



Rialtas na hÉireann  
Government of Ireland

# **DRAFT Offshore Renewable Energy Development Plan II**

A National Spatial Strategy  
for the transition to the  
Enduring Regime

**2023**

Prepared by the Department of the Environment, Climate and Communications  
[gov.ie](https://www.gov.ie)

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See [www.gov.ie/OffshoreEnergyPlan](http://www.gov.ie/OffshoreEnergyPlan) for the full documentation related to OREDP II and associated environmental assessments.

## Glossary

Abbreviation or Term	Definition or Meaning
AA	Appropriate Assessment
ABP	An Bord Pleanála
AIS	Automatic Identification Systems
AMP	Adaptive Management Plan
DECC	Department of the Environment, Climate and Communications
DHLGH	Department of Housing, Local Government and Heritage
DMAP	Designated Maritime Area Plan
EEZ	Exclusive Economic Zone
GW	Gigawatt
GSI	Geological Survey of Ireland
GIS	Geographical Information System
KW	Kilowatt
MAC	Maritime Area Consent
MAP	Maritime Area Planning Act, 2021
MARA	Maritime Area Regulatory Authority
MECC	Minister for Environment, Climate and Communications
MPPS	Marine Planning Policy Statement
MSP	Marine Spatial Planning
MSP Directive	Maritime Spatial Planning Directive
MW	Megawatt
NMPF	National Marine Planning Framework
ORE	Offshore Renewable Energy

OREDP	Offshore Renewable Energy Development Plan
ORESS	Offshore Renewable Electricity Support Scheme
PDA	Planning and Development Act 2000
SEA	Strategic Environmental Assessment
SEAI	Sustainable Energy Authority of Ireland
TW	Terawatt
VMS	Vessel Monitoring Systems

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# 1 Executive Summary

Ireland's large maritime area offers significant potential to develop renewable energy from wind, wave and tidal sources. The benefits will enable delivery on our long-term climate ambitions while also developing a new industrial strategy, delivering green jobs and balanced regional development that will benefit society as a whole.

In managing this transition, it's important that we move towards a more state-led, planned approach to ensure we develop the right technology in the right places, while respecting the principles of co-existence set out in the National Marine Planning Framework (NMPF). Our maritime area is a shared resource and to develop renewable energy effectively, we need to work collaboratively with other sectors to ensure we plan appropriately, while also respecting the need to protect marine biodiversity.

The Offshore Renewable Energy Development Plan (ORED II) is one of the building blocks in moving towards a more plan-led approach to developing renewable energy as part of the enduring or long-term regime. There are many advantages to adopting this approach from optimising the use of our marine resource to reducing environmental impacts.

This spatial strategy is one of the elements of work being progressed to establish the Enduring Regime. Others include the development of a Hydrogen Policy, updating of our Interconnector Policy and carrying out an economic assessment to identify how best to reap the benefits of this renewable energy potential for all of society. All of these elements of work are currently being progressed by the Department of the Environment, Climate and Communications (DECC) and will lead to the development of a Policy Statement for the Enduring Regime.

This draft document focuses on the spatial strategy, proposing how the State will identify the areas best suited for ORE, in line with the principles of good maritime spatial planning. The overall national and European policy context for the development of renewable energy are described in the document and a set of principles are set out that will be used to underpin the statutory planning process for offshore renewable energy (ORE).

The opportunities for wind, wave and tidal energy in our waters have been assessed. Certain assumptions have been made on the capabilities of these technologies at this time which have influenced the potential area of our seas available for consideration. All of these assumptions have been documented.



An assessment has been carried out on the known data and information we have at a national level on a range of maritime activities and features to inform the development of this strategy. Relevant environmental datasets have been considered, along with information on economic activities such as shipping, fisheries, and areas under existing licences.

The Maritime Area Planning Act 2021 (MAP Act) sets out a process for creating statutory plans for sectors, referred to as Designated Maritime Area Plans (DMAPs). Criteria have been proposed in this document to identify initial Broad Areas of Interest for future ORE development. These Broad Areas of Interest would be further refined into smaller geographical areas as part of the DMAP assessment process. The criteria are initially focused on our floating wind potential and includes consideration of the potential to use our offshore wind resources, not only for domestic use via connection to the grid, but also to support industrial development via the production of green hydrogen. These criteria identify potential Broad Areas of Interest for future ORE development in the Celtic Sea, Shannon/Foynes area or the North-West coast.

A Strategic Environmental Assessment (SEA) has been carried out and a Natura Impact Statement (NIS) prepared on the draft plan. Both have been used to inform the draft plan as it has been developed and are included in the public consultation.

A wide range of maritime stakeholders have been involved in contributing to the development of this strategy over the last 18 months to ensure a wide range of views have been considered. This includes the fisheries sector, eNGOs, renewable energy industry, ports, local authorities and academics.

Following completion of the public consultation, all submissions received will be considered and responses to them published online, indicating how they have informed finalisation of the plan and associated environmental reports.

## 2 Introduction

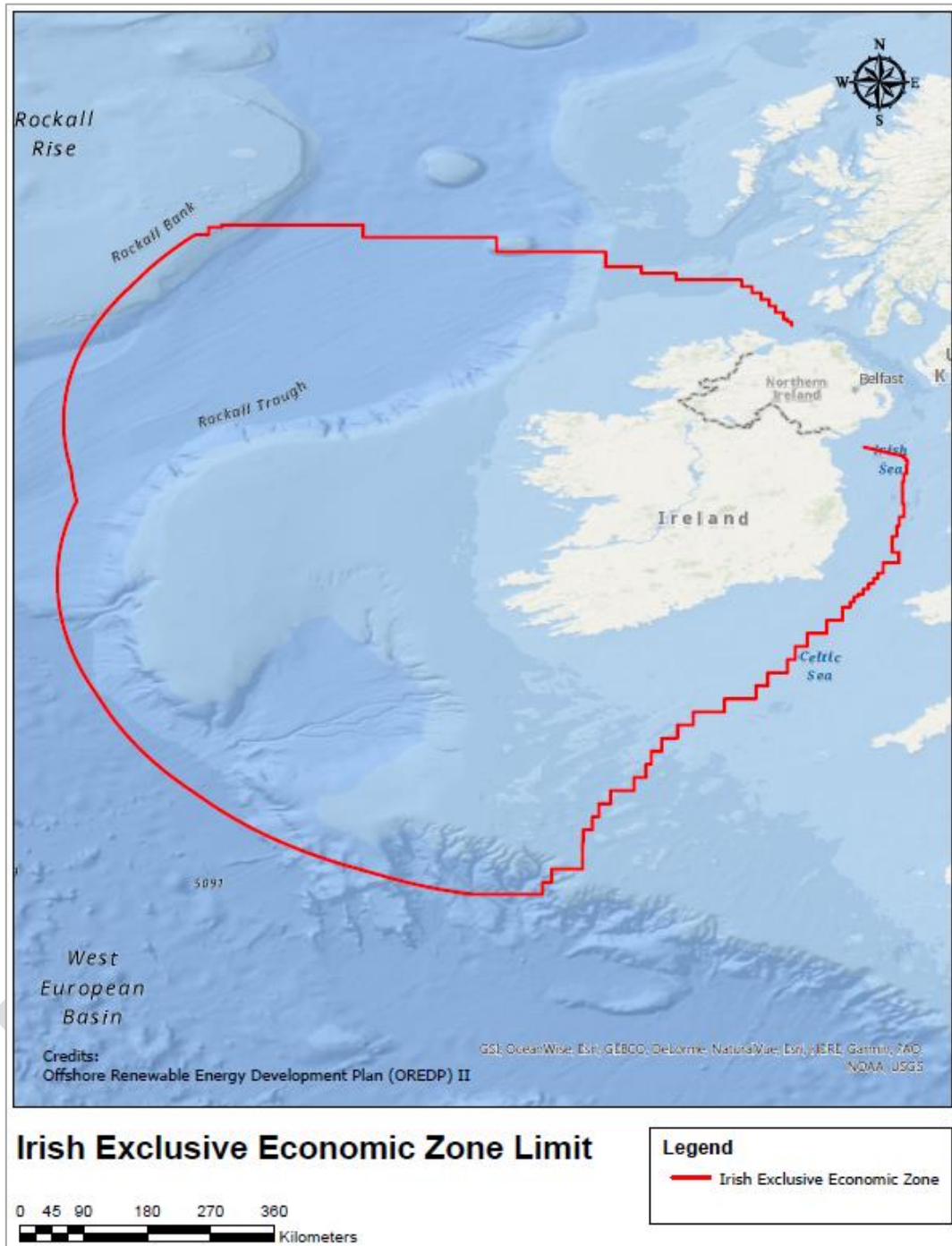
### 2.1 Vision

Ireland has a sea area of 490,000 square kilometres (Figure 2-1)—approximately seven times the size of its landmass—and one of the best ORE resources in the world. As Ireland transitions to a low-carbon, climate-resilient and environmentally sustainable economy within European Union (EU) and global frameworks, our significant ORE potential will play a vital role in phasing out fossil fuels, and in delivering a reliable supply of safe, secure and clean energy.

The development of ORE in Ireland is crucial to delivering on this ambition to achieve, among other objectives:

- Enhancing our security of energy supply
- Supporting the achievement of Ireland’s climate goals, including decarbonising our energy system by 2050
- Significantly reducing greenhouse gas emissions through replacing fossil fuels with renewable sources of energy
- Delivering balanced regional development, benefiting coastal, marine and island communities
- Sustainably developing ORE while recognising the importance of the protection biodiversity and other maritime users and activities

Effective spatial planning and management of Ireland’s maritime resource by the State to maximise the potential for ORE development into the future will be crucial to ensure that these objectives are realised, and to ensure the long-term, sustainable and planned development of ORE in Ireland.



**Figure 2-1: Ireland's Maritime Area out to the Exclusive Economic Zone limit**

Figure 2-1 maps the maritime area out to the outer limit of the Irish Exclusive Economic Zone (EEZ)<sup>1</sup> which in parts reaches up to 200 nautical miles (370 km) from the coast.

<sup>1</sup> Statutory Instrument No. 86/2014 - Maritime Jurisdiction (Boundaries of Exclusive Economic Zone) Order 2014.

## 2.2 Offshore Renewable Energy Policy Context

A range of actions are underway to deliver both on the immediate 2030 targets to increase the level of offshore wind energy on the grid and also to deliver on the long-term ambitions regarding the extensive resource potential we have off the western and southern coasts. Given the urgency of action required now to decrease dependence on fossil fuels and meet immediate targets, a different approach will be adopted to how the sector is developed in the long-term.

### 2030 Targets

The Climate Action Plan sets out the target to deliver 5-Gigawatt (GW) ORE by 2030. Work to deliver on this target is underway with two phases of projects to progress through planning and auctions:

- Phase 1 Projects – those projects awarded a Maritime Area Consent (MAC) in 2022, which are expected to compete in the first Offshore Electricity Support Scheme auction (ORESS 1) in mid-2023 and progress through the planning system. Successful projects are expected to deliver approximately 50% of the 2030 target and to become operational from 2027 onwards.
- Phase 2 Projects – this batch of projects is needed to bridge the gap between what can be delivered by the Phase 1 projects and the 2030 target of 5GW grid-connected offshore energy by 2030. A policy statement being published in Quarter 1 2023 sets out the sequencing of this phase. Projects will need to secure a route to market such as an ORESS 2 Letter of Offer, a MAC from MARA and development permission from An Bord Pleanála. Successful projects will likely become operational at the end of the decade.

### Developing the Enduring Regime

This document relates to the final phase: the long-term or enduring plan-led regime for ORE. For Ireland to achieve its long-term climate and energy commitments and ambitions, ORE must be developed in a planned, strategic and sustainable way. This will involve a transition as to how ORE projects are developed by moving away from a decentralised, project-led approach to a centralised approach with significant State involvement in identifying the most suitable areas in Ireland's maritime space for future ORE developments. There are many advantages in moving to a more State-led approach to development of ORE:

- Optimising the areas for ORE to benefit the State and streamlining permitting.
- Minimising speculative activity in the marine environment,

- Providing for the coordination of surveying, while minimising offshore and onshore transmission system infrastructure through future-proofing technology to minimise environmental impacts and reduce end-consumer costs.
- Providing greater certainty for all maritime users and sectors and creating opportunities for synergies, for example through the promotion of co-existence.
- Providing the opportunity for a joined up public acceptance process covering multiple projects.

This document is one of the key building blocks being progressed now to deliver on the Government ambition for at least 30GW floating energy beyond 2030 as set out in the Programme for Government. This document sets out the proposed national spatial strategy to be adopted to achieve this. It sets out what we know about our maritime space at a national level and proposes an approach to identifying Broad Areas of Interest which will be examined in greater detail in consultation with local maritime users before areas are designated for ORE as defined in the MAP Act.

The second OREDP II is an important tool in setting out the overall framework and spatial strategy to facilitate the transition from a developer-led approach to the enduring plan-led regime. It will lay out the overall framework and national spatial strategy to guide the long-term, sustainable and planned development of ORE in our maritime area. The OREDP II is a dynamic framework which will be updated cyclically to manage the development of ORE in a proactive and holistic way to support our transition to the enduring plan-led regime for ORE in Ireland.

Other work underway will inform the overall Enduring Regime policy and includes development of a Hydrogen Policy, updating our Interconnector Policy and economic assessment on routes to market. An associated piece of research is also underway to examine approaches to State involvement in ORE in other jurisdictions. The outcomes from this work will set out options for the future role of the State in ORE-related activity in our maritime area and to set out a roadmap for the transition from the current developer-led approach to a more State-led approach. This will encompass all elements of work from site investigations, to consenting to route to market.

**Table 1: Overview of transition to the enduring plan-led regime for ORE development**

Phase 1	Phase 2	Enduring plan-led regime
<b>Actions to deliver 5GW offshore wind connected to the grid by 2030</b>		<b>Actions to deliver the enduring plan-led regime</b>
<ul style="list-style-type: none"> <li>• A select number of pre-qualified projects which have been awarded MACs compete in ORESS 1</li> <li>• These projects must also secure development permission from ABP</li> <li>• Projects successful in above processes will proceed to construction with operation expected from 2027</li> </ul>	<ul style="list-style-type: none"> <li>• Projects compete in ORESS 2 in 2024 for support to develop ORE capacities in specific ORE designated areas</li> <li>• Projects are expected to become operational at the end of the decade</li> </ul>	<ul style="list-style-type: none"> <li>• Spatial Strategy set out in this draft document is finalised—mid-2023</li> <li>• Work will commence on assessing Broad Areas of Interest, before moving into a formal designation process (see Section 11)—mid-2023</li> <li>• A range of work currently underway will inform Enduring Regime Policy Statement to be published early 2024</li> </ul>

Many ORE projects and developments will be needed to ensure that the State’s targets are met, therefore, until the Enduring Regime is established, nothing in this strategy should be interpreted as limiting the ability of the relevant authorities to assess individual applications proposals for ORE in line with the relevant legislative provisions set out in the MAP Act and in the Planning and Development Act 2000 as amended (the PDA), and applicable EU legislation, including the following:

- The Marine Planning Policy Statement (MPPS)
- The National Marine Planning Framework (NMPF)
- The relevant environmental assessments
- Any other matters set out in legislation

In line with marine spatial planning best practice, DECC established a governance structure for the OREDP II. See Appendix A for more information on the governance structure.

## 2.3 Objectives of OREDP II

The first Offshore Renewable Energy Development Plan (ORED P I) was published in 2014. It set out the key principles, actions and enablers needed to harness ORE in Ireland. An interim review was carried out in 2018.

There have been significant developments in policy, legislation and regulation and additional marine data since the publication of ORED P I. As referenced in the NMPF and the Climate Action Plan 2019 updated annex of actions, the DECC began work on updating the ORED P I in 2021. While the ORED P I was a cross sectoral plan to facilitate the development of ORE, the ORED P II is a national level spatial strategy to support the sustainable and planned development of ORE in the long-term.

The ORED P II provides a framework and evidence base to facilitate the future identification of Broad Areas most suited for the development of fixed wind, floating wind, wave and tidal as part of the enduring plan-led regime. It does not identify specific areas for ORE development but provides a framework based upon the development of criteria which can be used to identify Broad Areas from within which offshore renewable areas will be designated under the MAP Act as part of the enduring plan-led regime.

The key objectives for the ORED P II are to:

- Assess the resource potential for ORE in Ireland's maritime area.
- Provide an evidence base to facilitate the future identification of Broad Areas most suitable for the sustainable deployment of ORE in Ireland's maritime area.
- Identify critical gaps in marine data or knowledge and recommend prioritised actions to close these gaps.

The ORED P II will sit alongside and support the implementation of the new forward marine planning framework established in 2021 by the MAP Act, the MPPS and the NMPF, explained in further detail in Section 3. As recognised in the NMPF, the ORED P II will play an important role in setting out a framework to support the transition to the enduring plan-led regime for ORE.

## 3 Maritime Spatial Planning and OREDP II

Maritime Spatial Planning (MSP) is a new way of looking at how we use the maritime area and planning how best to use it into the future. MSP will try to balance the different demands for using the sea including the need to protect the marine environment. It is about planning when and where human activities take place at sea and ensuring that these activities are as efficient and sustainable as possible. MSP involves stakeholders in a transparent way in the planning of maritime activities.

A planning system generally comprises three main elements:

- Forward planning (the process by which statutory authorities set out high-level planning objectives over the medium to long term at national, regional or local level)
- Development management (processing and making determinations in respect of applications for specific development)
- Enforcement (in other words, tackling unauthorised development or non-compliance with development management decisions, as well as ensuring that forward plans are being properly observed)

This chapter sets out how these are being applied to our maritime area.

### 3.1 Maritime Spatial Planning Directive

The Maritime Spatial Planning Directive (Directive 2014/89/EU) defines MSP as a process by which the relevant Member State's authorities analyse and organise human activities in marine areas to achieve ecological, economic and social objectives. The increasing demand for maritime space for different purposes, including ORE, has driven the need for MSP. This approach also supports and facilitates implementation of the Europe 2020 strategy for smart, sustainable and inclusive growth. This aims to deliver high levels of employment, productivity and social cohesion while also promoting a resource-efficient and green economy, which has great relevance for coastal and maritime sectors.

The MSP Directive recognises that in order to promote the sustainable coexistence of uses and the appropriate apportionment of relevant uses in the maritime space, Member States must establish a framework for consistent, transparent, sustainable and evidence-based decision making.

MSP is also intended to achieve the aims of other EU directives, including the Habitats Directive and the Birds Directive. Member States must also make use of the best available



data and information and make use of existing instruments and tools for data collection. Where marine spatial plans are likely to have significant effects on the environment, they are subject to the SEA Directive.

### **3.2 The Marine Planning Policy Statement**

The MPPS sits at the top of the new marine planning framework in Ireland. The MPPS sets out the principles and priorities of the Government in relation to marine planning by the State in the maritime area for the period to which the statement relates. The current MPPS was adopted on a non-statutory basis in 2019 and an update is currently under development by the Department of Housing, Local Government and Heritage (DHLGH).

### **3.3 The National Marine Planning Framework (NMPF)**

The NMPF was adopted in order to implement Article 4 of the MSP Directive, establishing a framework for maritime spatial planning. The NMPF is Ireland's first marine spatial plan, and sets out an overall decision-making framework for our shared maritime space and seeks to improve the management of Ireland's seas for the benefit of all people.

At the heart of the NMPF is the protection of the environment and co-existence between the different maritime activities and uses. The NMPF states that all proposals that assist the State in meeting the Government's ORE targets will be rigorously assessed to ensure compliance with environmental standards and seek to minimise impacts on the marine environment, marine ecology and other maritime users. The NMPF sets out a series of additional policies relevant to ORE and makes reference to the important role the OREDP II will play in supporting the move to a plan-led regime for the development of ORE.

### **3.4 Designated Maritime Area Plans (DMAPs)**

The MAP Act provides a new system enabling spatial designations for specified areas and activities including ORE and emerging renewable energy technologies through Designated Maritime Area Plans (DMAPs). The role and function of these DMAPs is set out in the NMPF. These will be regional marine spatial plans. The majority of the sub-national forward marine planning will be developed through the DMAP process. A DMAP will be a management plan for a specific area of our marine waters and can be used to develop multi-activity area plans or to promote the use of specific activities, to include ORE. DMAPs, once adopted, will form part of the NMPF and become a binding consideration for marine decision makers and marine plan-makers.

DECC is the relevant body with responsibility for proposing DMAPs for ORE. This DMAP process will be a key element of the move to a plan-led ORE regime. The Department will bring proposals for ORE DMAPs forward to the Minister for Housing, Local Government and Heritage as part of the work to establish the Enduring Regime. This document sets out the proposed strategy to be adopted.

The evidence base and spatial strategy set out in the OREDP II will facilitate the identification of Broad Areas for further analysis and to inform future designation for ORE as part of the statutory DMAP process. The process for DMAPs will include a more detailed analysis of the conditions of the relevant maritime area on a regional and local basis.

### **3.5 OREDP II and the Designation Process**

The purpose of the OREDP II is to provide an evidence base to facilitate the future identification of areas most suited for the development of fixed wind, floating wind, wave and tidal as part of the enduring plan-led regime. It is a high-level guiding framework and national spatial strategy that will be used by the Department to identify Broad Areas of Interest for ORE. It does not identify specific areas for ORE development but provides a framework based upon the development of criteria which can be used to identify Broad Areas which will be assessed in further detail before the formal designation process is initiated.

The criteria set out at Section 11.1, when applied, will identify these Broad Areas of Interest. DMAPs identified through application of this framework will be spatially refined through further analysis and stakeholder engagement, as part of the work to establish the Enduring Regime.

The process for the refinement of areas for DMAPs for ORE will be iterative in nature. This refinement process will include the consideration of data collected as part of the OREDP II national strategy development process. This process of further analysis and stakeholder engagement will help identify new information, issues and considerations. This will build out the evidence base to enable the spatial refinement of the Broad Area and the creation of DMAPs.

In addition to the further analysis to spatially refine the Broad Areas, as part of the DMAP process, there will also be further statutory environmental assessments in the form a SEA and Appropriate Assessment (AA) as provided for under the MAP Act.

Public participation will be a key element in the development of the DMAP process. The MAP Act provides that all proposals for DMAPs must include a mandatory draft Public Participation Statement (PPS). The PPS will detail the timeframes, procedures and

mechanisms for public participation specific to the DMAP in development. The DMAP process will include multiple opportunities for public participation and consultation, in compliance with the Aarhus Convention, and as part of the statutory environmental assessments. A high-level road map providing information on the anticipated timeline for DMAP development to establish the Enduring Regime will be published when the OREDP II has been finalised. The road map will provide information on main stages and activities including what further analysis may be required and how and when people can become involved in the process. Appendix H provides an overview of the statutory DMAP process set out in the MAP Act.

### **3.6 OREDP II principles**

The National Marine Planning Framework recognises that proposals for ORE developments must be consistent with national policy, including the successor to the OREDP I (which is the OREDP II). The OREDP II will sit alongside and support the implementation of the statutory DMAP process for ORE set out in the MAP Act, which, as recognised in the NMPF, will underpin the transition to the enduring plan-led regime for ORE development in Ireland.

The development of DMAPs for the ORE Enduring Regime by DECC will align with the following OREDP II principles:

- The use of the OREDP II to develop and propose DMAPs for ORE will recognise the important role of ORE to the achievement of the State's climate and energy commitments including energy security, the green transition, decarbonising the electricity system and net-zero emissions by 2050.
- In addition to having regard to the OREDP II, proposals for DMAPs for ORE informed by the OREDP II will be guided, where relevant, by the policy of the Government, Minister for the Environment, Climate and Communications (MECC) or any other Minister of the Government.
- The carrying out of the actions in the OREDP II, as outlined in Section 12.1 (Adaptive Management), will be coordinated cross Government to ensure the efficient use of resources and will ensure that marine data and knowledge is accessible and available for use by policy makers and transparent engagement with stakeholders, including through [marineplan.ie](http://marineplan.ie).
- While this plan uses datasets relevant to its scale and scope, any plans prepared at DMAP level should consider all other available and relevant data including datasets that were not suitable for use in the OREDP II itself or areas identified for further

assessment. The relevant environmental scoping exercises should, therefore, be carried out and be informed by best practice.

- Any DMAP prepared on foot of this plan should reflect the appropriate plan and project level mitigation measures identified in the OREDP II environmental assessments, where relevant.
- Proposals and decision-making for ORE must promote the objectives of good maritime spatial planning and ensure the sustainable development of Ireland's maritime area as set out in the relevant statutory provisions of the MAP Act and the PDA.
- Proposals for DMAPs for ORE informed by the OREDP II will align with objectives set out in the NMPF to support and prioritise co-existence and co-location of ORE and other maritime uses and activities to mitigate conflicts and minimise the spatial footprint of proposals, where necessary, and maximise the economic, social and environmental benefits of multiple developments or uses of an area.
- Proposals for DMAPs will focus on the location for technologies to be situated in the maritime area, with cable routes to be considered at individual project level given the varying requirements of different technologies and necessity of considering specific locations.
- Proposals for DMAPs for ORE informed by the OREDP II will demonstrate best practice in stakeholder and community engagement in order to ensure the maximum benefit to society from ORE including economic, environmental and social benefits such as employment and work and educational opportunities.
- Opportunities for targeted stakeholder engagement, to include the fisheries sector, will be considered in the development of the Public Participation Statement for all ORE DMAPs informed by the OREDP II. The fishery sector will be engaged from the outset of the enduring regime DMAP process to ensure the sector's input is captured in the development of the evidence base for ORE DMAPs.
- The use of public resources to facilitate the development of ORE via the designation of DMAPS for ORE must be cost-effective and demonstrate value for money.
- The governance of the OREDP II must be in line with best practice, with robust and transparent reporting mechanisms.

## 4 National and European Policy Context

At a national and European level, there is increased emphasis on the potential for ORE to make a significant contribution in the drive to net-zero greenhouse gas emissions by 2050. Development and deployment of Ireland's ORE potential requires coordination across a range of policy areas. Relevant international, EU and national policies regarding ORE are outlined below.

