Commercial Fishing and Aquaculture	MMO, DAERA, DEFRA/DAERA/Welsh Government/Scottish Government data/reports: • UK sea fisheries statistics • NI fish landings • Joint fisheries agreements
Tourism	NISRA, DAERA, NI Tourist Board data: • Tourism statistics, visitor attractions, AONBs.
Defence/Military Activity	UKHO, MoD, joint MoD/DESNZ/TCE/DBEIS data / reports: • Military practice areas • MoD Air Surveillance and Control System radar & byelaws • Air defence and offshore wind planning

Aviation	CAA, NATS data: • NI airports and statistics • Wind turbines and aviation guidance • Wind turbines and radar interference
Disposal Areas	DAERA data: • Marine disposal sites
Marine Aggregate Extraction	TCE data: • Marine aggregate extraction
Cultural Heritage	
Location and Status of Heritage Assets	DfC, HED, DAERA, UNESCO, SPLASHCOS data: • Northern Ireland Historic Buildings Database • NI Sites and Monuments Records • Historic Environment Record of Northern Ireland • UNESCO World Heritage Sites • Register of Historic Parks, Gardens and Demesnes • Areas of Significant Archaeological Interest (ASAI) • Areas of Archaeological Potential • Defence Heritage Sites • Industrial Heritage • Scheduled Zones • Battle sites • Known wrecks • Known submerged landscapes/archaeological sites
Landscape, Seascape & Visual Amenity	
Designated Landscapes	DAERA, National Trust data: • AONBs • Country Parks • National Trust Lands • Areas of High Scenic Value
Landscape and Seascape Character Areas and	DAERA data: • Landscape Character Areas • Seascape Character Areas
Visual/sensitivity of landscapes to offshore renewables	DAERA, UK Offshore Energy SEA, TCE Offshore Wind Leasing data/reports: • Visibility and landscape/seascape as a constraint to offshore wind

4.2 Current State of the Environment in Northern Ireland

Northern Ireland's most recent state of the environment review (2013)[8] found the situation to be variable. Air quality showed continuing improvement, while water quality had benefitted significantly from improved

[8] DAERA NI-From Evidence to Opportunity A Second Assessment of the State of Northern Ireland's Environment

control of effluents, and rates of municipal waste recycling had been steadily increasing. Significant challenges remained, however, in reversing biodiversity declines and meeting EU objectives for water bodies, landscapes, habitats and heritage.

The main threats identified in the previous 2008 review, namely climate change, land use, and socio-economic growth, continued to create pressures on the environment in Northern Ireland. These key challenges are outlined below:

- Economic downturn –

The most significant change since 2008 with regards to socio-economic growth has been the economic downturn, which has had impacts on housing, development, energy and resource use and on waste production. The 2008 recession had intensified the need to stimulate growth and to use our resources, such as agricultural lands more efficiently whilst protecting and enhancing our natural environment.

- Living within our limits –

Living within our limits relates to the impact of ever-increasing populations on the environment in terms of food production, imports, energy use, and water security. There was an increasing realisation that living within our limits, both economically and environmentally, locally, and globally, is now a major challenge.

- Sustainable rural land use –

It had been identified that the marine environment, from biodiversity indicators and the status of our waters are under threat. The 2013 State of the Environment report noted the relationship between rural land practices and the water environment and identified that a fully integrated approach to the management of the land and water environment was needed.

- Climate change –

Climate change remained an important issue for Northern Ireland and indeed globally. However recent legislation such as the UK Climate Change Act along with renewable energy policies and increasing energy costs are likely to contribute to already positive advancements.

Following on from the key challenges identified, three key principles underpinning the way forward were also listed, and comprise the following:

- Working to achieve **resilient, diverse ecosystems** capable of providing vital services while absorbing pressures and responding to change;
- Valuing and **managing natural resources** to support economic and social prosperity; and
- Protecting the quality of life by **reducing pollution, protecting heritage** and promoting **sustainable land use**.

A summary of the relevant aspects of the current state of the environment in Northern Ireland, as presented in the most recent state of the environment review (2013) and updated, where possible, by taking into account the most recent Northern Ireland Environmental Statistics Report (2023)[9], has been provided in **Table 4.2**.

Table 4-2 Summary of Current State of the Environment in Northern Ireland, as presented in 'From Evidence to Opportunity: Second assessment of State of NI Environment 2013' and updated by the 'NI Environmental Statistics Report 2023'.

Theme	Key Findings
Air Quality	There are 21 air quality monitoring stations in Northern Ireland. Air quality in Northern Ireland has shown substantial improvement in recent years. The average

[9] NISRA Northern Ireland Environmental Statistics Report May 2022

	annual mean concentration of NO_2 across Northern Ireland's urban background sites remained relatively stable between 2011 and 2016, varying between 20 and 23 µg/m^3. However, since 2017 the average annual mean concentration of NO_2 has fallen below this level and was 13.6 µg/m^3 across Northern Ireland's urban background sites in 2022. In 2022, there was no breach of the UK Strategy Objective or EU Limit Values of 40 µg/m^3 for the annual mean concentration of particle matter (PM_{10}). The annual mean PM_{10} concentration across Northern Ireland's urban monitoring sites reached a maximum of 22 µg/m^3 (in 2010) but has shown a gradual decline since that time, with an annual mean value of 14 µg/m^3 in 2022. The agriculture sector accounted for the majority of ammonia emissions in Northern Ireland in 2021. Other sources include transport, commercial and domestic combustion and industrial processes. Overall, ammonia emissions have increased, by 12.1%, from 28.5 kt in 2001 to 32.0 kt in 2021.
Climate	Since the start of the 20th century records show that the climate in Northern Ireland is changing. In 2020, Northern Ireland's greenhouse gas emissions were estimated to be 20.9 $MtCO_2e$, a reduction of 24% since baseline levels in 1990. Agriculture (27%), transport (16%) and residential (14%) were the largest contributing sectors to greenhouse gas emissions in Northern Ireland in 2020. The UK Climate Change Act commits the UK to reducing emissions by 100% by 2050 from 1990 baseline levels. The same 100% emission reduction target is now true of Northern Ireland, due to the Climate Change Act NI, as of June 2022. In 2020, Northern Ireland's total greenhouse gas emissions accounted for 5% of the UK total, higher than its population share of 3%. For the period January to December 2022, 50% of the total electricity consumption in Northern Ireland was generated from renewable sources based in Northern Ireland.
Water	Eutrophication, or the enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus is recognised in the State of the Environment Report 2013 as a widespread major threat to water quality in the freshwater environment. The report stated that the overall status of water bodies in Northern Ireland had not significantly changed from that recorded in 2012, but improvements had been identified in water utility discharges and drinking water quality. Long-term seasonal trend analysis reported in the State of the Environment Report 2013 showed that the monthly trends in average nitrate concentrations in rivers in Northern Ireland were predominantly decreasing or stable over the 28-year period, 1992-2019, which may be attributed to the measures implemented through the Nitrates Action Programme. However, DAERA issued a consultation document on Significant Water Management Issues[10] to inform the development of the third cycle River Basin Management Plan (2021-2027). This showed that the most significant pressure on water quality in Northern Ireland is from the release of the nutrients not only nitrogen but also from phosphorus, from agricultural and other sources. Between 2015 and 2018, Soluble Reactive Phosphorus (SRP) was the cause of decline in status for 100 river water bodies across Northern Ireland. It should also be noted that The Programme for Government (PfG) Outcome 2 indicator includes SRP concentrations in rivers. In 2022, there were 1,535 water incidents reported to NIEA or discovered by NIEA during inspections. Of these incidents, 44% were confirmed as having an impact on the water quality of the receiving waterway, with 13% of these considered as high or medium severity.
Marine	The majority of Northern Ireland's 650 km of coastline is protected for its special interest, and a number of our coastal species and habitats are recognised as internationally important. Of the 25 inshore coastal waterbodies in Northern Ireland, 13 were reported as good or better ecological conditions. High nutrient levels, particularly in inshore estuarine waters and sea loughs, are identified as a

[10] Government of Ireland Significant Water Management Issues in Ireland

	key element responsible for coastal water bodies not attaining good ecological condition. In January 2014, the Shellfish Waters Directive was subsumed into the Water Framework Directive, resulting in more stringent *E. coli* standards and a noticeable "drop" in the percentage of designated shellfish waters. Two out of nine (22%) designated shellfish water protected areas (SWPAs) complied with the Water Framework Directive guideline *E. Coli* standard in Shellfish Flesh in 2022, a decrease from a percentage compliance of 56% in 2021.
Land and Landscape	Agri-environment schemes encourage farmers and landowners to manage their land to benefit the environment. At the end of 2022, 63,800 ha of land in Northern Ireland were under an agri-environment scheme agreement. In Northern Ireland, over 52% of forests and woodlands are state-owned or managed. The NI Environmental Statistics Report 2023, reported that in 2022/23, 451 hectares of new woodland (72 ha conifer and 379 ha broadleaf) were planted by NI Forest Service and private landowners supported by grant aid.
Biodiversity	The Northern Ireland Environmental Statistics Report 2023 reported that in 2021/22, the area of terrestrial protected sites under favourable management in Northern Ireland was recorded as at least 35,896 ha. In 2022/23, 55% of features within marine and terrestrial protected sites were in Favourable condition while 36% were in Unfavourable condition. Approximately 3% were in Unfavourable-Recovering condition with less than 1% Destroyed. The wild bird population indicator using 56 bird species shows decreased levels in 2021 compared to 1996. Bird populations peaked in 2005 and have been in decline since, driven principally by bird species found in farmland habitats.
Built Heritage	In 2021/22, there were a total of 2,019 scheduled historic monuments protected under Article 3 of the Historic Monuments and Archaeological Objects (NI) Order 1995. Overall, there has been a 33% increase in the number of scheduled monuments since 2001/02, reflecting ongoing survey, designation and assessment. In addition, there has been a modest increase in the number of buildings listed in recent years with a total of 9,063 statutory listings in 2021/22, compared with 8,191 in 2003/04. The figures provide an indication of this aspect of the rich cultural and built heritage of Northern Ireland, an increasingly important source of "soft power" and an important contributor to the Northern Ireland economy, through attracting tourism and filming. In 2021/22, 892 historic buildings and structures were recorded on the HARNI register as 'at risk'.
Waste and Resources	Waste is produced by households, by industrial processes, by the construction and demolition industry, through commercial activities and agricultural practices and by public services and utilities. Waste can affect the environment through its visual impact or by emissions to the air, groundwater and surface water as well as the contamination of land. The Northern Ireland Environmental Statistics Report 2023 notes that The Local Authority Municipal Waste Management Statistics show that the amount of waste sent for energy recovery via incineration has grown exponentially since 2006-07, whilst the proportion of waste sent to landfill has more than halved in the same timescale. Recycling of waste is becoming much more common in Northern Ireland. The revised Northern Ireland Waste Management Strategy (Delivering Resource Efficiency, 2013) proposed to achieve a 50% recycling rate by 2020 for local authority collected municipal waste. For municipal waste in 2021/2022 the recycling rate was 49.7%, similar to the 50.0% rate for 2020/21. The recycling rate for household waste was 50.1% in 2021/22, which was a decrease compared to the 2020/21 rate of 50.9%.

4.3 Environmental Characteristics

This section describes the environmental baseline for Northern Ireland, of relevance to the draft OREAP. The baseline has been divided by topic into the issues requiring assessment under SEA legislation. The purpose of this section is to demonstrate the level of baseline environmental information to be used when assessing the potential impacts of implementing the draft OREAP. This baseline information forms the indicators which potential offshore renewable infrastructure will have the potential to impact upon. Future variations in these indicators owing to the implementation of the draft OREAP will be monitored as part of the OREAP and SEA review.

4.3.1 Biodiversity, Flora & Fauna

Biodiversity is the variety of all plants and animals, and the communities that they form. The conservation of biodiversity is important in its own right. Humans are also dependent on biodiversity for the provision of ecosystem services such as clean air and water, food, and shelter, as well as for the health and amenity value that the natural environment can provide. Northern Ireland's marine waters cover an area of over 6,000 km^2 and contain over 50% of the region's biodiversity, along with a coastline that stretches for over 650 km, more than 75% of which falls within some form of conservation designation[11].

The importance of preserving biodiversity has increasingly been recognised from an international to a local level, and Northern Ireland has legal obligations under International and EU commitments and legislation. The UN Convention on Biological Diversity (1992) is an international legally binding treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; and the fair and equitable sharing of the benefits arising from the use of genetic resources. It requires the development of national strategies for the conservation and sustainable use of biological diversity. The most recent Biodiversity Strategy for Northern Ireland, "Valuing Nature", was published by DAERA in 2015 and covered the period up to 2020. This set out how Northern Ireland planned to meet its international obligations and local targets to protect biodiversity, and to ensure that the environment can continue to support the population and economy of Northern Ireland. Its overall mission was "To make progress towards halting overall biodiversity loss, establish an ecosystem approach and help business and society in general have a greater understanding of the benefits that nature can bring to everyday life in Northern Ireland". Following the UN Biodiversity Conference in December 2022 (COP15), a Global Biodiversity Framework (GBF) was agreed that aims to see 30% of land protected globally by 2030. A new Biodiversity Strategy for Northern Ireland is currently in production, that will reflect the targets set out by the GBF. The draft OREAP must also have regard for the Habitats Directive and the Birds Directive, as transposed through the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, which require that any plan or project not directly connected with or necessary to the management of a European site but likely to have a significant effect on such a site, must undergo an appropriate assessment in view of best scientific knowledge and in view of the conservation objectives of the site. The draft OREAP falls under this remit, and an Appropriate Assessment is being undertaken in parallel to the SEA process, to assess the potential implications of the Plan for European Sites.

It is considered that the key issues associated with the implementation of the draft OREAP and Biodiversity, Flora and Fauna comprise:

- Potential for direct permanent loss of habitat and species, including protected or priority habitats and species, in the footprint of new infrastructure.
- Potential for construction phase disturbance of habitats and species, or indirect changes in habitat type post-construction e.g., through changes in sediment dynamics / smothering effects, effects on water quality / temperature or cable protection.
- Potential for infrastructure to create new habitat e.g., for epifauna colonisation.
- Potential disturbance effects from underwater sound on marine mammals, fish, and seabirds during construction and operation.
- Potential collision risk for marine mammals, fish, seabirds (above and below the water surface) and other marine fauna with vessels during the construction phase and with infrastructure during operation.
- Potential barrier effects / habitat exclusion from the presence of infrastructure during operation.
- Potential effects of EMF from transmission cables on fauna such as marine mammals and electrosensitive fish.
- Potential for introduction or spread of non-native species during construction.

4.3.1.1 Designated Sites

4.3.1.1.1 Overview of Designated Sites

There are a wide variety of natural habitats and species within Northern Ireland. Sites have been designated to provide protection to those habitats and species considered to be of particular conservation value. These include features whose conservation is of importance at an international level, for which 20 Ramsar Sites, 58 Special Areas of Conservation (SACs), and 16 Special Protection Areas (SPAs) have been designated, to date. Sites have also been designated for nature conservation importance at an international level within the Republic of Ireland, Scotland and the UK offshore region. There are 10 SACs, 10 SPAs, and six Ramsar Sites that are designated for the protection of marine or coastal habitats and species and that intersect the OREAP Study Area. Appropriate steps must be taken to avoid the deterioration of habitats, and habitats of species, as well as significant disturbance of the species for which these sites have been designated. The Conservation Objectives safeguard the habitats of the site, the range, numbers and supporting habitats of the qualifying species. Northern Ireland has 49[12] habitats listed in Annex I of the Habitats Directive, of which 18 are coastal / marine, and 18 species listed in Annex II of the Directive, of which 8 are coastal / marine for at least some part of their life [13]. Annex II marine and coastal species such as Common Seal and Harbour Porpoise are included within SAC designations while, in recent years, sites have also been designated solely for the protection of marine features: North Channel (Harbour Porpoise), Red Bay (Sandbanks), Skerries and Causeway (Reefs, Sandbanks, Sea Caves, Harbour Porpoise), The Maidens (Reef, Sandbanks, Grey Seal). Marine and intertidal habitats and species of significance within Northern Ireland's waters are further discussed in the following sections.

At a national level, 394 Areas of Special Scientific Interest (ASSIs) have been designated to provide statutory protection for the best examples of the UK's flora, fauna, geological or physiographical features, of which there are 160 ASSIs that intersect the OREAP study area. There is also one Site of Special Scientific Interest (SSSI), an equivalent Scottish national designation, and four Natural Heritage Areas (NHAs), an equivalent Republic of Ireland national designation, that intersect the OREAP Study Area. There are five Marine Conservation Zones (MCZs) designated under the Marine Act (Northern Ireland) 2013 to safeguard vulnerable or unique marine species and habitats of national importance in the inshore region of Northern Ireland, and one nature conservation Marine Protected Area (MPA) in Scottish waters, that intersect the OREAP Study Area.

There are 50 statutory Nature Reserves, designated to provide protection to features considered to be of national importance in Northern Ireland, while 940 sites have been designated for their importance at a more local level (Sites of Local Nature Conservation Importance or SLNCIs); of these, 12 and 402, respectively intersect the OREAP Study Area. In addition, there are 10 sites in Northern Ireland protected as RSPB nature reserves, and 18 sites protected as Ulster Wildlife nature reserves, of which 6 and 13, respectively, are situated adjacent to the coastline and intercept the OREAP Study Area.

These designated sites are further detailed in **Table 4-3** and their locations are shown in **Figure 4-1**.

Table 4-3 Number and type of sites designated for conservation of Biodiversity, Flora and Fauna that intersect the OREAP Study Area

Site Designation	Description	Number
Special Areas of Conservation (SACs)	Existing SACs in Northern Ireland were designated in accordance with the Habitats Directive (92/43/EEC) for the conservation of certain habitats and species while SPAs were designated under the EU Directive on the Conservation of Wild Birds (EC/79/409), "The Birds Directive", as areas that are important for breeding, feeding, wintering or migration of rare and vulnerable bird species. Together these formed part of the Natura 2000 network	10
Special Protection Areas (SPAs)		10

[12] The Annex 1 habitat 'Submarine structures made by leaking gases' is not located in NI waters but is found offshore in NI adjacent waters outside the territorial limit.

[13] Habitats Directive Annexes of Habitats and Species

	of protected sites. Following the UK's exit from the EU, there is now a UK National Site Network of European sites, comprising existing designated sites and any further sites designated under the Habitats Regulations. Sites in UK offshore waters are designated by The Conservation of Offshore Marine Habitats and Species Regulations 2017. SACs and SPAs in the Republic of Ireland remain part of the Natura 2000 site network.	
Ramsar Sites	Ramsar sites are designated under the "Ramsar Convention" (Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, Iran 1971), an international treaty for the conservation and sustainable use of wetlands.	6
Areas of Special Scientific Interest (ASSIs)	Areas of Special Scientific Interest (ASSI) are protected under the Environment (Northern Ireland) Order 2002. This requires NIEA to designate land as an ASSI that it considers to be of special scientific interest, owing to the flora or fauna present, or the presence of geological features.	160
Sites of Special Scientific Interest (SSSIs)	Sites designated in Scotland under the Nature Conservation (Scotland) Act 2004. An equivalent national designation to ASSIs in Northern Ireland.	1
Natural Heritage Areas (NHAs)	Sites designated in the Republic of Ireland under the Wildlife (Amendment) Act 2000. An equivalent national designation to ASSIs in Northern Ireland.	4
Marine Conservation Zones (MCZs)	Marine Conservation Zones (MCZs) protect nationally important marine species, habitats and features of geological or geomorphological interest. Priority Marine Features (PMF) is a collective term for the features considered to be of conservation importance in the Northern Ireland inshore region and form the basis of MCZ designation under the Marine Act (NI) 2013 and the UK Marine and Coastal Access Act 2009 for inshore and offshore regions, respectively. These sites should complement the marine components of sites designated under the Birds and Habitats Directives, coastal ASSIs and Ramsar sites, together forming a network of Marine Protected Areas (MPAs).	5
Nature Conservation Marine Protected Areas (MPAs)	MPAs protect a wide range of habitats, species, geology and undersea landforms in Scottish waters, and are designated under The Marine (Scotland) Act 2010. An equivalent national designation to MCZs in Northern Ireland.	1
National Nature Reserves	Statutory Nature Reserves are areas of importance for flora, fauna, geological or other special features for conservation purposes and to provide the opportunity for research. They are designated under the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.	12
Sites of Local Nature Conservation Importance (SLNCIs)	Each council area in Northern Ireland reports on locally important sensitive or valued habitats through the production of Local Biodiversity Action Plans (LBAPs). These Plans outline the areas of importance for natural heritage reasons within the council area, guiding development policy and potential enhancement of local biodiversity. These are known as SLNCIs.	402

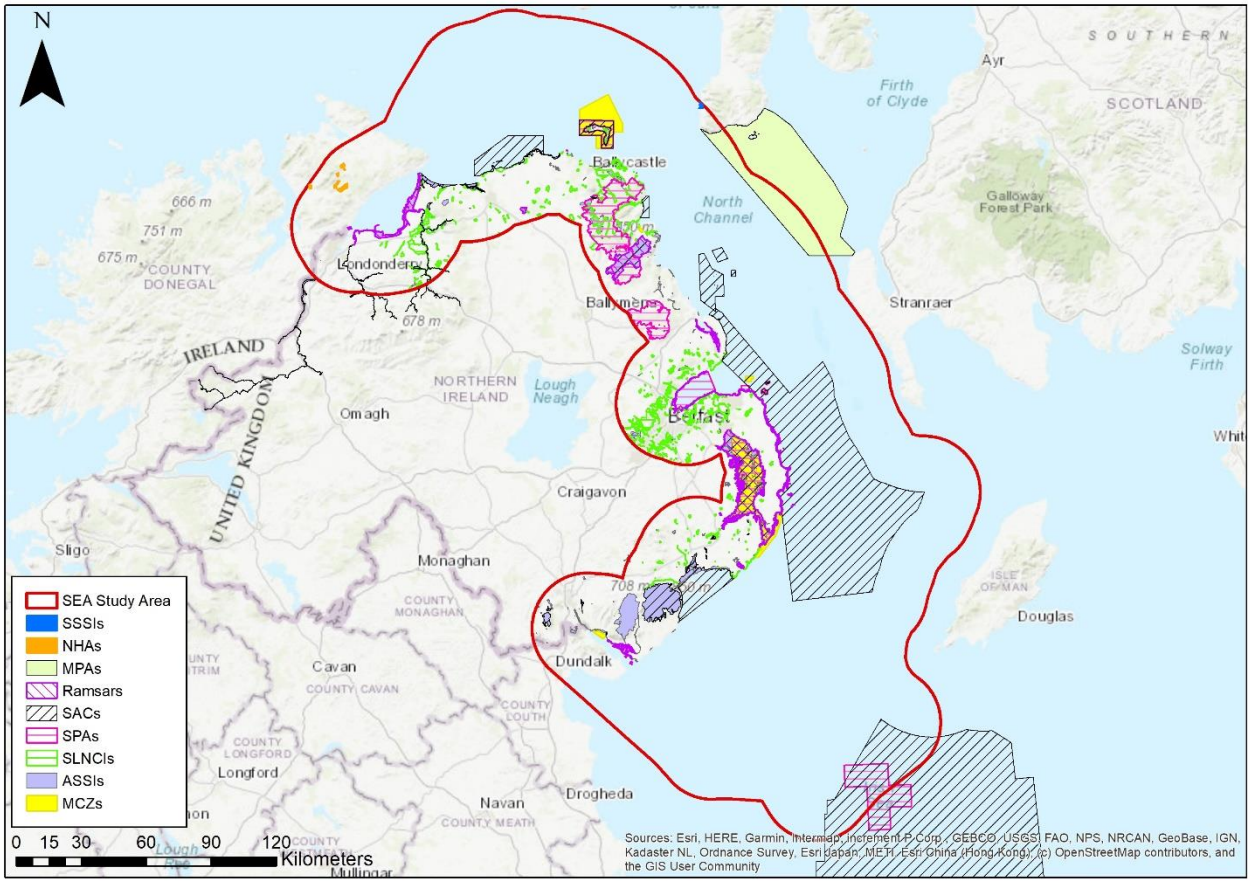

Figure 4-1 Designated sites that intersect the Study Area

4.3.1.1.2 Status and Trends for Sites Important at an International Level (SACs and SPAs)

Article 17 of the Habitats Directive requires that, every six years, all EU Member States report on the implementation of the Directive, including on the conservation status of habitats and species (informally known as the Article 17 report). The 4th UK Habitats Directive Report was submitted to the European Commission in August 2019, and included a General Implementation Report, Habitat Reports and Species Reports. These outlined any changes in designated habitats and species, for the UK as a whole, in the period 2013-2018[14]. Only six habitats were given an overall conservation status of 'Favourable', with eight habitats classified as 'Inadequate', 62 as 'Bad' and one classified as 'Unknown' conservation status. Of these, 22 habitats showed improvement in overall conservation status, 29 habitats showed no change, 22 habitats showed a decline, and 4 were uncertain in comparison with the results of the 3rd UK Habitats Directive Report. Of the designated species reported, 33 were given an overall conservation status of 'Favourable', 24 a status of 'Inadequate', 16 a status of 'Bad' and 20 a status of 'Unknown'. Of these, 9 species showed improvement in overall conservation status, 47 showed no change, 12 showed decline and 25 were uncertain in comparison with the results of the 3rd UK Habitats Directive Report.

Article 12 of the Birds Directive requires that, every six years, all EU Member States report on the implementation of the Directive. The 11th UK Report for Article 12 of the EU Birds Directive was submitted to the European Commission in October 2019. The report format includes both a General Report on the implementation of the Directive (Annex A), and a Bird Species Status and Trends Report containing individual assessments for all relevant bird species (Annex B). Of the 319 birds included in this assessment (including in some cases both breeding and wintering populations separately), 131 showed a short-term decreasing population trend, while 108 showed a long-term decreasing population trend.

[14] JNCC Article 17: Habitats Directive Report 2019

Following the UK's exit from the EU, reporting to the European Commission will no longer be required, however, DAERA will report periodically every 6 years following exit from the EU. The first of these reports is due in 2026.

4.3.1.1.3 Status and Trends for Sites important at a National Level (ASSIs)

Northern Ireland launched its first State of the Environment Report in 2008, containing 30 indicators that were designed to assist future comparison and measurement of the changing environment. The last full State of the Environment Report for Northern Ireland was published in 2013 and, in the interim period, the NIEA has published annually a Northern Ireland Environmental Statistics Report, providing annual reports on a range of environmental indicators. The most recent report is for 2023[15], and Section 5 provides key information regarding the current status of biodiversity indicators in Northern Ireland.

For the first time in 2022, and continued in 2023, a combined feature condition standard for all network features on land and sea in Northern Ireland was produced. This is a new metric collated for the country which helps align with UK reporting.

The 2023 report indicated that:

- 55% of all features were in a Favourable condition.
- 36% of all features were in an Unfavourable condition.
- 3% of all features were in an Unfavourable Recovering condition.
- Less than 1% of all features were destroyed.
- 6% of all features had an undetermined condition due to a lack of formal assessment.

When this is partitioned into the biological and earth science features assessed, 38% of habitats and 57% of species features were in Favourable condition, compared to 94% of earth science features in Favourable condition, reflecting the greater pressures on the natural environment.

These results remain very similar to the previous 10 years of reporting. NIEA is aiming to achieve Favourable condition for a much higher proportion of the ASSI network, and there is now a focus on improving the overall condition of sites towards "favourable conservation status (FCS)" through effective land management to support recovery of the special features within the site. The Environmental Statistics Report 2023 states that, in 2022/2023, the area of terrestrial protected sites under management in NI was recorded as at least 358.96 km^2, a significant increase since the baseline year for reporting (2015/2016) when just 2.63 km^2 of terrestrial sites were under favourable management.

The area of marine protected sites under management in 2022/23 was recorded as 211.68 km^2, which has increased since the baseline year for PfG reporting (2015/16) when 83.62 km^2 of marine protected sites were under favourable management. The focus between 2018 and 2023 was on bringing the protected area network into favourable management, through identification and introduction of necessary management measures for marine protected areas.

4.3.1.2 Benthic & Intertidal Habitats

Benthic ecology is the flora and fauna living in, on, or closely associated with the seabed. The benthic environment of Northern Ireland's coastal and offshore waters is rich and varied. Intertidal habitats comprise muddy habitats on sheltered coasts and sea loughs, exposed and sheltered rocky shores characterised by a very diverse community, and sandy shingle and gravel shores. Subtidal habitats comprise sheltered mud occurring mainly in sea loughs, subtidal sand habitats offshore of the north coast, subtidal mixed sediment gravel and cobble habitat found mainly in Strangford Lough and the Ards Peninsula, Lecale and the Mourne Coast, and rocky habitat characterised by bedrock or boulders colonised by kelp beds. Extensive offshore circalittoral mud habitat is present off the south-east coast, while areas of offshore circalittoral coarse sediment are extensive elsewhere.

The main benthic marine habitat types found within the study area are shown in **Figure 4-2**.

[15] NISRA Northern Ireland Environmental Statistics Report May 2023

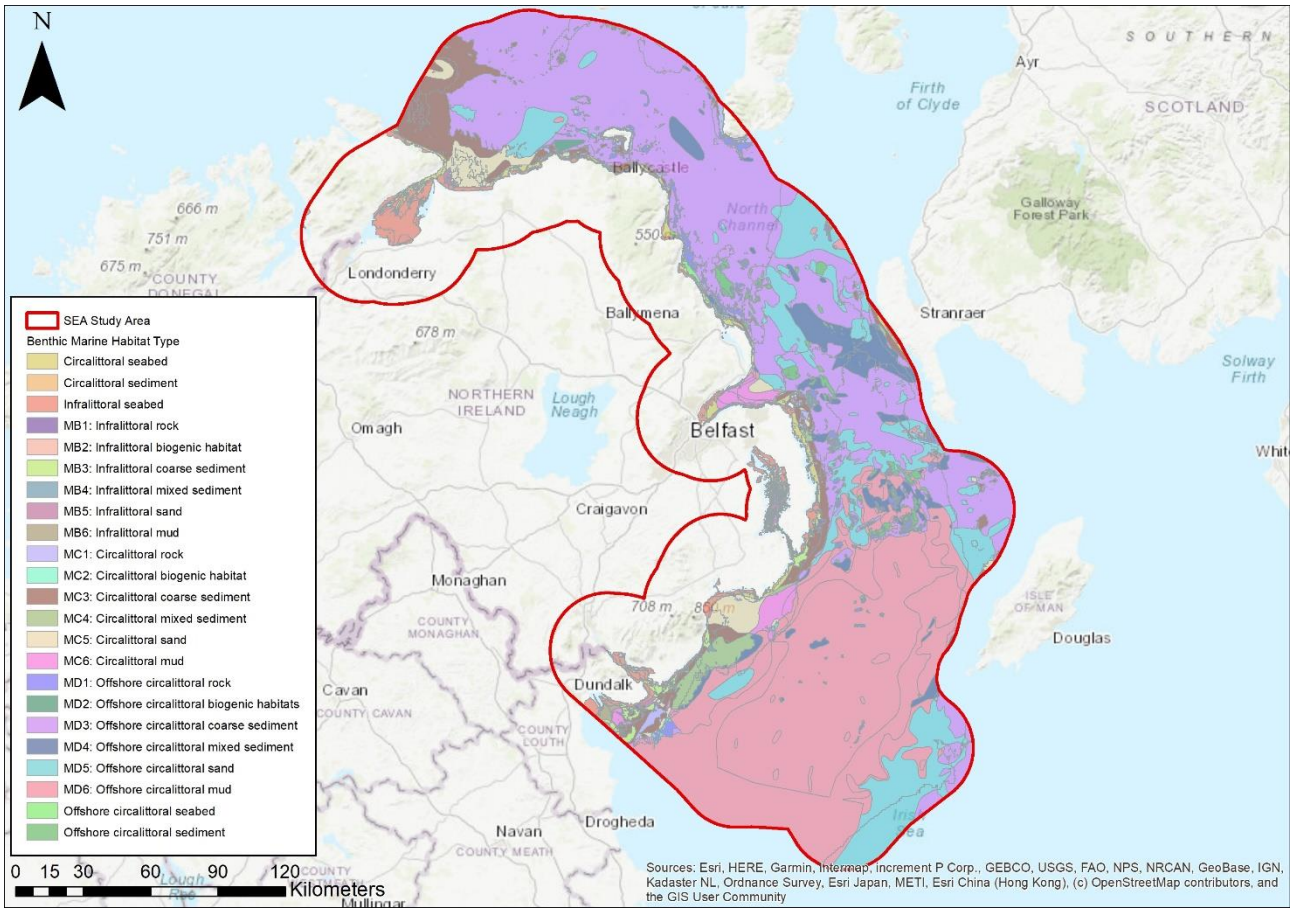

Figure 4-2 Benthic marine habitat types within the study area

4.3.1.2.1 Protected and Priority Habitats

The Northern Ireland Environment Agency (NIEA) has compiled a list of those habitats and species considered to be priority, based on their listing as a UK Priority Habitat[16] / Species[17] or importance in an all-Ireland context, and current downward trends; the most recent lists comprise 51 Northern Ireland Priority Habitats, and 594 species. Of these, 22 Priority Habitats are found in the marine or coastal environment:

- Blue mussel beds
- Coastal and floodplain grazing marsh
- Coastal saltmarsh
- Coastal sand dunes
- Coastal vegetated shingle
- Estuarine rocky habitats
- Fragile sponge and anthozoan communities on subtidal rocky habitats
- Horse mussel beds
- Intertidal chalk
- Intertidal mudflats
- Intertidal underboulder communities
- Maerl beds
- Maritime cliff and slopes
- Mud habitats in deep water
- Peat and clay exposures

[16] Northern Ireland list of priority habitats

[17] Northern Ireland list of priority species

- *Sabellaria alveolata* reefs
- Saline lagoons
- Seagrass beds
- Sheltered muddy gravels
- Subtidal chalk
- Subtidal sands and gravels
- Tide-swept channels

Some of these benthic habitats are also OSPAR threatened or declining habitats of the NE Atlantic, with areas of known locations mapped[18]. Those mapped around the Northern Ireland coastline include Zostera (seagrass) beds (Strangford Lough; Dundrum Bay; Carlingford Lough; Lough Foyle; Skerries and Causeway; Waterfoot; Old Church Bay; Rathlin Island), intertidal mudflats (Strangford Lough; Dundrum Bay; Carlingford Lough; Larne Lough; Lough Foyle; Bann Estuary), littoral chalk communities (several locations along the north east coast; Strangford Lough, Dundrum and Newcastle), maerl beds (Strangford Lough; Carlingford Lough; off Glenarm; the north-east Antrim coast; and Rathlin island), Modiolus (horse mussel) beds (primarily within, and to the east of, Strangford Lough; Belfast Lough; Carlingford Lough; Skerries off the north coast), Sabellaria reef (off the north coast at the Giant's Causeway), Sea-pen and burrowing megafauna (significant sub-tidal area off the south-east coast; Strangford Lough).

The following Annex I marine and coastal habitat types are known to be present in Northern Ireland's waters and are included within the SAC designations in Northern Ireland's coastline and waters:

- **Sublittoral Habitats**
  - Sandbanks which are slightly covered by seawater at all times
  - Large shallow inlets and bays
  - Estuaries
  - Reefs
- **Intertidal and Coastal Habitats**
  - Coastal Lagoons
  - Mudflats and sandflats not covered by seawater at low tide
  - Submerged or partially submerged sea caves
  - Annual vegetation of drift lines
  - Perennial vegetation of stony banks
  - Salicornia and other annuals colonising mud and sand
  - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
  - Sand dunes (Fixed dunes with herbaceous vegetation "grey dunes"; Shifting dunes along the shoreline with *Ammophila arenaria* "white dunes"; Atlantic decalcified fixed dunes (*Calluno-Ulicetea*); Dunes with *Salix repens ssp.*, Argentea (*Salicion arenariae*); Embryonic shifting dunes; Humid dune slacks)
  - Vegetated sea cliffs of the Atlantic and Baltic coasts

There are currently six SACs in Northern Ireland for which benthic ecology is either the primary reason for designation or is a qualifying feature, as detailed in **Table 4-4**. In addition, the Pisces Reef SAC is situated in offshore UK waters and intersects the OREAP Study Area and is designated for the protection of reef habitat.

Table 4-4 SACs designated for benthic habitats within the OREAP Study Area.

SACs	Annex 1 Habitat
Rathlin Island	Sandbanks which are slightly covered by sea water all the time Submerged or partially submerged sea caves Annual vegetation of drift lines

[18] EMODnet Map Viewer

	Vegetated sea cliffs of the Atlantic and Baltic coasts
Murlough Large shallow inlets and bays	Sandbanks which are slightly covered by sea water all the time Dune habitats (five types) Atlantic salt meadows Mudflats and sandflats not covered by seawater at low tide
Strangford Lough	Reefs Coastal lagoons Large shallow inlets and bays Annual vegetation of drift lines Atlantic salt meadows Mudflats and sandflats not covered by seawater at low tide Perennial vegetation of stony banks Salicornia and other annuals colonising mud and sand.
Red Bay	Sandbanks which are slightly covered by sea water all the time
Skerries and Causeway	Reefs Sandbanks which are slightly covered by sea water all the time Submerged or partially submerged sea caves
The Maidens	Reefs Sandbanks which are slightly covered by sea water all the time
Pisces Reef (UK Offshore SAC)	Reefs

There are currently five MCZs in the Northern Ireland inshore region (designated under the Marine Act (NI) 2013) that provide protection to a range of representative and threatened rare or declining habitats and species. The habitat features that are proposed MCZ (pMCZ) features of these sites are as follows:

- Deep-sea bed: Rathlin Island MCZ is the only known location of this broad scale habitat. This habitat is particularly unique in Northern Ireland inshore waters due to the steep drop-off in depth (>200m), close proximity to land and a range of deep subtidal sands, mixed sediments and rock.
- Seagrass bed (*Zostera marina*) on subtidal (sublittoral) sand: Waterfoot MCZ (located in a small embayment offshore from the village of Waterfoot, within the Red Bay area on the east coast of Co. Antrim) has been designated for this habitat type. Seagrass density is declining in UK waters, and although present throughout Northern Ireland, the subtidal bed in this MCZ is extensive and in good condition.
- Subtidal (sublittoral) sand: Outer Belfast Lough MCZ has been designated for this habitat type. This heterogeneous habitat incorporates occasional small patches of gravelly muddy sand. The Masked crab (*Corystes cassivelaunus*), King scallop (*Pecten maximus*) and Sand burrowing brittlestar (*Amphiura brachiata*) have been recorded within the MCZ; these are representative species associated with the seabed type.
- Subtidal (sublittoral) mud: Carlingford Lough MCZ has been designated for this habitat type, which includes White lobe shell (*Philine aperta*) and Sea-pen (*Virgularia mirabilis*) in soft stable infralittoral mud.

In addition, the South Rigg and Queenie Corner MCZs are situated in offshore UK waters between Northern Ireland and the Isle of Man and Wales, respectively. South Rigg MCZ is designated for benthic subtidal habitat features, such as mud, sand, coarse and mixed sediments, sea-pen and burrowing megafaunal communities, and circalittoral rock. Queenie Corner MCZ is designated for sea-pen and burrowing megafaunal communities and subtidal mud. An equivalent designation in Scottish territorial waters is also in proximity to the study area, the Clyde Sea Sill Nature Conservation MPA, designated under the Marine (Scotland) Act 2010. This site is situated to the north-east of Antrim Plateau between Northern Ireland and Scotland and is designated for the protection of marine geological and geomorphological features, benthic habitats, and Black guillemot.

4.3.1.3 Fish and Shellfish

There are two main categories of fish: pelagic and demersal. Pelagic fish are those that live in the mid-water, often occurring in shoals, such as herring and mackerel. Demersal fish are those that live at, or close to, the sea floor. Of these, some have a greater association with the seabed e.g., flatfish and ray, while others forage in a layer that can be several tens of metres above the seabed e.g., cod-like fishes. Both pelagic and demersal species can make extensive migrations between spawning and feeding grounds. Migrations are usually revealed by tag, release and recapture experiments; although these can indicate broad-scale movements, they do not provide information on migration pathways. Pelagic fish species also undertake diurnal vertical migrations, so that they may occupy all water column depths at some point during the day; herring and Atlantic mackerel for example, can both descend to 100 m, where depth allows.

The eggs of most finfish are pelagic; on hatching they pass through larval and post-larval stages before metamorphosing into their adult form. The eggs and larval stages drift with the currents, with their ultimate destination dependent on factors such as the location of the spawning area, the currents, and the duration of the larval stage. The metamorphosed juveniles may remain dispersed, or they may aggregate on nursery grounds; the latter includes herring, sprat and whiting in sea loughs or sheltered coastal areas, and plaice in the intertidal zone of sandy beaches. Owing to these characteristics any assessment of the effects of offshore renewable devices on fish needs to consider all stages of life history, which may differ quite considerably between species. The mobility of species at different stages of their life history may also influence their ability to avoid potentially harmful devices.

Northern Ireland's coastal waters are home to approximately 100 species of regularly occurring marine fish. There is evidence of 17 species of elasmobranch fish (cartilaginous fish, comprising sharks, rays and skates) in Northern Ireland waters, 6 species of ray and 11 species of shark. The slow growth rates, late maturity and small litter characteristics of many elasmobranchs render them among the most vulnerable marine fish. Consequently, a number of elasmobranch species present in Northern Ireland waters are considered endangered and included on the International Union for Conservation of Nature (IUCN) (the World Conservation Union) Red List. This species group is therefore one of particular sensitivity to the impacts of marine development. High sensitivity species present in Northern Ireland's waters include common skate, white skate, spotted ray and spurdog. The main areas where basking sharks have been seen are Rathlin Island, Co. Antrim; Portrush, Co. Antrim; St. Johns Point, Co. Down; and Belfast Lough and Strangford Lough, Co. Down; three sightings of this species have been recorded in the past year, and there is evidence of migration through the Irish Sea[19]. DAERA are currently developing an Elasmobranch Strategy for Northern Ireland; objectives from this upcoming Strategy will need to be considered when undertaking developments within Northern Ireland's marine environment.

4.3.1.3.1 Protected and Priority Fish and Shellfish Species

Several of the species that may be found within the Plan area are listed on the IUCN Red List of Threatened Species (e.g., common skate, cod and haddock), and some are also Priority Species in Northern Ireland (e.g., basking shark). In total, there are 16 species of bony fish and 13 elasmobranch species listed as Northern Ireland Priority Species. These Priority Species require conservation action because of their decline, rarity, and importance in an all-Ireland and UK context, and public bodies in Northern Ireland must take these species into consideration and further their conservation as far as is reasonably practical as part of their biodiversity duty. Further information on the legislation and agreements protecting these species is provided in **Table 4-5**[20].

Table 4-5 Priority Fish species within the OREAP Study Area

Name	IUCN	Habitats Directive	OSPAR	Bern	Bonn	Conservation Regs	Wildlife Order	Fisheries Acts	Irish Red List
Bony Fish									

[19] Doherty et al. 2017 Long-term satellite tracking reveals variable seasonal migration strategies of basking sharks in the north-east Atlantic. https://pubmed.ncbi.nlm.nih.gov/28216646/

[20] Habitas Priority Types

Allis Shad *Alosa alosa*	LC	Annex II		✓		✓		✓	V
Twaite Shad *Alosa fallax*		Annex V		✓		✓			V
Lesser/Raitt's Sandeel *Ammodytes marinus*									
Lesser Sandeel *Ammodytes tobianus*									
Greater Sandeel *Hyperoplus lanceolatus*	CR								
European Eel *Anguilla anguilla*								✓	CR
Herring *Clupea harengus*	LC								
Pollan *Coregonus autumalis*	E	Annex V						✓	V
Atlantic Cod *Gadus morhua*	T		✓						
Whiting *Merlangius merlangus*									
European Hake *Merluccius merluccius*									
Smelt *Osmerus eperlanus*									V
Atlantic Salmon *Salmo salar*	LC	Annex II & V (fw)		Y (fw)		✓		✓	V
Brown/Sea Trout *Salmo trutta*	LC							✓	LC
Turbot *Scophthalmus maximus*	D (Eur) V (Glo)								
Atlantic Blue-fin Tuna *Thunnus thynnus*									
Elasmobranch									
Basking Shark	E (Eur)		✓	✓	✓		✓		E

Cetorhinus maximus	V (Glo)								
Common (Blue) Skate *Dipturus batis*	CR (Eur) E (Glo)		✓				✓		CR
Common (Flappper) Skate *Dipturus intermedia*	CR		✓						CR
Tope *Galeorhinus galeus*	V								V
Porbeagle *Lamna nasus*	CR (Eur) E (Glo)		✓						CR
Cuckoo Ray *Leucoraja naevus*	LC								V
Blonde Ray *Raja brachyura*	NT								NT
Thornback Ray *Raja clavata*	NT		✓						LC
Spotted Ray *Raja monagui*	LC		✓						LC
Undulate Ray *Raja undulata*	NT (Eur) E (Glo)								E
White Skate *Rostroraja alba*	CR (Eur) E (Glo)		✓						CR
Spiny Dogfish (Spurdog) *Squalus acanthias*	E (Eur) V (Glo)		✓						E
Angel Shark (Monkfish) *Squatina squatina*	CR		✓				✓		CR

LC=Least Concern; D=Declining; V=Vulnerable; NT=Near Threatened; E=Endangered; CR=Critical; Eur=European Status; Glo=Global Status

In addition, there are four species of marine crustaceans and 16 species of marine molluscs included as Northern Ireland Priority Species. Three of the four species of crustaceans are not legally protected while the fourth, the European spiny lobster is protected under the Wildlife (NI) Order, the WANE Act and fisheries protection measures. Of the priority species of marine mollusc, the fan mussel is protected under the Wildlife (NI) Order, whilst the ocean quahog is protected under MCZ designation. The Outer Belfast Lough MCZ has been designated for its well-established population of ocean quahog, a long-lived suspension feeding marine mollusc that lives buried within the sediment. This species is distributed throughout Northern Ireland, in a range of sediments from coarse sand to muddy sand, and over a wide depth range from 4 m to 400 m+. In Outer Belfast Lough, it is restricted to a small area of predominantly sublittoral firm sediments at 20-25 m depth at the mouth of the Lough in a dense aggregation (densities of 4.5 individuals/m^2). The ocean quahog is an important food source for several species of fish, including cod.

There are currently no coastal or marine SACs in Northern Ireland that are designated for the protection of marine fish or shellfish, however, species of diadromous migratory species such as Atlantic salmon (*Salmo*

salar), sea trout (*Salmo trutta*), allis shad (*Alosa alosa*), twaite shad (*Alosa fallax*) and European eel (*Anguilla Anguilla*) are designated within freshwater SACs as they spend part of their lifecycle in freshwater and part at sea. Salmon and sea trout spawn in freshwater and then migrate to sea to mature, while eel mature in freshwater and reproduce at sea. These species occur within the study area as there are a number of rivers that flow out to sea and are known to contain populations, including:

- The Foyle, Faughan, Roe, Lower Bann, Bush and Glensheak rivers along the North Coast
- The Glendun, Glenariff and Glenarm rivers along the north-east coast
- The River Lagan, which flows into Belfast Lough
- The Moneycarragh, Shimna, Annalong and Kilkeel along the south-east coast
- The White Water, Cassy Water and Newry rivers which flow into Carlingford Lough

The degree to which these areas are sensitive to interaction with renewable energy development will vary according to the species and the time of year. Shad, for instance, feed in estuaries before moving upstream to spawn (April – July). Salmon, however, leave their river homes in spring and early summer, and migrate towards feeding areas in the Nordic Seas and West Greenland. In contrast, sea trout are more likely to remain in nearshore waters rather than undergoing extensive migrations. For eels, peak migration takes place on the increasing tides in April and May.

4.3.1.3.2 Fisheries

Analysis of fisheries statistics can provide a good indication of the type of species present in the study area. It should be noted that this does not provide a definitive guide to the finfish and shellfish in the area and the levels of catch do not correspond directly to community structure. However, as many of the species found in the waters of Northern Ireland are commercially exploitable, it does serve as a useful indicator. Section 4.3.6.3 describes the commercial species most commonly caught by the Northern Irish fleet.

4.3.1.3.3 Spawning and Nursery Grounds

Habitats of ecological importance for marine fish include those important for breeding (mating sites, spawning grounds where fish aggregate to spawn, and parturition grounds), those important for recruitment and early-stage growth (nursery grounds) and those important for feeding and migration. The Draft Marine Plan for Northern Ireland identified that a natural gyre circulatory system is present in the south-east, which creates ideal spawning and breeding grounds for a wide range of commercial fish species[21]. The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) has described and mapped known spawning and nursery grounds for selected fish species in UK waters, including species of commercial and conservation importance[22]. This indicates that spawning grounds occur off the coastline of Northern Ireland for the following species: herring, cod, whiting, blue whiting, ling, horse mackerel, sandeels, mackerel, plaice, sole. The data also indicates nursery grounds for the following species: spurdog, common skate, thornback ray, spotted ray, herring, cod, whiting, blue whiting, ling, European hake, anglerfish, horse mackerel, sandeels, mackerel, plaice, sole. Areas of known mapped spawning grounds within the OREAP Study Area are shown in **Figure 4-3**, and areas of known mapped nursery grounds are shown in **Figure 4-4**.

[21] DAERA NI Draft Marine Plan for Northern Ireland April 2018

[22] Cefas Spawning and nursery grounds of selected fish species in UK waters

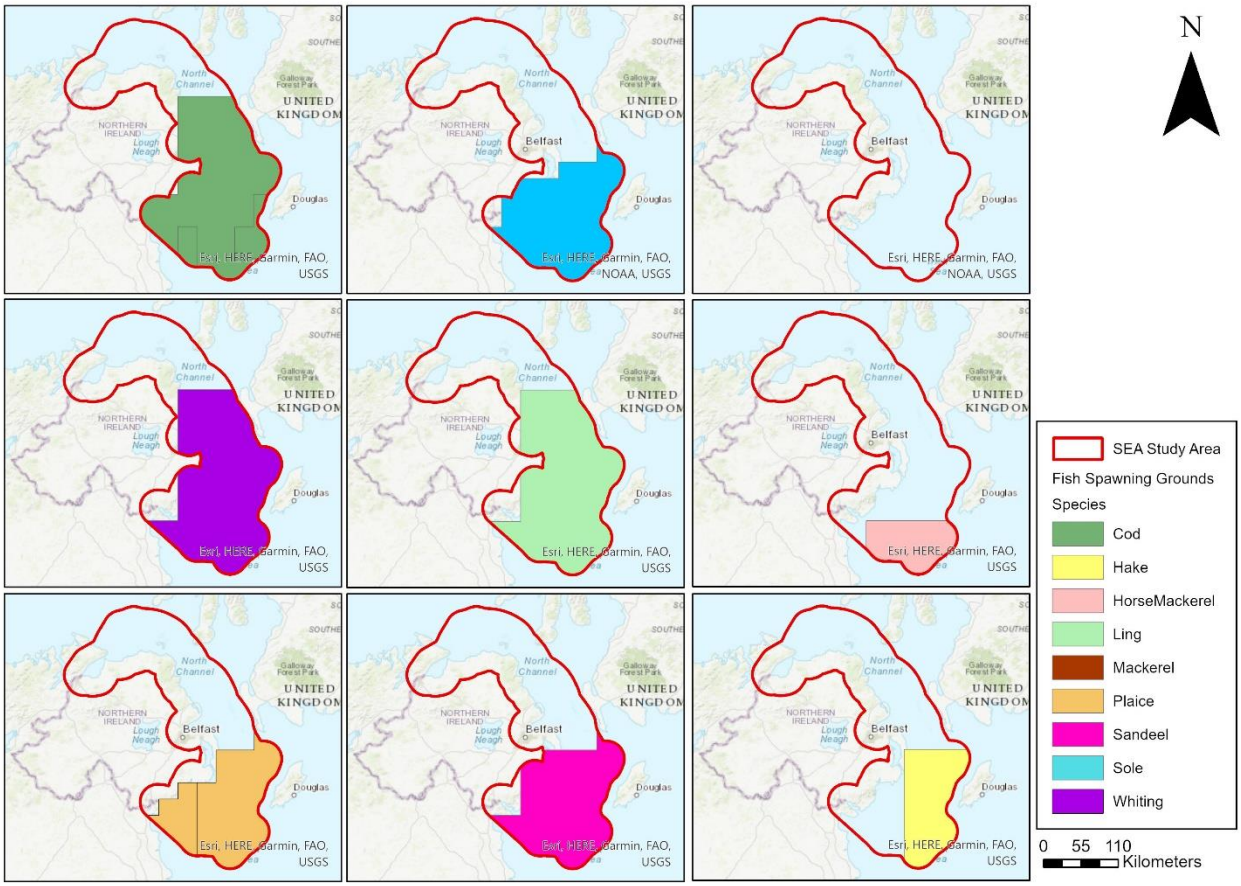

Figure 4-3 Known Fish Spawning Grounds within the Study Area

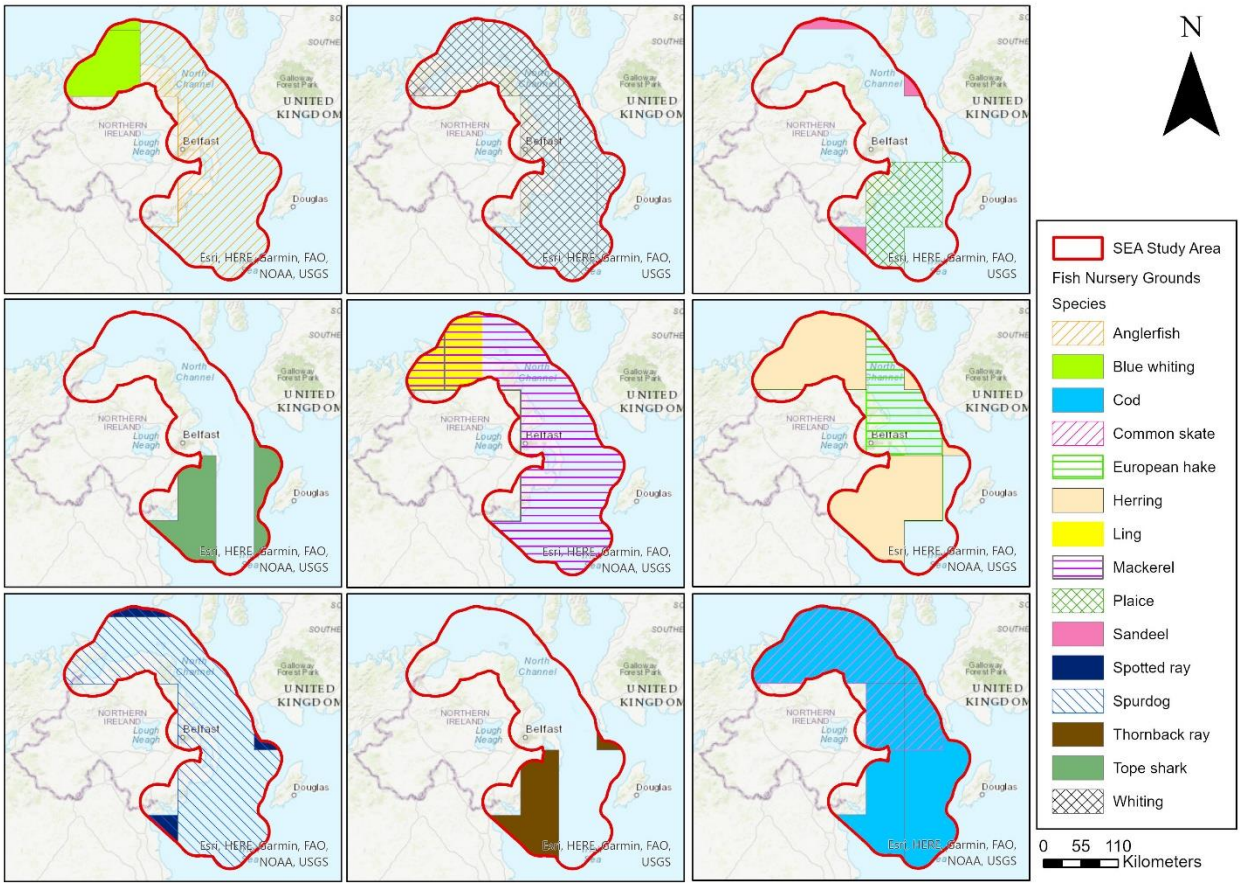

Figure 4-4 Known Fish Nursery Grounds within the Study Area

4.3.1.3.4 Status and Vulnerabilities of Fish

The UK assessment of environmental status for the Marine Strategy (2019) indicates that demersal fish communities are recovering from past over-exploitation in the UK, but that Good Environment Status (GES) has not yet been achieved in the Greater North Sea or Celtic Seas, while a partial assessment of pelagic fish did not provide a clear result.