### 4.1 National renewable energy policy

National policy strongly supports the sustainable development of ORE in Ireland. The NMPF as Ireland's first marine spatial plan is the overarching national policy context, which supports the sustainable spatial planning and management of the ORE sector into the future. The NMPF sets out a series of policies relevant to ORE and makes reference to the need for proposals for ORE developments to be consistent with national policy including any successor to the OREDP I (which is the OREDP II when implemented). Further relevant supporting national policies include the following:

- Ireland's [Climate Action Plan 2023](#) (CAP 2023) sets out the roadmap to deliver on Ireland's climate ambition and commits to up to 80% of Ireland's electricity being sourced from renewables by the end of this decade. Among the most important measures in the CAP 2023 is the target of at least 5GW of installed offshore wind energy by 2030 (with an additional 2GW offshore wind for green hydrogen production. Action 116 of the CAP 2021 committed to the development of a new ORE Development Plan (OREDP II) to quantify the ORE potential in Ireland's maritime area. The CAP 2023 aligns with the legally binding economy-wide carbon budgets and sectoral ceilings agreed by Government in 2022. Ireland's enormous potential for offshore wind will be key to meeting the electricity sector's carbon budget programme and sectoral emissions ceilings. Through the Climate Action Plan, Ireland is taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government.
- One of the objectives of the [2020 Programme for Government](#) is to realise the immense potential of Ireland's offshore renewables by developing a longer-term plan to realise the potential of at least 30GW of floating offshore wind in Ireland's deeper waters off the west coast. This longer-term plan will set out how Ireland can become

a major contributor to a pan-European renewable energy generation and transmission system.

- The [2021 Policy Statement on the Framework for Ireland's Offshore Electricity Transmission System](#) establishes the three-phased policy approach to offshore wind deployment in Ireland and sets the framework for the development, operation and ownership of Ireland's offshore electricity transmission system. It provides for a phased transition from a decentralised offshore transmission system model to a centralised model over the course of this decade, with ownership of offshore transmission system assets to be assigned to EirGrid, Ireland's existing electricity Transmission System Operator.
- Following the approval of Ireland's carbon budget programme, Ireland's first [Sectoral Emissions Ceilings](#) agreed to an additional 2GW of offshore wind for the production of green hydrogen by 2030.

## 4.2 International and EU Renewable Energy Policy

The Renewable Energy Directive sets the overall binding target for the percentage of renewables in the EU energy mix, and the Directive is currently being negotiated to support delivery of the EU's increased climate ambition and new commitments in the European Green Deal. The EU has committed to a 55% reduction in emissions by 2030 compared to 1990 levels, and to achieving carbon neutrality by 2050.

The EU Strategy on Offshore Renewable Energy emphasises the need to promote the protection of the environment and biodiversity along with co-existence with other marine activities. Geopolitical and energy market realities also require Ireland and the EU to drastically accelerate the clean energy transition and increase energy independence, as highlighted by the European Commission in the REPowerEU Communication. This communication calls on Member States to swiftly map suitable areas for renewable energy projects.

## 4.3 Designated environmental sites

Ireland will be designating additional sites for environmental protection in the maritime area throughout the lifetime of the OREDP II. The National Parks and Wildlife Service (NPWS) are progressing work to designate additional marine Special Protection Areas (SPAs) and Special Areas of Conservation (SACs).

There are also national and European commitments to expand the Marine Protected Area (MPA) network in Ireland. The Programme for Government commits to 30% of Ireland's marine area being designated as MPAs by 2030. Marine Protected Areas (MPAs) can be described as geographically defined areas of marine character or influence which are protected through legal means for the purpose of conservation or protection of specified species, habitats or ecosystems and their associated ecosystem services and cultural values. They will be managed with the intention of achieving stated objectives over the long term.

Developing ORE and protecting marine areas is not a binary choice. The designation of an MPA does not automatically prevent other activity in that maritime space. MPAs can be compatible with, and support, economic activity associated with the sea.

At present, the location of MPAs is not known. The DHLGH is developing legislation for the identification, designation, and management of MPAs in Irish marine waters.

Beyond protection and conservation designations, the European Commission's proposal for a Nature Restoration Law proposes legally binding targets for nature restoration in different ecosystems. The aim of the proposed law is to cover at least 20% of the EU's land and sea areas by 2030 with nature restoration measures, and eventually extend these to all ecosystems in need of restoration by 2050.

Additional information about designated sites, including in relation to the designation of MPAs and additional SACs and SPAs and nature restoration measures, will be incorporated into future updates of the plan. These factors will also be included in lower tier assessments under the marine planning framework, for example at the DMAP and project levels, where available.

## 5 Overview of approaches in other Jurisdictions

Research was carried out on the approach in other states to identify areas for ORE to aid in developing our approach and learn from lessons learned in countries that are further ahead in marine spatial planning. By way of an overview on the approach that is typically adopted elsewhere, states tend to identify an initial area which is progressively refined through determining interaction criteria with stakeholders, assessments including environmental assessments and consultation to identify relevant interactions with other activities and uses. Further assessments, consultation and in some instances weighting of criteria are carried out to narrow the area and eventually designate space for ORE. The general approach is to:

- Identify areas with the resources and technical aspects favourable for the location of ORE
- Visualise all factors likely to impact on the location of ORE through spatial data, for example opportunities and constraints assessments
- Eliminate unsuitable locations and identify lower constrained areas
- Analyse individual criteria (for example, fishing/shipping) expected to generate interactions using key data layers
- Identify areas that avoid constraint

Table 2 provides a comparative overview of the approach to identifying areas for ORE in other states. The areas examined are Scotland, England, the Celtic Sea (England and Wales), the Netherlands and Denmark. ORE processes and industries are well developed in the United Kingdom, the Netherlands and Denmark. Each country identifies optimal resource areas and applies constraints to inform planning. Learnings on the identification of suitable areas for ORE from these more mature systems can assist Ireland as it assesses options for ORE development. As mentioned in Section 5, DECC is researching international approaches which will provide options for Ireland's transition to a State-led approach.



**Table 2: International comparison of approaches to identifying areas for offshore renewable energy**

Steps in process	Scotland	England	Celtic Sea (England & Wales)	The Netherlands	Denmark
<b>Assessment Stage</b>	<p>1) Initial Areas of Search (AoS) in Scotland's territorial waters were identified through an opportunity and constraints analysis (2011) where datasets were scored and weighted. Draft Regional Locational Guidance was prepared which contained more technical, environmental, planning and socio-</p>	<p>1) For Leasing Round 4 for offshore wind an opportunity and constraints analysis where datasets were scored and weighted was carried out to identify AoS.</p>	<p>1) Initial areas for potential for floating wind in the Celtic Sea were identified through an opportunity and constraints analysis. The factors considered were:</p> <ul style="list-style-type: none"> <li>• <b>Economic</b> (Navigation, Sub-surface infrastructure, Infrastructure, Fisheries)</li> <li>• <b>Environmental</b> (Environmental designations, Environmental</li> </ul>	<p>1) The National Water Programme (NWP) 2009-2015 designated two areas for offshore wind. Two other areas were designated as search areas subject to further assessment.</p>	<p>1) Work began in 2016 for Denmark's MSP. A new Maritime Spatial Data Infrastructure (MSDI) was established in 2017 to make marine spatial data easily accessible and available for comparison and exchange between maritime authorities. A separate MSP Platform was also created in parallel to the MSDI.</p> <p>2) Work was carried out in 2018-2019 on prioritising designated areas for ORE. Previous sectoral plans provided key contributions</p>

Steps in process	Scotland	England	Celtic Sea (England & Wales)	The Netherlands	Denmark
	economic information on the AoS.		features, Contamination) <ul style="list-style-type: none"> <li>• <b>Social</b> (Leisure, Visual, Historic, Bathing)</li> </ul>		to the MSP planning process.
<b>Stakeholder engagement</b>	<p><b>2)</b> A consultation was held on the draft Sectoral Marine Plans for Offshore Wind, Wave and Tidal Energy in Scottish Waters.</p>	<p><b>2)</b> Following the identification of the initial AoS, stakeholder engagement was held with market and statutory stakeholder meetings and engagement with wider stakeholders.</p>	<p><b>2)</b> Following the identification of the initial areas, stakeholder engagement took place and additional factors were identified, for example environment, navigation, fisheries, aviation and defence. The factors weighted using the AHP model informed this stakeholder engagement.</p>	<p><b>2)</b> A specific SEA and AA were undertaken for the search areas. A consultation round was held on the designation of additional space for wind energy areas.</p>	<p><b>3)</b> Prior to the preparation of the environmental assessment report, a delineation of the environmental assessment was carried out. This was subject to public consultation.</p>

Steps in process	Scotland	England	Celtic Sea (England & Wales)	The Netherlands	Denmark
<b>Additional assessments</b>	<p><b>3)</b> Further opportunity and constraints analysis where datasets were scored and weighted was carried out to identify additional AoS for Scottish out to Scotland's EEZ (2018).</p> <p><b>4)</b> Additional areas for ORE were identified as a result of further assessment and included for consideration in Scotland's Sectoral Marine Plan for</p>	<p><b>3)</b> Further assessments through a regional refinement process was carried out to refine the number and spatial extent of regions which were to be made available through the leasing process.</p> <p><b>4)</b> Regions were excluded and taken forward for inclusion in Round 4.</p>	<p><b>3)</b> The spatial modelling work was refined following stakeholder engagement to identify initial 5 AoS.</p>	<p><b>3)</b> In a 2014 review of the NWP the search areas were refined and designated for wind energy at sea.</p> <p><b>4)</b> Further environmental assessments (SEA, AA) were undertaken, and consultations were held on the search areas.</p>	<p><b>3)</b> The MSP proposed four zones for different uses of the sea area, with 'Development Zones' covering offshore wind.</p>

Steps in process	Scotland	England	Celtic Sea (England & Wales)	The Netherlands	Denmark
	Offshore Wind Energy.				
<b>Stakeholder engagement</b>	<b>5)</b> Stakeholder engagement was undertaken including workshops to identify specific spatial constraints, the AoS were refined to identify Draft Plan Options (DPOs) and a public consultation was held on the draft plan.	<b>5)</b> The regions not included have not been precluded from consideration in future leasing rounds. The Crown Estate plans to continue to work with stakeholders to identify future opportunity.	<b>5)</b> The initial 5 AoS were subject to further stakeholder engagement. Following which 5 Refined AoS located within 3 of the original broad AoS were identified.  Further engagement and assessments are planned to refine the Refined AoS into potential Project Development Areas.	<b>5)</b> In 2021 the Additional Draft North Sea Programme identified search areas that may be later designated for ORE development beyond 2030. These were the subject of consultation and environmental assessment.	<b>4)</b> Public consultations and environmental assessments including an SEA and assessment of impacts on the draft MSP were undertaken in 2021.
<b>Identification of area(s)</b>	<b>6)</b> DPOs for offshore wind were identified in the Sectoral Marine Plan for	Process still on-going	Process still on-going	<b>6)</b> In March 2022, the Dutch Government decided to designate new Offshore Wind Farm Zones in the North Sea	<b>6)</b> The MSP for Denmark was issued in 2021 for a 10-year period. Amendments to the plan are possible within this time. The MSP

Steps in process	Scotland	England	Celtic Sea (England & Wales)	The Netherlands	Denmark
	Offshore Wind Energy.			<p>Programme 2022-2027. The Additional Offshore Wind Energy Roadmap includes seven additional sites for windfarms. Site studies and assessment against the Nature Conservation Act will be undertaken for four of these. The remaining sites are yet to be selected.</p>	<p>includes a list of zone types and datasets as an appendix.</p> <p>The sectors that are included in Denmark's current maritime spatial plan are:</p> <ul style="list-style-type: none"> <li>• the offshore energy sector</li> <li>• maritime transport</li> <li>• transport infrastructure</li> <li>• fisheries and aquaculture</li> <li>• extraction of raw materials at sea</li> </ul> <p>the preservation, protection and improvement of the</p>

Steps in process	Scotland	England	Celtic Sea (England & Wales)	The Netherlands	Denmark
					quality of the environment, including climate change resilience.

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## 6 Approach to the OREDP II

This section sets out the overall approach to developing OREDP II.

### 6.1 Scope

The OREDP II national spatial strategy for ORE covers Ireland's maritime area out to the EEZ outer limit, which in parts reaches up to 200 nautical miles (370 km) from the coast. This area has been assessed to establish Ireland's overall resource potential for wind, wave and tidal renewable energy technologies. The focus on the assessment is on the offshore area for the deployment of technology devices. Consideration of cable routes and landing points are not in scope but will be assessed at the later stage in the forward planning process.

While the OREDP II national spatial strategy will inform the deployment of ORE as part of Ireland's enduring plan-led regime, renewable projects that can objectively enable delivery of Ireland's target 2030 targets have been considered in the environmental assessments for the Plan, where relevant, in other words cumulative assessments.

### 6.2 Data Assessment

As set out in the MSP directive, the intention with the assessment undertaken as part of this work was to establish an evidence base to determine suitability of areas offshore for renewable energy. The assessment undertaken for OREDP I was taken as a starting point, and updates were sought on all data considered at that time. The approach was to take as many inputs as available and assess their appropriateness for inclusion in this national level assessment. All decisions made on data to inform the assessment were documented and will be published alongside this plan. Further details are set out in Section 7.

### 6.3 Evaluation Methodology

The approach to identifying the optimal areas for ORE involves a number of stages. The first objective is to determine what areas offshore are most suitable for various renewable energy technologies. Other activities and factors in these areas must then be evaluated. These include environmental considerations, social and cultural factors in addition to economic activity.

As part of this assessment, national baseline information is set out on all of these activities, this is an important step on the pathway to identifying the optimal areas for ORE. The next steps in this process are set out in Section 11.

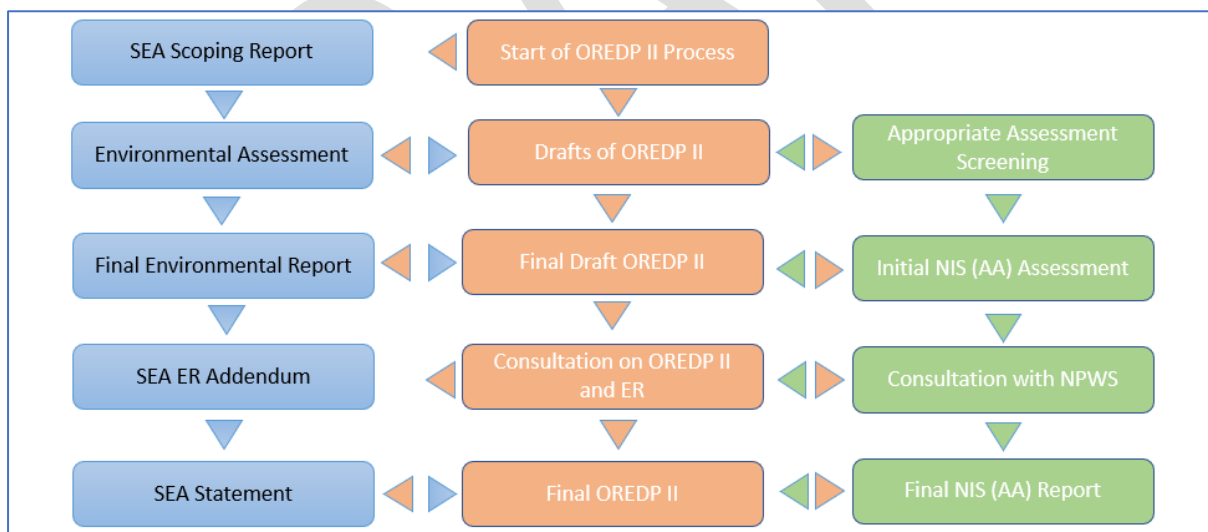
## 6.4 Governance and Stakeholder Input

A governance structure for the OREDP II project was established to ensure wide input from scientific and technical agencies; policy input from relevant departments with significant maritime interests and an Advisory Group was established to seek input from a range of industry stakeholders, eNGOs, academics and local authorities. These groups informed the development of the plan at all stages.

Further details on the governance structure including membership of the various groups established, along with their Terms of Reference, are set out in Appendix A.

## 6.5 Environmental Assessments

The OREDP II was developed in parallel with an SEA and AA to ensure an iterative process. Both processes have informed the development of the plan, in line with best practice. An overview of the process is set out in Figure 6-1.



**Figure 6-1: Interplay between OREDP II and environmental assessments**

An extensive national public consultation will be held on the draft OREDP II and associated environmental reports in line with statutory requirements. This consultation will be focused on coastal, marine and island communities and will seek to ensure input from a wide range of those with maritime interests. Responses to the consultation will be thoroughly assessed and used to inform the finalisation of the OREDP II.



## 7 Data Assessment

Joined-up technical, economic, social, and environmental data is essential to forming a rounded picture of the potential for the sustainable development of ORE in Ireland. To ensure a data-driven and ecosystem-based approach, a comprehensive review of the most relevant available data related to Ireland's maritime area was carried out for OREDP II.

### 7.1 Data Review

Holders of marine and environmental data across departments, agencies, public bodies, industry, the environmental pillar and academia were consulted to identify datasets to feed into the analysis. As a starting point, the OREDP I baseline data was reviewed by the Data and Scientific Working Group acting in an advisory capacity to review datasets and make recommendations to address strengthen the evidence base. Datasets of relevance to the OREDP II were also sought from members of the Advisory Group. A review was also undertaken into relevant research initiatives relevant to OREDP II.

The Geological Survey of Ireland (GSI) led the data assessment. Datasets core to the assessment and available in a usable format were used in the OREDP II data management system (geodatabase), while datasets not available in a usable format or which were otherwise not suited to the national level assessment were catalogued and have informed the plan to strengthen the evidence base. Each suggested dataset was catalogued and evaluated against a set of criteria to ascertain its usability and relevance to the OREDP II. The appropriate access and licence conditions attached to the use of datasets was also assessed. The data assessment followed the FAIR principles approach to data management: FINDABLE, ACCESSIBLE, INTEROPERABLE and REUSABLE.

The datasets are organised into the following four primary themes:

- Technical opportunities
- Environmental
- Economic
- Heritage (non-wildlife heritage)

There are sub-themes within the four primary themes. Where the dataset for each theme covers the entire area of interest for the OREDP II (national datasets), factors and activities were mapped for further consideration in the lower tier assessments in the marine planning framework.

Datasets within these themes were also analysed to identify infrastructure not considered compatible with ORE at this time. These were grouped into a further ‘exclusions’ theme.

## 7.2 Criteria for Inclusion

As a national level spatial assessment, the focus is necessarily on use of national datasets. In consultation with stakeholders, a set of five criteria was identified for the evaluation of data for use in the plan. Data identified in the data review as relevant to the plan were evaluated against these criteria to determine if they were suitable for use in the plan.

Some datasets were found not suitable for inclusion in the models for different reasons which have all been documented. Many of the datasets not used in the development of the plan itself were used in other parts of the OREDP II, for example as part of the SEA and AA for the plan.

In addition, datasets identified as not suitable for use in the plan may be considered in the lower tier assessments to be carried out at future stages in the MSP framework. Table 3 summarises the criteria for the evaluation of data for use in the plan.

**Table 3: Criteria for evaluation of data for OREDP II**

<p><b>Criteria 1: Relevance</b></p>	<p>Does the data contribute information on species or habitats defined as important within the NMPF and within the remit of OREDP II? These include, for example:</p> <ul style="list-style-type: none"> <li>• Annex I of the Habitats Directive</li> <li>• Annex II of the Habitats Directive known to occur within Irish waters</li> <li>• Annex IV of the Habitats Directive known to occur within Irish waters</li> <li>• Threatened and/or declining species and habitats as defined by OSPAR</li> </ul> <p>The full list of datasets used in the development of the OREDP II is documented collectively at Appendices C-G of this document and in the data decision logs which are available on <a href="http://www.gov.ie/OffshoreEnergyPlan">www.gov.ie/OffshoreEnergyPlan</a></p>
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<b>Criteria 2: Spatial relevance</b>	<ul style="list-style-type: none"> <li>• Is the data representative of the entire OREDP II plan area for the relevant species/habitats?</li> <li>• Is the data relevant for transboundary considerations?</li> <li>• Is the data restricted to a limited portion of the overall area under consideration? <ul style="list-style-type: none"> <li>○ For example, does the data provide specific point information?</li> <li>○ For example, does the data give larger 'area' locators, such as 5km squares?</li> </ul> </li> </ul>
<b>Criteria 3: Provenance</b>	<ul style="list-style-type: none"> <li>• Is there a described methodology with known expertise, clear quality control and an evidence base?</li> <li>• Has the data been peer reviewed?</li> <li>• Has the data been gathered by experts?</li> <li>• Does the data provide a clear audit trail for the Plan?</li> </ul>
<b>Criteria 4: Accessibility</b>	<ul style="list-style-type: none"> <li>• Is the data available or obtainable in the required timeframe?</li> <li>• Is the data readily available in shapefile format for integration into the developing Plan?</li> <li>• Does the data fill an existing or identify a new data gap?</li> <li>• Does the data provide information on a potential constraint to the Plan?</li> </ul>
<b>Criteria 5: Temporally valid</b>	<ul style="list-style-type: none"> <li>• Is this data time sensitive? <ul style="list-style-type: none"> <li>○ For example, was it collected within a reasonable time frame, such as five years?</li> </ul> </li> <li>• Does the data provide an accurate representation of the species/habitat over time?</li> <li>• If seasonal, are the relevant season(s) included?</li> </ul>

A decision data log documenting the decisions made for each dataset is made available at [www.gov.ie/OffshoreEnergyPlan](http://www.gov.ie/OffshoreEnergyPlan). The decision data logs document which datasets were

suitable for use in the OREDP II and the SEA and AA for the plan. They also identify additional datasets which must be considered in the lower tier assessments in the marine planning framework at the DMAP and project levels, in conjunction to those with national coverage. They also identify wider data needs to strengthen the evidence base.

### **7.3 Findings from the Data Review**

The data assessment carried out for the OREDP II has substantially updated the evidence base of marine data and knowledge relevant to spatial planning for ORE. The data collected has informed not only the development of the OREDP II but has created an evidence basis for the future identification of areas most suitable for ORE as part of the enduring plan-led regime. This will ensure that spatial planning for ORE will be informed by best available evidence on an on-going basis. There was a cut-off date of the 31 May 2022 for the inputting of new datasets into the development of the OREDP II, due to the need for the SEA and AA assessments to commence.

The data assessment has brought together a vast amount of marine data held across Government, contributing to our understanding of the marine environment and biodiversity in the context of ORE. The filling of identified data and knowledge gaps will deepen this understanding. This valuable marine data catalogue will be published and made accessible to other stakeholders.

The data decision logs created as part of the OREDP II process can be used to support all Departments and bodies in utilising the data gathered to inform policy development under their remit in line with the principle of collect once, use often. For example, the OREDP II data decision logs may usefully inform sectoral marine activities. Publication of the data decision logs will also be of use to stakeholders such as academics/researchers, non-governmental organisations and offshore renewable developers. The data decision logs for the OREDP II are available at [www.gov.ie/OffshoreEnergyPlan](http://www.gov.ie/OffshoreEnergyPlan).

A number of limitations were also identified from the data review regarding the availability of national level datasets covering all of our waters. However, the assessment found that there is a significant amount of data available at a local level which is suitable for use in lower tier assessments in the marine planning framework. As set out above, this additional data must be considered in the lower tier assessments at the DMAP and project levels, in conjunction with those with national coverage.

## 8 OREDP II Assessment

This chapter sets out the steps taken in the assessment of the maritime area out to the outer limit of the EEZ using the datasets identified as described in Section 7. This section includes consideration of the areas of opportunity for ORE and assessment of other activities that are known in these areas. Chapter 9 goes into greater detail on the resource potential, based on a number of assumptions made on each technology type.

### 8.1 Approach

The approach to spatial planning is a multi-stage process. A multiple-criteria analysis was used to map areas suitable for fixed and floating offshore wind, wave and tidal technologies and factors and activities relevant for ORE development.

The five criteria used in the multiple-criteria analysis mirror the data themes for categorising the data in the data review. The five criteria are:

- Technical opportunities
- Exclusions
- Environmental factors
- Economic activities
- Heritage factors

A dedicated Geographical Information Systems (GIS) model was built for each criterion to carry out the analysis:

- **Technical opportunities:** identifies areas of Ireland's maritime waters where characteristics are most favourable to ORE development such as water depth and wind and wave climate. Data for inclusion were agreed following engagement with relevant experts.
- **Exclusions:** removes activities or receptors which are considered incompatible with ORE development at this time such as cables and pipelines, internal shipping routes or existing offshore infrastructure. Data for inclusion in the model and any buffer distances around activities or receptors were agreed following engagement with relevant experts.
- **Environmental Factors:** includes environmental factors, which may be relevant to the development of ORE such as designated sites.

- **Economic Factors:** includes activities which may be relevant to the development of renewable energy such as fishing activity and shipping activity.
- **Heritage Factors:** includes heritage factors which may be relevant to the development of renewable energy such as UNESCO world heritage sites.

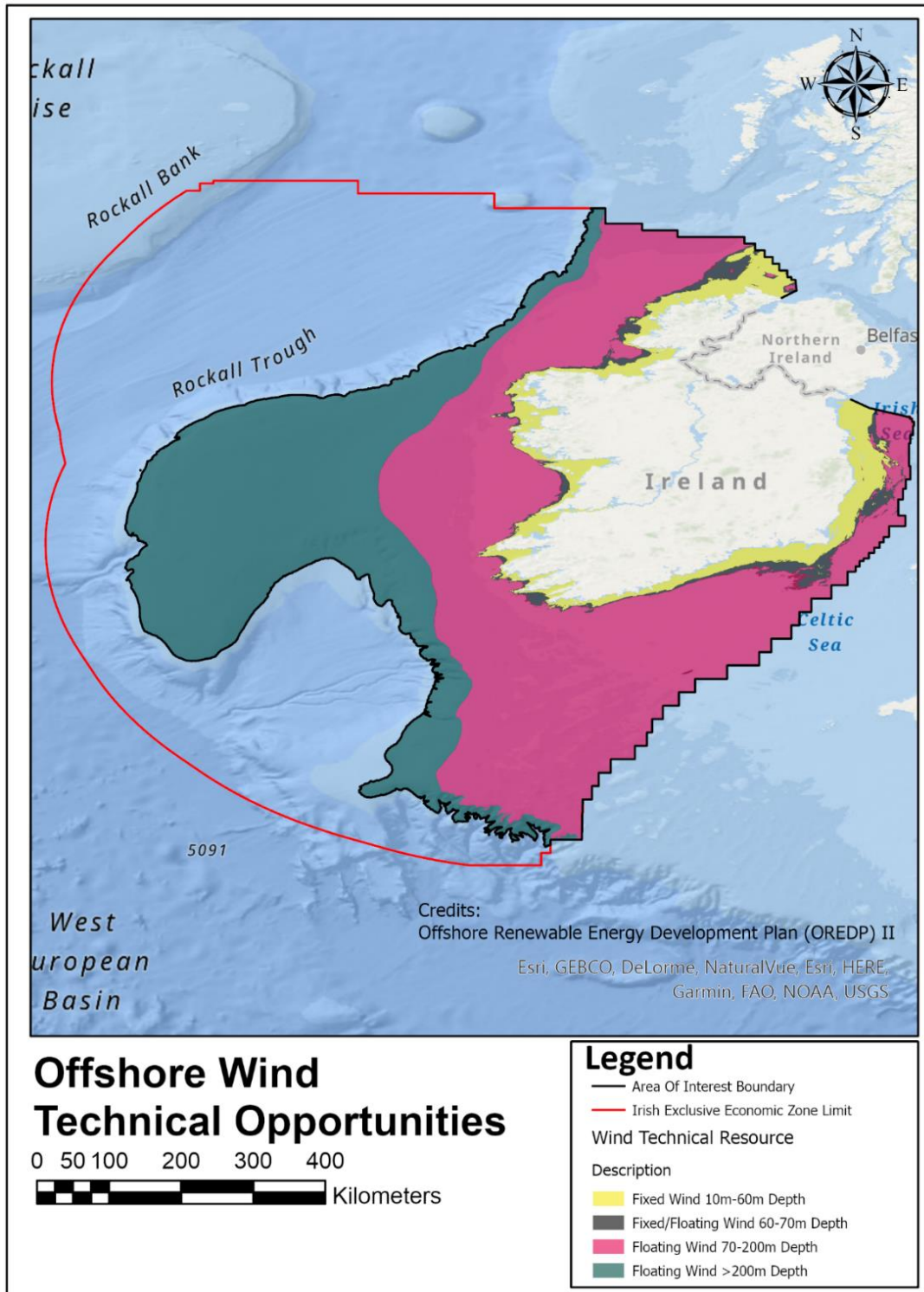
See Appendices C – G for a full list of data included.

The following sections provide further detail on the data included in each thematic area.

## 8.2 Technical Opportunities

The starting point for the assessment was the full extent of Ireland's maritime area out to the outer limit of the EEZ. The next step involved determining within that footprint what areas are suitable for the renewable energy technologies defined as within scope. This included fixed and floating wind, including wave and tidal technologies. The potential for each is set out in the next number of pages.

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**Figure 8-1: Technical opportunities - offshore wind**

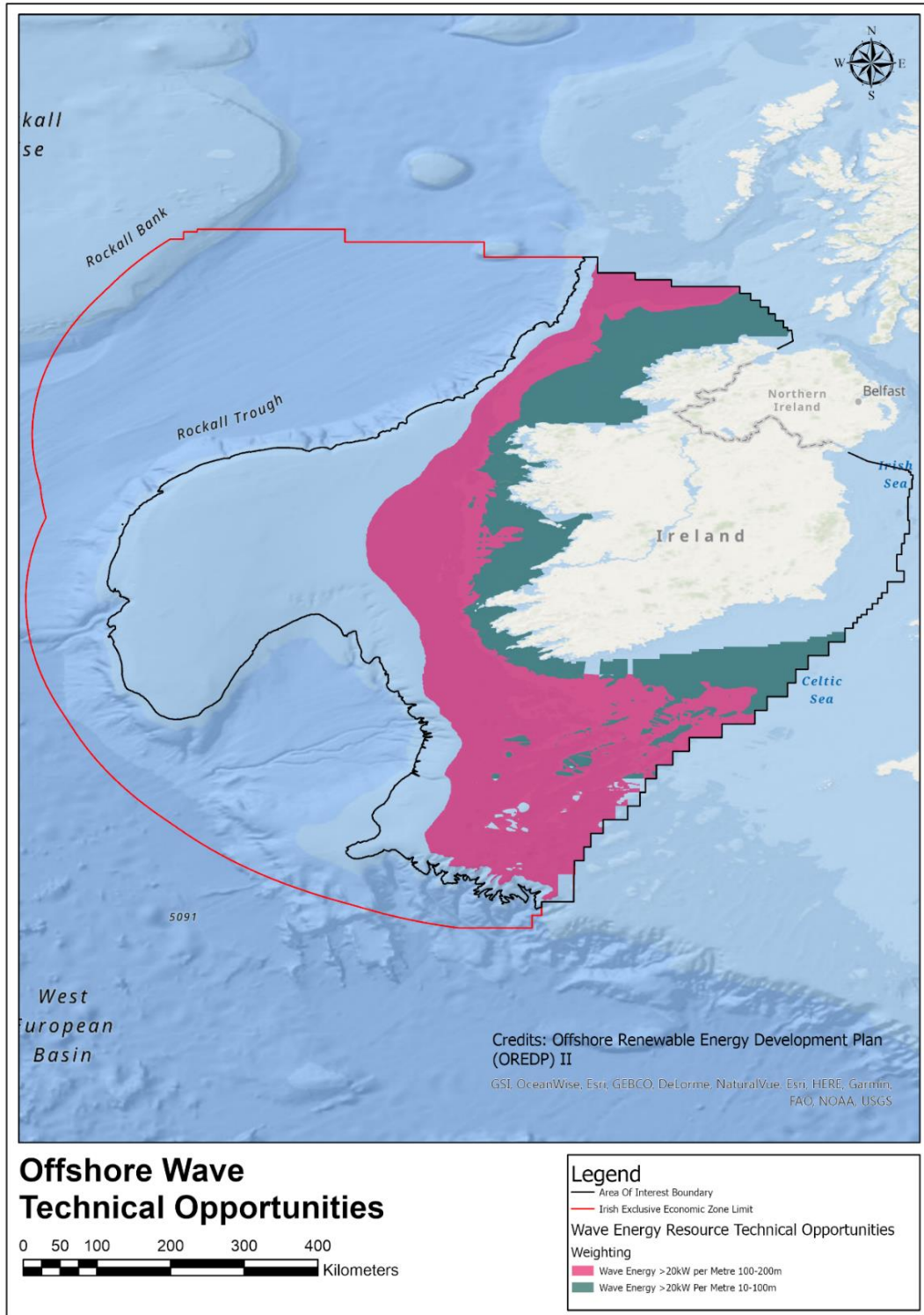
The key factors used to determine potential for both fixed and floating wind is water depth or bathymetry and wind speed. Key assumptions used in the analysis were based on expert input and current research, with fixed turbines assumed to be suitable to deployment to 60m depth and floating wind suitable from 60m depth out to a limit of 1000m depth. The latter is a

current theoretical maximum given devices have not yet in practice been deployed that far offshore in any jurisdiction. This is a significant change compared with OREDP I and explains the much larger potential deployment areas identified. Modelled wind speed data is available but the resolution and degree of seasonal variations have not been fully built into the assessment. Only areas with mean average wind speeds of greater than or equal to 7 meters per second were considered in the analysis. A full list of data included in the technical opportunities assessment can be found in Appendix C.

The OREDP II 1000m water depth contour Area of Interest was defined by reference to the deepest water depth where floating offshore wind is currently deemed feasible. This is a theoretical outer limit as it is expected that the first floating wind developments will be built in shallower waters. It is more difficult and expensive to develop in deeper waters. Areas further offshore are also more exposed to extreme weather which create operational challenges, such as access and maintenance.

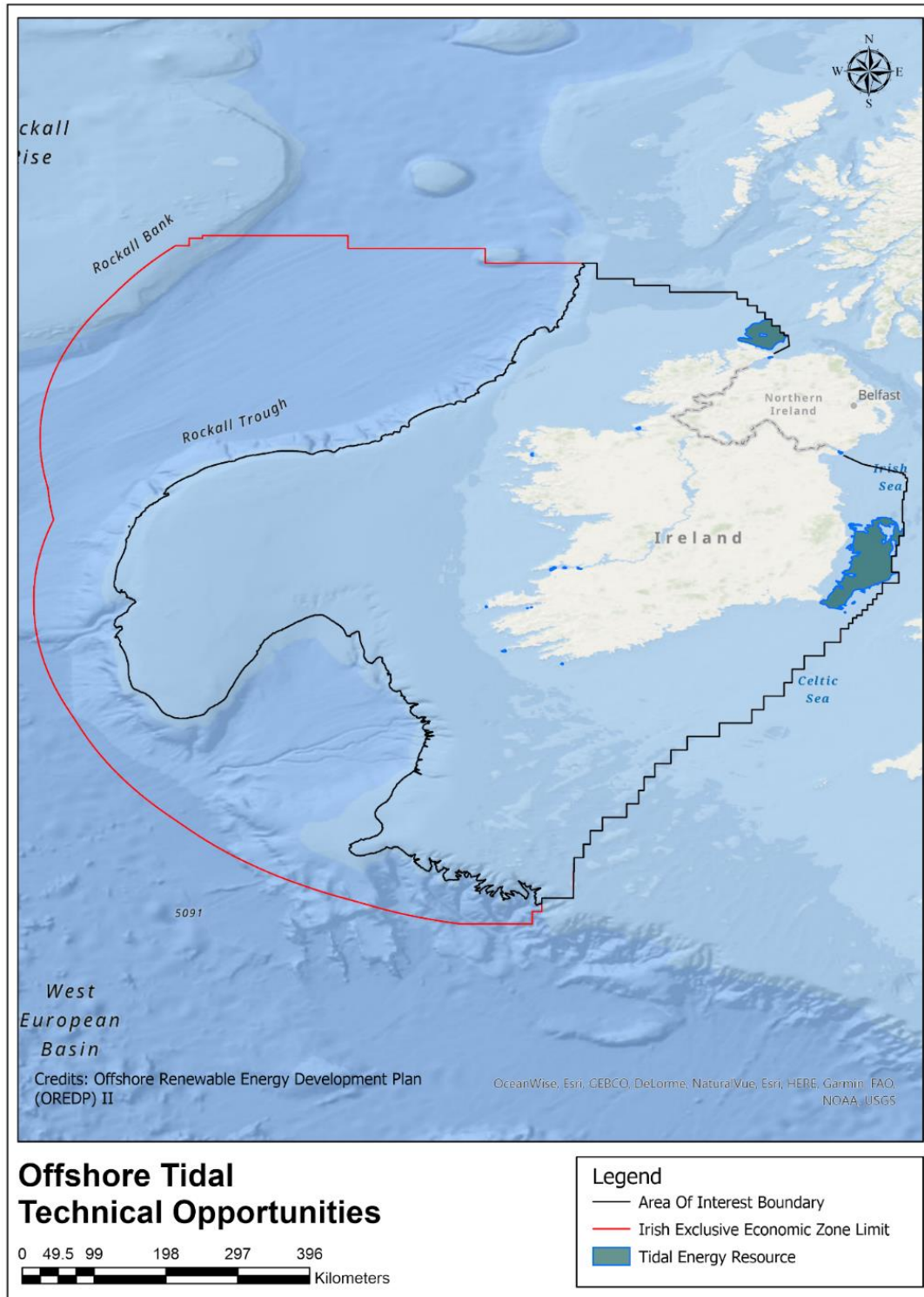
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**Figure 8-2: Technical opportunities - offshore wave**

For wave energy devices, water depth, wave height and wave periods are the key assessment factors. Areas with a power density of greater than 20 kilowatts (KW) per meter were included in the analysis. Results from the analysis tally closely with the assessment for OREDP I, with minor changes in the area mapped.



**Figure 8-3: Technical opportunities - offshore tidal**

The tidal assessment is based on areas that have depths of between 20m and 80m with peak spring tidal current speeds of 1.2m per second or greater. The areas identified in this OREDP II assessment are similar to OREDP I.

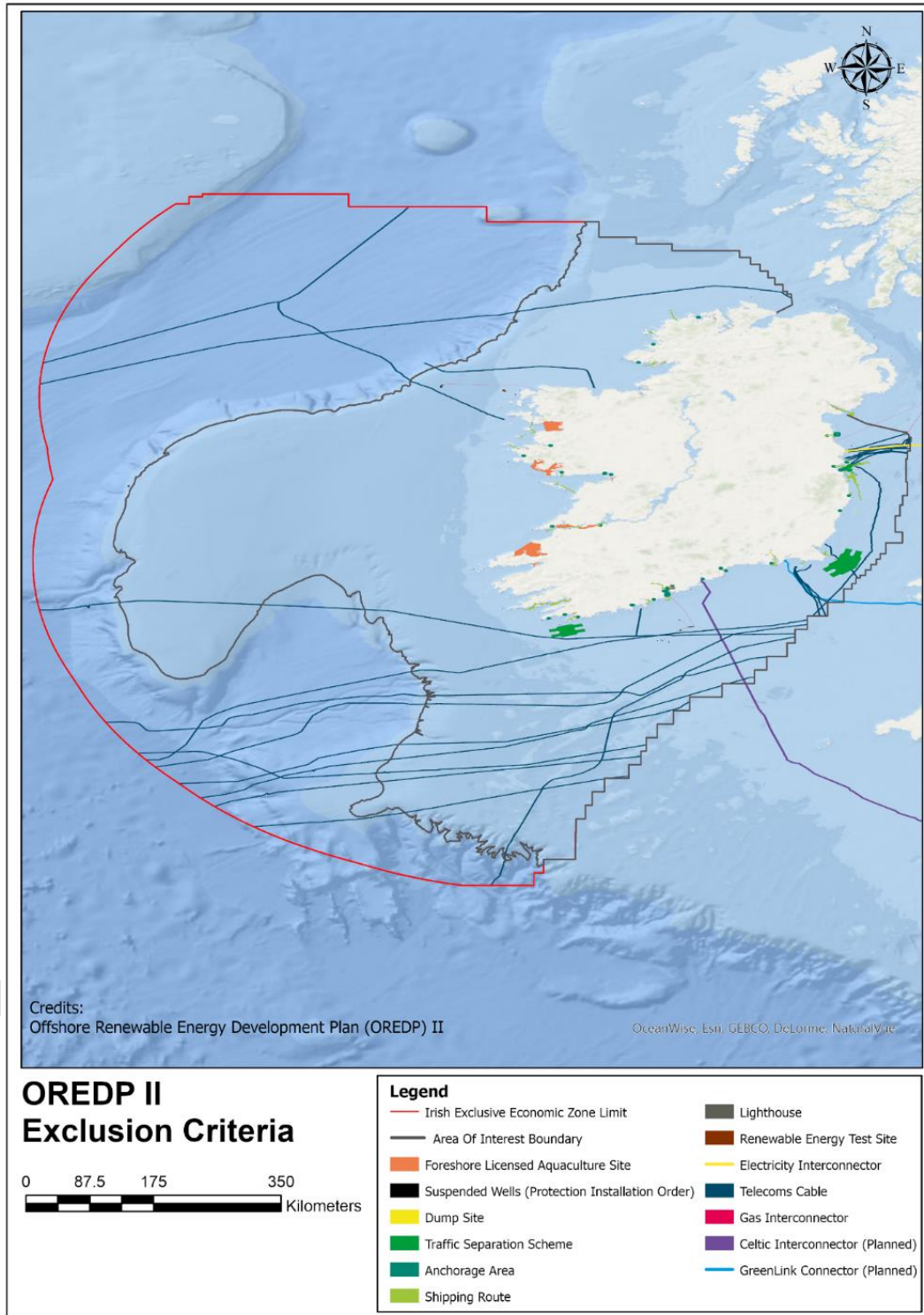
## 8.3 Exclusions

The output from the exclusion model present activities and areas that have been identified as not being compatible with the development of ORE at this time. Exclusions were identified in consultation with relevant expert groups and competent national authorities and align with national and international law and regulations. The area for exclusions combined is approximately 11,822km<sup>2</sup>. Appendix D provides a full list of the data included in the exclusions model and buffers applied.

Exclusions include:

- Traffic separate schemes
- Nearshore anchorage areas
- High density shipping routes (AIS Shipping Traffic Intensity greater than 10 hours)
- Offshore cables and pipelines
- Early-stage interconnector projects
- Renewable energy test sites
- Dumping at sea sites
- Lighthouses
- Suspended wells
- Aquaculture

Many of these features have safety buffer zones that extend the exclusion areas. The inclusion of safety buffer zones does not pre-empt decisions on licence or consent applications for ORE. Rather, the intention is to provide information on relevant activities for further consideration in the lower-tier assessments.



**Figure 8-4: Exclusions criteria for OREDP II**

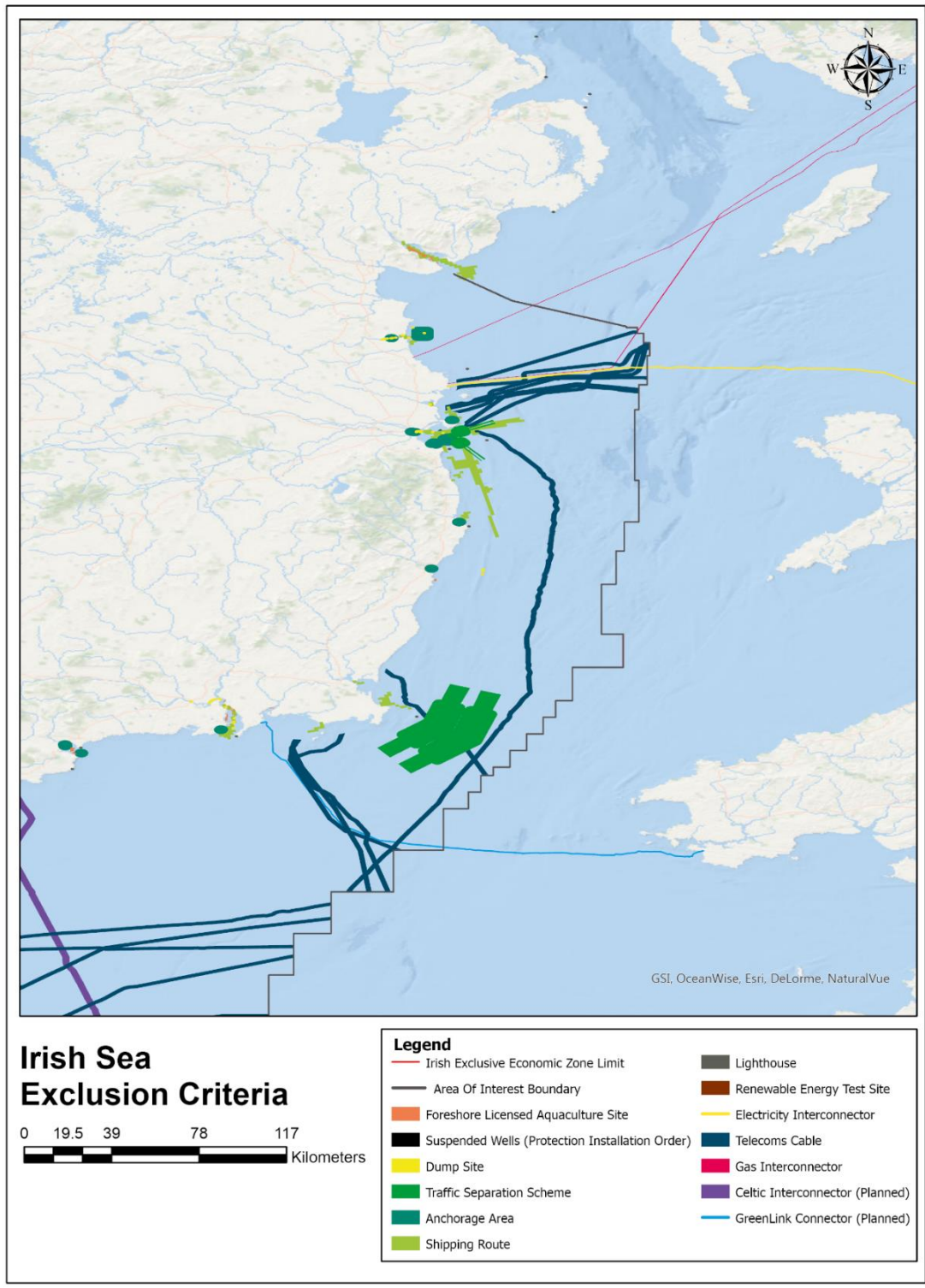
The OREDP II Exclusion Criteria map presents a breakdown of the exclusions:

- Foreshore Licenced Aquaculture site
- Suspended wells (Protection Installation order)

- Dumping at Sea
- Traffic Separation Scheme
- Anchorage Area
- High Density Shipping Route - (mainly on the approaches to major ports)
- Lighthouse
- Renewable Energy Test site
- Electricity Interconnector (Existing)
- Gas Interconnector
- Celtic Interconnector
- Greenlink Interconnector (Planned)
- Telecoms Cable

The largest areas of exclusions are two maritime traffic separation schemes off the southeast and southwest coasts. Most of the remaining exclusions are related to offshore cables and pipelines from the oil and gas, renewables and telecommunication sectors, including planned electricity interconnector cables. Suspended oil and exploration wells are represented.

ORE development and test sites are also included in the exclusions model. Only lighthouses as fixed navigation aids, as opposed to potentially moveable buoys, are represented as exclusions in this model. Sites and areas designated and licenced for aquaculture are present on all southern, western, and northern coasts. In Tralee and Brandon Bay, shellfish aquaculture production occurs over a wide range and this is evident from the large area shaded. Two large dumping at sea areas exist, one off Dublin City and the other off Cork City.



**Figure 8-5: Focus on exclusions in the Irish Sea**

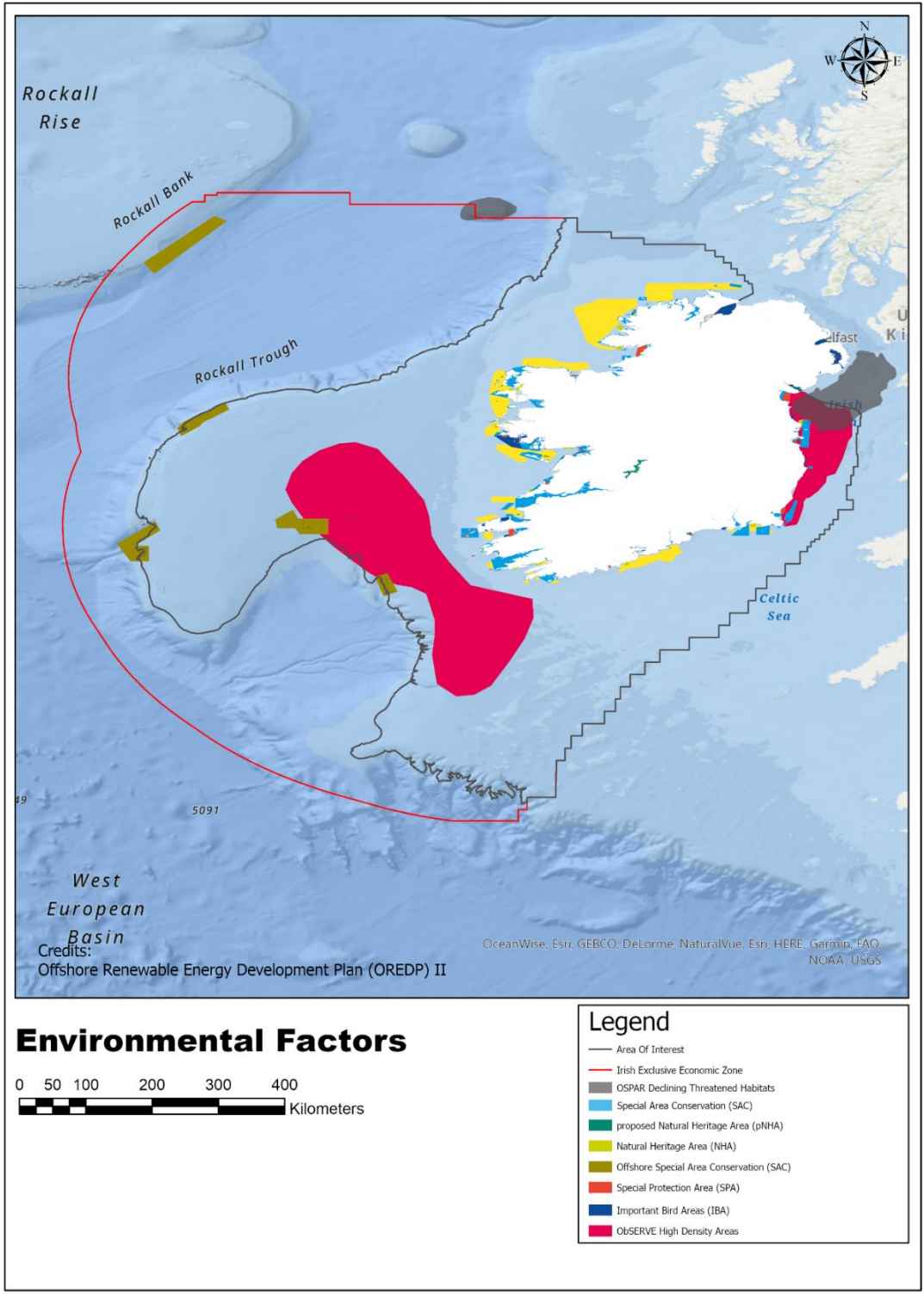
The Irish Sea Exclusion Criteria map presents a breakdown of the exclusions applied for the east and southeast coasts.

## 8.4 Environmental Factors

This stage of the analysis mapped the national level environmental data available following the data review and consideration of each dataset against the criteria defined in the earlier chapter. Appendix E provides a full list of the data included in the environmental model.

The factors mapped do not pre-empt decisions on licence or consent applications for ORE. Rather, the intention is to provide information on relevant factors for further consideration in the lower-tier assessments.