Offshore windfarms have the potential to adversely affect fish and shellfish in a number of ways during construction and operation, including via underwater noise during construction, electromagnetic fields (EMF) emitted from cables during operation, collision risk and changes to ground conditions and supporting habitat.

Marine fish can produce and hear marine noise which, whilst not fully understood, is thought to be associated with alarm calls and social behaviour. There is a wide diversity in hearing structures among fishes, resulting in different auditory capabilities across species. Herring and Cod have been identified as being highly sensitive to marine noise. Studies have found that general noise such as that generated by shipping activity can cause an avoidance or an attraction reaction in fish[23]. Noise from wind farms, wave and tidal energy projects therefore has the potential to affect fish in the immediate vicinity of operations. The COWRIE (Collaborative Offshore Wind Research Into the Environment) project reported on the effects of offshore wind farm noise on marine mammals and fish. During the operation of offshore wind turbines, the main source of underwater noise is transmitted into the water from the tower as structural noise. This study indicated that species such as dab and salmon might detect the operational noise of a wind turbine at relatively short distances of no more than 1 km. The zone of audibility for cod and herring will be larger, perhaps up to 4-5 km from the source. The level of behavioural response within this detection zone is not well understood, however, it is likely to occur only at very close ranges. The Fisheries Resource Access Mapping Project (FishRAMP), assessing the importance to the Northern Ireland fishing industry of the Wind

[23] Effects of Offshore Wind Farm Noises on Marine Mammals and Fish

Resource Zone off the County Down coast, carried out a literature review that included impact on fisheries sources via noise and vibration, EMF and sediment, seabed morphology and scour[24]. This review found that the recorded negative impacts of underwater sound on fish and shellfish species ranged from physical injury / mortality to behavioural effects. Biological damage from sound was generally related to a large pressure change (barotrauma) or to the total quantity of sound energy received by a receptor (fish / shellfish). The most significant noise relating to windfarms related to the installation of turbines via piling. Demersal fish and shellfish species were generally considered to have a low vulnerability and high recovery to localised noise and vibration impacts, with long-term significant effects not expected.

Electric and magnetic fields (EMF) are produced as a result of power transmission in inter array cables and export cables to shore. Magnetic field strength generated during electricity cable operation is variable, and dependent on a number of factors including cable alignment and configuration. Electric fields can be produced in water passing through the magnetic field surrounding a cable. Electric fields can be almost completely blocked from emanating externally by the shielding effect of a cable's structure. The devices themselves will also have an electrical signature, however, this will be specific to the individual devices. The strength of both magnetic and electric fields decreases with distance from the source. These have the potential to affect migration and prey detection in certain electro-sensitive fish species such as elasmobranchs (sharks and rays). A number of research reports have been undertaken by COWRIE into the likely field strengths and potential effects on marine species; a study in 2009 aimed to determine whether electrosensitive fish respond to the EMF emitted by sub-sea cables of the type and intensity associated with offshore wind farm cables[25] based on EMF mesocosm studies and wind farm surveys. This indicated that the benthic, elasmobranch species investigated (spurdog, thornback ray and dogfish) can respond to the presence of EMF of the type and intensity associated with sub-sea cables, but that this response appears to be species-specific and not predictable. Field measurement of EMF at operational offshore windfarms indicated both magnetic and electric field emissions associated with export cables to be comparable to the EMF produced in the laboratory study, with the zone of EMF potentially within the range of elasmobranch species detection spanning several hundred metres. Some crustaceans (such as lobster and crab) have shown a response to magnetic fields however, with the exception of elasmobranchs, experiments to date do not indicate significant concerns for fish and shellfish species from EMF[14].

4.3.1.4 Birds

4.3.1.4.1 Areas of importance to seabirds

The Northern Ireland coastline and marine area supports nationally and internationally important populations of a large number of seabird species. It can be difficult to make accurate assessments of the temporal and spatial distribution of bird species, owing to their highly mobile nature, particularly in offshore environments. Information available on SPAs and Important Bird Areas (IBAs) provide an indication of the areas of greatest importance for seabird populations, including important breeding grounds, and for wintering or migratory populations.

Protection is provided to certain species of breeding migrating and wintering birds through the establishment of SPAs under the Birds Directive and the Conservation (Natural Habitats, etc.) Regulations (NI). The location of these SPAs is shown in **Figure 4-1**, and details of the bird species for which these sites were designated are provided in **Table 4-6**.

Table 4-6 Coastal / marine SPAs and their designated species within the OREAP Study Area

Site	Designated Species
Carlingford Lough	Sandwich Tern *Sterna sandvicensis* (breeding) Common Tern *Sterna hirundo* (breeding) Light-bellied Brent Goose *Branta bernicla hrota* (wintering) Wetland and Waterbirds
Killough Bay	Light-bellied Brent Goose *Branta bernicla hrota* (wintering)

[24] FishRAMP Economic Analysis and Literature Review 2015

[25] COWRIE 2.0 Electromagnetic Fields (EMF) Phase 2

Strangford Lough	Sandwich Tern *Sterna sandvicensis* (breeding) Common Tern *Sterna hirundo* (breeding) Arctic Tern *Sterna paradisaea* (breeding) Light-bellied Brent Goose *Branta bernicla hrota* (wintering) Redshank *Tringa tetanus* (wintering) Knot *Calidris canutus* (wintering) Waterbird Assemblage
Outer Ards	Turnstone *Arenaria interpres* (wintering) Light-bellied Brent Goose *Branta bernicla hrota* (wintering) Ringed Plover *Charadrius hiaticula* (wintering) Golden Plover *Pluvialis apricaria* (wintering) Arctic Tern *Sterna paradisaea* (breeding)
Copeland Islands	Arctic Tern *Sterna paradisaea* (breeding) Manx Shearwater *Puffinus puffinus* (breeding)
Belfast Lough Open Water	Great Crested Grebe *Podiceps cristatus* (wintering)
Belfast Lough	Redshank *Tringa tetanus* (wintering) Bar-tailed Godwit *Limosa lapponica* (wintering) Black-tailed Godwit *Limosa limosa* (wintering) Common Tern *Sterna hirundo* (breeding) Arctic Tern *Sterna paradisaea* (breeding)
Larne Lough	Light-bellied Brent Goose *Branta bernicla hrota* (wintering) Mediterranean Gull *Larus melanocephalus* (breeding) Roseate Tern *Sterna dougallii* (breeding) Common Tern *Sterna hirundo* (breeding) Sandwich Tern *Sterna sandvicensis* (breeding)
Rathlin Island	Razorbill *Alca torda* (breeding) Black-legged Kittiwake *Rissa tridactlya* (breeding) Common Guillemot *Uria aalge* (breeding) Seabird Assemblage
Sheep Island	Cormorant *Phalacrocorax carbo* (breeding)
Lough Foyle	Light-bellied Brent Goose *Branta bernicla hrota* (wintering) Bar-tailed Godwit *Limosa lapponica* (wintering) Waterbird Assemblage
East Coast Marine proposed SPA	Great Crested Grebe *Podiceps cristatus* (wintering) Red-throated Diver *Gavia stellata* (wintering) Sandwich Tern *Sterna sandvicensis* (breeding) Common Tern *Sterna hirundo* (breeding) Arctic Tern *Sterna paradisaea* (breeding) Manx Shearwater *Puffinus puffinus* (breeding) Eider Duck *Somateria mollissima* (wintering)

Rathlin Island MCZ has also been designated for its importance in supporting a large population of black guillemots (*Cepphus grylle*) (in addition to deep-sea bed and geological / geomorphological features), which nest within the island's cliffs. This species has a wide distribution in Northern Ireland, however, the breeding and nesting population at Rathlin Island is significant, with the reproductive success likely associated with the highly productive waters and rich feeding grounds within the MCZ. This population is also afforded indirect protection through the SAC (Annex I Habitat is Vegetated sea cliffs) and SPA (Annex II breeding seabird population which also nest on the cliffs) designations for Rathlin Island.

Seabirds for which sites have been designated outside of Northern Ireland may also have potential to be affected by the implementation of the OREAP. Many seabirds, such as northern gannet (*Morus bassanus*), fulmar (*Fulmarus glacialis*), and manx shearwater (*Puffinus puffinus*), have extensive foraging ranges, extending for several hundred kilometres from their breeding colonies[26]. SPAs in the Republic of Ireland that are in proximity to the study area, and which include seabird species as qualifying species, include Lough Foyle SPA, Carlingford Lough SPA, and Dundalk Bay SPA, while those in Scotland include Ailsa Craig SPA and Loch of Inch and Torrs Warren SPA. The Clyde Sea Sill Nature Conservation MPA, designated under the Marine (Scotland) Act 2010, is designated in part for the protection of black guillemot. The Irish Sea Front SPA, situated to the south-east of Dundrum Bay between Northern Ireland and Wales and designated under the Conservation of Habitats and Species Regulation 2017, is designated for manx shearwater.

Several of the species that may be found within the Study Area are listed as Priority Species in Northern Ireland. In total, there are 85 species of birds listed as Northern Ireland Priority Species. Of these, there are 32 species whose broad habitat type either includes marine habitats or is solely marine. These include seabird species for which SPAs have been designated, as described previously, as well as species classified as vulnerable or endangered by the IUCN (e.g., dunlin, purple sandpiper, black-headed gull, long-tailed duck, puffin, shag).

In addition to designated SPAs and MCZs, a network of sites known as Important Bird Areas (IBAs) have been identified by BirdLife International as critical for the long-term viability of bird populations. These sites are not afforded any statutory protection but provide an indication of those areas of UK waters of particular importance to seabirds and may overlap with statutory designations. IBAs are selected due to the numbers and species of birds that they hold and are of particular significance for those species that congregate in large numbers. There are 13 IBAs with a coastal component that overlap with the OREAP Study Area; these are described in **Table 4-7** and their locations are shown in **Figure 4-5**.

Table 4-7 Important Bird Areas that overlap with the OREAP Study Area

Site Name	Species supported	Current Condition
Antrim Hills	Typical assemblage of upland bird species.	Not assessed
Belfast Lough	Important for wintering waders and wildfowl, with man-made lagoons in the Inner Harbour holding the main wader roost.	Unfavourable
Carlingford Lough	Important for breeding terns and wintering waterbirds. Brent geese are from the Canadian/Greenland breeding population of the *hrota* subspecies.	Unfavourable
Copeland Islands	Important for breeding seabirds and waders.	Favourable
Dundrum Inner Bay	Important for wintering wildfowl and waders. Wintering Brent geese are from the Canadian / Greenland breeding population of the *hrota* subspecies.	Favourable
Killough Bay	Important for wintering waterbirds. Wintering Brent geese are from the Canadian / Greenland breeding population of the *hrota* subspecies.	Favourable
Larne Lough	The mudflats are important for wintering Brent geese (*hrota*) from the Canadian/Greenland breeding population, while Swan/Blue Circle Islands support an important mixed tern colony.	Near favourable
Lough Foyle and River Foyle	Internationally important for wintering wildfowl and waders. Brent geese are from the Canadian/Greenland breeding population of the *hrota* subspecies.	Very unfavourable
Outer Ards	Important for wintering waders and geese, wintering and breeding cormorants and breeding terns. Most Brent geese are from the Canadian/Greenland breeding population of the *hrota* subspecies.	Unfavourable

[26] Woodward, I., Thaxter, C.B., Owen, E. and Cook, A.S.C.P. (2019). Desk-Based Revision of Seabird Foraging Ranges Used for HRA Screening. BTO Research Report No. 724, British Trust for Ornithology, Thetford. ISBN 978-1-912642-12-0.

Rathlin Island	Important for breeding seabirds.	Favourable
Sheep Island	Important for breeding seabirds.	Near favourable
South Down Coast	Important for wintering waders and waterbirds.	Not assessed
Strangford Lough and Islands	Northern Ireland's most important coastal site for wintering wildfowl and is also of importance for breeding terns.	Favourable

*As recorded by BirdLife International Data Zone at https://www.birdlife.org, accessed in May 2023

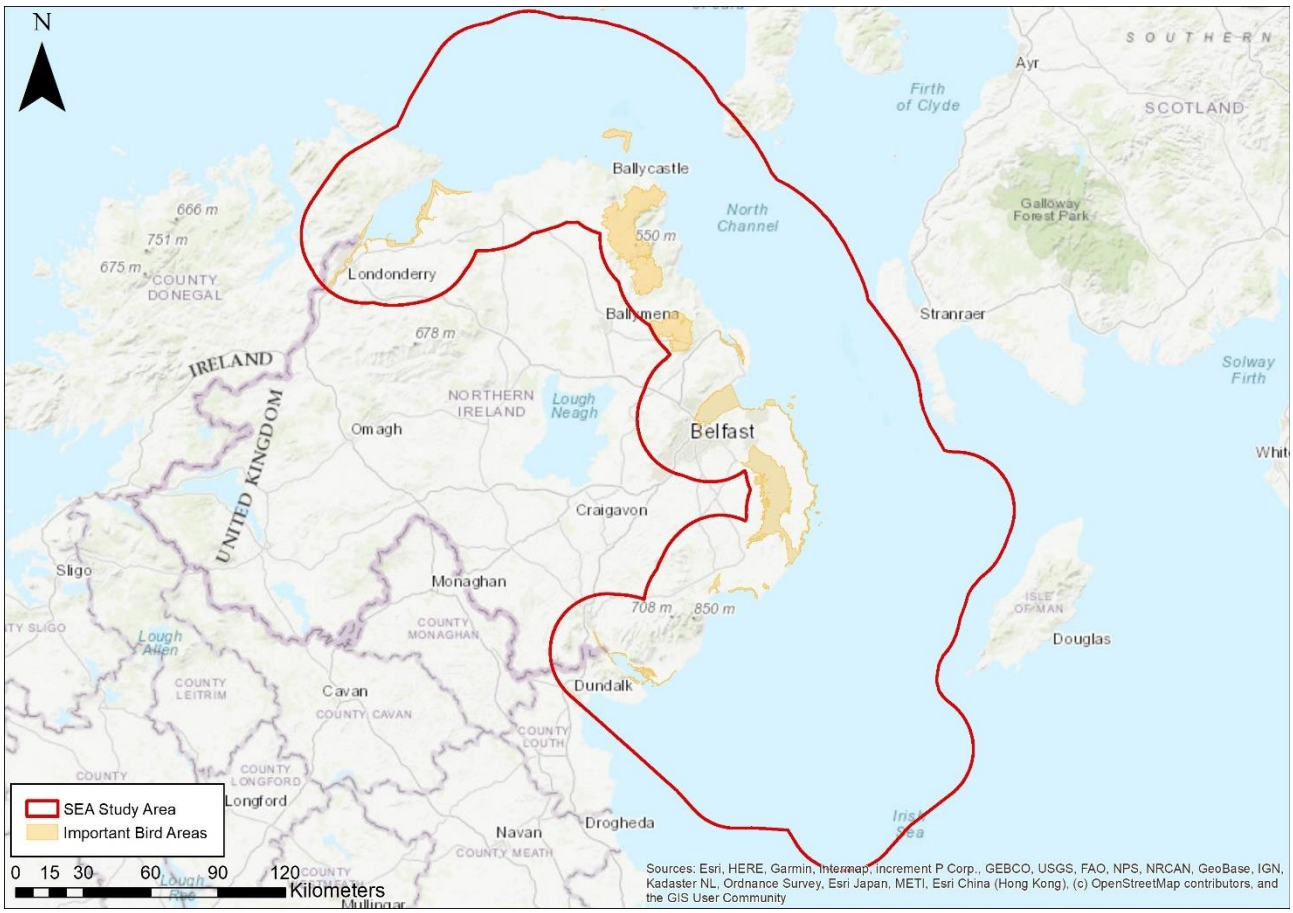

Figure 4-5 Location of Important Bird Areas within the OREAP Study Area

4.3.1.4.2 Status and Vulnerabilities of Seabirds

The UK population of breeding seabirds has shown an overall decline of almost 25% since the 1980s[27], while, for Scotland, this decline is as much as 49%[28]. The Northern Ireland Seabird Report 2022[29] provides an update on the status of seabird species known to breed in Northern Ireland, namely fulmar, manx shearwater, storm petrel, cormorant, shag, great skua, kittiwake, black-headed gull, Mediterranean gull, common gull, lesser black-backed gull, herring gull, great black-backed gull, little tern, sandwich tern, common tern, roseate tern, arctic tern, guillemot, razorbill, black guillemot and puffin. Highlighted in this report is that fulmar populations continue to be lower than in the past in Northern Ireland, with numbers at most monitored sites in 2022 stable or slightly declining. At monitored sites, kittiwake numbers continue to increase, while common tern populations appear to have recovered from a significant population decline of the coastal Northern Ireland population seen in 2020. A Northern Ireland Seabird Conservation Strategy

[27] NCC (2021) UK Biodiversity Indicators 2021- Seabirds

[28] NatureScot (2020) Scottish biodiversity indicator – The numbers and breeding success of seabirds (1986 – 2019)

[29] British Trust for Ornithology Northern Ireland Seabird Report 2022

(NISCS) is being developed by DAERA, which will review and report on the current status of seabird populations and identify and assess their sensitivity to threats and pressures, informing management recommendations to maintain and improve conservation status. This is included as a proposed measure for the Descriptor for Birds in the Marine Strategy Part Three: UK Programme of Measures. The UK assessment of the environmental status of birds for the Marine Strategy (2019) indicates that GES has not yet been achieved for non-breeding waterbirds in the Celtic Sea, or for breeding seabirds and non-breeding waterbirds in the Greater North Sea.

Offshore marine renewable devices have potential to adversely affect seabirds in a number of ways during construction and operation, including via noise and visual disturbance during construction, collision risk with above water devices and, for diving birds, with underwater devices, as well as with vessels and machinery, and indirect impacts affecting water quality, supporting habitats and food sources.

4.3.1.5 Marine Mammals

4.3.1.5.1 Background and Distribution

Many species of marine mammal are known to occur in Northern Irish waters, including cetaceans (whales, dolphins, and porpoises), seals and otter. The Irish Cetacean Review 2000-2009[30] of the Irish Whale and Dolphin Group (IWDG) set out all cetacean sighting and stranding records made during this period for the island of Ireland. Sightings and/or strandings were recorded of the Northern Irish coastline for the following species:

- Humpback Whale (*Megaptera novaengliae*)
- Minke Whale (*Balaenoptera acutorostrata*)
- Sei Whale (*Balaenoptera borealis*)
- Fin Whale (*Balaenoptera physalus*)
- Blue Whale (*Balaenoptera musculus*)
- Sperm Whale (*Physeter macrocephalus*)
- Cuvier's Beaked Whale (*Ziphius cavirostris*)
- Northern Bottlenose Whale (*Hyperoodon ampullatus*)
- Bottlenose Dolphin (*Tursiops truncatus*)
- Striped Dolphin (*Stenella coeruleoalba*)
- Short-beaked Common Dolphin (*Delphinus delphis*)
- White-beaked Dolphin (*Lagenorhynchus albirostris*)
- Atlantic White-sided Dolphin (*Lagenorhynchus acutus*)
- Risso's Dolphin (*Grampus griseus*)
- Killer Whale (*Orcinus orca*)
- Long-finned Pilot Whale (*Globicephala melas*)
- Harbour Porpoise (*Phocoena phocoena*).

Harbour porpoise and bottlenose dolphin have consistently been the most commonly reported cetacean species in waters surrounding Northern Ireland. Berrow (2008)[31] reviewed cetacean sightings for Northern Ireland and identified the key sites for cetaceans as being: Portrush and Portballintrae, Co. Antrim; Rathlin Island, Co. Antrim; Portmuck, Islandmagee, Co. Antrim, and Whitehead, Co. Antrim. In the past year (June 2022 to June 2023) there were 300 sightings of marine mammals off the coast of Northern Ireland registered with the IWDG. The majority of these sightings were of bottlenose dolphin and harbour porpoise, with 110 sightings and 116 sightings, respectively. A greater proportion of sightings of bottlenose dolphin were off the north coast, particularly from off the coast of Coleraine to Rathlin Island. On the east coast, sightings were mainly from Glenarm to Larne, Bangor to Donaghadee, and Strangford to Portaferry. Sightings of harbour porpoise were at similar locations, in particular off the coast of Coleraine, Rathlin, Larne, as well as Killough and Newcastle. There were 17 sightings of common dolphin recorded, comprising 245 individuals, with many large groups of over ten individuals. Records on the north coast occurred from off Coleraine to Torr, with records off the east coast from Larne to Bangor. There were 34 records of Minke whale, comprising 70

[30] Irish Cetacean Review 2000-2009

[31] Berrow, S. (2008) Review of cetacean sightings and strandings data from Northern Ireland, with recommendations for the designation of Special Areas of Conservation Kilrush.

individuals, from Coleraine to Causeway Coast, off Rathlin Island, and in the Irish Sea from off Kircubbin to Annalong. There were two recorded sightings of Killer whale, comprising two individuals off Rathlin Island, and one individual off Annalong. At present, there is limited information available on seasonal patterns of occurrence, site fidelity and annual variability in abundance of cetacean species within Northern Irish waters[32]. Current research suggests that there is a potential migratory corridor for north Atlantic humpback whales off the coast of Northern Ireland, with whale song detected off the north coast at Skerries and Causeway SAC and Malin Head in County Donegal[33].

In terms of wider distributions within the Celtic Seas Ecoregion, Harbour porpoises are commonly observed with high densities in the Irish Sea and its northern and southern channels (Wall *et al*., 2013)[34], predominantly along the West Scotland coastline, and Celtic and Irish Sea management units (IAMMWG, 2021)[35]. Bottlenose dolphins are also common with high concentrations in the Cardigan Bay area to the south, the Irish Sea, and off the North Wales Coast and the Coastal West of Scotland and Hebrides Management Unit with migrations following feeding patterns on benthic and pelagic fish species. The Short-beaked common dolphin has a large offshore distribution, found towards the southern end of the Irish Sea, and the Celtic and Greater North Seas Management Unit. It undergoes strong seasonal shifts in distribution during the winter with movement onto the Celtic Shelf, the western English Channel, and St. George's Channel. The Risso's dolphin is distributed in the nearshore waters off the south-west of Ireland, the northern Irish Sea around Shetland and Orkney, southern Irish Sea, Isle of Man, north Anglesey, north-west coast of Wales, and the Celtic and Greater North Seas Management Unit. Less common dolphin species include the Atlantic white-sided, striped, and white-beaked dolphins. The Atlantic white-sided dolphin is restricted to the cool waters of the North Atlantic and has been rarely recorded in the Irish Sea[29]. The Striped dolphin has rarely been sighted in inshore waters of the Irish Sea, largely distributed along south and west Ireland. The White-beaked dolphin has no sightings recorded for the Irish Sea; one stranding incident has been recorded.

Minke whales have a large offshore distribution, predominantly in Celtic Deep and the Celtic and Greater North Seas Management Unit and will enter the western Irish Sea during the summer months with seasonal distribution alterations due to oceanographic conditions and prey availability. They move east within waters during the September and November periods. Humpback whales are commonly seen on the south and southwest coast of Ireland, occasionally seen on the east coast of Ireland. Fin whales are found on the south coast of Ireland and along the west coast and are rarely recorded within the Irish Sea. Killer whales have occasionally been sighted in the Irish Sea, typically to the southwest, west, and north of Ireland. Sperm whales are largely distributed off the west coast of Scotland and Ireland, all sightings have been recorded in deep waters beyond the edge of the Irish Shelf e.g., 1000 m depth[29]. Blue whales undergo migration along the western seaboard of Ireland. Rarer whale species include the Northern bottlenose, with whale sightings in inshore waters very rare, with no strandings on the east coast of Ireland since 1954, and the Sowerby's beaked whale, which is rarely recorded in Irish Seas, and for which some records of strandings on the southeast coast of Ireland have occurred.

For pinnipeds, Harbour seals are widely distributed (covering the North Atlantic and North Pacific Seas) and cover several SACs, largely found in Scotland on the West coast, Inner and Outer Hebrides, Orkney, and Shetland. Grey seals are also a commonly observed species, and a designated feature for The Maidens SAC; a number of small breeding colonies occur off Northern Ireland, the Isle of Man, and North Wales coastlines. Around 84% of the UK population breeds in Scotland in the Hebrides and Orkney[29]. The Natural Environment Research Council Special Committee on Seals (SCOS) published advice regarding the status and management of seal populations in the UK in 2021[36]. Population trends of grey seals are assessed from pup counts during the breeding season, converted to an estimate of total population size. Pup production of grey seals in Northern Ireland in 2019 was estimated as 250 individuals (the overall UK total was given as 67,850), while the total population was estimated as 600 individuals (the overall UK population was

[32] Developing a cost-effective monitoring strategy for coastal cetaceans. PhD Thesis

[33] AFBI Humpback whales migrate through UK Waters

[34] Wall *et al* (2013). Atlas of the Distribution and Relative Abundance of Marine Mammals in Irish Offshore Waters, 2005-2011. Irish Whale and Dolphin Group.

[35] IAMMWG. 2022. Updated abundance estimates for cetacean Management Units in UK waters. JNCC Report No. 680, JNCC Peterborough, ISSN 0963-8091.

[36] NERC Special Committee on Seals: Scientific Advice on Matters Related to the Management of Seal Populations: 2021

estimated as 157,300 individuals). Harbour seal populations were estimated through counts on land during August moulting; the most recent count data for Northern Ireland (2016-2021) estimated 1,000 individuals, while population estimates were given as 1,400 individuals. The harbour seal population in Northern Ireland appeared to have declined slowly after 2002, however, appears to have remained stable since 2011.

DAERA coordinates seal counts in Northern Ireland; a review of seal count data for 1992-2017[37] indicated that a significant number of surveys were undertaken at locations within Strangford Lough (6,522) and Murlough (382), where harbour seals are qualifying features under the SAC and ASSI designations. Other areas surveyed included The Maidens North Antrim and Skerries, Carlingford Lough, Rathlin Islands, Lough Foyle, Larne Lough, South and North Belfast Lough, Copelands, Dundrum and test haul-out sites. Areas of known high density use by grey seals and harbour seals that overlap with the OREAP Study Area are shown in **Figure 4-6** and **Figure 4-7**, respectively.

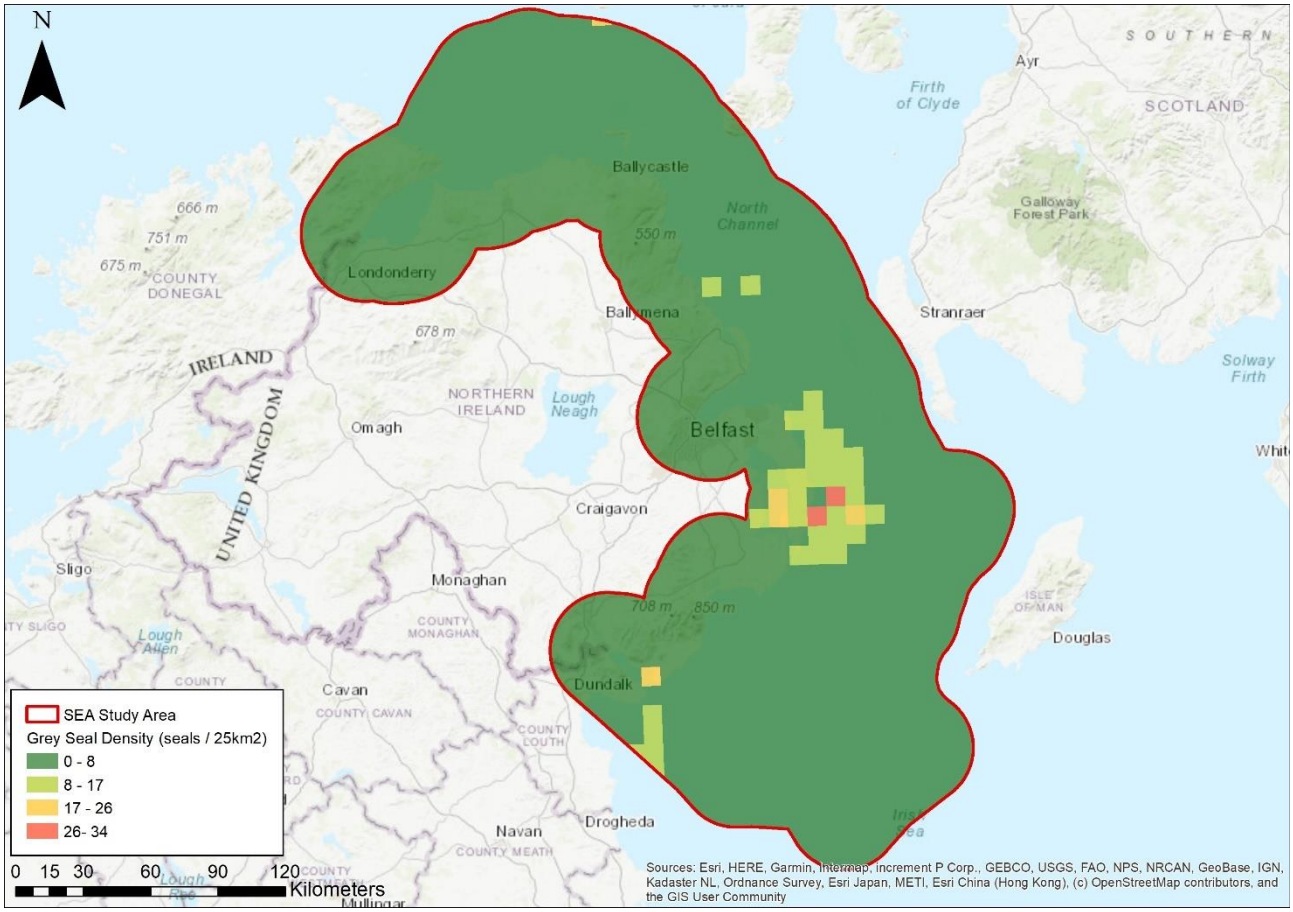

Figure 4-6 Areas of known high density grey seal use within the Study Area

[37] DAERA NI A review of Northern Ireland seal count data 1992-2017

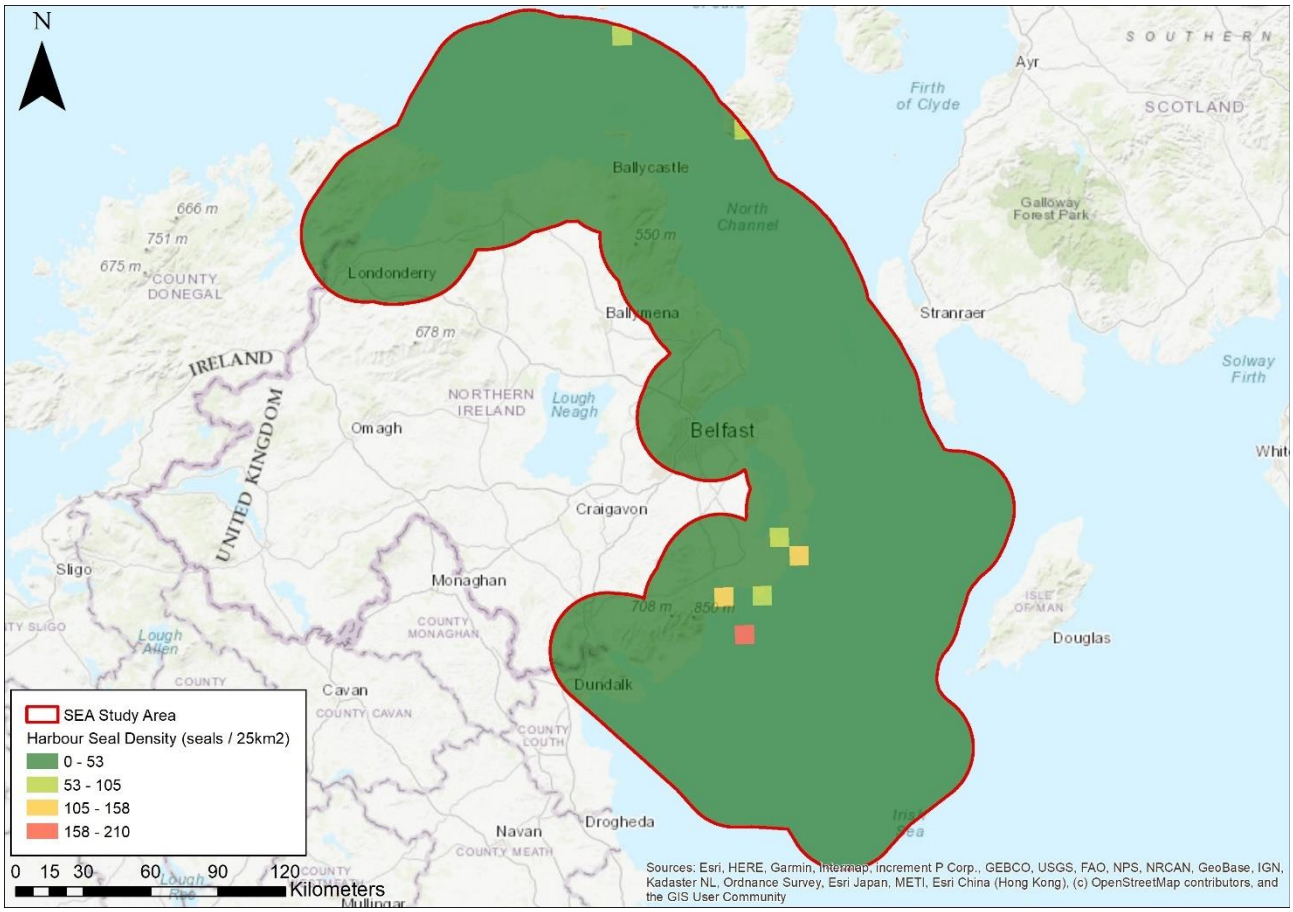

Figure 4-7 Areas of known high density harbour seal use within the Study Area

4.3.1.5.2 Protected and Priority Marine Mammals

All species of cetaceans and marine turtles are European Protected Species, as they are listed in Annex IV of the Habitats Directive and are thereby protected from killing, injury or disturbance in Northern Irish inshore waters through the Conservation Regulations (NI) 2009 (as amended) and in UK offshore waters by The Conservation of Offshore Marine Habitats and Species Regulations 2017. In addition, harbour porpoise, bottlenose dolphin, grey and harbour seal are species for which the designation of SACs is required owing to their listing in Annex II of the Habitats Directive.

There are currently five SACs in Northern Ireland designated wholly or partly for the protection of marine mammals:

- Murlough SAC: Common seal (not a primary feature). The beach area at Ballykinler is important as a haul-out for Common Seal.
- Strangford Lough SAC: Common seal (not a primary feature). Although not currently a qualifying species, Strangford Lough is now the most important site for grey seals in Northern Ireland.
- North Channel SAC: Harbour porpoise.
- Skerries and Causeway SAC: Harbour porpoise are residents of the site throughout the year. The site also contains non-qualifying populations of Grey seal, Common seal and Bottlenose dolphin.
- The Maidens SAC: Grey seal (not a primary feature). The relatively remote rocks, islands and the waters that surround them in the North Channel are important for providing haul-out sites, resting sites and foraging areas for grey seals.

Marine mammals for which sites have been designated outside of Northern Ireland may also have potential to be affected by the implementation of the OREAP. DAERA recommend that all SACs within 100 km of a project should be screened for grey seals; all SACs within 50 km should be screened for harbour seals; and all SACs within 100 km should be screened for harbour porpoise. In the Republic of Ireland, Horn Head and

Rinclevan SAC, designated for grey seal, and Rockabill to Dalkey Island SAC, designated for harbour porpoise, are within these distances. In addition, the North Anglesey Marine/Gogledd Môn Forol, located south-east of Dundrum Bay between Northern Ireland and Wales, and designated under both the Conservation of Habitats and Species Regulations (2017) and the Conservation of Offshore Marine Habitats and Species Regulations (2017) is designated for the protection of harbour porpoise. Several Isle of Man Marine Nature Reserves (MNRs) also protect these species: Calf of Man and Wart Bank (grey seal), Langness (common seal, grey seal, and harbour porpoise), Niarbl Bay (grey seal, harbour porpoise), West Coast (grey seal, harbour porpoise), while other cetacean species that are provided protection from Isle of Man MNRs include Risso's dolphin, bottlenose dolphin and minke whale.

Although otters (*Lutra lutra*) are widely distributed throughout Northern Ireland, there are currently no coastal SACs with otters as a qualifying feature. In general, otter distribution in Northern Ireland is concentrated inland with a relatively low occurrence at coastal sites[38].

Of the marine mammals that may be found within the OREAP Study Area, several species are listed as Priority Species in Northern Ireland, namely minke whale, common dolphin, Risso's dolphin, grey seal, harbour seal, killer whale, common porpoise, bottle-nosed dolphin and otter. These Priority Species and the protection measures that are afforded to them are outlined in **Table 4-8**.

Table 4-8 Priority Marine Mammal species in Northern Ireland and their Protection

Name	Bern Convention	IUCN	Habitats Directive	Conservation Regs.	Wildlife (NI) Order
Minke Whale *Balaenoptera acutorostrata*	Appendix 3		Annex IV	Schedule 4	
Common Dolphin *Delphinus delphis*	Appendix 2		Annex IV	Schedule 4	
Risso's Dolphin *Grampus griseus*	Appendix 2		Annex IV		
Grey Seal *Halichoerus grypus*	Appendix 3		Annex V	Schedule 3	Schedule 5 & 6
Killer Whale *Orcinus orca*	Appendix 2		Annex IV	Schedule 2	
Harbour Seal *Phoca vitulina*	Appendix 3		Annex II & V	Schedule 3	Part 1 Schedule 5, 6 and 7
Common Porpoise *Phocoena phocoena*	Appendix 2		Annex II & IV	Schedule 2	
Bottle-nosed Dolphin *Tursiops truncatus*	Appendix 2		Annex II & IV	Schedule 2	
Otter *Lutra lutra*		NT	Annex II & IV		Part 1 Schedule 6 and 6A

4.3.1.5.3 Status and Vulnerabilities of Marine Mammals

The UK assessment of environmental status for the Marine Strategy (2019) indicates that for cetaceans in the UK, the achievement of Good Environment Status (GES) is uncertain. For grey seals, GES has been achieved for grey seals in the Celtic Seas, while, for harbour seals in the Celtic Seas, there has been a significant increase in West Scotland but the status is uncertain elsewhere.

[38] Preston, J., Prodohl, P., Portig, A. & Montgomery, I. (2006) Reassessing Otter Lutra lutra distribution in Northern Ireland. Environment and Heritage Service Research and Development Series. No. 06/24.

Cetaceans and seals can be affected by bycatch from marine commercial fisheries, with the most recent estimated bycatch of seals in UK fisheries of 488 individuals[16]. Offshore marine renewable devices have potential to adversely affect marine mammals in a number of ways during construction and operation, including potential collision risk with vessels and underwater devices, noise effects that may vary from avoidance behaviour to physical damage, EMF (emitted from cables during operation) effects on behaviour, barrier effects of devices leading to habitat exclusion, and indirect impacts affecting water quality, supporting habitats and food sources. A review of the impacts of windfarms on biodiversity[39] found that acoustic impacts during construction are likely to be greater in the marine environment than the terrestrial environment owing to the conductivity of sound in water and the sensitivity of marine mammals and their prey species. For marine mammals this review found that literature indicated effects of operational noise on cetaceans and pinnipeds (seals) for up to a few hundred metres; JNCC recommend a minimum 500 m exclusion zone to mitigate for noise disturbance during piling activities[40], however, species will have different hearing abilities and varying sensitivities to noise.

4.3.1.6 Bats

There are eight species of bat known to commonly occur in Northern Ireland (of the nine species found in Ireland); these are common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Leisler's bat, brown long-eared bat, whiskered bat, Natterer's bat and Daubenton's bat. These are all strictly protected under the Habitats Regulations (NI) 1995 (as amended) and are known as European protected species. Their protection includes deliberate capture, injury killing and disturbance, as well as protection of their breeding and resting places (roosts).

Windfarms have potential to adversely affect bats, with extensive evidence from onshore windfarms in the UK and worldwide that significant casualties can arise through the following means:

- Direct mortality through collisions with turbine blades, barotrauma and other injuries.
- Loss of, damage to, or fragmentation of commuting and foraging habitat through installation of wind turbines and associated infrastructure, such as access roads.
- Loss of, damage to, or disturbance to roosts.
- Displacement from foraging and commuting habitats.

New 'Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments' in Northern Ireland was published by NIEA in 2021[41] to ensure that bats are appropriately taken into account when planning for onshore wind energy developments.

Bats are subject to a number of threats onshore, primarily relating to the loss of important roosting and foraging areas and the removal of flight corridors. However, there is limited understanding of the potential issues affecting bats in offshore locations. It has been recognised that there is potential for bats to interact with offshore windfarms, as discussed in a 2014 article published by Bat Surveys Ireland[42], with the EUROBATS Guidance document 'Guidance for consideration of bats in wind farm projects Revision 2014' recommending that "a pre-survey assessment should be undertaken for all new onshore and offshore wind turbine proposals". The potential interactions of bats with offshore wind turbines include interactions during migration or during offshore foraging. While limited information exists on bat migration across the sea in Europe, there is evidence of bat migration across the sea between the UK and mainland Europe (596 km migration of a Nathusius' pipistrelle from the UK to the Netherlands[43]), and of the presence of bats at Dutch offshore wind farms[44]. Non-migratory bats may also be found offshore when foraging on insects that have been blown out to sea and may interact with offshore turbines[45]. There is currently no evidence of significant

[39] Review of windfarms and their impact on biodiversity: Guidance for developments in Northern Ireland

[40] JNCC Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise

[41] NIEA Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland

[42] Bat Surveys Ireland-Could bats be an issue for offshore wind farms?

[43] The Guardian-Thumb-sized bat crosses English Channel

[44] Vindval-Bats and offshore wind turbines studied in southern Scandinavia

[45] Behavior of Scandinavian Bats during Migration and Foraging at Sea

bat migrations, or migrations over sea from Ireland, or evidence that bats in Ireland utilise offshore areas for foraging.

4.3.1.7 Reptiles

Two species of turtle have been observed in Northern Irish waters: leatherback turtles (*Dermochelys coriacea*) and loggerhead turtles (*Caretta caretta*). Leatherback turtles are the largest of all marine turtles and migrate huge distances between their feeding grounds and where they lay their eggs. The loggerhead is a wide-ranging turtle, occurring throughout the temperate subtropical and tropical regions of the Atlantic Pacific and Indian Oceans. The most frequently sighted are Leatherback turtles, which are located along the UK coastline and Isle of Man coastline, distribution patterns relate to the migration of jellyfish during summer seasons[29].

All marine turtles are legally protected: they are listed on Appendix I of the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES), Appendices I and II of the Bonn Convention on Migratory Species and Appendix II of the Bern Convention, and on Annex IV of the EU Habitats Directive, with the loggerhead turtle also listed as a priority species on Annex II. Globally, the leatherback turtle is listed as 'Vulnerable' on the IUCN Red List of Threatened Species, while the sub-population of the north-west Atlantic (one of seven sub-populations assessed) is 'Least Concern'[46]. Globally, the loggerhead turtle is now also listed as 'Vulnerable', while the sub-population of the north-east Atlantic (one of ten sub-populations assessed) is 'Endangered'[47]. The leatherback turtle is also listed as a Priority Species for Northern Ireland.

There were 41 records of sightings or strandings of turtles in Northern Irish waters between 1748-2021[48], the majority of which were leatherback turtles. Although there are annual records within Northern Ireland, there is no information on site fidelity. Similar to marine mammals, marine reptiles have potential to be affected by collision risk with vessels and with devices underwater, noise, exclusion from habitat, as well as indirectly via effects on water quality or marine litter. JNCC recommend that, whilst the appropriate mitigation may require further investigation, the protocols recommended for minimising the risk of injury to marine mammals from piling noise[23] would also be appropriate for marine turtles.

4.3.1.8 Non-indigenous Species

Non-indigenous species (NIS) comprise those species that have been introduced outside of their natural range, intentionally or unintentionally. Some of these species have the potential to thrive within their introduced environment and can out-compete native species of flora and fauna and pose a significant threat to native biodiversity. Once established, invasive species are extremely difficult and costly to control and eradicate and can have far-reaching impacts. NIS can enter UK waters from ballast water and the accumulation of organisms on ships' hulls via shipping, and through the introduction of commercial species into the wild in aquaculture.

The UK assessment of environmental status for the Marine Strategy (2019) indicates that for NIS in the UK, Good Environment Status (GES) has not yet been achieved but the ability to detect new NIS has improved, however, there was no significant change in the number of new records of NIS between 2003 and 2014 in either the Greater North Sea or the Celtic Seas. As part of the actions set out under the Marine Strategy, NIS monitoring has started to be integrated into biodiversity monitoring since 2016, while Species Action Plans are being developed for key species by the UK working non-native group, with an Action Plan produced for *Didemnum vexillum* (carpet sea squirt) in 2020[49]. In collaboration with the aquaculture industry, this Action Plan aims to reduce negative impacts of this species by improving the capacity to detect, report and prevent its spread.

The Invasive Alien Species Strategy for Northern Ireland provides an overarching framework to minimise the risk and negative impacts posed by these species, while the draft Marine Plan for Northern Ireland sets out

[46] IUCN Red List Leatherback Turtle

[47] IUCN Red List Loggerhead Turtle

[48] 2021 Turtle Stranding Report

[49] British Irish Council Invasive Non-Native Species Action Plan, Carpet Sea Squirt

policy in relation to invasive alien species. The Great Britain Invasive Non-Native Species Strategy[50] sets out the government strategy for the management of all non-native species of flora and fauna, particularly those known to be, or with the potential to be, invasive. As part of addressing transportation pathways for the introduction or spread of these species, operators are encouraged to follow the International Maritime Organisation's (IMO) voluntary guidelines for the control and management of ships' biofouling. In addition, the UK acceded to the Ballast Water Management Convention in 2022 and introduced domestic legislation[51] that aims to regulate discharges of ballast water and reduce the risk of non-native species introduction.

4.3.1.9 Summary of Existing Pressures and Issues for Biodiversity, Flora and Fauna

Marine habitats within the OREAP study area are subject to existing pressures, including loss or disturbance through destructive fishing methods, and extractive activities such as dredging. Marine fauna may be subject to direct loss through fishing (commercial fish and shellfish species), including bycatch (marine mammals), collision or behavioural avoidance due to vessel movements, and noise or visual damage, disturbance or displacement from numerous developments and activities within the marine and coastal environment. Seabird colonies have also been affected by Highly Pathogenic Avian Influenza (HPAI) in recent years. The multiple stressors that may affect marine habitats and species influences their ability to recover from disturbance and can lead to ecosystems that are less resilient to invasive species, and that may have less ability to adapt to potential climate change impacts.

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to lead to direct and indirect effects on habitats and species within the OREAP Study Area, including protected and priority species, within and outside designated sites.

4.3.2 Population & Human Health

Population and human health considers the presence and wellbeing of people, and their activities and use of receiving environments. Population size, growth predictions and distribution within an area can indicate both the potential pressures that people may exert on resources and infrastructure, and the potential to which they may be exposed to pollution, disturbance, or other risks. The health of a population can be adversely affected through several direct and indirect pathways, including through emissions to water and air, health and safety risks, noise and other disturbances.

It is considered that the key issues associated with the implementation of the draft OREAP and Population and Human Health comprise:

- Potential for disturbance of the local population during construction (e.g., noise) and impacts on residential amenity.
- Potential for conflict with other users of the coastal and marine environment (e.g., fishing and leisure), or indirect effects on leisure activities (e.g., through alteration of hydrodynamics).
- Potential positive or negative effects on employment and the local economy (e.g., local community employment, fisheries, and skilled technical workers, potential for increased capital investment in the local area).
- Potential for long-term indirect health effects on the local population.
- Potential for long-term positive effects on air quality (reduced emissions).

4.3.2.1 Population Demographics and Health

The total population of Northern Ireland in 2021 was approximately 1.903 million people[52], and is predicted to increase to approximately 1.99 million individuals by 2043[53].

In 2019-2021, life expectancy at birth was 78.4 years for men and 82.2 for women living in Northern Ireland[54], an increase from 69 and 76, respectively, since the base reporting period of 1980-1982. Northern Ireland has an ageing population, with 17.2% aged over 65 years, and it is projected that the over 65-year population will be larger than the number of children (0-15 years) from mid-2028 onwards[55]. The primary causes of death for people in Northern Ireland in 2021 were cancer (26.1%, most commonly bronchus or lung) and circulatory disease (21.1%), followed by Covid-19 (10.5%), respiratory (8.8%), other causes (17.5%) and Alzheimer's / dementias (10.7%)[56].

In the Northern Ireland census in 2021, just under four-fifths (78.7%) of Northern Ireland residents reported themselves to be of good or very good general health. Over one in five of the resident population (24.3%) had a long-term health problem or disability, which limited their day-to-day activities. The most common long-term conditions among the resident population were long-term pain or discomfort (11.6%) and a mobility or dexterity problem (10.9%)[57].

Seas, Oceans and Public Health in Europe (SOPHIE) is a pan-European initiative to coordinate research into the impacts that environments such as 'blue spaces' can have on human health and wellbeing, with recent research providing evidence that the marine environment and human health are inextricably linked (including through sustainable seafood, marine medicine and biotechnology, tourism and wellbeing)[58]. Many major population centres are situated along, or in proximity to, the coastline of Northern Ireland. These include Belfast, Derry/Londonderry, Bangor, Carrickfergus, Larne, Portrush and Portstewart.

4.3.2.2 Employment

Over two-thirds of all residents in Northern Ireland aged 16 to 64 years were economically active in the 2021 census (70.2%); these were primarily composed of full-time and part-time employees. In 2021, most district council areas in Northern Ireland saw an increase in employee jobs[59].

Total employment in Northern Ireland in September 2021 including employees and working owners was 823,672[60]. Services was the headline industry with greatest employment (at 666,235 individuals), followed by Manufacturing (89,024 individuals), Construction (43,269 individuals) and Other (25,145 individuals). The Other industry category, accounting for 3.1% of all jobs in Northern Ireland, were predominantly in 'Agriculture, forestry and fishing' (53%); and 'Water, sewage, waste management and remediation' (31%). Data from the Northern Ireland Business Register and Employment Survey 2021 includes 205 individuals directly employed in fishing and 106 in aquaculture, 406 individuals employed in the 'processing and preserving of fish, crustaceans and molluscs', 33,494 individuals employed in 'retail sale in non-specialised stores with food, beverages or tobacco predominating', and 32 individuals employed in the 'retail sale of fish, crustaceans and molluscs in specialised stores'. There were 528 individuals noted as employed in water transport, including 101 individuals in 'sea and coastal freight water transport'. There were also 585 individuals employed in 'service activities incidental to water transportation'.

[52] Census 2021-Main statistics for Northern Ireland Phase 1

[53] NISRA Registrar General Annual Report

[54] Information Analysis Directorate-Life Expectancy in Northern Ireland 2019-21

[55] NISRA MYE20 Bulletin

[56] NISRA Registrar General Northern Ireland Annual Report 2021

[57] Census 2021-Main statistics for Norhern Ireland Phase 2

[58] Seas, Oceans and Public Health in Europe

[59] NISRA Business Register and Employment Survey

[60] NISRA Business Register and Employment Survey 2021

Regarding employment in the renewables sector, estimates of the size of the UK's Low Carbon and Renewable Energy Economy (LCREE) indicate that, for Northern Ireland, the sector generated around £1.5 bn in turnover and provided 6,700 full-time equivalent jobs in 2021[61]. The Energy Strategy for Northern Ireland aims to at least double the size of this sector by generating local market opportunities, in place of importing fossil fuels, and by ensuring that Northern Irish companies can compete successfully for the UK and global opportunities in low carbon energy and technologies that are becoming available.

4.3.2.3 Coastal and Marine Recreation

Yachting is popular in the more sheltered coastal waters, bays and sea loughs of Northern Ireland, while particular routes are followed to traverse the coast, and travel between islands. Strangford Lough is a very popular location, with 12 clubs located on its shores. In total, there are 12 Royal Yachting Association (RYA) marinas within the OREAP Study Area. The east coast, from south of Carlingford Lough northwards to Ballygalley, and taking in Carlingford Lough, Strangford Lough and Belfast Lough, is identified as a general sailing area by RYA. Carlingford Lough, Strangford Lough, Belfast Lough, Larne Lough and Lough Foyle are also identified as RYA Boating (Sailing / Racing) Areas. The location of RYA marinas and Sailing and Racing Areas within the OREAP Study Area is shown in **Figure 4-8**.

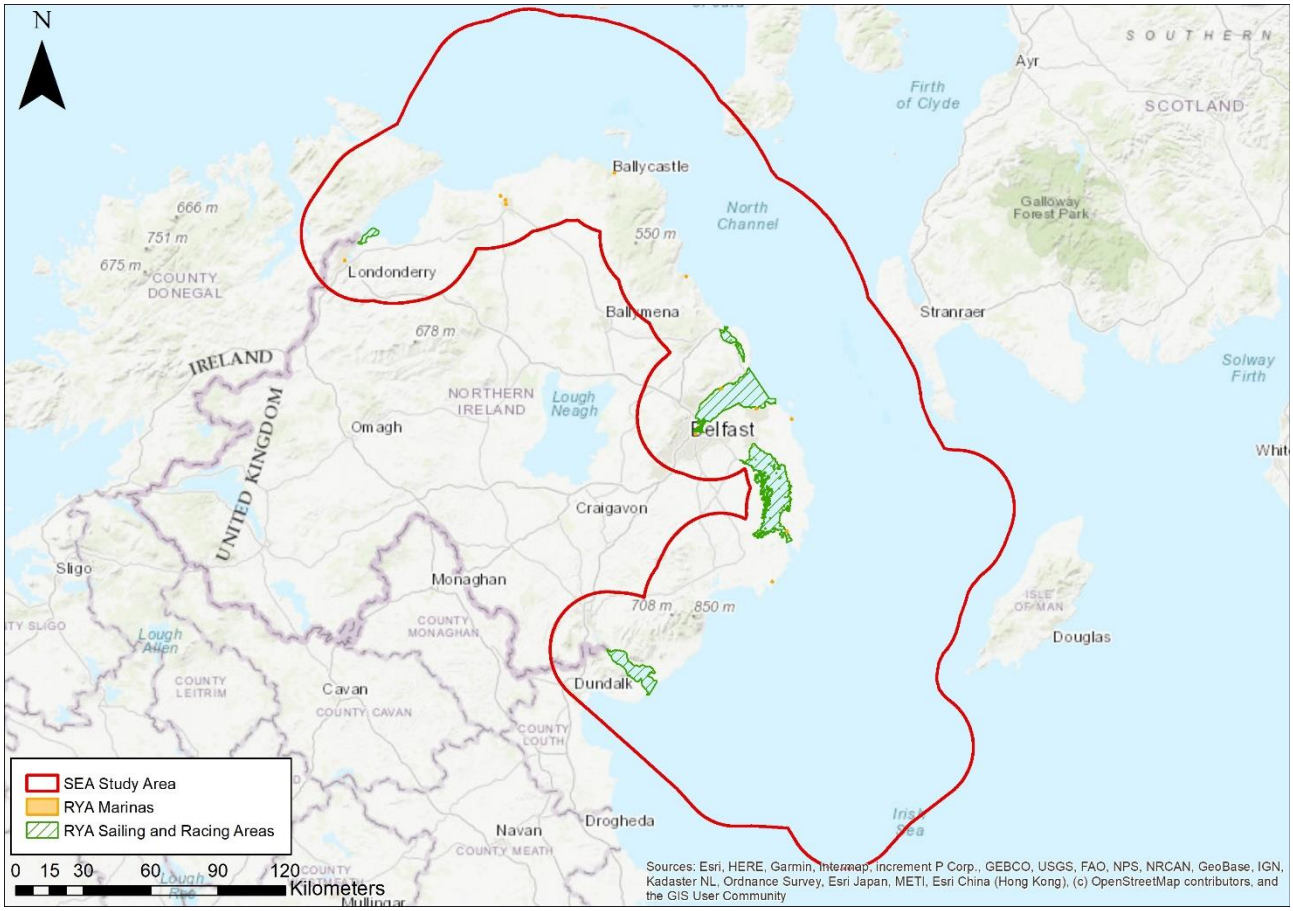

Figure 4-8 RYA areas within the Study area – Marinas, Sailing and Racing Areas

The OREAP Study Area is known for its clear waters and diverse marine life. Diving attractions within the study area include both wrecks and marine wildlife. There is localised diving around the population centres in the region, and some dive boat charters to more remote areas. Particular areas of interest include the historic wrecks of HMS Drake, MV Alastor and Girona, and the areas of Portstewart, Portmuck, Causeway coast, Whitehead and Rathlin Island.

[61] Low carbon and renewable energy economy, UK: 2021

The majority of coastal surf shops and outdoor activity operators within the study area are located on the north coast in the vicinity of Portrush, or along the coast of Belfast Lough. These centres offer a range of marine related activities including surfing, wind surfing, kayaking and angling. The coastline of Northern Ireland receives swell waves from the Atlantic Ocean. The main surfing areas are situated along the stretch of coast between Magilligan in the west to Ballycastle in the east, with the most popular surfing location around Portrush.