Data for inclusion in the model were identified in consultation with relevant expert groups. Each dataset suggested for inclusion in the plan was catalogued and evaluated against the five criteria outlined in Section 7.2 to identify data suitable for use in the plan. Many of the datasets not used in the development of the plan will be used as part of the SEA and AA for the OREDP II. In addition, datasets identified as not suitable for use in the plan will still be considered in the lower tier assessments of the new marine planning framework where relevant. In particular, local data will be used for further analysis as part of any designation process and must be used as at the project level, in conjunction to those with national coverage.



**Figure 8-6: Environmental factors considered for OREDP II**

Environmental datasets suitable found to be suitable for the national level assessment for OREDP II are:

- Proposed Natural Heritage Area (pNHA)



- Natural Heritage Area (NHA)
- Offshore Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Special Area Conservation (SAC)
- OSPAR Declining Threatened Habitats
- Important Bird Areas (IBA)
- obSERVE High Density Areas
- Herring Spawning Grounds

The environmental factors map shows a greater concentration of environmental factors on the west, southwest and east coasts. These areas are primarily associated with SACs and SPAs, collectively known as European Sites or Natura 2000 sites, which are the main components of the Natura 2000 network. The presence of these sites does not expressly preclude the ability to develop ORE projects. However, development will be subject to additional regulatory processes and may require specific mitigation and monitoring that would make avoidance of these sites preferable from both a nature conservation and project development perspective. Under the EU Habitats Directive, any plan or project with the potential to impact on the integrity of a Natura 2000 site must undergo an AA. It may also mean that avoidance is required under Article 6(3) of the EU Habitats Directive. It should be noted that both in-situ and ex-situ impacts need to be considered. Where negative impacts are identified (and avoidance and mitigation are not possible), this could lead to increased risk in terms of planning and reducing the likelihood of a project obtaining the relevant permissions required for development.

Unlike SPAs, IBAs are not statutorily protected but are often within protected sites and are often used as a basis for designating SPAs. Coastal habitats provide important breeding sites for many species of seabirds, all of which have some level of protection under national and European legislation. Some bird species are at risk to near and offshore development as they can, for example, be easily displaced by the presence of boats and offshore structures. This displacement can be considered equivalent to habitat loss, as the birds must find alternative feeding grounds.

Cetaceans (whales, dolphins and harbour porpoise) and pinnipeds (for example, common and grey seals) are the marine mammals most likely to be encountered within the study area. Harbour porpoise, bottlenose dolphin, common and grey seals are listed on Annex II of the Habitats Directive which requires the designation of SACs where areas of importance for these species can be identified. All cetaceans are listed on the Directive's Annex IV,

therefore requiring strict protection both within and outside Natura 2000 sites. All species are listed as protected species on the 5th Schedule of the Wildlife (Amendment) Act 1976-2005. Marine mammals may be at risk from habitat destruction, physical barriers to movement, disturbance and potential displacement because of increased noise levels from the installation of ORE projects. The level of risk would depend on the size, nature and location of the projects, installation/construction methods and duration/timing of activities. A number of mitigation strategies (for example installation technique choice, use of marine mammal observers and passive acoustic monitoring) could be employed to reduce the risk of potential impacts and progress projects through the planning process through to achieving the required permissions.

The environmental factors map also incorporates data gathered from aerial surveys on high-density areas for seabirds and cetaceans conducted under the ObSERVE Project 2015–2017. This information was considered alongside the location of SPAs and their relevant features. The high-density areas on the east and southwest (offshore) coasts were identified and mapped using expert judgement based on this data.

OSPAR Declining Threatened Habitats guide the OSPAR Commission in setting priorities for its further work on the conservation and protection of marine biodiversity. Designated and proposed Natural Heritage Areas are the basic designations for wildlife in Ireland as areas considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. These are also represented in the model.

The strengthening of the environmental evidence base is to be carried on an ongoing basis as new data becomes available through mapping, monitoring, assessments, and protection designations by competent authorities.

## 8.5 Economic Factors

The output from the economic model maps areas of economic activity. Appendix F provides a full list of the data included in the economic model.

The factors mapped do not pre-empt decisions on licence or consent applications for ORE. Rather, the intention is to provide information on relevant factors for further consideration in the lower-tier assessments, and as part of decision-making for the DMAP and project levels.

The output from the economic activities model shows the highest levels of activity in southern and northeast waters. Concentrated commercial fishing intensity and shipping route density was the determining factor in this output. As well as shipping routes, high density shipping activity can be observed at certain anchorage areas as well as in relation to serving existing non-renewable offshore developments.

Operational and oil and gas platforms located off southern and western coasts are represented, as well as currently authorised licensing and explorations. Ireland no longer accepts new applications for exploration licences for natural gas or oil, nor will there be any future licensing rounds.

Marine aggregates (sand and gravel) can contribute to the sustainable management of demand and future use of aggregates in Ireland. Marine aggregate deposits surveyed on the southwest, northwest, and east coasts are mapped in this model although no commercial activity is currently in operation.

Figure 8-7 maps all combined economic factors considered for OREDP II.

Figures 8.8 to 8.12 provide a closer look at single issues in the economic factors map.

Please note the following in relation to economic factor maps:

### **Shipping Densities:**

- Automatic identification systems (AIS) transponders provide position, identification and other information ships to other ships and to coastal authorities. Data on shipping traffic in all waters based on automated data collated by the AIS system is displayed. This highlights that there is a high density of shipping traffic in the Irish Sea and St. George's Channel and the Celtic Sea. Higher resolution maps provide more information on these areas.

The AIS shipping densities displayed in the economic factors figures are:

- ≤ 55 hours
- ≤ 203 hours

- ≤ 585 hours
- ≤ 1275 hours
- ≤ 2874 hours
- ≤ 7408 hours
- ≤ 17516 hours

### **Fishing Activity**

- Commercial fishing activity typically occurs further offshore, with vessel monitoring system (VMS) in place for all vessels over 12m in length. A feature of this activity is that it is carried out by a number of countries and so data on Irish vessels does not provide sufficient coverage. As a result, an International Council for the Exploration of the Sea (ICES)<sup>2</sup> dataset which estimates bottom trawling distribution using VMS and logbook data EU countries, United Kingdom, Faroes, Iceland and Norway has been included based on expert input.
- Inshore fishing activity is less well tracked as these smaller vessels do not require the use of VMS and activity is typically much closer to shore. Data in the Marine Institute's marine atlas has been included, as the best available information, noting that most of this data dates back to 2013.

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<sup>2</sup> International Council for the Exploration of the Sea fishing intensity data

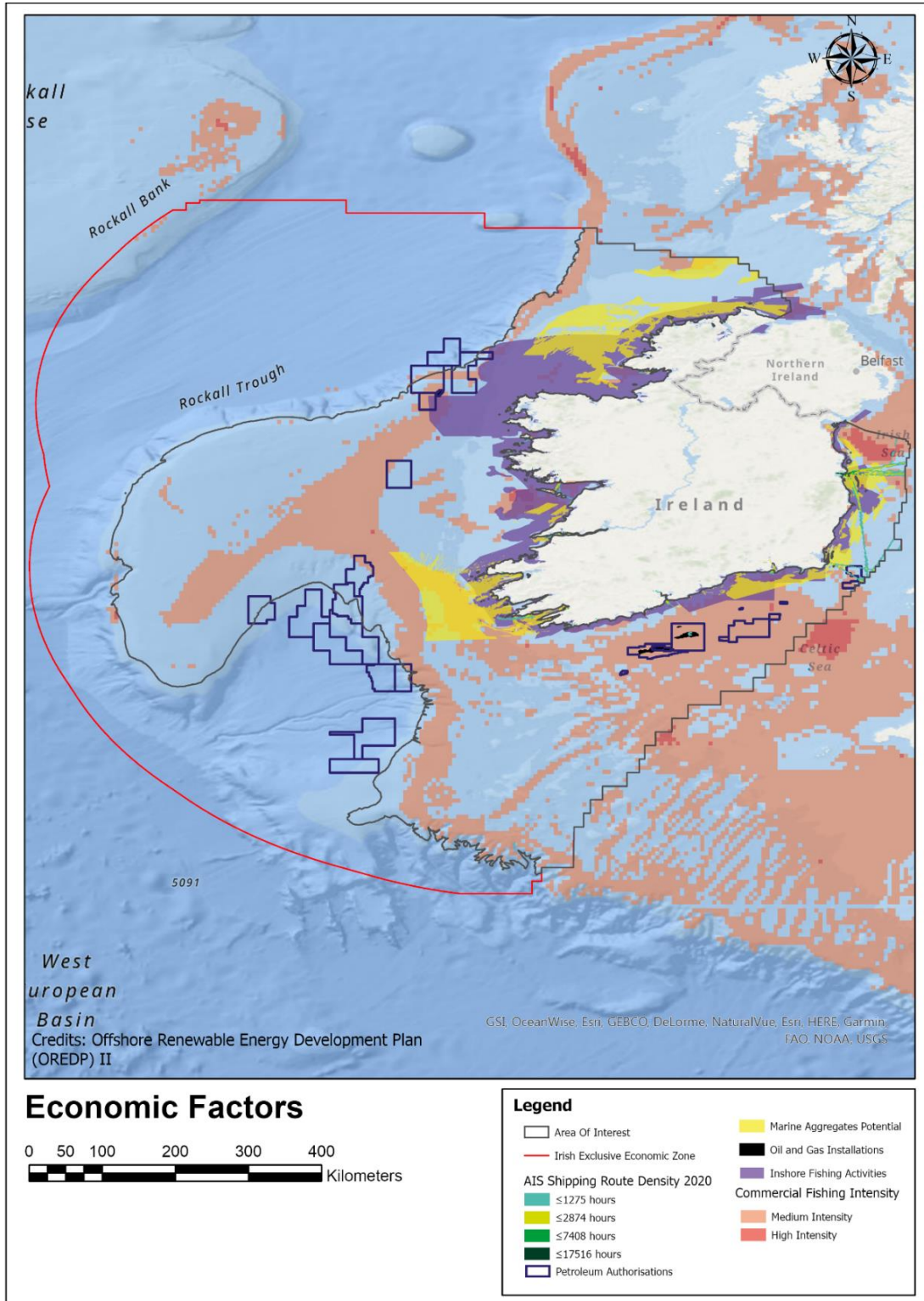


Figure 8-7: Economic factors considered for OREDP II

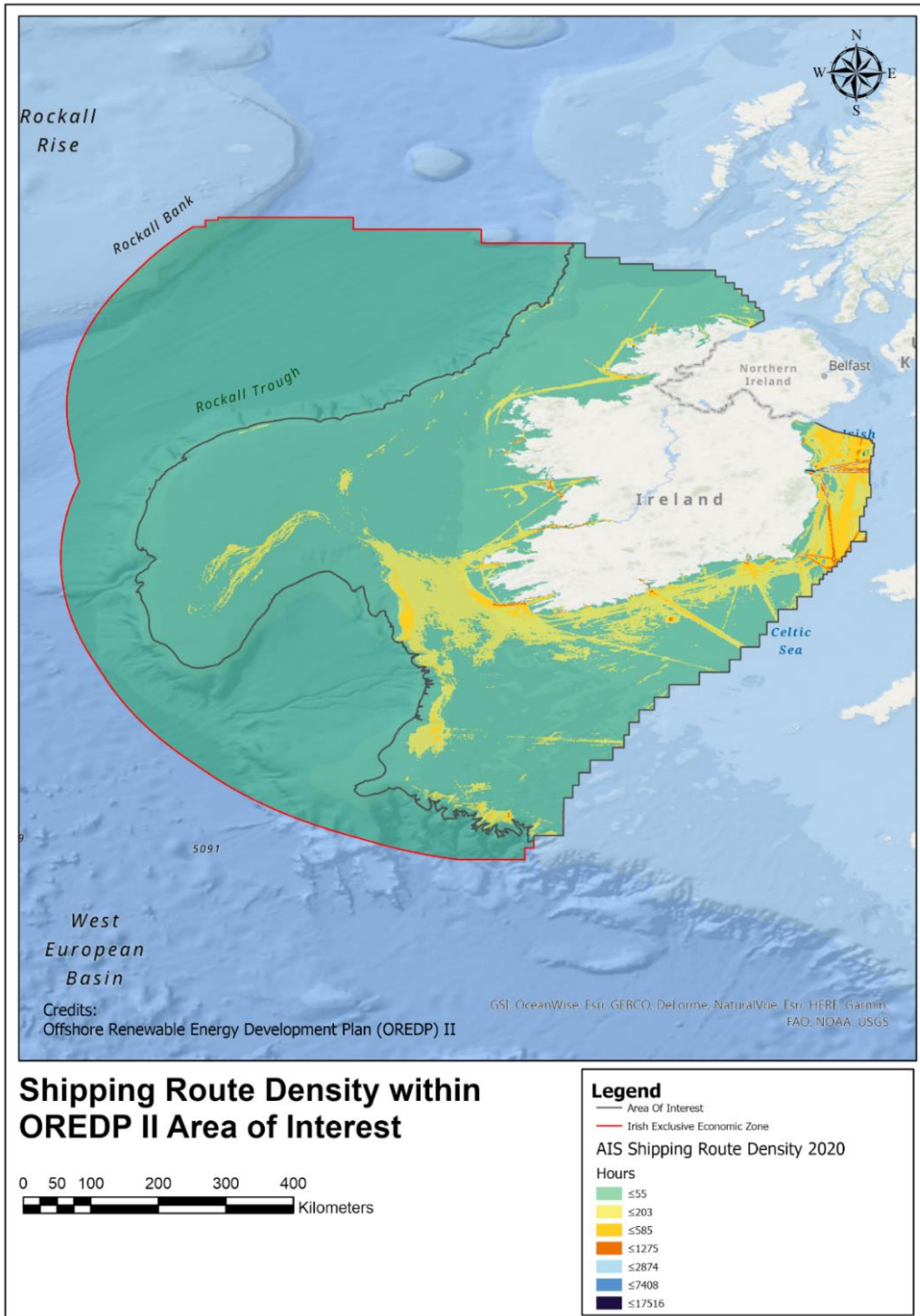
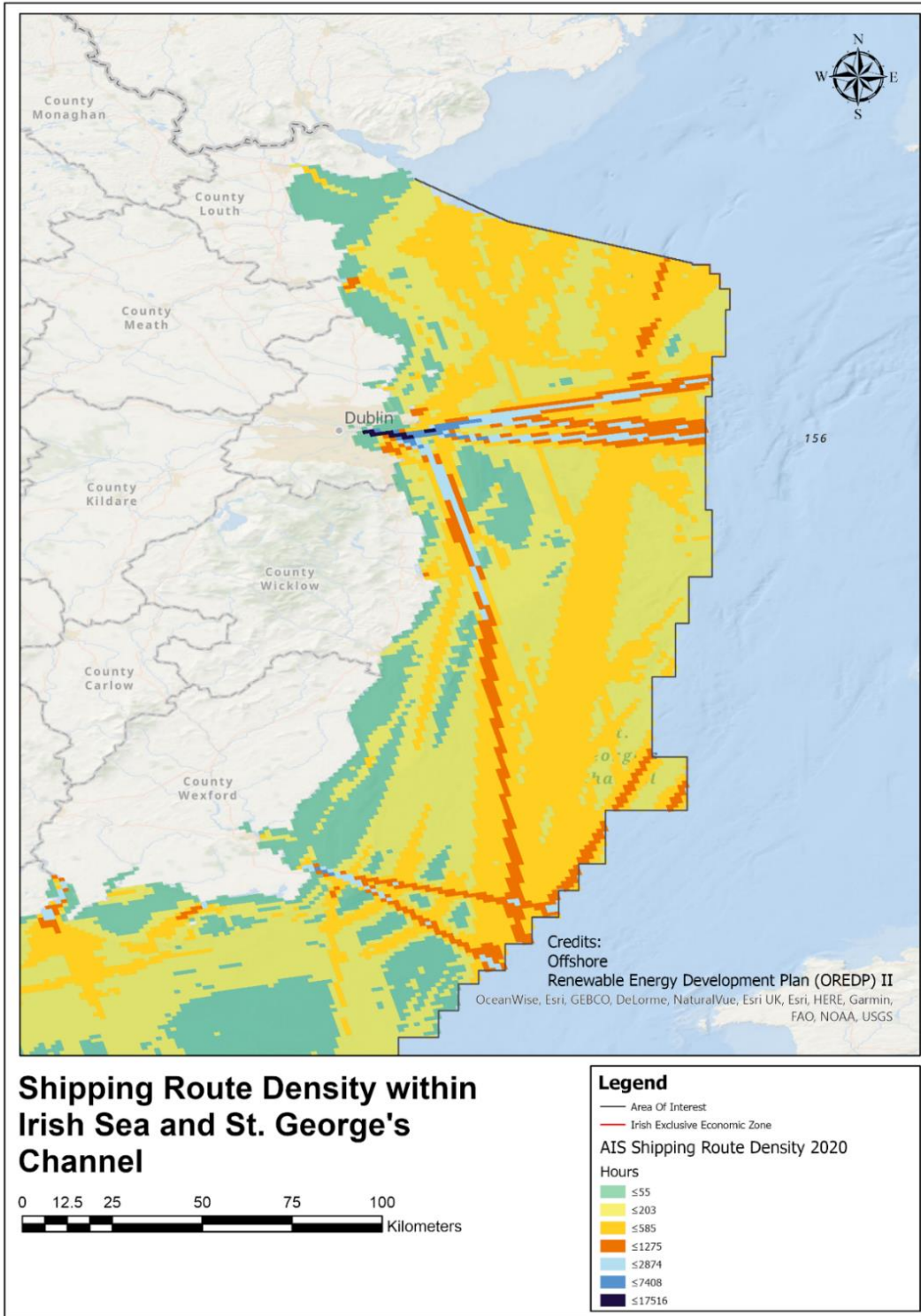
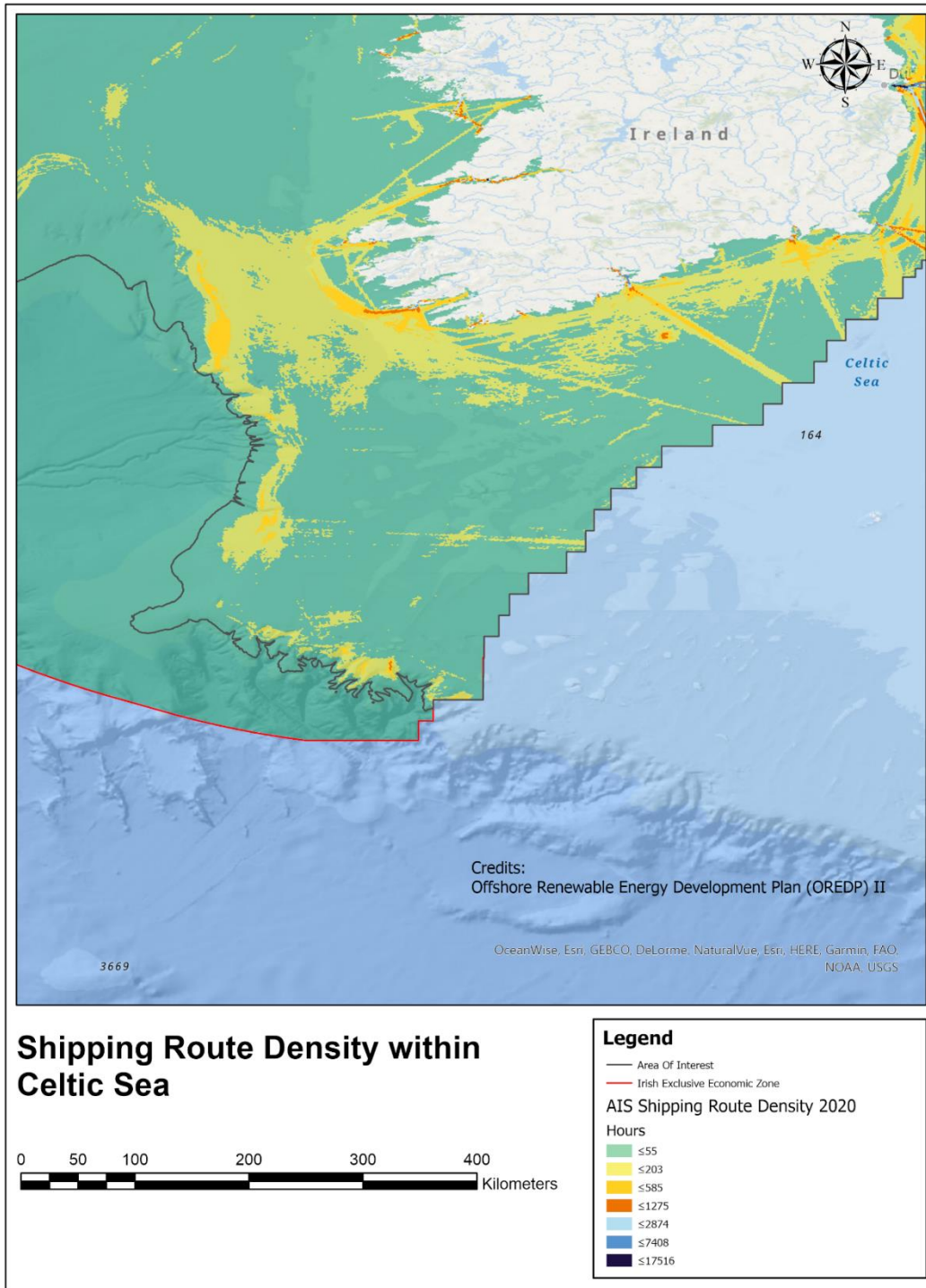


Figure 8-8: AIS<sup>3</sup> Shipping Densities (shown in yellow/red)

<sup>3</sup> <https://www.imo.org/en/OurWork/Safety/Pages/AIS.aspx>

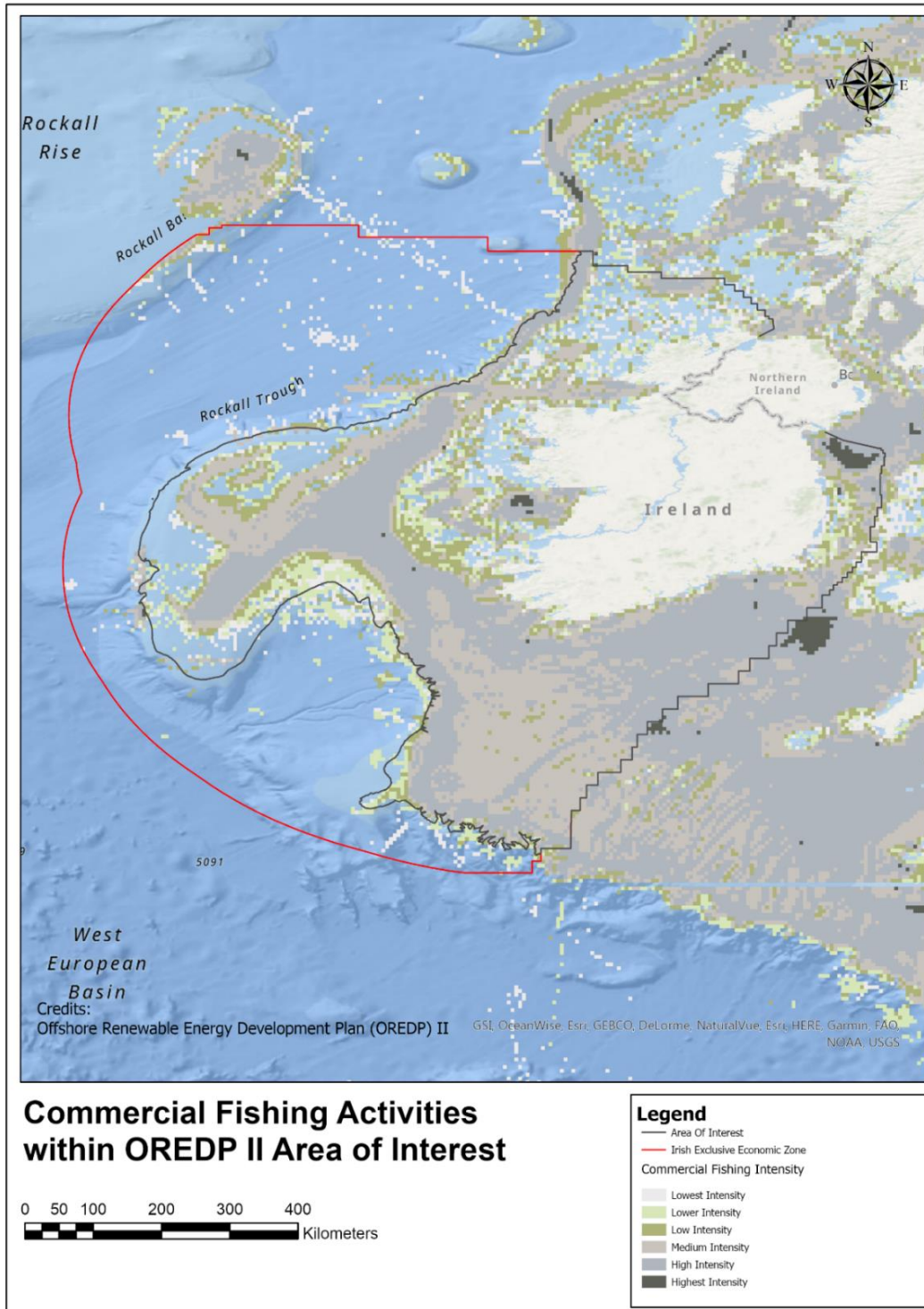


**Figure 8-9: Focus on AIS Shipping Route Density within the Irish Sea and St. George's Channel**



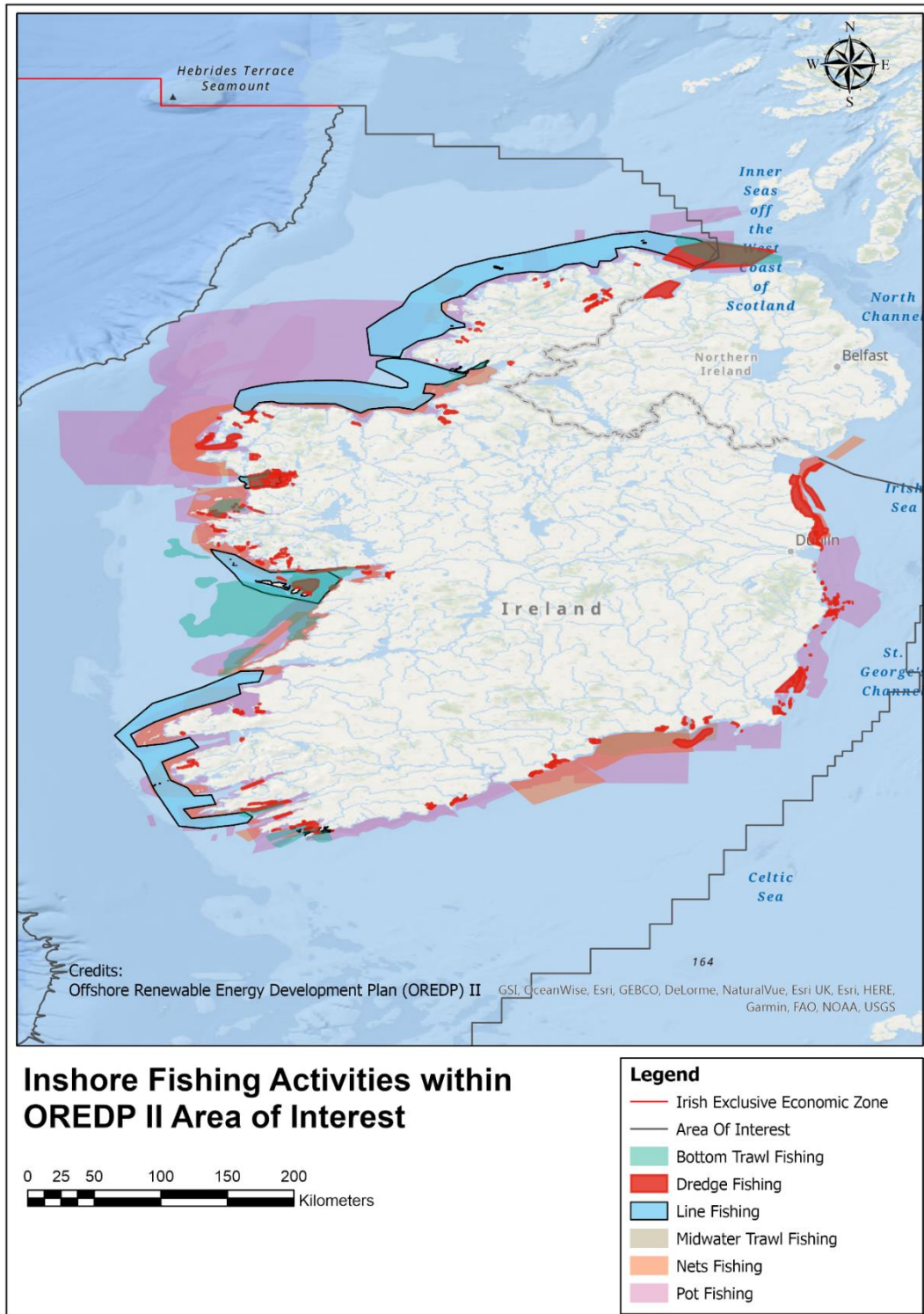
**Figure 8-10: Focus on AIS Shipping Route Density within Celtic Sea**





**Figure 8-11: Commercial Fishing Activities—ICES Fishing Intensity**

Commercial Fishing Activities—ICES Fishing Intensity maps the estimated bottom trawling distribution.