Sea angling is an important recreational activity, as well as a contributor to coastal tourism. Key areas for angling in the UK include the south and northeast coasts of England and Wales. The Directory of Charter Boats UK (CBUK)[62] holds records on 4184 charter boats in the UK, of which two are registered in Northern Ireland (one operating out of County Down, and one out of County Antrim).

Beaches in Northern Ireland, which are mostly rural in nature, are primarily used in summer months. There are 26 beaches designated as bathing waters in Northern Ireland under the Quality of Bathing Water (Northern Ireland) Regulations 2013 that are used for recreation predominantly during the tourist season. These designated bathing waters are detailed in **Table 4-13** and their locations shown in **Figure 4-13** of Section 4.3.4 Water. Several seaside resorts, such as Newcastle, Bangor, Portrush and Portstewart have a strong traditional accommodation base due to their historic popularity for tourism. Portstewart, with car parking on the beach, attracts high numbers of visitors in good weather and has one of the most popular beaches. Good railway connections to Belfast also contribute to the popularity of the beaches at Portrush and Portstewart.

The generally unspoilt and undeveloped nature of much of Northern Ireland's coastline makes it ideal for wildlife-related recreation and tourism. Notable sites include Rathlin Island, which is popular with birdwatchers for its extensive bird populations and undeveloped landscapes, and Strangford Lough, where watching for many types of wildlife, including grey and common seals, otters, porpoises, aggregations of wintering cormorants and terns, takes place.

Sightings of whales off the coast of Northern Ireland have increased over recent years as whale watching becomes more popular. The best places for whale watching are headlands, islands and bays when the sea is calm. Whale watching and angling vessels can also be chartered from a range of locations off the northern coast of Northern Ireland.

4.3.2.4 Summary of Existing Pressures and Issues for Population and Human Health

Northern Ireland's marine area supports many facets of employment directly and indirectly, such as fishing (including aquaculture), processing and sales, and water transport; these sectors have been disrupted in recent years by the Covid-19 pandemic and by Britain's exit from the EU. Coastal communities are likely to be increasingly subject to coastal hazards associated with extreme weather events due to climate change and may be subject to pressures such as coastal development, noise and, in some areas, water pollution.

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to lead to positive or negative effects on employment; employment relating to fisheries and marine transport could be adversely affected through disruption or displacement during installation of infrastructure, to exclusion from areas of operational infrastructure; however, renewable energy projects have potential for positive effects on employment, both locally and more widely. Coastal communities and leisure activities have the potential to be disrupted, primarily during the installation of renewable infrastructure, or associated with onshore cabling.

4.3.3 Geology, Soils & Land Use

Bathymetry is a key factor when selecting appropriate sites for marine devices, as these will have optimal water depth ranges within which they can operate. The bedrock and the nature of the Quaternary deposits is relevant to the design and siting of seabed installations and, where these rocks occur close to the seabed, they may also exert control over sedimentary processes and affect both physical and biological habitats at the seabed. Seabed sediments, and the marine sedimentary processes of erosion, transport and deposition

[62] Charter Boats: Northern Ireland

that control their distribution, character and thickness, are also relevant to the design and siting of seabed/near-seabed renewable energy installations. Seabed installations can have potentially significant effects on these marine sedimentary processes.

It is considered that the key issues associated with the implementation of the draft OREAP and Geology, Soils and Land Use comprise:

- Potential for physical damage to the seabed from new infrastructure.
- Potential for indirect physical effects on the seabed or subsurface from new infrastructure e.g., through alteration of the sediment regime, changes to seabed morphology, depositing of dredged material.
- Potential for alteration of hydrodynamics or coastal processes.

4.3.3.1 Bathymetry and Seabed Features

Northern Ireland is bordered by the Irish Sea to the east, by the North Channel to the north-east, and by the Malin Sea to the north. Off the north-east coast of Northern Ireland, the bathymetry is dominated by the North Channel, a strait that separates eastern Northern Ireland and the south-west of Scotland. The Irish Sea is a relatively small regional sea, covering an area of approximately 58,000 km^2. It generally takes the form of a relatively shallow basin, with considerable areas where the depth ranges from 20-100 m. In the western part of the Irish Sea, a deeper channel of over 100 m in depth extends from north to south, reaching a maximum depth of 315 m in the North Channel; this deeper channel links with the Celtic Sea in the south via St George's Channel, and with the Malin Sea to the north via the North Channel.

Surrounding the Northern Irish coastline, the local seabed is predominantly under shallow water, with approximately two thirds of the area having water less than 100 metres deep[63]. Off the south-eastern coast of County Down, the seabed slopes relatively gently, with overall gradients of approximately 0.17° to the south-east and water depths of approximately 100 m at the 12 nm limit. Off the north-eastern coast of Northern Ireland, the seabed gradients are higher in the vicinity of the North Channel, with overall gradients of approximately 0.45° towards the north-east. The centre of the North Channel lies roughly at the 12 nm limit, where isolated deeps of up to 284 m occur. The axis of the North Channel runs approximately 5 km to the north of Rathlin Island: in this area the seabed shelves steeply with overall gradients of 3° and a maximum depth of approximately 240 m. Off the north-east coast of County Donegal, to the west of Rathlin Island, the overall seabed gradient is relatively gentle at approximately 0.29°. An overview of the bathymetry of the study area is shown in **Figure 4-9**.

[63] AFBI Seabed Integrity

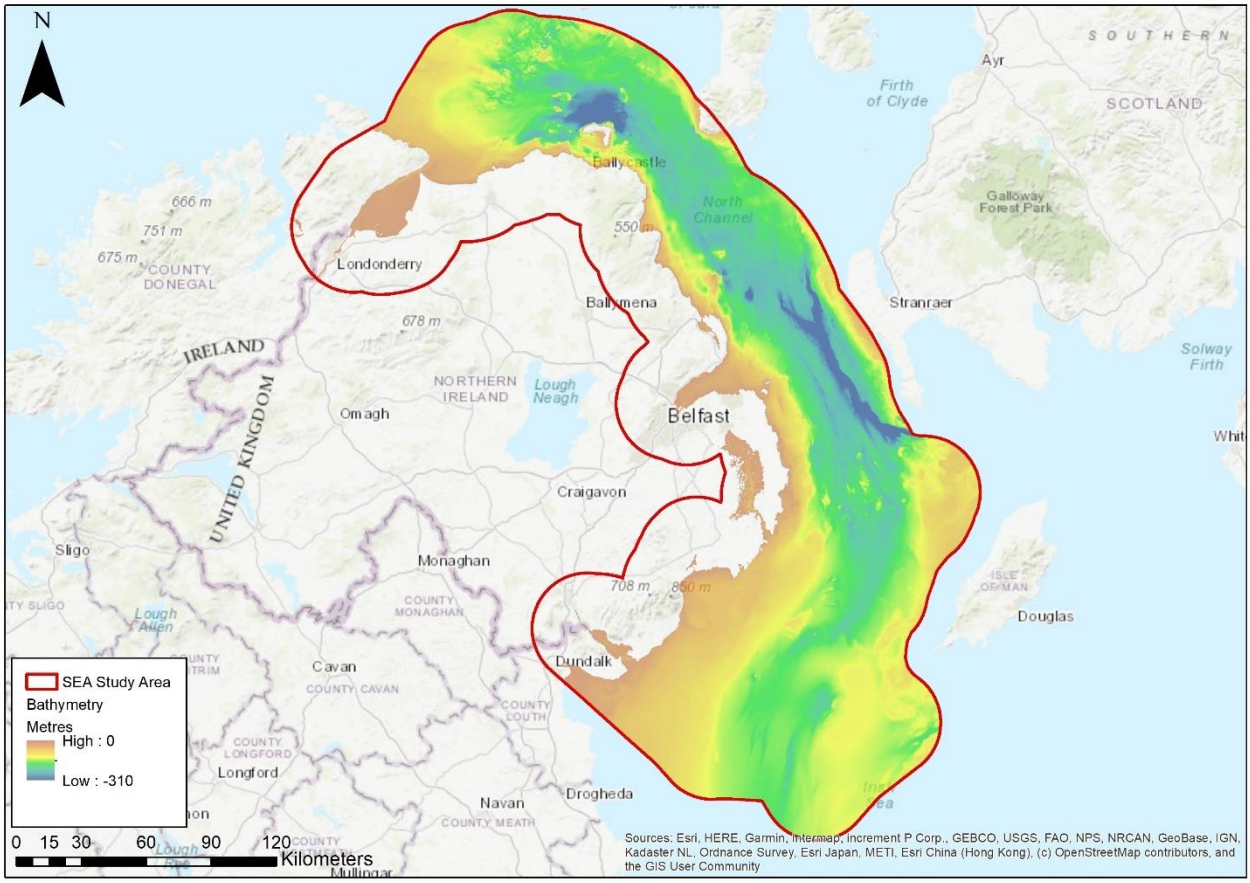

Figure 4-9 Bathymetry of the Study Area

4.3.3.2 Marine and Coastal Geology and Sediments

4.3.3.2.1 Bedrock and Quaternary Geology

The geological landscape of Northern Ireland is remarkably varied considering its relatively small area of about 14,000 km^2 and reflects the diverse geology on which it has been shaped. The older rocks can be broadly split into two distinct types: sedimentary bedrock and basement bedrock. Sedimentary bedrock geology consists of younger sequences, including limestones, sandstones and clays and older sequences, including sandstones, siltstones and mudstones. Basement geology (which underlies the sediment geology) consists of rocks that formed from the solidification of molten rock below volcanoes (igneous rocks) and sediments or intrusions that have changed as a result of high temperatures and pressures (metamorphic rocks). Onshore, the upland areas of Northern Ireland are dominated by hard rocks that are relatively resistant to erosion – the older Dalradian metamorphic basement rocks in the Sperrin Mountains, the basalts of the Antrim Plateau and the granites of the Mourne Mountains.

Onshore rock units may extend several kilometres offshore from the coastal areas, and many of the rock units found onshore are also present offshore, however, the distribution of rock types differs. Most of the offshore area of Northern Ireland is underlain by less resistant sedimentary rocks – mostly Permo-Triassic mudstones and sandstones. In areas off the north coast of Northern Ireland (Malin Sea and North Channel), rocky outcrops of basaltic rocks occur, which are locally significant.

Overlaying the bedrock geology, Northern Ireland has widespread geological deposits of relatively recent origin, known as superficial deposits, which formed during the last 2-3 million years of the Earth's history, spanning the Ice Ages and Interglacial periods. The Quaternary Period, with its dramatic changes in climatic conditions leading to rapid changes in sea level and episodes of extreme glacial erosion and deposition, acted on the existing bedrock and superficial sediments and largely shaped the gross bathymetry of the offshore area of Northern Ireland. The distribution and thickness of glacial and glaciomarine deposits are very variable, ranging from areas of exposed bedrock to narrow glacially eroded basins infilled with up to 300 m of glacial sediment. These offshore glacial deposits can also have great variability both in the size and

composition of material. In certain areas the near-surface parts of these deposits have been reworked during the Holocene.

4.3.3.2.2 Sediment Characteristics, Transport and Processes

The seabed around Northern Ireland's coastline can be divided into three roughly equal areas of mixed coarse sediment, sand and mud[47]. The seabed type is often reflective of the strength of the tides, with coarse sediments occurring in strong tidal conditions and mud in more sheltered areas. The seabed around Northern Ireland can be divided into areas of net erosion and deposition. In areas of net erosion, where the sediments overlay Quaternary sediments or older bedrock, the thickness of the active seabed sediment layer is usually less than 2 m, and there may be relict inactive bedforms formed at times of lower sea level. In areas of net deposition, banks of sand waves and megaripples can reach 30 to 40 m in height.

Off the north coastline the tides tend to be moderate in nature, and the seabed is comprised of mobile sand. Around Rathlin Island, the bedrock and strong currents present provide a rocky reef habitat. Stronger tides occur in the North Channel, with extensive areas of sand with large ripples and coarse sediment, while rocky outcrops are present at the Maidens. There are large areas of muddy sand close to the coast off County Down, with soft mud present in deeper waters. A variety of productive seabed habitats occur within the sea loughs. An overview of the seabed sediments within the study area is shown in **Figure 4-10**.

The shape and nature of the seabed can affect waves and currents, processes that shape the coastline through coastal erosion and deposition. The Coastal Erosion Risk Management Report[64] used available data to undertake a high-level assessment of the vulnerability of Northern Ireland's coastline to coastal erosion. This preliminary assessment did identify areas at potential risk of erosion, however, identified a lack of coastal erosion-specific data on which to base a reliable risk ranking.

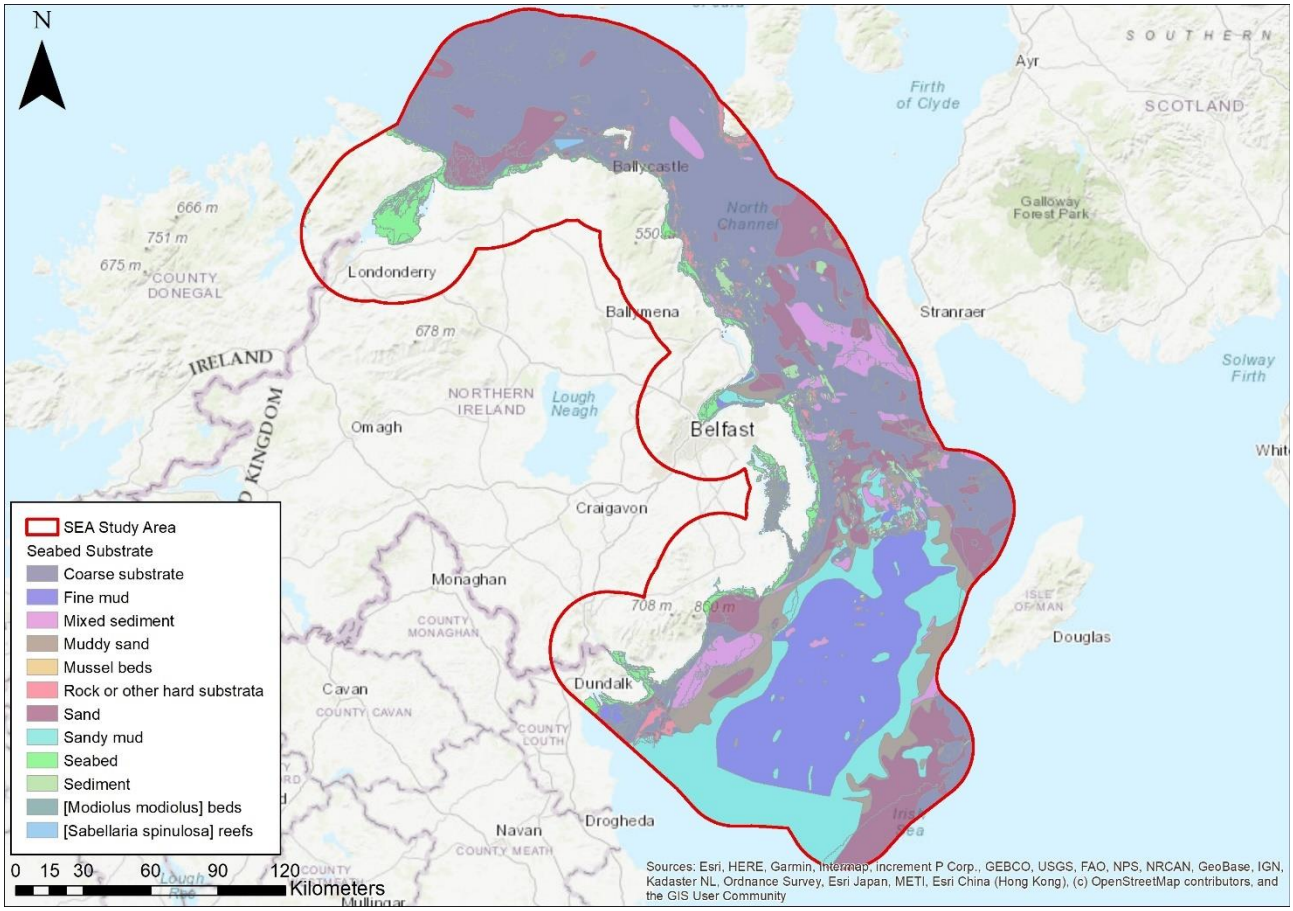

Figure 4-10 Seabed sediments within the Study Area

[64] DAERA NI-Baseline Study and Gap Analysis of Coastal Erosion Risk Management NI

4.3.3.2.3 Designated Sites for Earth Science Features

There is one UNESCO World Heritage Site (WHS) in Northern Ireland, the Giant's Causeway and Causeway Coast WHS, which is designated for its unique geological heritage. This site lies at the foot of basalt cliffs along the sea coast on the edge of the Antrim Plateau, and includes approximately 40,000 massive black basalt columns that project from the sea. The Mourne, Gullion, Strangford UNESCO Global Geopark is situated along the south-east border of Northern Ireland, encompassing three AONBs and covering an area of 1,932 km^2 including a marine area of 94 km^2; this Geopark protects areas of internationally important rocks and landscapes, all of which must be managed responsibly for conservation, education, and sustainable development.

As described in Section 4.3.1.1., ASSIs have been developed as a national suite of sites that provide statutory protection for the best examples of the UK's flora, fauna, geological or physiographical features. They are also used to underpin other national and international nature conservation designations. There are 148 ASSIs in Northern Ireland that are designated for, or partially for, their Earth Science interest. There are 77 ASSIS that are designated, at least in part for their earth science features, that intersect the OREAP Study Area; of these, 21 sites have a coastal component, or are situated immediately adjacent to the coast. Details of these sites are provided in **Table 4-9**.

Table 4-9 Summary of ASSIs protected for earth science interest in the OREAP Study Area.

Site Name	Location	Description of earth science / physiographic interest
Ballycastle Coalfield ASSI	Co. Antrim	Best exposure of a coalfield sequence in Ireland. The area also contains important evidence of early industrial activity.
Carrickarade ASSI	Co. Antrim	A section through an explosive volcano, an important feature in the interpretation of the earliest stages of Tertiary volcanic activity in the region. The limestone cliffs also contain one exceptional raised sea cave.
Giants Causeway and Dunseverick ASSI	Co. Antrim	Important geological site, with volcanic rocks that show the three main eruption phases and rocks containing important minerals. Geological feature of a lava feeder tube also occurs near Portmoon.
Larne Lough ASSI	Co. Antrim	A sea lough of approximately 9 km length whose form was mainly determined in relation to the Larne Lough Fault, which runs in a north-north-west direction. Fossiliferous Jurassic rocks occur as well as an estuarine clay series containing fossil remnants.
Portmuck ASSI	Co. Antrim	Contains the best exposure of the Cretaceous Hibernian formation in Northern Ireland, the only occurrence of the mineral sodalite in Ireland and the international type locality of Gobbinsite. A range of other minerals and basalt related features are also present.
Portrush West Strand ASSI	Co. Antrim	Important site for geological history. The area is underlain by layers of peat and dune sand that reflect the pattern of coastal changes over 7000 years.
Ramore Head and the Skerries ASSI	Co. Antrim	Important site regarding the origin of basaltic rocks. An unusually complex layered intrusion of Tertiary dolerite into shales of Jurassic age producing hornfels rock with abundant fossils.
Rathlin Island Coast ASSI	Co. Antrim	Formations include vertical cliffs, shores of both boulder and shingle, and wave cut platforms on chalk and basalt. The geological exposures and rock formations associated with these coastal conditions are also important.
Runkerry ASSI	Co. Antrim	A beach system of international importance that shows beach states from dissipative to reflective. A wide range of rhythmic morphological features are also present.
Torr Head ASSI	Co. Antrim	Best exposure of metamorphosed Limestone of Dalradian age in Northern Ireland, of international importance in understanding relationships between rock sequences elsewhere.
White Park Bay ASSI	Co. Antrim	The bay comprises a massive land-slipped area backed by high chalk cliffs, and several exposures are well represented, with sea stacks and

		natural arches present.
Outer Belfast Lough ASSI	Co Antrim / Co. Down	Important for the Ordovician series of spilitic lavas, black shales and greywackes. The Carboniferous series of the Holywood group are also of significance and the Permian rocks are the best exposed series of rocks of this age in Ireland.
Carlingford Lough ASSI	Co. Armagh / Co.Down	Limestones that were deposited in a shallow sea basin during the Carboniferous period and which contain numerous fossils. Moraines and deposited sediments provide evidence of ice sheet and glacier movement.
Copeland Islands ASSI	Co. Down	Rocks date from some 400 million years ago to the closure of the Iapetus Ocean during the Silurian period. They contain among the best examples in Northern Ireland of intruded volcanic rocks of this age, where the form of the intrusions is controlled by structural alteration of the country rock.
Killard ASSI	Co. Down	The glaciomarine sediment sequence within the site represents part of a unique moraine deposited in a tidewater setting. This feature fronts and is associated with the formation of the drumlin swarms to the west and dates from the Late Midlandian, some 17,000 years ago.
Murlough ASSI	Co. Down	Exhibits a range of gravel ridges, re-curved spit, dune systems, palaeosols and contemporary beach processes dating from between late glacial and modern times.
Outer Ards ASSI	Co. Down	The peninsula is of interest due to the structure, palaeontology and stratigraphy at Orlock Bridge, Coalpit Bay and Kearney Point. The seashore at Ballymacormick Point is composed of a number of Ordovician rock ridges running parallel to the waterline.
Strangford Lough ASSI	Co. Down	The sea inlet is made up of a drowned drumlin field, with raised beach terraces shaped by Quaternary glaciation. The drumlins display stages of wave erosion, with a number reduced to rocky islands or 'pladdies'. The Lough is an Earth Science Conservation Review Site (ESCR) because of its coastal processes (contemporary processes at Bar Hall Bay, Gransha Point, Youran, Narrows, Dorn and Northern Mudflats).
Bann Estuary ASSI	Co. Derry / Londonderry	The site incorporates a series of sand dune systems which together with the lowest section of the River Bann, are part of the same physiological unit that has evolved over the last 6,000 years. The study of the dune sediments provides information critical to understanding sea-level history in the area and the development stages and processes in the evolution of temperate dune soils.
Lough Foyle ASSI	Co. Derry / Londonderry	The physiographical interest of the site relates to various active coastal processes that occur on both the intertidal and upper beach areas of the shore, in the river and in the saltmarsh environments. These include development of shell and gravel ridges, saltmarsh pans, drainage creeks and sand pits.
Magilligan ASSI	Co. Derry / Londonderry	Represents one of the best sand dune systems in Northern Ireland. The system extends along a substantial portion of the north coast and is an internationally recognised classical beach-ridge cuspate foreland with active prograding dunes (which also presents a detailed record of Holocene sea-level changes). It is the largest and most intensively studied coastal accumulation site in Ireland and amongst the top such localities in Europe.

In addition, five Marine Conservation Zones have been designated to protect nationally important marine species, habitats and features of geological or geomorphological interest in the Northern Ireland inshore

region. The geological and / or geomorphological features considered for protection in MCZ development were listed as the following[65]:

- Glacial process features
- Marine process features
- Mass movement features
- Features indicating past change in relative sea level
- Geological process features
- Seaward extension features

Sites identified for geological and / or geomorphological features will, in most cases, be multi-feature sites where these occur alongside PMF habitats or species. Of the MCZs designated in Northern Ireland's waters to date, Rathlin Island MCZ was designated, in part for its geological / geomorphological interest features. This site encompasses an area of 90.6 km^2 off the coast of Co. Antrim. It includes a range of subtidal geological and geomorphological features that have been recorded along the north coast of the Island, including a submerged coastline, underwater caves, sea arches and lagoons. These are important indicators of global sea-level change.

The locations of these sites designated for geological, geomorphological or other earth science features are shown in **Figure 4-11**.

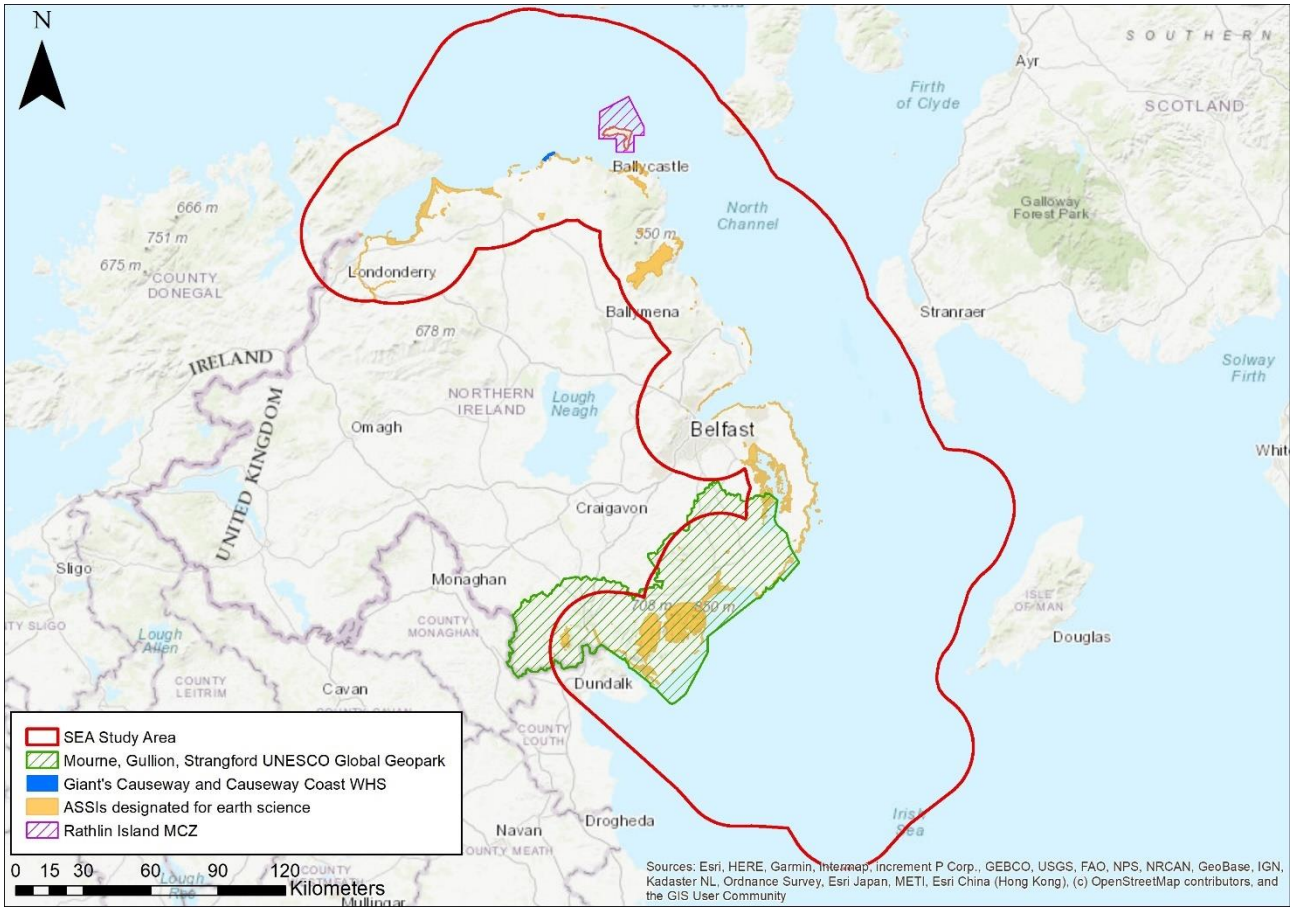

Figure 4-11 Sites designated for geological, geomorphological, or other earth science features within the Study Area

[65] DAERA NI Guidance on selection and designation of MCZs in the Northern Ireland Inshore Region

4.3.3.3 Summary of Existing Pressures and Issues for Geology, Soils and Land Use

Activities occurring at the seabed, such as capital and maintenance dredging, marine explorations and installations and destructive fishing methods can lead to localised changes in seabed sediments and marine sedimentary processes. The main issues affecting geomorphology are related to the interaction between the energy within coastal seas and the processes of erosion, transport, and deposition. Climate change could cause an increase in the frequency of extreme weather events. The intensity of storm events could impact associated wave heights and the energy within coastal seas, which in turn would affect erosion rates.

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to cause a loss of marine sediments, and to affect marine sedimentary processes through the addition of infrastructure at or near to the seabed. Geological or geomorphological features, including those within designated sites, have the potential to be directly or indirectly damaged by invasive construction methods such as piling or cable trenching. Bathymetry, as well as the nature of the seabed geology and deposits, directly influence the siting and design of marine renewable installations.

4.3.4 Water

Water is essential for the maintenance of biodiversity, supports the population through the provision of drinking water, and supports many of our core activities[66]. Assessment of the UK status of marine waters under the Marine Strategy indicates that, for several Descriptors, the achievement of good status is uncertain or has not yet been achieved, while assessments of transitional and coastal waters under the Water Framework Directive highlight that none have achieved a good or high overall status (note the overall failure for any water bodies to achieve a good or high status relates to an update in the monitoring of persistent chemicals, as discussed below)[67]. It is considered that the key issues associated with the implementation of the draft OREAP and Water comprise:

- Potential for the accidental release of contaminants or disturbance of historic sediment contaminants during construction, or release of contaminants from vessels during construction and operation.
- Potential for the disturbance and mobilisation of marine sediments and effects on turbidity.
- Potential for indirect effects on the water column e.g., temperature, turbidity, salinity.
- Potential for the introduction of temporary or permanent sound sources into the marine environment.
- Potential for the introduction of non-natural EMF into the marine environment.
- Potential for the introduction of marine litter and seabed debris into the marine environment.
- Potential to adversely affect the status and / or the potential to achieve Good Environmental Status of Marine Strategy Descriptors.
- Potential to adversely affect the status and / or the potential to achieve Good Status of WFD transitional and coastal water bodies, and WFD Protected Areas (Bathing and Shellfish Waters).

[66] DAERA NI-From Evidence to Opportunity, A Second Assessment of the State of Northern Ireland's Environment

[67] DAREA NI Water Framework Directive Statistics Report 2021

4.3.4.1 Marine and Coastal Water Quality

4.3.4.1.1 The Marine Strategy and Status of Descriptors

The Marine Strategy Regulations 2010, which transposed the EU Marine Strategy Framework Directive (Directive 2008/56/EC), required action to be taken to achieve or maintain Good Environmental Status (GES) in marine waters within the marine strategy area by 2020. GES is defined in the Regulations as "the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations".

The Regulations required the production of a Marine Strategy for UK waters, coordinated across the four UK Administrations. The Strategy aims to help in the delivery of international obligations and commitments such as those under the UN Convention on the Law of the SEA (UNCLOS), UN Sustainable Development Goal 14, OSPAR Strategy and Convention on Biological Diversity, and the OSPAR North-East Atlantic Environment Strategy (NEAES) 2030. The UK Marine Strategy applies an ecosystem–based approach to the management of human activities, and considers the following 11 quality Descriptors:

- D1 – Biological diversity (cetaceans, seals, birds, fish, pelagic habitats and benthic habitats)
- D2 – Non-indigenous species
- D3 – Commercially-exploited fish and shellfish
- D4 – Food webs (cetaceans seals, birds, fish and pelagic habitats)
- D5 – Eutrophication
- D6 – Sea-floor integrity (benthic habitats)
- D7 – Hydrographical conditions
- D8 – Contaminants
- D9 – Contaminants in fish and other seafood
- D10 – Marine litter
- D11 – Underwater noise

The UK Marine Strategy comprises three parts, to be updated every six years: assessment, monitoring programmes and a programme of measures. The first UK assessment of our seas was published in 2012[68], and set objectives, targets and indicators for achieving GES; this was updated in 2019[69], and the summary status of Descriptors for the UK is summarised in **Table 4-10**. Marine Strategy Descriptors that relate to habitats and species are discussed further within Section 4.3.1 Biodiversity, Flora and Fauna.

Table 4-10 Summary of UK Assessment of Environmental Status for the MSFD

Descriptor	GES Achieved	Trend	Description
D1 & D4 Cetaceans	Partially	Stable/mixed	Achievement of GES uncertain. Status of coastal bottlenose dolphin & minke whale consistent with GES in the Greater North Sea, but unknown / uncertain elsewhere. Unknown if GES achieved for other species. Fisheries bycatch is an ongoing pressure; the target for cetacean bycatch (indicated by harbour porpoise bycatch) has been met in the North Sea, but in the Celtic Seas it is likely to have exceeded the precautionary threshold.
D1 & D4 Seals	Partially	Improving	GES achieved for grey seals in the Greater North Sea and Celtic Seas. Harbour seals have not achieved GES in the Greater North Sea; in

[68] Marine Strategy Part One: UK Initial Assessment and Good Environmental Status, 2021

[69] Marine Strategy Part One: UK updated assessment and Good Environmental Status, 2019

			the Celtic Sea, significant increase in West Scotland but status uncertain in other areas.
D1 & D4 Birds	No	Declining	GES achieved for non-breeding waterbirds in the Greater North Sea but not the Celtic Sea. Breeding seabirds have not achieved GES.
D1 & D4 Fish	No	Improving	Demersal fish communities recovering from past over-exploitation, but GES not yet achieved in the Greater North Sea or Celtic Seas. Partial assessment of pelagic shelf fish did not provide a clear result.
D1 & D4 Pelagic Habitats	Partially	Stable/mixed	Achievement of GES uncertain; prevailing environmental conditions likely driving changes in plankton communities but influence of human activities not certain.
D1 & D6 Benthic habitats	No	Stable/mixed	GES achievement uncertain for intertidal & soft sediment habitats; for soft sediments, the levels of physical damage are considered consistent with GES in UK waters to the west of the Celtic Seas but not in the Celtic Seas or the Greater North Sea. GES not achieved for sublittoral rock and biogenic habitats.
D2 Non-indigenous species (NIS)	No	Stable/mixed	GES not achieved. Ability to detect new NIS has improved but no significant change in the number of new records of NIS between 2003 and 2014.
D3 Commercial fish	No	Improving	GES achieved for some commercially exploited fish. In 2015, 53% of marine fish (quota) stocks fished below maximum sustainable yield (MSY) and has increased significantly since 1990. Most national shellfish stocks have not achieved GES or their status is uncertain.
D4 Food webs	Partially	Improving	Extent to which GES has been achieved is uncertain, components of the marine food web are changing but it is not clear how they are affecting each other.
D5 Eutrophication	Yes	Stable/mixed	GES largely achieved. A small number of problems remain in coastal and estuarine waters, representing 0.03% of the UK EEZ and 0.41% of estuarine and coastal waters.
D7 Hydrographical conditions	Yes	Stable/mixed	GES continuing to be achieved.
D8 Contaminants	Yes	Improving	GES largely achieved. Concentration of hazardous substances and their biological effects generally meeting agreed target thresholds. Highly persistent legacy chemicals such as PCBs cause of few failures, mainly in coastal waters close to polluted sources.
D9 Contaminants in seafood	Yes	Improving	GES achieved, high level of compliance with agreed safety levels.
D10 Marine litter	No	Stable/mixed	GES not achieved. Beach litter levels in the Celtic Seas largely stable since assessment in 2012, whilst levels in the Greater North Sea have slightly increased.
D11 Underwater noise	Partially	Stable/mixed	Achievement of GES is uncertain, but research and monitoring programmes are improving

understanding.

4.3.4.1.2 WFD Status of coastal and transitional water bodies

The EU Water Framework Directive (WFD) (2000/60/EC), transposed in Northern Ireland through 'The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017' the "WFD Regulations", established a new legal framework for the protection, improvement and sustainable use of rivers, lakes, transitional waters, coastal waters, and groundwater across Europe. This was undertaken to prevent deterioration and to enhance the status of aquatic ecosystems, promote sustainable water use and reduce pollution. The WFD is implemented through River Basin Management Plans (RBMPs), with the Regulations requiring the production and implementation of a RBMP for Northern Ireland in six yearly cycles. The most recent is the draft third cycle RBMP (2021), which runs from 2021-2027. This classifies the status of all WFD surface water bodies according to chemical, biological and hydromorphological parameters, providing an overall status of either 'High', 'Good', 'Moderate', 'Poor' or 'Bad' for each surface water body (if the surface water bodies have been designated as artificial or heavily modified, they are classified using ecological 'potential' rather than ecological 'status'). 'Water Bodies' are the basic management units for reporting and assessing compliance with the environmental objectives of the WFD Regulations. There are 496 WFD surface water bodies in Northern Ireland, including 25 transitional and / or coastal water bodies that intersect the OREAP Study Area.

The third cycle RBMP for Northern Ireland 2021-2027 will identify those water bodies which can be classified as being at 'good or better' status and set objectives and a programme of measures for the next six-year cycle to help improve those water bodies which are classified as below 'good' status. This is currently at a draft stage, however, an updated classification for water bodies was published in December 2021 in the WFD Statistics Report prior to the production of the third cycle RBMP 2021-2027[70]. This report highlights that there have been significant changes in the monitoring and overall classification for rivers, lakes, and transitional and coastal water bodies. New priority substances were introduced into the monitoring programme in 2018, and the 'chemical status assessment' no includes the presence of ubiquitous, persistent, bioaccumulative, toxic (uPBT) substances. Although a number of these substances are now banned or have restricted use, their widespread past use has resulted in accumulation in the aquatic environment and breaching of Environmental Quality Standards (EQS). These substances were found at all monitoring stations, and uPBT failures were extrapolated to all surface water bodies across Northern Ireland; as the 'Overall Surface Water Status' from 2021 will incorporate the chemical classification including uPBT substances, as well as cypermethrin failures, this has resulted in no water bodies meeting a good or high 'Overall Surface Water Status'. **Figure 4-12** illustrates the most recent digitally available (2018) ecological status of WFD transitional and coastal water bodies.

Table 4-11 compares the number and percentage of transitional and coastal WFD water bodies at good or high status in 2015, 2018 and 2021. In 2015, 36% of the 25 transitional and coastal water bodies were classified as good or high overall status. In 2018, 40% were classified as good or high overall status. In 2021, no water bodies achieved good or high overall status. Considering ecological status, 40% of water bodies achieved good ecological status in 2021, in comparison to 40% in 2018 and 3% good and 6% high status in 2015. In addition, when the chemical status of water bodies is considered excluding uPBT substances and cypermethrin for comparative purposes, 88% achieved good chemical status in 2021, compared to 44% in 2018 (of 16 assessed water bodies) and 20% in 2015 (of 16 assessed water bodies).

The results of the draft third cycle RBMP classification mean that Northern Ireland will not achieve the objective to have 70% of its water bodies at 'good or better' status.

[70] DAERA NI Water Framework Directive Statistics Report 2021

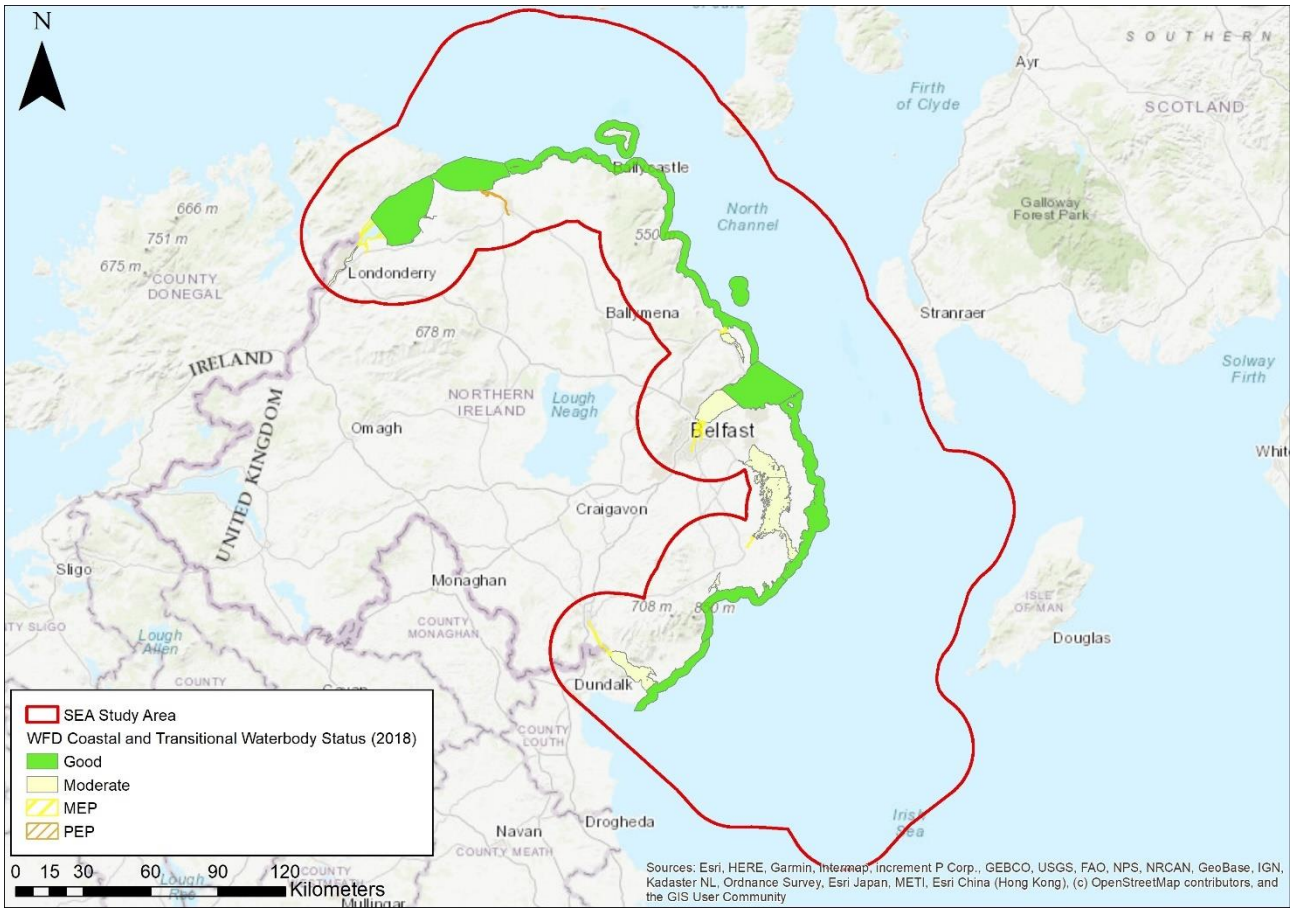

Figure 4-12 Ecological (2018) status of WFD transitional and coastal water bodies

Table 4-11 Comparison of WFD Transitional and Coastal Water Bodies at 'Good or Better' Status for 2015 and 2018

	Ecological Status	Chemical Status	Overall Status	No.	%
Transitional & coastal 2015	9%	20%	36%	9	36
Transitional & coastal 2018	40%	44%	40%	10	40
Transitional & coastal 2021	40%	88%	0%	0	0

The WFD Regulations also required the establishment of a register of protected areas for Northern Ireland, for water bodies, or parts thereof, that require additional water quality protection owing to their importance to people or wildlife. This is outlined in Article 10 of the WFD Regulations. The register includes the following protected areas of relevance to the OREAP:

- An area or body of water requiring special protection in accordance with any EU instrument protecting surface water, groundwater or conservation of habitats and species, including:
    - (i) Areas designated for the protection of economically significant aquatic species (including shellfish water protected areas).
    - (ii) Bodies of water designated as recreational waters (Bathing waters).

The location of areas designated for shellfish and bathing waters within Northern Ireland is shown in **Figure 4-13**.

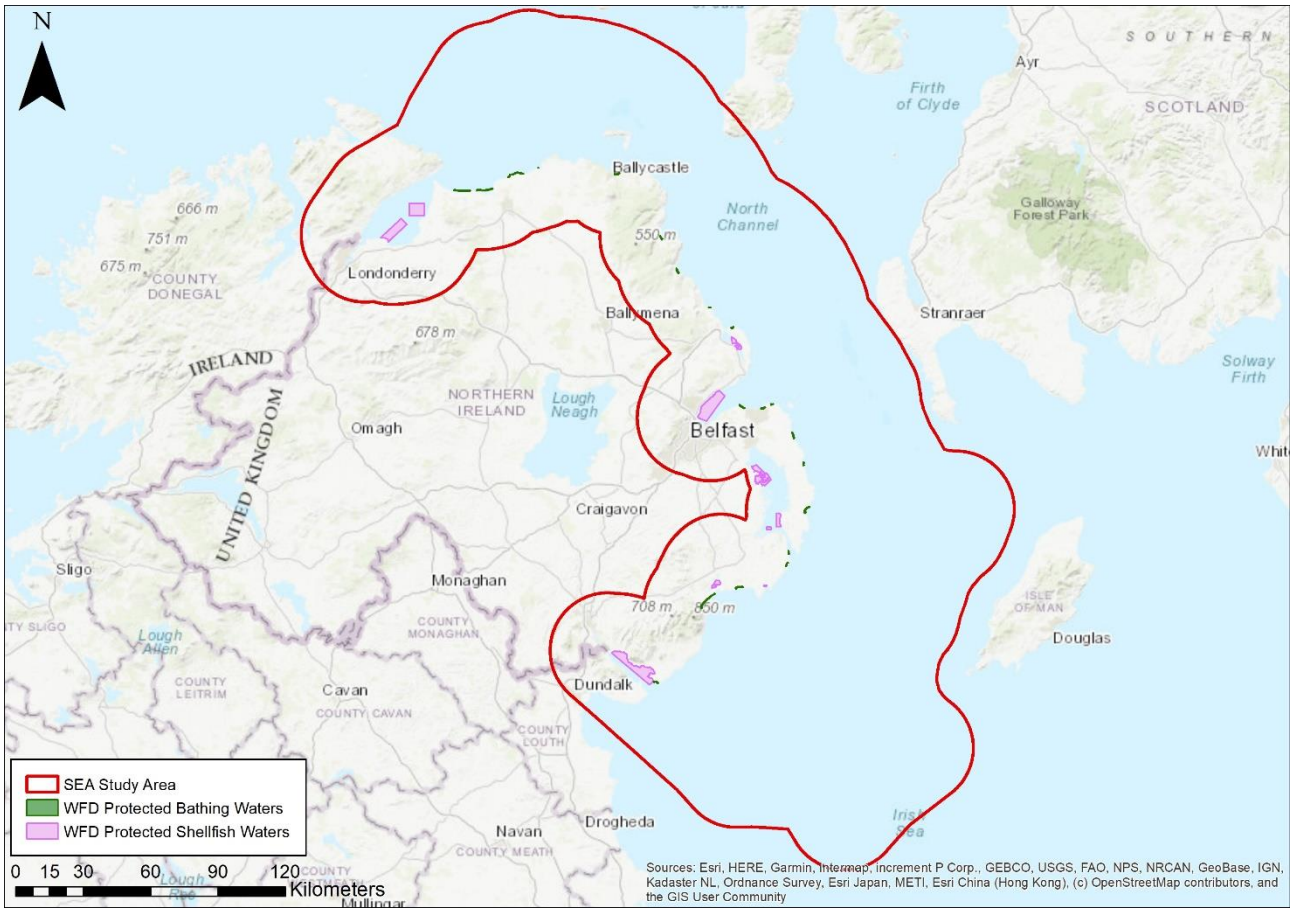

Figure 4-13 WFD Protected Shellfish Waters and Bathing Waters in Northern Ireland

Shellfish Areas

Shellfish water protected areas (SWPAs) are areas designated for the protection of shellfish growth and production. Good water quality within these areas is important for the production of high-quality shellfish. Both the Shellfish Directive (79/923/EEC) and Freshwater Fish Directive (78/659/EEC) were revoked in 2013 and subsumed into the WFD. Areas previously designated under these Directives are now areas designated for the protection of economically significant aquatic species under the WFD and listed on the Protected Areas register. All SWPAs must be managed to ensure that they meet ecological and chemical objectives under the WFD. They must also meet at least Class B status classification by the Food Standards Agency (FSA) under the Food Hygiene Regulations, to ensure that the quality of shellfish harvested is sufficient to protect public health. SWPAs must also make progress to meet a WFD microbiological guideline standard of ≥ 75%of samples containing ≤ 230 *E.coli* in the shellfish flesh and intervalvular liquid[71].

There are currently 10 SWPAs in Northern Ireland, shown in **Figure 4-13**. Shellfish Action Plans have been established for these sites and will be reviewed in line with the third river basin cycle under the WFD. SWPAs are managed by DAERA's Marine and Fisheries Division to ensure no deterioration in water quality, and that progress is made towards compliance with guideline standards. **Table 4-12** outlines the most recent status of these sites, as given in the 2019 Shellfish Action Plans[72]. A total of 2 out of 9 (22%) designated shellfish waters complied with the guideline *E.coli* standard in 2019[73]. Only one site has consistently met the guideline standard over the past six years, while four sites have met the guideline standard at least once, and four sites have not met this standard in any year. The draft 3rd cycle RBMP for 2021-2027 indicates the status of surface water bodies associated with these sites; according to the surface water classification for 2018, three

[71] The Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015

[72] DAERA NI Shellfish Action Plans 2019

[73] DAERA NI Draft 3rd Cycle River Basin Management Plan

surface water bodies had 'good' surface water status, while seven were at 'moderate' or 'moderate ecological potential' status.

Table 4-12 Location and Status of Shellfish Water Protected Areas in Northern Ireland

Site Name	WFD Status 2018	WFD Target 2021	FSA Classification 2018	WFD *E.Coli* Guideline 2018
Larne Lough	Moderate	Good	B	Did not meet guideline
Belfast Lough	Moderate	Good	B/C	Did not meet guideline
Strangford Lough – Paddy's Point and Reagh Bay	Moderate	Good	B	Did not meet guideline
Strangford Lough – Skate Rock	Moderate	Good	A	Met guideline
Strangford Lough – Marlfield Bay	Moderate	Good	N/P	N/A
Killough Harbour	Good	Good	B	Did not meet guideline
Dundrum Bay	Moderate	Good	B/C*	Did not meet guideline
Lough Foyle, Longfield Bank	Good	Good	B	Did not meet guideline
Lough Foyle, Balls Point	Good	Good	B	Did not meet guideline
Carlingford Lough	Moderate	Good	B**	Met guideline

*B Status for Inner North Mussels & C Status for Inner South Mussels

**B Status for all sites in Carlingford Lough with the exception of a B/C Status at Narrow Water Wild Fishery (seasonal classification)

Bathing Waters

The Bathing Water Directive (Directive 2006/7/EC concerning the management of bathing water quality and repealing Directive 76/160/EEC) required member states to identify their most popular bathing waters for regular testing in order to ensure that a minimum quality standard is reached; this is implemented in Northern Ireland by The Quality of Bathing Water (Northern Ireland) Regulations 2013. There are 26 designated bathing waters in Northern Ireland (**Figure 4-13**), as detailed in **Table 4-13**. These are monitored weekly from May to September, and classified into one of four categories:

- Excellent;
- Good;
- Satisfactory; or
- Temporary advice issued against bathing.

Classifications are based on the presence of *E.coli* in water samples. Individual sample results below 250 *E.coli* (EC)/ 100 ml and 100 Intestinal Enterococci (IE)/ 100 ml are typical of an 'Excellent' classification. Results below these values, and up to 500 EC/ 100 ml and 200 IE/ 100 ml are typical of a 'Good' or 'Sufficient' classification. When *E.coli* levels exceed 1250 EC / 100 ml, temporary advice against bathing is

issued. The most recent assessment of bathing water quality compliance at these sites from 2022 classified 21 as 'Excellent' quality, three as 'Good' quality, one as 'Sufficient' quality, and one as 'Poor' quality for bathing[74]. According to the draft 3rd cycle RBMP, over the assessment period of 2014-2019, 25 of the 26 bathing water sites consistently met the minimum standard (sufficient). Of these, ten sites consistently met the 'excellent' standard, seven sites consistently met 'excellent' or 'good' standard, and five sites consistently met 'good' or 'sufficient' standard. One site, Ballyholme, consistently met the 'sufficient' standard over this period. Investigations by DAERA have shown that this site is situated in a complex catchment, vulnerable to pressures from agricultural run-off and overflows from the WWT network.

Table 4-13 Location and Status of Bathing Water Sites in Northern Ireland

Bathing Water	2022 Compliance Level
Ballycastle	Excellent
Ballygally	Excellent
Ballyhornan	Excellent
Ballywalter	Excellent
Browns Bay	Excellent
Castlerock	Excellent
Cloughey	Excellent
Cranfield	Excellent
Crawfordsburn	Excellent
Groomsport	Excellent
Kilclief	Excellent
Magilligan (Benone)	Excellent
Magilligan (Downhill)	Excellent
Millisle	Excellent
Murlough (Co Down)	Excellent
Portballintrae Salmon Rock	Excellent
Portrush Curran (East Strand)	Excellent
Portrush Mill (West Strand)	Excellent
Portrush Whiterocks	Excellent
Portstewart	Excellent
Tyrella	Excellent
Carnlough	Good
Helen's Bay	Good
Waterfoot	Good
Newcastle	Sufficient
Ballyholme	Poor

[74] DAERA NI Bathing Water Quality

4.3.4.2 Summary of Existing Pressures and Issues for Water

The most recent State of the environment report for Northern Ireland states that industry, power generation, agriculture and forestry, development, transport and infrastructure pressures all potentially impact on Northern Ireland's water environment[75]. Under the WFD, pressures on the quality of the water environment have been assessed according to two types, as follows:

- Point source pollution pressures on water quality – e.g., effluent discharges arising from industry and WWTWs; sewer overflows during heavy rainfall events; and
- Diffuse source pollution pressures on water quality – e.g., contaminated surface run-off from roads, construction sites, fuel storage areas; septic tank discharges; acid and nutrient deposition from the air; run-off of pesticides, soils and nutrients from agriculture and forestry, and migration of these to groundwaters and surface waters.

Abstractions and impoundments of water for drinking water supply, industry, agriculture, recreation, and hydropower can lead to pressures on water quantity and flow and can exacerbate existing water quality issues. The introduction and spread of invasive non-native species can impact upon native aquatic biodiversity and can adversely affect water-based recreational activities.

The most recent UK Marine Strategy assessment indicated that some Descriptors have not yet met Good Environmental Status (e.g., breeding seabirds, fish, some benthic habitats, non-indigenous species, marine litter), or there is uncertainty or a lack of data to enable their status to be confidently determined. Part three of the Marine strategy has established a UK Programme of Measures with the aim of achieving GES.

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to lead to negative effects on the quality of marine and coastal water bodies in Northern Ireland (as well as to cross-border water bodies in the Republic of Ireland) alone, or in combination with, these existing pressures. Consideration should be given to the potential for impacts on marine Descriptors when planning for transmission infrastructure in coastal or marine environments. Construction-phase effects on water quality could occur, for instance, through the release of contaminants or from the mobilisation of sediments, while during operation effects could include the introduction of sound or EMF into the marine environment.

4.3.5 Air Quality and Climatic Factors

Good air quality is vital for human health and wellbeing, for our climate, habitats and built environment. Air pollution is the result of a range of substances that are introduced into the atmosphere from a variety of different sources. On the whole, air quality in Northern Ireland has improved significantly over the past few decades; in particular, concentrations of sulphur dioxide, originating from the combustion of coal and oil, have reduced. However, some pollutants are continuing to exceed air quality objectives. This has consequences on both human health and on some of our most important habitats that are sensitive to the effects of atmospheric pollutant deposition.

Climate change represents one of the most important threats to our environment, and to our economy, and projections indicate that hotter, drier summers and warmer wetter winters will occur over the next century because of climate change. The Paris Agreement, signed in 2015, committed to strengthening the global response to the threats of climate change, by holding the global temperature rise to no more than 2°C and preferably below 1.5°C. Key to this agreement is the reduction of Greenhouse Gas (GHG) emissions fast enough to achieve this temperature goal.

The recent European Green Deal 2019 aims to make significant advances in climate action, providing a more sustainable low-carbon economy for the EU. It plans to boost the efficient use of resources by moving to a clean circular economy, and to restore biodiversity and cut pollution. The Deal has set a goal of net zero carbon emissions by 2050, and a 50-55% reduction in emissions by 2030. The UK Climate Change Act 2008 introduced a legally binding target for the reduction of GHG emissions in the UK by at least 80% below 1990 baseline levels by 2050. The target for the current 2018-2022 period is a reduction in emissions by 37% by 2020 and, for the next period (2025) to reduce emissions by 51%. The Act was amended in 2019, and now commits the UK to reducing emissions by 100% by 2050 from 1990 baseline levels (in line with the EU's 'net

[75] DAERA NI-From Evidence to Opportunity A Second Assessment of the State of Northern Ireland's Environment

zero 2050 target'). The first climate change legislation was passed by the Northern Ireland Assembly in 2022; the Climate Change Act (Northern Ireland) 2022 sets out the legal framework for tackling climate change by reducing GHG emissions in Northern Ireland, with a net zero target by 2050 from baseline levels.