**Figure 8-12: Inshore Fishing Activities**

Inshore Fishing Activities mapped include:

- Bottom Trawl Inshore Fishing Activity
- Periwinkle Harvesting Inshore Fishing Activities

- Dredge Fishing Activity
- Line Fishing Activity
- Mid-water Trawl Fishing Activity
- Pot Fishing Activity
- Inshore Net Fishing Activity

## 8.6 Heritage Factors

The output from the heritage model (Figure 8-13) maps heritage factors. The factors included are:

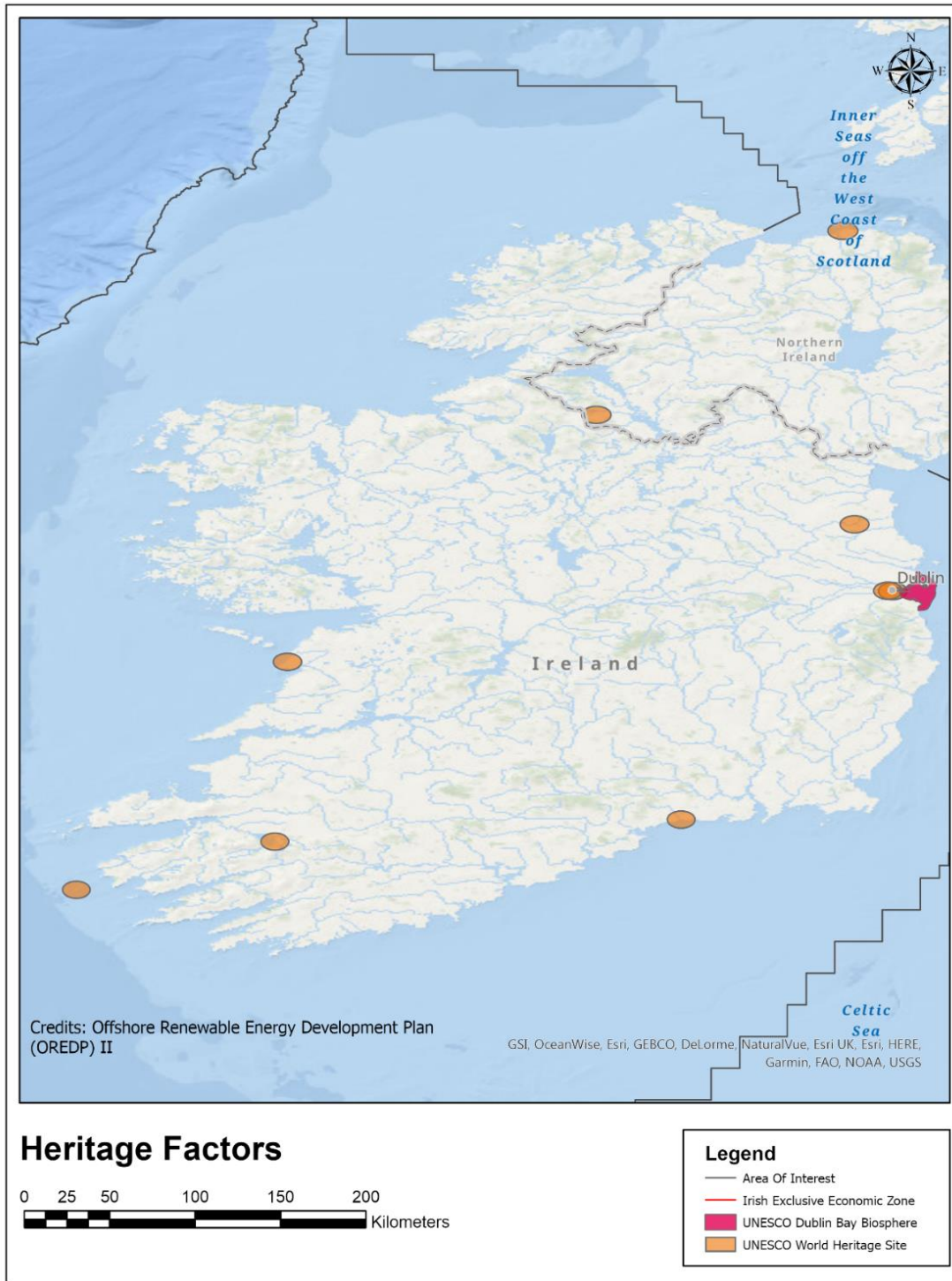
- UNESCO world heritage sites including Skellig Michael in Co. Kerry, The Burren and Cliffs of Moher Geopark, Co. Clare, Cooper Coast Geopark, Co. Waterford
- UNESCO Dublin Bay biosphere

An additional buffer of 5km has been applied to these features in the heritage model.

Data for inclusion in the model were identified in consultation with stakeholders including the Data and Scientific Group, competent national authorities and the Advisory Group.

Shipwrecks have not been included in the model for the OREDP II. Consideration was given to including shipwrecks data in the model. Given the widespread nature of the data, it was decided through the Data and Scientific Group that shipwreck data is more appropriate for consideration in the lower tier assessments, and as part of decision-making for the DMAP and project levels. It should be noted that a map of shipwrecks in Irish waters is available as part of the NMPF and can be accessed at [www.marineplan.ie](http://www.marineplan.ie). Appendix G provides a full list of the data included in the heritage model.

The factors mapped do not pre-empt decisions on licence or consent applications for ORE. Rather, the intention is to provide information on relevant factors for further consideration in the lower-tier assessments, and as part of decision-making for the DMAP and project levels.



**Figure 8-13: Heritage factor areas for OREDP II**

## 8.7 Summary

The assessment of available national level datasets presented in this section is an important step in updating the knowledge base regarding our maritime area. The information highlights the broad range of activities and characteristics that need to be considered in effective maritime spatial planning. While there is much data available nationally, additional data and information has been identified that will prove more useful for use in a regional level assessment.

It is evident that advances in technology have increased the potential area available for renewable energy compared with areas identified in OREDP I. While it is accepted that the energy potential is greater the further offshore devices are placed, this also creates additional challenges in terms of operation and maintenance of installations in heavy seas and difficult conditions. Further insights on seasonal conditions and accessibility would help refine the assessment of potential for ORE in more distant offshore areas further.

Significant amounts of information on environmental factors are known and presented in this section. As with all data, what is presented in this report is a snapshot of what was available at a point in time. Further work is in progress by the NPWS to designate more sites as SACs and SPAs.

In parallel work is underway by the DHLGH to deliver legislation and undertake work to designate 30% of marine waters as Marine Protected Areas. In December 2022, the Government approved and published the General Scheme of the Marine Protected Areas Bill. The Bill will be drafted and progressed through the Houses of the Oireachtas in the first half of 2023. A screening exercise in the Irish Sea has commenced to identify areas most likely to be designated as MPAs. The enactment of the MPA Bill in 2023 will enable further identification of MPAs. These developments will be important factors to consider in future iterations of this strategy.

## 9 Technical Resource Energy Potential

The marine space provides opportunities for a range of renewable energy technologies. This section provides an overview of these technologies and their state of readiness for commercial deployment. The theoretical resource potential is also estimated.

### 9.1 Overview of Renewable Energy Technologies

Wind, wave and tidal energy technologies are described in this section.

#### 9.1.1 Wind Energy

Offshore winds have greater speed and blow more consistently than onshore wind due to the lack of physical obstructions offshore. Larger turbines can be deployed offshore which allows for greater power outputs per turbine relative to onshore wind farms. In depths of 10m to 60m, fixed-bottom foundation wind turbines can be deployed.

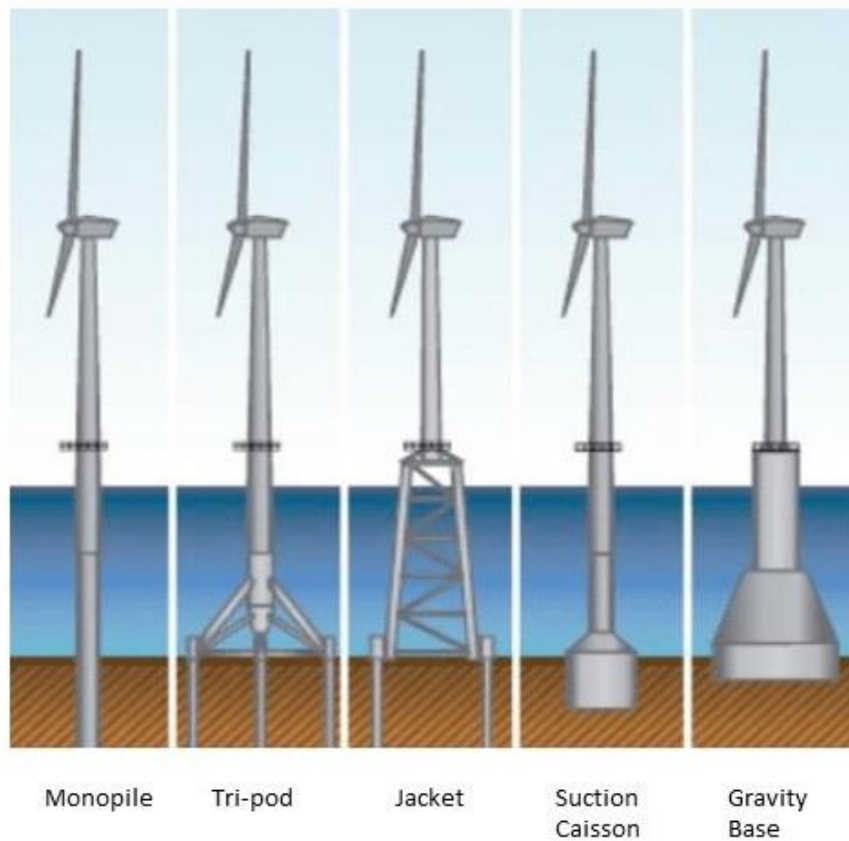
Fixed offshore wind devices exploit a resource above the sea surface and are attached to the seabed, they occupy the entire water column. The horizontal extent occupied in the atmosphere depends on the diameter of the rotor. For example, the International Energy Agency (IEA) Wind Technology Collaboration Programme (TCP) 15MW reference turbine has a rotor diameter of 240m and a hub height of 150m.<sup>4</sup> The taxonomy of fixed foundation turbines is presented in Figure 9-1. Larger foundations are required for greater depths and the seabed and metocean<sup>5</sup> conditions are also important factors in the technology choice for any given location. Fixed foundation offshore wind technologies are a mature technology with significant volumes installed globally, 57GW at the end of 2021.<sup>6</sup>

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<sup>4</sup> Gaertner, Evan, Jennifer Rinker, Latha Sethuraman, Frederik Zahle, Benjamin Anderson, Garrett Barter, Nikhar Abbas, Fanzhong Meng, Pietro Bortolotti, Witold Skrzypinski, George Scott, Roland Feil, Henrik Bredmose, Katherine Dykes, Matt Shields, Christopher Allen, and Anthony Viselli. 2020. Definition of the IEA 15-Megawatt Offshore Reference Wind. Golden, CO: National Renewable Energy Laboratory. NREL/TP-5000-75698. <https://www.nrel.gov/docs/fy20osti/75698.pdf>

<sup>5</sup> Metocean refers oceanographic and meteorological conditions, including currents, waves, air temperature, surface atmospheric pressure, and wind speed and direction (oxfordreference.com)

<sup>6</sup> Global Energy Wind Council (GWEC), Global Wind Report 2022



**Figure 9-1: Examples of fixed bottom foundation types for offshore wind turbines<sup>7</sup>**

For depths of greater than 60m, floating offshore wind devices are more feasible and economic than fixed foundation technologies. There are even greater wind speeds further offshore and more space available to deploy technologies. Floating offshore wind devices vary by the type of floating platform. How those platforms are stabilised in response to wave induced motion is one of the factors critical to the selection of the devices to be deployed at a particular location. The type of mooring is another critical factor and distinguishing feature, which will be influenced by the platform design, the site conditions, and the seabed. Classification of floating offshore wind concepts are presented in Figure 9-2. There are currently a large number of platform design concepts (60+)—predominately semi-submersibles.<sup>8</sup> Some floating offshore wind technologies are reaching technology maturity with demonstration projects already in the water, including off the coasts of Scotland,

<sup>7</sup> Image used under creative commons licence [Creative Commons — Attribution 3.0 Unported — CC BY 3.0](https://creativecommons.org/licenses/by/3.0/). Konstantinidis, E. I. & Botsaris, P., 2016. Wind turbines: current status, obstacles, trends and technologies. *IOP Conference Series Materials Science and Engineering*, p. 161 (1) 012079.

<sup>8</sup> Global Wind Energy Council, 2022, [GWEC-Report-Floating-Offshore-Wind-A-Global-Opportunity.pdf](https://www.gwec.org/wp-content/uploads/2022/07/GWEC-Report-Floating-Offshore-Wind-A-Global-Opportunity.pdf)

Norway, Portugal and China. In 2021, there was a total of 57MW floating wind installed capacity globally.<sup>9</sup>

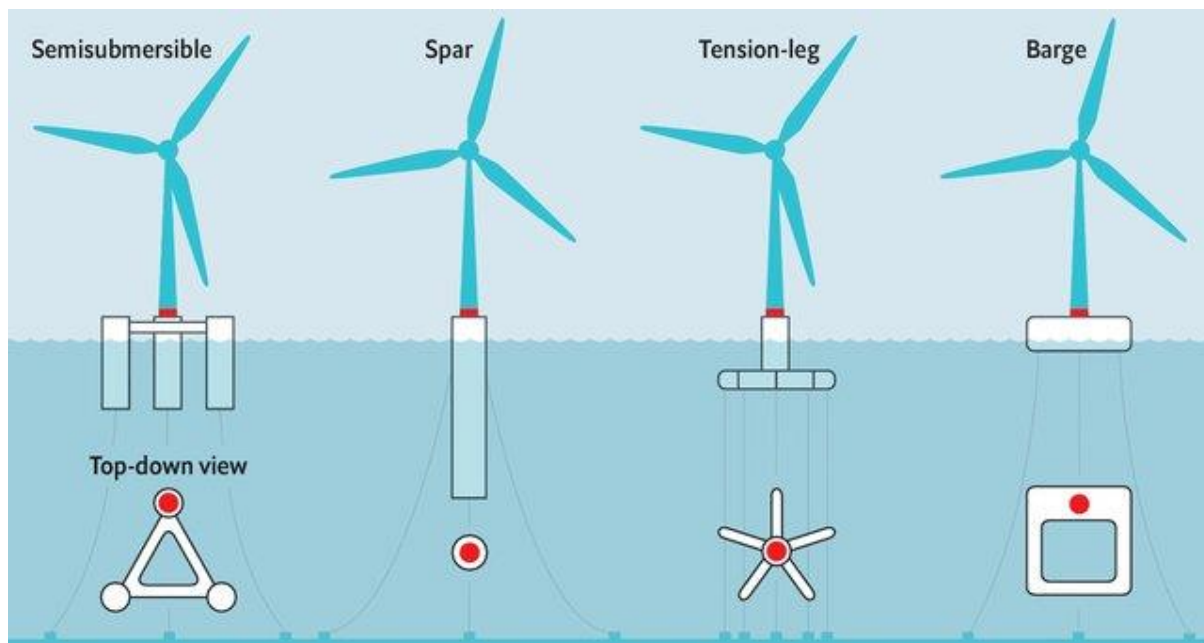


Figure 9-2: Floating offshore wind turbine foundation concepts<sup>10</sup>

### 9.1.2 Wave Energy

Waves are formed by winds blowing over the surface of the sea. The size of the waves generated will depend upon the wind speed, its duration, and the distance of water over which it blows (the fetch), bathymetry of the seafloor (which can focus or disperse the energy of the waves) and currents. The resultant movement of water carries kinetic energy which can be harnessed by wave energy devices. Waves are more persistent and consistently available than wind energy. Waves are created by the wind moving over the surface of the ocean, but they continue long after the wind has died down. This makes wave energy complementary to wind energy.

The best wave resources occur in areas where strong winds have travelled over long distances. For this reason, the best wave resources in Europe occur along the western coasts which lie at the end of a long fetch (the Atlantic Ocean). Nearer the coastline, wave energy decreases due to friction with the seabed, therefore waves in deeper, well exposed

<sup>9</sup> Global Wind Energy Council, 2022, [GWEC-Report-Floating-Offshore-Wind-A-Global-Opportunity.pdf](#)

<sup>10</sup> Image used under creative commons licence [Creative Commons — Attribution 4.0](#).

Mei, Xuan & Xiong, Min. (2021). Effects of Second-Order Hydrodynamics on the Dynamic Responses and Fatigue Damage of a 15 MW Floating Offshore Wind Turbine. *Journal of Marine Science and Engineering*. 9. 1232. 10.3390/jmse9111232.



waters offshore will have the greatest energy. Wave energy devices convert either the potential (wave height) or the kinetic (wave induced motion) energy of a wave into mechanical energy (turbine or rotor) which is then converted into electrical energy. One of the challenges for the extraction of wave energy is that wave power is available in low-speed and high forces, which the device has to resist. Moreover, the motion of forces is not in a single direction. There is yet to be consolidation in wave energy conversion technologies, with many different solutions being pursued. Wave energy technologies are currently at the pre-commercial and demonstration phase with a global cumulative capacity 24.7MW in 2021.<sup>11</sup>

### 9.1.3 Tidal Energy

Tidal streams are created by the constantly changing gravitational pull of the moon and sun on the world's oceans. Tides never stop, with water moving first one way, then the other, the world over. Since the relative positions of the sun and moon can be predicted with complete accuracy, so can the resultant tide. It is this predictability that makes tidal energy such a valuable resource. The highest (spring) tidal ranges are generated when the sun, moon and earth are in line. Water flows in greater volumes when attracted by this combined gravitational pull. The lowest (neap) tidal ranges are generated when the sun, moon and earth describe a right angle. The split gravitational pull causes water to flow in lesser volumes.

Tidal stream resources are generally largest in areas where a good tidal range exists, and where the speed of the currents are amplified by the funnelling effect of the local coastline and seabed, for example, in narrow straits and inlets, around headlands, and in channels between islands. Tidal stream technologies capture the kinetic energy of the currents flowing in and out of the tidal areas. Tidal stream devices harness the lateral flow of currents by turning a turbine. As water is denser than air, smaller devices can be deployed for tidal energy when compared to wind energy technologies. There is some potential to extract tidal stream energy in Irish waters. Tidal energy technologies are also currently at the pre-commercial and demonstration phase with a global cumulative capacity 39.6MW in 2021.<sup>12</sup>

## 9.2 Resource Potential

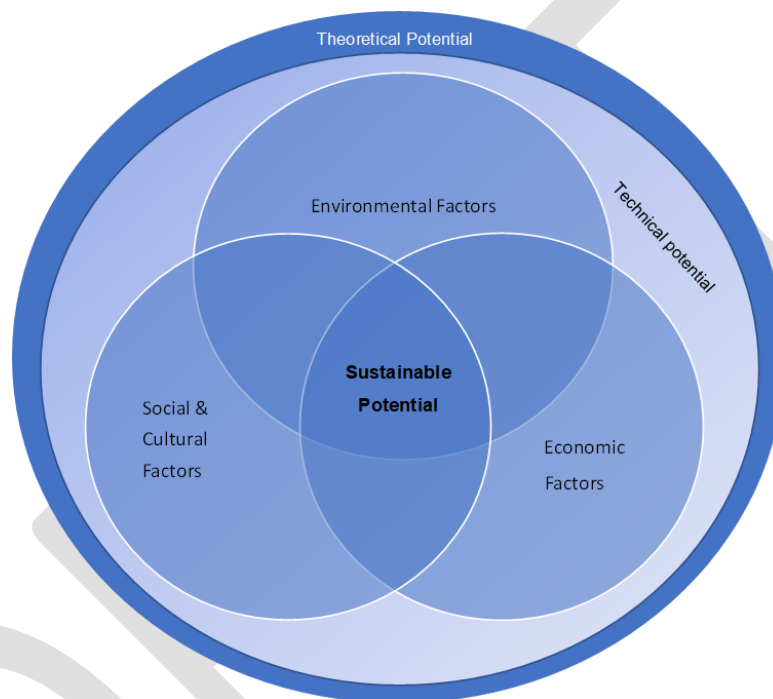
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<sup>11</sup> Ocean Energy Europe, 2022, Ocean Energy – Key trends and statistics 2021. [OEE Stats 2021 web.pdf](#)

<sup>12</sup> Ocean Energy Europe, 2022, Ocean Energy – Key trends and statistics 2021. [OEE Stats 2021 web.pdf](#)

The Sustainable Energy Authority of Ireland (SEAI) has carried out modelling to estimate the overall technical potential for fixed and floating wind, wave and tidal energy in the areas identified for potential deployment of these broad technology types (Section 8.2). It is important to note that these are theoretical potentials, based on gross geographic areas and significant assumptions. Greater refinement of these large potential areas through, for example, greater understanding of conditions at sea and restrictions due to weather/storms, will aid in the refinement of these models in future.

Figure 9-3 sets out the process for determining the sustainable resource potential.



**Figure 9-3: Process for determining sustainable resource potential for OREDP II**

Table 4 below presents the total technology opportunity areas identified by water depth for fixed wind, floating wind, wave and tidal energy as described in Section 8.2.

**Table 4: Offshore renewable energy technical opportunity areas**

Technology	Depth	Total area
<b>Fixed wind</b>	10-60m	17, 670 km <sup>2</sup>
	20-60m	14,609 km <sup>2</sup>
<b>Floating wind</b>	60-70m	7,494 km <sup>2</sup>
	70-200m	118,911 km <sup>2</sup>
	200-1000m	83, 707 km <sup>2</sup>
<b>Wave</b>	10-100m	39,388 km <sup>2</sup>
	100-200m	79,901 km <sup>2</sup>
<b>Tidal</b>	20-80m	4,451km <sup>2</sup>

Tables 5 to 8 provide an overview of the available gross technical resource energy potential for each technology type in this plan. It should be noted that the ORE resource potential represented in the figure and tables in this section were prepared for the purpose of the SEA carried out on the plan. ***These are the technical potential values and do not take into account the economic constraints or other activities or market factors as illustrated in Figure 9-3 above.*** Therefore, the ultimate resource available will be considerably less than the technical potentials below in Tables 5-8.

A watt (W) is a measure of power. Power is the rate at which something produces or uses energy. A watt-hour (Wh) is a measure of energy, which is the capacity to do work. In the following tables GW (Gigawatt) is the power rating or capacity of the technology and TWh (Terawatt-hour) is the expected energy output (in this case electricity) produced annually by each offshore renewable energy technology type. A 1GW capacity of generating technology, operating continuously (for 8762 hours) in one year could produce 8.762TWh of energy, if operating without any maintenance, disruptions and at full efficiency without losses, which would be considered a capacity factor of 100%. However, in reality the capacity factor of any generation technology (renewable or non-renewable) is considerably less than 100%.