It is considered that the key issues associated with the implementation of the draft OREAP and Air and Climatic Factors comprise:

- Potential for localised effects of air pollutants during the construction phase and / or operational support / maintenance (plant emissions).
- Potential for localised noise effects during construction and operation.
- Potential for indirect positive effects on air quality in the long-term through reduction in emissions from power stations owing to new renewable energy connections.
- Potential for marine renewable energy to contribute to a net reduction in GHG emissions.
- Potential for a permanent loss of blue carbon resources.
- Potential for marine renewable infrastructure to be resilient to the effects of climate change.

4.3.5.1 Air Quality in Northern Ireland

Air quality in Northern Ireland is reported annually by DAERA, the most recent report in 2021[76], and is compiled from data supplied by the 21 air quality monitoring stations. At each of these locations, levels of pollutants are monitored, and measured with regard to EU Air Quality Directives, the 2007 UK Air Quality Strategy (AQS) objectives, and The Air Quality Standards Regulations (NI) 2010. This highlights any exceedances of air quality objectives and highlights any emerging air quality trends. The most significant air pollutants for Northern Ireland and their sources are the following:

- Nitrogen oxides (NO_x, including nitric monoxide NO and nitrogen dioxide NO_2), arising from fuel combustion in transport and energy generation.
- Sulphur dioxide (SO_2), arising from combustion of fuels that contain sulphur, from power generation, industry and domestic solid fuel combustion.
- Particulate matter (PM_{10} and $PM_{2.5}$), arising from road transport and domestic solid fuel combustion, and as a secondary pollutant from ammonia.
- Ground-level ozone (O_3), arising from the interaction of various air pollutants with sunlight.
- Ammonia (NH_3), arising from agricultural activities and handling of manure. NH_3 reacts with other pollutants (NO_x, S), producing fine particles of ammonium nitrate and ammonium sulphate.
- Polycyclic aromatic hydrocarbons (PAHs), arising from incomplete combustion primarily from domestic sources.

The following pollutants were monitored in Northern Ireland during 2021: carbon monoxide (CO), oxides of nitrogen (NO_x), comprising nitric oxide (NO) and nitrogen dioxide (NO_2), sulphur dioxide (SO_2), particles (as PM_{10}, $PM_{2.5}$ and black carbon), ozone (O_3), benzene, polluting elements (including lead, arsenic, cadmium, nickel, and mercury) and polycyclic aromatic hydrocarbons (PAHs). The Regulations limit values, target values and AQS objectives were met for the following pollutants in Northern Ireland in 2021: PM_{10} and $PM_{2.5}$ particulate matter, NO_2, O_3, CO, benzene, SO_2 and polluting elements. The three sites monitored for PAHs exceeded AQS objectives; these are likely due to solid fuel burning. This has potential to decrease, however, as Northern Ireland's new Energy Strategy - Path to Net Zero Energy[77], published in 2021, details restrictions on burning fossil fuels for home heating.

Local Air Quality Management (LAQM) provides the framework under the Environment Order (NI) 2002 within which air quality is managed by Northern Ireland's local authorities (District Councils). LAQM requires

[76] DAERA NI Air pollution in Northern Ireland 2021

[77] Department for the Economy-Energy Strategy-Path to New Zero Energy

the District Councils to review and assess a range of air pollutants against the objectives set by the Air Quality Strategy (AQS), using a range of monitoring, modelling, and other methods. For locations where objectives are not expected to be met by the relevant target date, District Councils are required to declare an Air Quality Management Area (AQMA), and to develop an Action Plan to address the problem. There are 19 active AQMAs in Northern Ireland, set for one or more of the pollutants PM_{10}, NO_2, or SO_2.

The UK National Atmospheric Emission Inventory (NAEI) is the standard reference air emissions inventory for the UK, and includes emission estimates for England, Scotland, Wales and Northern Ireland for a wide range of important pollutants including GHGs, regional pollutants leading to acid deposition and photochemical pollution, persistent organic pollutants (POPs) and other toxic pollutants such as heavy metals. The NAEI is compiled annually, when the latest set of data is added, and the full-time series updated and reported internationally. The latest report was published in October 2022 and covers the period 2005-2020[78]. This summarises emissions in Northern Ireland for the eight priority air pollutants: ammonia (NH_3), carbon monoxide (CO), nitrogen oxides (NO_x as NO_2), non-methane volatile organic compounds (NMVOCs), particulate matter less than 10 micrometres (PM_{10}), particulate matter less than 2.5 micrometres ($PM_{2.5}$), sulphur dioxide (SO_2) and lead (Pb). Most pollutant emission levels were lower in 2020 than they were in 2005. A switch in energy generation has created a reduction in sulphur dioxide (SO_2) levels in Northern Ireland due to the development of a natural gas pipeline to Northern Ireland, this has allowed for fuel switching away from oil and coal-fired generation.

4.3.5.2 GHG Emissions

The Northern Ireland GHG Inventory includes data on GHG emissions in Northern Ireland, forming part of the UK GHG Inventory reported at an international level in line with UK commitments under the Kyoto Protocol. The Inventory is updated annually, the latest available covers the period 1990-2020[79].

In 2020, Northern Ireland accounted for 5.2% of the UK total GHG emissions, which is higher than its population share of 2.8%. Since the base year (1990), Northern Ireland's total GHG emissions have decreased by 24% from 27.5 to 20.9 million tonnes of carbon dioxide equivalent ($MtCO_2e$), with a 4.2% decrease from 2019 to 2020, largely attributable to the transport sector which was impacted by travel restrictions imposed during the COVID-19 pandemic. Residential emissions also declined in this period, driven by fuel switching from coal to natural gas.

Agriculture was the sector responsible for the greatest amount of GHG emissions in 2020 (26.6%), followed by transport (16.2%), residential (13.7%), energy supply (13.6%) and business (13.4%) sectors. The energy supply sector experienced a fall in emissions of 2.5 $MtCO_2e$ from 2019 to 2020 (2.5% decrease), due mainly to fuel switching from coal and oil to natural gas. Since the base year, there has been a 46.4% decrease in emissions from this sector.

The composition of GHG emissions for Northern Ireland in 2020 was as follows:

- 68% Carbon dioxide (UK 79%)
- 23% Methane (UK 13%)
- 8% Nitrous oxide (UK 5%)
- 1% Fluorinated and other gases (UK 3%)

Across all sectors other than agriculture and waste management, carbon dioxide was the most common emitted GHG. Within the energy supply sector, CO_2 comprised the total amount of GHG emissions.

The energy supply sector is currently responsible for 13.6% of GHG emissions in Northern Ireland, comprised entirely of CO_2. Energy-related sectors (business, energy supply, industrial process, public, residential and transport) together account for almost 60% of Northern Ireland's GHG emissions and, to target changes in the overall energy sector, the Energy Strategy for Northern Ireland – Path to Net Zero Energy was published in 2021[80]. The primary targets of this strategy are:

[78] Air Pollution Inventories for England, Scotland, Wales and Northern Ireland: 2005-2020

[79] NISRA Northern Ireland Greenhouse Gas Emissions 2020

[80] Northern Ireland Executive-The Path to Net Zero Energy

1. Energy Efficiency: Deliver energy savings of 25% from buildings and industry by 2030.
2. Renewables: Meet at least 70% of electricity consumption from a diverse mix of renewable sources by 2030.
3. Green Economy: Double the size of our low carbon and renewable energy economy to a turnover of more than £2 billion by 2030.

GHG emissions are an indicator in the draft 2016-2021 PfG, based on a criteria for change set at +/ 1.0 percentage points annually since the baseline of 21.9 $MtCO_2e$ in 2014. The decrease of 7.7% from 2014 to 2020 is considered as 'no change' for PfG reporting. On the whole, the UK has reduced emissions by nearly 50% since the base year, however, the different parts of the UK vary in their reduction, with Northern Ireland achieving the lowest reduction of 24% in emissions to date (Scotland 51%; England 53%; Wales 40%).

4.3.5.3 Climate Change

4.3.5.3.1 Climate Change Projections

The UK Climate Change Projections (UKCP18)[81] anticipate a greater chance of hotter, drier summers and warmer, wetter winters with more extreme weather and rising sea levels. The high emission scenario for Northern Ireland indicates that, by 2070, winters could be up to 3.9 °C warmer and 25% wetter and summers could be up to 4.9°C hotter and 38% drier.

The emphasis of the UKCP18 marine projections is on changes in coastal sea levels, including extreme water levels that arise from storm surges and surface waves[82]. Global sea level has risen over the 20th century and will continue to rise over the coming centuries, which could affect tidal characteristics, including tidal range. The amount of sea level rise projected depends on the location around the UK and the emission scenario; under the high emission scenario, it is predicted that sea levels at Belfast could rise by up to 94 cm by 2100. No evidence has been found for significant changes in future storm surges. The UKCP09 multi-level temperature and salinity marine data were not updated for UKCP18. Around the UK, the sea surface temperature (SST) generally shows a significant warming trend of around 0.3°C per decade over the last 40 years, with warming greatest across the southern North Sea, and a predicted warming trend in the future[83]. Research to date suggests that it is unlikely that multi-year annual mean wind speeds will change by more than a maximum of ±25% over most of Europe and North America during the present century[84].

These effects of climate change are likely to increase coastal flooding and will require future development to be adaptable or resilient to future climatic changes and associated impacts. Sea level and storm surge projections, in combination with local information on coastline structure and existing coastal defences can enable coastal vulnerability assessment.

According to the UK Climate Change Risk Assessment (CCRA) 2017, infrastructure in Northern Ireland in general is exposed to a range of climate hazards; flooding poses the greatest long-term risk to infrastructure from climate change, however, there are growing risks from heat, water scarcity and slope instability caused by severe weather[85]. Risks to offshore infrastructure are identified from storms and high waves; the CCRA considered this not to be a high priority risk for Northern Ireland, as the majority of offshore infrastructure in the UK at the time was in the North Sea, but that this risk would need to be assessed should there be an increase in offshore infrastructure in the area in the future. The Evidence Report for the Third UK Climate Change Risk Assessment CCRA3 (Summary for Northern Ireland)[86] assessed the risks to offshore infrastructure from the impacts of climate change, including equipment used by the oil and gas industry, wind, tidal and wave energy, and gas pipelines and power cables on or under the seabed. The vulnerabilities of these infrastructure types due to storms and high waves were considered to include the destabilisation or

[81] DAERA NI UK Climate Change Projections

[82] UKCP18 Marine Report, 2018

[83] The Impacts of Climate Change on Sea Temperatures around the UK and Ireland

[84] IPCC Renewable Energy Sources and Climate Chnage Mitigation

[85] UK Climate Chnage Risk Assessment 2017 Evidence Report Summary for Northern Ireland

[86] UK Climate Risk Evidence for the third UK Climate Change Risk Assessment (CCRA3)-Summary for Northern Ireland

degradation of mechanical structures, reduced energy output and operating periods, damage to cabling systems during storms and prevention of access for maintenance and inspection activities. The current level of risk was deemed to be low, however, the future risk was allocated as medium magnitude due in part to increasing offshore renewable energy infrastructure and the presence of a large fleet of oil and gas platforms that may be repurposed for carbon capture and storage.

4.3.5.3.2 Carbon Sequestration Potential (Blue Carbon)

Carbon sequestration (or Blue Carbon) is the carbon captured by ocean and coastal ecosystems and is typically stored in ocean plants and sediments. Blue carbon habitats include mangroves, coastal wetlands, seagrass, and saltmarsh areas, which are frequently in severe decline. Boosting carbon sequestration rates (and reducing GHG levels within the atmosphere) is an area of increased research and need, given that it is estimated that UK blue carbon ecosystems sequester an estimated 11 million tonnes of CO_2 annually, representing 30% of all CO_2 sequestration by UK ecosystems[87]. Restoring habitats such as saltmarsh (a hectare of saltmarsh can capture two tonnes of carbon per year), and seagrass (a hectare of seagrass can store a tonne of carbon per year) can have significant potential to further sequester carbon, while the development of kelp forests can also help to increase carbon sequestration rates.

Ulster Wildlife's Blue Carbon Habitat Restoration Feasibility Study[88] identified that Northern Ireland has several blue carbon habitats (saltmarshes, seagrass beds, shellfish beds, kelp forests, maerl beds, and biogenic reefs). This study estimated that the current extent of coastal blue carbon habitats in Northern Ireland is 658 km^2, with approximately half of this area occurring within the inshore Marine Protected Area network. The effective protection of these areas of carbon sinks can contribute to climate change mitigation and adaptation.

Activities that are damaging or disruptive to seabed habitats (e.g., trawling and dredging) can cause the resuspension of stored sediment carbon. Planned offshore renewable infrastructure should consider the potential damage to these habitats and release of carbon and / or reduction in carbon sequestration potential, and factor this into the consideration of overall CO_2 emission reductions that may be achieved. DAERA is currently developing a Blue Carbon Action Plan to protect and restore Northern Ireland's blue carbon habitats; objectives from the upcoming Action Plan will need to be considered when undertaking developments within Northern Ireland's marine environment.

4.3.5.4 Carbon Impacts (Carbon Cost) of Offshore Renewables

Renewable energy can produce electricity without direct carbon emissions, however, there is an up-front carbon cost associated with the extraction of raw materials and the production of infrastructure.

The Intergovernmental Panel on Climate Change (IPCC) published a Special Report on Renewable Energy Sources and Climate Change Mitigation in 2012[66], taking account of costs and GHG emissions across various technologies and scenarios, and their current and potential role in the mitigation of GHG emissions. Six renewable energy sources were considered: bioenergy, direct solar energy, geothermal energy, hydropower, ocean energy (including wave and tidal devices) and wind energy (onshore and offshore). Lifecycle assessments (LCA) for electricity generation indicated that GHG emissions from renewable energy technologies are generally significantly lower than those associated with fossil fuel options (median values for all renewable energy types ranged from 4-46 g CO_2 eq/ kWh, while those for fossil fuels ranged from 469-1,001 g CO_2 eq/ kWh).

A review of literature for this Special Report demonstrated that the energy used and GHG emissions produced from the manufacture, transport, installation, operation and decommissioning of wind turbines are small in comparison to the energy generated and emissions avoided over the lifetime of wind power devices – estimates for the GHG emissions intensity of wind energy ranged from 8-20 g CO_2 eq/ kWh, while energy payback times were 3.4-8.5 months. Management of the variability that can be associated with energy output from wind power was found to not significantly detract from these GHG benefits. Regarding ocean energy (including wave and tidal devices), CO_2 is not directly emitted during operation, but GHG emissions can arise from raw material extraction, manufacturing, construction, maintenance and decommissioning. A review of

[87] Blue Carbon in the UK-Understanding and Developing the Opportunity

[88] Ulster Wildlife Blue Carbon Restoration in Northern Ireland - Feasbility Study

lifecycle assessment studies indicates that GHG emissions from wave and tidal systems are less than 23 g CO_2 eq/ kWh, with a median estimate of 8 g CO_2 eq/ kWh for wave energy.

A report by Bernstein Research on the carbon cost of renewables[89] determined that the biggest contributors to the carbon footprint of wind turbines are steel, aluminium and the epoxy resins that are used to hold components together, the steel tower of the turbine comprising 30% of the associated carbon impact, the concrete foundation comprising 17% and the carbon fibre and fibreglass blades comprising 12%. In terms of the lifecycle cost, this report estimated that wind power has a carbon footprint that is 99% lower than coal-fired power plants, 98% lower than natural gas, and 75% lower than solar power (11 g CO_2/ kWh for wind compared to 44 g/ KWh for solar, 450 g/ KWh for natural gas, and 1000 g/ KWh for coal).

4.3.5.5 Summary of Existing Pressures and Issues for Air and Climatic Factors

According to Northern Ireland's most recent State of the Environment review (2013), air pollution from domestic combustion and from road transport remain as challenges in the improvement of air quality for the protection of human health[90], while pollutants can also lead to secondary effects on sensitive habitats. However, air quality has improved significantly over the past few decades, and the most recent air quality monitoring report shows that all pollutants, except for PAHs, met the EU limit and target values and AQS objectives. Northern Ireland's new Energy Strategy - Path to Net Zero Energy is expected to support further improvements in air quality.

Climate change represents a significant challenge internationally. GHG emissions in Northern Ireland have decreased by 24% since 1990, owing to improvements in energy efficiency, switching from coal to natural gas as a fuel source, and improvements in the management of landfills. The energy supply sector has lower emissions of GHGs currently than it had in 1990. The UK has committed to a target of a 37% reduction in GHGs by 2020 and, through the Climate Change Act (Northern Ireland) 2022, Northern Ireland has committed to a target of 100% reduction by 2050; although in 2020 the UK as a whole had a 49.9% reduction, in Northern Ireland GHG reduction stood at only 23.9%. This has implications for successfully contributing to the UK and Northern Ireland targets for 'net zero emissions' by 2050.

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to lead to temporary, localised, increases in air pollution, including ambient PM_{10} and nitrogen dioxide emissions, resulting in short-term negative impacts upon air quality. There is also an upfront carbon cost and GHG emissions associated with the extraction of raw materials and the manufacture of renewable infrastructure. However, implementation of the draft OREAP also has the potential to lead to positive effects on air quality and GHG emissions in the medium and long-term, with the potential for connection of new renewable energy generators, such as wind, wave, and tidal turbines, to the national grid expected to support a reduced dependence on fossil fuels and a net reduction in the quantity of pollutants and GHG released into the atmosphere. This could have far-reaching positive consequences upon other factors such biodiversity and human health.

4.3.6 Material Assets

The term 'Material Assets' can be considered very broadly within the SEA process, encompassing for example infrastructure, settlements, transport and utilities. Given the geographic scope of the OREAP and the large-scale nature of projects that may arise from its implementation, there is potential for offshore renewable infrastructure development and operation to impact upon, or be impacted by, existing material assets. It is considered that the key issues associated with the implementation of the draft OREAP and material assets comprise:

[89] How Green is Wind Power Really?

[90] DAERA NI-From Evidence to Opportunity A Second Assessment of the State of Northern Ireland's Environment

- Potential for interaction with / disruption effects on ports, shipping and navigation during construction.
- Potential for interaction with areas of marine infrastructure (cables & pipelines, existing or planned renewable energy infrastructure).
- Potential for temporary or permanent disturbance or displacement from areas of importance for commercial fisheries and aquaculture.
- Potential for indirect effects on tourism.
- Potential for temporary or permanent disruption effects on areas of known military / defence activity.
- Potential for temporary or permanent disruption effects on aviation operations, including navigational radar and telecommunications.
- Potential for interaction with / disturbance of areas used for disposal or for aggregate extraction.

4.3.6.1 Ports, Shipping and Navigation

There are several commercial ports in Northern Ireland ranging from large port facilities to numerous smaller ports that are essential for ferry traffic and local trade and supplies (**Figure 4-13**). The estimated total tonnage through Northern Ireland's major ports in 2022 was 27.5 million tonnes, comprising 6.1% of the total tonnage handled at major UK ports (448.6 million tonnes)[91]. The majority of tonnage (66.5%) came through Belfast Port, while Larne was the second busiest (accounting for 13.4%), followed by Warrenpoint (11.6%). Londonderry is also considered as a major port, handing approximately 6% of Northern Ireland's tonnage in 2021. The use of ports in the OREAP study area by commercial vessels can be seen in the shipping route density data displayed in **Figure 4-14**.

The Northern Ireland licensed sea fishing industry is concentrated at the fishing ports of Ardglass, Kilkeel and Portavogie, located on the East coast, while many smaller ports around the coastline are frequently used by local fishing boats. According to the most recent UK Sea Fisheries statistics[92], the most used fishing port in Northern Ireland in 2021 (based on the quantity of landings in kt) was Belfast (8.7 kt), followed by Londonderry (4.4 kt), Ardglass (3.9 kt) and Kilkeel (3.4 kt). Landings at Belfast were solely pelagic fish, while in Londonderry and Ardglass they were primarily pelagic, with some shellfish and a small percent of demersal fish. Landings at Kilkeel were primarily shellfish and demersal species, with a smaller percent of pelagic species.

The recent National Ports Study for Wind Energy Ireland[93] investigated the potential suitability of ports on the island of Ireland for the offshore renewable industry, recognising the key role of ports and suitable port infrastructure to the successful delivery of offshore wind projects, in terms of transportation of turbine components and foundations as well as their role as a link between marine and landside activities and supply chains. The locations considered within Northern Ireland were Belfast D1 and Harland & Wolff and Larne. The D1 facility in Belfast Harbour was concluded to be the only facility that could currently accommodate staging and marshalling of fixed-bottom projects of the scale anticipated soon, while Harland & Wolff and Larne appeared to have some suitability to be used as staging ports. No existing facilities were considered suitable to facilitate manufacturing and staging of floating wind projects; D1 and Garland and Wolff could provide some capacity for assembly, however, several new facilities were deemed to be required to meet the demand for staging at ports.

Shipping route density within the Study Area can be seen in **Figure 4-14**. The route density for various vessel types (cargo, fishing, passenger, tanker, other) can be seen within the DAERA Northern Ireland Marine Map Viewer[94]. Cargo vessels tend to pass through the Plan area in a north-south direction, with high

[91] NISRA Ports traffic

[92] UK Sea Fisheries Statistics 2021

[93] National Port Study 2022

[94] ArcGIS DAERA NI

density from Belfast Lough south, as well as east to Morecambe Bay, between the north coast of Rathlin Island and Scotland, and approaching Derry / Londonderry. Tankers show a similar concentration from north to south, with the highest vessel density approaching Belfast Lough, and between Rathlin Island and Scotland. Fishing vessel density appears highest in the south-east of the region, between the ports of Portavogie, Ardglass and Kilkeel, as well as within Belfast Lough. Passenger vessels (or ferries) provide transport from Northern Ireland to Scotland, England and the Isle of Man, with major ferry ports located in Belfast and Larne. A ferry service also runs between Campbeltown (Scotland), Ballycastle and the Isle of Islay. Ferries are also an important mode of transport within Loughs, including Strangford Lough, Lough Foyle and Carlingford Lough, and between Rathlin Island and the mainland of Northern Ireland. These routes are represented in **Figure 4-14**, with the highest route density between Belfast / Larne and Cairnryan (Scotland) and between Rathlin Island and the mainland. Ferries tend to take very distinct routes and in certain areas (e.g., Rathlin sound) due to bathymetry and other characteristics there is no, or limited, scope for adjustment of routes.

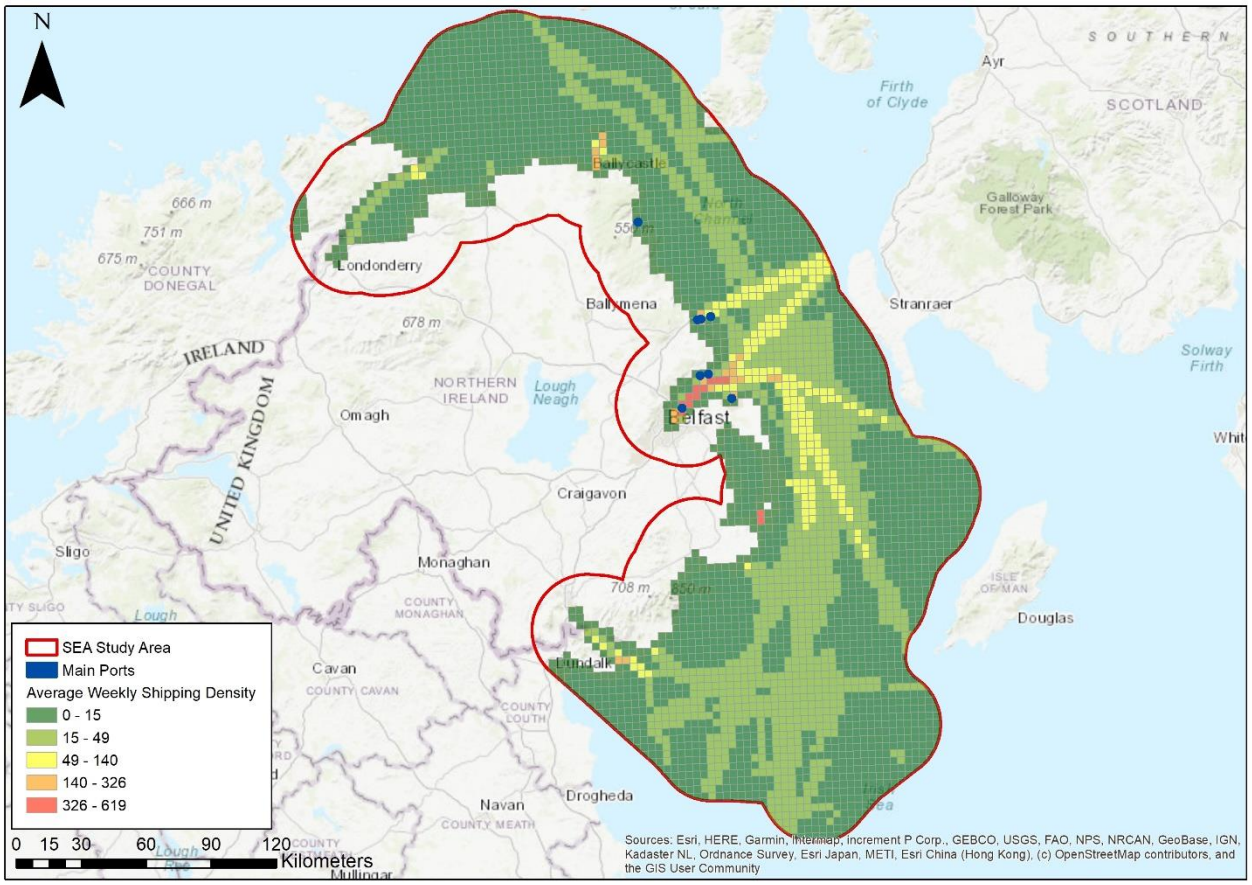

Figure 4-14 Location of Major Ports and Shipping Route Density within the Study Area

The North Channel is recognised as a ‘strait used for international navigation’ under the UN Convention on the Law of the Sea; as such, development consent cannot be granted where installations would be likely to interfere with the shipping lane. The International Maritime Organisation (IMO) is an international body that adopts routeing measures for international shipping to aid navigation of certain ships or ships with certain cargoes. Traffic Separation Schemes (TSS) are areas where navigation of ships is highly regulated owing to large numbers of ship movements in different directions or where there is a high risk of collision. Given the importance of the North Channel to international shipping there is a TSS in place between Rathlin Island and the Mull of Kintyre. There are no other IMO measures in the OREAP Study Area, although there is an area noted for the movement of high-speed craft (in this case high speed ferries) also within the North Channel area. The speed at which high speed craft move requires other vessels to maintain a particularly good lookout and can indicate areas of higher risk for shipping. Marine Environmental High Risk Areas (MEHRAs) have been established for the protection of environmentally sensitive marine areas that are considered to be at risk from shipping. The sole MEHRA within the Study Area area is Island Magee, situated on the northern edge of Belfast Lough and with adjacent shipping routes to and from the nearby ports of Belfast and Larne.

Several ports within the Study Area use shore-based radar systems for navigational purposes; wind turbines have the potential to interfere with marine radar, including shore-based radar systems.

4.3.6.2 Marine Infrastructure

4.3.6.2.1 Cables and Pipelines

Submarine telecommunications and electricity interconnectors are located within the OREAP study area, as are several pipelines.

There are two major sub-sea electricity interconnectors within the study area. Northern Ireland's electrical system is connected to the Scottish system via the 0.5 GW Moyle Interconnector, which runs across the North Channel between Islandmagee (Northern Ireland) and Ayrshire (Scotland), while the Rathlin interconnector connects Rathin Island to the main Northern Ireland electricity grid. Both electricity interconnectors are operated by Northern Ireland Electricity (NIE).

There are several major telecommunications cables linking Northern Ireland with the UK and the Isle of Man; these cables make landfall on the east coast of Northern Ireland, owing to the shorter crossing distances. The Hibernia 'A' telecommunications cable, which is a transatlantic cable connecting Europe and the USA, also passes through the study area, following the territorial limit. A submarine cable, known as Project Kelvin, connects from Portrush on the north coast to the Hibernia 'A' cable 22 miles off the north coast.

There is one major pipeline within the study area: the Scotland to Northern Ireland Pipeline (SNIP), owned by Premier Transmission Limited is a 135 km long pipeline that runs across the North Channel from Twynholm in Scotland to Ballylumford in Northern Ireland. In addition, there are two sub-sea gas pipelines that cross coastal loughs; these comprise a 9 km pipeline across Belfast Lough and a 3 km pipeline across Larne Lough. There are also several local outfall pipes located along the coastline.

The major cable systems in the study area are detailed in **Table 4-14** and the location of major cables and pipelines are shown in **Figure 4-15.**

Table 4-14 Major cable systems within the OREAP Study Area

Cable	Type	Operator
Moyle Interconnector	Power	NIE
Rathlin Interconnector	Power	NIE
Scotland – Northern Ireland 1	Telecommunications	BT
Scotland – Northern Ireland 2	Telecommunications	BT
Manx – Northern Ireland	Telecommunications	BT
Lanis 2	Telecommunications	C&W
Lanis 3	Telecommunications	C&W
Sirius North	Telecommunications	Virgin Media
Hibernia 'A'	Telecommunications	Hibernia Atlantic
Project Kelvin	Telecommunications	Hibernia Atlantic

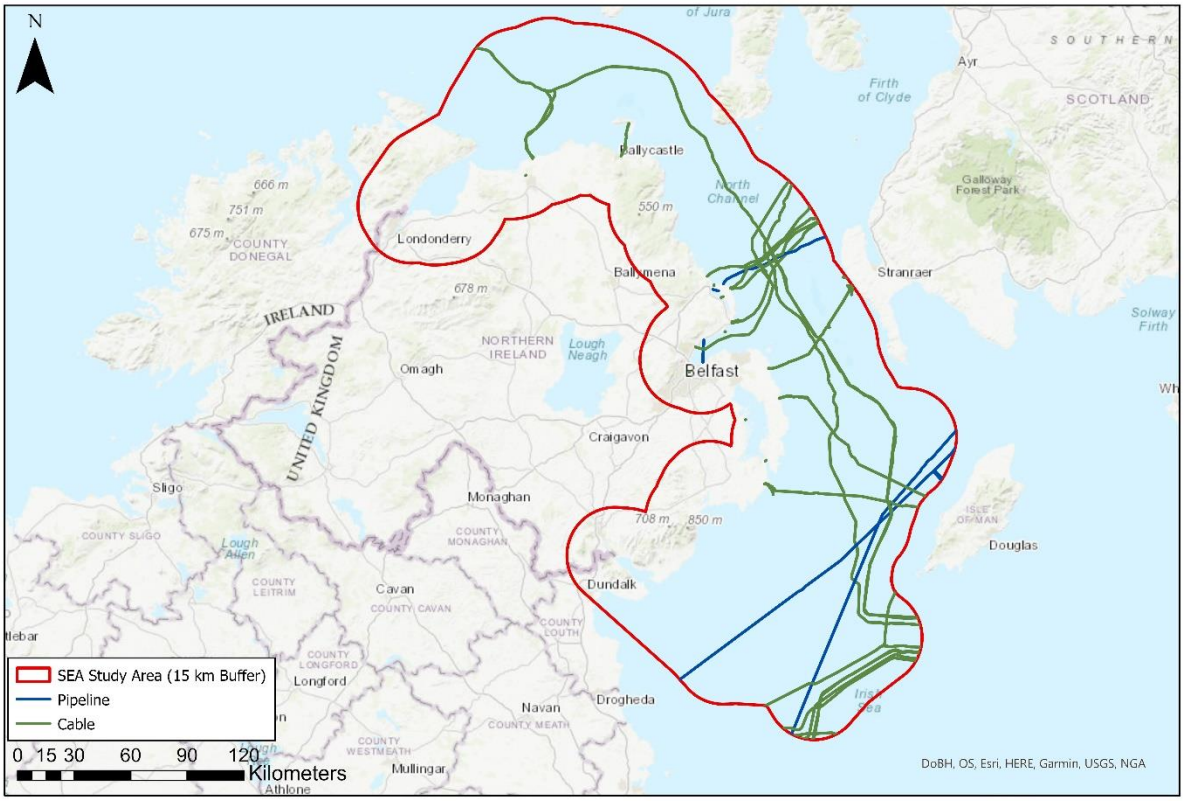

Figure 4-15 Locations of major cables and pipelines within the Study Area

4.3.6.2.2 Renewable energy infrastructure

There is limited offshore renewable energy infrastructure within Northern Irish waters at this time. There are currently no offshore wind facilities, with several proposed projects having been abandoned; this includes the First Flight Wind project, a 600 MW fixed foundation wind project proposed off the south County Down coastline. DfE and the Crown Estate have agreed to a statement of intent toward establishing offshore wind leasing for Northern Ireland. One prospective project is the SBM Offshore North Channel Wind[95], which is a floating offshore windfarm (consisting of North Channel Wind 1 and North Channel Wind 2) in the North Channel of the Irish Sea located 9-25 km off the eastern coast (at a depth of approximately 120 m), aimed for construction in 2029-2030. It is proposed that the turbines be sited in deep water using tension leg platforming, with key project infrastructure to include wind turbine generators, floating platforms, mooring infrastructure, inter-array cables, offshore substations, and offshore export cables. Combined, North Channel 1 and 2 have a potential capacity of over 1.4 GW. A second proposed offshore commercial wind facility is the Simply Blue Group Olympic Offshore Wind project[96]; this is a floating windfarm with a potential capacity of 1.3 GW located in the Irish Sea off the County Down coast. It aims to enter into commercial operation by 2028.

Regarding tidal energy infrastructure, sites were leased by The Crown Estate for projects at Torr Head and Fair Head off the north coast, and for MCT SeaGen, Minesota and a QUB Test Site within Strangford Lough following the ORESAP 2012-2020. SeaGen, the world's first tidal power station was installed in Strangford Narrows between Strangford and Portaferry and connected to the grid in 2008; this was a horizontal twin turbine system with an infrastructure of buried seafloor cables and above sea / water column turbine components. It was decommissioned by 2019. Strangford Lough has also been used for other tidal energy

[95] North Channel Wind

[96] Simply Blue Group Olympic Offshore Wind

forms including testing since 2010 for Minesto's[97] novel subsea tidal kite, the Deep Green, and the H2020 Powerkite, Flex Marine Power 2020. More recent turbines, installed in 2022 (operational for 2 years), included 10 kW vertical axis turbines, known as the Vertical Axis Tidal Turbines in Strangford (VATTS)[98], which feature battery-based energy storage and aim to deliver energy to the network in an adaptable manner rather than relying on cabling infrastructure and associated costs. The Torr Head project was abandoned following the liquidation of the company in 2019. The Fair Head Tidal Project initially consists of a 10 MW demonstration array phase to connect to the existing grid system at Ballycastle, before advancing to a proposed 100 MW array of turbines; there are currently delays to this project owing to issues with cable infrastructure routing and facilitation of onshore grid connections.

Wave renewable devices, whilst at an earlier stage of commercial development compared to tidal devices, are also in development, namely the Pure Marine Gen machine as a wave energy converter of 2 MW capacity with deployment aimed at large arrays generating up to 500 MW[99].

4.3.6.3 Commercial Fishing and Aquaculture

Commercial fishing is a significant industry in Northern Ireland and is based largely around the three east coast ports of Ardglass, Kilkeel and Portavogie, from which the bulk of the fleet of vessels in excess of 10 m length operates. These vessels depend mainly on fishing opportunities in the Irish Sea and the North Channel, and the local fleet constitutes the main UK fishery interest in the Irish Sea.

In 2021, there were 332 Northern Ireland registered fishing vessels, which employed 632 full-time workers and 184 part-time workers. Of these, 120 vessels were over 10 m in length, while 203 vessels were 10 m and under. The Northern Irish fleet has the highest proportion of vessels over 10 m within the UK. In 2021, the Northern Ireland fleet landed a total of 46,000 tonnes of fish worth approximately £55.5 million into UK ports and abroad, representing 5.7% of the total value of fish landed by UK vessels. This comprised £26.1 million for shellfish, £23.1 million for pelagic fish and £3.3 million for demersal fish[100]. The top ten landings (by species live weight) for 2022[101] from DAERA annual statistical returns on fishing vessel landings into Northern Ireland are shown in **Table 4-15**; horse mackerel, Nephrops and Mackerel were the highest species in terms of landed weight. Areas of high intensity fishing activity within the Study Area are shown in **Figure 4-16**.

Table 4-15 Total landings of fish and shellfish into all Northern Ireland ports in 2022

Species	Live Weight (Tonnes)	Value (£)
Horse Mackerel	8,151	2,466,632
Nephrops (Norway Lobster)	6,266	17,192,043
Mackerel	5,291	4,335,604
Crabs (C.P. Mixed sexes)	966	2,518,712
Scallops	697	1,590,673
Haddock	691	744,199
Lesser Spotted Dog	500	105,930
Blue Whiting	296	0
Crabs – Velvet (Swim)	195	461,404

[97] Minesto Strangford Lough test and demonstration site

[98] Ges Group-The new tidal turbine technology from the VATTS project

[99] Pure Marine Duo Wave Energy Technology

[100] UK sea fisheries annual statistics report 2021

[101] DAERA NI-Fish Landings into Northern Ireland

Hake	171	355,872

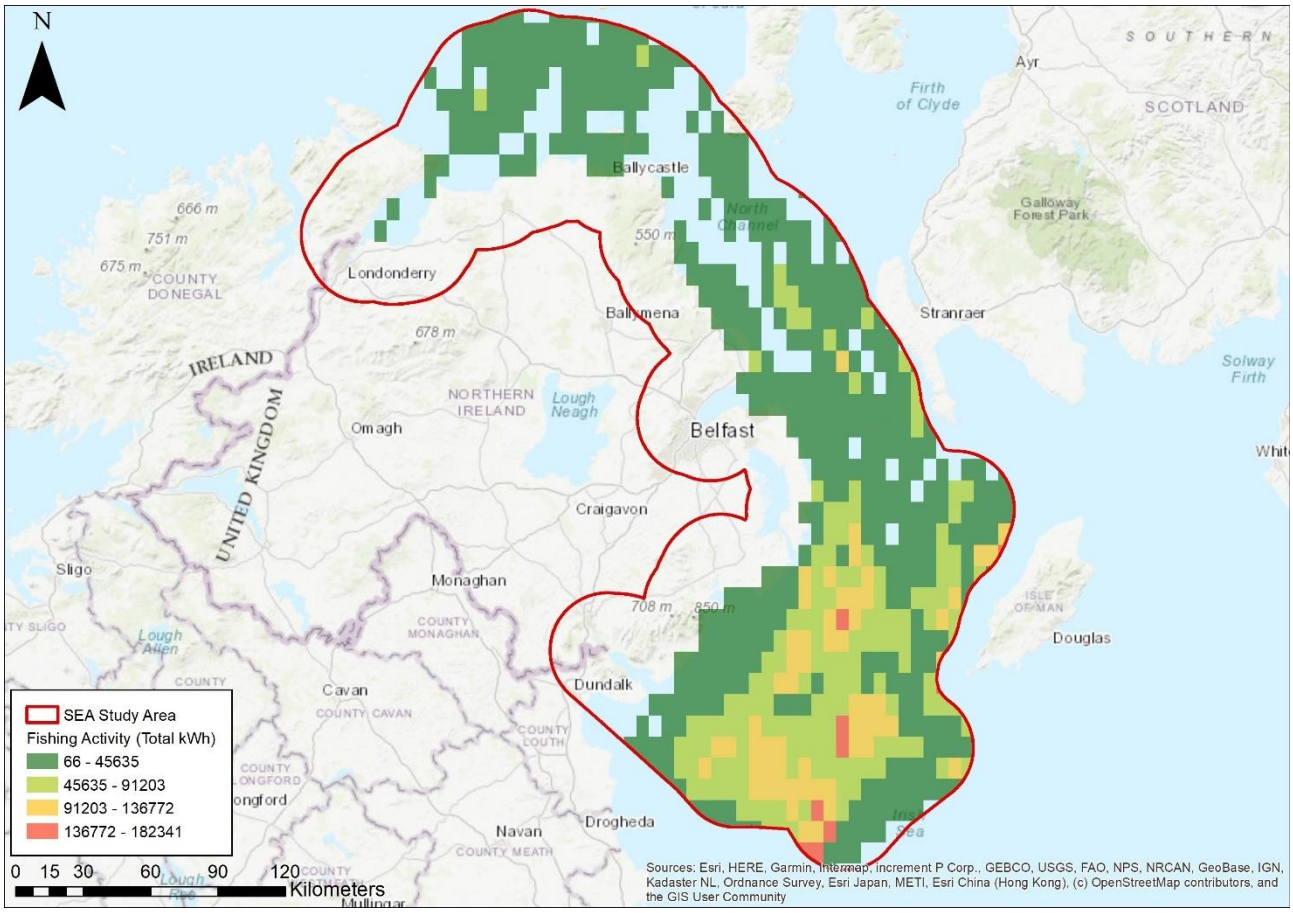

Figure 4-16 Areas of High Intensity Fishing within the Study Area

Shellfish aquaculture sites are present within Lough Foyle and Carlingford Lough and include farming of Pacific oysters and blue mussels.

Under the Marine Strategy, the assessment of the status of commercial fish is based on two indicators, commercial fishing pressure, and reproductive capacity; these are measured for the commercially exploted stocks of UK interest that have maximum sustainable yield (MSY) assessments. The 2019 assessment for the UK (see Section 4.3.4) indicates that GES has been achieved for some commercially exploited fish (Descriptor D3 Commercial fish). In 2015, 53% of marine fish (quota) stocks were fished below MSY and had increased significantly since 1990. Most national shellfish stocks had not achieved GES or their status was uncertain.

Prior to the UK's exit from the EU, commercially valued fish species were subject to catch limits set by the EU for the protection of fish stocks. Shellfish, excluding Nephrops which were not subject to EU catch limits, are also financially significant to the local fishing fleet. Following the withdrawal of the UK from the EU fisheries policy is being replaced by UK fisheries policy. Eight high-level policy objectives have been set out in the UK Fisheries Act 2020, and a Joint Fisheries Statement (JFS)[102] has been developed and adopted that sets out the policies for achieving these objectives. Fisheries Management Plans (FMPs)[103] are being developed for key stocks and fisheries; these include the following FMPs coordinated by DAERA:

- Irish Sea Pelagic FMP

[102] Joint Fisheries Statement November 2022

[103] List of fisheries management plans (FMPs)

- Irish Sea Demersal FMP
- Northern Ireland Inshore FMP

In addition, DAERA is a joint authority for the following; a number of FMPs for individual species coordinated by Marine Scotland, including cod, haddock, whiting, hake, saithe, monk/angler, megrim, ling, nephrops, mackerel, herring, greater silver smelt, and blue whiting.

Two new fisheries regulations were introduced in January 2023 to protect sensitive habitats from destructive fishing methods. The Marine Protected Areas (Prohibited Methods of Fishing) Regulations[104] specify fishing method restrictions (demersal mobile gear or static gear) within nine MPAs: Carlingford Lough MCZ, Murlough SAC, Outer Belfast Lough MCZ, Rathlin Island SAC and MCZ, Red Bay SAC, Skerries and Causeway SAC, Strangford Lough MCZ, The Maidens SAC and Waterfoot MCZ. The Scallop Enhancement Sites (Prohibited Methods of Fishing) Regulations (NI)[105], intending to further the Conservation Objectives of MPAs and support fishing at sustainable levels, define a number of locations as scallop enhancement sites. These regulations protect 55,660 Ha of seabed from bottom towed fishing gear, which represents 10% of the Northern Ireland inshore region. The regulations also protect 950 Ha of highly sensitive marine habitats, such as seagrass, from all types of fishing.

The Fisheries Resource Access Mapping Project (FishRAMP), assessing the importance to the Northern Ireland fishing industry of the Wind Resource Zone off the County Down coast, set out the potential impacts that a windfarm may have on commercial fisheries including:

- Damage or disturbance to target resources.
- Exclusion from the whole or certain areas of the development.
- Displacement of fishing effort (potentially leading to reduced catches, unsustainable fishing effort in remaining areas and increased gear conflict).
- Additional gear snagging risk.
- Additional steaming times (reducing profit with increased fuel costs).

4.3.6.4 Tourism

Tourism represents an important source of income for Northern Ireland's economy, with the most recent 2019 annual statistics for tourism[106] indicating the following:

- There were an estimated 5.3 million overnight trips in Northern Ireland. Expenditure associated with these trips was estimated as £1.0 billion.
- Three million of these trips were from external visitors, with associated expenditure estimated at £731 million. This was an increase of 7% from the previous year.
- 167 cruise ships docked at ports in Northern Ireland in 2019, a marked increase from 62 ships in 2013; the total number of passengers and crew has nearly trebled since 2013 (from 103,000 to 290,000).
- Tourism statistics show an upward trend in overall tourism activity between 2013 and 2019, and statistics regarding trips and spends have increased significantly since 2017.
- It is estimated that 70,803 individuals were employed in tourism-related industries in 2019, with the majority employed in food and beverage serving activities (59%), followed by accommodation for visitors (15%), sporting and recreational activities (12%) and transport (7%).

The quality of Northern Ireland's environment, heritage and culture has strong national and international appeal and tourism is therefore an important activity in the study area. The north coast of Northern Ireland has a developed tourist infrastructure and a number of coastal attractions. The Causeway Coast Way, for example, takes in attractions like the Giant's Causeway, Dunluce Castle ruins, and the Carrick-a-rede Rope

[104] The Marine Protected Areas (Prohibited Methods of Fishing) Regulations (Northern Ireland) 2022

[105] The Scallop Enhancement Sites (Prohibited Methods of Fishing) Regulations (Northern Ireland) 2022

[106] NISRA Northern Ireland Annual Tourism Statistics 2019

Bridge. Access to the coast is relatively easy, with good infrastructure in place, although car parking facilities are in short supply in some areas. Long distance footpaths, notably the 16 km long North Antrim Cliff Path, allows exploration of less accessible sites. NISRA run an annual survey to collect information on visits to all visitor attractions. Of the top ten most visited tourist attractions in Northern Ireland in 2020[107], shown in **Table 4-16**, six (highlighted in bold text) are in coastal or marine locations.

Table 4-16 Top ten visitor attractions in Northern Ireland in 2020

Attraction	Visitor Numbers (thousands)
Dundonald International Ice Bowl	202
Ballyronan Marina	174
Blackhead Path	151
Titanic Belfast	150
Pickie Fun Park	148
Giants Causeway World Heritage Site	139
Mount Stewart House & Gardens	132
Slemish Mountain	77
Castle Ward	72
An Creagán Visitor Centre	65

There are four Areas of Outstanding Natural Beauty (AONB) that intersect the coastline of Northern Ireland, as described in Section 4.3.8.1, and a number of National Trails and long-distance walking routes, that often coincide with National Parks or AONBs, offering significant attraction for outdoor tourism and leisure; these include Antrim Hills Way, Lecale Way, Mourne Way and Moyle Way. Coastal and marine recreation including watersports, sea angling, beach use and wildlife watching within the OREAP study area, as described in Section 4.3.2.3, are also popular with tourists.

4.3.6.5 Defence / Military Activity

Military activity occurs extensively throughout the OREAP study area, with almost the entire coast utilised for practice and exercise areas. Much of this is dominated by the Navy who use the PEXA areas for submarine, general surface fleet and aircraft exercises; no ammunition firing occurs in these areas. There are no Air force training areas located within the study area. The UK low flying system (LFS) allows training within the whole of the UK airspace and surrounding seas, to 3 nm, from the surface to 2,000 feet above the ground or mean sea level. Low flying is unlikely to impact upon offshore wind farms as no designated Tactical Training Areas (TTAs) are present over the sea, and any possible interference can be resolved through consultation, charting and lighting of developments[108].

Air Surveillance and Control System (ASACS) are critical to air defence systems in the UK and as such the MoD submits holding objections to all wind energy proposals within 74 km and in line of sight of air defence radars. Two weapons ranges are located in the study area, the Magilligan and Ballykinler ranges, which are controlled by the Army. Both Magilligan and Ballykinler ranges are byelawed areas that are due to be reviewed by the Defence Estates as part of their review of all existing MoD byelaws[109]. Byelaws are a form of delegated legislation, used mostly by local authorities and government departments; they cover a defined

[107] NISRA Visitor attraction survey publications

[108] A Strategic Framework for the Offshore Wind Industry

[109] MOD byelaws: Northern Ireland

geographical area, normally regulating certain activities in the interests of safety and security[110]. In the two byelawed areas within the study area certain civilian activities are restricted and therefore these areas would not be considered suitable for offshore renewable energy development. The MoD is currently undertaking a review of the practice and exercise areas under byelaw and is also considering proposing new byelawed areas. No information is yet available on the location of proposed new byelawed sites.

In recognition of the move towards a net zero carbon economy and the deployment of offshore wind, which could potentially have adverse impacts on the UK's air defence radars, the UK government have published a strategy 'Air defence and offshore wind – working together towards Net Zero'[111] outlining how the government will manage the effective coexistence of air defence and offshore wind.

4.3.6.6 Aviation

Northern Ireland has three main airports: George Best Belfast City Airport, Belfast International Airport, and City of Derry Airport. Of the 221.8 million passengers passing through UK airports in 2022, 6.6 million used the main Northern Ireland airports[112].

The physical characteristics of wind turbines, coupled with the size and siting of the developments, can result in effects that can have a negative impact on aviation. The safety of aviation operations has the potential to be a concern for offshore wind developments within the study area. Aviation operations may be affected by windfarm development in the following ways:

- Through the physical obstruction caused by a tall structure.
- Through effects that the supporting structure and rotating turbine blades may have on communications, navigation and surveillance (CNS) systems (including radar).
- Through turbulence.

Authority for policy and regulation of aviation services in the UK rests with the Department for Transport and the Civil Aviation Authority (CAA). The CAA has produced CAP764 Policy and Guidelines on Wind Turbines[113] and are a statutory consultee for offshore developments in excess of 100 MW.

The CAA, the Ministry of Defence (MoD), and the National Air Traffic Services (NATS) have a statutory duty to safeguard certain sites and airspace from radar interference in the interests of national security and for the safe operation of passenger and military aviation. NATS has produced, and made publicly available, GIS-based maps designed as an aid to developers in understanding where interference with NERL (NATS En Route plc) infrastructure is likely[114], which can facilitate an assessment of the impact of wind turbines on the electronic infrastructure required to operate an air traffic service. For each of the 54 air-ground-air (AGA) communication stations, 55 navigation aids and 20 secondary surveillance radar operated by NERL, a consultation zone has been provided; 10 km for the air-ground-air communication stations and navigation aids and, in line with CAA publication CAP764, 15 nautical miles (nm) for the secondary surveillance radar.

4.3.6.7 Disposal Areas

The deposit of substances or articles in the sea or under the seabed within Northern Ireland's territorial waters or controlled waters is regulated by DAERA, under Part II of the Food and Environment Protection Act 1985 (FEPA) (as amended). Most sites receive chemically unmodified geological material derived from the adjacent coastline. The disposal of waste at sea is strictly controlled through the Marine and Coastal Access Act (MCAA) 2009 licensing system through the Marine and Fisheries Division of DAERA. Statutory changes have occurred over recent years governing the types of waste that may be disposed of at sea. Since the end of 1998, most forms of waste disposal at sea have been prohibited including disposal of

[110] Ministry of Defence: byelaws review

[111] Aire defence and offshore wind-working together towards Net Zero

[112] Airports Terminal and Transit Passengers 2022

[113] CAA Policy and Guidelines on Wind Turbines

[114] NATS Self-Assessment Maps

radioactive waste (since 1982); disposal of industrial waste (since 1992: and disposal of sewage sludge (since 1998).

The main types of disposal activity that remain licenced by the Marine and Fisheries Division[115] are as follows:

- Disposal of dredged material at sea (e.g., capital dredged material or maintenance dredged material).
- Miscellaneous disposal (e.g., explosives and munitions, tracers, others).
- Alternative use (e.g., habitat creation / feeding (saltmarsh and mudflat), beach nourishment).

The location of known disposal sites within the study area is shown in **Figure 4-17**.

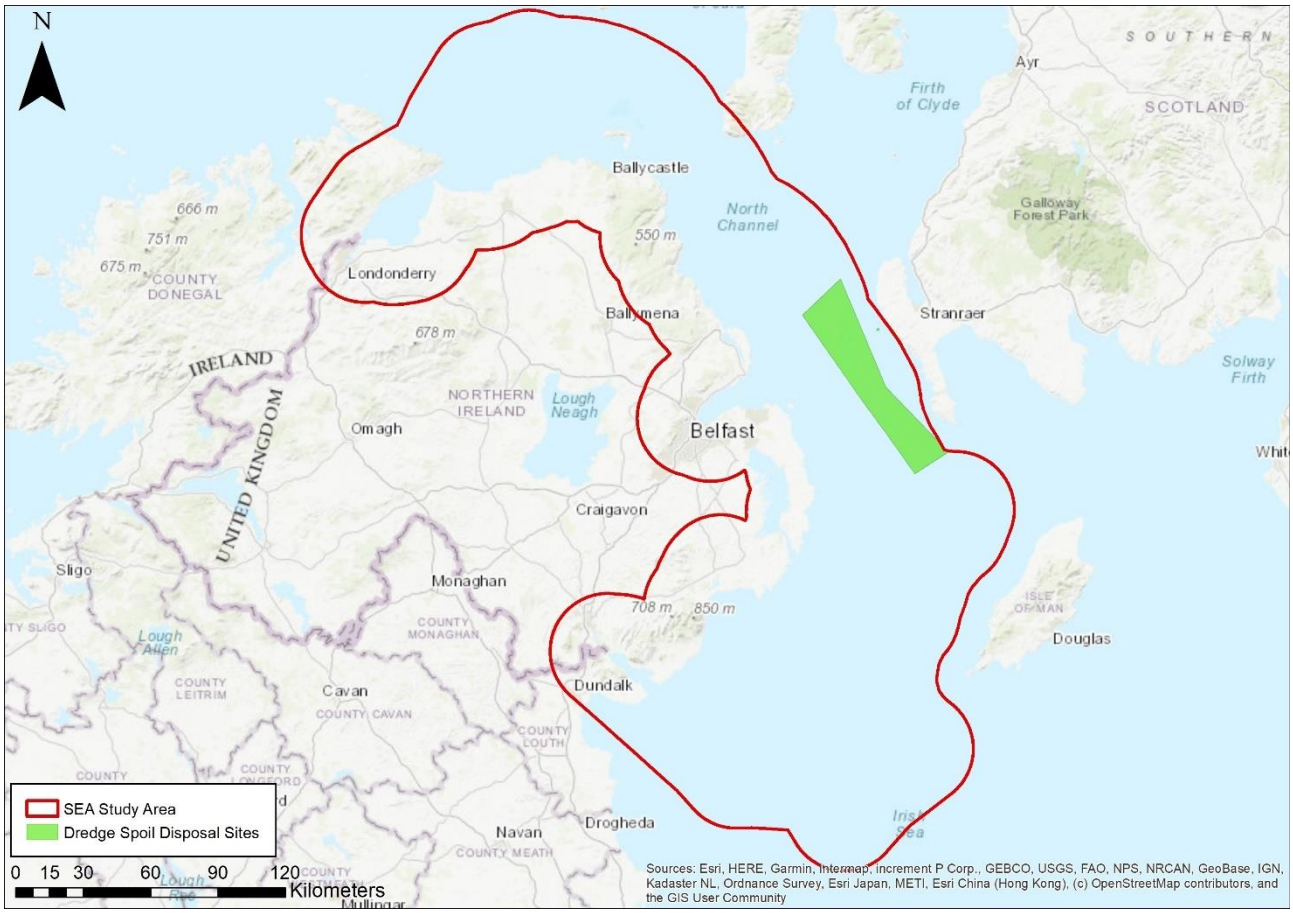

Figure 4-17 Location of Known Disposal Sites within the Study Area

4.3.6.8 Marine Aggregate Extraction

Marine aggregates can be defined as sedimentary material comprised of sand or gravel of various grain and class sizes (grades). This material can be a valuable contributor to infrastructure development, including for buildings and roads, and may also be used for beach nourishment and coastal defences. The extraction of marine aggregates typically involves dredging of the deposit to remove it from the seabed. Screening of aggregate material may occur at sea prior to its transportation to land for further processing[116].

The (non-energy) mineral rights to the seabed, extending from the edge of the UK continental shelf, are owned by the Crown Estate, who issues consents for non-exclusive sampling, and licences for commercial

[115] Northern Ireland Guidance on Marine Licensing Dredging, Disposal and Aggregate Dredging, under Part 4 of the Marine and Coastal Access Act 2009

[116] Irish Sea Martine Aggregates Initiative Technical Synthesis Report

aggregate extraction. Aggregate dredging is regulated in Northern Ireland under Part 4 of the Marine and Coastal Access Act (MCAA) 2009 (marine licensing). Prior to the commencement of extraction, the operator must obtain consent from the government, as administered in Northern Ireland through a marine licence from the Marine and Fisheries Division. There is currently no licensed marine aggregate extraction in Northern Ireland and no prospective licence areas have been defined[117].

4.3.6.9 Summary of Existing Pressures and Issues for Material Assets

Population growth and development are placing increasing pressure on many infrastructure assets in Northern Ireland, particularly in urban areas. Annual population growth has been positive for the past 25 years in Northern Ireland, and the total population is predicted to increase from approximately 1.9 million in 2021 to approximately 1.99 million by 2043. Population growth is likely to increase the demand for infrastructure and the consumption of energy. Commercial fisheries and shipping have been disrupted in recent years by the Covid-19 pandemic and by Britain's exit from the EU (Brexit). There has been a slower growth in tourism than in previous years, affected by uncertainty surrounding Brexit, geopolitical and trade tensions, and the global economic slowdown.

The complexity in management of multiple activities and users in the marine region is recognised by recent plans and legislation, including the UK Marine Policy Statement, the Marine and Coastal Access Act and the draft Marine Plan for Northern Ireland. Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, have the potential to result in short to long-term disruption or displacement of other users (e.g., from fishing grounds or shipping routes). The location of existing, or indeed planned, infrastructure will influence the siting of offshore renewable devices, as will the level of constraint associated with areas where there is significant conflict with other users and the location of ports and potential onshore location of supporting infrastructure.

4.3.7 Cultural Heritage

Cultural heritage, including archaeological heritage and architectural heritage, are places and objects of beauty, cultural, historic, scientific, social, or spiritual value. They include archaeological monuments, world heritage sites, protected structures, designed landscapes, place names, language, and inherited traditions. Northern Ireland is rich in cultural, archaeological and architectural heritage, with many important archaeological sites, monuments and heritage buildings. Marine cultural heritage in Northern Ireland is rich, and includes features such as submerged landscapes, harbours and jetties, fish traps and quays and wrecks.

It is considered that the key issues associated with the implementation of the draft OREAP and Cultural Heritage comprise:

- Potential for direct or indirect effects on marine archaeological features (including protected features) such as wrecks and submerged landscapes during construction.
- Potential for indirect effects on the setting of coastal archaeological or architectural features.
- Potential for the discovery of new cultural heritage features during construction.

4.3.7.1 Protected Sites

There are 51,820 recorded heritage assets within Northern Ireland that have been included in the Historic Environment Record of Northern Ireland (HERoNI). This includes:

- 17,855 entries on the Sites and Monuments Record.
- 15,383 recorded historic buildings.
- 15,704 Industrial Heritage Record sites.

[117] Marine Aggregates Annual Review 2022

- 738 Defence Heritage Record sites.
- 738 Battlefield sites.
- 663 Historic Parks and Gardens Record sites.
- 340 Historic Wrecks.
- 399 Historic Nucleated Urban Settlements (including those with identified areas of archaeological potential).

There are also over 12,000 designated heritage assets in Northern Ireland. This includes:

- 190 Monuments in State Care. Of these, 54 intersect the OREA Study Area.
- 2,014 Scheduled Historic Monuments. Of these, 843 intersect the OREA Study Area, as well as 49 that are Scheduled and in State Care).
- 2 Protected Wrecks (see Section 4.3.7.2).
- 8,976 Listed Buildings (Listed Buildings are those designated through listing as being of 'special architectural or historic interest' under Section 80 of the Planning Act (NI) 2011). Of these, 8949 intersect the OREA Study Area.
- 300 Historic Parks and Gardens of Special Historic Interest (A Register of Parks, Gardens and Demesnes of Special Historic Interest was established in the late 1990s to identify those sites that can be considered of exceptional importance within Northern Ireland). Of these, 128 intersect the OREA Study Area.
- 58 Conservation Areas.

Historic Parks, Gardens and Demesnes form part of the HERoNI, and are identified on the basis of these records for protection in the Local Development Plan (LDP) process. Local Landscape Policy Areas (547 no.), Areas of Significant Archaeological Interest (ASAI) (10 no., representing distinctive areas of the historic landscape in Northern Ireland), and Areas of Townscape / Village Character (177 no.) are LDP designations which may include assets recorded by HERoNI.

There is also one coastal UNESCO World Heritage Site in Northern Ireland; being the Giant's Causeway, designated for its unique geological heritage. This site is situated at the foot of basalt cliffs along the coast on the edge of the Antrim Plateau and is comprised of some 40,000 massive black basal columns that protrude from the sea. Geological study of these formations has shown that they were formed by volcanic activity during the Tertiary period some 50-60 million years ago and have contributed greatly to the understanding of earth science.

It is important to note that The HERoNI archive is still growing, with new assets added as new information is provided.

The locations of designated heritage assets within the OREAP Study Area are shown in **Figure 4-18**.

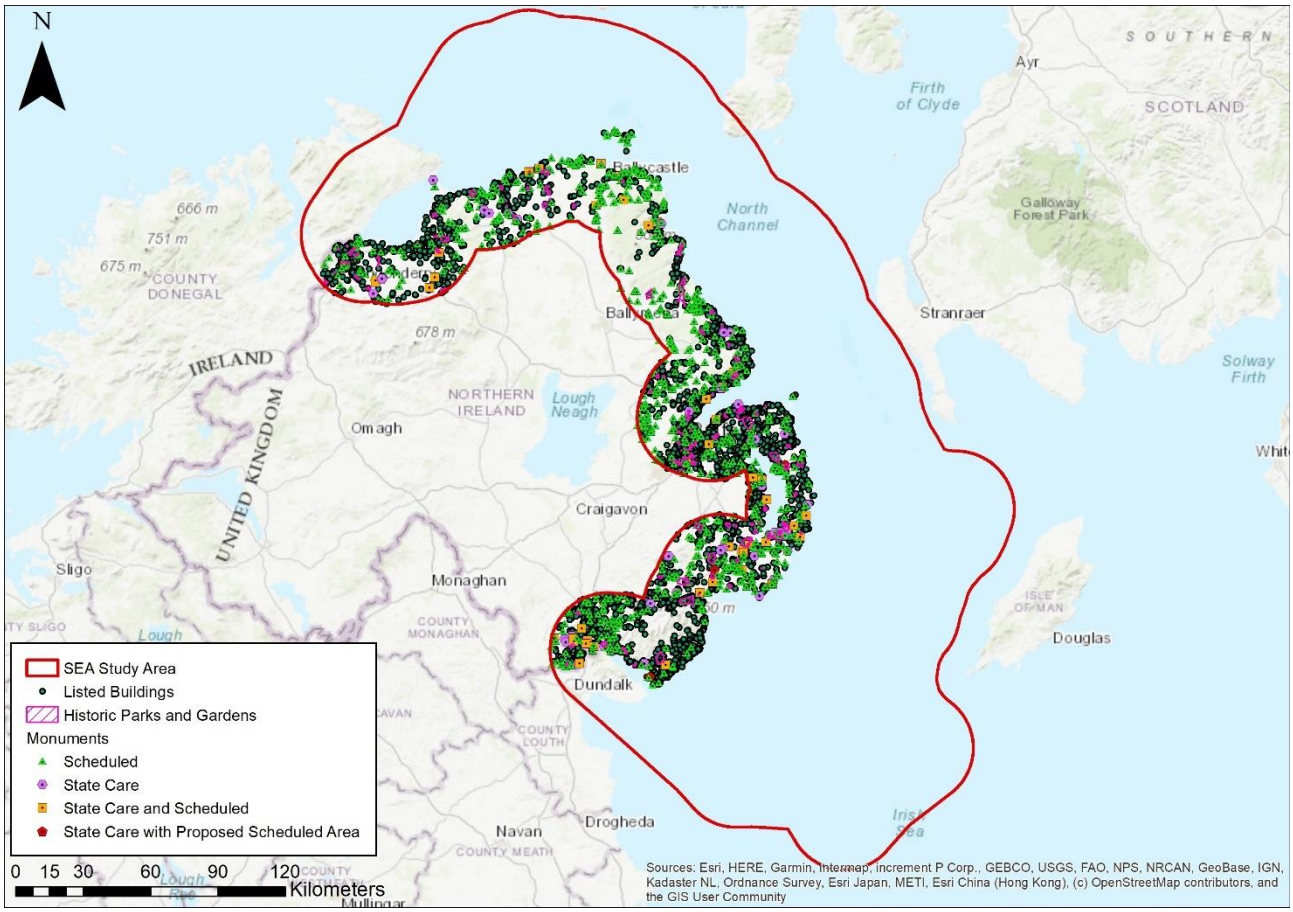

Figure 4-18 Location of designated heritage assets within the OREAP study area

4.3.7.2 Wrecks

Wreck sites are generally defined as sunken ships and aircraft, and any material associated with such vessels. This includes vessels ranging from prehistoric logboats to modern metal ships and aircraft. There are many thousands of shipwrecks that lie off the coastline of Northern Ireland, with designated wreck zones, historic wrecks and a density map of documented marine losses available for viewing on the Department for Communities' Historic Environment Map Viewer[118]. This shows a high concentration of marine losses along the eastern coastline of Northern Ireland from Larne to Strangford, with the highest concentration within Belfast Lough. Known wreck sites in the OREAP study area range from single isolated items to virtually complete vessels and cargoes. It is highly probable that more 'undiscovered' wrecks and their associated material culture exist in the waters off Northern Ireland.

There are two protected wrecks within Northern Ireland's territorial waters. The wreck site of the Spanish Armada vessel, La Girona, which sank at Lacada Point on the north Antrim coast in 1588 is designated under The Protection of Wrecks Act 1973. There is a 300 m exclusion zone around the wreck, and diving is prohibited without a licence from the NIEA. The First World War armoured cruiser HMS Drake was scheduled for protection in 2017 under the Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995; the first time that scheduling has been used to protect a historic shipwreck on the seabed in Northern Ireland. This makes it an offence to execute, cause or permit to be executed any works that affect a scheduled monument without consent.

Significant numbers of shipwrecks have also been recorded around the coast of the Republic of Ireland including a dense cluster on the north coastline in proximity to the Northern Irish coastline. All wrecks within the Republic of Ireland's territorial waters that are over 100 years old are protected under Section 3 of the National Monuments (Amendment) Act 1987, while those less than 100 years old, as well as potential wreck

[118] Historic Environment Map Viewer

locations, may be protected under this Act if considered to be of significance. **Figure 4-19** shows the presence of known wrecks around the coastline.

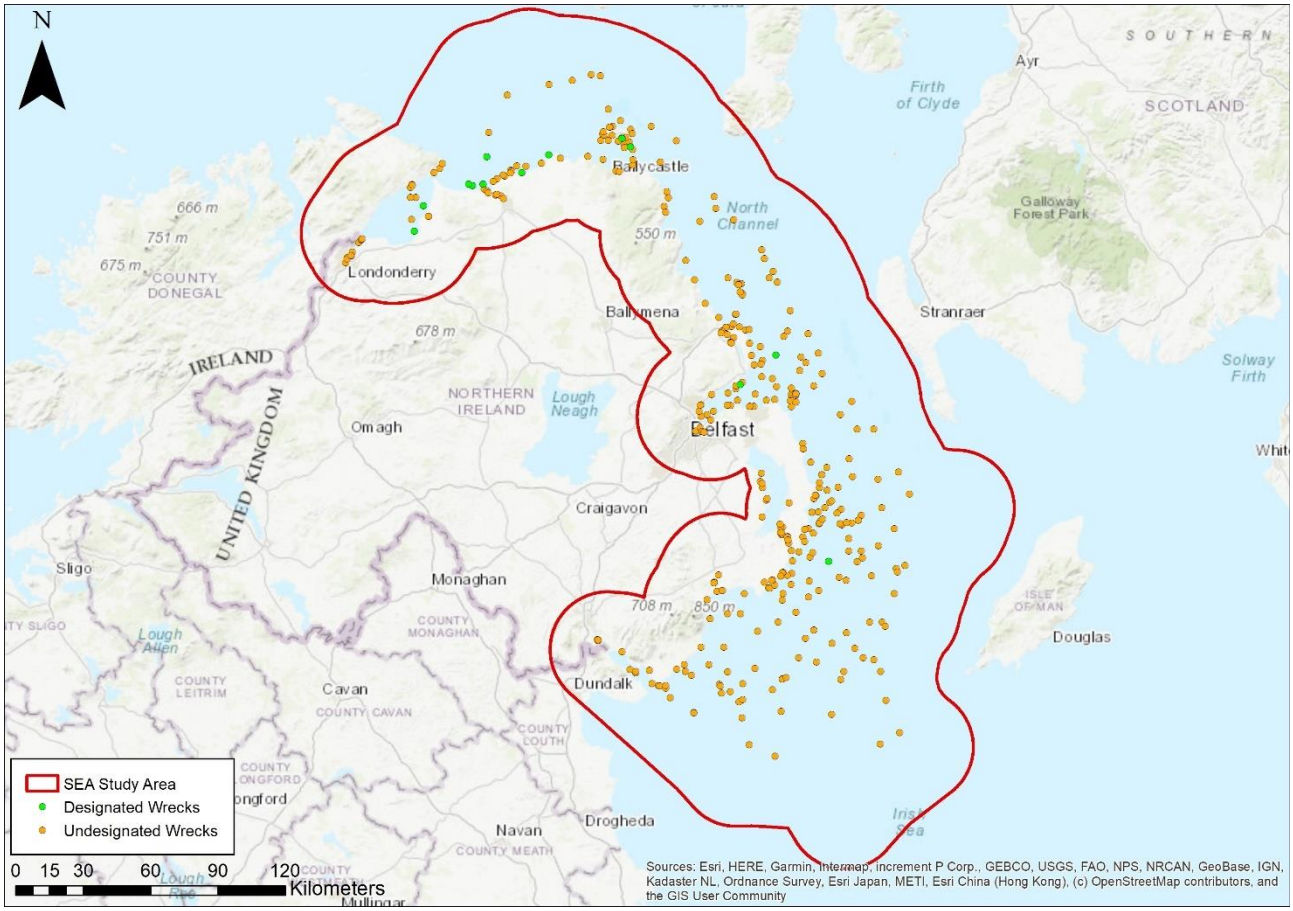

Figure 4-19 Known Wreck (Designated and Undesignated) Locations within the Study Area

4.3.7.3 Submerged Landscapes

The earliest known human occupation of Northern Ireland is dated to about 10,000-9,000 before present (BP) (the site of Mount Sandel, Co. Derry). As is the case with much of the northern part of the British Isles the possibility of early habitation of the Northern Ireland coastal zone is related to the extent of past glaciation and sea level. Almost all of Ireland was glaciated at the height of the last Ice Age, some 20,000 years ago. Large-scale ice retreat occurred from about 16,000 years BP, exposing land along the Northern Ireland coastline. As the ice continued to retreat, the land rebounded such that sea-levels between 14000-10000 BP were lowered by up to 30 m, moving the coastline seaward of its present position[119]. Sea-levels then rose again reaching present levels by 5000-6000 BP. There is therefore a possibility of early (i.e., 14000-6000 BP) settlement sites being found offshore. Later (i.e., post-6000 BP) sites are restricted to the intertidal and coastal zone.

The Historic Monuments and Archaeological Objects (NI) Order 1995 acts to provide protection for scheduled monuments both on land and within UK territorial waters adjacent to the coastline of Northern Ireland. It also obliges the finder of archaeological objects to report them, and (if portable) to deposit them with the authorities.

There is relatively little known regarding submerged archaeological sites in Northern Ireland evidencing drowned landscapes and settlements. There are a considerable number of known intertidal sites, such as fish traps and quays, which are associated with settlement dating from the Mesolithic to the historic period; a number of these are also scheduled. A database of all known subtidal and intertidal assemblages with

[119] Post-Glacial relative sea-level observations from Ireland and their role in Glacial Rebound Modelling

prehistoric evidence was compiled from published and grey literature for the SPLASHCOS project for the entire coastline island of Ireland[120]. There are currently 50 sites recorded on this database, of which 11 are fully subtidal, 38 are intertidal and one is deeply buried below sea level beneath reclaimed land[121]. Spatially, the distribution of these sites is concentrated in the north and north-east coasts (35 of the 50 sites), mirroring the distribution of terrestrial mesolithic sites on the island. Of the 11 recorded sites, those found within Northern Irish waters comprise a single isolated find in Larne Lough, and a small number in Belfast Lough, both in nearshore waters. The intertidal locations primarily comprise archaeological evidence of flint tools, with the largest concentrations around Strangford and Belfast Loughs.

4.3.7.4 Summary of Existing Pressures and Issues for Cultural Heritage

Built heritage in Northern Ireland has been adversely affected by population growth and expansion of the agricultural sector since the 18th century, with major landscape changes such as marginal land reclamation and removal of peatland occurring since the UK joined the EU in the 1970s[122]. According to the most recent State of the Environment report for Northern Ireland (2013), the archaeological resource is most at risk from agricultural land use practices, and from urban development. At present, 527 heritage assets, including 5.4% of listed buildings, are on the Heritage at Risk register, while 3% of Scheduled Historic Monuments are considered to be in poor condition[123].

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to lead to damage or disturbance of known or as yet undiscovered heritage features in the marine environment, including wrecks and archaeological features, while development of infrastructure in inshore areas, or inshore and coastal cabling associated with the export of energy from offshore renewables to land could have potential to directly impact on coastal architectural and archaeological features, or indirectly affect their setting.

4.3.8 Landscape, Seascape and Visual Amenity

'Landscape' is defined by the European Landscape Convention as ''an area as perceived by people whose character is the result of the action and interaction of natural and/or human factors' and 'it concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes' Landscape and seascape form an important part of Northern Ireland's identity and culture and influence the economy and the wellbeing of the population.

It is considered that the key issues associated with the implementation of the draft OREAP and Landscape, Seascape and Visual Amenity comprise:

- Potential for effects on areas of designated landscape quality and scenic views (AONBs, AoHSV).
- Potential for effects on the general landscape and seascape and its sensitivity to development (potential compatibility with landscape and seascape character types).
- Potential visibility of offshore structures and / or onshore support structures by human receptors.

4.3.8.1 Designated Landscapes

The value of the landscape present in Northern Ireland is recognised through the designation of eight Areas of Outstanding Natural Beauty (AONB), designated for their distinctive landscape character and high scenic value. These areas cover approximately 325,000 hectares, or *c*. 20% of the total land area of Northern

[120] Splaschos Viewer

[121] Ireland: Submerged Prehistoric Sites and Landscapes

[122] DAERA NI-From Evidence to Opportunity A Second Assessment of the State of Northern Ireland's Environment

[123] NI Heritage Statistics

Ireland. Of these sites, seven intersect the coastline; these are described in **Table 4-17** and their locations are shown in **Figure 4-20**.

Table 4-17 AONBs intersecting the OREAP Study Area

AONB Name	Area covered	Description
Antrim Coast and Glens	The AONB includes the coastline of Co. Antrim from Ballycastle to Larne and the Glens of Antrim.	The area is dominated by a high undulating plateau cut by deep glens which open north and eastwards to the sea. It is an area of contrasts: gentle bays are separated by blunt headlands; exposed moorland gives way to sheltered valleys; wide-open expanses to enclosed farmland.
Binevenagh	The AONB covers the area between the Roe Estuary and Magilligan, the cliffs of Binevenagh, the Bann Estuary and Portstewart sand dunes.	Much of the landscape is characterised by long beaches and extensive dune systems. The Bann Estuary is also an important site in relation to the study of coastal physiography.
Causeway Coast	The AONB encompasses 18 miles of coastline and incorporates the Giant's Causeway.	This area is renowned internationally and boasts the only WHS in NI. The spectacular coastal scenery includes dramatic cliffs and headlands that are broken by sandy beaches backed by dunes. The dark volcanic rocks and white chalk form geological features including the Giant's Causeway and Carrick-a-Rede rope bridge.
Strangford and Lecale	This AONB follows the shores of Strangford Lough and extends inland up the Quoile River and south along the outward-facing shore of the Irish Sea.	This coastal AONB and its lowland landforms illustrate Northern Ireland's glacial past, with drumlin hilltops poking from the sea to form hundreds of islets of Strangford Lough.
Mourne	This AONB includes the south-east coastline from the south of Dundrum Bay to the north of Carlingford Lough.	This AONB includes a picturesque mountain district, including twelve peaks such as Slieve Donard, Northern Ireland's highest mountain. The mountain slopes descend through moorland, woodland, fields, and farms before meeting the coast.
Ring of Gullion	This AONB surrounds Slieve Gullion mountain in County Armagh.	Slieve Gullion mountain lies at the centre of this AONB, with an encircling ring of lower rugged hills. The Ring of Gullion is regarded as the finest expression of a ring dyke in the British Isles. The area has an extensive geology and is rich in natural, cultural and built heritage.
Lagan Valley	This AONB lies mostly within the Lagan Valley Regional Park, to the south of Belfast.	This AONB is focussed on the course of the River Lagan, and includes riverbank scenery, meadows, woods and pastoral valley land.

There is one UNESCO WHS that intersects the OREAP Study Area, the Giant's Causeway, as described in Section 4.3.7. There are eight NIEA Country Parks in Northern Ireland; of these, six sites intersect the OREAP Study Area: Scrabo Country Park, Ness Wood Country Park, Crawfordsburn Country Park, Redburn Country Park, Roe Valley Country Park and Lagan Valley Regional Park. There are also 56 National Trust Sites within Northern Ireland, of which 43 intersect the OREAP Study Area.

In addition, the Northern Ireland Landscape Character Assessment 2000, described below, identified special landscapes that it termed Areas of Scenic Quality; some of these areas have been included in Local Area Plans, where they may be designated as Areas of High Scenic Value (AoHSV).

In the Republic of Ireland, there are six areas designated as National Parks, as they are recognised as nationally important landscapes; none of these areas are in proximity to the border with Northern Ireland.

The location of these designated landscape types is shown in **Figure 4-20**.

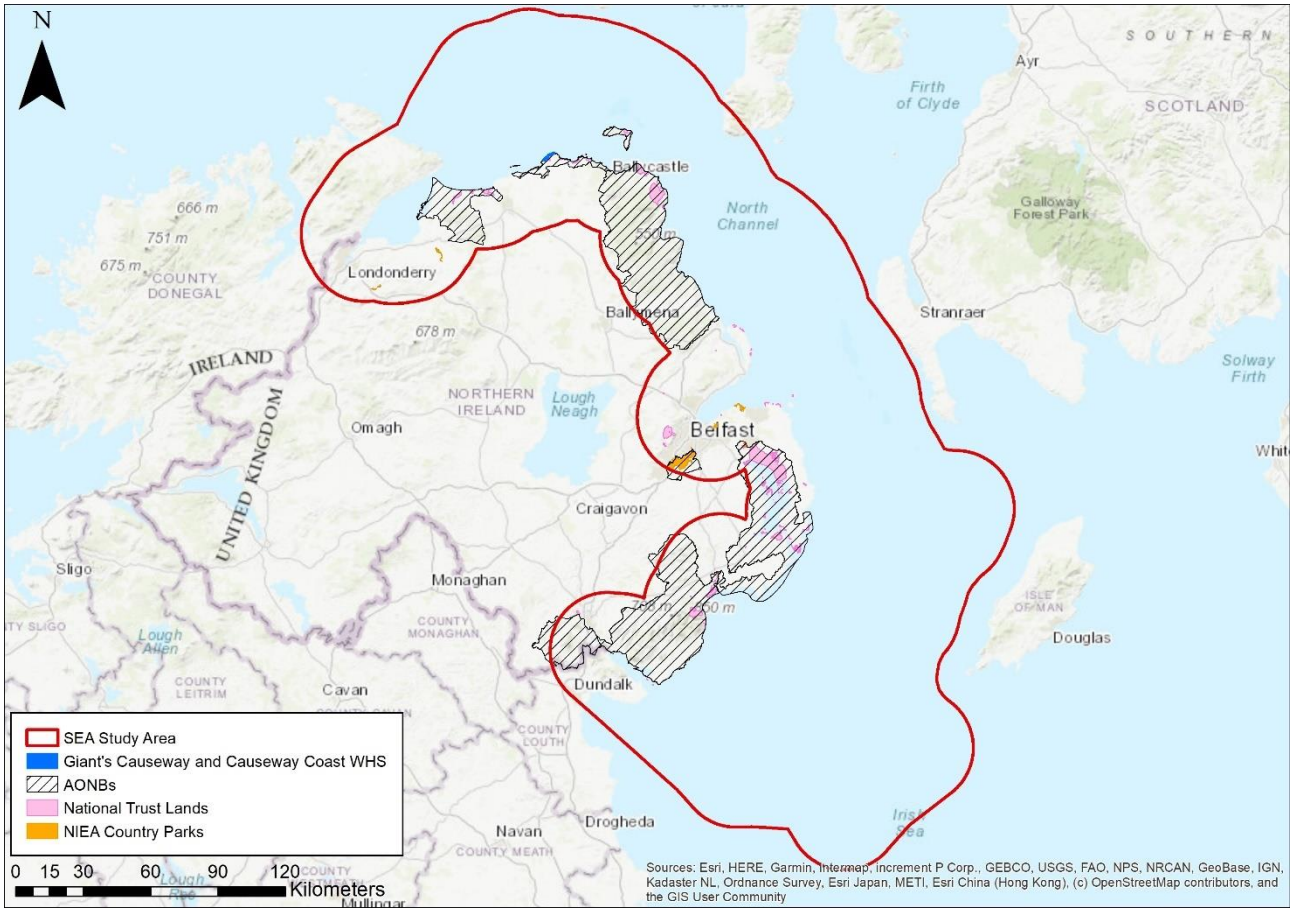

Figure 4-20 Areas Designated for Landscape that intersect the Study Area

4.3.8.2 Landscape and Seascape Character Assessment

Landscape character assessments are used as a tool to identify the landscape features that give a locality its 'sense of place'. The Northern Ireland Landscape Character Assessment 2000[124] (NILCA) subdivided the countryside into 130 Landscape Character Areas (LCAs), each based upon local patterns of geology, landform, landuse, cultural and ecological features. For each LCA, the key characteristics were described and an analysis of landscape condition and its sensitivity to change was made. The land use planning system will generally refer to the NILCA where development might affect the landscape character[125].

The Northern Ireland Regional Landscape Character Assessment (NIRLCA), developed in 2016, aimed to complement the NILCA by providing a regional framework upon which more detailed local studies could be based. This subdivided the countryside into 26 Regional Character Areas (RCAs), based upon information relating to people and place and the combinations of nature, culture and perception that contribute to local uniqueness. These aim to provide information on which to base plans at a more local level that might affect landscape character.

The Northern Ireland Regional Seascape Character Assessment[126] identified 24 Seascape Character Areas (SCAs) along the Northern Ireland coast, describing the key features and characteristics of each area, and relating these to neighbouring terrestrial LCAs. These SCAs were identified as distinct areas with a unique sense of place, with boundaries tending to represent indicative lines of gentle transition rather than an abrupt

[124] DAERA NI Landscape Character of Northern Ireland

[125] Landscape Planning for Sustainable Development

[126] DAERA NI Regional Seascape Character Assessment

change in seascape character. These regional SCAs are shown in **Figure 4-21**, and their key characteristics are described in **Table 4-18**.

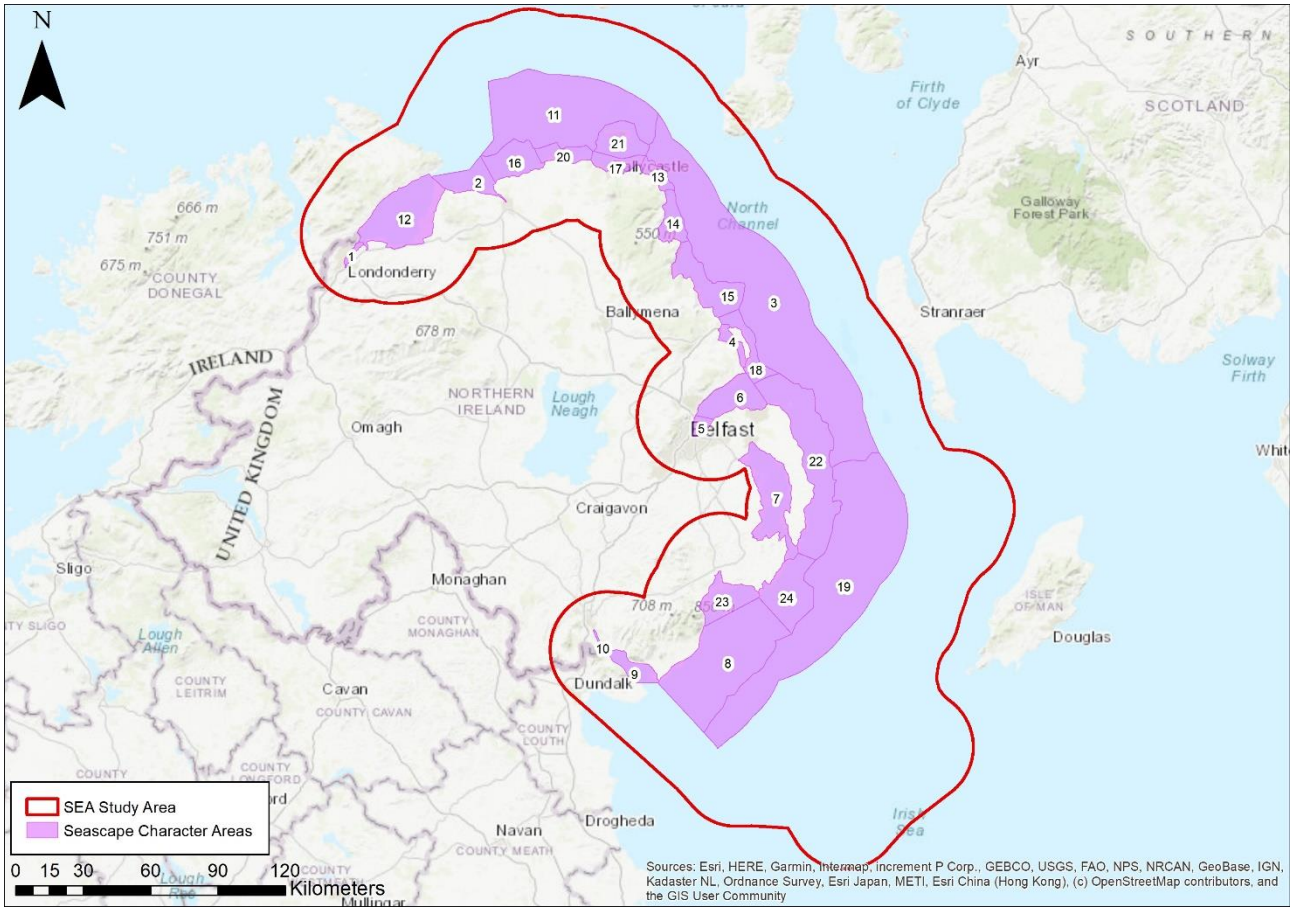

Figure 4-21 Location of Regional Seascape Character Areas in Northern Ireland

Table 4-18 Description of Regional Seascape Character Areas in Northern Ireland

No.	Seascape Character Area	Key Characteristics*
1	Foyle Estuary	Contained by valley sides, the gently meandering river is flanked by a series of historic navigational features with channel markers along its length. The constant flow of water and changing tides underpin a dynamic seascape, emphasised by occasional small boats and yachts moving up and down the river and commercial shipping activities at Lisahally, where large shipping containers import and export goods. The river valley sides to the north-east of Derry / Londonderry are heavily wooded which contrasts with large-scale industrial and commercial land uses towards Derry / Londonderry and around the port. The Peace Bridge is a striking feature across the River Foyle which, along with the Foyle and Craigavon bridges, provides strategic connections across the river. The SCA also forms an important recreational resource and setting for the city.
2	Lough Foyle	Lough Foyle is an extensive sea lough and has one of the largest catchments of all Irish sea loughs. At 3,700 km^2, it is the largest sea lough in Northern Ireland and several rivers run into it including the Foyle, Faughan and Roe. From the Donegal coast to the mudflats off Ballykelly, the Lough is approximately 10 km at its widest point. There is a well-marked channel down the Donegal side which is used by large ships visiting Lisahally Port opposite Culmore Bay. The large expanse of water provides ever-changing patterns of currents, waves and reflections of the sky. At low tide, there are extensive textured patterns of mudflats that are important feeding grounds for wintering bird populations. Magilligan Strand forms an extensive, peaceful beach along the eastern shore. The Lough is also an important resource for shellfish fisheries, aquaculture and recreational activity.

3	North Coast Strands & Dunes	With panoramic open views of dramatic rolling waves, the SCA has a prevailing windswept and often wild appearance. The extensive flat sandy beaches of Benone Strand, Castlerock Strand, Downhill Strand and Portstewart Strand, all backed by large sand dune systems, are notable scenic features that define much of the coastline character and provide an important resource for a range of coastal recreational activities. The dynamic dune system at Magilligan is the largest accumulation of coastal sands in Ireland. At Portstewart and Castlerock, there are sections of basalt forming rocky headlands that contrast with the extensive swathes of sand. The sheltered River Bann punctuates the coastline and enters the sea between the coastal towns of Castlerock and Portstewart. Offshore, large rolling waves form in shallow waters above extensive areas of sandy seabed. Located on the cliff top, the iconic Mussenden Temple is visible from across much of the SCA.
4	The Skerries & Dunluce Coast	This dramatic section of exposed coastline is formed of rugged and intricate basalt and contrasting chalk cliffs with submerged sandbanks, sea caves and reefs. Ramore Head juts out to sea forming a very prominent headland and is composed of a hard dolerite sill that extends offshore to form the Skerries, a chain of nearby low-lying uninhabited rocky islands. Located on a rocky outcrop, the dramatic medieval ruin of Dunluce Castle overlooks the rugged cliffs and wild sea beyond. There are three sections of scenic beach, Bushfoot Strand, Curran Strand and Portrush West Strand where high-energy rolling waves are popular for surfing. Portrush is a popular tourist resort, providing a good location to explore the coast and nearby visitor attractions.
5	Causeway Coast	The iconic and world-famous Giant's Causeway and Causeway Coast, (designated a World Heritage Site) is a defining feature of this stunning SCA. The seascape is typified by rough seas crashing against a series of rocky headlands and surrounding high vertical cliffs with dramatic formations of Basalt and Chalk. There is also an impressive submerged palaeo-cliff shoreline off White Park Bay and the Giant's Causeway. There is an intricate pattern of sweeping bays, islets, rocky headlands and outcrops, punctuated by the sweeping sands at White Park Bay, backed by hummocky ground and low-rising, slumped Chalk cliffs. There are a number of small rocky islands near to the coastline including Sheep Island and Carrick-a-rede Island with a series of submerged sandbanks, sea caves and reefs towards the west of the SCA. The area has a strong undeveloped character with a remote and exposed experience that contrasts with the intimacy and shelter provided by the distinctive harbours at Ballintoy, Dunseverick, Portbradden and Portnaboe. Along the cliff tops, there are extensive swathes of semi-natural grasslands and patches of gorse.
6	Ballycastle Coast	The SCA is formed by a broad sweeping bay that partly encloses the dynamic waters of Rathlin Sound, notable for its extremes of currents, overfalls and eddies that make navigation very challenging. The character of the SCA is heavily influenced by the distinctive outline of Rathlin Island which forms a sense of visual containment and shelter from the wild Atlantic beyond. Along the coast, a series of mostly vertical and exposed cliffs of varying geology and landforms are punctuated by rocky headlands and small rocky outcrops. A distinctive series of large sea caves are located between Kinbane and Ballycastle and the sheltered bay at Ballycastle contains the town, harbour and a beach backed by sand dunes. Fair Head is a particularly prominent and exposed headland with a very distinctive profile that marks the eastern point of the SCA. The imposing open moorland summit of Knocklayd, Glentaisie and Glenshesk are important features that provide an important setting to the southern part of the SCA
7	Rathlin	This stunning and dramatic seascape is typified by its remote and wild qualities, extreme exposure to the elements and panoramic views of extensive rough sea. A composition of rugged cliffs, a broad sweeping bay, an exposed inland plateau providing distant views towards Scotland and the nearby mainland, underpins an exhilarating coastal experience with an outstanding scenic quality. The island has a long history of settlement, invasion, industry and trade with a large number of notable maritime sites, including harbours, quays, slipways, landing places and lighthouses. Rathlin Sound is also notable for its extremes of currents, overfalls and eddies that make navigation very challenging, and a number of interesting submarine geological features are found around Rathlin Island, including a submerged partly-enclosed basin

		within the bedrock structure.
8	Torr Head Coast	The SCA includes some of the most unspoilt and dramatic coastal landscapes in Northern Ireland. With its very exposed location, Torr Head juts out into open sea forming a prominent headland and focal point in the seascape. There are expansive views across the North Channel SCA where occasional large shipping movements add interest against a distant backdrop of Scotland. The coast is characterised by a series of large, vegetated landslips, small, sheltered bays and crashing waves against exposed headlands and rocky outcrops. Large sections of the coast are inaccessible which underpins a strong sense of remoteness and tranquillity.
9	Northern Glens Coast	The SCA is typified by a series of dramatic large sweeping bays backed by a series of distinctive glens and surrounding open moorland with panoramic views across the open expanse of the North Channel that, when travelling along the open coastal road, provide a constantly changing visual experience. The sweeping bays, enclosed by broad rocky headlands of varying geology and landforms with a series of vegetated slopes, have a prevailing exposed and undeveloped nature. Within the shelter of the bays, the traditional coastal towns of Cushendall, Waterfoot and Cushendun, with a concentration of cultural sites, are popular visitor attractions. The shoreline within the bays is typically lined with pebbles, boulders and sands, with rocky outcrops along the more exposed sections of the coastline.
10	Southern Glens Coast	Centred on the broad sweep of Carnlough Bay and backed by the Larne Glens, the SCA is heavily influenced by dramatic basalt cliffs and scarp slopes and further south, the prominent headland of Ballygally Head. The bays provide shelter for the traditional coastal settlements of Carnlough, Ballygally and Glenarm that contrast with open and exposed headlands. On the seabed, there are extensive maerl beds and the Maidens' light towers amongst rocky outcrops are distinctive features in the open sea. The shoreline consists mostly of gravel with rocky outcrops with sandy beaches found at Ballygally Bay and Carnlough Bay. When travelling along the open coastal road, there is a dramatic and contrasting experience with extensive views across the open sea. The bays are also popular for sailing.
11	The Gobbins	Stunning views of dramatic basalt cliffs and extensive open sea, combined with exposure to the elements, underpin an exhilarating coastal experience. 'The Gobbins', a three-mile-long coast path that opened in 1902 (although now closed but to be restored again), in its heyday, was more popular than the Giant's Causeway. It consisted of a series of cliff staircases, suspension bridges, caves and tunnels. Further north, the small offshore Isle of Muck is important for nesting sea birds and the surrounding open sea often provide sightings of Dolphins and Whales. Black Head Lighthouse is situated on a prominent headland and further south, the sheltered town of Whitehead is located near to the mouth of Belfast Lough. Out to sea, ferries and commercial ships pass along busy shipping lanes to and from Larne and Belfast ports.
12	Larne Lough	The SCA is centred on Larne Lough, a shallow and relatively small and narrow sea lough contained by the wooded sides of the Larne Ridgeland to the west and the open farmlands of Islandmagee to the east. The Port of Larne is a very busy commercial harbour with a continuous flow of ferries and commercial traffic into and out of the Ro-Ro docks on the west side of the Lough entrance. The east side of the entrance to the Lough is dominated by Ballylumford Power Station. The wooded escarpments either side of the village of Glynn form a distinctive backdrop to the Lough, contrasting with lower-lying areas of development in Larne. The Lough is dotted with small boats and towards the southern quieter end, there are extensive mudflats and saltmarsh. A network of large pylons across the southern part of the Lough contributes to a visually cluttered appearance.
13	Belfast Lough	Belfast Lough is a large, shallow sea lough and busy gateway for Belfast Port. The Lough has three main channels that provide shipping routes for a large number of ferries, container ships and occasional cruise liners. With a diversity of land and sea uses, the constant activity of boats and ships underpins a dynamic and vibrant seascape experience. The majority of the shore is characterised by rocky headlands, small sandy bays and intertidal rocky outcrops, with occasional lagoons and mudflats. Along the southern shore, a strong pattern of wooded estates contrasts with the more

		open and industrial character along the northern shore where Kilroot power station forms a prominent landmark. There are a number of busy towns with marinas scattered around the Lough that provide a base for water-based recreational activity. As the Lough is virtually free of strong tides, it is a very popular attraction for sailing and kayaking.
14	Belfast Harbour	Belfast Harbour is a compact SCA centred on three main shipping channels and docks with surrounding mixed, large scale land uses. The two yellow Harland and Wolff cranes form an iconic feature on the Belfast skyline. The origins of the port can be traced back to 1613 and it has played a central role in the evolution of Belfast. Today, it is a hub for maritime services, logistics, industry and urban regeneration, receiving over 6000 vessels each year. In addition to providing a major centre for importing and exporting with regular ferry links to Scotland and England, it is also a popular destination for cruise liners. The Titanic Belfast Visitor Centre is a striking new building that explores the history of its construction at the docks. The SCA also includes Belfast City Airport, an RSPB Reserve, Victoria Park, sewage works, landfill sites and industrial estates.
15	Ards Peninsula	Although still exposed to the elements, the eastern coast of the Ards Peninsula is the most sheltered stretch of open rocky coast in Northern Ireland. Along the low-lying coastline, there is a simple pattern of rocky outcrops and curved sandy beaches, punctuated by occasional coastal settlements and harbours. Lighthouses and historic fishing harbours are a particular feature and Portavogie is an important commercial fishing centre. Offshore, there are a large number of reefs, islands and rocky outcrops. The Copeland Islands, important for seabirds and located near to the mouth of Belfast Lough, are separated from the mainland by strong currents racing through the Donaghadee Sound. Burial Island, off Burr Point near Ballyhalbert, is the easternmost point of Ireland.
16	Strangford Lough	Strangford Lough is a near-land-locked and sheltered marine inlet with a highly indented coastline that contains a highly distinctive and visually stunning composition of numerous whale-backed islands produced from the drowning of countless drumlins by the sea. The drumlins are found mainly on the west coast with most of those on the east coast having been removed by marine erosion forming small islands and numerous rocky reefs known as ‘pladdies’. Strangford Lough is of particular importance for its marine flora and fauna and is Northern Ireland’s only Marine Conservation Zone. The intimacy experienced along the seclusion of the western shore contrasts with the larger scale and more open appearance of the northern and eastern shores. The area has a long history of settlement with religion, industry and pleasure reflected in a large number of historical features associated with the Lough.
17	Lecale Coast	With a horizontal emphasis, the SCA is a low-lying, exposed and windswept coastline with extensive views out to sea. The coastline is predominantly formed of intricate rocks with sections of low-lying soft cliffs, punctured by two small, secluded inlets of Killough Bay and Ardglass Harbour which supports an important commercial fishing centre. There are many shipwrecks submerged in shallow water and a scattering of archaeological remains along the coast. There are sheltered fishing harbours at Killough and Ardglass and the open coast road is separated from the sea by a narrow section of open farmland with patches of gorse and stone walls.
18	Dundrum Bay	Dundrum Bay is the largest natural bay in Northern Ireland and its sweeping formation provides a contained and sheltered setting for the busy coastal resort of Newcastle, which hosts a range of popular visitor attractions. A huge swath of sandy beach, popular for recreation, is backed by the extensive Murlough dunes. The dune system, dating back 6000 years, has an unusually intact and extensive transition including sand dunes, yellow and grey dunes, dune grassland, heath and scrub. Intertidal mudflats in Inner Dundrum Bay and sublittoral sands in Dundrum Bay are important for wintering birds. Dundrum derives its name from its Norman Castle, in Irish Dún Droma, meaning "fort of the ridge" which is located just outside the SCA boundary. The imposing outline of the Mourne Mountains is integral to the contained and instantly recognisable setting of the bay, particularly when viewed from the sea.
19	Mourne Coast	With an imposing and dramatic backdrop of the Mourne Mountains, the SCA has a prevailing open, exposed and windswept appearance with panoramic views of the

		extensive Irish Sea. The low-lying coast bulges out into the sea and is exposed to the east and south-east to high energy waves. A series of rock platforms alternate with sand beaches with greywacke rock outcrops and gravel beaches further north. Maritime cliffs and slopes and coastal vegetated shingles occur at the northern end of the SCA. Kilkeel is an important commercial fishing centre and there are a large number of shipwrecks scattered across the seabed.
20	Carlingford Lough	Carlingford Lough is a shallow and relatively broad sea lough sheltered from the rough waters of the Irish Sea and is particularly noted for its glacial fjord or sea inlet form. The surrounding summits of the stunning Mourne and Cooley Mountains, with large areas of wooded slopes, are integral features to its contained setting. It is a particularly dynamic and busy seascape with a diversity of land and sea uses and busy shipping lanes leading out to sea. The Newry River and the Newry Canal link the Lough to the nearby city of Newry. There is an extensive shellfish culture, and the Lough is also a very popular visitor attraction, offering a wide range of recreational activities. There are extensive mudflats and areas of saltmarsh supporting large numbers of wintering water birds.
21	Newry Estuary	With a long association of maritime trade, the SCA is centred on the narrow lower reaches of the Newry River set within a dramatic, steep-sided narrow valley. Running alongside the river, the Newry Canal links the Lough to the nearby city of Newry. The gently meandering river is flanked by a series of historic navigational features with channel markers along its length. Newry Canal, with its impressive archaeological features including pump houses, quays, locks and lock houses, contribute to a strong sense of place. The seclusion of the wooded valley sides contrasts with areas of busy large-scale land use of port infrastructure, industrial and commercial development.
22	Atlantic	The Atlantic SCA adjoins the outer marine extents of several SCAs located along the north coast. It includes extensive areas of often rough open sea with turbulent tides, difficult to navigate. Sea depth is generally up to 100 m and to the north of Rathlin Island, the seabed drops steeply away to over 200 m. At this distance, features along the north coast are difficult to distinguish but the formations of vertical cliffs and moorland hills above Ballycastle, form an important skyline to the expanse of open sea. The outline of Rathlin Island is a distinctive feature and in close proximity, the rugged cliffs and seabird colonies become apparent. To the south-west, there are views of the outline of the hills of Inishowen and distant views of the Kintyre Peninsula, Islay and Jura to the east.
23	North Channel	With relatively busy commercial shipping lanes, the deep North Channel SCA adjoins the outer marine extents of several SCAs located along the north-east coast. It extends from the eastern side of Rathlin Island, past the entrance of Belfast Lough, where it meets the Irish Sea (South Down) SCA. Formed above the deep circalittoral zone, sea depth extends to approximately 200 m along the outer reaches, becoming shallower towards the coast. Habitats are diverse and are likely to mainly consist of deep circalittoral sediment and sand, faunal communities on circalittoral rock and deep circalittoral mixed sediments. Along the northern part of the SCA, the outline of the Moyle Glens and basalt escarpments, backed by rolling moorland summits and the Garron plateau, form a distinctive skyline. Further south, the low-lying coastline is difficult to distinguish. To the north-east, there are distant views of the Kintyre Peninsula, Ailsa Craig, Arran and the Rhins of Galloway
24	Irish Sea (South Down)	The Irish Sea (South Down) SCA is located off the south-east coast and adjoins the outer marine extents of several SCAs located along the coast. Formed above the deep circalittoral zone, sea depth extends to approximately 200 m along the outer northern boundary, becoming progressively shallower to the south and towards the coast where depth is up to approximately 50 m. Habitats are predominantly deep circalittoral mud with smaller areas of deep circalittoral sand, faunal communities on circalittoral rock, with deep circalittoral course and mixed sediments to the north of the SCA. At this distance, features along the low-lying coastline would be hardly discernible although the dramatic outline of the Mourne Mountains and the Cooley Mountains form a distinctive skyline. To the east, there are distant views of the Rhins of Galloway, the Isle of Man and the north-west coast of England beyond. The SCA is notable for its important prawn grounds.

*As described in the Northern Ireland Regional Seascape Character Assessment

Coastal Character Assessment[127] and Landscape Character Assessment[128] have also been undertaken for Scotland. Thirteen National Coastal Character Types have been identified at a very broad scale:

- Type 1 - Remote High Cliffs
- Type 2 - Rocky Coastline / Open Sea Views
- Type 3 - Deposition Coastline, Open Views
- Type 4 - Outer Firths
- Type 5 - Developed Inner Firths
- Type 6 - Narrow Coastal Shelf
- Type 7 - Kyles and Sea Lochs
- Type 8 – Enclosed Bays, Islands and Headlands
- Type 9 – Sounds, Narrows and Islands
- Type 10 – Outer Firth with Islands
- Type 11 – Less Developed Inner Firths
- Type 12 – Low Rocky Island Coasts

National Scenic Areas (NSAs) are those areas in Scotland designated for their outstanding scenery, and broadly comparable to AONB designations. In total, there are 40 NSAs covering 13% of the land cover.

4.3.8.2.1 Visibility and Sensitivity to Offshore Renewables

The draft UK Offshore Energy SEA (OSEA4) for the future leasing / licencing for offshore renewable energy offshore oil and gas and gas storage and associated infrastructure [129] determined that an assessment of the likely impacts of offshore energy activity on the seascape / landscape of UK waters and coastlines should have three principal considerations:

- The limit of visual perception from the coast (i.e., are the devices or installations visible, and what influences their visibility).
- The individual characteristics of the coast, which affect its capacity to contain a given development.
- How people perceive and interact with the seascape, and what changes in character may be introduced by certain developments, including in a non-visual way.

UK guidance on the landscape / seascape and visual effects of offshore wind farms recommends that a study area of a 50 km radius is considered for wind turbines of height 150 m to blade tip and above[130]. The Crown Estate Offshore Wind Leasing Round 4 excluded Northern Ireland from that leasing round primarily due to potential landscape / seascape effects[131], with 'Visibility from sensitive receptors' given a red rating as 'Significant / insurmountable issue that would be challenging to mitigate within the area of influence of a receptor'. This visual assessment was based on bands of significant visual impacts from medium and high sensitivity receptors (National Parks, AONBs, Heritage Coasts and WHS) as established in the UK's Offshore Energy Strategic Environmental Assessment (OSEA3), which determined that 99% of the potential area for offshore wind in the region was within 13 km of the coast and that visual impacts would therefore be

[127] Nature Scot Coastal Character Assessment

[128] Nature Scot Scottish Landscape Character Types Map and Descriptions

[129] UK Offshore Energy Strategic Environmental Assessment (OESEA4)

[130] Scottish Natural Heritage Visual Representation of Wind Farms Guidance

[131] The Crown Estate Offshore Wind Leasing Round 4 Regions Refinement Report

a significant issue. The draft OSEA4 does not include consideration of the territorial and offshore waters of Northern Ireland for the leasing of offshore renewable energy.

In Northern Ireland, local planning authorities are responsible for controlling development in an AONB; they have a duty to ensure that any proposed development in the AONB is in line with the statutory purpose of conserving and enhancing the natural beauty of the area and will often have policies or guidelines in place that are specific to the AONB. Onshore, windfarms have been developed within AONBs, and further planning applications have been put forward within these areas; however there has been significant opposition in some cases relating to the landscape sensitivity and potential adverse impacts on visual amenity and landscape character. In terms of potential landscape and visual impacts, DAERA usually only provides advice on the impacts of wind energy developments located within the boundary of the Giant's Causeway WHS or its landscape setting, or for major or regionally significant windfarm development proposals located within the boundary of an AONB[132].

4.3.8.3 Summary of Existing Pressures and Issues for Landscape / Seascape and Visual Amenity

Around 20% of the total land area of Northern Ireland is designated as within an AONB, and a significant length of the coastline of the region is designated for its landscape value. In particular, the Antrim Coast and Glens AONB intersects much of the north-east coast, while together the Strangford Lough and Mourne AONBs cover much of the south-east coastline. Landscape and seascape character types have been defined that can provide information on which to base plans at a more local level that might affect landscape / seascape character.

Implementation of the draft OREAP, and the construction, maintenance and decommissioning activities associated with the potential offshore renewable energy projects that may arise as a result, has the potential to lead to temporary (during construction), to permanent effects on visual amenity and / or seascape character (operation of renewable devices at sea), including in some areas the potential for transboundary effects in the Republic of Ireland or Scotland.

Scoping Questions:

5. Are we proposing the most appropriate data and scale of data to be used?
6. Can you propose any other data to be used in the SEA, and why it would be beneficial?

[132] DAERA NI-Wind Energy Installations

5 FRAMEWORK FOR ASSESSING ENVIRONMENTAL EFFECTS

5.1 Iterative Development of the OREAP and SEA

As described in section 3.1, the draft OREAP is an environmentally led plan; further development of the plan will be undertaken in an iterative manner in conjunction with the SEA and HRA, comprised of several stages and taking on board stakeholder views and recommendations.

5.2 Approach to SEA Assessment of Effects

Assessment of the draft OREAP should be relatively strategic, with the aim of reporting likely impacts at the national and regional level to reflect the scale at which the potential technically suitable areas and Resource Zones will be identified. Where appropriate, a regional perspective of the potential main issues and impacts of each proposal will be detailed by environmental topic area. Where possible this assessment will be quantitative, with a graphical output to aid public appreciation and understanding of the implications of each proposal in the draft OREAP.

Assessment of the draft OREAP will comprise an assessment of the baseline environmental information available against the high-level objectives and potential issues. This method will involve an assessment of each option available in the enactment of the OREAP against the following SEA topics:

- Biodiversity, Flora & Fauna (BFF)
- Population & Human Health (PHH)
- Geology, Soils and Land Use (GSL)
- Water (W)
- Air (A)
- Climatic Factors (CF)
- Material Assets & Infrastructure (MA)
- Cultural, Architectural & Archaeological Heritage (CH)
- Landscape & Visual Amenity (L)

The purpose of this is to predict and evaluate, as far as possible, the environmental effects of the draft OREAP, highlighting any significant environmental problems and / or benefits that are likely to arise from its implementation.

5.2.1 Identification of high-level impacts

A variety of devices can be used to extract and convert offshore energy into electrical energy which uses different energy sources: offshore wind (both fixed and floating), tidal energy, and wave energy. These offshore energy forms can have several different types of renewable devices installed to generate electrical energy. These devices have various factors influencing their suitability for use, including constraints on their location, required installation and maintenance processes, environmental interactions, and the size and energy density of the device arrays. Further information on these device types will be provided in the SEA Environmental Report.

To simplify the assessment process and avoid repetition during the assessment of each proposal, it is proposed that the types and severity of high-level impacts that the types of renewable energy devices (i.e., fixed wind turbines, floating wind turbines, submerged or floating tidal devices, wave devices) can have on sensitive features within each SEA topic will first be considered. A draft of the potential high-level impacts identified from the installation, decommissioning, and operation of these device types across SEA topics is provided in **Appendix D**. These potential impacts have been described based on the experience of the SEA Team, and from a review of SEA reports from several related plans (the Northern Ireland ORESAP SEA; the UK Offshore Energy SEA 4 (OSEA4), the UK Offshore Energy SEA 3 (OSEA3); the Scottish Draft Sectoral Marine Plan for Offshore Wind Energy and SEA (2019), the Scottish draft Sectoral Marine Plans for wave

and tidal energy (2013); Planning Scotland's Seas: SEA of Plans for Wind, Wave and Tidal Power in Scottish Marine Waters (2013); FishRAMP project Literature review), and a comprehensive review of 165 EIA reports associated with offshore renewable energy projects in UK waters.

Further detail regarding these potential high-level impacts will be provided in the SEA Environmental Report.

5.2.2 Potential Resource Zone Assessment

Following this high-level assessment of the potential impacts associated with device types, each proposal in the draft OREAP (potential Resource Zones, capacity proposals, as identified by constraint mapping and modelling and refined, as described in Section 3.1) will be assessed in the short, medium and long term for likely effects, the significance of the effects, and whether they are positive or negative effects. Other impacts that will be assessed for significance are secondary effects, cumulative effects, synergistic effects, temporary and permanent effects, and the inter-relationship of effects. The scenario of "The Evolution of the Environment without the Plan" will also be assessed in the same format. This will be considered the Do-Nothing Scenario.

All potential positive and negative impacts will be presented individually, with a text description, and then a summary graphic. In addition, a summary of the overall balanced potential effect will be presented for each environmental issue area. Scores will be assigned to impacts, which will range from +3 to -3 as demonstrated in **Table 5-1**. The purpose of adding numerical scores is to assist in the ranking of options and for potential incorporation of the environmental and social criteria into future decision making by the OREAP team, as this can easily be tied into a multi-criteria analysis of alternatives, if desired. Like the assessment, the scores will demonstrate both the positives and the negatives and will not be conveyed in terms of net benefit or net loss, which can sometimes be misleading. A draft guide to the scorings that will used for this assessment is given in **Appendix E**; note that this provides *examples* of the types of effects that may occur and their potential significance on environmental receptors. The scoring will take into account the sensitivity of receptors and professional opinion, and be linked to the potential high-level impacts identified and the baseline environment.