**Table 5: Available technical wind resource potential for Bottom Fixed Wind technology**

Water Depth	Gross technical resource capacity (GW)	Gross technical resource energy potential [TWh/year]
10 -60m	42	170
60-70m	20	83
<b>Total</b>	<b>62</b>	<b>253</b>

As wind speeds have remained the same since OREDP I was published in 2014, the theoretical resource potential for fixed wind turbines at depths of 10-60m remains largely the same for OREDP II. However, an increased resource potential was identified for OREDP II as turbines have increased in size and are more efficient - the assumed turbine size has increased from 5MW (OREDP I) to 15MW (OREDP II). These estimates are based on assumptions of turbine rating of 15MW with spacing between turbines of seven times the diameter of the turbine and wind speeds of 3–25m per second. Further details are set out in Appendix B.

**Table 6: Available technical wind resource potential for Floating Wind Technology**

Water Depth	Gross technical resource capacity (GW)	Gross technical resource energy potential [TWh/year]
60 - 70m	20	83
70 - 200m	331	1334
200 - 1000m	246	1065
<b>Total</b>	<b>579</b>	<b>2482</b>

The potential for floating wind identified in this assessment is greater than that identified in OREDP I. The main reason is the greater area of potential out to the 1000m depth contour, as compared with an area out to 200m in OREDP I. Floating offshore wind technology has

also significantly developed since the OREDP I and a larger floating offshore wind system (15MW) with an improved performance in the latest analysis for the OREDP II also contributes to the greater potential identified.

**Table 7: Available Technical Resource Potential for Wave Energy 10–200m**

150m spaced Wave Energy Converters	Gross technical resource capacity (GW)	Output (TWh)
West Coast - North	9.9	46.3
West Coast- South	5.4	26.3
West Coast	8.5	41.2
<b>Total</b>	<b>23.8</b>	<b>113.7</b>

The potential technical resource for wave energy for this assessment is similar to the estimates in the OREDP I. Both the wave and tidal estimates are based on historical wave and tidal resource data, and theoretical devices, spaced at different lateral and longitudinal distances throughout the technical opportunities, data as calculated through the SELKIE project.<sup>13</sup>

**Table 8: Available Technical Resource Potential for Tidal Energy**

150m spaced Tidal Energy Converters	Gross technical resource capacity (GW)	Output (TWh)
East Coast – South	5.3	3.1
West Coast - North	2.5	0.5
<b>Total</b>	<b>7.9</b>	<b>3.6</b>

The area suitable for deployment of tidal energy technologies is much smaller than for the other ORE technologies examined. Therefore, the potential is much less than for other

<sup>13</sup> <https://www.selkie-project.eu/>

technologies. However, relative to the OREDP I estimates there is a greater potential tidal energy resource identified due to technological advances since 2014.

### **9.3 Atlantic Marine Test Site**

A full-scale demonstration test site and test-case for delivery of ORE to the electricity grid is critical to align actions and research focus with Government climate action targets. The important element is to ensure that there are adequate test facilities in response to demand, to ensure Ireland realises the potential of and ambition for its offshore resource.

SEAI is developing the Atlantic Marine Test Site (AMETS) on behalf of the DECC to provide a full-scale grid connected ocean test facility. AMETS was conceived in 2009, initially to focus on wave energy technologies. Technological advances since then, have led to expanding the remit of the site to include floating offshore wind. This is a research-focussed activity, playing a crucial role in the final test phase before full development and deployment and as such projects are expected to both succeed and fail at the site.

AMETS has a lease for wave energy technology deployment since 2015 and is currently undergoing a project level environmental impact assessment for floating offshore wind. However, there is a commitment to deliver the facility in time to contribute to accelerating floating offshore wind in Ireland to contribute to Government 2030 targets.

## 10 Environmental Assessments

The statutory environmental assessment is integral to the development of the OREDP II as the long-term national spatial strategy for ORE. Key contributions of the environmental assessment include:

- Identification of indicators to monitor the potential effects of OREDP II implementation on the marine environment and biodiversity
- Recommendation of strategic national plan-level mitigation measures to incorporate into the draft OREDP II, including the spatial strategy's guiding commitment to carry out further lower-tier environmental assessments to be carried out at DMAP and project levels
- Development of the data decision logs identifying environmental datasets suitable for OREDP II and lower tier assessments
- Provision of an environmental data baseline to inform iterative updating of OREDP II under the Adaptive Management Plan.

This section provides an overview of the different perspectives the assessment took, its key findings of potential positive and negative effects on the environment, and its suggested measures to mitigate and monitor potential negative effects. Further information and the full documentation, including appendices, for the environmental assessment is available at the following website [www.gov.ie/OffshoreEnergyPlan](http://www.gov.ie/OffshoreEnergyPlan)

### 10.1 Environmental Assessment Overview

The Strategic Environmental Assessment (SEA) is undertaken in accordance with the SEA Directive<sup>14</sup> and aims to achieve environmental protection at a strategic level and to integrate the consideration of the environment into the preparation and adoption of OREDP II. The Appropriate Assessment (AA) is undertaken in accordance with the Birds and Natural Habitats Regulations<sup>15</sup> and assesses whether the OREDP II is likely to have a significant effect on European sites designated to protect specific species and habitats<sup>16</sup>.

#### Process

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<sup>14</sup> Directive 2001/42/EC: Assessment of the Effects of Certain Plans and Programmes on the Environment

<sup>15</sup> S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 as amended, most recently 2021

<sup>16</sup> Natura 2000 network of European sites such as SPAs and SACs

The OREDP II was developed in parallel with a SEA and AA to ensure an iterative process which considers a range of potential environmental effects of the spatial strategy and possible reasonable alternatives. From the outset, the consultants (Clearlead Consulting Ltd.) responsible for the environmental assessment have provided independent advice to DECC on the draft document which has informed its development, including through the incorporation of plan-level mitigation measures. Members of the OREDP II governance groups have also played a key role in the environmental assessment, including through participation in the data review and the development of the data decision logs.

Feedback received from public, and in particular coastal, island and marine communities, via the national public consultation for OREDP II will be taken into consideration in the final stage of the environmental assessment. To support consultation, a digital environmental report and videos are available at this website <https://oredpii-sea-digitalreport.com/>. Figure 10-1 provides an overview of the interaction between the development OREDP II and the environmental assessments.

**Figure 10-1: Iterative development of OREDP II and environmental assessments**

SEA	ORED II	AA
SEA Scoping Report	Data Assessment	AA Screening
Environmental Assessment and Environmental Report	Draft 1 of plan	Assessment and consultation with NWPS
Public Consultation on Environmental Report	Draft 2 of plan and Public Consultation	Public Consultation on AA Report / Draft Natura Impact Statement (NIS)
SEA Statement	Final OREDP II	Final AA Report / NIS

## Methodology

The environmental assessment looks at the potential positive and negative effects on the environment that could be expected from the implementation of OREDP II. The assessment covers the following topics:

- **Physical Environment** (SEA Objectives 1 and 2)
- **Water** (SEA Objectives 3 and 4)
- **Climate and Air Quality** (SEA Objectives 5, 6, 7 and 8)
- **Marine Pollution** (SEA Objectives 9, 10 and 11)
- **Biodiversity** (SEA Objectives 12 and 13)
- **Archaeology and Cultural Heritage** (SEA Objectives 14 and 15)
- **Land and Seascape** (SEA Objective 16)
- **Population and Human Health** (SEA Objectives 17 and 18)
- **Material Assets** (SEA Objectives 19 and 20)



The assessment tested the significance of these effects in a two-step process: (1) before mitigation and (2) after mitigation. It presents the results in the following scale:

<b>Significant negative</b>	<b>Minor negative</b>	<b>Neutral</b>	<b>Minor positive</b>	<b>Significant positive</b>
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The assessment takes a risk-based approach due the forward-looking and strategic nature of the OREDP II and consequent uncertainty around potential projects. This means that uncertain effects and possible mitigations were also considered in the assessment.

Table 9 provides a summary of potential effects on the environmental per technology type before and after mitigation. The full assessment is available in the Environmental Report and in SEA Appendices.

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**Table 9: Summary of potential environmental effects per technology type**

SEA Objectives		Bottom-Fixed Wind		FLOW		Wave		Tidal	
		Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation
SEA 1	Protect the quality and character of the seabed and its sediments and avoid significant effects on seabed morphology and sediment transport processes.	Significant Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Significant Negative	Minor Negative
SEA 2	Protect the integrity of coastal and estuarine processes.	Significant Negative	Uncertain	Minor Positive	Minor Positive	Significant Negative	Uncertain	Minor Negative	Minor Negative
SEA 3	Protect, maintain, and improve status of classified water bodies within the Plan area in line with requirements of the WFD and MSFD.	Significant Negative	Uncertain	Minor Positive	Minor Positive	Significant Negative	Uncertain	Minor Negative	Minor Negative
SEA 4	Avoid pollution of the coastal and marine environment.	Minor Negative	Minor Negative	Minor Positive	Minor Positive	Minor Negative	Minor Negative	Minor Negative	Minor Negative
SEA 5	Avoid, prevent or reduce harmful emissions to air, promoting air quality improvements through reduction of emissions As Low as Reasonably Practical (ALARP) (direct emissions)	Minor Negative	Minor Positive	Minor Negative	Minor Positive	Minor Negative	Minor Positive	Minor Negative	Minor Positive
SEA 6	Promote and prioritise use of renewable energy and energy efficiency measures.	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Minor Positive	Minor Positive

SEA Objectives		Bottom-Fixed Wind		FLOW		Wave		Tidal	
		Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation
SEA 7	Minimise emissions of Green House Gases	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Significant Positive	Significant Positive
SEA 8	Promote resilience to Climate Change	Minor Negative	Minor Positive	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Neutral	Minor Positive
SEA 9	Reduce/prohibit release of marine litter to the marine environment.	Minor Negative	Neutral	Minor Negative	Neutral	Minor Negative	Neutral	Minor Negative	Neutral
SEA 10	Minimise generation and propagation of manmade noise within the marine environment.	Significant Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Significant Negative	Minor Negative
SEA 11	Promote energy transmission technologies and configurations which seek to minimise EMF within the marine environment.	Minor Negative	Minor Negative	Significant Negative	Minor Negative	Significant Negative	Minor Negative	Uncertain	Uncertain
SEA 12	Preserve, protect, maintain and, where appropriate, enhance biodiversity and ecosystems within Plan area.	Significant Negative	Uncertain	Significant Negative	Uncertain	Significant Negative	Uncertain	Significant Negative	Minor Negative
SEA 13	Avoid significant impact to EU and National level designated sites, Qualifying Interests and protected species.	Significant Negative	Minor Negative	Significant Negative	Minor Negative	Significant Negative	Minor Negative	Significant Negative	Minor Negative
SEA 14	Protect known wrecks and historic and cultural features of the Plan area.	Significant Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Significant Negative	Minor Negative

SEA Objectives		Bottom-Fixed Wind		FLOW		Wave		Tidal	
		Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation	Before mitigation	After mitigation
SEA 15	Incorporate opportunities to enhance cultural/historic knowledge and understanding.	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
SEA 16	Implement the requirements of the European Landscape Convention through high quality design for the sustainable stewardship of Ireland’s landscape and by integrating landscape into Ireland’s approach to sustainable development.	Significant Negative	Minor Negative	Minor Negative	Minor Negative	Minor Negative	Neutral	Minor Negative	Minor Negative
SEA 17	Avoid significant impact on human health and wellbeing.	Significant Negative	Minor Positive	Minor Positive	Minor Positive	Minor Negative	Minor Negative	Minor Negative	Minor Negative
SEA 18	Avoid disruption, disturbance or nuisance to local communities.	Minor Negative	Minor Negative	Minor Positive	Minor Positive	Minor Negative	Minor Negative	Minor Negative	Minor Negative
SEA 19	Protect marine material assets (including fisheries, shellfish, military activity and infrastructure) and resources.	Significant Negative	Minor Negative	Significant Negative	Minor Negative	Significant Negative	Minor Negative	Significant Negative	Minor Negative

## 10.2 Environmental Assessment Perspectives

The OREDP II environmental assessment was carried out from different strategic perspectives, each considering the SEA Objectives set out in Section 10.1. Table 10 sets out the assessment perspectives and presents an overview of key findings. The full assessment is available in the Environmental Report and the Natura Impact Statement (NIS).

**Table 10: OREDP II environmental assessment perspectives and findings**

<b>Assessment perspective</b>	<b>Findings overview</b>	<b>Type of assessment</b>
Assessment of overall plan objectives to facilitate deployment of ORE and build a data evidence base	<p>Found that the potential effects of the plan's objectives as neutral, minor positive or significant positive, including for reducing Greenhouse gas emissions by providing carbon free energy, as well as building a database for further lower tier environmental assessments.</p> <p>Recommended a range of plan-level measures to mitigate potential negative effects.</p>	SEA
Assessment of specific ORE technologies: fixed wind, floating wind, wave and tidal	<p>Found that many of the potential effects are similar for different technologies. However, the magnitude of the effect depends on how the technologies work, location-specific sensitivities, design, energy generation, engineering constraints, cost and cumulative effects. Table 9 summarises the outcomes of the assessment for all four technology types.</p> <p>Across all technology types, the assessment identified the potential to promote renewables and minimise Greenhouse gas emissions to be positively affected by the Plan. Other potentially positive impacts are brought by specific ORE technologies.</p>	SEA

<p>Three Broad Areas of Interest for floating wind (North-West, Mid-West, Celtic Sea East)</p>	<p>Tested the framework for identification of ORE-DMAPs by applying draft selection criteria to three Broad Areas of Interest.</p> <p>Found that due to deployment at greater depths, the offshore floating wind resource extends outside the inshore coastal area, reducing the potential for conflict. However, there are number of existing use exclusions, environmental factors, and economic factors in the area of potential for floating offshore wind.</p>	<p>SEA</p>
<p>Alternatives assessment</p>	<p>Considered alternatives to the plan under the following hierarchy:</p> <ul style="list-style-type: none"> <li>• Need or demand for energy</li> <li>• Mode or process – for example, technology types</li> <li>• Location</li> <li>• Timing, For example, through phasing</li> <li>• Implementation, for example through addressing data gaps or mitigation measures</li> </ul>	
<p>Cumulative assessment</p>	<p>Considered the potential for cumulative effect of interrelated plans and polices. It found, for example, that the NMPF has cumulative positive effects for environmental, economic and social objectives; and that the NECP and the CAP provide strong support and cumulative benefit particularly for promoting and prioritising use renewable energy.</p> <p>Considered the potential for cumulative effect of OREDP I, including specified Phase 1 projects where they have been identified, with OREDP II. Specific locations of potential Phase 2 projects were not available to inform the cumulative</p>	<p>SEA</p>

	<p>assessment. Noted that OREDP II commits to reviewing potential for in-combination effects throughout the life of the Plan in light of policy developments.</p> <p>Indicated that the cumulative effect of policies which lead to related energy infrastructure such as transmission grid development, ports facilities and capacity planning, as well as supply chain development require increasingly detailed consideration as planning and policy development continues through lower tier assessments.</p>	
<p>Assessment of the risk of the plan to specific marine habitats and species protected by law, alone or combination with other plans or projects</p>	<p>Provides for adverse effect on integrity risk (scale 1-3) for the plan, set out in maps.</p> <p>Found that with appropriate mitigation measures, the Plan will not have an adverse effect on the integrity of protected European sites.</p> <p>Recommended that lower tier environmental assessments undertake further consultation and provide evidence of site selection, including consideration of alternatives, to mitigate potential negative effects.</p>	AA

### 10.3 Mitigation and Monitoring Measures

Where the OREDP II environmental assessment identified potential for a significant negative or uncertain effect, it suggests mitigation measures.<sup>17</sup> This is done in a three-tier structure:

1. National plan level mitigations
2. DMAP level mitigations
3. Project level mitigations

<sup>17</sup> Mitigation measures provide for a system to reduce, avoid or offset the potential adverse environmental consequences of development activities. Their objective is to maximise project benefits and minimise undesirable impacts [https://ec.europa.eu/environment/legal/law/2/module\\_3\\_10.htm](https://ec.europa.eu/environment/legal/law/2/module_3_10.htm)

The SEA indicated that the identified potential for significant effects or residual uncertain effects at the national level is in most cases primarily mitigated through commitments to further assessment as part of lower tier assessments (in other words, DMAP and project-level assessments). The SEA also suggested potential enhancement for minor negative effects, or minor positives, which could become significant positives.

The full assessment and proposed mitigations at each level is available in the Environmental Report and SEA at Appendix 4. Mitigation measures outlined for the AA has fed into the SEA mitigation approach. Specific mitigation relating to the AA is available within the Natura Impact Statement (NIS) report.

### **Recommended plan-level mitigation measures included in draft OREDP II**

Following the delivery of the draft SEA and AA, a workshop took place between DECC and the environmental consultants carrying out the SEA and AA, to consider the range of proposed plan-level mitigation measures for OREDP II and the appropriate remedial actions. These are set out in the Environmental Report.

### **Monitoring**

As an iterative and adaptive spatial strategy, the OREDP II environmental baseline will be augmented through the monitoring of potential effects on the environment. Significant or residual uncertain environmental effects of the implementation of OREDP II will be monitored by the Environmental Subgroup under the AMP as set out in Section 12. Unforeseen adverse effects on the environment will be identified at an early stage and appropriate remedial action will be taken to iteratively review, evaluate and adapt OREDP II to reflect the best available evidence. The Environmental Subgroup will establish an Environmental Monitoring Programme linked to the Data Action Plan and Research Integration Schedule which will identify existing and new monitoring initiatives across the State of relevance to OREDP II.

This evidence base will be complemented over time by the relevant statutory environment assessments that will assess the direct and indirect effects at the regional and local levels. This includes planned environmental sensitivity mapping for Broad Areas of Interest for ORE once decided.

The OREDP II will sit alongside and support the implementation of the dynamic forward marine planning framework established by the MAP Act, including the MPPS, the NMPF, statutory Guidelines and Ministerial Policy Directions and any sub-national forward plans (in other words, DMAPs), in order to facilitate sustainable and State-led ORE development. The



ORED II itself will not have a statutory basis in its own right but will form the basis for ORE DMAPs to be prepared under the MAP Act regime. The ORED II tiered mitigation approach will, therefore, rely on the national set of legal obligations set out under Section 22 of the MAP Act and the policies relating to good environmental management already established in the NMPF. These set out clear requirements in relation to measures to avoid or mitigate any adverse impact activities in the maritime area on protected sites, species or habitats relevant at the DMAP and project-levels.

Further to this, proposals for ORE DMAPs and projects will be required to include a section outlining how they have addressed the statutory recommendations for mitigation measures set out in the ORED II SEA and AA where relevant, as well as how they adhere to the NMPF Overarching Marine Planning Policy on Environmental—Ocean Health to avoid, minimise, or mitigate significant adverse impacts on the environment and the suggested mitigation measures proposed in the NMPF SEA.

As with the Monitoring Approach of the NMPF, the State's monitoring of the marine environment and progress towards Good Environmental Status under reporting cycles for the Marine Strategy Framework Directive (MSDF) will form an essential element of the ORED II Environmental Monitoring Programme.

### **Participation**

DMAPs will also be subject to a mandatory PPS that will detail the timeframes, procedures and mechanisms for public participation specific to the particular plan in development. The DMAP process will include multiple opportunities for public participation and consultation from all sectors, in compliance with the Aarhus Convention, and will include statutory environmental assessments (SEA and AA).

## 11 Broad Areas of Interest

The intention with this document is to set out the strategy for identifying areas to be designated as part of the Enduring Regime for ORE. The assessment described as part of the OREDP II sets out the national level of knowledge on a range of thematic areas. The data review also identified additional datasets available at a regional or local level.

The designation process, as described earlier in this document, along with a review of approaches adopted in other countries, has informed the proposed next steps. These involve defining criteria to identify the initial Broad Areas of Interest to be assessed in greater detail at a regional scale. This assessment will inform the identification of more refined areas to be taken forward as part of the DMAP designation process.

Identifying a Broad Area suitable for ORE will address many of the limitations encountered at the national level. It will:

- Narrow the scope of the assessment to a sub-set of the assessment area in the Plan
- Enable the inclusion of additional data which was not suitable for use at the national strategic level but is suitable for use at the regional and local level
- Reduce the potential for constraints and help to identify the most relevant stakeholders
- Environmental assessments will also be carried out at this level to inform the refinement of the Broad Area and identify the optimal areas for ORE
- Enable the design of a process based on best practice from other States, including the extensive engagement of stakeholders
- Enable the identification of specific issues by stakeholders at the regional and local level and the consideration of constraints which are not discernible from the national multiple-criteria analysis through the identification those specific issues
- Enable the development of a roadmap for assessing the offshore area including for developing opportunity and constraints assessments as well as sensitivity assessments to identify the potential effects of different technologies and device types on the marine environment

Narrowing the geographic scope, using additional data and knowledge and engaging with local stakeholders will build out the evidence base created through the OREDP II process.

This approach aligns with the approach of other states for identifying areas for offshore renewable energy development.

## 11.1 Criteria for Selection

The spatial analysis described in Section 8 is a useful guide to show potential areas at a national, strategic level. It provides a high-level visual guide of areas with high levels of opportunities for ORE and areas of potential constraint.

To narrow the scope of the spatial assessment in the next stage of the marine planning framework the following criteria are to be applied for the purpose of identifying the initial Broad Areas of Interest from within which regional or local ORE DMAPs may be created for the enduring plan-led regime. The criteria below are not listed in order of priority.

The first two criteria are informed by the technical opportunities assessment for the OREDP II. They are:

- **Wind resource potential for floating wind**—initially Ireland’s offshore wind targets will be primarily met through fixed offshore wind in Ireland’s eastern and southern coastal regions. The OREDP II will assist in delivering the Programme for Government commitment to develop a long-term plan to take advantage of a potential of at least 30GW of floating wind.
- **Bathymetry potential for floating wind (60m to 100m water-depth)**—while FLOW is theoretically feasible out to 1000m, the current floating wind projects are installed at water depths ranging between 60m to 120m.

The following five criteria further narrow the areas identified by the application of the above two criteria.

- **Availability of localised datasets**—the assessment for OREDP II identified a range of data available at a regional and local level. Further detailed assessment of this data will be possible within the Broad Areas of Interest. This will assist in the identification of opportunities and constraints and the refinement of the broad areas of interest.
- **Onshore infrastructure**—proximity to onshore infrastructure can support the development of ORE. For example, the significant role for ports, and need for associated infrastructure development, in Irish ORE development is recognised in the Policy Statement on the facilitation of Offshore Renewable Energy by Commercial Ports in Ireland (Multi-Port Policy Statement).

- **Industrial opportunities**—proximity to areas which are currently used for large industry offer opportunities for green hydrogen generated from offshore wind. Identification of Broad Areas in proximity to potential industrial demand centres would support Government commitments to deliver 2GW offshore wind earmarked for green hydrogen.
- **Demand centre proximity**—electricity demand is forecast to increase over the coming decade and the spatial distribution of additional demand ensures that the growth needs for specific regions are identified.
- **Interconnectors**—due to advances in technology, proximity to grid connection will be less relevant to the location of ORE in the future once domestic demands have been met. The presence or planned presence of interconnectors provide the opportunity for export of energy which is not needed for domestic demand. This would facilitate the Programme for Government committee for Ireland to become a major contributor to a pan-European renewable energy generation and transmission system and align with the development of offshore priority grid corridors under the amended Trans-European Networks for Energy (TEN-E) Regulation.

The application of the above criteria will identify areas which include a mix of interactions of activities and uses.

An initial application of the criteria above and consideration of the features and activities which have been mapped as part of the OREDP II multi-criteria analysis (see Section 8 for more information) has identified three potential Broad Areas of Interest, shown in Figure 11-1 Potential Broad Areas of Interest based on the proposed criteria Figure 11-1.

- Celtic Sea-East
- Mid-West (Shannon/Foynes area)
- North-West (off Donegal coast)

The SEA assessment and public consultation on the draft plan and associated reports will further inform the proposed criteria and resulting Broad Areas of Interest.