Table 5-1 Description of SEA Environmental Impact Scores

Score	Description
+3	Significant positive environmental effects
+2	Moderate positive environmental effects
+1	Slight positive environmental effects
0	No environmental effects
-1	Slight negative environmental effects
-2	Moderate negative environmental effects
-3	Significant negative environmental effects

The HRA for the draft OREAP will investigate the potential impacts on the European sites (National Site Network Sites) and may cover a much wider study area and zones of influence to address ex situ impacts to habitats and species.

5.3 Draft SEA Objectives

The proposals of the draft OREAP will be assessed in terms of their potential effects, and the significance of these effects, on the environment against a set of strategic environmental objectives (SEOs). These SEOs have been developed in the context of broader environmental protection objectives set at both international and national levels (outlined in **Section 2.4** and detailed in **Appendix B**), and also take into account the context of potential for impacts associated with the draft OREAP. Each of the environmental topics described in **Section 4** has been assigned at least one high-level SEO, specifying a desired outcome, against which the potential proposals set out in the draft OREAP can be assessed. Each high-level SEO has been paired

with a specific target(s), as well as indicator(s) that can be used to measure the progress towards achievement of these targets. The draft SEOs, Sub-Objectives, Indicators and Targets proposed to be used are given in T**able 5-2** for discussion. The assessment will examine the likely significant impacts of the proposals set out by the draft OREAP, and how their implementation will contribute to achieving these SEOs.

Table 5-2 Draft Strategic Environmental Objectives, Indicators and Targets.

SEA Topic	Objective	Sub-Objectives	Indicators	Targets
Biodiversity, Flora & Fauna	Avoid damage to, and where possible enhance, biodiversity, flora and fauna.	Preserve, protect, maintain and, where possible, enhance internationally, nationally, and locally protected species and habitats. Preserve, protect, maintain and, where possible, enhance, protected habitats and species and other known species of conservation concern.	• Conservation status of designated habitats and species within International / European sites (SACs, SPAs, Ramsar sites). • Conservation status of designated habitats and species within national and local sites (MCZs, ASSIs). • Status of protected and priority habitats and species (Annex I habitats, Annex II species, NI Priority Habitats and Species).	• No negative change, or a positive change, in the conservation status of designated habitats and species within International / European Sites. • No negative change, or a positive change, in the conservation status of designated habitats and species within national and local conservation sites. • No negative change, or a positive change, in the status of protected and priority species outside designated sites.
Population & Human Health	Minimise disruption to the local population and provide employment benefit for the community.	Minimise disruption to the local population and leisure use of the area, while providing robust offshore renewable infrastructure. Minimise the potential for loss in employment and contribute to positive effects on employment in construction and operation of offshore renewable infrastructure.	• Population density within proximity to potential development areas. • Potential for disruption or displacement of leisure users of the marine area (sailing, sea angling, beach use). • Potential to contribute to an indirect loss of employment through disruption of other marine users (e.g., fisheries). • Potential to contribute to employment within the local community and for skilled technical workers.	• Low population density within proximity to offshore renewable energy developments. • No significant disruption of leisure use of the area in development and operation of infrastructure. • No significant disruption of other users of the potential development area that could affect employment. • Contribution of development and operation of infrastructure to employment.
Geology, Soils and Land use	Minimise damage to the function and quality of the seabed in the study	Minimise direct and indirect damage to the function and quality of the seabed in the study area in	• Loss or damage to the seabed. • Alteration of hydrodynamics or coastal processes.	• No loss of, or damage to, sensitive seabed due to development and operation of

	area in construction and operation of offshore renewable infrastructure.	construction and operation of offshore renewable infrastructure. Preserve, protect, maintain and, where possible, enhance, sites designated for geological or geomorphological features.	• Site condition / status of protected geological / geomorphological features within designated sites (UNESCO Geoparks, WHSs, ASSIs, MCZs).	infrastructure. • No alteration of hydrodynamics or coastal processes due to development and operation of infrastructure. • No negative change, or a positive change, in the condition of protected geological / geomorphological features within designated sites.
Water	Avoid impacts on, and where possible enhance, the status or quality of water bodies.	Support the objectives of the WFD and Marine Strategy by avoiding damage to or deterioration of water status, quality and resource.	• WFD status of coastal and transitional water bodies that may interact with the Plan areas considered. • Status of MS Descriptors for marine water bodies that may interact with the Plan areas considered. • Status of sensitive waterbodies, e.g., Bathing waters and Shellfish waters that may interact with the Plan areas considered.	• No negative change, or a positive change, in the status of surface water bodies, including sensitive water bodies, and potential to contribute to the achievement of water body objectives under the WFD. • No deterioration in the status of NI seas, and potential to contribute to the achievement of Good Environmental Status (GES) under the MSFD.
Air	Minimise risk to local air quality and contribute to improving regional emissions.	Minimise risk to local air quality. Contribute to improving regional pollutant emissions.	• Development in air quality sensitive areas. • Enable increased renewable energy connection to reduce requirements for fossil fuel burning.	• No potential development within air quality sensitive areas. • Number of potential new developments that may facilitate increased renewable energy connection.
Climatic Factors	Contribute to a reduction of GHG emissions from the energy supply sector in line with national commitments.	Contribute to a reduction in GHG emissions from the energy supply sector in line with national commitments.	• Enable increased renewable energy connection to reduce requirements for fossil fuel burning. • Quantity and trends of GHG emissions attributable to the	• Number of potential new developments that may facilitate increased renewable energy connection. • Reduction in the quantity of GHG emissions arising from the energy supply sector.

			energy supply sector. • Minimal loss of blue carbon.	• No significant loss of blue carbon.
Material Assets & Infrastructure	Provide new, robust offshore renewable energy infrastructure with minimal disruption to other assets and infrastructure.	Provide new, robust offshore renewable energy infrastructure with minimal disruption to other assets and infrastructure.	• Offshore renewable energy infrastructure developed. • Potential for impacts on marine infrastructure (cables, pipelines, existing/planned renewable energy infrastructure). • Potential for disruption or displacement of other users of the marine area (shipping, fisheries, military, aviation).	• Number of potential new offshore renewable infrastructure developments. • No loss of, or damage to, other marine infrastructure. • No significant disruption of other users of the potential development area.
Cultural, Architectural & Archaeological Heritage	Protect International, National and Local Heritage Designations, and their settings.	Protect International, National and Local Heritage Designations, and their settings.	• Potential for impacts on known archaeological heritage features or their setting. • Potential for impacts on known architectural heritage features or their setting.	• No negative change, or a positive change in the condition or setting of international, national and local heritage designations, in development and operation of infrastructure.
Landscape, Seascape & Visual Amenity	Protect and where possible enhance the landscape and seascape character and visual amenity of the Northern Ireland shoreline.	Protect and where possible enhance the landscape and seascape character and visual amenity of the Northern Ireland shoreline.	• Landscape/seascape sensitivity to infrastructure development. • Potential for impacts on visually sensitive areas, such as AONBs and country parks.	• No negative change, or a positive change, in visual amenity or landscape / seascape character, in development and operation of infrastructure.

5.4 Consideration of Alternatives

It is proposed that the following alternatives will be considered in the assessment:

- Each potential proposal (potential Resource Zones, capacity proposals) is considered as an alternative option available to the draft OREAP to contribute to the renewable energy targets and meet the needs of generation and capacity for Northern Ireland. The various proposals available to the draft OREAP will be assessed in terms of their potential effects, and the significance of these effects, on the environment against the SEOs. This will allow for a comparison between the relative merits and drawbacks of the proposals set out by the draft OREAP.
- Consideration of a strategic-level alternative to the draft OREAP, which is to retain the existing version of the plan, the ORESAP.

5.5 Monitoring

The SEA Directive requires that the significant environmental effects of the implementation of a Plan/Programme are monitored to identify, at an early stage, unforeseen adverse effects, and to undertake appropriate remedial action. The proposed monitoring programme for the OREAP will be based on the Indicators and Targets established in the SEA Objectives. This programme will aim to be realistic and achievable, with existing monitoring arrangements being used where possible, as well as bespoke monitoring should any negative effects be identified. Examples of likely monitoring to be proposed are:

- Reported conservation status and condition of designated sites that new offshore renewable infrastructure encroaches on, or is within the vicinity of, to gauge impacts on Biodiversity, Flora and Fauna.
- Reported Marine Strategy and WFD status of water bodies that may interact with the OREAP area to gauge impacts on Water.

Note that this represents strategic level monitoring that is specific to the SEA process. Depending on the outcomes of the environmental assessments, the SEA Environmental Report may also recommend long-term monitoring to be undertaken at the Plan and project level as part of the mitigation measures that it will set out.

Scoping Questions:

7. Do you agree with the approach to the assessment?
8. Do you agree with the draft SEA objectives?

6 CONSULTATION AND NEXT STEPS

6.1 Consultation

Under Regulation 4 of the SEA Regulations (NI), the competent authority (in this case DfE) preparing the plan or programme is required to consult with specific “environmental authorities” (statutory consultees) throughout the SEA process.

The statutory consultee established within the national legislation in Northern Ireland is:

- The Department of Agriculture, Environment and Rural Affairs (DAERA)

The statutory transboundary consultees established within the Republic of Ireland’s national legislation are:

- Environmental Protection Agency (EPA)
- Department of Housing, Local Government and Heritage (DHLGH)
- Department of Environment, Climate and Communications (DECC)
- Department of Agriculture, Food and the Marine (DAFM)
- Any adjoining planning authority whose area is contiguous to the area of the planning authority.

The statutory transboundary consultees established within Scotland’s national legislation are:

- NatureScot
- Scottish Environmental Protection Agency (SEPA)
- Historic Environment Scotland (HES)

The English statutory consultees, as established in The Environmental Assessment of Plans and Programmes Regulations 2004, are:

- Environment Agency (EA);
- Historic England; and
- Natural England.

The Welsh statutory consultees, as established in the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004, are:

- Cadw; and
- Natural Resources Wales (NRW).

These statutory consultees will be formally consulted upon as part of the scoping of the SEA for the draft OREAP.

Non-statutory consultees that may have an interest in the development of the OREAP will also be contacted with this scoping information, and will include:

- The Crown Estate
- Northern Ireland Electricity Networks
- Systems Operator for NI
- Utility Regulator NI
- Ofgem
- Renewable NI
- Department for Infrastructure NI
- Agri-Food & Biosciences Institute
- Belfast Harbour
- British Geological Survey
- The Consumer Council
- Department for Communities
- Solace NI/NILGA

- Foyle Port
- Invest NI
- Irish Lights
- Larne Port
- MCGA
- NI Fish Producers Organisation
- Northern Ireland Marine Task Force
- RSPB
- Seafish
- Seasource/ANIFPO
- Ulster Wildlife
- NI Federation of Sea Anglers

This Scoping Report, including contact details, will also be published on the DfE website so that all interested parties, including the general public, can submit comments and feedback on the report. Comments and submissions received on the report will be logged, reviewed and, where considered to be relevant or appropriate, applied to the OREAP and SEA / HRA processes.

The SEA Environmental Report, once completed, will also be sent to the statutory consultee for Northern Ireland, and to the statutory transboundary consultees within the Republic of Ireland, Scotland, England and Wales, and will be issued for public consultation along with the HRA and the draft OREAP. The public and stakeholders will have the opportunity to comment on the draft OREAP and associated environmental reports. Comments and submissions received on the reports will be logged, reviewed, and applied where relevant in finalizing the OREAP.

6.2 Next Steps

Table 6-1 demonstrates the proposed upcoming time stages for the draft OREAP, SEA and HRA.

Table 6-1 Draft Anticipated Milestones

OREAP	Dates	SEA / HRA
Development of the revised OREAP	September 2023 - February 2024	Strategic Environmental Assessment and Appropriate Assessment. Writing of SEA Environmental Report and HRA.
Public and statutory consultation on the revised OREAP	February – April 2024	Statutory, Non-Statutory and Public Consultation on SEA Environmental Report and HRA.
Release of Final revised OREAP	May - June 2024	SEA Environmental Statement

The proposed timescale to complete the SEA process is given in

Table 6-2.

Table 6-2 Proposed Timescale for SEA of the OREAP

Actions	Timescales
SEA Scoping	June - September 2023
SEA Scoping Consultation	September - October 2023
SEA Environmental Assessment	October 2023 - February 2024
Public Consultation	February - April 2024
SEA Environmental Statement	May - June 2024

The contact for any information regarding the SEA of the draft OREAP is as follows:

By post	Richard Bingham RPS 74 Boucher Road Belfast BT12 6RZ Northern Ireland Tel: +44 (0)28 90667914
By email	Richard.bingham@rpsgroup.com

Scoping Question:

9. Do you agree with the proposed project timescales, and proposed consultees in the SEA process?

Appendix A – SEA Guidance

Northern Ireland

A Practical Guide to the Strategic Environmental Assessment Directive. September 2005. Office of the Deputy Prime Minister. https://www.gov.uk/government/publications/strategic-environmental-assessment-directive-guidance

Guidance on Sustainability Appraisal and Strategic Environmental Assessment for the Historic Environment. June 2018. Department for Communities – Historic Environment Division

Strategic Environmental Assessment. Services and Standards for Responsible Authorities. Environment and Heritage Service. https://www.daera-ni.gov.uk/publications/strategic-environmental-assessment

Other

Article 8 (Decision Making) of EU Directive 2001/42/EC on Strategic Environmental Assessment (SEA) as amended. DoECLG Circular (PL 9/2013).

Developing and Assessing Alternatives in Strategic Environmental Assessment. 2015. Environmental Protection Agency. http://www.epa.ie/pubs/advice/ea/SEA-Alternatives-157-Published_web.pdf

Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report. 2001. Environmental Protection Agency. https://www.epa.ie/pubs/advice/ea/EPA_development_methodology_SEA_synthesis_report.pdf

Further Transposition of EU Directive 2001/42/EC on Strategic Environmental Assessment (SEA). DoECLG Circular (PSSP 6/2011).

GISEA Manual, Improving the Evidence Base in SEA, 2016. Environmental Protection Agency.

http://www.epa.ie/pubs/advice/ea/EPA%20GISEA_web.pdf

Implementation of SEA Directive (2001/42/EC). Assessment of Certain Plans and Programmes on the Environment. Guidelines for Regional Planning Authorities. November 2004. Department of Environment, Heritage and Local Government. http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownLoad,1616,en.pdf

SEA Scoping Guidance Document. 2016. Environmental Protection Agency. http://www.epa.ie/pubs/advice/ea/seascopingguidance.html

Strategic Environmental Assessment (SEA) Checklist - Consultation Draft. January 2008. Environmental Protection Agency. http://www.epa.ie/downloads/consultation/strategic_environmental_assessment_jan086.pdf

Guidance on Consideration of Air in Strategic Environmental Assessment. April 2017. Scottish Environment Protection Agency.

Guidance on Consideration of Climatic Factors within Strategic Environmental Assessment. March 2010. Scottish Environment Protection Agency.

Guidance on Consideration of Material Assets in Strategic Environmental Assessment. August 2016. Scottish Environment Protection Agency.

Guidance on Consideration of Soil in Strategic Environmental Assessment. April 2017. Scottish Environment Protection Agency.

Appendix B – Plans and Programmes

PRELIMINARY REVIEW OF PLANS AND PROGRAMMES

This table will be updated accordingly following the receipt of scoping responses and will be presented in the SEA Environmental Report later in the process.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
International / European			
Biodiversity			
UN Convention on Biological Diversity (1992)	Maintenance and enhancement of Biodiversity, and strategies to ensure a fair and equitable sharing of the benefits from the use of genetic resources.	• Conservation of biological diversity (or biodiversity); • Sustainable use of its components; and • Fair and equitable sharing of benefits rising from genetic resources. • Development of national strategies for the conservation and sustainable use of biological diversity.	The OREAP should have regard for this Convention and look for opportunities to conserve, and, where possible, restore or enhance biodiversity. Environmental protection objectives of the Convention are reflected in the SEOs for Biodiversity, Flora and Fauna.
Ramsar Convention on Wetlands of International Importance (1971 and amendments)	Protection and conservation of wetlands.	• Objectives include protection and conservation of wetlands, particularly those of importance to waterfowl as Waterfowl Habitat.	The draft OREAP should ensure that European Sites, including a consideration of Ramsar sites, are suitably protected from loss or damage. Appropriate Assessment is being undertaken for the draft OREAP, to ensure that its implementation will not adversely affect European Sites. Environmental protection objectives of the Convention are reflected in the SEOs for Biodiversity, Flora and Fauna.
Bern Convention (Convention on European Wildlife and Natural Habitats) (1982)	The Bern Convention is a binding international legal instrument in the field of nature conservation, covering most of the natural heritage of the European continent and extending to some States of Africa.	• Objectives are to conserve wild flora and fauna and their natural habitats, as well as to promote European co-operation in this field. • The treaty also takes account of the impact that other policies may have on natural heritage.	The OREAP should have regard for this Convention and look for opportunities to conserve, and, where possible, restore or enhance biodiversity. Environmental protection objectives

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
			of the Convention are reflected in the SEOs for Biodiversity, Flora and Fauna.
The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (1992)	The current instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. Objectives include the protection of the marine environment.	• Prevention and elimination of pollution, and protection of the maritime area against the adverse effects of human activities, to safeguard human health and to conserve marine ecosystems.	The draft OREAP should have regard for the Convention and ensure that it does not compromise its objectives, and that it contributes to achieving its aims. Environmental protection objectives of the Convention are reflected in the SEOs for Water.
Bonn Convention on the Conservation of Migratory Species of Wild Animals [L210, 19/07/1982 (1983)]	The Bonn Convention focuses on preserving the habitats used by migratory species and aims to enhance the conservation of terrestrial, marine and avian species on a global scale throughout their range.	• Establishes a legal foundation for internationally coordinated conservation measures throughout a migratory range. • Migratory species threatened with extinction are listed on Appendix I of the Convention. Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. • In Europe, legislation to ensure that the provisions of the Bonn Convention are applied includes the Birds Directive and the Habitats Directive.	The OREAP should have regard for any implications on migratory species. Environmental protection objectives of the Convention are reflected in the SEOs for Biodiversity, Flora and Fauna.
EU Biodiversity Strategy to 2030 [COM(2020)380]	Aims to put Europe's biodiversity on the path to recovery by 2030 for the benefit of people, climate and the planet. The Strategy aims to build societies' resilience to future threats such as: the impacts of climate change, forest fires, food insecurity and disease outbreaks.	The strategy contains specific commitments and actions to be delivered by 2030: • Establishing a larger EU-wide network of protected areas on land and at sea. Enlarging of existing Natura 2000 areas with strict protection for areas of very high biodiversity and climate value. • Launching an EU nature restoration plan. Including concrete commitments and actions (and proposed binding nature restoration	The OREAP should have regard for this strategy and look for opportunities to conserve, and, where possible, restore or enhance biodiversity. Environmental protection objectives of the strategy are reflected in the SEOs for Biodiversity, Flora and Fauna.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		targets) to restore degraded ecosystems by 2030 and manage them sustainably, addressing the key drivers of biodiversity loss. • Introducing measures to enable the necessary transformative change. Unlocking funding for biodiversity, and setting in motion a new, strengthened governance framework. • Introducing measures to tackle the global biodiversity challenge. In particular, working towards adoption of an ambitious global biodiversity framework under the Convention on Biological Diversity.	
EU Directive on the conservation of wild birds (Birds Directive) [2009/147/EC]	Protects all wild birds, their nests, eggs and habitats within the European Community. It gives EU member states the power and responsibility to classify Special Protection Areas (SPAs) to protect birds which are rare or vulnerable in Europe, as well as all migratory birds which are regular visitors.	• Preserve, maintain or re-establish a sufficient diversity and area of habitats for all the species of birds referred to in Annex I. • Preserve, maintain and establish biotopes and habitats to include the creation of protected areas (Special Protection Areas); ensure the upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones, re-establish destroyed biotopes and creation of biotopes • Measures for regularly occurring migratory species not listed in Annex I are required as regards their breeding, moulting and wintering areas and staging posts along their migration routes. The protection of wetlands, and particularly wetlands of international importance.	Environmental protection objectives of the Directive are reflected in the SEOs for Biodiversity, Flora and Fauna. The draft OREAP should ensure that European Sites are suitably protected from loss or damage. Appropriate Assessment is being undertaken for the draft OREAP, to ensure that its implementation will not adversely affect European Sites.
EU Directive on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) [92/43/EEC]	Builds on the Birds Directive (see above) by protecting natural habitats and other species of wild plants and animals. Together with the Birds Directive, it underpins a European network of protected areas known as Natura 2000: Special Protection Areas (SPAs, classified under the Birds Directive) and Special Areas of Conservation	• Propose and protect sites of importance to habitats, plant and animal species. • Establish a network of Natura 2000 sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, to enable the natural habitat types and the species' habitats concerned to be	Environmental protection objectives of the Directive are reflected in the SEOs for Biodiversity, Flora and Fauna. The draft OREAP should ensure that European Sites are suitably protected from loss or damage. Appropriate

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
	(SACs, classified under the Habitats Directive).	maintained or, where appropriate, restored at a favourable conservation status in their natural range. • Carry out comprehensive assessment of habitat types and species present. • Establish a system of strict protection for the animal species and plant species listed in Annex IV.	Assessment is being undertaken for the draft OREAP, to ensure that its implementation will not adversely affect European Sites.
Convention for the Conservation of Salmon in the North Atlantic	This Convention recognises that salmon originating in the rivers of different states intermingle in certain parts of the North Atlantic Ocean.	• The key objectives of the Convention are the desire to promote the acquisition, analysis and dissemination of scientific information pertaining to salmon stocks in the North Atlantic Ocean and the desire to promote the conservation, restoration, enhancement and rational management of salmon stocks in the North Atlantic Ocean through international cooperation.	The draft OREAP should contribute towards the achievement of the desires of the Convention and the Articles therein.
Climate Change			
Paris Agreement (UNFCCC, 2016)	A legally binding international treaty on climate change, adopted by 196 parties at the UN Climate Change Conference (COP21) in December 2015. It aims to strengthen the global response to the threats of climate change by keeping this century's global temperature rise below 2 degrees Celsius above pre-industrial levels.	The Paris Agreement and the outcomes of the UN climate conference (COP21) cover all the crucial areas identified as essential for a landmark conclusion: • Mitigation – reducing emissions fast enough to achieve the temperature goal; • A transparency system and global stock-take – accounting for climate action; • Adaptation – strengthening ability of countries to deal with climate impacts; • Loss and damage – strengthening ability to recover from climate impacts; and • Support – including finance, for nations to build clean, resilient futures.	The draft OREAP should aim to contribute towards climate change mitigation. The OREAP should contribute to reducing GHG emissions by connecting offshore renewable energy generators to the system. Environmental protection objectives of the Agreement are reflected in the SEOs for Climatic Factors.
UN Kyoto Protocol, the Doha Amendment, The	The Framework Convention on Climate Change seeks to alleviate the impacts of climate change	• Commits industrialised countries and economies in transition to limit and reduce	The draft OREAP can contribute to achieving emission reduction targets

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United Nations Framework Convention on Climate Change (UNFCC, 1997)	and reduce global emissions of GHGs. The Protocol operationalises this Convention. It was adopted in December 1997 and entered into force in February 2005.	GHG emissions in accordance with agreed individual targets. • Places a heavier burden on developed countries under the principle of "common but differentiated responsibility and respective capabilities". • Annex B sets binding emission reduction targets for 37 industrialised countries and economies in transition and the EU. Overall, the targets for the first period (2008-2012) added up to an average 5% emission reduction compared to 1990 levels. • The Doha Amendment was adopted in December 2012 and entered into force in December 2020. This set a second period (2013-2020) with new commitments and a revised list of GHG to be reported.	through connection of offshore renewable energy generators to the system. Environmental protection objectives of the Protocol are reflected in the SEOs for Climatic Factors.
EU 20-20-20 Climate and Energy Package Agreement (2007)	Objectives seek to alleviate the impacts of climate change and reduce global emissions of GHGs.	To meet the EU's obligation under international law and in line with European ambition. Member States are required to: • 20% cut in GHG emissions collectively (from 1990 levels) • 20% of EU energy produced from renewables • 20% improvement in energy efficiency The collective EU target of reducing emissions by 20% by 2020 is to be achieved by: The EU Emissions Trading System, the backbone of the EU mitigation effort, which sets a cap on emissions from the most polluting sectors, including over 11,000 factories, power plants and other installations, including airlines. By 2020, the cap should result in a 21% reduction relative to 2005 levels. The EU ETS covers about 40% of all EU emissions. The 'effort sharing decision', which operates outside the EU ETS and establishes annual binding GHG emission targets for individual Member States for the 2013-2020 period. These concern	As an EU Member State when the Agreement was produced, the UK was subject to its obligations. The more recent Energy Strategy for Northern Ireland sets out more stringent targets relating to GHG emissions and the energy sector. The OREAP can contribute to achieving emission reduction targets through connection of offshore renewable energy generators to the system.

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		emissions from sectors such as waste, agriculture, buildings, etc. The '20-20-20' targets are supported by the long-term target of 85-90% reduction in GHG emissions against 1990 levels by 2050.	
The European Green Deal 2019	The European Green Deal is a plan to make the EU's economy sustainable.	The growth strategy outlines transformation of the EU to a resource-efficient and competitive economy where: • There are no net emissions of GHGs by 2050; • Economic growth is decoupled from resource use; and • No person and no place is left behind. The Deal provides an Action Plan to: • Boost the efficient use of resources by moving to a clean circular economy; and • Restore biodiversity and cut pollution.	As an EU Member State when the strategy was produced, the UK was subject to its obligations. The Climate Change Act (Northern Ireland (2022) has subsequently been introduced, setting a legal framework for a net zero target of GHG emissions by 2050 from baseline levels. The OREAP can contribute to achieving emission reduction targets through connection of offshore renewable energy generators to the system.
Renewable Energy Directive (2009/28/EC)	This Directive establishes a common framework for the use of energy from renewable sources in order to limit greenhouse gas emissions and to promote cleaner transport. The Member States are to establish national action plans that set the share of energy from renewable sources consumed in transport, as well as in the production of electricity and heating, for 2020.	It requires the EU to fulfil at least 20% of its total energy needs with renewable by 2020 – to be achieved through the attainment of individual national targets. All EU countries must also ensure that at least 10% of their transport fuels come from renewable sources by 2020.	The OREAP can contribute to achieving renewable energy targets through connection of offshore renewable energy generators to the system. Environmental protection objectives of the Directive are reflected in the SEOs for Climatic Factors and Material Assets.
EU Strategy on Adaptation to Climate Change	The Adaptation Strategy recognises how important impact assessment is for climate proofing, identifies the key priorities for action and how EU policies can encourage effective adaptation action.	The strategy was adopted by the EC in April 2013. It outlines the measures for taking climate change preparedness to a new level. The strategy has three main objectives: • Promote climate action in Member States through encouraging the adoption of adaptation strategies; • The promotion of informed decision-making through addressing knowledge gaps and the	As an EU Member State when the strategy was produced, the UK was subject to its obligations. The NICCAP2 outlines the risks and opportunities relevant to Northern Ireland, as identified in the UK Climate Change Risk Assessment 2017. The OREAP should aim to contribute

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		development of the European Climate Adaptation Platform for better knowledge dissemination; and • Promoting adaptation in key vulnerable sectors.	towards climate change mitigation and infrastructure to be planned for and resilient to climatic change.
Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change 2021[COM(2021)82]	The Strategy outlines a long-term vision for the EU to become a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050 and complements the EU's goal of becoming climate neutral by this date. Deepens and expands upon adaptation actions in the 2013 EU Adaptation Strategy.	This strategy aims to reinforce the adaptive capacity of the EU and the world, and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the proposal for European Climate Law. It seeks to step up action across the economy and society in synergy with other Green Deal policies such as biodiversity protection and sustainable agriculture. The Strategy has three objectives, and proposes a range of actions in order to meet them: • To make adaptation smarter - improving knowledge and availability of data, while managing the inherent uncertainty brought upon us by climate change; securing more and better data on climate-related risk and losses; and making Climate-ADAPT the authoritative European platform for adaptation knowledge. • To make adaptation more systemic - supporting policy development at all levels of governance, society and the economy and in all sectors by improving adaptation strategies and plans; integrating climate resilience in macro-fiscal policy, and promoting nature-based solutions for adaptation. • To speed up adaptation across the board – by accelerating development and rollout of adaptation solutions; reducing climate-related risk; closing the climate protection gap; and ensuring the availability and sustainability of fresh water.	As an EU Member State when the strategy was produced, the UK was subject to its obligations. The NICCAP2 outlines the risks and opportunities relevant to Northern Ireland, as identified in the UK Climate Change Risk Assessment 2017. The OREAP should aim to contribute towards climate change mitigation and infrastructure to be planned for and resilient to climatic change.

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Second European Climate Change Programme (ECCP II) 2005.	Objectives seek to develop the necessary elements of a strategy to implement the Kyoto protocol.	Develop a framework for a low carbon economy which will be achieved through a National Mitigation Plan (to lower GHG emissions) and a National Adaptation Framework (to provide for responses to changes caused by climate change). This includes: • Reform of the EU Emissions Trading System (EU ETS) to include a cap on emission allowances in addition to existing system of national caps • Agreement of national targets for non-EU ETS emissions from countries outside the EU • Commitment to meet the national renewable energy targets of 16% for Ireland by 2020 • Preparation of a legal framework for technologies in carbon capture and storage	The draft OREAP will need to have regard for this programme in the planning of offshore renewable infrastructure. The OREAP can contribute towards climate change mitigation though connection of offshore renewable energy generators to the system.
EU Green Infrastructure Strategy (COM(2013) 249 final).	Aims to develop preserve and enhance healthy green infrastructure to help stop the loss of biodiversity and enable ecosystems to deliver their many services to people and nature. The greater the scale, coherence and connectivity of the green infrastructure network, the greater its benefits. The EU Strategy on green infrastructure aims to outline how to deploy such a network and encourages action at all levels.	The Green Infrastructure strategy is a key step towards the success of the EU Biodiversity Strategy. It is made up of four main elements: • Promoting Green Infrastructure in the main EU policy areas • Supporting EU-level GI projects • Improving access to finance for GI projects • Improving information and promoting innovation.	The draft OREAP will need to have regard for this strategy in regard to the development of green infrastructure as part of offshore renewable infrastructure developments.
Air Quality			
Stockholm Convention (2004)	The Stockholm Convention is an international treaty with the aim of eliminating or restricting the production and use of persistent organic pollutants (POPs).	The main objective of the treaty is in seeking to protect human health and the environment from POPs.	The draft OREAP will need to have regard for this Convention with regard to the potential for cumulative emission effects.
WHO Air Quality Guidelines	Objectives seek the elimination or minimisation of	• Air Quality Guidelines (AQGs) were	The draft OREAP should have regard

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– global update (2005).	certain airborne pollutants for the protection of human health.	published by the WHO in 1987 and revised in 1997 and most recently in 2005. • These offer guidance on threshold limits for key air pollutants that pose health risks and provide a reference for setting air pollution targets at regional and national levels to improve air quality. • The 2005 guidelines offer recommended exposure levels for particulate matter (PM10 and PM2.5), ozone, nitrogen dioxide and sulphur dioxide, as well as a set of interim targets to encourage a progressive improvement in air quality.	for the environmental protection objectives of these guidelines, in terms of cumulative emissions affecting air quality from the energy supply sector and other sources. The OREAP may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
The Gothenburg Protocol (1999), as amended in 2012.	The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) is a multi-pollutant protocol designed to reduce acidification, eutrophication and ground-level ozone by setting emissions ceilings for sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia to be met by 2010. The protocol was updated and amended in 2012.	• The 1999 Protocol set national emission ceilings for 2010 for four pollutants: sulphur dioxide (SO_2), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and ammonia (NH_3). • As amended in 2012, the Protocol includes national emission reduction commitments to be achieved by 2020 and beyond • Parties must report on their emissions annually and are required to provide projections of their future emissions.	The draft OREAP should have regard for the environmental protection objectives of the Protocol, relating to the control of emissions from construction. The OREAP may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive [2008/50/EC] & 4th Daughter Directive of the Air Quality Framework Directive [2004/107/EC]	Set air quality standards for protection of human health and the environment. Addresses air pollution at the level of zones, while the complementary NEC Directive addresses total emissions.	• The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008. It replaced the Framework Directive and the first, second and third Daughter Directives. • Sets limit and target values for certain pollutants. Covers in particular nitrogen dioxide (NO_2) and particulate matter or fine dust (PM10), which is emitted by traffic and combustion engines. • Lays down limit values to be respected by Member States in their zones.	The draft OREAP should have regard for the environmental protection objectives of these Directives, relating to the control of emissions from construction. The OREAP will be obliged to comply with air quality standards set out in these Directives and has potential to contribute to reducing air emissions by connecting renewable offshore renewable energy generators to the system.

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		• The 4th Daughter Directive relates to arsenic cadmium, mercury, nickel and polycyclic aromatic hydrocarbons.	
Industrial Emissions Directive [2010/75/EU]	• Aims to achieve a high level of protection of human health and the environment taken as a whole by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques (BAT) • Around 50,000 installations undertaking the industrial activities listed in Annex I of the Industrial Emissions Directive (IED) are required to operate in accordance with a permit (granted by the authorities in Member States).	The IED is based on several pillars, in particular (1) an integrated approach, (2) use of best available techniques, (3) flexibility, (4) inspections and (5) public participation: • The integrated approach means that the permits must take into account the whole environmental performance of the plant. • The permit conditions including emission limit values must be based on the Best Available Techniques (BAT). • The IED allows competent authorities some flexibility to set less strict emission limit values. • The IED contains mandatory requirements on environmental inspections. Member States shall set up a system of environmental inspection and draw up inspection plans accordingly. • The IED ensures that the public has a right to participate in the decision-making process, and be informed of its consequences, by having access to permit applications, permits and the results of the monitoring releases.	The draft OREAP should have regard for the environmental protection objectives of the Directive, which includes protection from emissions from certain power plants, in terms of cumulative emissions affecting air quality.
National Emissions reduction Commitments (NEC) Directive [2016/2284/EU]	This Directive seeks to limit the national emissions of certain airborne pollutants for the protection of human health and the environment. Implements at the EU level obligations under the Geneva Convention and Gothenburg Protocol. It replaced the earlier National Emission Ceilings for Certain Atmospheric Pollutants Directive (2001/81/EC).	It sets the limits on total national emissions from four pollutants - sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia. These can cause acidification (e.g., the chemical composition of the sea acidifies), water and soil pollution (eutrophication) and ground-level ozone (ozone resulting from the reaction of the four pollutants with heat and sunlight).	The draft OREAP should have regard for the environmental protection objectives of the Directive, relating to the control of emissions from construction. The OREAP should, where possible, contribute to the protection of air quality. Connection of offshore renewable energy infrastructure could contribute to reducing national emissions.

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Geneva Convention (1979) on Long-range Transboundary Air Pollution (LRTAP)	International agreement with the aim of limiting problems of air pollution on a broad regional basis.	• First international legally binding instrument dealing with problems of air pollution on a broad regional basis. It was signed in 1979 and entered into force in 1983. It has since been extended by eight specific protocols. • Under the Convention, the parties commit to working together to limit, to gradually prevent, and to reduce their discharges of air pollutants in order to combat the resulting transboundary pollution. • The Convention has substantially contributed to the development of international environmental law and has created the essential framework for controlling and reducing the damage to human health and the environment caused by transboundary air pollution.	The draft OREAP should have regard for the environmental protection objectives of the Directive, relating to the control of emissions from construction.
Sustainable Development			
Eighth Environmental Action Programme (EAP) (2021-2030) of the European Community	The Programme provides a framework for the EU's overall environmental policy development and guides the policy-making by identifying priorities and setting out a long-term vision and goals.	• Replaces the 7th programme. • The new 10-year programme keeps the 2050 vision and enforces it by aiming to accelerate the EU transition to a climate-neutral, resource efficient clean circular economy in a just and inclusive way, fully endorsing the environmental and climate objectives of the European Green Deal. The 8th EAP should also provide a basis for the achievement of the environmental objectives of the UN Agenda 2030 and its 17 SDGs. • The 8th EAP has 6 thematic priority objectives in areas of: • Climate neutrality • Adaptation and resilience to climate change and other environmental risks • Circular economy and regenerative growth decoupling economy from resource use and	The draft OREAP should have regard for the environmental protection objectives of the Programme.

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		environmental degradation • Zero pollution ambition for a toxic-free environment • Protecting and restoring biodiversity, and enhancing natural capital • Environmental sustainability and reduction of the environmental pressures from production and consumption.	
EUROPE 2020 A strategy for smart, sustainable and inclusive growth (COM/2010/2020)	Europe 2020 is a 10-year growth strategy proposed by the European Commission in 2010 for advancement of the EU economy. It aims at "smart, sustainable, inclusive growth", with greater coordination of national and European policy. It follows the Lisbon Strategy for the period 2000–2010.	The Strategy set five overarching objectives to be reached by 2020: • Employment: 75% of population aged 20-64 should be employed; • Innovation: 3% EU's GDP should be invested in R&D; • Climate Change: 20/20/20 climate/energy targets should be met (including an increase to 30% of emissions reduction if conditions are right); • Education: Share of early school leavers should be under 10% and at least over 40% of the younger generation should have a tertiary degree; and • Poverty: At least 20m fewer people in at-risk-of-poverty and social exclusion.	Environmental protection objectives of the Strategy, with regard to climate change objectives, are reflected in the SEO for Climatic Factors.
Roadmap to a Resource Efficient Europe (COM(2011) 571)	Outlines how to transform the EU economy to a sustainable one by 2050. It proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. It sets out a vision for the structural and technological change needed up to 2050, with milestones to be reached by 2020. These milestones illustrate what will be needed to put Europe on a path to resource efficient and sustainable growth.	• Areas where policy action can make a real difference are a particular focus, and specific bottlenecks like inconsistencies in policy and market failures are tackled to ensure that policies are all going in the same direction. • Cross-cutting themes such as addressing prices that do not reflect the real costs of resource use and the need for more long-term innovative thinking are also in the spotlight. • Key resources are analysed from a life-cycle and value-chain perspective. Nutrition,	The draft OREAP should have regard for the environmental protection objectives of this roadmap in planning for offshore renewable infrastructure and should contribute to achieving renewable energy targets.

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		housing and mobility are the sectors responsible for most environmental impacts; actions in these areas are being proposed to complement existing measures.	
SEA Directive [2001/42/EC]	To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.	• Requires that Plans & Programmes take into account protection of the environment and integration of the Plan into the sustainable planning of the country as a whole. • Eleven sectors are specified in the Directive and Competent Authorities (Plan/ Programme makers) must subject specific Plans and Programmes for these sectors to an environmental assessment where they are likely to have significant effects on the environment.	The draft OREAP will be subject to the SEA process. This is being undertaken through this SEA Scoping Report and subsequent Environmental Report.
EIA Directive [85/337/EEC] [2014/52/EU]	The objective of this Directive is to require Environmental Impact Assessment of the environmental effects of those public and private projects, which are likely to have significant effects on the environment. Aims to assess and implement avoidance or mitigation measures to eliminate environmental effects, before consent is given of projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location. Projects of this type are subject to a requirement for development consent and an assessment with regard to their effects.	• All projects listed in Annex I are considered as having significant effects on the environment and compulsorily require an EIA. • For projects listed in Annex II, a "screening procedure" is required to determine the effects of projects on the basis of thresholds/criteria or a case-by-case examination. The competent authority may give a decision on whether a project requires EIA. • Requirement for identification, description and assessment in an appropriate manner, in the light of each individual case, on the direct and indirect effects of a project on the following factors: human beings, fauna and flora, soil, water, air, climate and the landscape, material assets, cultural heritage, and the interactions between these factors. • Requirement for consultation with relevant authorities, stakeholders and the public, allowing sufficient time for these to make a submission before a decision is made.	The OREAP will have regard to the EIA Directive in the development of any offshore renewable infrastructure. Development and operation of offshore renewable development projects may be subject to EIA.

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		• Establishment of a recognised structure and content for the Environmental Impact Statement, which is the document submitted as a written account of the EIA. • Inclusion of proposed flood risk management schemes in EIA screening process	
Energy Efficiency Directive [2012/27/EU]	European Union directive which mandates energy efficiency improvements within the European Union.	The aim of the EU Energy Efficiency Directive was to save energy and to reach the EU's energy savings targets: • By 2020, a 20% cut in energy consumption, or in absolute terms -calculated in million tons of oil equivalent (Mtoe) - 1483 Mtoe in 2020 compared to projected consumption in that year of 1842 Mtoe for the EU as a whole. • The Directive included a legal obligation to establish energy saving schemes in all Member States: energy distributors or retail energy sales companies were obliged to save 1.5 % of their energy sales annually, by volume, through the implementation of energy efficiency measures such as improving the efficiency of heating systems, installing double glazed windows or insulating roofs, among final energy customers.	The OREAP will be obliged to comply with the requirements of this Directive. Development and operation of new electricity offshore renewable infrastructure should contribute to improved energy efficiency.
UN 2030 Agenda for Sustainable Development	The UN 2030 Agenda envisages "a world of universal respect for human rights and human dignity, the rule of law, justice, equality and non-discrimination". It is grounded in the Universal Declaration on Human Rights and international human rights treaties and emphasises the responsibilities of all states to respect, protect and promote human rights.	The Agenda's 17 Sustainable Development Goals (SDG), and their 169 targets, aim to: Eradicate poverty in all forms and "seek to realize the human rights of all and achieve gender equality".	The draft OREAP should have regard for the environmental protection objectives of the Agenda in the planning of offshore renewable infrastructure. It should promote sustainable planning and management in the development and operation of offshore renewable infrastructure.
Water			

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International Convention for the Prevention of Pollution from Ships (The MARPOL Convention)	The main international convention covering prevention of marine environment pollution by ships from operational or accidental causes.	The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations. Six Annexes are currently included that cover: • ***Annex I Regulations for the Prevention of Pollution by Oil -*** Prevention of pollution by oil. • ***Annex II Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk -*** The discharge criteria and measures for the control of pollution by 250-listed noxious liquid substances carried in bulk. • **Annex III Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form -** General requirements for the issuing of detailed standards on packing, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications of “harmful substances”. • ***Annex IV Prevention of Pollution by Sewage from Ships -*** Requirements to control pollution of the sea by sewage. • ***Annex V Prevention of Pollution by Garbage from Ships -*** Different types of garbage and specifies the distances from land and the manner in which they may be disposed of. • ***Annex VI Prevention of Air Pollution from Ships -*** Limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances.	The OREAP should have regard for the pollution prevention objectives of the Convention. Any vessels used for installation and transport of equipment or personnel may have the potential to pollute the marine environment. The draft plan should have regard for the pollution prevention aims of the regulations included in the Convention during the planning of infrastructure construction and installation.
UNCLOS (United Nations Convention on the Law of the Sea) 1982	UNCLOS is a comprehensive regime of law and order in the oceans and seas. It sets out the legal framework within which all ocean and sea activities must be carried out. The Convention contains 320 articles and nine annexes which govern all aspects of ocean space	The objectives of UNCLOS are to: • Promote peaceful use of oceans and seas. • Facilitate International Communications. • Enable equitable and efficient ocean resource utilisation.	The OREAP should have regard for the ocean space governance objectives and laws of the Convention.

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	such as environmental control, delimitation, marine scientific research, transfer of technology. commercial and economic activities, and settlement of disputes relating to ocean matters.	• Promote maritime safety.	
European Integrated Maritime Policy 2007	The Integrated Maritime Policy (IMP) of the European Union (EU) is a holistic approach to all sea-related EU policies. It is a crucial policy framework aiming to foster the sustainable development of all sea-based activities and coastal regions by improving the coordination of policies affecting the oceans, seas, islands, coastal and outermost regions and maritime sectors, and by developing cross-cutting tools.	The main objectives and corresponding fields of action of the IMP are: • Maximising the sustainable use of the oceans and seas in order to enable the growth of maritime regions and coastal regions as regards shipping, seaports, shipbuilding, maritime jobs, the environment and fisheries management; • Building a knowledge and innovation base for maritime policy through a comprehensive European Strategy for Marine and Maritime Research (e.g. the Maritime Strategy Framework Directive (2008/56/EC) and the Horizon 2020 programme (2.4.5); • Improving the quality of life in coastal regions by encouraging coastal and maritime tourism, creating a Community Disaster Prevention Strategy and developing the maritime potential of the EU's outermost regions and islands; • Promoting EU leadership in international maritime affairs through enhanced cooperation at the level of international ocean governance and, on a European scale, through the European Neighbourhood Policy (ENP) (5.5.5) and the Northern Dimension (5.5.3); • Raising the visibility of maritime Europe through the 'European Atlas of the Seas' internet application, as a means of highlighting the common European maritime heritage, and by celebrating an annual European Maritime Day on 20 May.	The draft OREAP should have regard for the main objectives and actions of the IMP.

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Water Framework Directive (2000/60/EC), (as amended by Decision 2455/2001/EC and Directives 2008/32/EC, 2008/105/EC and 2009/31/EC.	Aims to improve water quality and quantity within rivers, estuaries, coasts and aquifers. Aims to prevent the deterioration of aquatic ecosystems and associated wetlands by setting out a timetable until 2027 to achieve good ecological status or potential. Member States are required to manage the effects on the ecological quality of water which result from changes to the physical characteristics of water bodies. Action is required in those cases where these "hydro-morphological" pressures are having an ecological impact which will interfere with the ability to achieve WFD objectives. The following Directives have been subsumed into the Water Framework Directive: • The Drinking Water Abstraction Directive • Sampling Drinking Water Directive • Exchange of Information on Quality of Surface Freshwater Directive • Shellfish Directive • Freshwater Fish Directive • Groundwater (Dangerous Substances) Directive • Dangerous substances Directive	• Identification and establishment of individual river basin districts. • Preparation of individual river basin management plans for each of the catchments. These contain the main issues for the water environment and the actions needed to deal with them. • Establishment of a programme of monitoring water quality in each RBD. • Establishment of a Register of Protected Areas (includes areas previously designated under the Freshwater Fish and Shellfish Directives which have become sites designated for the protection of economically significant aquatic species under WFD and placed on the Protected Areas register). • Promotion of sustainable management of the water environment by carefully considering current land use and future climate scenarios, minimising the effects of flooding and drought events and facilitating long term improvements in water quality, including the protection of groundwater near landfill sites, as well as minimising agricultural runoff.	The draft OREAP should have regard for the environmental protection objectives of the WFD in the planning of offshore renewable infrastructure. It will need to consider the requirements of the WFD and ensure that it does not compromise its objectives, and that it contributes to achieving its aims.
Marine Strategy Framework Directive (2008/56/EC)	• Establishes a framework whereby the necessary measures are undertaken to achieve or maintain good environmental status in the marine environment by the year 2020. • Requires the development and implementation of marine strategies in order to protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems in areas where they have been adversely affected. • It aims to prevent and reduce inputs in the marine environment, with a view to phasing out	• Preparation of an assessment of the current environmental status of the waters concerned and the environmental impact of human activities. • Establishment of a series of environmental targets and associated indicators. • Development of a programme of measures designed to achieve or maintain good environmental status, by 2020. • Establishment of a monitoring programme for ongoing assessment and regular updating of targets.	The draft OREAP should have regard for the environmental protection objectives of the MSFD in the planning of offshore renewable infrastructure. The OREAP could have implications on the environmental status of marine waters. Development and operation of offshore renewable infrastructure should aim to avoid impacts on the marine environment. Environmental protection objectives

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	pollution as defined in Article 3(8), so as to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea.	• Cooperation with transboundary Member States to implement these measures.	of the Directive are reflected in the SEOs for Water.
Floods Directive (2007/60/EC)	This Directive provides a framework for the assessment and management of flood risks, aiming to reduce the adverse consequences associated with flooding for human health, the environment, cultural heritage and economic activity.	Member States must: • Assess the risk of flooding of all water courses and coast lines, • Map the flood extent and assets and humans at risk in these areas at River Basin level and in areas covered by Article 5(1) and 13(1); and • Implement flood risk management plans and take adequate and coordinated measures to reduce this flood risk. Member States are required to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by the end of 2015. The public must be informed and allowed to participate in the planning process.	The draft OREAP should have regard for the environmental protection objectives of the Floods Directive in the planning of onshore cabling requirements of offshore renewable infrastructure.
Bathing Water Directive (2006/7/EC)	The overall objective of the revised Bathing Water Directive remains the protection of public health whilst bathing. It: • Imposes stricter standards for water quality and the implementation of new method of assessment. • Establishes a more pro-active approach to the assessment of possible pollution risks, and to the management of bathing waters; and • Places considerable emphasis on promoting increased public involvement, and for improved dissemination of information on bathing water	• Updates the way in which water quality is measured, focusing on fewer microbiological indicators, and setting different standards for inland and coastal bathing sites. • Reduces the health risks linked to bathing by setting scientifically based minimum water quality standards. • Makes changes to monitoring and sampling frequency. • Allows a limited number of water samples to be disregarded during short term pollution incidents, if the event is predicted and the	The draft OREAP should have regard for the environmental protection objectives of this Directive in the planning of offshore renewable infrastructure, relating to the potential for cumulative effects on waters used for recreation. Development and operation of offshore renewable transmission infrastructure should not negatively impact on designated bathing waters.

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	quality to the general public.	public is warned beforehand. • Provides better information to the public, allowing more informed choices to be made about the risk of bathing. • Improves the overall management of bathing water quality by requiring an assessment of potential sources of pollution. • Is compatible with other EU water related legislation, in particular the Water Framework Directive.	
Environmental Quality Standards Directive (Directive 2008/105/EC) (also known as the Priority Substances Directive), as amended by Directive 2013/39/EU.	Establishes environmental quality standards (EQS) for priority substances and certain other pollutants as provided for in Article 16 of the Water Framework Directive and aims to achieve good surface water chemical status in accordance with the provisions and objectives of Article 4 of the Water Framework Directive.	• Apply the EQS laid down in Part A of Annex I to this Directive for bodies of surface water. • Determine the frequency of monitoring in biota and/or sediment of substances. • Monitoring shall take place at least once every year, unless technical knowledge and expert judgment justify another interval. • Notify the European Commission if the substances for which EQS have been established if a deviation of the monitoring is planned along with the rationale and approach. • Establish an inventory, including maps, if available, of emissions, discharges and losses of all priority substances and pollutants listed in Part A of Annex I to this Directive for each river basin district.	Impacts on water quality are of relevance to the OREAP, as offshore renewable development options have potential to be associated with water pollution. Development and operation of offshore renewable transmission infrastructure should aim to not negatively impact on any environmental quality standards.
Environmental Liability Directive [2004/35/EC]	• Establishes a framework for environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. • Relates to environmental damage caused by occupational activities (listed in Annex III), and to any imminent threat of such damage occurring by reason of any of those activities; damage to protected species and natural habitats caused by any occupational activities other than those listed in Annex III, and to any	• Describes procedures for circumstances where environmental damage has occurred. Requires the polluter to take all practicable steps to immediately control, contain, remove or otherwise manage the relevant contaminants and/or any other damage factors in order to limit or to prevent further environmental damage and adverse effects on human health or further impairment of services and the necessary remedial	The draft OREAP will be obliged to comply with the requirements of the Directive and to prevent environmental damage. Development and operation of offshore renewable infrastructure should aim to cause no damage to the wider environment.

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	imminent threat of such damage occurring by reason of any of those activities, whenever the operator has been at fault or negligent.	measures. • Establishes measures for cases where environmental damage has not yet occurred, but there is an imminent threat of such damage occurring. • The regulations make the polluter financially liable and allow the competent authority to initiate cost recovery proceedings where appropriate.	
Waste			
Waste Electrical and Electronic Equipment Directive [2002/96/EC], as recast by [201219/EU]	EU rules on waste electrical and electronic equipment (widely known as WEEE or e-waste) aim to contribute to sustainable production and consumption. They address environmental and other issues caused by the growing number of discarded electronics in the EU.	The WEEE Directive aims to contribute to sustainable production and consumption by: • preventing the creation of WEEE as a first priority • contributing to the efficient use of resources and the retrieval of secondary raw materials through re-use, recycling and other forms of recovery • improving the environmental performance of everyone involved in the life cycle of WEEE In order to achieve these objectives, the Directive: • requires the separate collection and proper treatment of WEEE and sets targets for their collection as well as for their recovery and recycling • helps European countries fight illegal waste exports more effectively by making it harder for exporters to disguise illegal shipments of WEEE • reduces the administrative burden by calling for the harmonisation of national WEEE registers and of the reporting format	The draft OREAP should consider the implications of this Directive for developmental infrastructure options within the Plan that are likely to result in waste electrical equipment being generated.
Waste Framework Directive [2008/98/EC], as amended	• Sets the basic concepts and definitions related to waste management, such as definitions of	The Directive requires that: • Waste is managed without endangering	The draft OREAP will be obliged to comply with the requirements of the

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in 2018 [2018/51/EU]	waste, recycling, recovery. • Explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products.	human health • Waste is managed without harming the environment. • Waste is managed without harming water, air, soil, plants or animals. • Waste does not cause a nuisance through noise or odours, or to countryside or places of special interest.	Directive in the management of waste arising from offshore renewable developments.
Cultural Heritage			
Valletta Convention (1992)	Convention for the Protection of the Archaeological Heritage of Europe (revised) (Valletta, 1992). The Valletta Treaty aims to protect the European archaeological heritage "as a source of European collective memory and as an instrument for historical and scientific study	Sets guidelines for the funding of excavation and research work and publication of research findings. Deals with public access, in particular to archaeological sites, and educational actions to be undertaken to develop public awareness of the value of the archaeological heritage. The Convention constitutes an institutional framework for pan-European co-operation on the archaeological heritage, entailing a systematic exchange of experience and experts among the various States. The Committee responsible for monitoring the application of the Convention assumes the role of strengthening and co-ordinating archaeological heritage policies in Europe.	The draft OREAP should consider sites of archaeological heritage and ensure that they are protected from loss or damage resulting from the development of infrastructure. Environmental protection objectives of the Treaty are reflected in the SEO for Cultural Heritage.
Granada Treaty (1985)	Convention for the Protection of the Architectural Heritage of Europe (Granada, 1985). The main purpose of the Convention is to reinforce and promote policies for the conservation and enhancement of Europe's heritage. It also affirms the need for European solidarity with regard to heritage conservation and is designed to foster practical co-operation among the Parties.	• Conservation of European architectural heritage.	The draft OREAP should consider sites of architectural heritage and ensure that they are protected from loss or damage resulting from the development of infrastructure. Environmental protection objectives of the Treaty are reflected in the SEO for Cultural Heritage.
World Heritage Convention [WHC-2005/WS/02]	Objectives seek to ensure the identification, protection, conservation, presentation and transmission to future generations of cultural and	• Establishment of measures for the protection of monuments of national importance by virtue of the historical, architectural,	The draft OREAP should consider sites of archaeological, architectural, cultural and natural heritage and

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	natural heritage and ensure that effective and active measures are taken for these. The Convention recognises the way in which people interact with nature and encourages signatories to integrate the protection of cultural and natural heritage into regional planning programmes, set up staff and services at their sites, undertake scientific and technical conservation research and adopt measures which give this heritage a function in the day-to-day life of the community.	traditional, artistic or archaeological interest attaching to them. Includes the site of the monument, the means of access to it and any land required to preserve the monument from injury or to preserve its amenities. • World Heritage Sites in Ireland are specific locations that have been included in the UNESCO World Heritage Programme list of sites of outstanding cultural or natural importance to the common heritage of humankind. Two such sites in Ireland have been designated	ensure they are protected from loss or damage resulting from the development of infrastructure. Environmental protection objectives of the Treaty are reflected in the SEO for Cultural Heritage.
Landscape			
European Landscape Convention [ETS No. 176]	• Promotion of the protection, management and planning of European landscapes and organising European co-operation on landscape issues. • Applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. • Inclusion of landscapes that might be considered outstanding as well as everyday or degraded landscapes. • Aimed at the protection, management and planning of all landscapes and raising awareness of the value of a living landscape. • Complements the Council of Europe's and UNESCO's heritage conventions.	• Respond to the public's wish to enjoy high-quality landscapes and to play an active part in the development of landscapes. • Each administrative level (national, regional and local) should draw up specific and/or sectoral landscape strategies within the limits of its competencies. These are based on the resources and institutions which, when co-ordinated in terms of space and time, allow policy implementation to be programmed. The various strategies should be linked by landscape quality objectives.	The draft OREAP could potentially have implications on landscapes, seascapes and visual amenity. Infrastructure should be planned to avoid sensitive landscapes. Environmental protection objectives of the Treaty are reflected in the SEO for Landscape and Visual Amenity.