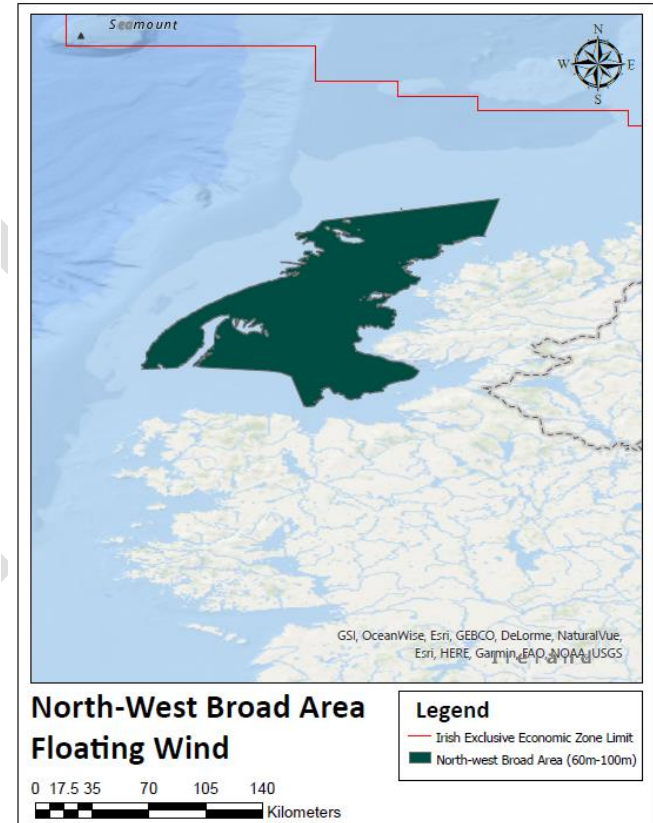
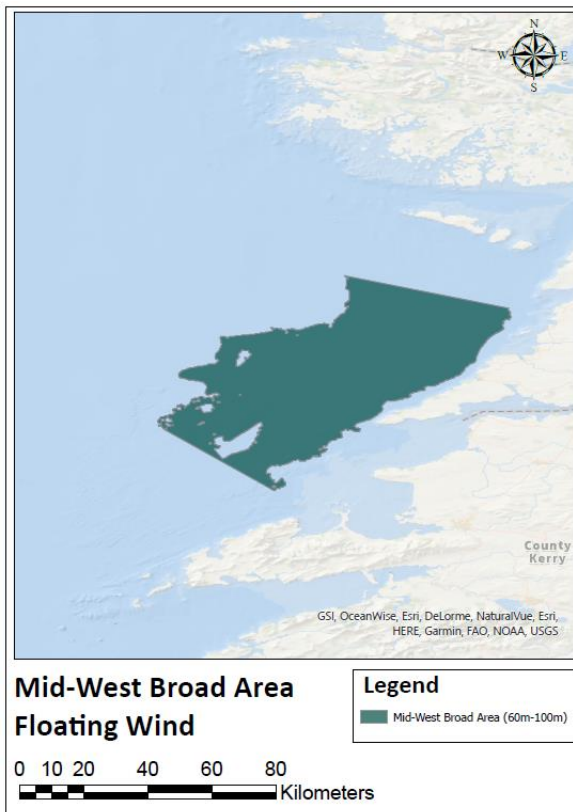
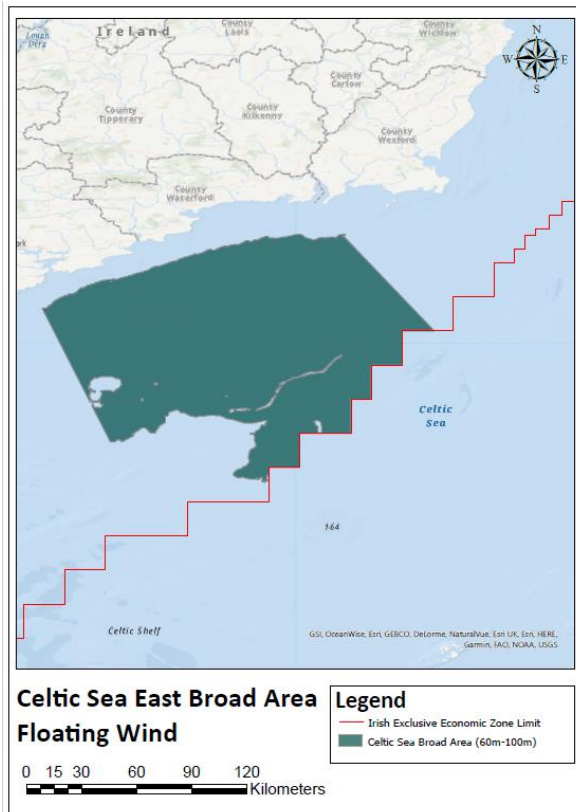


Figure 11-1 Potential Broad Areas of Interest based on the proposed criteria

## 11.2 Approach to Refining the Areas

As set out above, the criteria to identify a Broad Area of Interest are informed by the SEA assessment and the public consultation on the draft plan including the criteria and associated environmental reports.

The identification of a Broad Area is the start of the process for identifying areas suitable for ORE development as part of the enduring plan-led regime. It is not proposed that the entire Broad Area identified be designated.

Once a Broad Area of Interest has been selected, it will be assessed in greater detail including an iterative process of stakeholder engagement. Further analysis may include:

- Opportunities and constraints assessments
- Environmental assessments such as wildlife sensitivity mapping

The further analysis on the Broad Area will allow for more detailed consideration of individual spatial opportunities and constraints (specific issues analysis) at a regional and local level which are not discernible from the strategic, national multiple-criteria analysis. It will also enable the consideration of the situation post-ORED II such as the designation of protected sites, for example MPAs and Natura 2000 sites, the identification of national priorities in the forthcoming MPPS and matters identified for further analysis in the lower tier assessments by the SEA and AA for the ORED II (see Section 10).

As with the ORED II process, stakeholder engagement and public participation will be a key element in spatially refining the Broad Area and the subsequent DMAP process.

## 12 OREDP II Adoption and Implementation

Implementation of the OREDP II will involve the following:

- Adoption of the OREDP II principles in the development of ORE
- The establishment of a governance structure for the implementation and monitoring of the plan
- The implementation of the iterative update process for the plan
- The selection of Broad Areas of Interest and the designation of areas suitable for ORE as part of the Enduring Regime

The OREDP II is an iterative process which will be subject to regular review and management to ensure that it reflects:

- The best available information and evidence, including data and assessments from lower-tier environmental assessments where necessary
- Environmental sensitivity mapping conducted on Broad Areas of Interest
- Up-to-date national and regional spatial developments, for example updates to the MPPS, the NMPF and other activities in the maritime area.
- Technological developments and regulatory environment, for example access to the grid

### 12.1 Adaptive Management

To ensure effective OREDP II implementation, governance and iterative review, an Adaptive Management Plan (AMP) has been developed. This will encompass:

- Continuous monitoring and evaluation of implementation and environmental impact
- Iterative updates feeding into formal reviews
- Responsive planning and modelling to adapt to the best available data and evidence and/or changes in conditions
- Cross-sectoral participation and decision-making

- Integration of the needs and policies of multiple sectors, including through engagement with the fisheries sector potentially via the ORE-Seafood Working Group<sup>18</sup>
- Coordination and cooperation across sectors, institutions, agencies and competent authorities at local, regional and national level

The OREDP II will be reviewed at a minimum every five years. Earlier formal reviews may be triggered by a significant data update or policy development. Formal reviews will consider smaller, more incremental updates to the evidence base under the AMP, for example, due to emerging environmental, technology or socio-economic developments and the wider policy and regulatory context.

It is anticipated that future iterations of the OREDP II will identify areas suitable for ORE including future ORE DMAPs areas, where possible. Future iterations of the plan may also provide the spatial framework for any future ORE consenting or leasing rounds, if required.

Appendix I sets out the proposed outline for the AMP.

## 12.2 Governance Structure

The OREDP II AMP will be developed and directed by an Implementation Group which will be supported by a Data Subgroup, an Environmental Subgroup and other sectoral subgroups the Implementation Group considers necessary to establish. With DECC as the lead Department, the governance groups will facilitate an active whole-of-Government approach to OREDP II and ensure coordination and accountability for cross-sectoral delivery. The groups will be provided with appropriate delegated authority, resources and secretariat support as decided by the MECC.

The governance groups will be established after publication of the OREDP II. Membership of the groups will be assessed based on relevance and appropriateness. Core members will be drawn from Government departments and public bodies key to OREDP II implementation. Other stakeholders, including at a regional and local level, may also provide input.

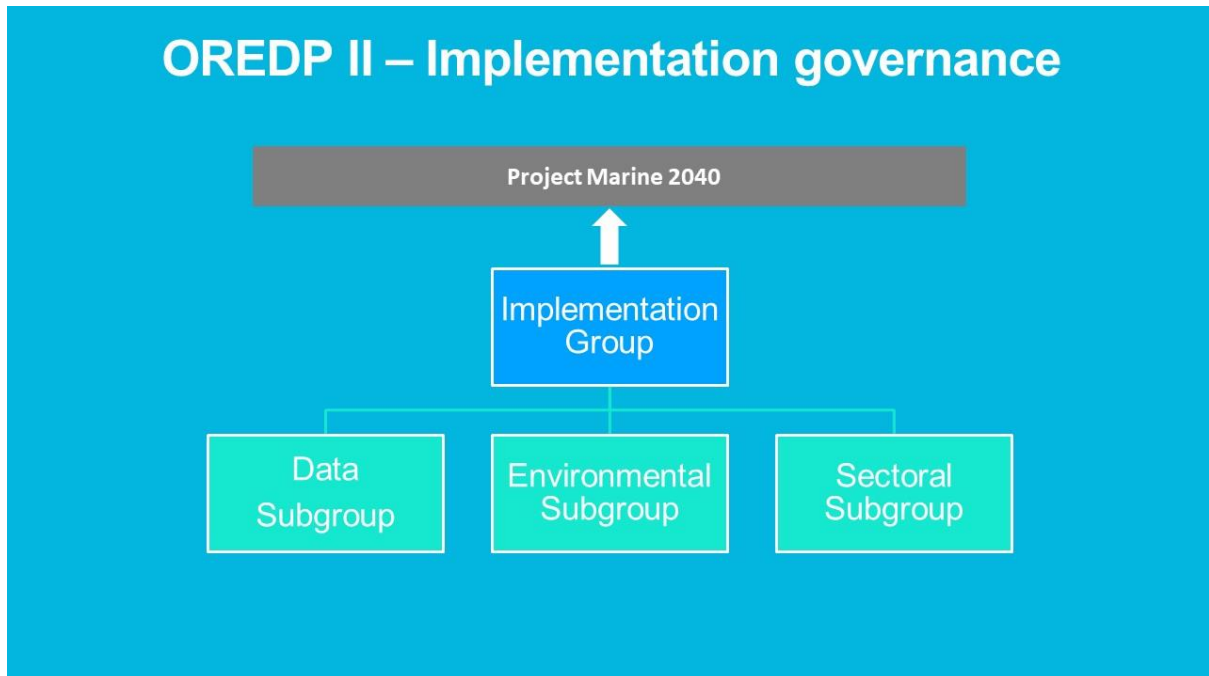
It is anticipated that the Implementation Group that will be established for the implementation of the plan will report into the governance model for Project Ireland Marine 2040 once

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<sup>18</sup> The Seafood / ORE Working Group was established by the Minister for Housing, Local Government & Heritage in July 2022 to facilitate discussion on matters arising from the interaction of the seafood and ORE industries, to promote and share best practice, and to encourage liaison with other sectors in the marine environment. Chaired by Captain Robert McCabe, the initial aim of the group is to agree on a communications protocol between the Seafood and ORE sectors, which all group members will be bound by.



established, a marine governance group, working under the broader Project Ireland delivery board to provide leadership and oversight for NMPF implementation. Figure 12-1 provides an overview of the governance structure for implementation of the plan.



**Figure 12-1: Overview of governance structure for implementation of the OREDP II**

A key role of the governance groups will be providing oversight and strategic direction to a Data Action Plan and Research Integration Schedule and the refinement of the GIS data model underpinning the OREDP II assessment. This will include consideration of the resource requirements for related data collection, management and research undertaken by DECC and/or linking in with other funding mechanisms and opportunities. Table 11 provides an overview of the governance structure for OREDP II implementation and the respective functions of the governance groups.

**Table 11: Governance of Plan Implementation and Adaptive Management**

<b>Body/Group</b>	<b>Function</b>
<b>Minister for the Environment, Climate and Communications</b>	<p>It is proposed that the Minister will:</p> <ul style="list-style-type: none"> <li>• Delegate authority to the Implementation Group and other subgroups as necessary.</li> <li>• Assign human, capital, technical resources to ensure effective governance as necessary.</li> <li>• Consider recommendations of the Implementation Group for Government approval as necessary.</li> </ul>
<b>Implementation Group</b>	<p>It is proposed that the Implementation Group will:</p> <ul style="list-style-type: none"> <li>• Lead on ensuring the effective and strategic implementation of the OREDP II.</li> <li>• Oversee the Adaptive Management Plan.</li> <li>• Advise and make recommendations to the Minister for the Environmental Climate and Communications for updating of the Plan.</li> <li>• Make recommendations to the Minister for the Environmental Climate and Communications in relation to the Data Action Plan and Research Integration Schedule, including the resource requirements for data capture and research across Government and public bodies.</li> <li>• Meet quarterly and issue annual progress reports and annual statements/memos to Government.</li> <li>• It would be open to the Implementation Group to establish other subgroups as relevant.</li> </ul>
<b>Data Subgroup</b>	<p>It is proposed that the Data Subgroup will:</p>

	<ul style="list-style-type: none"> <li>• Advise and make recommendations to the Implementation Group on data requirements, research needs, formal OREDP II updates and continuing adaptive management.</li> <li>• Agree standards and protocols including for data standards, data collection/update schedules, skills development in key Departments and public bodies.</li> <li>• Provide input on the enhancement of the GIS data model.</li> <li>• Meet more regularly than the Implementation Group throughout the year, as appropriate to specific workstreams and schedule activities.</li> </ul>
<b>Environmental Subgroup</b>	<p>It is proposed that the Environmental Subgroup will:</p> <ul style="list-style-type: none"> <li>• Monitor potential effects on the environment of OREDP II implementation as identified in the SEA and AA</li> <li>• Monitor the residual uncertain environmental effects of OREDP II as identified in the Environmental Report</li> <li>• Establish an Environmental Monitoring Programme linked to the Data Action Plan and Research Integration Schedule.</li> <li>• Monitor the availability of additional data to enhance understanding of Ireland’s marine environment characteristics and sensitivities</li> <li>• Monitor additional environmental protection designations which may come forward</li> </ul>
<b>Other sectoral subgroups</b>	<p>It is proposed that the Implementation Group will establish other sectoral subgroups where it considers it necessary.</p>

Membership and terms of reference of the groups will be determined after the OREDP II has been finalised. Membership will be assessed based on relevance and appropriateness. Core members will be drawn from Government departments and public bodies key to OREDP II implementation. Other stakeholders, including at a regional and local level, may also provide input. Upon establishment, the governance groups will develop their terms of reference for implementing the functions outlined in Table 11 above.

## 12.3 Best Available Evidence

The AMP will ensure that the OREDP II is iteratively reviewed, evaluated and adapted to reflect the best available evidence in the form of data and information gathered through:

- Monitoring OREDP II implementation and adaptive review
- Research initiatives
- Environmental assessments
- Project-level assessments
- Risk assessments
- The DMAP identification processes

In addition, the AMP will consider national, regional and international contextual factors including:

- Updates to legislation and policy
- Developments in spatial planning
- Specific sectors such as maritime transport and fishing
- Technological developments for ORE capacity
- Changes in the regulatory environment, such as access to the grid or interconnectors
- Socio-economic factors, such as updates to the National Development Plan
- Climate change and related adaptations, such as to port infrastructure

## 12.4 Building the Evidence Base

Through the oversight and elaboration of a Data Action Plan and Research Integration Schedule, the governance groups will consider and recommend how and when to fill identified areas to strengthen the OREDP II evidence base. The governance groups will coordinate with existing Government, State bodies and research institutes/initiatives to ensure:

- The strategic and efficient use of resources in the building the evidence base relevant to ORE and avoidance of duplication of work.
- The implementation of the principle “collect once, use often” to avoid duplication of work and to ensure that data and knowledge are used efficiently and consistently

- That relevant parties are aware of work underway to build the evidence base and that additional data and knowledge is fed into the adaptive review to improve the evidence base
- That data and knowledge is made accessible to inform future iterations of the plan and for ORE DMAPs

The data assessment for this plan also identified data which was not suitable for use in the plan due to a lack of accessibility of data at this time. Examples include data which was not in a format that could be incorporated in the GIS model. The Implementation Group will consider how best to make this data and knowledge accessible to inform future iterations of the plan and for the future identification of areas most suitable for ORE as part of the DMAP process.

As data actions and research progress which address identified areas to strengthen the evidence base, the governance groups will develop the evidence base to inform future iterations of the plan and for the future identification of areas most suitable for ORE as part of the DMAP process.

## **12.5 Data Management Framework**

The data assessment carried out for the OREDP II substantially updated the OREDP I evidence base to inform the development of OREDP II and provide an evidence base to facilitate the future identification of areas most suitable for ORE as part of the DMAP process. Through the data decision logs, the environmental assessments also identified data which is not suitable in a national level plan and is more suited to the lower tier assessments at the DMAP and projects levels. See Section 7 for more information on the data assessment. See the appendices to the Environmental Report for data and knowledge that remains to be collected.

There are a number of research actions across Government Departments and State bodies to build our marine data evidence base and knowledge of the marine environment. The OREDP II Data Subgroup will develop a robust process for the sustainable and transparent coordination of data across different sectors and ensure that governance of individual datasets and the data model itself are maintained as required to ensure long-term usefulness. It will also develop standards for data protection, security, and confidentiality where appropriate for example when dealing with proprietary information provided by industry. The Environmental Subgroup will monitor the availability of additional data to enhance understanding of Ireland's marine environment characteristics and sensitivities.

The work of these groups should also focus on how to build the OREDP II evidence base through the use of automated techniques without the need for data collection at sea. These types of approaches will increase the speed of delivery and reduce the environmental impacts of working in the marine environment.

To develop the OREDP II data management framework, it is proposed to use the five criteria developed as part of the OREDP II to assess data for inclusion in the plan development process (see Section 7.2). The five criteria are:

- Relevance to ORE
- Spatial relevance
- Provenance
- Accessibility
- Temporally valid

## 12.6 Thematic Areas of Focus

The data review carried out for the OREDP II along with the SEA and AA have identified a number of areas where further data and information is needed. It is intended that these will be reviewed as part of the work of the Data Action Plan and actions prioritised. Some examples raised during the work of this are outlined below in this section.

**Technical opportunities for wind energy:** much of the analysis focused on the available wind speed data and water depths. To refine this assessment further it would be useful to include consideration of accessibility. It is expected that at certain times of the year, when there is a greater risk of storms, some locations would be inaccessible for periods of time. This will be an important consideration when considering where to locate wind farms, particularly in deeper waters further offshore.

**Fishing activity:** there is limited data available on inshore fisheries data, both to the spatial extent of activity and economic value.

**Shipping or leisure craft data:** there is limited data available particularly for vessels under 12m in length that are exempt from the requirement to have VMS fitted to their vessels. These vessels are more frequently found in the inshore. While less relevant for the OREDP II assessment, inshore data will be required for the DMAP level and project level.

**Recreational angling:** assumption is to use marinas as a base for this activity but actual data on areas and associated volume of angling activity is not available. This would be most useful at the DMAP stage of assessment.

**Post-Brexit shipping data:** while the most current available data has been used in the assessment, it is recognised that the withdrawal of the United Kingdom from the EU has had an impact on the volumes and intensity on shipping routes. This will likely become more evident in the next few years, following the impacts of the Covid pandemic and more normal levels of trading return.

**As part of the SEA process,** information was gathered on the potential effects of ORE on the environment. These assessments are organised by technology type (Fixed Wind Assessment, Floating Wind Assessment, Wave Assessment, Tidal Assessment) and can be viewed in detail within the SEA appendices.

Each assessment shows the potential effects on the environment (with and without mitigation), how this relates to the SEA objectives and where the evidence base can be strengthened. Each assessment outlines potential effects of an offshore renewable technology type on the following models:

- Technical Opportunities
- Exclusions
- Environment
- Economic
- Heritage

Each of these models and the SEA Objectives, indicators and targets as identified within the SEA Framework have been assessed, with detailed results set out in Appendix 4 of the SEA (Workbooks 1 to 4) with a summary of potential effects.

## 13 Conclusions

The work undertaken as part of the OREDP II is an important building block in the work required to establish the long-term approach to developing ORE in Ireland (the enduring plan-led regime). It has updated the identification of areas with potential for wind, wave and tidal energy technologies. It has also updated the knowledge base on characteristics of our maritime space and activities that need to be considered for effective MSP.

In addition, the establishment of the governance and stakeholder groups has increased understanding of interactions between ORE and other sectoral activities. This in turn has helped identify particular interactions that will need to be considered further at the next stage which will involve designation of areas for ORE. Effective stakeholder engagement will be a critical part of this process.

### 13.1 Next Steps

While the OREDP has updated our knowledge of the maritime space at a national level, the next stage of work will involve identification of Broad Areas of Interest. Proposed criteria to identify these areas have been set out in this document for consideration as part of the public consultation.

Once these criteria have been finalised, decisions will be taken on the initial Broad Areas of Interest. Further detailed analysis will be undertaken on these Broad Areas, particularly to understand any potential environmental sensitivities. Engagement with stakeholder groups will also be core to the process, which will ultimately lead to the development of proposals for areas to be designated. The designation process, as set out in the MAP Act, will involve approval by the MHLGH, public consultation and approval by the Oireachtas.

### 13.2 Management of OREDP II

An AMP has been developed to ensure the effective implementation of the OREDP II and to support its governance and iterative review. The OREDP II will be reviewed at a minimum every five years, however earlier formal reviews may be triggered by a significant data update or policy development. Formal reviews will consider smaller, more incremental updates to the evidence base under the AMP, for example due to emerging environmental, technological or socio-economic developments and the wider policy and regulatory context.

An Implementation Group will be established to manage the implementation of the OREDP II and its AMP, which will be supported by a Data Subgroup, an Environmental Subgroup and



other sectoral subgroups the Implementation Group considers necessary to establish. It is anticipated that the Implementation Group will report into the governance model for Project Ireland Marine 2040 once established, a marine governance group, working under the broader Project Ireland delivery board to provide leadership and oversight for NMPF implementation.

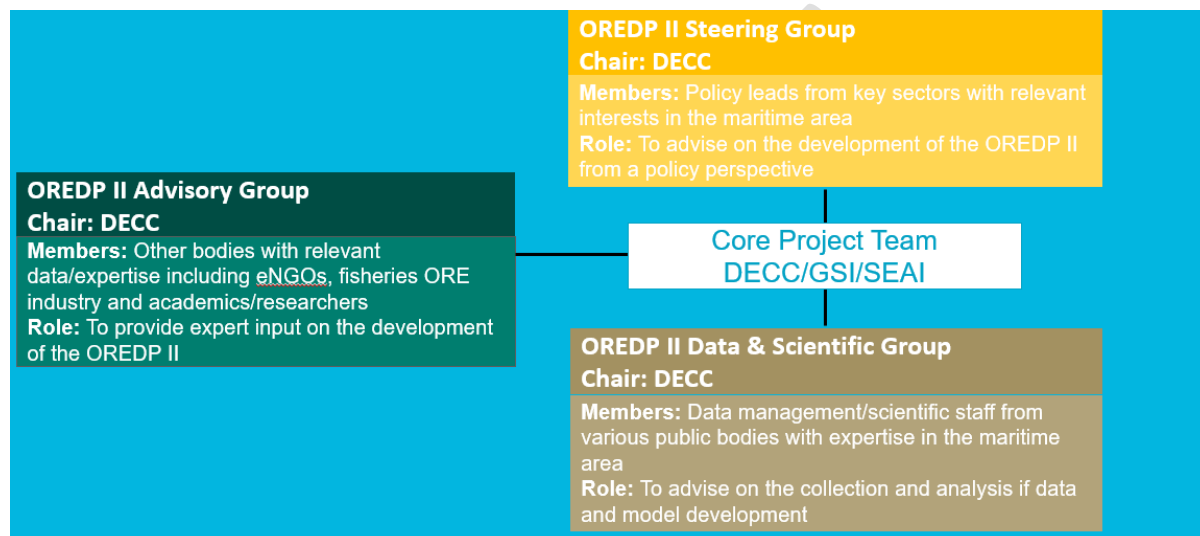
With DECC as the lead Department, the OREDP II governance groups will facilitate an active whole-of-Government approach to OREDP II and ensure coordination and accountability for cross-sectoral delivery. The groups will be provided with appropriate delegated authority, resources and secretariat support as decided by the MECC.

The governance groups will be established after publication of the OREDP II and membership of the groups will be assessed based on relevance and appropriateness. Core members will be drawn from Government departments and public bodies key to OREDP II implementation. Other stakeholders, including at a regional and local level, may also provide input.

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## 14 Appendix A: OREDP II Governance

A governance structure has been put in place to achieve the level of cross-Government cooperation necessary for delivery of the OREDP II. In line with marine spatial planning best practice, DECC established a Steering Group, a Data and Scientific Group, and an Advisory Group to inform the development of the OREDP II and engaged with a wide range of stakeholders for input.



### Steering Group

The Steering Group provides overall oversight and policy input to the OREDP II. It reviews and advises on outputs from the Data and Scientific Group and on recommendations from the SEA and AA work.

The Steering Group includes representation from the DHLGH (including NPWS), Department of Transport and Department of Rural and Community Development.

Under its Terms of Reference, the remit of the Steering Group was:

- To provide advice to DECC on the scope and overall approach to OREDP II
- To advise on sectoral policies relevant to OREDP II
- To review and provide feedback on the outputs from the Data & Scientific Working Group
- To review and advise on recommendations made from the SEA/AA work
- To provide input on the outcomes of public consultations at various stages of the process

- To take a whole-of-government approach in identifying solutions to issues as they may arise
- To review and provide input on the OREDP II report

### **Data and Scientific Group**

The Data and Scientific Group undertook a data review and provided data relevant to the OREDP II process. It also advised on how to strengthen the data evidence base. The working group also provided expert input into on the data included in the GIS model.

Members of the Data and Scientific Group include:

- The GSI
- The SEAI
- The DHLGH (including NPWS)
- The Marine Institute
- The Department of Transport
- EirGrid

The remit of the Data and Scientific Working Group was:

- To identify and provide relevant data to inform the offshore resource assessment
- To consider gaps in current knowledge/data and prioritise requirements
- To advise on constraints and opportunities from various sectoral perspectives relevant to ORE
- To provide expert input to the constraint model to be developed and which will identify future candidate areas for ORE development
- To engage with the consultants appointed to carry out the SEA/AA to ensure alignment and avoid duplication of work
- To review and provide input on the development of the OREDP II report

### **Advisory Group**

The Advisory Group includes stakeholders from the economic, environmental, and social and academic pillars who share expertise, knowledge, and local perspectives of relevance to the OREDP II plan-making process. DECC invited members of the MSP Advisory Group established as part of the NMPF process to participate in the OREDP II Advisory Group. Environmental organisations and industry representative bodies were also invited to

nominate up to three representatives to participate. Third-level academics and researchers with relevant expert knowledge relevant to the OREDP II were also invited to participate.