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National			
Biodiversity			
Biodiversity Strategy for Northern Ireland to 2020	A strategy for Northern Ireland to meet its international obligations and local targets to protect biodiversity	The strategy sets out the proposals for action to help halt the loss of biodiversity and the degradation of ecosystems up to 2020. 1. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society 2. Reduce the direct pressures on biodiversity and promote sustainable development 3. To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity 4. Enhance the benefits to all from biodiversity and ecosystem services 5. Enhance implementation through participatory planning, knowledge management and capacity building.	The draft OREAP should look for opportunities to conserve, and where possible, restore biodiversity.
UK Post-2020 Biodiversity Framework	Succeeds the UK Biodiversity Action Plan and 'Conserving Biodiversity – the UK Approach'. Sets out the UK's response to the CBD's 'Strategic Plan for Biodiversity 2011-2020' and its 20 'Aichi Targets' (2010), and the EU Biodiversity Strategy (2011).	The Framework demonstrates how the work of the four countries and the UK contributes to achieving the Aichi Targets, and identifies the activities required to complement the country's biodiversity strategies in achieving the Targets. The following are the Strategic Goals of the Framework: • Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; • Reduce the direct pressures on biodiversity and promote sustainable use; • To improve the status of biodiversity by	The draft OREAP should look for opportunities to conserve, and where possible, restore biodiversity.

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		safeguarding ecosystems, species and genetic diversity; • Enhance the benefits to all from biodiversity and ecosystems; and • Enhance implementation through participatory planning, knowledge management and capacity building	
Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, and amendment Regulations	These Regulations give effect to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and the Minister to designate special areas of conservation (endangered species and habitats of endangered species). These sites, together with SPAs designated under the EU Directive on the Conservation of Wild Birds (EC/79/409), formed part of the Natura 2000 network of protected sites. Following the UK's exit from the EU, there is now a UK National Site Network of European sites, comprising existing designated sites and any further sites designated under the Habitats Regulations.	Protects certain birds, plants, animals, marine life and their habitats, including Natura 2000 sites, through creating criminal offences and changing planning requirements.	The draft OREAP should ensure that European Sites are suitably protected from loss or damage. Appropriate Assessment is being undertaken for the draft OREAP, to ensure that its implementation will not adversely affect European Sites. Environmental protection objectives of the Regulations are reflected in the SEOs for Biodiversity, Flora and Fauna.
Wildlife and Natural Environment Act (Northern Ireland) 2011	Amended the Wildlife (Northern Ireland) Order 1985 by giving protection to a wider range of plants, animals and birds, and providing additional enforcement powers and increased penalties for wildlife related offences. The Act also introduced a statutory duty on all public bodies to further the conservation of biodiversity.		The draft OREAP should have regard for the environmental protection objectives of the Act in the planning of offshore renewable infrastructure. The draft OREAP will have a 'Duty of Care' to conserve biodiversity.
The Environment (Northern Ireland) Order 2002	Covers several environmental issues, including pollution prevention control, assessment and management of air quality, and designation of areas of special scientific interest (ASSIs).		The draft OREAP should have regard for the environmental protection objectives of this legislation in the planning of offshore renewable infrastructure. The draft OREAP should look for opportunities to conserve, and where possible, restore biodiversity, should aim to not cause any negative impacts on air quality, and may

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			be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
DAERA Conservation Management Plans for SACs (in prep.)	Series of Management Plans for SACs in Northern Ireland, determining the pressures and threats to habitats and species at the sites, and identifying the management actions required to address these pressures.	In line with obligations under The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended), measures must be put in place to maintain and, where needed, improve the ecological health of NI SACs (58 no.) In 2017, NIEA began a 4-year work programme to develop a series of Management Plans.	The draft OREAP should ensure that European Sites are suitably protected from loss or damage, with regard to the information provided in these Conservation Management Plans.
UK National Ecosystem Assessment (2011)	Provides a comprehensive overview of the state of the natural environment in the UK and a new way of estimating our national wealth. Northern Ireland is covered in Chapter 18. The four key components are: 1. environmental spaces; 2. cultural practices; 3. cultural values; and 4. benefits need to be considered if cultural ecosystem services are to be fully addressed in the ecosystem service framework		The draft OREAP should ensure that the natural environment is suitably protected from loss or damage in its implementation.
Northern Ireland Species and Habitat Action Plans	Northern Ireland Species and Habitat Action Plans are published to assist delivery of the Northern Ireland Biodiversity Strategy, for the protection and enhancement of Northern Ireland Priority Species populations and areas of Priority Habitats which in turn supports Nature Recovery Networks and Green Growth Strategies.	A wide range of actions for these habitats and species continues to be undertaken, e.g., through the management of designated sites, planning regulation, agri-environment schemes and grant-aided projects, but have not been specifically designed to fully implement these action plans or any overarching Habitat and Species Action Plan.	The draft OREAP should look for opportunities to conserve, and where possible, restore biodiversity. Environmental protection objectives to protect European designated sites and species are reflected in the SEOs for Biodiversity, Flora and Fauna.
Marine Protected Areas (Prohibited Methods of Fishing) Regulations (NI)	Aims to protect sensitive habitats from destructive fishing methods.	Specifies fishing method restrictions (demersal mobile gear or static gear) within nine MPAs:	The draft OREAP should look for opportunities to conserve, and where

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2022		• Carlingford Lough MCZ • Murlough SAC • Outer Belfast Lough MCZ • Rathlin Island SAC and MCZ • Red Bay SAC • Skerries and Causeway SAC • Strangford Lough MCZ • The Maidens SAC • Waterfoot MCZ.	possible, restore biodiversity. Environmental protection objectives to protect designated sites and sensitive species are reflected in the SEOs for Biodiversity, Flora and Fauna.
The Scallop Enhancement Sites (Prohibited Methods of Fishing) Regulations (NI) 2022	Aims to further the Conservation Objectives of MPAs and support fishing at sustainable levels.	Prohibits fishing for sea-fish using demersal mobile gear and diving for scallops within the following sites: • Ballyquintin scallop enhancement site • Drumfad Bay scallop enhancement site • Roaring Rock scallop enhancement site • Whitehead scallop enhancement site	The draft OREAP should look for opportunities to conserve, and where possible, restore biodiversity. Environmental protection objectives to protect designated sites and sensitive species are reflected in the SEOs for Biodiversity, Flora and Fauna.
(ROI) National Biodiversity Action Plan 2017-2022 and Ireland's 4th National Biodiversity Action Plan (draft, 2022)	ROI National strategy for the maintenance and enhancement of biological diversity, which should be integrated across other policy sectors. The draft 4th National Biodiversity Action Plan (NBAP) will set the national biodiversity agenda for the period 2023-2027 and aims to deliver the transformative changes required to the ways in which we value and protect nature.	The key targets include: • Mainstream biodiversity in the decision-making process across all sectors. • Substantially strengthen the knowledge base for conservation management and sustainable use of biodiversity. • Increase awareness and appreciation of biodiversity and ecosystems services. • Conserve and restore biodiversity and ecosystem services in the wider countryside. • Conserve and restore biodiversity and ecosystem services in the marine environment. • Expand and improve on the management of protected areas and legally protected species. • Strengthen international governance for biodiversity and ecosystem services. The draft 4th NBAP has the following six	The OREAP should have regard for the current and draft action plans and look for opportunities to conserve, and, where possible, restore or enhance biodiversity, from potential transboundary impacts.

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		Objectives: • Adopt a whole of Government, whole of society approach to biodiversity. • Meet urgent conservation and restoration needs. • Secure nature's contribution to people. • Embed biodiversity at the heart of climate action. • Enhance the evidence base for action on biodiversity. • Strengthen Ireland's contribution to international biodiversity initiatives.	
Climate Change / Air Quality			
Northern Ireland's second Climate Change Adaptation Programme (NICCAP2) 2019 – 2024	The NICCAP2 contains the NICS Department's response to the risks and opportunities relevant to Northern Ireland, as identified in the UK Climate Change Risk Assessment 2017 (CCRA 2017). It sets out preparation for climate change impacts that are already happening and puts in place plans for future impacts.	• NICCAP2 focuses on priority areas identified in the NI Evidence Report as requiring urgent adaptation action over the next 5 years: • Sets the strategies, policies and actions by which government departments will deliver on the agreed outcome objectives	The OREAP should aim to contribute towards climate change adaptation and infrastructure to be planned for and resilient to climatic change.
UK Climate Change Act 2008	The Climate Change Act, the first of its kind in any country, set out a framework for moving the UK to a low-carbon economy.	The key component of the legislation requires a mandatory 60% cut in the UK's carbon emissions by 2050. Two key aims underpinning the Act: 1. Improve carbon management and help the transition towards a low carbon economy in the UK 2. Demonstrate strong UK leadership internationally, signalling that we are committed to taking our share of responsibility for reducing global emissions in the context of developing negotiations on a post-2012 global agreement at Copenhagen in 2009.	The OREAP should aim to contribute towards climate change mitigation. The Plan can contribute towards achieving renewable energy targets through connection of offshore renewable generators to the electricity system.
The Climate Change Act	Sets a legal requirement to reduce the UK's	Legislative basis for achieving the 'net zero'	The OREAP should aim to contribute

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2008 (2050 Target Amendment) Order 2019	emissions of GHGs by 100% relative to 1990 levels by 2050.	target by 2050, increasing the previous target committed to within UK legislation.	towards climate change mitigation. The Plan can contribute towards achieving renewable energy targets through connection of offshore renewable generators to the electricity system.
Climate Change (Northern Ireland) Act 2022	Sets a legal requirement to reduce NI's emissions of GHGs by 100% relative to 1990 levels by 2050.	• Target of an at least 100% reduction in net zero greenhouse gas (GHG) emissions by 2050 (i.e., net zero emissions by 2050) for Northern Ireland compared to baseline; • Target of at least 48% reduction in net emissions by 2030. • Raised the commitment for renewable electricity consumption from 70% as established in the NI Energy Strategy to 80% by 2030.	The OREAP should aim to contribute towards climate change mitigation. The Plan can contribute towards achieving renewable energy targets through connection of offshore renewable generators to the electricity system. Environmental Protection Objectives of the Act are reflected in the SEO for Climatic Factors.
UK Climate Change Risk Assessment (CCRA) Programme 2022	The UK Government is required, under the Climate Change Act, to publish a CCRA every 5 years, setting out the risks and opportunities facing the UK from climate change.	The first CCRA was published by the Department for Environment, Food and Rural Affairs (Defra) in 2012, second in 2017 and third in 2022. These assessments identify the risks and opportunities posed by climate change over the next 5 years. Evidence Reports feed into the UK National Adaptation Programme, and national adaptation programmes of devolved administrations (i.e., the NICCAP2).	The OREAP should aim to contribute towards climate change mitigation. The Plan can contribute towards achieving renewable energy targets through connection of offshore renewable generators to the electricity system.
(RoI) National Adaptation Framework 2018	The National Adaption Framework (NAF) was developed under the Climate Action and Low Carbon Development Act 2015 and sets out the national strategy to reduce the vulnerability of the Republic of Ireland to the negative effects of climate change and to avail of any positive impacts.	Key actions under the NAF include: • Putting in place revised governance and reporting arrangements. • Formalising the status of existing guidelines. • Formalising long term operational support for key sectors. • Facilitating the establishment of regional local authority climate action offices. • Increasing awareness around climate	The draft OREAP should aim to contribute towards climate change adaptation and infrastructure to be planned for and resilient to climatic change.

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		adaption and resilience. • Integrating climate adaption into key national plans and policies.	
(RoI) Climate Action Plan 2023 (CAP23)	CAP23 is the second annual update to Ireland's Climate Action Plan 2019. It implements the carbon budgets and sectoral emissions ceilings introduced in 2022 ad sets the roadmap for taking action to halve emissions by 2030 and reach net zero emissions no later than 2050.	• Identifies the nature and scale of the challenge, outlining the current situation across key sectors such as Electricity, Transport, Built Environment, Industry and Agriculture. • The supplementary Annex of Actions provides the specific actions required to implement the targets set out in the Plan.	The OREAP should aim to contribute towards climate change mitigation. The Plan can contribute towards achieving renewable energy targets through connection of offshore renewable generators to the electricity system.
The National Emissions Ceiling Regulations 2018	Implement in the UK Directive 2016/2284/EU relating to national emission ceilings for certain atmospheric pollutants.	The Regulations require: • Preparation of an annual inventory of emissions of certain pollutants occurring in the UK, and projections of such emissions. • Ensure from 2010-2019 that anthropogenic emissions of sulphur dioxide, nitrogen oxides, VOCs and ammonia occurring within the UK do not exceed specified amounts. • Ensure from 2020-2029 that anthropogenic emissions of sulphur dioxide, nitrogen oxides, VOCs, ammonia and fine particulate matter occurring within the UK do not exceed specified amounts, and from 2030 that they do not exceed additional specified amounts. • Ensure emissions in 2025 are following a linear reduction trajectory between 2020 and 2030 targets. • Preparation of a national air pollution control programme, to which public authorities must have regard. • Locate sites representative of specified ecosystems and habitats in order to monitor the negative impacts of air pollution.	The draft OREAP should have regard for the environmental protection objectives of the Regulations. The plan should aim to not cause any negative impacts on air quality that could breach standards and objectives and may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.

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UK National Air Pollution Control Programme (NAPCP) 2023	Programme required under The National Emission Ceilings Regulations 2018. The NAPCP sets out how the UK can meet the legally binding 2020 and 2030 emission reduction commitments.	• Emission reduction commitments apply for 5 pollutants: nitrogen oxides, ammonia, non-methane VOCs, particulate matter and sulphur dioxide.	The draft OREAP should have regard for the environmental protection objectives of the Programme. The plan should aim to not cause any negative impacts on air quality and may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
The Environment Act 2021 and The Environment (2021 Act) (Commencement and Saving Provision) Order (Northern Ireland) 2022	This legislation acts as the UK's new framework of environmental protection. It provides the Government with powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction.	• Establishes the Office for Environmental Protection as a new environmental watchdog. • Sets the priority areas as air quality, water, biodiversity, and resource efficiency and waste reduction. • Established a legally binding duty on Government to bring forward at least two new air quality targets in secondary legislation.	The draft OREAP should have regard for the environmental protection objectives of this legislation. The plan should aim to not cause any negative impacts on air quality, water, biodiversity and waste, and may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007	The Air Quality Strategy sets out air quality objectives and policy options to improve air quality in the UK from current to long term. As well as direct benefits to human health, these options are intended to provide important benefits to quality of life and to help protect the environment. The AQS was due for review in 2023, and has resulted in the following changes: • For Northern Ireland, this is under review, with a Clean Air Strategy for Northern Ireland – Public Discussion Document published in November 2020. • For England, Defra reviewed the AQS in April 2023 and published the 'Air quality strategy: framework for local authority delivery', to supersede the AQS: Volume 1 in England. • For Wales, the Welsh Government reviewed the AQS in 2023, and modified the 2007 National Air Quality Strategy (NAQS) for	The Strategy sets out the UK Government and devolved administrations' air quality objective and the measures selected to achieve desired improvements in air quality. The overall aim is a steady decrease in ambient levels of pollutants towards the objectives over the period of implementation. These objectives are a statement of policy intentions or targets and are not legally binding in themselves. The main sources, hazards and strategy's objectives are provided for the following pollutants: particulate matter, oxides of nitrogen, ozone, sulphur dioxide, polycyclic aromatic hydrocarbons, benzene, 1,3-butadiene, carbon monoxide, lead and ammonia.	The draft OREAP should have regard for the environmental protection objectives of the Strategy. The plan should aim to not cause any negative impacts on air quality and may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.

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	Wales by replacing this with the 'Clean Air Plan' published in 2020, while retaining air quality objectives in Table 2 of the NAQS. • For Scotland, the national AQS was reviewed in 2021 and the 'Cleaner Air for Scotland 2 – Towards a Better Place for Everyone' was published.		
Air Quality Standards Regulations (Northern Ireland) 2010, and amendments (2017)	Transpose the EU Air Quality Directives and place a duty on the NI government departments to monitor levels of air pollutants specified in the Air Quality Directives and ensure compliance with limit values for these pollutants.	Designate zones in which ambient air will be protected by limiting the concentration of pollutants within them.	The draft OREAP should have regard for the environmental protection objectives of the Strategy. The plan should aim to not cause any negative impacts on air quality and may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
Clean Air Strategy for Northern Ireland – A Public Discussion Document, 2020	Discussion document in advance of developing the first Clean Air Strategy for Northern Ireland.	Presents evidence and research on a range of ambient air pollutants and outline policy and legislation currently in place to control air pollution.	The draft OREAP should have regard for Environmental Protection Objectives of this Strategy. The plan should aim to not cause any negative impacts on air quality and may be able to contribute to reducing air emissions by connecting offshore renewable energy generators to the system.
Sustainable Development			
Northern Ireland Energy Strategy – the Path to Net Zero (2021)	Energy accounts for almost 60% of Northern Ireland's GHG emissions. The Strategy sets out a pathway for energy to 2030 that aims to mobilise the skills, technologies and behaviours needed to take Northern Ireland towards the vision of net zero carbon and affordable energy by 2050.	The Strategy set the following targets to drive the desired changes: • Energy Efficiency – Deliver energy savings of 25% from buildings and industry by 2030. • Renewables – Meet at least 70% of electricity consumption from a diverse mix of renewable sources by 2030. • Green Economy – Double the size of our low carbon and renewable energy economy to a turnover of more than £2 billion by 2030.	The OREAP has a key role to play in furthering the ambitions set out in the Energy Strategy.

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Energy Strategy for Northern Ireland – the Path to Net Zero Energy. Action Plan (2022)	The Action Plan sets out the actions that are considered necessary to achieve the targets of the Energy Strategy.		The OREAP has a key role to play in furthering the ambitions set out in the Energy Strategy.
Energy Strategy Action Plan 2023	Follows on from the Energy Strategy Action Plan 2022. Outlines the priority areas of action and the associated tasks for delivery in 2023, which is year 2 of the delivery of the Energy Strategy programme.		The OREAP has a key role to play in furthering the ambitions set out in the Energy Strategy.
Electricity (Northern Ireland) Order 1992 (Article 39)	This legislation establishes a legal structure for the generation, supply, transmission and distribution of electricity in Northern Ireland. Article 39 requires a consent from the Department of the Economy (DfE) for the construction, extension or operation of a generating station if the capacity of the station exceeds certain limits.	The construction, extension or operation of an electricity generation station must apply for an Article 39 Consent from DfE, if the capacity of the station exceeds: • 10 megawatts for onshore • 1 megawatt for offshore	The Draft OREAP should have regard for the consent requirements of the Order, during the planning and development of offshore renewable infrastructure.
Food and Environment Protection Act 1985	This Act is UK legislation which was enacted to protect public health from the consumption of unsuitable food, the environment from pollution and waste disposal, and to regulate pesticide use. The Act allows for the authorisation of otherwise prohibited activities.	The objective of the seeking authorisation of otherwise prohibited activities is to; • Protect against the human consumption of food rendered unsuitable due to pollution; • Provide fresh provision of the deposit of substances or articles in the sea or under the seabed, replacing the Dumping at Sea Act 1974; • Regulate pesticides and substances, preparations and organisms prepared or used for pest control; • And for connected purposes. A FEPA license is required for or the deposit of any substances or articles in the sea or under the sea-bed in UK waters, UK controlled waters, or from British vessels.	The draft OREAP should comply with the objectives of the Act, in the planning and development of offshore renewable infrastructure.
(RoI) Offshore Renewable Energy Development Plan	The OREDP is a plan that identifies the opportunity for the sustainable development of	The OREDP was based on the following: • Ireland is obliged to reach a target of 16%	The OREAP should have consideration for this plan, as it identifies the opportunity

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(OREDP) 2014, and draft OREDP II	Ireland's abundant offshore renewable energy resources for increasing indigenous production of renewable electricity, thereby contributing to reductions in greenhouse gas emissions. The draft OREDP II provides an updated assessment of this resource.	of all energy consumed in the State coming from renewable sources by 2020. • This obligation is to be met by 10% in transport, 12% from heat and 40% from electricity. The OREDP II considers advances in technology to assess the offshore renewable energy potential in Irish waters and seek to map areas most suitable for offshore renewable energy, and assist in delivering the PfG commitment to develop a long-term plan to take advantage of a potential of at least 30GW of floating wind off the Atlantic coast.	for offshore renewable energy for which may have transboundary impacts on DfE strategic planning.
Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004	Implements the SEA Directive (2001/42/EC) in Northern Ireland. To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.	See SEA Directive.	The draft OREAP will be subject to the SEA process. This is being undertaken through this Scoping Report and subsequent Environmental Report.
(RoI) European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, as amended	Implements the SEA Directive (2001/42/EC) in the Republic of Ireland. Description as for NI above.	See SEA Directive.	The draft OREAP will be subject to the SEA process. This is being undertaken through this Scoping Report and subsequent Environmental Report.
(Scotland) Environmental Assessment (Scotland) Act 2005	Implements the SEA Directive (2001/42/EC) in Scotland. Description as for NI above.	See SEA Directive.	The draft OREAP will be subject to the SEA process. This is being undertaken through this Scoping Report and subsequent Environmental Report.
(England) The Environmental Assessment	Implements the SEA Directive (2001/42/EC) in	See SEA Directive.	The draft OREAP will be subject to the SEA process. This is being undertaken

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of Plans and Programmes Regulations 2004	England. Description as for NI above.		through this Scoping Report and subsequent Environmental Report.
(Wales) Environmental Assessment of Plans and Programmes (Wales) Regulations 2004	Implements the SEA Directive (2001/42/EC) in Wales. Description as for NI above.	See SEA Directive.	The draft OREAP will be subject to the SEA process. This is being undertaken through this Scoping Report and subsequent Environmental Report.
UK Offshore Energy Plan and SEA 3 (OESEA3). Department of Energy & Climate Change 2016	A Strategic Environmental Assessment (SEA) of a draft plan/programme to enable future renewable leasing for offshore wind, wave and tidal devices and licensing/leasing for seaward oil and gas rounds, hydrocarbon and carbon dioxide gas storage. The renewable energy elements of the draft plan/programme cover parts of the UK Exclusive Economic Zone and the territorial waters of England and Wales.	The OESEA 3 was conducted to: • Consider the environmental implications of DECC's draft plan/programme to enable further licensing/leasing for offshore energy (oil and gas, hydrocarbon gas storage, carbon dioxide storage and marine renewables including wind, wave, tidal stream and tidal range). This includes consideration of the implications of alternatives to the plan/programme and consideration of potential interactions with other users of the sea. • Inform the UK Government's decisions on the draft plan/programme • Provide routes for public and stakeholder participation in the process	The OREAP should have consideration for this plan, as it provides information on renewable leasing and licensing of offshore renewable energy projects in the future.
Offshore Wind Leasing Round 4 (Regions Refinement Report). The Crown Estate 2019	A report which undertakes significant spatial analysis and engagement on offshore wind resource and constraints at a strategic level across Northern Irish, English and Welsh waters, to support the Offshore Wind Leasing Round 4 Process. The aim is to identify and characterise the most favourable areas of seabed for offshore wind development with relatively lower levels of constraint.	The regions refinement process has identified: • Ten regions that will not be taken forward in Round 4; • Four regions of seabed that remain unchanged since November 2018 and will be used to form relevant bidding areas in Round 4; and • Four regions of seabed that have been modified since November 2018 based on specific constraints and stakeholder feedback, with the modified boundaries used to form relevant Bidding Areas in	The OREAP should have consideration for this report, as it provides information on UK regions that have been identified as favourable for offshore wind development with lower constraint levels.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		Round 4 in refined form.	
Broad Horizons: Key Resource areas for offshore wind. Everoze Report, commissioned by The Crown Estate 2020	A study which maps the 'key resource areas' for offshore wind enabling early conversations over future development potentials in English, Welsh and Northern Irish waters. The evolving technology landscape was surveyed to assess how practical limits to installation of offshore wind will change until 2040. .	The report identifies the future technology profiles for nineteen different resource areas Key findings include: • Advances in engineering will expand the technical reach of offshore wind. • Floating wind and fixed foundation are complimentary technologies. • There is no one-size-fits-all technology solution.	The draft OREAP should have consideration for this report, as it provides information on key resource areas and which technology is best suited to different regions.
(Scotland) National Marine Plan 2015	The Marine Plan aims to provide a strategic framework for managing all developments, activities and interests in or affecting Scotland's marine area (territorial and offshore waters). This is in order to protect Scotland's seas and balancing economic growth with environmental sustainability. Adopted in March 2015, the NMP sets out high-level objectives, general policies and sectoral policies. This plan serves as a long-term strategic document, guiding decision making and informing sectoral plans and projects.	The Marine Act requires that economic, social and marine ecosystem objectives, and objectives relating to the mitigation of and adaption to climate change are set by marine plans. Plans must also state policies for, and in connection with, the sustainable development of the area to which this Plan applies. The main objectives of the plan include: • Promoting sustainable economiic development while minimising conflicts between different sectors and considering the marine environment's carrying capacity. • Protecting and enhancing the marine environment, safeguarding the diversity, health and productivity of marine ecosystems and habitats in Scotland. • Coordinating and integrating decision-making processes to facilitate a holistic approach to marine management and planning. • Encouraging engagement and collaboration involving a wide-range of stakeholders such as industry, environmental organisations and local communities to promote effective	The draft OREAP should have regard for the objectives of this plan in the planning and development of offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		marine management. • Considering the impacts of climate change on the marine environment and incorporating mitigation measures in the planning process.	
(Scotland) ScotWind Offshore Wind Leasing Round (The Crown Estate)	ScotWind Leasing – the process of making seabed available for commercial-scale offshore wind projects – will benefit Scottish businesses and communities for decades to come as well as providing a major boost to UK clean energy production.	Key points of the leasing round: • There are 20 ScotWind projects with seabed option agreements. The first 17 successful projects were announced in April 2022. These were joined in October 2022 by three further projects, granted agreements through the Clearing process. • These agreements are for up to ten years. Crown Estate Scotland will offer a full seabed lease (enabling projects to be built and operated) once developers have secured the necessary consents, licences, and finance. • ScotWind is 'plan-led'. This means that all sites are within the areas of seabed identified in the Scottish Government's Sectoral Marine Plan for Offshore Wind. • Supply chain commitments were required from the outset. This approach – the first of its kind – will ensure a focus from the earliest stage on supply chain capacity to develop and deliver the projects. • Latest figures, taking into account all 20 projects, now show initial total Scottish commitments total £28.8bn, indicating an average of £1.4bn investment in Scotland per project built, and £1bn investment in Scotland per gigawatt of capacity built. • Offshore wind projects typically take several years to plan, develop, and build. ScotWind projects are expected to be built from the late 2020s onwards. • 14 of the 20 projects are for floating rather than fixed turbines. Scotland is already a	The OREAP should have consideration for this report, as it provides information on existing and planned developments in transboundary Scottish waters.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		world leader in floating wind test and demonstration. Commercial-scale projects will place Scotland at the forefront of this global technology.	
(RoI) National Marine Planning Framework	The NMPF contains a vision, objectives and planning policies for all marine-based human activities. It outlines how those activities will interact with each other in an increasingly pressured ocean space. It is the key decision-making tool for Government departments, State agencies, regulatory authorities and policymakers for decisions on marine activities up to 2040. Decisions will include planning applications as well as policies, projects and strategies. The Framework is a parallel document to the National Planning Framework, which guides terrestrial planning and development. This is Ireland's first national framework for managing marine activities.	The NMPF details how these marine activities will interact with each other in an ocean space that is under increasing spatial pressure, ensuring the sustainable use of our marine resources to 2040. This approach will enable the Government to: • set a clear direction for managing our seas • clarify objectives and priorities • direct decision makers, users and stakeholders towards strategic, plan-led, and efficient use of our marine resources	The OREAP will have regard to these objectives and policies in the development of any offshore renewable infrastructure.
(RoI) The Maritime Area Planning Act 2021 (all-encompassing Act that covers both on-shore and off-shore planning)	The Act provides a new legislative framework and streamlined development consent process for activities in the maritime area. A new regulatory body, the Maritime Area Regulatory Authority (MARA) is established under the Act. Although the Act is not solely applicable to offshore renewable energy projects, it will contribute in enabling Ireland to achieve its goal of generating 5GW of offshore wind energy by 2030.	The Act will play an integral role in Ireland reaching the renewable electricity target of having renewable energy account for 80% of energy within the State by the year 2030. The Act provides for two separate consent requirements for an offshore renewable energy project: • Apply to MAPA for a Maritime Area Consent (MAC) which allows the right to occupy a particular maritime area. • Development permission must be sought under the Planning and Development Act 2000. A MAC is a prerequisite for development permission.	The OREAP will have regard to these regulations and consent requirements in the development of any offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017	Implement the EIA Directive in Northern Ireland in respect of the planning system.	• Contains procedures to facilitate the preparation of environmental statements and the provision of information relevant to their preparation and sets out the minimum content and requirements when preparing an environmental statement. • Ensure that environmental impact assessment (EIA) development cannot be permitted without the consideration of environmental information, describe the EIA process and set out the matters that confirm that development is EIA development.	The OREAP will have regard to these EIA Regulations in the development of offshore renewable infrastructure. Development and operation of certain offshore renewable development projects included in the OREAP may be subject to EIA.
Draft Transmission Development Plan for Northern Ireland 2023-2032	The draft Transmission Development Plan Northern Ireland (TDPNI) 2023-2032 is the blueprint for the development of the transmission network and interconnection over the next ten years. This ten-year plan presents projects that are expected to meet the operational needs of the transmission network and also outlines future needs that may drive future potential projects.	A wide range of environmental policies and objectives are compiled in the Plan to ensure SONI has regard for existing environmental protection legislation and best practices. These environmental objectives fall under topics such as: • Biodiversity • Climate Change • Noise • Landscape • Cultural Heritage • Water • Air Quality • Tourism There are also planning, social and technical policies and objectives.	The draft OREAP should have regard for the environmental policies and objectives outlined in the draft TDPNI. Future planning and development of onshore infrastructure will support the outcomes of the OREAP implementation in connecting renewable energy generated.
Air defence and offshore wind – working together towards Net Zero 2021	The Air Defence and Offshore Wind (AD&OW) Strategy & Implementation Plan (S&IP) sets the direction for collaboration between Government Departments and the Wind Industry in pursuit of identifying, assessing and deploying solutions that will enable the co-existence of AD&OW operations such that neither is unduly or	In order to achieve the Strategy's aims, it will be necessary to: • Draw on timely evidence which enables a high degree of confidence that mitigation concepts and solutions can be resourced and deployed to meet 2030 targets and Net Zero timelines.	The draft OREAP should have regard for the objectives and actions of the AD&OW S&IP, in the planning and operation of offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
	excessively compromised. Through identification of such solutions, and processes through which they will be deployed, the S&IP will support the achievement of its objective to enable the co-existence of AD&OW. Mitigation of the adverse impacts of windfarms on current AD systems will be a stepping stone towards a longer term solution that will enable co-existence. This plan contributes to the Government's ambition for the rapid increase of offshore wind developments out to 2030 and beyond.	• Implement processes that allow the MOD to make irrevocable decisions on the release of windfarm development planning consent conditions. • Confirm that such concepts and solutions are realistic in terms of: - performance: laws of Physics as well as against the MOD requirements - time: balancing the time available against the time necessary for deployment - cost: available funding and procurement processes - policy: laws, safety standards, security regulations, etc. • Outline how different concepts could be deployed in either a national, regional, clustered and/or project level such that solutions can be implemented according to short, medium and longer-term timelines	
Northern Ireland Executive Programme for Government 2016-2021	The Programme for Government identifies the actions the Executive stated purpose – Improve wellbeing for all – by tackling disadvantage and driving economic growth.	List of Programme for Government Outcomes • We prosper through a strong, competitive, regionally balanced economy. • We live and work sustainably – protecting the environment. • We have a more equal society. • We enjoy long, healthy, active lives. • We are an innovative, creative society where people can fulfil their potential. • We have more people working in better jobs. • We have a safe community where we respect the law and each other. • We care for others and we help those in need. • We are a shared, welcoming and confident society that respects diversity. • We have created a place where people want to live and work, to visit and invest.	The draft OREAP will have regard to this programme and will (in combination with other users and bodies) aim to cumulatively contribute towards the achievement of the objectives of this programme.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		• We connect people and opportunities through our infrastructure. • We give our children and young people the best start in life.	
Programme for Government Draft Outcomes Framework 2021	The Northern Ireland Executive is currently developing a new strategic, outcomes-based Programme for Government. Two of the key outcomes in the draft PfG that are most relevant to the draft OREAP are: 'an economy that is globally competitive, regionally balanced and carbon neutral'; and 'that we live and work sustainably – protecting the environment'.		The draft OREAP will have regard to this programme and will (in combination with other users and bodies) aim to cumulatively contribute towards the achievement of the objectives of this programme.
Strategic Planning Policy Statement for Northern Ireland 2015	This planning policy sets out the Department's regional planning policies for securing the orderly and consistent development of land in Northern Ireland under the reformed two-tier planning system. The provisions of the SPPS must be taken into account in the preparation of Local Development Plans and are also material to all decisions on individual planning applications and appeals.	There are two new Core Planning Principles included in the SPPS: • Supporting Sustainable Economic Growth, and • 'Preserving and Improving the Built and Natural Environment	The draft OREAP will have consideration for these planning policies in the development and operation of offshore renewable infrastructure.
Planning Policy Statements 1 – 23	Policies on land-use and other planning matters that apply to the whole of Northern Ireland.	PPS1: General Principles- Sets out the general principles that the DoENI observes in carrying out its planning functions. PPS2: Natural Heritage- Sets out the Department's planning policies for the conservation, protection and enhancement of our natural heritage, PPS4: Planning and Economic Development- Sets out the Department's revised planning policies for economic development uses and indicates how growth associated with such uses can be accommodated and promoted in development plans. PPS6: Planning, Archaeology and the Built Heritage- Provides the main criteria in assessing proposals which affect the	The OREAP should have consideration for these planning policies in strategic and detailed planning for offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		archaeological or built heritage. PPS15: Planning and Flood Risk- The main objectives are to: Adopt a precautionary approach to decision-making taking account of climate change so that risk is avoided where possible; PPS18: Renewable Energy- Sets out the planning policy for development that generates energy from renewable resources. PPS21: Sustainable Development in the Countryside- sets out planning policies for development in the countryside.	
The Regional Development Strategy 2035 – Shaping Our Future Updates the Regional Development Strategy for Northern Ireland 2025	The strategy aims to take account of the economic ambitions and needs of the Region, and put in place spatial planning, transport and housing priorities that will support and enable the aspirations of the Region to be met.	The over-arching vision of the Regional Development Strategy is: "An outward-looking, dynamic and liveable Region with a strong sense of its place in the wider world; a Region of opportunity where people enjoy living and working in a healthy environment which embraces the quality of their lives and where diversity is a source of strength rather than division. " The aims of the RDS 2025 remain valid: • Support strong, sustainable growth for the benefit of all parts of Northern Ireland • Strengthen Belfast as the regional economic driver and Londonderry as the principal city of the North West • Support our towns, villages and rural communities to maximise their potential • Promote development which improves the health and well-being of communities • Improve connectivity to enhance the movement of people, goods, energy and information between places • Protect and enhance the environment • Take actions to reduce our carbon footprint and facilitate adaptation to climate change	The draft OREAP should have consideration for this planning strategy in strategic and detailed planning for offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		• Strengthen links between north and south, east and west, with Europe and the rest of the world	
(RoI) National Planning Framework (Project Ireland 2040)	A national document that will guide, at a high-level, strategic planning and development for Ireland over the next 20+ years, so that as the population grows, that growth is sustainable.	The ultimate objectives of the National Planning Framework (NPF) are to: • Guide the future development of Ireland, taking into account a projected 1 million increase in population, the need to create 660,000 additional jobs to achieve full employment and a need for 550,000 more homes by 2040; • Of the 1 million extra people: - 25% is planned for Dublin, recognised as a key international and global city of scale and principal economic driver, - 25% across the other four cities combined (Cork, Limerick, Galway and Waterford), enabling all four to grow their population and jobs by 50-60% and become cities of greater scale, i.e., growing by twice as much as they did over the previous 25 years to 2016, and - With the remaining 50% of growth to occur in key regional centres, towns, villages and rural areas, to be determined in the forthcoming regional plans. • Enable people to live closer to where they work, moving away from the current unsustainable trends of increased commuting; • Regenerate rural Ireland by promoting environmentally sustainable growth patterns; • Plan for and implement a better distribution of regional growth, in terms of jobs and	The draft OREAP should have regard for this Framework by considering the potential transboundary impacts from the development of offshore renewable infrastructure and promoting sustainable development.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		prosperity; • Transform settlements of all sizes, through imaginative urban regeneration and bring life / jobs back into cities, towns and villages; • Co-ordinate delivery of infrastructure and services in tandem with growth, through joined up NPF/National Investment Plan and consistent sectoral plans, which will help to manage this growth and tackle congestion and quality of life issues in Dublin and elsewhere.	
UK Sustainable Development Strategy, Agenda 21	The strategy aims to take account of the economic ambitions and needs of the Region, and put in place spatial planning, transport and housing priorities that will support and enable the aspirations of the Region to be met.	The over-arching vision of the Regional Development Strategy is: "An outward-looking, dynamic and liveable Region with a strong sense of its place in the wider world; a Region of opportunity where people enjoy living and working in a healthy environment which embraces the quality of their lives and where diversity is a source of strength rather than division. " The aims of the RDS 2025 remain valid: • Support strong, sustainable growth for the benefit of all parts of Northern Ireland • Strengthen Belfast as the regional economic driver and Londonderry as the principal city of the North West • Support our towns, villages and rural communities to maximise their potential • Promote development which improves the health and well-being of communities • Improve connectivity to enhance the movement of people, goods, energy and information between places • Protect and enhance the environment • Take actions to reduce our carbon footprint and facilitate adaptation to climate change • Strengthen links between north and south,	The draft OREAP should have regard for the environmental protection objectives of the Strategy in the development and operation of offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		east and west, with Europe and the rest of the world.	
10X Economy – An Economic Vision	In May 2021, the Department for the Economy launched its economic vision for the next 10 years, called 10X Economy – an economic vision for a decade of innovation.	The concept embraces innovation to deliver a ten times (10X) better economy with benefits for all the people of Northern Ireland. Ten guiding principles have been identified to underpin this vision and a number of these are relevant to the energy sector, such as delivering positive economic, environmental and societal outcomes; supporting a greener, sustainable economy; position Northern Ireland amongst the most competitive small, advanced economies in the world; and focussing on increasing innovation in high value-added areas and priority clusters.	The draft OREAP should have regard for the environmental protection objectives of the vision in the development and operation of offshore renewable infrastructure. The Plan has potential to support the aims of the Vision by contributing to the growth of the low carbon and renewable energy economy.
Draft Green Growth Strategy for Northern Ireland– Balancing our Climate, Environment and Economy 2021	Green Growth is an over-arching multi-decade Strategy, led by DAERA, which sets out the long-term vision and a solid framework for tackling the climate crisis by balancing climate action with the need for a clean, resilient environment and economy. It has been developed by all Ministers and Government departments working together, in collaboration with external stakeholders from local government, the private sector, voluntary and community sectors and others.	The cross-cutting strategy will be delivered through a series of Climate Action Plans, which will set out the actions to meet sector-specific greenhouse gas emission targets to deliver a cleaner environment rich in biodiversity; delivering a more efficient use of resources within a circular economy; and green jobs.	The OREAP should aim to contribute towards climate change mitigation. The Plan can contribute towards achieving GHG emission reduction targets through connection of offshore renewable generators to the electricity system.
Water			
The Marine Strategy Regulations 2010	The Regulations are a set of regulations implemented to support the European Union's Marine Strategy Framework Directive (MSFD) implementation in the UK. The main aim of the regulations is to establish a framework for the development and implementation of marine strategies, aiming to achieve and maintain good environmental status (GES) in UK marine waters.	The Regulations aim to achieve and maintain good environmental status in UK marine waters by implementing the objectives of the European Union's Marine Strategy Framework Directive (MSFD). The Regulations require the production of a "Marine Strategy" for all UK waters that integrate economic, social and environmental considerations for the protection and sustainable use of marine resources, and that	The draft OREAP should have regard for the key provisions of the Regulations in the planning and operation of offshore renewable infrastructure. It will need to consider the requirements of the MS and ensure that it does not compromise its objectives, and that it contributes to achieving its aims

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
	It helps to deliver key international obligations and commitments to protect and preserve the marine environment including those under the UN Convention on the Law of the Sea (UNCLOS), the UN Sustainable Development Goal 14 (to conserve and sustainably use the ocean, seas and marine resources for sustainable development), the OSPAR North-East Atlantic Environment Strategy and the Convention on Biological Diversity.	the approach is coordinated across all four UK Administrations. It also requires cooperation with other countries sharing our seas. Key provisions of the Regulations include: • Marine Strategy Unit (MSU) establishment within each country to develop and coordinate marine strategy implementation. • Marine Region identification • Environmental target setting within each region to achieve or maintain GES. • Monitoring and assessment to gather data on the environmental status of marine waters and the impact of anthropogenic activities on those waters. • The development and implementation of programmes of measures to achieve GES, considering the monitoring and assessment results. • Strategy and progress reporting, and regular reviews of strategy and measure effectiveness.	
Water Environment (Floods Directive) Regulations (Northern Ireland) 2009, and amendment Regulations 2018	Implement EU Floods Directive 2007/60/EC on the risk and management of flood risk in Northern Ireland.	Main purpose is to establish a framework for the assessment of adverse consequences of flooding on human health, the environment, cultural heritage and economic activity.	The draft OREAP should have regard for the environmental protection objectives of the Floods Regulations in planning onshore cabling requirements of offshore renewable infrastructure. .
The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017	Transpose the Water Framework Directive (2000/60/EC) into NI legislation.	• Place a responsibility on NI to try to ensure that all inland and coastal waters reach at least “good status” (or good ecological potential for artificial or heavily modified water bodies); • Implementation of management planning at river basin level, to achieve this target, linking with other key policy areas such as agriculture, land use, biodiversity, tourism and flood protection through a river basin	The draft OREAP should have regard for the environmental protection objectives of the WFD in the planning and operation of offshore renewable infrastructure. It will need to consider the requirements of the WFD and ensure that it does not compromise its objectives, and that it contributes to achieving its aims. Environmental protection objectives of the Directive are reflected in the SEOs for

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		management plan (RBMP). This sets out a programme of measures to be implemented over 6-year cycles aimed at improving water body status.	Water.
Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015	Transpose Directive 2013/39/EU which revised environmental standards for some priority substances and added a further twelve additional substances to the list of priority substances introduced by the original Priority Substances Directive (2008/105/EC). Consolidate all the current legislation which set out the Water Framework Classification Schemes.	• Consolidate all the current legislation which set out the Water Framework Classification Schemes. • Sets environmental quality standards for priority substances. • Outlines standards required for Shellfish waters.	The draft OREAP should have regard for the environmental protection objectives of the WFD in the planning and operation of offshore renewable infrastructure. It will need to consider the requirements of the WFD and ensure that it does not compromise its objectives, and that it contributes to achieving its aims.
The Quality of Bathing Water Regulations (Northern Ireland) 2008	These Regulations set quality standards for bathing water.	• Require regular testing of bathing waters, to ensure that they are of high enough quality for the general public to bathe in; • Require a Profile to be prepared for each designated bathing water site, giving detailed information on the physical characteristics and assessing the pollution risk to each site • Set quality standards for a number of issues, the most important of which relate to coliform and streptococcal groups of bacteria, which can indicate the mount of sewage or other faecal contaminants present.	The draft OREAP should have regard for the environmental protection objectives of these Regulations in the planning and operation of offshore renewable infrastructure and ensure that these do not negatively impact on designated bathing waters.
Environmental Liability (Prevention and Remediation) Regulations 2009 and amendment	Implement the Environmental Liability Directive (2004/35/EC) in Northern Ireland.	• Brings into force rules to force polluters to prevent and repair damage to water systems, land quality, species and their habitats and protected sites. • The polluter does not have to be prosecuted first, so remedying the damage should be faster.	The draft OREAP will be obliged to comply with the requirements of the Regulations and to prevent environmental damage. Development and operation of offshore renewable infrastructure should aim to cause no damage to the wider environment.
Pollution Control and Local		Regulates waste on land, abandoned vehicles,	The draft OREAP should have regard for

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Government (Northern Ireland) Order 1978		noise nuisance, noise abatement zones, sulphur content of oil fuel used in furnaces and engines, cable burning, and pollution of the atmosphere and water. Other aspects have been revoked.	the environmental protection objectives of this Order. Development and operation of offshore renewable infrastructure should aim to cause no damage to the wider environment.
NI Flood Risk Management Plan, 2021-2027	The NI Flood Risk Management Plan (FRMP) is a key requirement of the Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) and is aimed at reducing the potential adverse consequences of significant floods on human health, economic activity, cultural heritage and the environment.	The objectives set, in relation to each area of impact are: Economic Activity • To reduce the cost of potential future flood damages to properties and infrastructure; • To reduce the economic costs caused by disruption to essential infrastructure and services; and, • To optimise the economic return on flood risk management investment. Human Health and Social • To reduce the risk to life, health and wellbeing. • To increase awareness and understanding of flooding and its adverse consequences and improve community resilience. • To reduce the impact on people caused by the disruption to essential infrastructure and services. • To improve recreation and public amenities. Environmental • To consider the impact of Climate Change across all areas of impact; • To support the objectives of the Water Framework Directive and contribute to the achievement of good ecological potential/status for water bodies; • To protect and enhance the natural environment.	The draft OREAP should have regard for the environmental protection objectives of the FRMP in planning onshore cabling requirements of offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
Marine Act (NI) 2013	The Marine Act sets out a new framework for Northern Ireland's seas based on: a system of marine planning that will balance conservation, energy and resource needs; improved management for marine nature conservation and the streamlining of marine licensing for some electricity projects.	The Marine Act enables DAERA to prepare a marine plan for the inshore region and to designate areas as Marine Conservation Zones (MCZ).	The draft OREAP will operate within a new marine planning system for Northern Ireland, underpinned by the draft Marine Plan for Northern Ireland 2018, the NI Marine Act 2013 and the UK Marine Policy Statement 2011, and Marine and Coastal Access Act (MCAA) 2009. The draft Marine Plan will inform and guide the regulation, management, use, and protection of the Northern Ireland marine area, and the MCCA and Marine Act require that public authorities, in taking authorisation or enforcement decisions that might affect the marine area, must do so in accordance with the draft Marine Plan. The draft OREAP will have regard to the requirements of the Act and the draft Marine Plan.
Marine and Coastal Access Act 2009	New Marine Licensing legislation came into operation in Northern Ireland on the 6th April 2011. It replaced licensing under the Food and Environment Protection Act 1985 (FEPA). The purpose of this licensing system is to aid industry and encourage investment by enabling more strategic decisions to be made about what activities are permissible in the marine environment. The overall objective of marine licensing is to regulate sustainable development in a cohesive and fair manner.	The key features of the new system include • The definition of marine licensable activities; • exempt activities; • fees and charges; • implementation of measures for sanctioning and enforcement; and] • making appeals against licensing decisions, statutory notices and monetary penalties.	The draft OREAP should consider licencing requirements for offshore renewable energy infrastructure under this Act.
UK Marine Policy Statement 2011	The Marine Policy Statement (MPS) is the framework for preparing Marine Plans and taking decisions affecting the marine environment.	• Achieve integration between different objectives; • Recognise that the demand for use of our seas and the resulting pressures on them will continue to increase; • Manage competing demands on the marine area, taking an ecosystem-based approach;	The draft OREAP will have to consider the policies of the MPS in the strategic planning for offshore renewable infrastructure options that may impact on marine areas. The MPS includes a number of high-level principles for decision making that should be taken into

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		• Enable the co-existence of compatible activities wherever possible; and • Integrate with terrestrial planning.	account, particularly in relation to those impacts associated with Section 2.6.7 Climate change adaptation and mitigation and Section 2.6.8 Coastal change and flooding.
(Scotland) Marine (Scotland) Act 2010	The Marine (Scotland) Act provides a framework which will help balance competing demands on Scotland's seas. It introduces a duty to protect and enhance the marine environment and includes measures to help boost economic investment and growth in areas such as marine renewables.	• Marine planning: a new statutory marine planning system to sustainably manage the increasing, and often conflicting, demands on our seas • Marine licensing: a simpler licensing system, minimising the number of licences required for development in the marine environment to cut bureaucracy and encourage economic investment • Marine conservation: improved marine nature and historic conservation with new powers to protect and manage areas of importance for marine wildlife, habitats and historic monuments • Seal conservation: much improved protection for seals and a new comprehensive licence system to ensure appropriate management when necessary • Enforcement: a range of enhanced powers of marine conservation and licensing	The draft OREAP will have to consider the policies of the Marine (Scotland) Act in the strategic planning for offshore renewable infrastructure.
Draft Marine Plan for Northern Ireland 2018	The Marine Plan for Northern Ireland will inform and guide the regulation, management, use and protection of our marine area. It is a single document made up of two plans, one for the inshore region and one for the offshore region. All public authorities are responsible for implementing the Plan through existing regulatory and decision-making processes. As well as public authorities, all applicants, third parties and advisors should also consider the Plan.	The Marine Plan will be used by Public Authorities in taking decisions which affect or might affect the marine area, including: • Authorisation or enforcement decisions • Decisions that relate to the exercise of any function capable of affecting the marine area.	As described for the Marine Act (NI) 2013. The draft OREAP will have to consider the policies of the Marine Plan in the strategic planning for offshore renewable infrastructure. Proposals should conform with all relevant policies, taking account of economic, environmental and social considerations.
Integrated Coastal Zone	The Integrated Coastal Zone Management	The Integrated Coastal Zone Management	The draft OREAP will have to consider

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
Management Strategy for Northern Ireland 2006-2026	Strategy for Northern Ireland 2006-2026 is based around 4 broad themes, consistent with the principles of sustainable development.	Strategy for Northern Ireland 2006-2026 is intended to set out long-term objectives for achieving sustainable coastal management, through improvements to existing management systems, the development of new management systems and identifying and dealing with potential areas of conflict.	this strategy in the strategic planning for offshore renewable infrastructure options within the plan that may impact on coastal areas, with particular relevance to priority 2: safeguarding and improving the environment within the coastal zone and priority 4: integration of planning effort.
Draft 3rd cycle River Basin Management Plan (RBMP) for Northern Ireland 2021-2027	Describes existing condition of waters in the River Basin Districts, the objectives for improving their condition and the measures to be used to deliver these improvements. • Establish a framework for the protection of water bodies at River Basin District (RBD) level • Preserve, prevent the deterioration of water status and where necessary improve and maintain “good status” of water bodies in that RBD • Promote sustainable water usage	• Aims to improve water quality and quantity within inland surface waters (rivers and lakes), transitional waters coastal waters and groundwater and meet the environmental objectives outlined in Article 4 of the Water Framework Directive • Identifies and manages water bodies in the RBD; • Establishes a programme of measures for monitoring and improving water quality in the RBD; • Involves the public through consultations; • RBMPs are prepared and reviewed every six years. The most recent is the draft 3rd cycle RBMP, which runs from 2021-2027.	The draft OREAP should have regard for the environmental protection objectives of the RBMP in the planning of offshore renewable infrastructure. It will need to consider the requirements of the WFD and ensure that it does not compromise its objectives, and that it contributes to achieving its aims.
Waste			
Northern Ireland Waste Management Strategy, 2012 (new Strategy under development 2023)	The Waste Management Strategy sets out in detail those proposed policies, including specific actions to be taken. Strategy development is a continuous process and the Waste Management Strategy for Northern Ireland is considered as a living document, requiring regular review and revision to ensure that it remains relevant and the policies and actions therein remain appropriate.	The proposals of this Strategy are as follows: • The development of a Waste Prevention Programme; • A new 60% recycling target for local authority collected municipal waste (LACMW); • The introduction of a statutory requirement on waste operators to provide specified data on commercial and industrial waste; • New and more challenging collection and recycling targets for packaging and WEEE; • The introduction of a landfill restriction on	The draft OREAP should consider the implications of this Management Strategy with developmental infrastructure options within the Plan which are likely to result in waste being generated.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		food waste; • The potential for the devolution of landfill tax; • The implementation of legislation on carrier bags; • The development of detailed proposals for an Environmental Better Regulation Bill.	
Draft Waste Management Plan for Northern Ireland 2019	The draft Waste Management Plan for Northern Ireland 2019 outlines how it will efficiently manage waste for the Councils it represents with the overall goal of creating a system that 'meets the region's needs and contributes towards economic and sustainable development'. Subject to review every five years the Plan details how NI will fulfil its statutory obligations under the EU Waste Framework Directive and The Waste and Contaminated Land (Northern Ireland) Order 1997.	• Updates the previous WMP (2013-2020) • Provides an overview of waste management in Northern Ireland and fulfils the requirements of Article 2 (mandatory requirements) of the Waste Framework Directive and other required content as set out in Schedule 3 to the Waste and Contaminated Land (NI) Order 1997.	The draft OREAP should consider the implications of this plan with developmental infrastructure options within the Plan which are likely to result in waste being generated.
Cultural Heritage			
Archaeology 2030 – A Strategic Approach for Northern Ireland	A review of the current position of archaeology in Northern Ireland, to develop a sector-wide, strategic approach, with recommendations for the future.	The overall vision of this strategy is: • By 2030, we want archaeology to be accessed and valued by as many people as possible, led by a sector which is healthy, resilient and connected. It sets the following priorities, with associated recommendations for their successful delivery: • Aim 1 – Archaeology on the ground. • Aim 2 – Understanding the past. • Aim 3 – Sustaining the historic environment. • Aim 4 – Engaging and enriching people's lives. • Aim 5 – Innovation, understanding and skills.	The draft OREAP should have regard for the environmental protection objectives of this Strategy, in the planning and operation of offshore renewable infrastructure. Environmental Protection Objectives of the Strategy are reflected in the SEO for Cultural Heritage.
Historic Monuments and	The Order allows for Monuments to be protected	The purpose of designation is to ensure that	The draft OREAP should have regard for

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
Archaeological Objects (NI) Order 1995	by taking them into State Care, or by Scheduling, and also places restrictions on searching for archaeological material	policies are created and action taken to: • Conserve or enhance the natural beauty or amenities of that area; • Conserve wildlife, historic objects or natural phenomena within it; • Promote its enjoyment by the public; and • Provide or maintain public access to it.	the environmental protection objectives of this Order, in the planning and operation of offshore renewable infrastructure.
Planning Act (NI) 2011	The principal piece of planning legislation in Northern Ireland. Underpinned the reform of the planning system. Transferred the majority of planning functions and decision-making responsibilities for local development plans, development management plus planning enforcement to councils.	• Defines functions of Department of the Environment with respect to development of land • Grant powers to the Department to make provision, by Regulations, for environmental effects consideration in relation to development planning permission • Provide with respect to the grant of mineral planning permission and aftercare conditions regarding land subject to mineral development • Provide for hazardous substances consent • Define powers of Councils or Department to issue Tree Preservation Orders and provides for preservation of trees or woodlands in general; and • Make provision for appeals.	The draft OREAP should have regard for the requirements of this Act, in the planning of onshore infrastructure associated with offshore renewable developments.
The Regional Development Strategy 2035 – RG11	A description of the RDS is provided above.	RG11 of the RDS is to “Conserve, protect and where possible enhance, our built heritage and our natural environment”.	The draft OREAP will need to consider strategic policies of the RDS in the development and operation of offshore renewable infrastructure.
The Protection of Wrecks Act 1973	An Act to protect the historic wrecks located in UK territorial waters from unauthorised interference by designation. On account of the historical, artistic or archaeological importance of the vessel, a restricted area around the vessel on or in the seabed is designated.	The Key Objectives of the Act are: • The protection and preservation of wrecks of historic and archaeological significance, ensuring their survival. • Designation of wrecks as ‘protected’ through official designation orders by the Secretary of State, legally protecting wreck sites and associated artefacts from	The draft OREAP should have regard for the protection objectives of this Act, in the planning, installation and operation of offshore renewable infrastructure. Environmental Protection Objectives of the Order are reflected in the SEO for Cultural Heritage.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		unauthorised interference. • A legal framework is established that prohibits activities such as diving, excavation, salvage and removal without an appropriate license or consent. • Licensing and regulation for activities can be granted for specific purposes including conservation, archaeological research and controlled excavation. • Responsible research and exploration of the wrecks are allowed by licenced individuals or organisations if the regulations and guidelines are followed.	
(RoI) National Monuments (Amendment) Act 1987	Provides further provision for the protection and preservation of national monuments and archaeological objects including provision for the regulation of the use and possession of detection devices, to make provision for the protection and preservation of historic wrecks. This act amends and extends the National Monuments Acts, 1930 and 1954, and provides for connected matters.	The main objectives of the Act include: • The protection and preservation of national monuments. It establishes legal frameworks and mechanisms to safeguard these monuments from damage, destruction or unauthorised alteration. • The facilitation of effective management of national monuments by providing guidelines and regulations for their proper maintenance and access. • Governance of the excavation and research activities related to national monuments. It establishes a licensing system that regulates archaeological surveys and excavations, ensuring they comply with ethical and scientific standards. • The clarification of the ownership of national monuments (mostly to the State)) and recognises the responsibility of the state	The draft OREAP should have regard for the protection objectives of this Act, in the planning, installation and operation of offshore renewable infrastructure.
Landscape			
Nature conservation and	Provides for designation of the finest landscape		The draft OREAP should have regard for

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
Amenity Lands Order (NI 1985	areas as either Areas of Outstanding Natural Beauty (AONB) or National Parks land and takes steps to manage them for both conservation and recreation.		the environmental protection objectives of this Order, in the planning and operation of offshore renewable infrastructure.
(ROI) National Landscape Strategy for Ireland 2015-2025	Strategy for the provision of a framework for the protection of the many cultural, social, economic and environmental values embedded in the landscape.	• To be implemented by the State, working in co - operation with public authorities, stakeholders, communities and individuals. • Objectives include to establish and to implement, through a series of actions, policies aimed at understanding, managing, protecting and planning the landscape. • Sets out specific measures to integrate and embed landscape considerations in all sectors which influence the landscape and improve and enhance the quality of decision-making by those who have an impact on it.	The draft OREAP should consider the potential transboundary impacts on landscape and visual amenity within Ireland, particularly in sensitive areas, from the development of offshore renewable infrastructure.
Regional			
Local Biodiversity Action Plans (LBAPs)	Local Biodiversity Action Plans are a way of encouraging people to work together and deliver a programme of continuing action for biodiversity at a local level. They set out practical steps that aim to help protect biodiversity, enhance and improve biodiversity where possible, and promote biodiversity at a local level.		The draft OREAP should have regard for these plans and look for opportunities to conserve, and, where possible, restore or enhance biodiversity.
Local Development Plans / Draft Plan Strategies	Development Plans set out how an area should look in the future by deciding the type and scale of development and where building should be allowed. Each Council must prepare a development plan for their area in consultation with the local community.	When preparing a development plan the council should consider; • The council's Community Plan, a long-term vision for the social, environmental and economic well-being of the area and its citizens; • The council's Statement of Community Involvement (SCI) which sets out who, how, where and when consultation and policy	The draft OREAP should have regard to these plans / strategies in order to take into consideration the local community in development and operation of offshore renewable infrastructure.