The Advisory Group Members include:

- Coastwatch Ireland
- Commissioners of Irish Lights
- County and City Management Association
- IBEC
- Irish Environmental Network
- Irish Maritime Development Office
- Irish Ports Association
- Irish Whale and Dolphin Group
- Killybegs Fishermen's Organisation
- MaREI - University College Cork
- Marine Renewables Industry Association
- National Offshore Wind Association of Ireland
- NUI Galway - Ryan Institute
- Queen's University Belfast
- Sustainable Water Network (SWAN Ireland)
- Irish South and East Fish Producers Organisation
- Irish South and West Fish Producers Organisation
- University College Cork
- University College Dublin
- Wind Energy Ireland

Under its Terms of Reference, the Advisory Group had the following key roles:

- To apply sectoral knowledge and expertise in reviewing the outputs from the Data & Scientific Working Group
- To identify additional relevant datasets to include in the analyses

- To help identify gaps in data and suggest priority actions to fill gaps
- To provide input on the constraints and opportunities for ORE off Ireland's coast, considering other maritime interests and activities
- To provide input on the model development and to review model outputs to ensure a comprehensive approach is adopted
- To review and provide input on the Draft OREDP II as it is developed

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## 15 Appendix B: Technical Resource Energy Potential

To estimate the offshore wind resource potential in the Maritime Area, the following assumptions were considered:

- Area: The areas identified in Section 8.2 where mean annual wind speeds are above 7m per second. While it is assumed that fixed foundation wind will be deployed in areas between the 10m and 60m depth contours, and floating wind technologies from 60m to 1000m depth contours, the same turbine design is assumed for both fixed and floating wind resource estimates.
- Wind Resource: The wind microscale data are from the New European Wind Atlas (NEWA).<sup>19</sup> The annual wind distribution was calculated for a 150m hub height using a Weibull probability distribution function.<sup>20</sup>
- Device: The International Energy Agency (IEA) Wind Technology Collaboration Programme Task 37<sup>21</sup> designed and published<sup>22</sup> a generic 15MW wind turbine power curve that is based on typical commercial offshore wind turbines that were on the market. This reference wind turbine power curve was used in the calculation.
- Energy production: the annual energy production for each turbine is calculated based on the wind resource Weibull distribution function and the turbine power curve.
- Device spacing: A spacing between devices of 7Dx7D where D is the rotor diameter is considered to be optimal within arrays. Such spacing would produce a power density of 5 megawatts per square kilometre (MW/km<sup>2</sup>). However, a lower power density of 3 MW/km<sup>2</sup> was used in this analysis to account for reasonable wake replenishment in large arrays and uncertainty in what the realized density will be due

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<sup>19</sup> <https://map.neweuropeanwindatlas.eu/>. Due to NEWA wind resource data limitation within two areas, Porcupine Bank – west and Goban Spur – south, with a water depth range 200-1000 m, the offshore wind resource was estimated using the average values at the edge of the GIS layer that was created in the model at the border of these two areas.

<sup>20</sup> Interpolated from the 100m and 200m datasets.

<sup>21</sup> <https://iea-wind.org/>

<sup>22</sup> <https://github.com/IEAWindTask37/IEA-15-240-RWT>

to interconnection limits, cable limits, wake impacts including from proximal lease areas, and other site-specific plant design considerations.<sup>23,24</sup>

- Losses: The main losses considered were wake losses, electrical losses, and availability losses. The total losses considered in this analysis is the median value (17.5%). Although wake losses were considered inside each array, with the assumption of 100 turbines in each wind farm, the cumulative wake effect of adjacent windfarms was not fully estimated.

To estimate the offshore wave resource potential in the maritime area, the following assumptions were considered:

- Area: The areas identified in Section 8.2 where wave power is greater than 20 kW/mWC (kilowatt per meter wave crest) and in depths of 10m to 200m.
- Wave resource: 20 year hindcast of significant wave height and wave period data for the area identified was obtained from the Copernicus Marine Service (CMS) 'Atlantic-European North West Shelf- Wave Physics Reanalysis' model.<sup>25</sup> Data for a wave power matrix was found in the literature.<sup>26</sup>
- Device: Hypothetical Wave Energy Converters (WECs) were estimated based on the SELKIE project.<sup>27</sup>
- Energy production: the annual energy production for each individual WEC was calculated based on the wave power matrix function at a given location and the generic WEC power take-off curve.
- Device spacing: theoretical WECs arrays were separated at 10km with an individual WEC spacing of 150m within arrays.

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<sup>23</sup> [2022 Offshore Wind Energy Technical Potential for the Contiguous United States](#)

<sup>24</sup> [2016 Offshore Wind Energy Resource Assessment for the United States](#)

<sup>25</sup> Copernicus Marine Service, "Copernicus Marine Service," 2022. [Online]. Available: <https://marine.copernicus.eu/> [Accessed 11 05 2022].

<sup>26</sup> B. Robertson, C. Hiles, E. Luczko and B. Buckham, "Quantifying wave power and wave energy converter array production potential," *International Journal of Marine Energy*, vol. 14, pp. 143-160, 2016.

<sup>27</sup> <https://www.selkie-project.eu/>

- Losses: the losses considered comprised 5% wake losses, 5% line losses, 75% availability.<sup>28</sup>

To estimate the offshore tidal resource potential in the Maritime Area, the following assumptions were considered:

- Area: The areas identified in Section 8.2 where the peak spring current flow is greater than 1.2m per second and in depths of 20–80m of water.
- Tidal resource: A one year hindcast of current velocity data was obtained from the NEMO (Nucleus for European Modelling of the Ocean) 'Atlantic-European North West Shelf - Ocean Physics Analysis and Forecast' model that is forced by both the UK Met Office North Atlantic Ocean forecast model and by the CMEMS Baltic forecast product and the ECMWF Numerical Weather Prediction model.<sup>29</sup>
- Device: Power curve data, openly available online for the SIMEC Atlantis 1.5MW Tidal Energy Converter (TEC) was used for the tidal energy estimates.<sup>30</sup>
- Device spacing: Tidal device spacing of two times the turbine diameter and at an array spacing of 10km apart was used in the calculations.
- Losses: Conservative spacing estimates were used in lieu of data availability for losses related to tidal energy devices.

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<sup>28</sup> O'Connor, M., Lewis, T., Dalton, G. (2013), 'Operational expenditure costs for wave energy projects and impacts on financial returns', *Renewable Energy*, 50, 1119-1131

<sup>29</sup> <https://www.nemo-ocean.eu/>

<sup>30</sup> SIMEC Atlantis Energy, "Twitter," 14 08 2018. [Online]. Available: <https://twitter.com/simecatlantis?lang=en> . [Accessed 26 10 2021]



## 16 Appendix C: Technical Opportunities Data

THEME	DATASET	PROVENANCE	DATE	DRIVER
<b>Area of Interest</b>	High Water Coastline + Irish Internal Waters + Irish Exclusive Economic Zone	DECC Geoscience Division	2014	This is the initial area of interest (AOI) in Ireland's EEZ within which the development of ORE is possible. The AOI was identified using the outer limits of where ORE (floating wind) is expected to be feasible in the lifetime of the OREDP II.
	OREDPA Resource Area Potential from 10m to 1000m water depth	OREDPA II	2021	
<b>Fixed Wind</b>	Technical Wind Resource: >=7m per second mean annual at 100m above mean sea level 10-60m water depth	OREDPA II	2014	Water depth from 10m to 60m are suitable for fixed bottom wind turbines. Beyond the 60m water depth fixed bottom wind turbines become less technically feasible.

<b>Floating Wind</b>	Technical Wind Resource: >=7m per second mean annual at 100m above mean sea level 60-200m water depth	OREDP II	2014	Floating offshore wind technology is currently feasible within the water depths up to 200m.
<b>Floating Wind</b>	Technical Wind Resource: >= 7m per second mean annual wind speed at 100m above mean sea level 200-1000m water depth	OREDP II	2021	Based on current predictions it is reasonable to assume that floating offshore wind will be a mature technology by 2030 and is likely to reach its peak in terms of turbine technology between 2030 to 2040. Research indicates that certain floating platforms can be deployed in water depths up to 1000m. The 1000m water dept limit for offshore wind aligns with the European Commission, Joint Research Centre (JRC) (2019): ENSPRESO - WIND - ONSHORE and OFFSHORE which supported the European Commission's REPowerEU communication.

<b>Wave</b>	Technical Wave Resource: ≥20KW per metre wave crest 10-100m water depth	OREDP II (OREDP I plus EirWind infills)	2021	Main resource identified where wave power is greater than 20 kW/mWC.  Wave energy was split into shallower (10-100m) and deeper water resources (100-200m). Initially wave development is likely to occur in shallow areas between 10m to 100m in the shorter term, with deeper areas being developed in the longer term.
	Technical Wave Resource: ≥20KW per metre wave crest 100-200m water depth	OREDP II (OREDP I plus EirWind infills)	2021	
<b>Tidal</b>	Technical Tidal Stream Resource:  >1.2m per second peak spring flow current  20-80m water depth	OREDP I	2014	Depth averaged peak spring tidal currents in Irish waters are up to 2m/s.  Main tidal stream resource identified where peak spring current flow is >1.2m/s.  Main tidal stream resource occurs in water depth from 20-80m.

## 17 Appendix D: Exclusions Data

THEME	DATASET		PROVENANCE	DATE	BUFFER	DRIVER
<b>Maritime outer boundary - Area of Interest</b>	Outer boundary of fixed/floating wind energy data from the OREDP I		Geosciences Division, DECC	2021	N/A	This exclusion sets the outer boundary of the OREDP II Area of Interest at the 1000m water depth contour, which is the current theoretical maximum limit at which floating offshore wind turbine can operate according to industry and academic research.
<b>Land boundary</b>	Ireland Discovery Series 1:50K		Ordnance Survey Ireland	2021	N/A	Ireland's landmass is excluded from the OREDP II model, which looks only at inshore and offshore maritime areas.
<b>Maritime Traffic</b>	IMO Traffic Separation Scheme Exclusion Zone (TSSZNE)		United Kingdom Hydrographic Office (UKHO)	2021	5 nautical miles (NM)	The NMPF recognises the importance of navigation channels to the national economy. Traffic Separation Schemes are regulated maritime areas, such as around busy ports, which ensure ships sail in the same direction and avoid collision.  These exclusions follow regulations set by the International Convention for the Safety of Life at
	IMO Traffic Separation Scheme Lane Part (TSSLPT)		United Kingdom Hydrographic Office (UKHO)	2021	5NM on the approach and 2NM on the parallel	

	IMO Traffic Separation Scheme Roundabout		United Kingdom Hydrographic Office (UKHO)	2021	N/A	Sea (SOLAS) and the International Maritime Organization (IMO) and the buffers are based on UK Marine Guidance Notice MGN 654.
	Near Shore Anchorage Area		United Kingdom Hydrographic Office (UKHO)	2021	2NM	The buffer is based on the need to allow vessels space to approach the anchorage area and to turn.
	High Density Shipping Routes		EMODnet Human Activities	2020	1NM	Exclusions have been applied to areas with heavy vessel traffic density greater than 10 hours on the basis that large ships can require up to 1NM to manoeuvre in these areas. An additional buffer from 1-2NM has been applied to this dataset in the economic model.
<b>Suspended Wells</b>	Suspended Exploration Wells (13 in number in the Celtic Sea)		DECC Geoscience Division	2022	500m	A suspended oil or gas wells is hard infrastructure that is generally considered incompatible with other development in the same area. Sites subject to a Protection of Installation Order under the Continental Shelf Act 1968 which establish safety zones around offshore installations and generally prohibit ships from entering the zone. The buffer is

						based on Marine Notices issued by the Department of Transport associated with suspended wells post-2000.
<b>Renewable Energy Test Site</b>	Galway Bay 1/4 Scale Test Site boundary & Atlantic Marine Energy Test Site boundary		SEAI / Irelands Marine Atlas	2010	N/A	Existing licensed test and demonstration facilities for marine renewable energy are generally considered incompatible with new ORE development within the same maritime area. No buffer has been applied as these are defined areas.
<b>Cables and Pipelines</b>	Gas Pipeline		EMODnet Pipelines	2017	2 NM (1NM either side of the pipeline)	The NMPF objectives for energy transmission include protect the two existing natural gas interconnector pipelines that are vital to ensuring the security of Ireland's energy supply. The buffer is based on NMPF Transmission Policy 5 which provides that proposals for construction or operation activities within one nautical mile of either of the two existing natural gas interconnector pipelines shall be avoided.
	Telecoms Cables		KIS-ORCA Undersea Cable	2021	750m	The NMPF recognises the importance of telecommunications cables, and its objectives include protecting existing telecommunications

						cables. The buffer is based on the European Subsea Cables Association (ESCA) Guideline No.6 on 'The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters' which recommends a working zone (500 metres) and a hazard area (250 metres).
	Electricity Cables		KIS-ORCA Undersea Cable	2021	750m	This exclusion for cables is based on the European Subsea Cables Association (ESCA) Guideline No.6 on 'The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters' which recommends a working zone (500 metres) and a hazard area (250 metres).
<b>Interconnectors</b>	EirGrid Electrical Interconnectors		ESB Networks (EirGrid)	2021	Minimum 750m buffer for all electricity interconnectors	Electricity interconnectors are recognised in the NMPF as critical national infrastructure. It also recognises the importance of electricity transmission to security of supply and the transition to a low carbon economy.
	East-West Interconnector (Ireland-UK)		KIS-ORCA Undersea Cable	2021		

	Greenlink Interconnector (Ireland-UK)		Greenlink Interconnector Limited	2022		The buffer is based on the European Subsea Cables Association (ESCA) Guideline No.6 on 'The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters' which recommends a working zone (500 metres) and a hazard area (250 metres).
	Celtic Interconnector (Ireland-France)		EirGrid	2022		
<b>Fixed Aids to Navigation</b>	Lighthouses		Commissioners of Irish Lights	2021	500m	The NMPF recognises that aids to navigation act as a critical infrastructure for safe navigation. Fixed navigation aids as hard immovable infrastructure is generally considered incompatible with ORE development within the same maritime area. This exclusion follows the International Convention for the Safety of Life at Sea (SOLAS).
<b>Dumping at Sea</b>	EPA Dumping at Sea Chemicals Monitoring (Area)		EPA / Dumping At Sea Acts (1996, 2009)	2016-2019	500m	The NMPF recognises that all maritime activity should be undertaken in such a manner as to reduce the likelihood of marine litter generation. While changes in legislation and international conventions have substantially reduced the amount of dumping and the nature of it less hazardous, active dump sites could constitute a



						hazard for marine construction, installation and maintenance activities. The possibility of encountering or redistributing disposal site material can have negative effects on marine biodiversity, fisheries and aquaculture and should be avoided.
<b>Aquaculture sites</b>	Foreshore licensed aquaculture sites		Department of Agriculture, Food and the Marine (DAFM)	2021	N/A	Aquaculture is an integral part of Ireland's coastal economy, primarily comprising finfish, shellfish and seaweed species production. An aquaculture licence is required for these activities. Locations licensed for aquaculture are generally considered incompatible with ORE development within the same maritime area.

## 18 Appendix E: Environmental Factors

THEME	DATASET	PROVENANCE	DATE
Special Areas of Conservation	Coastal Lagoons	NPWS - Habitats Conservation Objectives	2021
	Estuaries	NPWS - Habitats Conservation Objectives	2021
	Large Shallow Inlet Bays	NPWS - Habitats Conservation Objectives	2021
	Reefs	NPWS - Habitats Conservation Objectives	2021
	Sand Banks	NPWS - Habitats Conservation Objectives	2021
	Sand Dunes	NPWS - Habitats Conservation Objectives	2021
	SAC Salt Marsh	NPWS - Habitats Conservation Objectives	2021
	Tidal Mudflats Sandflats	NPWS - Habitats Conservation Objectives	2021
	Sea Cliffs	NPWS - Habitats Conservation Objectives	2021
	Marine Community Types	NPWS - Habitats Conservation Objectives	2021
	Sea Caves	NPWS - Habitats Conservation Objectives	2021
	SAC Dolphins	NPWS - Species Conservation Objectives	2021
	Grey Seal	NPWS - Species Conservation Objectives	2021
	Harbour Porpoise	NPWS - Species Conservation Objectives	2021

	Harbour Seal	NPWS - Species Conservation Objectives	2021
	Otter	NPWS - Species Conservation Objectives	2021
	Offshore Special Area Conservation	NPWS	2018
<b>Special Protection Areas</b>	Offshore Special Protected Area	NPWS	2021
<b>Natural Heritage Areas</b>	Natural Heritage Area	NPWS	2019
	Proposed National Heritage Area	NPWS	2015
<b>Important Bird Areas</b>	Important Bird Areas	BirdLife DataZone	2018
<b>RAMSAR</b>	Wetlands	NPWS	1985-2021
<b>OSPAR</b>	Declining Threatened habitats	OSPAR	2015
<b>ObSERVE High Density Areas</b>	ObSERVE Aerial Surveys for Seabirds and Cetaceans in the Irish Atlantic Margin	DECC	2015-2017
<b>Herring Spawning Grounds</b>	Herring Spawning Ground	Marine Institute	2014

## 19 Appendix F: Economic Activities Data

THEME	DATASET	PROVENANCE	DATE
<b>Inshore Fishing</b>	Bottom Trawl Inshore Fishing Activity (Natura 2000 assessment)	Irelands Marine Atlas (Marine Institute)	2014
	Periwinkle Harvesting Inshore Fishing Activities (Marine Institute)	Irelands Marine Atlas (Marine Institute)	2014
	Dredge Fishing Activity (Natura 2000 assessment)	Irelands Marine Atlas (Marine Institute)	2014
	Line Fishing Activity (Natura 2000 assessment)	Irelands Marine Atlas (Marine Institute)	2014
	Mid-water Trawl Fishing Activity (Natura 2000 assessment)	Irelands Marine Atlas (Marine Institute)	2014
	Pot Fishing Activity (Natura 2000 assessment)	Irelands Marine Atlas (Marine Institute)	2014
	Inshore Net Fishing Activity (Natura 2000 assessment)	Irelands Marine Atlas (Marine Institute)	2014
<b>AIS Shipping Density Route</b>	≤1275 hours	EMODnet Human Activities: EMSA Route	2020

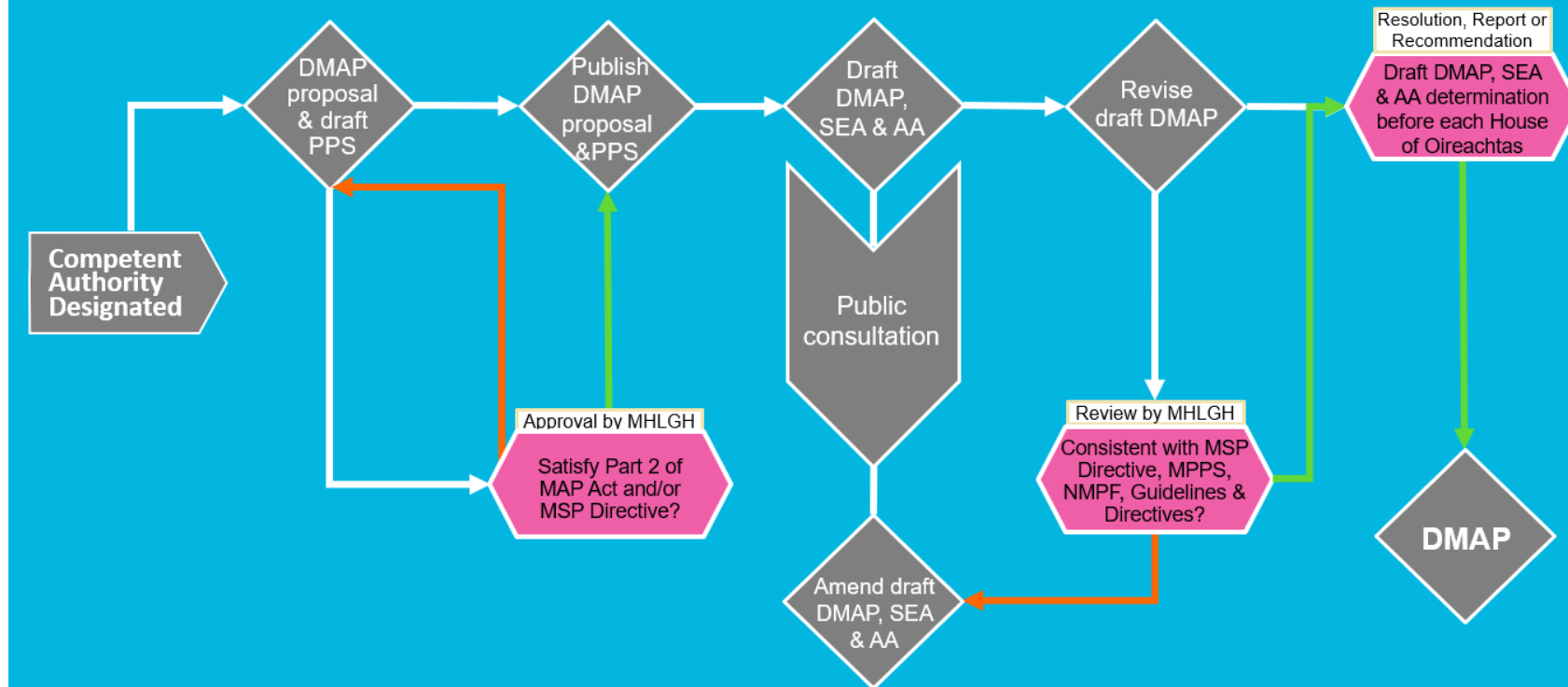
		Density	
	≤ 2874 hours	EMODnet Human Activities: EMSA Route Density	2020
	≤ 7408 hours	EMODnet Human Activities: EMSA Route Density	2020
	≤ 17516 hours	EMODnet Human Activities: EMSA Route Density	2020
<b>Minerals</b>	Oil & gas production installations	EMODnet Geology WP7 Minerals (Hydrocarbons)	2021
	Petroleum Authorisations PAD Current Authorisations (Licensing & Exploration)	DECC	2021
	Marine Aggregates	EMODnet Geology submission	2019
<b>Fishing Intensity</b>	ICES Fishing Intensity	International Council Exploration Seas (ICES)	2014-2018

## 20 Appendix G: Heritage Data

THEME	DATASET	PROVENANCE	DATE
<b>UNESCO</b>	UNESCO World Heritage Sites	UNESCO	2022
	UNESCO Dublin Bay Biosphere (Core Area)	Dublin Bay Biosphere	1981-2021
	UNESCO Dublin Bay Biosphere (Marine Transition Zone)	Dublin Bay Biosphere	1981-2021
	UNESCO Dublin Bay Biosphere (Marine Buffer Zone)	Dublin Bay Biosphere	1981-2021

## 21 Appendix H: Overview of Statutory DMAP Process

# Designated Maritime Area Plan Process



## 22 Appendix I: Outline for OREDP II Adaptive Management Plan

Outline for an AMP overseen by the OREDP II governance groups, based on the UN conceptual guidelines for the application of MSP and Integrated Coastal Zone Management.<sup>31</sup>

### 1. Set parameters for OREDP II oversight

- Identify key performance indicators.
- Set timeframes for activities, objectives and responsibilities.
- Advise on monitoring approaches, appropriate implementation performance indicators and review intervals.
- Agree triggering criteria for review.
- Agree on the scope of the adaptive management plan.
- Ensure future iterations of the plan address climate change mitigation and adaptation appropriately.
- Undertake environmental and socio-economic analysis to mitigate potential negative impacts of the plan.
- Link in with international, regional, national planning, regulatory, environmental bodies and monitoring frameworks.

### 2. Oversee plan implementation

- Implement ongoing monitoring and data collection processes using traditional environmental management approaches, social approaches and sectoral approaches with data/information stored in the data/information system.
- Oversee OREDP II Data Action Plan and Research Integration Schedule, including and coordinating research initiatives.
- Outline funding and resource requirements including for Government departments and State bodies for OREDP II implementation.

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<sup>31</sup> UN Environment (2018). Conceptual guidelines for the application of Marine Spatial Planning and Integrated Coastal Zone Management approaches to support the achievement of Sustainable Development Goal Targets 14.1 and 14.2. UN Regional Seas Reports and Studies No. 207. 58pp <https://wedocs.unep.org/handle/20.500.11822/26440>



### **3. Develop monitoring and evaluation framework**

- Analyse data collected during implementation after a designated interval, or when triggered by other factors (i.e., changes in government, policy, technology, natural disaster, large-scale changes in ecosystem).
- Review progress against the established implementation performance indicators.

### **4. Review and propose plan adaptations**

- Review progress against objectives.
- Identify any barriers to effective planning and implementation, and potential solutions.
- Identify lessons learned that can support the design of other planning processes, such as Marine Protected Areas.
- Consider impact of climate change and related adaptations, for example to transport infrastructure in coastal locations, such as ports and associated on-shore and off-shore access networks
- Propose plan adaptations.
- Propose new research initiatives.
- Consider modifications to enhance the effectiveness of the review process in the interval before the next review.

## 23 Appendix J: Data Action Plan and Research Integration Schedule

Below is a non-exhaustive list of examples of data monitoring and research programmes and initiatives that have been identified as relevant to the OREDP II adaptive management plan. It is proposed that the Implementation and/or Data Subgroup would further refine this information.

Body responsible	Datasets	Process	Timeframe
DHLGH - Marine Planning	Environmental	MPA designations	2023-24 ++
DHLGH – Marine Planning	Environmental	Marine Strategy Framework Directive reporting, including forthcoming programme of measures	TBD
DHLGH – NPWS	Environmental	SAC, SPA designations	2023-24 ++
Various  DHLGH – Marine Planning  Department of Transport	Fishing, shipping, economic, environmental	NMPF monitoring approach  Subnational marine spatial plans	NMPF has a formal review of 5 years, although early reviews are expected.
DECC	National - environment, economic, technical opportunity, constraints	OREDPA II SEA/AA	5-year update cycles

Various  DECC  Local authorities	Regional and local - environment, economic, technical opportunity, constraints	DMAPs SEA/AA	Rolling
DECC ++	Various	DECC Research and Innovation Strategy	Following consultation, a Draft Research and Innovation Strategy will be completed in the first half of 2023.
DECC – GSI	Environmental	ObSERVE Phase 2	2021 – 2025
DECC – GSI	Environmental	INFOMAR	2006 – 2026
SEAI	Various	SEAI National Energy Research Funding Programme	Annual funding calls
SEAI		Marine Research Fundlers' Funders	
Marine Institute and Inland Fisheries Ireland ++	Various - Protected areas and species in regional seas of Ireland, N. Ireland, West Scotland	COMPASS project	Funded through EU INTERREG VA Programme (2014- 2022)

IFI	Protected species;  Recreational sea angling species & activity	EU Habitats Directive monitoring; WFD monitoring, Varied fish species monitoring programmes	Rolling
MARA + Project developers	Various	ORE project-level assessments – data capture for licenced activities under MAP Act	Rolling
Marine Institute	Various	National Marine Research Programme and Database	Annual funding calls
MI		National Marine Research & Innovation Strategy	
Environmental Protection Agency (EPA)	Environmental	EPA Research 2030	Annual funding calls
Department of Further and Higher Education, Research, Innovation and Science	Various	Impact 2030 Ireland's Research and Innovation Strategy	