Plan / Programme	High Level Description	Key Objectives, Actions etc.	Relevance to the draft OREAP
		making is to take place; • The RDS 2035, as the spatial strategy for NI; • Planning Policy and guidance; and • A sustainability appraisal prepared by the council so that economic and social factors are considered alongside environmental factors when developing the plan.	

Appendix C – Constraints Data

Note: This table may be updated following further consultation with key stakeholders and will be presented in the SEA Environmental Report later in the process.

Subject	Theme	Data Displaying	Fixed Wind	Floating Wind	Wave	Tidal	Cabling	Buffer (m)
Environmental	SACs	Onshore and offshore NI SACs - those identified for habitats	R	R	R	R	R	0
		Onshore and offshore NI SACs - those identified for mobile species	A	A	A	A	A	0
Environmental	SPAs	Onshore and offshore NI SPAs	R	R	A	A	A	0
Environmental	MCZs	NI MCZs - those identified for habitats	R	R	R	R	R	0
Environmental		NI MCZs - those identified for mobile species	A	A	A	A	A	0
Environmental	MPAs	MPAs - Restricted Areas	A	A	A	A	A	0
Environmental	MPAs	MPAs - Exempted Areas	A	A	A	A	A	0
Environmental	Scallop Enhancement Areas	Scallop Enhancement Areas	A	A	A	A	A	0
Environmental	Seagrass Beds	Subtidal and Intertidal Seagrass Beds	A	A	A	A	A	0
Environmental	Ramsar	NI Ramsar Sites - those identified for habitats	R	R	R	R	R	0
Environmental	ASSIs	NI ASSIs	A	A	A	A	A	0
Environmental	NNRs	NI NNRs	A	A	A	A	A	0
Environmental	Annex 1 Reefs outside designated sites	NI Annex 1 Reefs	A	A	A	A	A	0

Environmental	Annex 1 Sandbanks outside designated sites	NI Annex 1 Sandbanks	A	A	A	A	A	0
Environmental	Annex 1 Saltmarsh outside designated sites	NI Annex 1 Saltmarsh	A	A	A	A	A	0
Environmental	Fish Spawning Grounds	UK Fish Spawning Grounds 2010	A	A	A	A	A	0
Environmental	Fish Nursery Grounds	UK Fish Nursery Grounds 2010	A	A	A	A	A	0
Environmental	Fish Spawning Grounds overlapping Fish Nursery Grounds	Areas where UK Fish Spawning Grounds 2010 / UK Fish Nursery Grounds 2010 overlap	R	R	R	R	R	0
Environmental	Important Bird Areas	UK Important Bird Areas	A	A	G	G	G	0
Environmental	RSPB Reserves	UK RSPB Reserves	N/A	N/A	A	A	G	0
Environmental	UK Grey Seals	UK Grey Seal - High Density	A	A	A	A	G	0
Environmental	UK Harbour Seals	UK Harbour Seal - High Density	A	A	A	A	G	0
Community	Fishing Activity	UK Fishing Activity - Areas of high intensity fishing effort	A	A	A	A	G	0

Community	Marine Fish Farms	UK Marine Finfish	B	B	B	B	B	1000
Technical	Port Lands		N/A	N/A	N/A	N/A	A	1000
Technical	Harbour Areas		R	R	R	R	G	0
Technical	Traffic Separation Scheme		B	B	B	B	B	2 nm / 3704 m
Technical	Safeguarding Pilotage Areas		R	R	R	R	A	2 nm / 3704 m
Technical	AIS Vessel Density Grid	High density shipping areas	R	R	R	R	G	1nm
Technical	Designated anchorage areas	Designated anchorage areas	R	R	R	R	R	0
Technical	RYA marinas		B	B	B	B	R	200
Community	RYA leisure density data		R	R	R	R	G	
Community	National Trust Land		N/A	N/A	N/A	N/A	A	0
Technical	Military Areas	Military Areas - Onshore and Offshore danger areas	B	B	B	B	R	0
Technical	Military Areas	Military Areas - Onshore and Offshore practice areas	A	A	A	A	A	0

Technical	Dredge and Spoil Dumping Sites	UK Dredge Spoil Dumping Sites	A	A	A	A	A	0
Community	Major settlements/Urban Areas	UK Major Urban Settlements	N/A	N/A	N/A	N/A	R	0
Technical	Passenger Airports Lands	Airports	N/A	N/A	N/A	N/A	A	
Technical	OLS	Obstacle Limitation Surfaces	G	G	N/A	N/A	N/A	15 km / 30 km
Technical	Offshore Rock	Offshore Rock	A	A	A	A	A	0
Technical	Water- lakes	Lakes and large water bodies for NI	N/A	N/A	N/A	N/A	G	0
Technical	Water- rivers	Rivers for NI	N/A	N/A	N/A	N/A	G	0
Technical	National Flood Zones	NI Flood Zones	N/A	N/A	N/A	N/A	G	0
Community	Bathing waters		R	R	R	R	A	1nm
Environmental	Shellfish waters		G	G	G	G	G	0
Technical	Offshore Infrastructure	Offshore Telecom Cables - in service	B	B	B	B	A	500
		Offshore Energy Cables - in service	B	B	B	B	A	500
		Offshore Pipelines - in service	B	B	B	B	A	500

Technical	Offshore Infrastructure	Offshore Telecom Cables - out of service	R	R	R	R	A	500
		Offshore Power Cables - out of service	R	R	R	R	A	500
		Offshore Pipelines - out of service	R	R	R	R	A	500
Technical	Major Onshore Infrastructure	NI Power Stations / Other Major Infrastructure	N/A	N/A	N/A	N/A	R	
Community	World Heritage Sites (WHS)	NI World Heritage Sites	N/A	N/A	N/A	N/A	B	0
Community	Scheduled Monuments	NI Scheduled Monuments	N/A	N/A	N/A	N/A	R	20
Community	Listed Buildings	NI listed buildings (Grade I, II* and II listed buildings)	N/A	N/A	N/A	N/A	R	20
Community	Registered Parks, Gardens and Demesnes	NI Registered Historic Parks, Gardens and Demesnes	N/A	N/A	N/A	N/A	A	0
Community	Wreck locations	UK wreck locations	A	A	A	A	G	25
Community	Protected wrecks	NI Protected Wrecks	B	B	B	B	B	250
Community	Ship Hulk	Ship Hulk	A	A	A	A	G	25

Community	Country Parks	NI Country Parks	N/A	N/A	N/A	N/A	A	0
Community	Areas of Outstanding Natural Beauty	NI AONBs	A	A	G	G	A	0
Community	Seascape Character Areas	Onshore and Offshore SCAs - Identified as sensitive to offshore renewable infrastructure	A	A	G	G	A	0
		Onshore and Offshore SCAs - Not identified as sensitive to offshore renewable infrastructure	G	G	G	G	G	0
Technical	Water Depth	Water Depth m to chart datum approximately equivalent to Lowest Astronomical Tide	<10 m - >70 m	<50 m - >250 m	<10 m - >200 m	<5 m - >25 m	N/A	0
Technical	Theoretical Wind Resource	Annual Mean Wind Speed at 100m height a MSL (m/s)	<7.0 m/s	<7.0 m/s	N/A	N/A	N/A	0
Technical	Theoretical Wave Resource	Average Wave Height (m)	N/A	N/A	<1.2 m	N/A	N/A	0
Technical	Theoretical Wave Resource	Average Wave Energy (kW/m)	N/A	N/A	<20 kW/m wave crest	N/A	N/A	0
Technical	Theoretical Tidal Resource	Average current speed across the tidal cycle (m/s)	N/A	N/A	N/A	<1.5 m/s	N/A	0
Technical	Bathymetry	Slope 10-15%	A	A	A	A	G	0
Technical	Bathymetry	Slope >15%	R	R	R	R	R	0
Technical	Cliff Shoreline	>15m	N/A	N/A	N/A	N/A	R	0
Technical	Topography - Slope	Slope >57% (30 degrees)	N/A	N/A	N/A	N/A	R	0

Recommended Data to be Provided by third party

	AFBI Annual Scallop Survey							
	AFBI Annual Grandfish Survey							

	AFBI Annual Nephrops Survey							
	Detailed Fish Spawning and Nursery Grounds		R	R	R	R	R	
	Designated Feature Risk Layers							
	Key Resource Layers							
	Leisure Density AIS Data		R	R	R	R	G	
	Historic Environment Record of NI							
	Harbour Porpoise							

Constraints BRAG Ranking Definitions

Rating	Environment / Community	Technical	Constraint Score**
Black	Significantly sensitive features / receptors to proposed infrastructure development and / or operation. Pose such a significant degree of risk to a design that they should be avoided completely.	Significantly constraining features to proposed infrastructure development and / or operation. Pose such a significant degree of risk to a design that they should be avoided completely.	9999
Red	Highly sensitive features / receptors to proposed infrastructure development and / or operation. Pose such a high degree of risk to the design that they should be avoided*.	Highly constraining features to proposed infrastructure development and / or operation. Pose such a high degree of risk to the design that they should be avoided, unless potential solutions to the issues are identified.	10
Amber	Moderately sensitive features / receptors to proposed infrastructure development and / or operation. Includes most protected features, sensitive receptors and/or areas that are likely to require detailed assessment and potentially mitigation and should be avoided* if possible.	Moderately constraining features to proposed infrastructure development and / or operation. Technical constraints that may cause cost increases and / or schedule delays; not ideal but likely to be achievable and / or capable of resolution.	5
Green	Features and receptors of low sensitivity to proposed infrastructure development and / or operation. Receptors or designations to be considered in constraint assessment / study but which are likely to be capable of resolution. Note, are still a constraint.	Informative of approach but medium to low likely technical constraint causing cost increase and / or schedule delays. Note, are still a constraint.	3
*To be avoided except for linear constraints, which may need to be crossed.			
** For constraints modelling.			

Appendix D – Draft High-Level Impact Assessment of Offshore Renewable Energy Devices

SEA Topic	Sub-topic	ORE Device Type				Impacted During		Potential Effects	
		Fixed Wind Turbines	Submerged Tidal Devices	Floating Devices	Wave Devices	Installation	Operation	Installation	Operation
Biodiversity, Flora and Fauna	Protected sites and species	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for device arrays to affect the integrity, quality, ecology, structure, and functions of protected sites, habitats, and species; these impacts will depend on the characteristics and sensitivity of the protected sites, habitats, and species.	
	Benthic and intertidal ecology	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for a permanent loss of substrate (and possible release of associated contaminants) and temporary species disturbance to permanent mortality. This has potential to result in a short-term increase in suspended sediment levels and turbidity, with potential for indirect temporary localised smothering or mortality / displacement of benthic fauna (typically within 50 m of the construction site). Impacts are expected to be lower where structures do not require seabed piling. There is potential for recovery of benthic faunal populations through recruitment from adjacent unaffected areas. • Potential for an alteration of benthic populations due to device installation – via potential habitat fragmentation and / or a reduction in overall area of species density due to smothering and sediment changes (granulometry and chemistry) associated with drilling, cuttings, and piles. • Potential for renewable tidal schemes to	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for a loss of substrate and loss / alteration of associated benthic habitat / species through scouring at the base of piled structures e.g., monopiles, gravity bases, and clump weights, associated with wave and tidal devices. • Potential alteration of benthic community composition through colonisation of seabed-based device structures by benthic species. • Potential for a decrease in water flow and wave exposure due to extraction of wave and tidal energy that could alter suspended sediment concentrations and turbidity and indirectly affect those habitats / species sensitive to tidal changes e.g. there is potential for an increase in suspended sediments and turbidity to indirectly impact eelgrass bed habitat. • Potential for operational and / or accidental marine discharges and underwater noise to impact on local plankton communities; depending on the food chain hierarchy this may result in indirect effects on other marine

								affect large intertidal areas, through direct or indirect habitat loss and potential indirect effects on other species due to a loss of foraging areas.	species. • Potential for adverse effects on benthic habitats due to leakage of toxic compounds from devices; the degree of sensitivity of the benthic habitat to chemical contamination will influence recovery. • Potential for adverse effects on benthic species from Electro-Magnetic Fields (EMF), produced via power transmission and devices. However, current research indicates that marine flora / macroinvertebrates are insensitive to EMF. • Potential for the introduction of non-native species to the area should construction / maintenance vessels previously have operated in foreign waters. Depending on the species, the presence of non-native species may have indirect adverse effect on native species. • Potential for temporary impacts on onshore / terrestrial benthic ecology from the continuation of cabling and pipeline laying operations onto onshore areas. Potential for a temporary to permanent loss of habitats from the construction of onshore infrastructure associated with ORE developments e.g., substations. • Potential for activities associated with the repowering of devices to adversely affect seabed and seashore ecology. • Potential for adverse effects on marine species due to the heat generated by installed device cables.
	Fish and Shellfish	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for short-term disturbance due to installation / decommissioning vessels and / or equipment and the potential for release of contaminated sediments. • Potential for temporary to permanent effects on fish spawning and shellfish habitats. Potential for short-term smothering impacts on these habitats;	<u>Potential Positive Effects:</u> • Potential for the formation of artificial reefs from colonisation of fixed submerged equipment and aggregation of fish; device presence may benefit spawning and nursery grounds, as these would be undisturbed by fishing. • Potential for positive population regrowth due to the exclusion of fishing activities such as trawling in proximity to devices, benefitting ecological communities. <u>Potential Negative Effects:</u>

								shellfish are generally more sensitive than fish. Potential for an increase in suspended sediment and turbidity, which may influence foraging, social, and prey / predator interactions. Potential for small fish or nests to be damaged or crushed during the construction process. • Potential for short to long-term effects from temporary construction noise generated. Potential for noise to cause a startle and alarm reaction and temporary avoidance behaviours. Potential for species mortality, deafness, or internal and external injuries. Potential for long-term effects via behavioural changes and a lack of immediate fish return to the area. • Potential for temporary noise disruption to species via geophysical survey methods prior to the construction / operational phases. • Potential for long-term or permanent effects if unexploded ordnance (UXO) are present within the device installation area; these require high-order detonation for removal, producing significant sound that has potential to adversely affect fish through auditory injuries or mortality, or behavioural changes leading to habitat exclusion.	• Potential for the presence of turbines to impact migration and transit pathways, particularly in constrained areas. The potential for collision with turbines is expected to be low owing to the narrow diameter (<5 m) and wide spacing of turbines. Wave and tidal devices are expected to pose a greater collision risk; specific species at risk will depend on the device type, location, and fish behaviours. • Potential for hearing loss and / or increased collisions due to generated noise from devices (note that lower noise levels are expected for wave devices than for tidal devices). Potential for an increased collision risk due to reduced visibility resulting from increased turbidity. • Potential for hydraulic impacts leading to mortality or injury, as devices may cause pressure changes (note that entry by marine organisms into shrouded venturi turbines should be prevented by using screens). • Potential for long-term habitat exclusion effects due to the presence of fixed submerged equipment; device arrays may prevent fish from accessing feeding habitats, which may impact long-term food resources and influence adjacent populations. • As for installation, potential for long-term effects on shellfish and benthic spawners due to substratum and seabed loss. • Potential for indirect adverse effects on species due to contamination of habitat from leaching toxic compounds. • Potential for effects on certain species from a decrease in water flow and wave energy due to the extraction of tidal and wave energy. • Potential for adverse effects on species from device EMF generation; EMF generation is expected to be small and within the variation range of the environment, but may be detectable to electro / magnetosensitive species. Some crustacea (crabs and lobster) species are known to demonstrate a response to magnetic fields, with behavioural changes due to EMF emissions from cables during

									device operation. Cable burial can provide a potential barrier to EMF. • Potential for adverse effects on marine species due to the heat generated by installed device cables.
	Birds	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • Potential for opportunistic scavenging bird species to benefit from scavenging opportunities created by construction works. Potential Negative Effects: • Potential for short-term adverse effects on species due to collision risk with installation / decommissioning machinery and vessels, with increased risk at night. Potential for moving vessels involved in installation to collide with rafting bird species / groups. • Potential for temporary physical and / or visual disturbances and increased noise during installation and decommissioning, which may increase stress, disrupt breeding, cause hearing loss, or lead to site avoidance for marine and terrestrial bird species. Potential for construction noise to cause a startle and alarm reaction and avoidance behaviours. Potential for damage to eggs or young, premature fledging, or reduced feeding efficiency, which may impact juvenile survival rates. • Potential for temporary disturbance to bird species during the construction phase through the use of artificial lighting; this may affect behavioural patterns or disrupt flight patterns, increasing the risk of collisions. This risk is particularly enhanced at night-time. • Potential for temporary noise disruption to species via geophysical survey methods prior to the construction / operational phases. • Potential for long-term or permanent	Potential Positive Effects: • Potential for long-term positive effects due to creation of new resting and breeding habitats on surface structure devices, with increased foraging opportunities from artificial reefs or fish aggregation. Potential Negative Effects: • Potential for long-term collision risk for birds with wind turbines, influenced by species sensitivity, weather / visibility conditions, bird population locations, flight behaviour heights, migration, and feeding routes. Inshore arrays increase the collision risk due to the proximity to flight paths. With a range of deployed (including wave and tidal) devices, collision risks increase for all species. For above-surface devices, birds in flight use avoidance tactics. Below-surface devices may be avoided by diving birds; however, if such devices are detected late, it reduces the potential for collision avoidance. There may be variations due to topography as avoidance behaviours can be restricted, and sea lough entrances can increase collision risks further as these are often foraging areas given their high tidal currents. • Potential for increased collision risk relating to water depth and quality e.g., for subsurface turbines. Potential for increased suspended sediment (with possible contaminated substances or device leakages) to increase turbidity which may increase collision risk. • Potential for collisions to occur between moving vessels involved with operation maintenance, and decommissioning phases to collide with rafting bird species/groups. • Potential for elevated collision risks for birds

								effects if unexploded ordnance (UXO) are present within the device installation area; these require high-order detonation for removal, producing significant sound that has potential to adversely affect birds through auditory injuries or mortality, or behavioural changes leading to habitat exclusion. • Potential for indirect effects on birds due to damage to the local environment during installation / decommissioning, indirectly altering invertebrate fauna and fish stocks, and thereby reducing short-term food availability for birds. • Potential for effects on sensitive species due to disturbance of contaminated sediments during installation / decommissioning. Potential for an increase in turbidity that may reduce visibility, affecting foraging and predator / prey interactions for birds. • Potential a loss of / alteration to supporting terrestrial habitats due to onshore construction activities.	during stormy weather with reduced visibility. • Potential for devices to increase collision risk should they alter flow characteristics and cause high flow zones i.e., high flow provides good foraging but can increase collision risk if devices alter characteristics encouraging new foraging locations. • Potential for long-term avoidance behaviour due to operational airborne noise. However, operational marine noise is generally lower than installation noise. • Potential for long-term habitat exclusion through the arrays providing a barrier, which may influence long-term food availability. • Potential for increased collision risk through creation of new resting and breeding habitats on surface structure devices, as diving birds may encounter submerged devices.
	Marine mammals and reptiles	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for short-term collision risk for seals, cetaceans, and turtles with vessels during the installation / decommissioning phase. Potential for spiral injuries from vessel propulsion systems. • Potential for short-term physical visual and noise disturbance of species due to vessel presence and from airborne and marine noise (with behavioural changes and hearing damage) particularly for otters and hauled-out seals on land, during the breeding season, or moulting seals. Generated noise may interfere with seal and cetacean-produced noises, however sensitivity to noise will depend on typical	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for long-term effects through collision risk with wave and tidal devices due to regular transit through the water column. Smaller features such as chains, cables, or power lines may not be readily detected by species (particularly depending on size, and environmental conditions) causing injury. • Potential for increased collision risk due to an increase in suspended sediment and associated turbidity through changes in wave and tidal extraction processes. Decreases in water flow via tidal extraction may affect species using this for prey tracking. This may be impacted by the potential leakage of toxic compounds.

								background noise levels. Potential for construction noise to cause a startle and alarm reaction and avoidance behaviours, particularly for seals with potential for risks of injury or mortality. Potential for noise to impact the ability of marine species to locate mates thereby impacting breeding success. • Potential for effects on species' behaviour due to release of sediments (potentially with contaminants) from seabed disturbance during installation / decommissioning, and an associated increase in turbidity leading to reduced visibility. • Potential for temporary noise disruption to species via geophysical survey methods prior to the construction / operational phases. • Potential for long-term or permanent effects if unexploded ordnance (UXO) are present within the device installation area; these require high-order detonation for removal, producing significant sound that has potential to adversely affect species through auditory injuries or mortality, or behavioural changes leading to habitat exclusion.	• Potential for increased collision risk for mammals travelling in groups (or individuals of a larger size), as they may be attracted to the devices due to artificial reefs or fish aggregation areas for feeding. Juvenile marine species may investigate moving parts (particularly for ducted or shrouded turbines) which may lead to injury. • Open waters are expected to reduce the collision risk; however, many species are attracted to high-flow environments (produced by such devices) which may lead to reduced avoidance or lower evasion response times. Sounds and loughs can increase the collision risk due to the constrained area. • Potential for a long-term constraint on species' diving capabilities from the presence of device arrays, which can be problematic for whales when surfacing. Seasonal variations in behaviour can increase the risk of collisions. • Potential for long-term indirect effects from habitat exclusion from foraging, migratory, breeding, or nursery areas due to barriers of device arrays. • Potential for effects of species' behaviour from marine noise and EMF; generally, less noise is produced for wave and wind devices compared to tidal devices. • Potential for device structures to provide horizontal surfaces near the surface to act as haulout sites, posing potential injury zones. • Potential for effects on marine species from the generation of heating by installed device cables.
	Bats	✓	×	×	×	×	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Lack of knowledge and data relating to effects on bats from device installation. • Potential for temporary disturbance and disruption effects on terrestrial species including bats, amphibians, reptiles,	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for long-term effects from collision risk with wind farms; research has suggested attraction by bats to static and moving blades. Bats may use wind farms as resting areas when completing longer migrations. Bat fatality

								mammals, and birds, due to the disturbance, loss, or damage of terrestrial habitats such as hedgerows, woodland, sand dunes, and non-statutory designated sites.	is associated with barotrauma, which is caused by rapid air pressure reductions near moving turbines causing internal damage. • Potential for an increased risk of collisions between devices and bats whenever artificial lighting is used on devices, with an enhanced risk at night-time.
Population and Human Health	Recreation	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for temporary noise and visual effects on recreational activities due to noise generated and visual impacts during installation / decommissioning or potential release of contaminants, which may affect recreational activities through water quality changes. • Potential for short-term congestion, increased air pollution, noise, and environmental disturbances from the transportation of components during installation / decommissioning equipment from production areas to ports and deployment vessels. • Potential for temporary effects on recreational activities due to access restrictions during installation and decommissioning.	Potential Positive Effects: • Potential for the long-term positive effects on recreational opportunities for local areas e.g., pedestrian and cycling routes through incorporation into the design of renewable devices. Potential Negative Effects: • Potential for long-term effects to other marine environment users e.g., sailing and yachting, windsurfing, scuba diving, leisure fishing, and power boating, as submerged / subaerial devices to pose a hazard through collisions; this may restrict access and squeeze recreational sailing routes into commercial navigation routes. Potential for increased collision risks for recreational sailing vessel masts, which may collide with turbine blades; the likelihood of this depends on the vessel clearance and the wind turbine's blade tip height. • Potential for effects on coastal processes governing beaches or impacting recreational activities such as surfing from energy extraction (wave and tidal).
	Human Health	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for risks to construction workers during device installation processes requiring robust health and safety measures. • Potential for adverse effects on the health	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for adverse disturbance effects such as increased light pollution and potential for increased traffic congestion impacting access to road networks and/or services such as ferry ports during device maintenance periods.

								of construction workers, local populations, or polluted controlled waters potentially leading to wider human health impacts in terms of ground contamination due to the potential for the cabling and trench excavation process to release contaminants (e.g., contaminants from historic disposal areas, discharges from radioactive materials). • Potential for adverse disturbance effects such as increased light pollution and potential for increased traffic congestion impacting access to road networks and/or services such as ferry ports. • Potential for impacts on residential areas from noise generated by piling activities, impacts are expected to be higher during the night with potential health implications.	• Potential for adverse effects on human health from exposure to toxic chemicals should leakages from devices occur. • Potential for indirect effects on human health through contamination of fish or other seafood intended for human consumption at levels exceeding legislation or other relevant standards to occur if contamination from device fluid leakage or accidental chemical release occurs. • Potential long-term visual, noise and disturbance effects on the local population. Potential impacts on residential areas and amenities with occurrence of shadow flicker; whereby under certain seasonal and daily conditions the passing of the sun behind moving blades can cast a flickering shadow into nearby narrow window buildings. Further potential impacts include the generation of noise, vibration, light, and dust by operational devices. • Potential for indirect effects on human health from an increased flood risk onshore due to the construction of impermeable areas of the onshore substation; this may indirectly impact human health owing to a release of contaminants and / or damage to residential properties.
	Economy	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • Potential for short-term economic benefits from increased jobs associated with the construction and maintenance of devices. Potential boosts for local businesses during the construction phase with an increase in footfall traffic. Potential positive economic effects for local hotels / B&Bs from the requirement for temporary accommodation for workers during the construction phase. • Potential for positive effects on the socio-economic situation with increased infrastructure development and capital investment in the local area during the installation process.	<u>Potential Positive Effects:</u> • Potential for long-term socio-economic benefits throughout the device lifecycle with upskilling of the local workforce and increased opportunities for employment. Potential for the UK to become a manufacturing area for turbine components. • Potential long-term positive effects as renewable energy devices may provide educational opportunities for renewable industry and local schools. • Potential for long-term positive effects on the socio-economic situation with increased infrastructure development and capital investment in local areas to maintain devices during their lifecycle.

								• Potential for positive effects on employment; development of offshore renewable energy forms will contribute to maintained growth and investment with benefits for the workplace in terms of increased employment and develop transferable skills from the oil and gas industry into renewable devices given the ongoing declines in job availability within this industry. <u>Potential Negative Effects:</u> • Potential for adverse effects on local populations due to pressure on utilities and services resulting from an increased population associated with the construction workforce. • Potential for a temporary reduction of agri-environment scheme payments due to associated onshore construction.	• Potential for long-term positive effects due to improvements for local ports and harbours through financial income gained by leasing to facilitate access to devices during installation, operation, maintenance, and decommissioning activities. <u>Potential Negative Effects:</u> • Potential for a significant loss of jobs and other industries dependent on fishing if there are significant impacts from the presence of wind farms on fishing quotas, stocks, or economic viability; this may represent a significant portion of the workforce for rural communities.
Geology, Soils and Land Use	Geology, Geomorphology, and Sediment Processes	✓	✓	×	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for direct effects on seabed morphology through changes due to excavation / disturbance of sediment / bedrock. • Potential for a short-term increase in suspended sediment (expected to be more for wave and tidal devices than wind). Potential for short-term sediment plumes to occur during the trenching process, and potential for release of additional sediment loads during drilling and grouting of foundations. • Potential for contamination of sediments from drilling wastes during installation processes if not removed during piling operations. Potential for sediment modification with the introduction of particulate discharges. Potential for effects from reinjection of produced water and / or	<u>Potential Positive Effects:</u> • Potential for long-term positive effects on seabed morphology and biodiversity following initial disturbances during installation due to a restriction in commercial trawling opportunities that could reduce sediment disturbance. <u>Potential Negative Effects:</u> • Potential for long-term effects on sediment transport pathways; the presence of devices may directly alter sediment transport pathways and contribute to sediment deposition or erosion on a long-term basis. Wave and tidal devices may alter coastal processes of tidal currents and wave regimes. • Potential for secondary effects on burrowing Nephrops stock which may alter Nephrops numbers due to alteration in seabed sediment, this could lead to economic impacts for commercial fisheries in terms of stock. • Potential for long-term effects on the occurrence of longshore drift altering sediment transfer where the design of cabling and

								cuttings and carbon dioxide. • Potential for disturbance of sediment during the installation process to release carbon sequestered as Blue Carbon, impacting the overall offset of CO_2 by the renewable energy project. • Potential for effects on geology if directional drilling is used for cable landfall installation. Potential for permanent changes in the physical seabed through indentations left using jacking up vessels and anchoring operations during the construction phase. • Potential for disturbance of / obstruction to land use from construction activities and the presence of onshore cable routes and substations. Potential for temporary physical alterations to internal drains, underground flows, and destabilisation of soils during construction of onshore elements. Onshore construction has potential to disrupt public rights of way, and impact agricultural land due to onshore cable installation. Onshore construction may result in ground instability, and accidental chemical spillages leading to the contamination of soil resources. Risks have also been identified in respect of encountering areas of previously contaminated soils, groundwater, or gas associated with historic landfill sites.	pipelines sit proud on the seabed surface. • Potential for secondary effects on sediments as scour "wakes" may occur around devices in the direction of the dominant flood tide and can extend for several hundreds of metres. • Potential for adverse effects on geology in the post-decommissioning phase from the presence of in situ cables, pipelines, foundations, or piles. • Potential for the compaction of onshore soils, increased runoff occurrence, and modifications to drainage patterns influencing flooding occurrence. • Potential for a permanent change in land use due to associated onshore infrastructure.
	Bathymetry	×	×	×	×	×	×	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • No potential identified for significant effects on seabed bathymetry Device presence is likely to affect water depth / availability.	
Water	Seabed contamination and water quality	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u>	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u>

								• Potential for temporary disturbance of sediment substrate (which may be contaminated e.g., bacterial components), with potential for short-term release of sediment across seabed which could affect nearby designated shellfish and bathing waters and increased weathering of newly exposed sediment during device installation / decommissioning. • Potential for adverse effects on water quality due to discharges of drainage water from drilling rig involved in the installation process, and through loss of grouting / concreting materials into the water during construction. • Potential for adverse effects on water quality through the introduction of radioactive particles if construction processes disturb sediment that contains radioactive components. • Potential for effects on seawater or estuarine salinity, turbidity, and temperature from construction discharges. • Potential for adverse effects on water quality due to littering impacts from the device installation process if these are improperly removed; litter may also pose a secondary risk to marine species through collision risk or through injury or mortality if accidentally ingested. • Potential for effects on onshore soils and geology from the installation of onshore components. • Potential for temporary adverse effects on water quality from accidental and known release of contaminants to adversely affect onshore soils, surface water bodies, aquifers or groundwater during construction activities. Contamination may impact sources of potable water. Potential for increased risk of flooding with alterations of drainage systems.	• Potential for adverse effects on water quality through accidental contaminant release. It is difficult to predict the likelihood of occurrence or duration; requirement for controls on use and discharge of such chemicals. • Potential for adverse effects on water quality from leakage of device hydraulic fluids and anti-fouling compounds. • Potential for corrosion of sacrificial anodes (currently no noted adverse effects); however, zinc and aluminium (commonly used anode materials) are potentially toxic to marine organisms. • Potential for longer-term declines in water quality status from wave devices and a higher rate of marine fouling. • Potential for large-scale effects on the physical water system from the presence of tidal barrages. • Potential for alteration of hydrodynamic regimes from the presence of devices throughout the water column; potential for impacts on biogeochemical cycles, thermal stratification, current strength, and wave climate.
Air Quality and	Climate	✓	✓	✓	✓	✓	✓	Potential Positive Effects:	Potential Positive Effects:

Climatic Factors								• Potential to contribute to the long-term decarbonisation of the energy sector with the development of a secure energy supply aiding in the increased diversification of the electricity supply network, aiding in energy security and meeting energy objectives and climate change targets. • Potential for initial short-term CO_2 generation from device manufacture to be offset and considered low by the long-term device's generation of renewable energy. <u>Potential Negative Effects:</u> • Potential for short-term CO_2 generation from device manufacture. • Potential for installation to sterilise potential areas for future gas and carbon storage.	• Potential for positive effects on energy security for the UK compared to current reliance on older, declining infrastructure of non-renewable North Sea resources and reduced reliance on expensive imported energy resources. <u>Potential Negative Effects:</u> • Potential for direct effects on devices, in terms of output and durability, from climatic changes for waves, particularly under increased storm frequency. • Potential for coastal facilities to become at-risk for climate change which may impact the overall survivability and lifecycle of devices. • Climate change may alter the environmental effects of the devices indirectly e.g., changing sea temperatures and altering ecological interactions with the devices.
	Air Quality	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for short-term air pollution impacts and effects on air quality from the transportation of devices. • Potential for increased noise pollution from construction activities, which may be discernible onshore with specific weather conditions. • Potential for adverse effects on local air quality from emissions associated with the installation process. Potential for increased regional acid loading, potentially resulting in low-level ozone and smog formation during routine installation processes and from smaller emissions generated during operational and maintenance periods. Potential for fugitive emissions of dust / particulates and volatile organic	<u>Potential Positive Effects:</u> • Potential for long-term positive effects on air quality; renewable energy generation has potential to benefit overall air pollution and quality levels and to contribute to long-term reductions in CO_2 emissions.

								compounds from cement tanks, diesel storage, and cooling / refrigeration systems. • Potential for dust, particulate, and NOx emissions released by vessels involved with the construction process to have adverse secondary impacts on ecosystems e.g., soiling of surfaces, impacts on soils or watercourses through deposition occurring in the localised construction area. • Potential for adverse effects on air quality from accidental fire at the onshore facility.	
Material Assets	Commercial Fisheries	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • Potential for positive effects on the local economy; potential for local fishing vessels to have supply chain opportunities for the transfer of materials and/or resources to offshore wind farms during construction, operation, maintenance, and decommissioning phases. <u>Potential Negative Effects:</u> • Potential for temporary short-term displacement from traditional fishing grounds during the installation phase to facilitate safety. • Potential for short-term disturbance to fishing grounds during installation / decommissioning affecting sedimentation rates and possibly smothering spawning areas. Potential release of contaminated sediments may cause detrimental ecosystem impacts.	<u>Potential Positive Effects:</u> • Potential for wind farm device foundations and scour protection materials to attract fish into these areas, potentially enhancing fish populations at the edges of the wind farm for trawler fishing. <u>Potential Negative Effects:</u> • Potential for permanent displacement from traditional fishing grounds, particularly for at-risk trawler activities. This displacement may directly affect other fish stocks through overfishing and a reduction in species availability via changes in substratum extent, EMFs, marine noise, contamination effects, and sediment changes. • Potential for alterations in the availability of fishing species' targets through population changes, impacting on survivability and economic profitability of fishing activities, potentially lowering quotas with increased resource competition for fishing grounds. Fisher response - skipper may choose not to fish in an area irrespective of the physical or management constraints with the presence of devices resulting in a de facto constraint. This can be influenced by weather conditions. • Potential for a concentration of vessels into a smaller area for shipping and navigation routes to lead to interference with fishing activities. Potential for increased collision risk due to the

									presence of device maintenance vessels. Potential for enhanced allision risks with floating wind structures should these break free or have a technological failure allowing the device to drift. • Potential for a loss of fishing gear from commercial fishing boats should collision or entanglement with offshore device infrastructure occur. Potential for spoil, construction, or decommissioning debris on the seabed to impact commercial fisheries using bottom-towed fishing gear and the forms of fishing able to take place. Potential for increased insurance costs for fishing vessels if entanglement were to occur regularly.
	Mariculture	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for direct short-term disturbance during installation / decommissioning and potential release of contaminants. For fish farms, noise and contaminated sediments may be significant as these fish cannot employ avoidance behaviours, exhibiting stress and potential mortality, and impacting commercial returns.	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for substratum loss to affect the available mariculture area. • Potential for effects of EMF and marine noise on certain species, with potential for hearing loss.
	Shipping and Navigation	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for increased journey times / distances for a short-term period due to safety exclusion zones, which may impact shipping density. Potential trade reductions through temporary restriction of port and harbour access. The presence of installation and decommissioning vessels may pose a collision risk, which could result in the spillage of oil and hazardous cargo. • Potential for effects on search and rescue operations that occur within the installation	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for collisions to occur with stationary devices, with a risk of associated hazardous spills. Potential for enhanced allision risks with floating wind structures should these break free or have a technological failure allowing the device to drift. • Potential for adverse effects on coastal defences or compromises on integrity through cables crossing pre-existing defences. • Potential effects on safety for shipping and navigation vessels due to a reduction in the

								area; such activities must take into consideration the installation equipment.	under-keel clearance with the presence of subsea structures. • Potential for disruptions to shipping and navigation activities through impacts on the locations available for safe vessel anchoring to the seabed. • Potential for increased journey times / distances for a long-term period due to safety exclusion zones. There may be direct displacements in shipping density trends and trade and impacts on supplies through reduced access to ports and harbours. • Potential for direct effects on navigation by devices obstructing lights, buoys, or the coastline; there may be compass deviation through magnetic interference. Radar, communications, and positioning systems can be affected by wind farms interfering with radar responses. • Potential for effects on local ferry routes, which may impact existing ferry services, island residents, and businesses. • Potential for effects on search and rescue activities within the operation area, which will require planning regarding device presence.
	Tourism	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for short-term effects on coastal tourism locations and recreational activities (via water quality changes) due to generated noise and visual impacts during installation / decommissioning and /or the potential release of contaminants. • Potential for short-term effects on tourism through congestion, increased air pollution, noise, and environmental disturbances associated with the transportation of components during installation / decommissioning equipment from production areas to ports and deployment vessels.	<u>Potential Positive Effects:</u> • Potential for long-term effects on tourism; device presence has the potential to impact perceptions of the area regarding tourism and may potentially become tourist attractions given shifts in focus to consider renewable energies. Potential for positive media coverage for the local area with the introduction of "green" technologies, may lead to increased tourism and popularity in the area. <u>Potential Negative Effects:</u> • Operational noise will mainly affect the marine environment, but shoreline devices may generate noise with the potential to directly affect land-based receptors (wildlife). • Potential for adverse effects on recreational sailing. Potential for submerged / subaerial

								• Potential for temporary effects on recreational activities due to short-term access restrictions during installation and decommissioning.	devices to pose a hazard to other marine environment users through collisions; this may restrict access and squeeze recreational sailing routes into commercial navigation routes. • Potential for effects on coastal processes governing beaches or impacting surfing activities from energy extraction (wave and tidal).
	Interference with Military and Aviation Radar	✓	✓	✓	✓	×	✓	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • None anticipated.	<u>Potential Positive Effects:</u> • None anticipated. <u>Potential Negative Effects:</u> • Potential for direct effects by wind turbines on aviation operations, which could also impact communications, navigation, and surveillance. Civil radar may also be impacted by EMF signals masking objects. • Potential for adverse effects on aircraft surveillance; air defence radar systems and sites state that no wind turbines should be installed near the sites as these may impact the ability of surveillance systems to detect and identify aircraft. • Potential for collisions with helicopters and fixed-wing aircraft given the larger area covered by the turbine rotor blades. Potential for impacts on offshore helicopter landing areas e.g., offshore oil and gas platforms when windfarms overlap with helicopter flight routes due to potential collision risks. • Potential for effects of turbine arrays on communication systems e.g., Very High Frequency (VHF) radio systems, Television (TV) signals, Global Positioning Systems (GPS), radio communications, Automated Identification Systems (AIS), mobile telephony, and various Marine Communications system e.g., Marine Vessel Traffic System (VTS). Potential for turbines to mask real targets on radar equipment increasing the risk of collision.
	Military Activities/ Practice Areas	✓	✓	✓	✓	✓	✓	<u>Potential Positive Effects:</u> • None anticipated.	<u>Potential Positive Effects:</u> • None anticipated.

								Potential Negative Effects: • Potential for temporary disruption to military exercises and activities during the installation as safety areas prevent access and require changes to routes and activities. • Potential for UXO (unexploded ordnance) to impact the development of device arrays due to MoD and WWI and WWII history.	Potential Negative Effects: • Potential for long-term disruption to military exercises and activities, potential to cause military vessels to use alternate locations or take longer journeys.
	Disposal Areas	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for temporary disruption to vessels moving to and from disposal sites, with possible financial implications if the distance to the disposal site is increased. • Potential for previously disposed material to be released should device arrays be installed close to disposal areas, which may adversely affect ecosystems.	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for disruption through increased journey times / distances to access disposal sites.
	Cables and Pipelines	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for damage to cables and pipelines during installation processes by anchors, device foundations, or array cable installation; this could disrupt telecommunications or release hazardous substances. • Potential for reduced access to existing pipelines and cables for maintenance during the installation phase.	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for damage to cables and pipelines during device maintenance, which may disrupt telecommunications or release hazardous substances. • Potential for reduced long-term access to existing cables and pipelines during operation.
	Aggregation Extraction	✓	✓	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for temporary disruption to	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for long-term disruption for vessels

								vessels moving to and from extraction sites during installation.	transiting to and from extraction sites with increased journey times. • Potential for sterilisation of unlicensed mineral resources with device arrays, with locations being unavailable for exploitation of aggregate resources during the operational lifecycle. • Potential for adverse effects on future oil and gas exploratory activities, with the generation of underwater noise affecting the acoustic qualities of underwater gas and oil seismic surveys.
Cultural Heritage	Archaeology and Wrecks	✓	✓	✓	✓	✓	×	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for destruction of sites and artefacts during seabed attachment of devices and cable laying. Sediment displacement may damage artefacts or lead to the burial of sites. • Potential for the installation process to contribute to the compression of stratigraphic components which may contain marine archaeology or cultural heritage components; this may also occur with maintenance activities impacting on the seabed structure.	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for effects on marine archaeological features. Changes to the stable marine environment through alterations in hydrodynamic and sedimentary processes may increase archaeological feature degradation through changes in physical, chemical, or biological processes, with alterations in sediment transport or localised scour leading to indirect impacts on marine archaeological features. However, there is also potential for alterations in sedimentation patterns to benefit exposed archaeological features if burial occurs, protecting these features.
	Coastal heritage	✓	×	✓	✓	✓	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for direct or indirect temporary to permanent effects on coastal heritage sites and features from the onshoring of cables associated with ORE devices.	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for long-term effects on the setting of coastal heritage sites and features from the presence of above-surface devices.

Landscape, Seascape and Visual Amenity	Seascape Components and Elements	✓	×	✓	×	×	✓	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for short-term and temporary effects on seascapes during the installation and decommissioning phases; these are not considered to be significant. • Potential for short-term visual impacts during the construction phase with the use of temporary lighting.	Potential Positive Effects: • None anticipated. Potential Negative Effects: • Potential for long-term effects on landscape and seascape; effects of arrays on seascapes will depend on the seascape character type and sensitivity, the presence of protected landscapes, and the magnitude / scale of development. Seascape scale considers the sensitivity of the seascape to installed devices. This relates to scenic quality, referring to a seascape's inherent visual characteristics, which may have long-term significance for tourism or traditional landscapes. Coastal topography, form, and pattern can affect how intrusive the device array will be i.e., large vertical wind farms compared to smaller submerged and wave devices. Arrays will often be located close to larger more developed settlements and larger-scale infrastructure rather than smaller, fragmented coastal settlements. • The degree of exposure to the elements is affected by the seascape scale and topography. It is assumed that exposed, dramatic seascapes of high-energy waves will have lower impacts on seascape sensitivity through the motions of waves creating a more natural appearance on device arrays. Compared to low energy, lower exposure seascapes i.e. sheltered bays of low-impact waves will make the appearance of device arrays more obvious. • Potential for changes in hydrodynamic regime from the presence of the device foundation's structure can lead to alterations in coastal morphology landfall characteristics, which can be categorised into device, near-field and far-field scales depending on the degree of impact. • Potential for effects to be greater for renewable devices such as tidal lagoons or barrages, as these are located nearshore with alterations to the visual seascape and landscape from the

									creation of lagoon/barrage walls, foreshortening of seascape views, introduction of industrial components, introduction of navigational lighting. These may also have indirect impacts on sediment regimes, altering intertidal areas and tidal regimes, affecting biodiversity and impacting on navigational routes. • Potential for long-term effects on designated landscapes; the presence of protected areas does not necessarily stop development, but device operation may conflict with landscape designations for protected areas. • Potential effects on the visual landscape; daytime and night-time periods in terms of navigation and aviation warning lights on device structures have potential to impact on the current visual scenarios.

Appendix E – Draft SEA Scoring Guidelines

Topic	Objective	Score	Score Description	Example of Effects
Biodiversity, Flora and Fauna	Avoid damage to, and where possible enhance, the biodiversity, flora and fauna.	+3	Significant Positive Effects	Potential for increased protection for, or enhancement of, designated species / habitats within International / European designated sites (SACs, SPAs, Ramsar sites).
		+2	Moderate Positive Effects	Potential for increased protection for, or enhancement of, designated species / habitats within national designated sites (MCZs, ASSIs).
		+1	Slight Positive Effects	Potential for increased protection for, or enhancement of, species / habitats within local designated sites. Potential for increased protection for, or enhancement of, protected or priority species / habitats outside designated sites (Annex I habitats, Annex II species, NI Priority Habitats and Species).
		0	Neutral / No Effects	No potential for effects on species / habitats within international / European, national or local designated sites. No potential or effects on protected or priority species / habitats outside designated sites.
		-1	Slight Negative Effects	Potential for disturbance or damage to species / habitats within local designated sites. Potential for disturbance or damage to protected or priority species / habitats outside designated sites.
		-2	Moderate Negative Effects	Potential for direct and / or long-term disturbance or damage to designated species / habitats within national designated sites. Potential for indirect and / or short-term disturbance or damage to designated species / habitats within international designated sites.
		-3	Significant Negative Effects	Potential for direct and / or long-term disturbance or damage to designated species / habitats within international designated sites.
Population and Human Health	Minimise disruption to the local population and provide employment benefit for the community.	+3	Significant Positive Effects	No population within proximity to potential development areas. Long-term, large-scale employment opportunities within the local community / long-term, large-scale employment opportunities for skilled technical workers.
		+2	Moderate Positive Effects	No population within proximity to potential development areas. Long-term, small-scale employment opportunities within the local community / long-term, small-scale employment opportunities for skilled technical workers.
		+1	Slight Positive Effects	No population within proximity to potential development areas. Short-term and / or small-scale employment opportunities within the local community / short-term and / or small-scale employment opportunities for skilled technical workers.
		0	Neutral / No Effects	No population within proximity to potential development areas. No disruption or displacement of leisure users of the marine area (e.g., sailing, sea angling, beach use). No indirect loss of employment through disruption of other marine users (e.g., fisheries). No employment opportunities within the local community or for skilled technical workers.
		-1	Slight Negative Effects	Low population density within proximity to potential development areas. Temporary disruption or displacement of a small proportion of leisure users of the marine area (e.g., sailing, sea angling, beach use). Short-term indirect loss of employment through disruption for a small proportion of other marine users (e.g., fisheries).
		-2	Moderate Negative Effects	Moderate population density within proximity to potential development areas. Permanent disruption or displacement of a moderate proportion of leisure users of the marine area (e.g., sailing, sea angling, beach use). Permanent indirect loss of employment through disruption for a moderate proportion of other marine users (e.g., fisheries).

Topic	Objective	Score	Score Description	Example of Effects
		-3	Significant Negative Effects	High population density within proximity to potential development areas. Permanent disruption or displacement of a significant proportion of leisure users of the marine area (e.g., sailing, sea angling, beach use). Permanent indirect loss of employment through disruption for a significant proportion of other marine users (e.g., fisheries).
Geology, Soils and Land Use	Minimise damage to the function and quality of the seabed in the study area in construction and operation of offshore renewable infrastructure.	+3	Significant Positive Effects	Increased protection for protected geological / geomorphological features within international designated sites (UNESCO Geoparks, WHSs). Protection of a significant area of sensitive seabed.
		+2	Moderate Positive Effects	Increased protection for protected geological / geomorphological features within national designated sites (ASSIs, MCZs). Protection of a moderate area of sensitive seabed.
		+1	Slight Positive Effects	Protection of a small area of sensitive seabed.
		0	Neutral / No Effects	No effects on protected geological / geomorphological features within international or national designated sites (UNESCO Geoparks, WHSs, ASSIs, MCZs). No loss of sensitive seabed.
		-1	Slight Negative Effects	Potential for temporary disturbance to protected geological / geomorphological features within national designated sites (ASSIs, MCZs). Temporary disturbance or damage to a small to moderate area of sensitive seabed. Temporary alteration of hydrodynamics for a small to moderate area or permanent alteration of hydrodynamics within the localized device area. No impacts on coastal processes.
		-2	Moderate Negative Effects	Potential for direct and / or long-term disturbance / damage to protected geological / geomorphological features within national designated sites (ASSIs, MCZs). Potential for indirect and / or short-term disturbance / damage to protected geological / geomorphological features within international designated sites (UNESCO Geoparks, WHSs). Permanent loss of a small to moderate area of sensitive seabed / temporary damage to a significant area of sensitive seabed. Permanent alteration of hydrodynamics for a small area. No impacts on coastal processes.
		-3	Significant Negative Effects	Potential for direct and / or long-term disturbance / damage to protected geological / geomorphological features within international designated sites (UNESCO Geoparks, WHSs). Permanent loss of a significant area of sensitive seabed. Permanent alteration of hydrodynamics for a large area. Impacts on coastal processes.
Water	Protect and enhance the state of the water environment.	+3	Significant Positive Effects	Potential improvement of coastal / transitional water body overall WFD status. Potential improvement in the status of sensitive water bodies. Potential improvement in the status of Marine Strategy Descriptors.
		+2	Moderate Positive Effects	Potential for regional improvement of marine, coastal or transitional water quality. Decreased potential impediment to the achievement of waterbody objectives under the WFD or Good Environmental Status for Descriptors under the Marine Strategy.
		+1	Slight Positive Effects	Potential for localised improvement of marine, coastal or transitional water quality.
		0	Neutral / No Effects	No effects on local water quality or the status of marine, coastal or transitional water bodies.
		-1	Slight Negative Effects	Potential for short term or infrequent adverse effects on marine, coastal or transitional water quality.

Topic	Objective	Score	Score Description	Example of Effects
		-2	Moderate Negative Effects	Potential for permanent or frequent adverse effects on marine, coastal or transitional water quality. Increased potential impediment to the achievement of water body objectives under the WFD, or Good Environmental Status for Descriptors under the Marine Strategy.
		-3	Significant Negative Effects	Potential deterioration of coastal / transitional water body overall WFD status. Potential deterioration in the status of sensitive water bodies. Potential deterioration of the status of Marine Strategy Descriptors.
Air	Minimise risk to local air quality and contribute to improving regional emissions.	+3	Significant Positive Effects	Potential to significantly contribute to renewable energy connection, with a significant indirect contribution to a reduction in fossil fuel use.
		+2	Moderate Positive Effects	Potential to moderately contribute to renewable energy connection, with a moderate indirect contribution to a reduction in fossil fuel use.
		+1	Slight Positive Effects	No development in air quality sensitive areas. Potential to slightly contribute to renewable energy connection, with a slight indirect contribution to a reduction in fossil fuel use.
		0	Neutral / No Effects	No development in air quality sensitive areas. No potential for direct or indirect air emissions.
		-1	Slight Negative Effects	Potential for short-term and small-scale air emissions from the manufacture and transportation of device components.
		-2	Moderate Negative Effects	Potential for long-term, small-scale impacts on air quality in air quality sensitive areas.
		-3	Significant Negative Effects	Potential for long-term, significant impacts on air quality in air quality sensitive areas.
Climatic Factors	Contribute to a reduction in GHG emissions from the energy supply sector in line with national commitments.	+3	Significant Positive Effects	Potential to significantly contribute to a reduction in GHG emissions through renewable energy connection.
		+2	Moderate Positive Effects	Potential to moderately contribute to a reduction in GHG emissions through renewable energy connection.
		+1	Slight Positive Effects	Potential to slightly contribute to a reduction in GHG emissions through renewable energy connection.
		0	Neutral / No Effects	No potential to contribute to a reduction in GHG emissions through renewable energy connection. No interaction with known areas of blue carbon.
		-1	Slight Negative Effects	Permanent slight loss / short-term moderate to significant disturbance of known blue carbon habitat.
		-2	Moderate Negative Effects	Permanent moderate loss of known blue carbon habitat.
		-3	Significant Negative Effects	Permanent significant loss of known blue carbon habitat.
Material Assets and Infrastructure	Provide new, robust offshore renewable energy	+3	Significant Positive Effects	Potential for significant scale offshore renewable energy development.
		+2	Moderate Positive Effects	Potential for moderate offshore renewable energy development.

Topic	Objective	Score	Score Description	Example of Effects
	infrastructure with minimal disruption to other assets and infrastructure.	+1	Slight Positive Effects	Potential for slight offshore renewable energy development.
		0	Neutral / No Effects	No interaction with other users of the marine area. No interaction with other marine infrastructure.
		-1	Slight Negative Effects	Potential for short-term slight disruption or displacement of other users of the marine area (shipping, fisheries, military, aviation). Loss of or damage to a small number of other marine infrastructure (e.g., cables, pipelines).
		-2	Moderate Negative Effects	Potential for long-term moderate disruption or displacement / short-term significant displacement of other users of the marine area (shipping, fisheries, military, aviation). Loss of or damage to a small number of other marine infrastructure (e.g., cables, pipelines).
		-3	Significant Negative Effects	Potential for long-term significant disruption or displacement of other users of the marine area (shipping, fisheries, military, aviation). Loss of or damage to a moderate to significant number of other marine infrastructure (e.g., cables, pipelines).
Cultural, Architectural and Archaeological Heritage	Protect International, National and Local Heritage Designations, and their settings.	+3	Significant Positive Effects	Potential for positive effects on a significant number of designated heritage features, or their settings, from construction / operation of ORE developments.
		+2	Moderate Positive Effects	Potential for positive effects on a moderate number of designated heritage features, or their settings, from construction / operation of ORE developments.
		+1	Slight Positive Effects	Potential for positive effects on a small number of designated heritage features, or their settings, from construction / operation of ORE developments.
		0	Neutral / No Effects	No loss or damage to designated heritage features from construction / operation of ORE developments.
		-1	Slight Negative Effects	Potential for adverse effects on a small number of designated heritage features, or their settings, from construction / operation of ORE developments.
		-2	Moderate Negative Effects	Potential for adverse effects on a moderate number of designated heritage features, or their settings, from construction / operation of ORE developments.
		-3	Significant Negative Effects	Potential for adverse effects on a significant number of designated heritage features, or their settings, from construction / operation of ORE developments.
Landscape and Visual Amenity	Protect, and where possible enhance, the landscape and seascape character and visual amenity of the Northern Ireland shoreline.	+3	Significant Positive Effects	Permanent enhancement of designated landscapes and views, the landscape / seascape and visual amenity of the Northern Ireland shoreline. Many receptors.
		+2	Moderate Positive Effects	Potential localised improvement of landscape / seascape and visual amenity. Several receptors.
		+1	Slight Positive Effects	Potential improvement of local views. Few receptors.
		0	Neutral / No Effects	No effects on landscape / seascape quality and visual amenity.
		-1	Slight Negative Effects	Short term / disturbance effects on local views and the local landscape / seascape. Few receptors.
		-2	Moderate Negative Effects	Potential localised adverse effects on, and deterioration of, the landscape / seascape and visual amenity. Several receptors.
		-3	Significant Negative Effects	Permanent adverse effects on, and deterioration of, designated landscapes and views, the

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				landscape / seascape quality and visual amenity of the Northern Ireland shoreline. Many receptors.